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REMEDIAL INVESTIGATION WORK PLAN

For

2752-2768 Webster Avenue
Block 3273; Lot 100 (Former Lots 91 and 100)
Bronx, Bronx County, NY

Prepared for:

South Bronx Development I LLC

SESI Project No:
13581A

Date:
October 2025 /
Revised December 2025

CERTIFICATIONS

I, Justin Protasiewicz, certify that I am a professional engineer, and meet the definition of qualified environmental professional as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10)

102352	12/23/2025	
NYS Professional Engineer #	Date	Signature

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

Table of Contents

LIST OF ACRONYMS ..... **i**
1.0 INTRODUCTION **1**
2.0 PROJECT BACKGROUND **2**
2.1 SITE DESCRIPTION 2
2.2 SITE HISTORY 3
2.3 PREVIOUS ENVIRONMENTAL INVESTIGATION 3
2.3.1 PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA, JANUARY 2021) 4
2.3.2 REPORT OF GEOTECHNICAL EXPLORATION (FEBRUARY 2022) 4
2.3.3 DRAFT PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT (OCTOBER 2024) 5
2.3.4 PHASE II ENVIRONMENTAL SITE ASSESSMENT (SEPTEMBER 2024) 7
2.3.5 PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA, APRIL 2025) 11
2.4 GEOLOGIC SETTING 13
2.5 HYDROGEOLOGIC SETTING 14
2.6 SUBSURFACE FEATURES 14
2.7 SUMMARY OF ENVIRONMENTAL ASSESSMENT 14
3.0 FIELD REMEDIAL INVESTIGATION **16**
3.1 SOIL REMEDIAL INVESTIGATION 16
3.2 GROUNDWATER REMEDIAL INVESTIGATION 20
3.3 SOIL VAPOR INVESTIGATION 23
3.4 DECONTAMINATION AND IDW 25
3.5 WASTE CHARACTERIZATION 26
3.6 SURVEY 26
3.7 GREEN REMEDIATION STRATEGIES (GRS) 26
4.0 RECEPTOR AND VULNERABILITY ASSESSMENTS **27**
4.1 HUMAN HEALTH EXPOSURE ASSESSMENT 27
4.2 FISH AND WILDLIFE IMPACT ANALYSIS 27
4.3 CLIMATE CHANGE SCREENING OR VULNERABILITY ASSESSMENT 28
5.0 DUSR **29**
6.0 REPORTING **30**
6.1 DAILY REPORTS 30
6.2 REMEDIAL INVESTIGATION REPORT 30
7.0 GOVERNING DOCUMENTS **32**

7.1 QUALITY ASSURANCE/QUALITY CONTROL 32
7.2 HEALTH AND SAFETY PLAN 32
7.3 COMMUNITY AIR MONITORING 32
7.4 CITIZEN PARTICIPATION 32
8.0 REMEDIAL INVESTIGATION AND ACTION SCHEDULE 33

TABLES

TABLE 2.1 SUMMARY OF SURROUNDING PROPERTIES (EMBEDDED)
TABLE 2.2 SUMMARY OF SOIL ANALYTICAL RESULTS
TABLE 2.3 SUMMARY OF SOIL EXCEEDANCES (EMBEDDED)
TABLE 2.4 SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
TABLE 2.5 SUMMARY OF GROUNDWATER EXCEEDANCES (EMBEDDED)
TABLE 2.6 SUMMARY OF SOIL VAPOR ANALYTICAL RESULTS
TABLE 3.1 SUMMARY OF PROPOSED SOIL BORINGS AND SAMPLING (EMBEDDED)
TABLE 3.2 SOIL ANALYSES SUMMARY (EMBEDDED)
TABLE 3.3 SUMMARY OF PROPOSED GROUNDWATER MONITORING WELLS (EMBEDDED)
TABLE 3.4 SUMMARY OF PROPOSED SOIL VAPOR SAMPLING (EMBEDDED)
TABLE 8.1 PROPOSED REMEDIAL INVESTIGATION SCHEDULE (EMBEDDED)

FIGURES

FIGURE 1.1 SITE LOCATION MAP
FIGURE 2.1 SITE PLAN
FIGURE 2.2 REC/BER LOCATION PLAN
FIGURE 3.1 LOCATION OF PROPOSED REMEDIAL INVESTIGATION SOIL BORINGS
FIGURE 3.2 LOCATION OF PROPOSED REMEDIAL INVESTIGATION GROUNDWATER MONITORING WELLS

FIGURE 3.3 LOCATION OF PROPOSED REMEDIAL INVESTIGATION SOIL VAPOR POINTS

APPENDICES

APPENDIX A PREVIOUS ENVIRONMENTAL REPORTS (ELECTRONIC)

APPENDIX B QUALITY ASSURANCE PROJECT PLAN (QAPP)

APPENDIX C EMERGING CONTAMINANT SAMPLING PLAN

APPENDIX D TYPICAL BORING/WELL CONSTRUCTION LOG

APPENDIX E HEALTH AND SAFETY PLAN (HASP)

APPENDIX F COMMUNITY AIR MONITORING PLAN (CAMP)

APPENDIX G CITIZEN PARTICIPATION PLAN (CPP)

LIST OF ACRONYMS

Acronym	Definition
AWQS	Ambient Water Quality Standards
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BER	Business Environmental Risks
CAMP	Community Air Monitoring Plan
cis-1,2-DCE	cis-1,2-Dichloroethene
COC	Contaminant of Concern
CSCO	Commercial Soil Cleanup Objectives
DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Accreditation Program
ESA	Environmental Site Assessment
ft bgs	feet below ground surface
FWIA	Fish and Wildlife Impact Analysis
GRS	Green Remediation Strategies
HASP	Health and Safety Plan
ISCO	Industrial Soil Cleanup Objective
NYCBC	New York City Building Code
NYCDEP	New York City Department of Environmental Protection
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PEJA	Potential Environmental Justice Area
PFAS	Per- and polyfluoroalkyl substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PGSCO	Protection of Groundwater Soil Cleanup Objectives
PHC	Petroleum Hydrocarbon
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
REC	Recognized Environmental Conditions
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
RRSCO	Restricted Residential Soil Cleanup Objectives
RSCO	Residential Soil Cleanup Objectives
SESI	SESI Consulting Engineers, Inc.
SCG	Standards Criteria and Guidance
SVOC	Semi-volatile Organic Compound
TIC	Tentatively Identified Compound

Acronym	Definition
TCE	Trichloroethene
TCL	Target Compound List
VOC	Volatile Organic Compound
USEPA	United States Environmental Protection Agency
USCO	Unrestricted Use Soil Cleanup Objectives

1.0 INTRODUCTION

South Bronx Development I LLC has submitted a Brownfield Cleanup Program (BCP) application as the Volunteer for the property located at 2752-2768 Webster Avenue, Block 3273, Lot 100 (former Lots 91 and 100) in Bronx, New York ("Site") and has submitted this Remedial Investigation Work Plan with the BCP application. The two former lots that made up the Site were recently merged for the project. A Site Location Map is presented as **Figure 1.1.**

This document comprises a draft Remedial Investigation Work Plan (RIWP) to be conducted at the Site after New York State Department of Environmental Conservation (NYSDEC) approval, as part of the Site's planned remedial investigation. The RIWP includes a description of the Site, summary of the Site history and previous environmental investigations, a description of the Site's physical, geologic, hydrogeologic setting and subsurface features and a plan of action for further investigation of the areas of concern identified previously.

This RIWP has been prepared to establish a plan to achieve the following objectives:

- To complete the horizontal and vertical delineation of the nature and extent of contamination on the Site,
- To identify any potential source areas of contamination,
- To determine the remedial action needed to protect human health and the environment, and
- To collect sufficient data to advance the remediation of the Site.

This RIWP has been developed in general accordance with the Department's Remediation Technical Guidance for Site Investigation and Remediation (DER-10).

2.0 PROJECT BACKGROUND

2.1 SITE DESCRIPTION

The Site consists of an approximately 1.4-acre area parcel and is located at 2752-2768 Webster Avenue in the Bronx, Bronx County, New York (Site). The Site is identified as Block 3273; Lot 100 (former Lots 91 and 100). The Site is improved with one (1) approximately 9,350-square feet (sf) one-to-two-story warehouse and one (1) approximately 2,330-sf two-story former automotive repair garage building. The buildings were constructed in 1906. The Site is currently vacant and was recently acquired by the Requestor South Bronx Development I LLC after their members performed environmental due diligence with respect to the Site as further described below.

The Site was initially developed prior to 1896. Railroad tracks have been present at the Site since at least 1896. Historical Site operations included a sewer pipe yard in 1900, a freight house from 1900 to 1950, an engine room in 1945, cold storage and substation from at least 1978 to 2007, and automotive repair from at least 1992 to 2010. SESI identified that the most recent operations at the Subject Property included a substation, cold storage facility, alcohol/liquor distributor, restaurants, and automotive repair garages. **Figure 2.1** presents a Site Plan.

According to the New York City Searchable Property Environmental E-Database (SPEED), the Subject Property has an E-designation. The E-designation process ensures that sampling and remediation take place at the Subject Property to avoid any significant impacts related to hazardous materials. The E-designation process requires that the owner of the Subject Property conduct testing and sampling protocol, and remediation where appropriate, to the satisfaction of the New York City Department of Environmental Protection (NYCDEP) before the issuance of a building permit by the Department of Buildings pursuant to the provisions of Section 11-15 of the Zoning Resolution (Environmental Requirements). The E-designation process also includes a mandatory construction-related health and safety plan which must be approved by NYCDEP.

Additionally, according to the NYC SPEED, the Subject Property is located within a Potential Environmental Justice Area (PEJA). Redevelopment sites within PEJAs are subject to increased regulatory oversight and community outreach requirements during redevelopment.

The Site is located in a mixed-use commercial and residential neighborhood and is bounded by Webster Avenue followed by mid-rise mixed-use commercial and residential buildings to the

north, the Metro-North railroad and Fordham University and Preparatory School to the south, a warehouse to the east, and a laydown yard and parking lot to the west. **Figure 2.1** presents a Site Plan.

Adjacent properties are summarized on **Table 2.1** below:

Table 2.1: Summary of Surrounding Properties

Direction	**Adjacent Property**
North	Mixed-use commercial/residential buildings
South	Metro-North railroad and Fordham University and Preparatory School
East	Warehouse
West	Laydown yard and parking lot

The proposed Site development is anticipated to consist of the redevelopment of the Site with a 100% affordable mixed-use commercial and residential apartment building. Formal Site Plans are anticipated to be developed during the design phase of the project.

2.2 SITE HISTORY

The Site has historically been occupied by a sewer pipe yard (circa 1900), a freight house (circa 1900 to 1950), an engine room (circa 1945), cold storage and substation (circa 1978 to 2007), and automotive repair (circa 1992 to 2010). SESI identified that the most recent operations at the Subject Property included a substation, cold storage facility, alcohol/liquor distributor, restaurants, and automotive repair garages.

2.3 PREVIOUS ENVIRONMENTAL INVESTIGATION

The following environmental reports are attached in **Appendix A** and summarized below:

- "Phase I Environmental Site Assessment, 2768 Webster Ave, Bronx, NY 10458", prepared by Environmental Affiliates, Inc. (EAI), dated January 20, 2021.

- "Report of Geotechnical Exploration, 2740 Webster Avenue, Borough of the Bronx, New York," prepared by GTA Engineering Services of New York, P.C. (GTA), dated February 2022.
- "Preliminary Geotechnical Investigation Report, 2740-2768 Webster Avenue Residential Development, 2740-2768 Webster Avenue, Bronx, NY," prepared by SESI Consulting Engineers (SESI), dated October 11, 2024 (draft document).
- "Phase II Environmental Site Assessment, Proposed Affordable Housing Mixed-Use Development, 2752-2768 Webster Avenue, Bronx, NY," prepared by SESI Consulting Engineers (SESI), dated September 2024.
- "Phase I Environmental Site Assessment, Proposed Affordable Housing Mixed-Use Development, 2752-2768 Webster Avenue, Bronx, NY," prepared by SESI Consulting Engineers (SESI), dated April 2025.

2.3.1 PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA, JANUARY 2021)

The Phase I ESA prepared by EAI identified the following Recognized Environmental Conditions (RECs) for the Site:

The following RECs have been identified:

- The Subject Property is identified as a substation on the 1978, 1998, 2001, 2002, 2003, 2004, 2005, 2006, and 2007 Sanborn maps. Prior usage as a substation poses the material risk that polychlorinated biphenyl (PCB)-containing equipment were utilized at the Subject Property and may have discharged to the subsurface.

- According to EAI's review of the city directories available for the subject property, the subject building housed an auto repair facility during 1993-2009. EAI inspected the former auto repair area and observed inactive hydraulic equipment; however, the floor was mostly obstructed with water, cooking grease (leaking from a grease trap utilized by a restaurant tenant of the Subject Property), and debris.

2.3.2 REPORT OF GEOTECHNICAL EXPLORATION (FEBRUARY 2022)

A Geotechnical Investigation consisting of the advancement of twelve (12) borings to depths between 27 and 100 feet below ground surface (bgs) was performed by GTA Engineering

Services of New York, P.C. between December 7th and 16th, 2022, at the Site. The subsurface conditions encountered in these borings consisted of fill overlaying glacial soils underlain by residual soils and soft rock. The surface material and fill generally were observed to be between 6 and 13 feet thick, followed by glacial deposits, which extended up to 25 and 55 feet below grade. The residual soil and soft rock were encountered below the glacial material down to the boring termination depths. In GTA's investigation, groundwater was encountered at approximately 20 to 24 feet bgs.

Gradation Testing was performed on six (6) samples, and the results can be reviewed in GTA's Geotechnical Investigation Report presented in **Appendix A**. In GTA's opinion, the formerly proposed development of the Site is feasible provided that the geotechnical recommendations included in their report are followed, and that the standard level of care is maintained during construction. However, GTA's investigation was performed to support a previous development design.

2.3.3 DRAFT PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT (OCTOBER 2024)

The Preliminary Geotechnical Investigation Report was prepared by SESI in conjunction with the Phase II Environmental Site Assessment investigation. SESI's geotechnical investigation consisted of a review of the investigation performed by GTA and the existing soils and geological data, and a field investigation consisting of drilling eight (8) geotechnical borings that extended below the fill layer at the Site (in addition to the environmental borings described in Section 2.3.5 below) and installation of two (2) temporary groundwater wells. The field investigation was performed between June 10, 2024, and June 14, 2024. Soil samples suitable for identification purposes were extracted from the borings at near-continuous intervals in accordance with the Standard Penetration Test (ASTM D1586-11).

SESI investigated and interpreted the Site subsurface conditions and developed the following preliminary foundation design recommendations:

- Additional subsurface investigation is required to satisfy the New York City Building Code (NYCBC) minimum requirement for subsurface investigation.

- Once foundation layout and structural loading are determined, a settlement analysis should be performed to calculate individual column footing and differential settlements to

confirm they will be within tolerable limits. If a mat foundation is utilized, an iterative settlement and bearing pressure analysis should be performed in collaboration with the Project Structural Engineer.

- Once pile loading requirements, layouts, and details are finalized, group uplift and lateral capacity analyses should be performed to finalize pile length and reinforcement requirements.

- Site-specific temporary excavation support design drawings should be prepared and submitted to the NYCDOB and Metro North Railroad for approval and permitting purposes.

- Technical specifications should be prepared for the geotechnical aspects of the proposed construction.

- An adjacent structure documentation and monitoring plan should be prepared and submitted to Metro North Railroad for their review and approvals.

- Pre-construction existing conditions documentation of the neighboring/bordering structures should be performed prior to commencing excavation and foundation construction activities at the Site. A similar post-construction conditions documentation should be performed if required by Metro North Railroad.

- Special inspection of deep foundations and shallow foundation subgrade preparation and backfilling should be performed per NYCBC requirements. In addition, quality assurance observation during tie-down anchor installation and testing work (if applicable) should be performed.

- Neighboring structures should be monitored during excavation, support of excavation system installation, dewatering (if applicable), and foundation construction activities using seismographs, crack-monitoring gauges, and elevation and lateral position control points. Results of monitoring should be summarized in reports periodically submitted to Ownership.

2.3.4 PHASE II ENVIRONMENTAL SITE ASSESSMENT (SEPTEMBER 2024)

In June 2024, SESI performed Target Compound List plus 30 tentatively identified compounds / Target Analyte List (TCL+30/TAL) sampling of soil and groundwater, and VOC sampling of soil vapor at the Site to partially satisfy the requirements of potentially entering the BCP. The June 2024 investigation activities completed by SESI consisted of geophysical surveys and the advancement of twenty-eight (28) soil borings, two (2) temporary wellpoints, and three (3) soil vapor samples at the Site. Elevated photoionization detector (PID) readings up to 9.7 parts per million (ppm) were observed within borings B-1 and B-2 advanced in the vicinity of the former engine room, and elevated PID readings up to 68 ppm accompanied by petroleum odors were observed within an oily tar-like substance within borings B-12, B-15, and B-25 advanced in the vicinity of the former substation. Based on the concentrations of petroleum-related compounds within the oily tar-like substances, it is likely that this material is coal tar. Additionally, an unknown odor accompanied by an elevated PID reading (6.3 ppm) was observed within boring B-14 advanced in the vicinity of the former substation. SESI investigations confirmed the presence of VOC, SVOC, metal, pesticide, and PFAS contamination in soil/historic fill, and phenol, metal, and PFAS contamination in groundwater at the Site. Additionally, elevated VOC concentrations in soil vapor will likely require mitigation following redevelopment.

Contaminant concentrations exceeding USCOs are present Site-wide. RSCO, RRSCO, CSCO, and ISCO exceedances are concentrated in the central portion of the Site, specifically within the location of the former substation. The depth of contamination exceeding RSCOs is generally in the top 4.5 feet of on-Site soils. Soil samples B-1(11-11.5) and B-2(11.5-12) collected approximately eleven (11) fbgs from the eastern portion of the Site identified that contaminant concentrations in soil in this area do not exceed RSCOs.

Groundwater samples were collected from two (2) temporary wellpoints located in the central and eastern portions of the Site. The SVOC Phenol was detected at a concentration exceeding its NYSDEC TOGS AWQS in one groundwater sample and select metals and PFAS were detected at concentrations exceeding NYSDEC TOGS AWQS in samples collected from both temporary wellpoints. The analytical results are detailed further below:

<u>Soil</u>

The complete soil analytical results are presented as **Table 2.2**. A summary table of the analytical results exceedances compared to NYSDEC USCOs, RSCOs, RRSCOs, CSCOs, and ISCOs is presented in **Table 2.3** below.

Table 2.3 Summary of Soil Exceedances

					SAMPLE ID:	B-1 (11-11.5)		B-2 (11.5-12)		B-4 (2-2.5)		B-6 (4.5-5)		B-8 (4-4.5)	
					COLLECTION DATE:	6/10/2024		6/10/2024		6/10/2024		6/10/2024		6/10/2024	
	USCO	RSCO	RRSCO	CSCO	ISCO	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
ORGANOCHLORINE PESTICIDES (mg/kg)															
4,4'-DDE	0.0033	1.8	8.9	62	120	ND		ND		ND		**0.00361**		0.000664	J
4,4'-DDT	0.0033	1.7	7.9	47	94	0.00294		ND		ND		**0.00631**		ND	
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) (mg/kg)															
Perfluorooctanesulfonic Acid (PFOS)	0.00088	0.0088	0.044	0.440	0.440	ND		ND		0.000662		0.00024		**0.00122**	
Perfluorooctanoic Acid (PFOA)	0.00066	0.0066	0.033	0.500	0.600	ND		0.000082	J	**0.00095**		0.000243		0.000297	
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs) (mg/kg)															
3-Methylphenol/4-Methylphenol	0.33	34	100	500	1000	ND		ND		ND		ND		ND	
Benzo(a)anthracene	1	1	1	5.6	11	0.72		ND		0.62		0.84		0.37	
Benzo(a)pyrene	1	1	1	1	1.1	0.43		ND		0.5		**1.2**		0.45	
Benzo(b)fluoranthene	1	1	1	5.6	11	0.78		ND		0.59		**1.7**		0.67	
Benzo(k)fluoranthene	0.8	1	3.9	56	110	0.18		ND		0.18		0.42		0.16	
Chrysene	1	1	3.9	56	110	0.77		ND		0.63		0.94		0.41	
Dibenzo(a,h)anthracene	0.33	0.33	0.33	0.56	1.1	0.058	J	ND		0.092	J	0.15		0.065	J
Dibenzofuran	7	14	59	350	1000	1.4		ND		0.056	J	0.066	J	0.028	J
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5	5.6	11	0.21		ND		0.38		**0.64**		0.25	
Naphthalene	12	100	100	500	1000	2		ND		0.042	J	0.08	J	0.036	J
TOTAL METALS (mg/kg)															
Arsenic, Total	13	16	16	16	16	2.49		3.85		**16**		9.78		4.18	
Barium, Total	350	350	400	400	10000	64		79.4		86.4		82.8		64.6	
Copper, Total	50	270	270	270	10000	6.92		42.1		**155**		**63.9**		23.4	
Lead, Total	63	400	400	1000	3900	6.83		33.9		**345**		**634**		58	
Mercury, Total	0.18	0.81	0.81	2.8	5.7	0.059	J	**0.424**		**1.22**		**0.261**		0.07	J
Zinc, Total	109	2200	10000	10000	10000	29.4		49.4		**275**		**332**		51.8	
VOLATILE ORGANIC COMPOUNDS (VOCs) (mg/kg)															
1,2,4-Trimethylbenzene	3.6	47	52	190	380	0.21		ND		ND		ND		ND	
1,3,5-Trimethylbenzene	8.4	47	52	190	380	0.12		ND		ND		ND		ND	
Acetone	0.05	100	100	500	1000	ND		ND		ND		0.0056	J	0.0089	J
Methylene chloride	0.05	51	100	500	1000	**0.16**	J	0.0043	J	0.0036	J	ND		ND	
Naphthalene	12	100	100	500	1000	11		ND		ND		ND		ND	
Xylenes, Total	0.26	100	100	500	1000	0.058	J	ND		ND		ND		ND	

					SAMPLE ID:	B-9 (3.5-4)		B-10 (3.5-4)		B-10 (3.5-4)		B-12 (3-3.5)		B-12 (3-3.5)	
					COLLECTION DATE:	6/10/2024		6/11/2024		6/11/2024		6/11/2024		6/11/2024	
	USCO	RSCO	RRSCO	CSCO	ISCO	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
ORGANOCHLORINE PESTICIDES (mg/kg)															
4,4'-DDE	0.0033	1.8	8.9	62	120	0.00114	J	ND		-		ND		-	
4,4'-DDT	0.0033	1.7	7.9	47	94	ND		**0.00792**		-		ND		-	
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) (mg/kg)															
Perfluorooctanesulfonic Acid (PFOS)	0.00088	0.0088	0.044	0.440	0.440	0.000081	J	0.000283		-		0.000685	J	-	
Perfluorooctanoic Acid (PFOA)	0.00066	0.0066	0.033	0.500	0.600	**0.00102**		0.000467		-		ND		-	
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs) (mg/kg)															
3-Methylphenol/4-Methylphenol	0.33	34	100	500	1000	ND		0.14	J	-		**0.53**	J	-	
Benzo(a)anthracene	1	1	1	5.6	11	0.11		**8.3**	E	**5.9**		**19**		-	
Benzo(a)pyrene	1	1	1	1	1.1	0.1J		**8.1**	E	**6.5**		**15**		-	
Benzo(b)fluoranthene	1	1	1	5.6	11	0.15		**11**	E	**8.8**		**17**		-	
Benzo(k)fluoranthene	0.8	1	3.9	56	110	0.042	J	**2.6**		-		**6.4**		-	
Chrysene	1	1	3.9	56	110	0.12		**8.6**	E	**5.9**		**17**		-	
Dibenzo(a,h)anthracene	0.33	0.33	0.33	0.56	1.1	0.022	J	**1.7**		-		**2.3**		-	
Dibenzofuran	7	14	59	350	1000	ND		0.29		-		6.5		-	
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5	5.6	11	0.077	J	**6.7**		-		**8.5**		-	
Naphthalene	12	100	100	500	1000	ND		1.7		-		**27**		-	
TOTAL METALS (mg/kg)															
Arsenic, Total	13	16	16	16	16	4.14		**63.5**		-		**59.3**		-	
Barium, Total	350	350	400	400	10000	51.3		195		-		86.9		-	
Copper, Total	50	270	270	270	10000	12.2		**125**		-		**54.3**		-	
Lead, Total	63	400	400	1000	3900	9.03		**1,050**		-		**168**		-	
Mercury, Total	0.18	0.81	0.81	2.8	5.7	0.048	J	**0.33**		-		0.103		-	
Zinc, Total	109	2200	10000	10000	10000	33.7		**332**		-		76.5		-	
VOLATILE ORGANIC COMPOUNDS (VOCs) (mg/kg)															
1,2,4-Trimethylbenzene	3.6	47	52	190	380	ND		ND		-		**27**		-	
1,3,5-Trimethylbenzene	8.4	47	52	190	380	ND		ND		-		**11**	J	-	
Acetone	0.05	100	100	500	1000	0.015		ND		-		ND		-	
Methylene chloride	0.05	51	100	500	1000	0.003	J	ND		-		ND		-	
Naphthalene	12	100	100	500	1000	ND		ND		-		**2,500**	E	**2,300**	
Xylenes, Total	0.26	100	100	500	1000	ND		0.0036		-		**22**	J	-	

						SAMPLE ID:		B-14 (6.5-7)		B-16 (3.5-4)		B-19 (4-4.5)		B-25 (3-3.5)		B-25 (3-3.5)	
						COLLECTION DATE:		6/12/2024		6/11/2024		6/12/2024		6/14/2024		6/14/2024	
	USCO	RSCO	RRSCO	CSCO	ISCO	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q		
ORGANOCHLORINE PESTICIDES (mg/kg)																	
4,4'-DDE	0.0033	1.8	8.9	62	120	0.000935	J	ND		ND		ND		ND		-	
4,4'-DDT	0.0033	1.7	7.9	47	94	0.00274		ND		0.0046		ND		-			
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) (mg/kg)																	
Perfluorooctanesulfonic Acid (PFOS)	0.00088	0.0088	0.044	0.440	0.440	0.000234		0.00172		0.00037		0.00242		-			
Perfluorooctanoic Acid (PFOA)	0.00066	0.0066	0.033	0.500	0.600	0.000075	J	0.000392		0.000204		ND		-			
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs) (mg/kg)																	
3-Methylphenol/4-Methylphenol	0.33	34	100	500	1000	ND		0.078	J	ND		0.047	J	-			
Benzo(a)anthracene	1	1	1	5.6	11	ND		4.4		2.1		19	E	25			
Benzo(a)pyrene	1	1	1	1	1.1	ND		4.3		1.7		12	E	18			
Benzo(b)fluoranthene	1	1	1	5.6	11	ND		6.9		2.2		12	E	19			
Benzo(k)fluoranthene	0.8	1	3.9	56	110	ND		1.4		0.82		3		-			
Chrysene	1	1	3.9	56	110	ND		4.2		1.9		17	E	23			
Dibenzo(a,h)anthracene	0.33	0.33	0.33	0.56	1.1	ND		0.7		0.25		1.7		-			
Dibenzofuran	7	14	59	350	1000	ND		0.41		0.083	J	8.5		-			
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5	5.6	11	ND		3.3		1		5.6		-			
Naphthalene	12	100	100	500	1000	ND		0.46		0.074	J	11	E	15			
TOTAL METALS (mg/kg)																	
Arsenic, Total	13	16	16	16	16	0.64	J	9.28		5.22		7.12		-			
Barium, Total	350	350	400	400	10000	41.7		249		79.1		387		-			
Copper, Total	50	270	270	270	10000	8.9		118		54.8		69		-			
Lead, Total	63	400	400	1000	3900	61.9		1,640		69.8		365		-			
Mercury, Total	0.18	0.81	0.81	2.8	5.7	ND		0.185		0.261		0.259		-			
Zinc, Total	109	2200	10000	10000	10000	31.8		576		79.1		694		-			
VOLATILE ORGANIC COMPOUNDS (VOCs) (mg/kg)																	
1,2,4-Trimethylbenzene	3.6	47	52	190	380	ND		ND		ND		ND		-			
1,3,5-Trimethylbenzene	8.4	47	52	190	380	ND		ND		ND		ND		-			
Acetone	0.05	100	100	500	1000	ND		ND		0.0053	J	ND		-			
Methylene chloride	0.05	51	100	500	1000	ND		ND		ND		ND		-			
Naphthalene	12	100	100	500	1000	ND		ND		ND		0.022		-			
Xylenes, Total	0.26	100	100	500	1000	ND		0.0038		ND		ND		-			

Notes:

Mg/kg – Milligrams per kilogram
Q – Sample Qualifier
ND – Analyte was not detected
J – Estimated value
I – The lower value for the two columns has been reported due to obvious interference
P – The RPD between the results for the two columns exceeds the method-specific criteria
E - Concentration of analyte exceeds range of calibration curve and/or linear range of instrument

Key:

Value Exceeds USCO.
Value Exceeds RSCO.
Value Exceeds RRSCO.
Value Exceeds CSCO.
Value Exceeds ISCO.

Groundwater

The complete groundwater analytical results are presented as **Table 2.4.** A summary table of the analytical results exceedances compared to NYSDEC TOGS AWQS is presented in **Table 2.5** below.

Table 2.5 Summary of Groundwater Exceedances

SAMPLE ID:		TWP-1		TWP-2		TWP-1		TWP-2	
COLLECTION DATE:		6/12/2024		6/12/2024		6/14/2024		6/14/2024	
ANALYTE	NY-AWQS	Results	Q	Results	Q	Results	Q	Results	Q
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) (ug/L)									
Perfluorooctanesulfonic Acid (PFOS)	0.0027	-		-		**0.024**		**0.023**	
Perfluorooctanoic Acid (PFOA)	0.0067	-		-		**0.0413**		**0.019**	
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs) (ug/L)									
Phenol	1	ND		**5**		-		-	
TOTAL METALS (ug/L)									
Iron, Total	300	**3,100**		53.8		-		-	
Magnesium, Total	35000	**41,000**		**51,500**		-		-	
Manganese, Total	300	**706.2**		44.74		-		-	
Sodium, Total	20000	**26,100**		**60,800**		-		-	

Notes:
ug/L – Micrograms per liter
Q – Sample Qualifier
ND – Analyte was not detected
J – Estimated value

Key:

Result Exceeds NY-AWQS.

Soil Vapor

A summary table of the analytical results is presented in **Table 2.6.**

A total of twenty-eight (28) VOCs were detected in the three (3) soil vapor samples. Based on a comparison of the soil vapor results to the NYSDOH Soil Vapor/Indoor Air Matrices, the elevated VOC concentrations in soil vapor at the Site will require mitigation. Specifically, 1,2,4-trimethylbenzene was detected in each of the soil vapor samples at concentrations warranting mitigation when compared to NYSDOH Soil Vapor/Indoor Air Matrix D in the soil vapor sample collected. Additionally, naphthalene in soil vapor sample SV-3 and 1,3,5-trimethylbenzene in each of the soil vapor samples may require further action. Lastly, it should be noted that several other VOCs were determined to be present at levels in the soil vapor that would also require mitigation if they were collocated with indoor air levels with fairly low levels of the same compound. This further reinforces the likely need for vapor mitigation in the future redevelopment.

Based on the results and due to the future residential use of the Site, further investigation is required to further delineate the volume of soil, groundwater, and soil vapor that will require remediation to address the exceedances in soil, groundwater and soil vapor, and to specifically identify the source of the VOC soil vapor contamination.

2.3.5 PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA, APRIL 2025)

The Phase I ESA prepared by SESI identified the following RECs and Business Environmental Risks (BERs) for the Site:

The following RECs have been identified:

- **REC 1 – Historic Fill:** Historic fill material was encountered at the Subject Property during due diligence subsurface investigations at the Subject Property in June 2024. SESI identified historic fill materials within the soil borings to depths of up to 6.0 feet below ground surface (fbgs). Select volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), metals, pesticides, and per- and polyfluoroalkyl substances (PFAS) were identified at concentrations above NYSDEC Unrestricted Use Soil Cleanup Objectives (USCOs), Residential Soil Cleanup Objectives (RSCOs), Restricted Residential Soil Cleanup Objectives (RRSCOs), Commercial Soil Cleanup Objectives (CSCOs), and/or Industrial Soil Cleanup Objectives (ISCOs) in soil samples collected within the fill stratum. **Further investigation and remediation is warranted to address this REC. Additionally, the presence of contaminated historic fill will likely result in a premium disposal cost during redevelopment.**

- **REC 2 – Groundwater Impacts:** SESI collected two (2) groundwater samples during a due diligence investigation at the Subject Property in June 2024. Phenol, metals, and PFAS were identified at concentrations above NYSDEC Technical and Operational Guidance Series 1.1.1 (TOGS) Ambient Water Quality Standards (AWQS) in the groundwater samples collected. **Further action is warranted to address this REC. Additionally, regulated dewatering will be required during redevelopment if groundwater is encountered.**

- **REC 3 – Soil Vapor Impacts:** SESI collected three (3) soil vapor samples during a due diligence investigation at the Subject Property in June 2024. Specifically, 1,2,4-

trimethylbenzene was detected in each of the soil vapor samples at concentrations warranting mitigation when compared to New York State Department of Health (NYSDOH) Soil Vapor/Indoor Air Matrix D in the soil vapor sample collected. **Further action is warranted to address this REC. A sub-slab depressurization system or equivalent vapor intrusion mitigation system will be required for any proposed development.**

- **REC 4 – Current and Former Subject Property Operations:** The Subject Property is identified as a substation on the Sanborn maps dated 1978 through 2007. Prior usage as a substation poses the material risk that PCB-containing equipment was utilized at the Subject Property and may have discharged to the subsurface. Furthermore, the Subject Property supported automotive repair operations from at least 1992 to 2010, according to the City Directory Abstract. Additionally, SESI observed one (1) empty plastic 55-gallon drum and one (1) steel 55-gallon drum containing oily fluids within the former automotive repair garage building and several areas of refuse containing petroleum product containers on gravel or cracked concrete surfaces throughout the Subject Property. Staining was observed at the base of the drums. An investigation of these areas was performed during due diligence subsurface investigations at the Subject Property in June 2024. Soil, groundwater, and soil vapor impacts were identified at concentrations above NYSDEC Standards, Criteria, and Guidance (SCGs) in these areas. **Further investigation and remediation is warranted to address this REC. Additionally, the drums and petroleum product containers should be removed in accordance with local, state, and federal guidelines and regulations.**

- **REC 5 – Former Railroad Operations:** A historic railroad spur (circa 1896-2007), freight shed, and engine room (circa 1900-1950) were identified at the south and southeast of the Subject Property through historical aerial imagery and Sanborn maps. An investigation of these areas was performed during due diligence subsurface investigations at the Subject Property in June 2024. Soil, groundwater, and soil vapor impacts were identified at concentrations above NYSDEC Standards, Criteria, and Guidance (SCGs) in these areas. **Further investigation and remedial action is warranted to address this REC.**

The following BERs have been identified:

- **BER 1 – E-Designation:** According to the New York City Searchable Property Environmental E-Database (SPEED), the Subject Property has an E-designation. The E-designation ensures that sampling and remediation take place at the Subject Property to avoid any significant impacts related to hazardous materials. The E-designation requires that the fee owner of the Subject Property conducts testing and sampling protocol, and remediation where appropriate, to the satisfaction of the New York City Department of Environmental Protection (NYCDEP) before the issuance of a building permit by the Department of Buildings pursuant to the provisions of Section 11-15 of the Zoning Resolution (Environmental Requirements). The E-designation also includes a mandatory construction-related health and safety plan which must be approved by NYCDEP. **Further action is required to address this BER.**

- **BER 2 – Potential Environmental Justice Area Designation:** According to the NYC SPEED, the Subject Property is located within a Potential Environmental Justice Area (PEJA). Redevelopment sites within PEJAs are subject to increased regulatory oversight and community outreach requirements during redevelopment. **No further action is required to address this BER. However, increased planning costs and construction delays may result from the increased regulatory oversight and community outreach requirements as a result of the PEJA designation.**

- **BER 3 – Hazardous Building Materials:** Based on the age of the structures, hazardous building materials including PCB caulking, asbestos containing materials (ACM), and lead-based paint (LBP) may be present at the Subject Property. **SESI recommends performing a comprehensive hazardous building materials survey prior to demolition of the existing buildings.**

The above RECs are presented on **Figure 2.2**.

2.4 GEOLOGIC SETTING

Regional surface topography slopes southeast. Based on the U.S. Geological Survey – 2019 Central Park/Flushing/Yonkers/Mount Vernon, New York, 7.5-minute Quadrangle map, the Property is approximately 58 feet above the North American Datum. Based on the Phase II investigation conducted by SESI, the stratigraphy of the Site, from the surface down, consists of

historic fill materials generally consisting of coarse to fine sand, variable amounts of gravel, silt, and clay, beneath the asphalt pavement. Debris within the historic fill layer includes concrete, metal, wood and/or brick. The historic fill materials were encountered between 2.0 to 6.0 fbgs.

2.5 HYDROGEOLOGIC SETTING

As per the USDA National Cooperative Soil Survey map for the area, the soils at the Site are characterized as urban land outwash substratum overlying bedrock, consisting of asphalt over human-transported material overlying native gravelly sand. During SESI's due diligence investigations, groundwater was encountered at depths as shallow as 11 fbgs. Groundwater is anticipated to flow to the northwest.

2.6 SUBSURFACE FEATURES

No known underground storage tanks or drywells have been identified at the Site.

2.7 SUMMARY OF ENVIRONMENTAL ASSESSMENT

Based on the investigations conducted to date, the primary contaminants of concern (COCs) are anticipated to be VOCs, SVOCs, metals, pesticides, and PFAS. COCs will be refined based on the RIR results.

Soil: (maximum concentrations).

- **VOCs:** Naphthalene (2,500 mg/kg), methylene chloride (0.16 mg/kg), 1,3,5-trimethylbenzene (11 mg/kg), 1,2,4-trimethylbenzene (27 mg/kg), and total xylenes (22 mg/kg)
- **SVOCs:** 3-methylphenol/4-methylphenol (0.53 mg/kg), benzo(a)anthracene (25 mg/kg), benzo(a)pyrene (18 mg/kg), benzo(b)fluoranthene (19 mg/kg), benzo(k)fluoranthene (6.4 mg/kg), chrysene (23 mg/kg), dibenzo(a,h)anthracene (2.3 mg/kg), indeno(1,2,3-cd)pyrene (8.5 mg/kg), and dibenzofuran (8.5 mg/kg)
- **Metals:** Arsenic (63.5 mg/kg), barium (387 mg/kg), copper (155 mg/kg), lead (1,640 mg/kg), mercury (1.22 mg/kg), and zinc (694 mg/kg)
- **Pesticides:** 4,4'-DDE (0.00409 mg/kg) and 4,4'-DDT (0.00792 mg/kg)
- **PFAS:** Perfluorooctanoic acid (PFOA, 0.00102 mg/kg) and Perfluorooctanesulfonic acid (PFOS, 0.00172 mg/kg)

Groundwater: (maximum concentrations)

- **SVOCs:** Phenol (5 ug/L)
- **PFAS:** PFOS (0.024 ug/L) and PFOA (0.0413 ug/L)

- **Metals:** Iron (3,100 ug/L), magnesium (51,500 ug/L), manganese (706.2 ug/L), and sodium (60,800 ug/L)

Soil Vapor:

- **VOCs:** 1,2,4-trimethylbenzene (1,140 ug/m^3)

Naphthalene and 1,3,5-trimethylbenzene were detected above the lower limits of the NYSDOH Soil Decision Matrices in the soil vapor samples. Additionally, several other VOCs were determined to be present at levels in the soil vapor that would also require mitigation if they were collocated with indoor air levels with fairly low levels of the same compound.

3.0 FIELD REMEDIAL INVESTIGATION

Soil borings, soil vapor probes, and groundwater monitoring wells are proposed below based on the following rationale to complete the nature and extent delineation of contaminated soil, groundwater and soil vapor throughout the Site. Specific areas of potential discharge will be delineated such as the oily tar-like substance and/or petroleum-related impacts observed within borings B-12, B15-SV-2, B16-TWP-2, and B-25 collected in the vicinity of the former substation. The applicable SCGs for the Site soil are the unrestricted use soil cleanup objectives (SCOs). The applicable criteria for sub-slab vapor are the NYSDOH Decision Matrices (February 2024). The applicable SCGs for the Site groundwater are the NYSDEC TOGS AQWS Groundwater Effluent Limitations Class GA standards (cf. Section 703.6).

3.1 SOIL REMEDIAL INVESTIGATION

Surface soil samples are not being collected because the proposed redevelopment is anticipated to cover the entire Site and all surface soil will be removed during remediation and construction. If the anticipated future conditions change and existing soil is to remain exposed at the Site, surface soil samples may need to be collected and analyzed.

In order to further evaluate the soils, fifteen (15) soil borings will be performed on the Site in an approximate (50)-foot grid pattern to evaluate and delineate soil contamination from historical operations, and other potential sources. Select borings will be installed within and around the former substation to delineate the existence of the suspected coal tar and petroleum-related impacts observed during the Phase II. In addition, waste characterization samples will be collected from the borings for disposal approval. The proposed soil boring locations are shown on **Figure 3.1.**

The borings will be advanced using direct-push or other drilling methods as needed. The borings will extend to a depth of up to 20 ft-bgs or until native material or bedrock is encountered. Soil samples will be at a minimum of one sample per 5-foot depth interval biased based on field screening that includes visual observations, PID readings and olfactory observations. Boring logs documenting soil classifications, PID readings, and visual observations will be provided in the final report.

Upon retrieval of the sampling barrel, the collected sample shall be placed in glass jars and labeled, stored on site (on ice in a cooler if necessary), and transmitted to the NYSDOH Environmental Laboratory Approval Program (ELAP)-certified testing laboratory. Chain-of-custody procedures will be practiced following Section 15, EPA-600/4-82-029, Handbook for Sampling and Sample Preservation of Water and Waste Waters. Soil samples for VOC analysis will be collected in Encore ® vials.

The drilling contractor will be responsible for obtaining accurate and representative samples, informing the geologist of changes in drilling pressure, keeping a separate general log of soils encountered and installing monitoring wells to levels directed by the supervising engineer, scientist, or geologist following specifications further outlined in this protocol.

As many as sixty (60) soil samples will be collected from the fifteen (15) boring locations and will be analyzed by a NYSDOH ELAP-certified laboratory for TCL+30/TAL including VOCs by EPA Method 8260C, SVOCs by EPA Method 8270D, pesticides by EPA Method 8081B, PCBs by EPA Method 8082A, TAL metals by EPA Methods 6010C, 7471B, and 9012, the 41 PFASs compounds by EPA Method 1633A, and 1-4,dioxane by EPA Method 8270. Category B deliverables will be requested on each sample chain of custody.

The proposed soil sample locations and the rationale for their locations are presented in **Table 3.1** below.

Table 3.1 – Summary of Proposed Soil Borings and Sampling

Soil Boring Name	Proposed Sample Depths	Boring Location Rationale	Analysis
RI-SB-01	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-SB-02	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-SB-03	1 sample every 5 feet to a total depth of 20 ft bgs	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS

Soil Boring Name	Proposed Sample Depths	Boring Location Rationale	Analysis
	or until bedrock refusal		
RI-SB-04	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-SB-05	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-SB-06	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-SB-07	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-SB-08	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-SB-09	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-SB-10	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-SB-11	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-SB-12	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS

Soil Boring Name	Proposed Sample Depths	Boring Location Rationale	Analysis
RI-SB-13	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-SB-14	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-SB-15	1 sample every 5 feet to a total depth of 20 ft bgs or until bedrock refusal	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS

[1] Notes: ft bgs - feet below ground surface

A geologist, scientist, or engineer will be on site during the drilling operations to fully describe each soil sample, following the New York State Soil Description Procedure, and to retain representative portions of each sample.

A summary of the parameters to be tested, the analytical methods and the holding times for the samples is shown on **Table 3.2**.

Table 3.2 – Soil Analyses Summary

Parameter and Analytical Method	Holding Time
Volatile Organic Compounds (VOCs) – USEPA 8260C	14 days
SVOCs (BNAs) and 1,4-Dioxane – USEPA 8270D or E	14 days (until extraction, 40 days extracted)
Pesticides – USEPA 8081B	14 days (until extraction) 40 days (extracted)
PCBs – USEPA 8082A	None
Metals - Method 6010D, 7470A for mercury, and 9012B for cyanide	180 days Cyanide: 14 days

Parameter and Analytical Method	Holding Time
PFAS – USEPA 1633A	28 days

Quality assurance/quality control (QA/QC) samples will be collected and analyzed as specified in the Quality Assurance Project Plan (QAPP). The number of duplicate, spiked and blank samples analyzed will be collected at a frequency of one (1) duplicate for every 20 samples. The inclusion and frequency of analysis of field blanks will be on the order of one (1) per every 20 soil samples but not more than one (1) per day. Samples to be analyzed for volatile organic compounds will be accompanied by a field blank for all matrix types and trip blank for water matrices. SESI's field sampling procedures are described in the QAPP presented in **Appendix B.** The Sampling Plan for Emerging Contaminants is included as **Appendix C.**

3.2 GROUNDWATER REMEDIAL INVESTIGATION

To investigate the Site groundwater, a total of six (6) permanent groundwater monitoring wells will be installed as shown on **Figure 3.2**. Well RI-MW-02 will be installed within the former substation to further investigate and delineate the petroleum-related impacts observed during the Phase II. The wells will be installed to a depth of approximately 15-20 feet bgs with a 10-foot screen, such that the groundwater table intersects the well screen. The groundwater table is anticipated to be between approximately eleven (11) feet below ground surface based on previous investigations. If bedrock is encountered before 15-20 ft bgs, the well depth will be determined based on the depth to bedrock and the observed groundwater table. Wells are anticipated to be installed only in the overburden. Well depths and screen placement will be evaluated based on observed groundwater table.

Each monitoring well will be constructed with two (2)-inch diameter well screens. The well screening will intersect the water table and extend to the bottom of the well boring. The annular space of each well will be filled with well sand to at least two (2) feet above the screening and will be sealed with hydrated bentonite or cement grout. Finally, each monitoring well will be completed with a flush-mount road-box or stickup as necessary. A typical boring and well construction log is provided in **Appendix D**.

The Groundwater RI will be conducted to achieve the following:

- delineate the nature and extent of area of concern (AOC)-specific contaminants in the Site groundwater;
- identify actual or potential impacts to sensitive receptors, e.g. surface water;
- determine whether a contaminant plume exists;
- gather sufficient data to determine groundwater flow direction and contour map and evaluate groundwater Remedial alternatives, including, as appropriate, monitored natural attenuation (MNA), and
- provide information on the background quality of the groundwater flowing into the Site.

All the wells will be surveyed for location and elevation. The survey data will be provided pursuant to the DER-10 requirements in an acceptable format (e.g., North America Datum 83 [NAD83]). The wells will be gauged for groundwater depth to determine the groundwater elevation. The Site-specific groundwater flow direction and gradient will be determined based on the latest elevation data and summarized in the Remedial Investigation Report (RIR). The proposed well locations are shown on **Figure 3.2**.

Two (2) rounds of sampling will be conducted from the newly installed wells, with the second round of sampling completed within one (1) month of the start of remedial work. The data will be analyzed to determine whether groundwater contamination exists, the magnitude and the extent of the potential contaminant plume. In addition to the analytical data, field measurements and chemical analyses will be conducted to characterize the impacted groundwater.

All the wells will be sampled for TCL+30/TAL metals, PFAS, and 1-4 dioxane. The VOCs will be analyzed by EPA Method 8260C, SVOCs by EPA Method 8270D, pesticides by EPA Method 8081B, PCBs by EPA Method 8082A, TAL metals by EPA Methods 6010C, 7471B, and 9012, PFAS compounds by EPA Method 1633A, and 1-4 dioxane by EPA Method 8270 SIM. The QAPP, which describes all field sampling procedures, is included as **Appendix B**, and the Sampling Plan for Emerging Contaminants is included as **Appendix C**. The proposed groundwater monitoring wells and the rationale for their locations are presented in **Table 3.2** below.

Table 3.3 – Summary of Proposed Groundwater Monitoring Wells

Well Name	Proposed Sample Depths	Well Location Rationale	Analysis
RI-MW-01	Center of Water Column feet below groundwater table	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-MW-02	Center of Water Column feet below groundwater table	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-MW-03	Center of Water Column feet below groundwater table	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-MW-04	Center of Water Column feet below groundwater table	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-MW-05	Center of Water Column feet below groundwater table	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS
RI-MW-06	Center of Water Column feet below groundwater table	Horizontal / Vertical Delineation	TCL+30/TAL, 1,4-Dioxane, PFAS

All groundwater samples will be analyzed by a NYSDOH ELAP-certified laboratory and Category B deliverables will be requested on each sample chain of custody. In addition, QA/QC samples will be collected and analyzed as specified in the QAPP. Specifically, the number of duplicate, spiked and blank samples analyzed will be a minimum of one (1) duplicate for every 20 samples. For the aqueous matrix field blanks will be collected at a frequency of one (1) per day. Samples to be analyzed for volatile organic compounds will be accompanied by a trip blank for each shipment and field blanks water matrix.

The wells will be sampled using the low flow technique, when possible. A flow rate of 100 milliliters (ml) to 250 ml per minute is used to purge the wells. Drawdown will not exceed 0.3 feet. At the initiation of low flow purging a water level is recorded as well as field parameters. Field parameters are then monitored every five minutes during low flow purging using a flow through cell. When three (3) consecutive measurements of pH differ by 0.1 units or less, with oxygen reduction potential (ORP) within 10 mv or less, turbidity varies 10 percent or less, conductivity differs by 3 percent or less and dissolved oxygen by 10 percent or less, sampling may begin.

Flow through cells are used so continuous real time readings are made. When the parameters stabilize the flow through cell is disconnected and sample bottles are filled directly from the tubing. If the parameters of a well do not stabilize in a timely manner, the groundwater sample will be collected after emptying three (3) well volumes from the well being sampled.

In addition to water samples collected from the monitoring wells, two types of "blanks" will be collected and submitted to the chemical laboratory for analyses. The blanks will consist of 40 ml VOA vials, as follows:

- A trip blank will be prepared before the sample bottles are sent by the laboratory. It consists of a sample of distilled, deionized water which accompanies the other sample bottles into the field and back to the laboratory. A trip blank will be included with each shipment of samples where sampling and analysis for TCL volatiles is planned (water matrix only). The trip blank will be analyzed for TCL VOCs as a measure of potential contamination from background sources and their effect on the results.
- In order to check for contaminant carryover when non-dedicated sampling equipment is used, a rinsate blank will be submitted to the laboratory. This blank will also be analyzed for TCL VOCs.

3.3 SOIL VAPOR INVESTIGATION

SESI will collect five (5) soil vapor samples from soil vapor points in the footprint of the proposed building. The proposed soil vapor point locations are shown on **Figure 3.3**. Soil vapor sample RI-SV-02/RI-IA-02 will be collected from within the former substation to further investigate and delineate the petroleum-related impacts observed during the Phase II. The purpose of the soil vapor points is to assess the potential for vapor intrusion into future buildings. All soil vapor points will be installed at depths indicated on **Table 3.4.**

The soil vapor samples will be collected in accordance with the procedures of the NYSDOH October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York as amended in May 2017 and February 2024. Specifically, the soil vapor probes will be advanced using direct push sampling equipment and samples will be collected by installing vapor implants. The soil vapor depth will be based on the final construction and development plan. A sacrificial vapor point connected to flexible tubing will be inserted into the borehole. The annular space of the

borehole will be filled with sand and the surface will be sealed with bentonite to seal the surface. Prior to sampling the tubing system will be purged of ambient air with a low-flow pump.

The soil vapor samples will be collected into laboratory supplied one (1)-liter, stainless-steel, summa canisters. The summa canisters will be equipped with a manometer to verify the canister is under vacuum, and a flow controller set to a flow rate of <200 ml/min. A sample log sheet will be 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, apparent moisture content of the sampling zone, and chain of custody protocols. The vapor samples will be sent to a certified laboratory for analysis of VOCs in accordance with EPA Method TO-15. In addition to the soil vapor, three (3) collocated indoor air samples will be placed in the existing buildings should demolition not proceed prior to this investigation, and one (1) ambient air sample will be collected with a 1-liter summa canister set to a flow rate of <200 ml/min outside the building. The field sampling procedures are described in the QAPP, which is included as **Appendix B**.

As part of the vapor sampling, a tracer gas will be used to serve as a QA/QC device to verify the integrity of the soil vapor probe seal. Helium will be used as the tracer gas and a box will serve to keep it in contact with the probe during testing. A portable monitoring device will be used to analyze a sample of soil vapor for the tracer prior to sampling. If the tracer sample results show a significant presence of the tracer, the probe seals will be adjusted to prevent infiltration. At the conclusion of the sampling round, tracer monitoring will be performed a second time to confirm the integrity of the probe seals.

Table 3.4 Summary of Proposed Soil Vapor Sampling

Soil Vapor/Indoor Air/Ambient Air Point Name	Sample Type	Proposed Sample Depths	Analysis
RI-SV-01	Soil Vapor	2 feet below grade	VOCs (TO-15)
RI-IA-01	Indoor Air	3 feet above grade	VOCs (TO-15)

Soil Vapor/Indoor Air/Ambient Air Point Name	Sample Type	Proposed Sample Depths	Analysis
RI-SV-02	Soil Vapor	2 feet below grade	VOCs (TO-15)
RI-IA-02	Indoor Air	3 feet above grade	VOCs (TO-15)
RI-SV-03	Soil Vapor	2 feet below grade	VOCs (TO-15)
RI-SV-04	Soil Vapor	5 feet below grade	VOCs (TO-15)
RI-SV-05	Soil Vapor	5 feet below grade	VOCs (TO-15)
RI-AA-01	Ambient Air	3 feet above grade	VOCs (TO-15)

3.4 DECONTAMINATION AND IDW

Reusable equipment utilized for ground intrusive activities (i.e. borings and wells) will be decontaminated between each boring. Equipment utilized for sample collection (i.e. spoons, trowels) will be decontaminated between each sample unless disposable equipment is utilized. Appropriate decontamination areas will be established to support work being conducted in each area of the Site. PFAS free certified deionized water, supplied from the laboratory, will be used for the decontamination of the sampling tools if needed. Locally supplied water, if available, or water supplied by the driller in a tank will be used to decontaminate the equipment.

All investigative derived waste (IDW) of soil cuttings and purged groundwater will be containerized, sampled, and properly disposed of pursuant to DER-10 requirements. Disposable sampling equipment, including macro core liners, spoons, gloves, bags, paper towels, and PPE that contacts environmental media, will be double bagged and disposed of as municipal trash in a facility trash dumpster as non-hazardous refuse.

3.5 WASTE CHARACTERIZATION

Waste characterization will be completed in conjunction with the remedial investigation to obtain data for facility approvals. Waste characterization samples will be collected as five-point composites, and analyzed for TCL+30/TAL, however, the exact quantity and parameters will be determined based on disposal facility requirements.

3.6 SURVEY

After the RI sampling scope is completed, a survey will be completed, which includes the locations and elevations of all the monitoring wells, soil borings, and soil vapor points.

3.7 GREEN REMEDIATION STRATEGIES (GRS)

Remedial Investigation: While there are only a limited number of GRS principles that can be incorporated during the investigation phase of the project, the engineering firm of record will be required to incorporate as many carbon reduction measures as possible by using mass transit where available to travel to and from the site or electrical vehicles if available and causing any vehicles on the site to be turned off and avoid idling. Waste reduction measures such as use of less disposal gloves and equipment will also be considered.

4.0 RECEPTOR AND VULNERABILITY ASSESSMENTS

4.1 HUMAN HEALTH EXPOSURE ASSESSMENT

A qualitative human health exposure assessment will be performed for the Site in accordance with the NYSDOH's Qualitative Human Health Exposure Assessment guidance document. Sampling data will be reviewed along with the physical conditions of the contaminant sources or physical hazards near the Site. Potential on-Site and off-Site exposures will be evaluated. The Exposure Assessment will describe the nature and size of the population exposed, or potentially exposed, to the contaminants that are present at, or migrating from the Site, and will characterize the exposure setting, identify exposure pathways and evaluate contaminant fate and transport.

Several objectives will be met by the exposure assessment. First, applicable Site information and characterization data for environmental media of concern will be evaluated. Applicable SCGs including Part 375 SCOs and CP-51 SCOs for soil, and AWQS for groundwater and surface water will be applied.

An assessment of current and future Site activities and Site use will be conducted in relation to potential human exposure. Next, potential exposure pathways will be identified, and each aspect of the potential exposure pathway will be evaluated. Soil and groundwater contamination will be addressed and the impact of remediation on future exposure scenarios will be analyzed.

4.2 FISH AND WILDLIFE IMPACT ANALYSIS

A Fish and Wildlife Impact Analysis (FWIA) Decision Key will be completed prior to the excavation work to determine if a FWIA is needed. Contaminant migration pathways and any fish and wildlife exposure pathways will be identified. As stated in the FWIA, "if no resources are associated with the site or if there is no potential for contaminant migration to the resources, then only the necessary information to support that conclusion should be provided."

If resources are identified, or migration pathways exist, a FWIA will be completed and submitted as part of the RI Report. The FWIA would include qualitative estimates of the following: 1) the routes, intensity, frequency, and duration of actual or potential exposures to chemicals; 2) the nature and size of the population exposed to the contaminants that are present at or migrating from the Site; 3) the exposure setting and possible exposure pathways; and 4) contaminant fate and transport.

4.3 CLIMATE CHANGE SCREENING OR VULNERABILITY ASSESSMENT

The Site is entering the program at the investigation stage; therefore, a Climate Change Screening or Vulnerability Assessment is not required at this time. Further, this Site is not in a floodplain and is not located in the vicinity of a wetland; therefore, the requirements for a vulnerability assessment is not anticipated.

5.0 DUSR

Following the completion of the laboratory analysis program, a Data Usability Summary Report (DUSR) will be completed for the lab data and included as part of the RI Report. The DUSR will include available datasets from previous investigations, as well as data from this phase of Site characterization. The DUSR is carried out as specified in DER-10 to evaluate the quality control measures that were implemented during the field and laboratory analytical programs, with the objective of determining whether the reported analytical data are representative and usable for decision making. The DUSR will evaluate whether the data are technically defensible (i.e. were all analytical data requirements met and documented?). Data usability analysis reviews the Site data to determine whether they are adequate to draw conclusions regarding the nature and extent of contamination.

The items that will be reviewed as part of the DUSR will include the following:

- Completeness (number of samples collected and analyzed compared to plans)
- Chains of custody are complete and accurate
- Holding times
- Instrument calibration
- Relative percent difference between field duplicates
- Reasonableness of data (e.g. relationships between total and soluble analytes)
- Blank contamination

The DUSR will be conducted in accordance with guidelines provided under Appendix 2B of DER-10. The site-specific QAPP is included in **Appendix B**.

6.0 REPORTING

6.1 DAILY REPORTS

Daily reports will be submitted upon request of the NYSDEC case manager following each day of investigation activities and will include:

- Activities relative to the Site during the previous day and those anticipated for the next reporting day, including a quantitative presentation of work performed (i.e. number of borings or wells completed, etc.);
- Description of approved activity modifications, including changes of work scope and/or schedule;
- Sampling, when applicable, results received following internal data review and validation, as applicable;
- An update of the remedial investigation schedule including the percentage of project completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays;
- Information regarding any complaints made; and
- Air monitoring data downloaded from the air monitoring instruments and a summary of the data.

6.2 REMEDIAL INVESTIGATION REPORT

Following the completion of the RI activities and the receipt of sample results, an RIR will be prepared. The RIR report will summarize the activities completed during the RIR including analytical results, well construction and sampling logs, waste characterization information for disposal purposes, conclusions from the FWIA if necessary, a DUSR and laboratory data packages. Scaled figures showing the sample locations and areas of contamination exceeding applicable standards will be prepared for soil, soil vapor, and groundwater. Sampling results will be summarized and discussed and the need for additional investigation and remediation will be evaluated. In addition, analytical summary tables will be prepared for soil, soil vapor, and groundwater compared to applicable standards.

The RIR will also include: 1) a summary of the site history and previous investigations, 2) a description of current site conditions, 3) the identification of exposure pathways via a Qualitative

Human Health Exposure Assessment; an analysis of the results, 4) a description of the nature and extent of the contamination; and 5) a detailed conclusion with recommendations.

Analytical data collected during the Remedial Investigation and previous data used for the selection of the remedy will be submitted in the NYSDEC approved Electronic Data Deliverable (EDD) format. EDDs will be prepared using the DEC's Environmental Information Management

7.0 GOVERNING DOCUMENTS

7.1 QUALITY ASSURANCE/QUALITY CONTROL

QA/QC is addressed in the QAPP included as **Appendix B**. The QAPP outlines procedures to be followed for sampling and analysis to ensure quality of the results. A DUSR will be prepared with the final reports to document the reliability of the sample results.

7.2 HEALTH AND SAFETY PLAN

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

7.3 COMMUNITY AIR MONITORING

A Community Air Monitoring Plan (CAMP) is provided as **Appendix F**, 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 RI, in order to minimize the release of contaminants to off-Site areas.

7.4 CITIZEN PARTICIPATION

Citizen participation activities will be performed throughout the RI process to involve and inform the public. The specific citizen participation activities to be performed will be outlined in the Citizen Participation Plan (CPP), included as **Appendix G**.

8.0 REMEDIAL INVESTIGATION AND ACTION SCHEDULE

The anticipated remedial investigation and action schedule is presented on **Table 11.1** below.

Table 8.1: Proposed Remedial Investigation Schedule

Activity	Duration
Remedial Investigation with first round of RI groundwater samples	February 2, 2026 – February 13, 2026
Second Round of RI Groundwater Samples	February 23, 2026 – February 27, 2026
Submit Draft RIR	April 6, 2026
NYSDEC comments on RIR	May 6, 2026
Submit Final RIR	May 20, 2026
Submit Draft RAWP	July 20, 2026
NYSDEC comments on RAWP	August 20, 2026
RAWP Public Comment Period	August 27, 2026 – October 11, 2026
Submit Revised RAWP	October 19, 2026
Decision Document and acceptance of RAWP	November 2, 2026
Remediation	November 23, 2026 – June 30, 2027
Environmental Easement Submission (If Required)	April 30, 2027
Submit Final Engineering Report and Site Management Plan	August 31, 2027
Certificate of Completion after approval of Environmental Easement, FER and SMP	December 31, 2027

Tables

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	**B-1 (11-11.5)**			**B-2 (11.5-12)**			**B-4 (2-2.5)**			**B-6 (4.5-5)**		
						LAB ID:	**L2432305-01**			**L2432305-03**			**L2432305-05**			**L2432305-07**		
						COLLECTION DATE:	**6/10/2024**			**6/10/2024**			**6/10/2024**			**6/10/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
GENERAL CHEMISTRY																		
Cyanide, Total	27	27	27	27	10000	mg/kg	ND		0.98	ND		1.1	ND		1.1	0.57	J	1
Solids, Total						%	93.3		0.1	85.5		0.1	84.6		0.1	91.2		0.1
ORGANOCHLORINE PESTICIDES																		
4,4'-DDD	0.0033	2.6	13	92	180	mg/kg	ND		0.00169	ND		0.00178	ND		0.0018	ND		0.0017
4,4'-DDE	0.0033	1.8	8.9	62	120	mg/kg	ND		0.00169	ND		0.00178	ND		0.0018	**0.00361**		**0.0017**
4,4'-DDT	0.0033	1.7	7.9	47	94	mg/kg	0.00294		0.00169	ND		0.00178	ND		0.0018	**0.00631**		**0.0017**
Aldrin	0.005	0.019	0.097	0.68	1.4	mg/kg	ND		0.00169	ND		0.00178	ND		0.0018	ND		0.0017
Alpha-BHC	0.02	0.097	0.48	3.4	6.8	mg/kg	ND		0.000705	ND		0.00074	ND		0.000749	ND		0.00071
Beta-BHC	0.036	0.072	0.36	3	14	mg/kg	ND		0.00169	ND		0.00178	ND		0.0018	ND		0.0017
Chlordane						mg/kg	ND		0.0141	ND		0.0148	ND		0.015	ND		0.0142
cis-Chlordane	0.094	0.91	4.2	24	47	mg/kg	ND		0.00211	ND		0.00222	ND		0.00225	0.00172	J	0.00213
Delta-BHC	0.04	100	100	500	1000	mg/kg	ND		0.00169	ND		0.00178	ND		0.0018	ND		0.0017
Dieldrin	0.005	0.039	0.2	1.4	2.8	mg/kg	ND		0.00106	ND		0.00111	ND		0.00112	ND		0.00106
Endosulfan I	2.4	4.8	24	200	920	mg/kg	ND		0.00169	ND		0.00178	ND		0.0018	ND		0.0017
Endosulfan II	2.4	4.8	24	200	920	mg/kg	ND		0.00169	ND		0.00178	ND		0.0018	ND		0.0017
Endosulfan sulfate	2.4	4.8	24	200	920	mg/kg	ND		0.000705	ND		0.00074	ND		0.000749	ND		0.00071
Endrin	0.014	2.2	11	89	410	mg/kg	ND		0.000705	ND		0.00074	ND		0.000749	ND		0.00071
Endrin aldehyde						mg/kg	ND		0.00211	ND		0.00222	ND		0.00225	ND		0.00213
Endrin ketone						mg/kg	ND		0.00169	ND		0.00178	ND		0.0018	ND		0.0017
Heptachlor	0.042	0.42	2.1	15	29	mg/kg	ND		0.000846	ND		0.000888	ND		0.000899	ND		0.000852
Heptachlor epoxide						mg/kg	ND		0.00317	ND		0.00333	ND		0.00337	ND		0.0032
Lindane	0.1	0.28	1.3	9.2	23	mg/kg	ND		0.000705	ND		0.00074	ND		0.000749	ND		0.00071
Methoxychlor						mg/kg	ND		0.00317	ND		0.00333	ND		0.00337	ND		0.0032
Toxaphene						mg/kg	ND		0.0317	ND		0.0333	ND		0.0337	ND		0.032
trans-Chlordane						mg/kg	ND		0.00211	ND		0.00222	ND		0.00225	0.00248	IP	0.00213
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)																		
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)						mg/kg	ND		0.000772	ND		0.000785	ND		0.000795	ND		0.00078
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)						mg/kg	0.000432	J	0.000772	ND		0.000785	ND		0.000795	ND		0.00078
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)						mg/kg	ND		0.000193	ND		0.000196	ND		0.000199	ND		0.000195
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)						mg/kg	ND		0.000193	ND		0.000196	ND		0.000199	ND		0.000195
Perfluorobutanesulfonic Acid (PFBS)						mg/kg	ND		0.000193	ND		0.000196	0.000043	J	0.000199	ND		0.000195
Perfluorobutanoic Acid (PFBA)						mg/kg	ND		0.000772	ND		0.000785	0.000051	J	0.000795	ND		0.00078
Perfluorodecanesulfonic Acid (PFDS)						mg/kg	ND		0.000193	ND		0.000196	ND		0.000199	ND		0.000195
Perfluorodecanoic Acid (PFDA)						mg/kg	ND		0.000193	ND		0.000196	ND		0.000199	ND		0.000195
Perfluorododecanoic Acid (PFDoA)						mg/kg	ND		0.000193	ND		0.000196	ND		0.000199	ND		0.000195
Perfluoroheptanesulfonic Acid (PFHpS)						mg/kg	ND		0.000193	0.000049	J	0.000196	ND		0.000199	ND		0.000195
Perfluoroheptanoic Acid (PFHpA)						mg/kg	0.000029	J	0.000193	0.00005	J	0.000196	0.000156	J	0.000199	0.000038	J	0.000195
Perfluorohexanesulfonic Acid (PFHxS)						mg/kg	ND		0.000193	0.000059	J	0.000196	0.000096	J	0.000199	ND		0.000195
Perfluorohexanoic Acid (PFHxA)						mg/kg	ND		0.000193	ND		0.000196	0.000126	J	0.000199	ND		0.000195
Perfluorononanoic Acid (PFNA)						mg/kg	ND		0.000193	ND		0.000196	0.000115	J	0.000199	ND		0.000195
Perfluorooctanesulfonamide (PFOSA)						mg/kg	ND		0.000193	ND		0.000196	ND		0.000199	ND		0.000195
Perfluorooctanesulfonic Acid (PFOS)	0.00088	0.0088	0.044	0.440	0.440	mg/kg	ND		0.000193	ND		0.000196	0.000662		0.000199	0.00024		0.000195
Perfluorooctanoic Acid (PFOA)	0.00066	0.0066	0.033	0.500	0.600	mg/kg	ND		0.000193	0.000082	J	0.000196	**0.00095**		**0.000199**	0.000243		0.000195
Perfluoropentanoic Acid (PFPeA)						mg/kg	ND		0.000386	ND		0.000392	0.000096	J	0.000397	ND		0.00039
Perfluorotetradecanoic Acid (PFTeDA)						mg/kg	ND		0.000193	ND		0.000196	ND		0.000199	ND		0.000195
Perfluorotridecanoic Acid (PFTrDA)						mg/kg	ND		0.000193	ND		0.000196	ND		0.000199	ND		0.000195
Perfluoroundecanoic Acid (PFUnA)						mg/kg	ND		0.000193	ND		0.000196	ND		0.000199	ND		0.000195
PFOA/PFOS, Total						mg/kg	ND		0.000193	0.000082	J	0.000196	0.00161		0.000199	0.000483		0.000195
POLYCHLORINATED BIPHENYLS (PCBs)																		
Aroclor 1016	0.1	1	1	1	25	mg/kg	ND		0.0519	ND		0.0571	ND		0.0585	ND		0.0527
Aroclor 1221	0.1	1	1	1	25	mg/kg	ND		0.0519	ND		0.0571	ND		0.0585	ND		0.0527
Aroclor 1232	0.1	1	1	1	25	mg/kg	ND		0.0519	ND		0.0571	ND		0.0585	ND		0.0527
Aroclor 1242	0.1	1	1	1	25	mg/kg	ND		0.0519	ND		0.0571	ND		0.0585	ND		0.0527
Aroclor 1248	0.1	1	1	1	25	mg/kg	ND		0.0519	ND		0.0571	ND		0.0585	ND		0.0527
Aroclor 1254	0.1	1	1	1	25	mg/kg	ND		0.0519	ND		0.0571	ND		0.0585	ND		0.0527
Aroclor 1260	0.1	1	1	1	25	mg/kg	ND		0.0519	ND		0.0571	ND		0.0585	0.0134	J	0.0527
Aroclor 1262	0.1	1	1	1	25	mg/kg	ND		0.0519	ND		0.0571	ND		0.0585	ND		0.0527
Aroclor 1268	0.1	1	1	1	25	mg/kg	ND		0.0519	ND		0.0571	ND		0.0585	0.00647	J	0.0527
PCBs, Total	0.1	1	1	1	25	mg/kg	ND		0.0519	ND		0.0571	ND		0.0585	0.0199	J	0.0527

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						COLLECTION DATE:	**6/10/2024**			**6/10/2024**			**6/10/2024**			**6/10/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)																		
1,2,4,5-Tetrachlorobenzene						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
1,2,4-Trichlorobenzene						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
1,2-Dichlorobenzene	1.1	100	100	500	1000	mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
1,3-Dichlorobenzene	2.4	17	49	280	560	mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
1,4-Dichlorobenzene	1.8	9.8	13	130	250	mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
1,4-Dioxane	0.1	9.8	13	130	250	mg/kg	ND		0.026	ND		0.029	ND		0.029	ND		0.027
2,4,5-Trichlorophenol						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
2,4,6-Trichlorophenol						mg/kg	ND		0.1	ND		0.11	ND		0.12	ND		0.11
2,4-Dichlorophenol						mg/kg	ND		0.16	ND		0.17	ND		0.18	ND		0.16
2,4-Dimethylphenol						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
2,4-Dinitrophenol						mg/kg	ND		0.84	ND		0.92	ND		0.94	ND		0.88
2,4-Dinitrotoluene						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
2,6-Dinitrotoluene						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
2-Chloronaphthalene						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
2-Chlorophenol						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
2-Methylnaphthalene						mg/kg	1.4		0.21	ND		0.23	0.055	J	0.23	0.047	J	0.22
2-Methylphenol	0.33	100	100	500	1000	mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
2-Nitroaniline						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
2-Nitrophenol						mg/kg	ND		0.38	ND		0.41	ND		0.42	ND		0.39
3,3'-Dichlorobenzidine						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
3-Methylphenol/4-Methylphenol	0.33	34	100	500	1000	mg/kg	ND		0.25	ND		0.27	ND		0.28	ND		0.26
3-Nitroaniline						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
4,6-Dinitro-o-cresol						mg/kg	ND		0.46	ND		0.5	ND		0.51	ND		0.47
4-Bromophenyl phenyl ether						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
4-Chloroaniline						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
4-Chlorophenyl phenyl ether						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
4-Nitroaniline						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
4-Nitrophenol						mg/kg	ND		0.24	ND		0.27	ND		0.27	ND		0.26
Acenaphthene	20	100	100	500	1000	mg/kg	1.5		0.14	ND		0.15	0.14	J	0.16	0.079	J	0.14
Acenaphthylene	100	100	100	500	1000	mg/kg	0.21		0.14	ND		0.15	0.041	J	0.16	0.2		0.14
Acetophenone						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
Anthracene	100	100	100	500	1000	mg/kg	0.73		0.1	ND		0.11	0.24		0.12	0.33		0.11
Benzo(a)anthracene	1	1	1	5.6	11	mg/kg	0.72		0.1	ND		0.11	0.62		0.12	0.84		0.11
Benzo(a)pyrene	1	1	1	1	1.1	mg/kg	0.43		0.14	ND		0.15	0.5		0.16	**1.2**		**0.14**
Benzo(b)fluoranthene	1	1	1	5.6	11	mg/kg	0.78		0.1	ND		0.11	0.59		0.12	**1.7**		**0.11**
Benzo(ghi)perylene	100	100	100	500	1000	mg/kg	0.2		0.14	ND		0.15	0.4		0.16	0.7		0.14
Benzo(k)fluoranthene	0.8	1	3.9	56	110	mg/kg	0.18		0.1	ND		0.11	0.18		0.12	0.42		0.11
Benzoic Acid						mg/kg	ND		0.57	ND		0.62	ND		0.63	ND		0.59
Benzyl Alcohol						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
Biphenyl						mg/kg	0.31	J	0.4	ND		0.44	ND		0.45	ND		0.42
Bis(2-chloroethoxy)methane						mg/kg	ND		0.19	ND		0.21	ND		0.21	ND		0.2
Bis(2-chloroethyl)ether						mg/kg	ND		0.16	ND		0.17	ND		0.18	ND		0.16
Bis(2-chloroisopropyl)ether						mg/kg	ND		0.21	ND		0.23	ND		0.23	ND		0.22
Bis(2-ethylhexyl)phthalate						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
Butyl benzyl phthalate						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
Carbazole						mg/kg	0.34		0.18	ND		0.19	0.053	J	0.2	0.17	J	0.18
Chrysene	1	1	3.9	56	110	mg/kg	0.77		0.1	ND		0.11	0.63		0.12	0.94		0.11
Di-n-butylphthalate						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
Di-n-octylphthalate						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
Dibenzo(a,h)anthracene	0.33	0.33	0.33	0.56	1.1	mg/kg	0.058	J	0.1	ND		0.11	0.092	J	0.12	0.15		0.11
Dibenzofuran	7	14	59	350	1000	mg/kg	1.4		0.18	ND		0.19	0.056	J	0.2	0.066	J	0.18
Diethyl phthalate						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
Dimethyl phthalate						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
Fluoranthene	100	100	100	500	1000	mg/kg	2.2		0.1	ND		0.11	1.3		0.12	1.8		0.11
Fluorene	30	100	100	500	1000	mg/kg	1.4		0.18	ND		0.19	0.11	J	0.2	0.088	J	0.18
Hexachlorobenzene	0.33	0.33	1.2	6	12	mg/kg	ND		0.1	ND		0.11	ND		0.12	ND		0.11
Hexachlorobutadiene						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	**B-1 (11-11.5)**			**B-2 (11.5-12)**			**B-4 (2-2.5)**			**B-6 (4.5-5)**		
						LAB ID:	**L2432305-01**			**L2432305-03**			**L2432305-05**			**L2432305-07**		
						COLLECTION DATE:	**6/10/2024**			**6/10/2024**			**6/10/2024**			**6/10/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
Hexachlorocyclopentadiene						mg/kg	ND		0.5	ND		0.55	ND		0.56	ND		0.52
Hexachloroethane						mg/kg	ND		0.14	ND		0.15	ND		0.16	ND		0.14
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5	5.6	11	mg/kg	0.21		0.14	ND		0.15	0.38		0.16	**0.64**		**0.14**
Isophorone						mg/kg	ND		0.16	ND		0.17	ND		0.18	ND		0.16
n-Nitrosodi-n-propylamine						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
Naphthalene	12	100	100	500	1000	mg/kg	2		0.18	ND		0.19	0.042	J	0.2	0.08	J	0.18
NDPA/DPA						mg/kg	ND		0.14	ND		0.15	ND		0.16	ND		0.14
Nitrobenzene						mg/kg	ND		0.16	ND		0.17	ND		0.18	ND		0.16
p-Chloro-m-cresol						mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
Pentachlorophenol	0.8	2.4	6.7	6.7	55	mg/kg	ND		0.14	ND		0.15	ND		0.16	ND		0.14
Phenanthrene	100	100	100	500	1000	mg/kg	3.1		0.1	ND		0.11	1.3		0.12	1		0.11
Phenol	0.33	100	100	500	1000	mg/kg	ND		0.18	ND		0.19	ND		0.2	ND		0.18
Pyrene	100	100	100	500	1000	mg/kg	1.6		0.1	ND		0.11	1.4		0.12	1.5		0.11
TOTAL METALS																		
Aluminum, Total						mg/kg	7460		8.3	6590		8.86	6840		8.92	8440		8.56
Antimony, Total						mg/kg	ND		4.15	ND		4.43	2.44	J	4.46	1.68	J	4.28
Arsenic, Total	13	16	16	16	16	mg/kg	2.49		0.83	3.85		0.886	**16**		**0.892**	9.78		0.856
Barium, Total	350	350	400	400	10000	mg/kg	64		0.83	79.4		0.886	86.4		0.892	82.8		0.856
Beryllium, Total	7.2	14	72	590	2700	mg/kg	0.396	J	0.415	0.394	J	0.443	0.334	J	0.446	0.321	J	0.428
Cadmium, Total	2.5	2.5	4.3	9.3	60	mg/kg	0.094	J	0.83	0.202	J	0.886	1.06		0.892	0.863		0.856
Calcium, Total						mg/kg	1070		8.3	3710		8.86	3650		8.92	2180		8.56
Chromium, Total						mg/kg	32.3		0.83	69.6		0.886	19.8		0.892	29.9		0.856
Cobalt, Total						mg/kg	4.45		1.66	4.15		1.77	6.84		1.78	7.41		1.71
Copper, Total	50	270	270	270	10000	mg/kg	6.92		0.83	42.1		0.886	**155**		**0.892**	**63.9**		**0.856**
Iron, Total						mg/kg	14100		4.15	12900		4.43	19600		4.46	20800		4.28
Lead, Total	63	400	400	1000	3900	mg/kg	6.83		4.15	33.9		4.43	**345**		**4.46**	**634**		**4.28**
Magnesium, Total						mg/kg	2020		8.3	2750		8.86	2990		8.92	4070		8.56
Manganese, Total	1600	2000	2000	10000	10000	mg/kg	118		0.83	146		0.886	239		0.892	289		0.856
Mercury, Total	0.18	0.81	0.81	2.8	5.7	mg/kg	0.059	J	0.068	**0.424**		**0.073**	**1.22**		**0.074**	**0.261**		**0.069**
Nickel, Total	30	140	310	310	10000	mg/kg	10.2		2.08	12.7		2.22	16.1		2.23	17.1		2.14
Potassium, Total						mg/kg	407		208	802		222	1410		223	1240		214
Selenium, Total	3.9	36	180	1500	6800	mg/kg	ND		1.66	0.466	J	1.77	0.68	J	1.78	ND		1.71
Silver, Total	2	36	180	1500	6800	mg/kg	ND		0.415	ND		0.443	ND		0.446	ND		0.428
Sodium, Total						mg/kg	132	J	166	226		177	376		178	238		171
Thallium, Total						mg/kg	ND		1.66	ND		1.77	0.288	J	1.78	0.631	J	1.71
Vanadium, Total						mg/kg	24.6		0.83	25		0.886	27.7		0.892	35.7		0.856
Zinc, Total	109	2200	10000	10000	10000	mg/kg	29.4		4.15	49.4		4.43	**275**		**4.46**	**332**		**4.28**
VOLATILE ORGANIC COMPOUNDS (VOCs)																		
1,1,1,2-Tetrachloroethane						mg/kg	ND		0.024	ND		0.00072	ND		0.00059	ND		0.00049
1,1,1-Trichloroethane	0.68	100	100	500	1000	mg/kg	ND		0.024	ND		0.00072	ND		0.00059	ND		0.00049
1,1,2,2-Tetrachloroethane						mg/kg	ND		0.024	ND		0.00072	ND		0.00059	ND		0.00049
1,1,2-Trichloroethane						mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
1,1-Dichloroethane	0.27	19	26	240	480	mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
1,1-Dichloroethene	0.33	100	100	500	1000	mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
1,1-Dichloropropene						mg/kg	ND		0.024	ND		0.00072	ND		0.00059	ND		0.00049
1,2,3-Trichlorobenzene						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
1,2,3-Trichloropropane						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
1,2,4,5-Tetramethylbenzene						mg/kg	0.11		0.098	ND		0.0029	ND		0.0024	ND		0.0019
1,2,4-Trichlorobenzene						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
1,2,4-Trimethylbenzene	3.6	47	52	190	380	mg/kg	0.21		0.098	ND		0.0029	ND		0.0024	ND		0.0019
1,2-Dibromo-3-chloropropane						mg/kg	ND		0.15	ND		0.0043	ND		0.0035	ND		0.0029
1,2-Dibromoethane						mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
1,2-Dichlorobenzene	1.1	100	100	500	1000	mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
1,2-Dichloroethane	0.02	2.3	3.1	30	60	mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
1,2-Dichloroethene, Total						mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
1,2-Dichloropropane						mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	**B-1 (11-11.5)**			**B-2 (11.5-12)**			**B-4 (2-2.5)**			**B-6 (4.5-5)**		
						LAB ID:	**L2432305-01**			**L2432305-03**			**L2432305-05**			**L2432305-07**		
						COLLECTION DATE:	**6/10/2024**			**6/10/2024**			**6/10/2024**			**6/10/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
1,3,5-Trimethylbenzene	8.4	47	52	190	380	mg/kg	0.12		0.098	ND		0.0029	ND		0.0024	ND		0.0019
1,3-Dichlorobenzene	2.4	17	49	280	560	mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
1,3-Dichloropropane						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
1,3-Dichloropropene, Total						mg/kg	ND		0.024	ND		0.00072	ND		0.00059	ND		0.00049
1,4-Dichlorobenzene	1.8	9.8	13	130	250	mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
1,4-Dioxane	0.1	9.8	13	130	250	mg/kg	ND		3.9	ND		0.12	ND		0.094	ND		0.078
2,2-Dichloropropane						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
2-Butanone	0.12	100	100	500	1000	mg/kg	ND		0.49	ND		0.014	ND		0.012	ND		0.0097
2-Hexanone						mg/kg	ND		0.49	ND		0.014	ND		0.012	ND		0.0097
4-Methyl-2-pentanone						mg/kg	ND		0.49	ND		0.014	ND		0.012	ND		0.0097
Acetone	0.05	100	100	500	1000	mg/kg	ND		0.49	ND		0.014	ND		0.012	0.0056	J	0.0097
Acrylonitrile						mg/kg	ND		0.2	ND		0.0058	ND		0.0047	ND		0.0039
Benzene	0.06	2.9	4.8	44	89	mg/kg	ND		0.024	ND		0.00072	ND		0.00059	ND		0.00049
Bromobenzene						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
Bromochloromethane						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
Bromodichloromethane						mg/kg	ND		0.024	ND		0.00072	ND		0.00059	ND		0.00049
Bromoform						mg/kg	ND		0.2	ND		0.0058	ND		0.0047	ND		0.0039
Bromomethane						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
Carbon disulfide						mg/kg	ND		0.49	ND		0.014	ND		0.012	ND		0.0097
Carbon tetrachloride	0.76	1.4	2.4	22	44	mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
Chlorobenzene	1.1	100	100	500	1000	mg/kg	ND		0.024	ND		0.00072	ND		0.00059	ND		0.00049
Chloroethane						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
Chloroform	0.37	10	49	350	700	mg/kg	ND		0.074	ND		0.0022	ND		0.0018	ND		0.0015
Chloromethane						mg/kg	ND		0.2	ND		0.0058	ND		0.0047	ND		0.0039
cis-1,2-Dichloroethene	0.25	59	100	500	1000	mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
cis-1,3-Dichloropropene						mg/kg	ND		0.024	ND		0.00072	ND		0.00059	ND		0.00049
Dibromochloromethane						mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
Dibromomethane						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
Dichlorodifluoromethane						mg/kg	ND		0.49	ND		0.014	ND		0.012	ND		0.0097
Ethyl ether						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
Ethylbenzene	1	30	41	390	780	mg/kg	0.0087	J	0.049	ND		0.0014	ND		0.0012	ND		0.00097
Hexachlorobutadiene						mg/kg	ND		0.2	ND		0.0058	ND		0.0047	ND		0.0039
Isopropylbenzene						mg/kg	0.0076	J	0.049	ND		0.0014	ND		0.0012	ND		0.00097
Methyl tert butyl ether	0.93	62	100	500	1000	mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
Methylene chloride	0.05	51	100	500	1000	mg/kg	**0.16**	**J**	**0.24**	0.0043	J	0.0072	0.0036	J	0.0059	ND		0.0049
n-Butylbenzene	12	100	100	500	1000	mg/kg	0.012	J	0.049	ND		0.0014	ND		0.0012	ND		0.00097
n-Propylbenzene	3.9	100	100	500	1000	mg/kg	0.012	J	0.049	ND		0.0014	ND		0.0012	ND		0.00097
Naphthalene	12	100	100	500	1000	mg/kg	11		0.2	ND		0.0058	ND		0.0047	ND		0.0039
o-Chlorotoluene						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
o-Xylene						mg/kg	0.022	J	0.049	ND		0.0014	ND		0.0012	ND		0.00097
p-Chlorotoluene						mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
p-Diethylbenzene						mg/kg	0.16		0.098	ND		0.0029	ND		0.0024	ND		0.0019
p-Ethyltoluene						mg/kg	0.091	J	0.098	ND		0.0029	ND		0.0024	ND		0.0019
p-Isopropyltoluene						mg/kg	0.037	J	0.049	ND		0.0014	ND		0.0012	ND		0.00097
p/m-Xylene						mg/kg	0.036	J	0.098	ND		0.0029	ND		0.0024	ND		0.0019
sec-Butylbenzene	11	100	100	500	1000	mg/kg	0.014	J	0.049	ND		0.0014	ND		0.0012	ND		0.00097
Styrene						mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
tert-Butylbenzene	5.9	100	100	500	1000	mg/kg	ND		0.098	ND		0.0029	ND		0.0024	ND		0.0019
Tetrachloroethene	1.3	5.5	19	150	300	mg/kg	ND		0.024	ND		0.00072	ND		0.00059	ND		0.00049
Toluene	0.7	100	100	500	1000	mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
trans-1,2-Dichloroethene	0.19	100	100	500	1000	mg/kg	ND		0.074	ND		0.0022	ND		0.0018	ND		0.0015
trans-1,3-Dichloropropene						mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
trans-1,4-Dichloro-2-butene						mg/kg	ND		0.24	ND		0.0072	ND		0.0059	ND		0.0049
Trichloroethene	0.47	10	21	200	400	mg/kg	ND		0.024	ND		0.00072	ND		0.00059	ND		0.00049

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2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

SAMPLE ID:							**B-1 (11-11.5)**			**B-2 (11.5-12)**			**B-4 (2-2.5)**			**B-6 (4.5-5)**		
LAB ID:							**L2432305-01**			**L2432305-03**			**L2432305-05**			**L2432305-07**		
COLLECTION DATE:							**6/10/2024**			**6/10/2024**			**6/10/2024**			**6/10/2024**		
SAMPLE MATRIX:							**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
Trichlorofluoromethane						mg/kg	ND		0.2	ND		0.0058	ND		0.0047	ND		0.0039
Vinyl acetate						mg/kg	ND		0.49	ND		0.014	ND		0.012	ND		0.0097
Vinyl chloride	0.02	0.21	0.9	13	27	mg/kg	ND		0.049	ND		0.0014	ND		0.0012	ND		0.00097
Xylenes, Total	0.26	100	100	500	1000	mg/kg	0.058	J	0.049	ND		0.0014	ND		0.0012	ND		0.00097

NOTES:
ND - Analyte was not detected.
J - Estimated value.
I - The lower value for the two columns has been reported due to obvious interference.
P - The RPD between the results for the two columns exceeds the method-specific criteria.
E - Concentration of analyte exceeds range of calibration curve and/or linear range of instrument.
Q - Sample qualifier.
mg/kg - Milligrams per kilogram.

KEY:

	Value Exceeds USCO.
	Value Exceeds RSCO.
	Value Exceeds RRSCO.
	Value Exceeds CSCO.
	Value Exceeds ISCO.

USCO: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
RSCO: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
RRSCO: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
CSCO: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
ISCO: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	B-8 (4-4.5)			B-9 (3.5-4)			B-10 (3.5-4)			B-10 (3.5-4)		
						LAB ID:	L2432305-09			L2432305-10			L2432804-01			L2432804-01 R1		
						COLLECTION DATE:	6/10/2024			6/10/2024			6/11/2024			6/11/2024		
						SAMPLE MATRIX:	SOIL			SOIL			SOIL			SOIL		
	USCO	RSCO	RRSCO	CSCO	ISCO	Units	Results	Q	RL	Results	Q	RL	Results	Q	RL	Results	Q	RL
GENERAL CHEMISTRY																		
Cyanide, Total	27	27	27	27	10000	mg/kg	ND		1	ND		1.1	ND		1	-		-
Solids, Total						%	87.2		0.1	88		0.1	93.1		0.1	-		-
ORGANOCHLORINE PESTICIDES																		
4,4'-DDD	0.0033	2.6	13	92	180	mg/kg	0.00112	J	0.00179	0.00108	J	0.00176	ND		0.00169	-		-
4,4'-DDE	0.0033	1.8	8.9	62	120	mg/kg	0.000664	J	0.00179	0.00114	J	0.00176	ND		0.00169	-		-
4,4'-DDT	0.0033	1.7	7.9	47	94	mg/kg	ND		0.00179	ND		0.00176	**0.00792**		**0.00169**	-		-
Aldrin	0.005	0.019	0.097	0.68	1.4	mg/kg	ND		0.00179	ND		0.00176	ND		0.00169	-		-
Alpha-BHC	0.02	0.097	0.48	3.4	6.8	mg/kg	ND		0.000747	ND		0.000733	ND		0.000704	-		-
Beta-BHC	0.036	0.072	0.36	3	14	mg/kg	ND		0.00179	ND		0.00176	ND		0.00169	-		-
Chlordane						mg/kg	ND		0.0149	ND		0.0146	ND		0.0141	-		-
cis-Chlordane	0.094	0.91	4.2	24	47	mg/kg	ND		0.00224	ND		0.0022	ND		0.00211	-		-
Delta-BHC	0.04	100	100	500	1000	mg/kg	ND		0.00179	ND		0.00176	ND		0.00169	-		-
Dieldrin	0.005	0.039	0.2	1.4	2.8	mg/kg	ND		0.00112	ND		0.0011	ND		0.00106	-		-
Endosulfan I	2.4	4.8	24	200	920	mg/kg	ND		0.00179	ND		0.00176	ND		0.00169	-		-
Endosulfan II	2.4	4.8	24	200	920	mg/kg	ND		0.00179	ND		0.00176	ND		0.00169	-		-
Endosulfan sulfate	2.4	4.8	24	200	920	mg/kg	ND		0.000747	ND		0.000733	ND		0.000704	-		-
Endrin	0.014	2.2	11	89	410	mg/kg	ND		0.000747	ND		0.000733	ND		0.000704	-		-
Endrin aldehyde						mg/kg	ND		0.00224	ND		0.0022	ND		0.00211	-		-
Endrin ketone						mg/kg	ND		0.00179	ND		0.00176	ND		0.00169	-		-
Heptachlor	0.042	0.42	2.1	15	29	mg/kg	ND		0.000896	ND		0.000879	ND		0.000845	-		-
Heptachlor epoxide						mg/kg	ND		0.00336	ND		0.0033	ND		0.00317	-		-
Lindane	0.1	0.28	1.3	9.2	23	mg/kg	ND		0.000747	ND		0.000733	ND		0.000704	-		-
Methoxychlor						mg/kg	ND		0.00336	ND		0.0033	ND		0.00317	-		-
Toxaphene						mg/kg	ND		0.0336	ND		0.033	ND		0.0317	-		-
trans-Chlordane						mg/kg	ND		0.00224	0.000702	JIP	0.0022	ND		0.00211	-		-
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)																		
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)						mg/kg	ND		0.000796	ND		0.000789	ND		0.000788	-		-
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)						mg/kg	ND		0.000796	ND		0.000789	ND		0.000788	-		-
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)						mg/kg	0.000166	J	0.000199	ND		0.000197	ND		0.000197	-		-
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)						mg/kg	ND		0.000199	ND		0.000197	ND		0.000197	-		-
Perfluorobutanesulfonic Acid (PFBS)						mg/kg	ND		0.000199	ND		0.000197	ND		0.000197	-		-
Perfluorobutanoic Acid (PFBA)						mg/kg	ND		0.000796	ND		0.000789	ND		0.000788	-		-
Perfluorodecanesulfonic Acid (PFDS)						mg/kg	ND		0.000199	ND		0.000197	ND		0.000197	-		-
Perfluorodecanoic Acid (PFDA)						mg/kg	ND		0.000199	ND		0.000197	ND		0.000197	-		-
Perfluorododecanoic Acid (PFDoA)						mg/kg	ND		0.000199	ND		0.000197	ND		0.000197	-		-
Perfluoroheptanesulfonic Acid (PFHpS)						mg/kg	ND		0.000199	ND		0.000197	ND		0.000197	-		-
Perfluoroheptanoic Acid (PFHpA)						mg/kg	0.000036	J	0.000199	0.000092	J	0.000197	0.000119	J	0.000197	-		-
Perfluorohexanesulfonic Acid (PFHxS)						mg/kg	ND		0.000199	0.000178	J	0.000197	ND		0.000197	-		-
Perfluorohexanoic Acid (PFHxA)						mg/kg	ND		0.000199	ND		0.000197	0.000101	J	0.000197	-		-
Perfluorononanoic Acid (PFNA)						mg/kg	ND		0.000199	ND		0.000197	ND		0.000197	-		-
Perfluorooctanesulfonamide (PFOSA)						mg/kg	ND		0.000199	ND		0.000197	ND		0.000197	-		-
Perfluorooctanesulfonic Acid (PFOS)	0.00088	0.0088	0.044	0.440	0.440	mg/kg	**0.00122**		**0.000199**	0.000081	J	0.000197	0.000283		0.000197	-		-
Perfluorooctanoic Acid (PFOA)	0.00066	0.0066	0.033	0.500	0.600	mg/kg	0.000297		0.000199	**0.00102**		**0.000197**	0.000467		0.000197	-		-
Perfluoropentanoic Acid (PFPeA)						mg/kg	ND		0.000398	ND		0.000394	0.0001	J	0.000394	-		-
Perfluorotetradecanoic Acid (PFTeDA)						mg/kg	ND		0.000199	ND		0.000197	ND		0.000197	-		-
Perfluorotridecanoic Acid (PFTrDA)						mg/kg	ND		0.000199	ND		0.000197	ND		0.000197	-		-
Perfluoroundecanoic Acid (PFUnA)						mg/kg	ND		0.000199	ND		0.000197	ND		0.000197	-		-
PFOA/PFOS, Total						mg/kg	0.00152		0.000199	0.0011	J	0.000197	0.00075		0.000197	-		-
POLYCHLORINATED BIPHENYLS (PCBs)																		
Aroclor 1016	0.1	1	1	1	25	mg/kg	ND		0.0544	ND		0.0526	ND		0.0526	-		-
Aroclor 1221	0.1	1	1	1	25	mg/kg	ND		0.0544	ND		0.0526	ND		0.0526	-		-
Aroclor 1232	0.1	1	1	1	25	mg/kg	ND		0.0544	ND		0.0526	ND		0.0526	-		-
Aroclor 1242	0.1	1	1	1	25	mg/kg	ND		0.0544	ND		0.0526	ND		0.0526	-		-
Aroclor 1248	0.1	1	1	1	25	mg/kg	ND		0.0544	ND		0.0526	ND		0.0526	-		-
Aroclor 1254	0.1	1	1	1	25	mg/kg	ND		0.0544	ND		0.0526	0.0141	J	0.0526	-		-
Aroclor 1260	0.1	1	1	1	25	mg/kg	ND		0.0544	ND		0.0526	0.0135	J	0.0526	-		-
Aroclor 1262	0.1	1	1	1	25	mg/kg	ND		0.0544	ND		0.0526	ND		0.0526	-		-
Aroclor 1268	0.1	1	1	1	25	mg/kg	ND		0.0544	ND		0.0526	0.00686	J	0.0526	-		-
PCBs, Total	0.1	1	1	1	25	mg/kg	ND		0.0544	ND		0.0526	0.0345	J	0.0526	-		-

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						LAB ID:	L2432305-09			L2432305-10			L2432804-01			L2432804-01 R1		
						COLLECTION DATE:	6/10/2024			6/10/2024			6/11/2024			6/11/2024		
						SAMPLE MATRIX:	SOIL			SOIL			SOIL			SOIL		
	USCO	RSCO	RRSCO	CSCO	ISCO	Units	Results	Q	RL	Results	Q	RL	Results	Q	RL	Results	Q	RL
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)																		
1,2,4,5-Tetrachlorobenzene						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
1,2,4-Trichlorobenzene						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
1,2-Dichlorobenzene	1.1	100	100	500	1000	mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
1,3-Dichlorobenzene	2.4	17	49	280	560	mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
1,4-Dichlorobenzene	1.8	9.8	13	130	250	mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
1,4-Dioxane	0.1	9.8	13	130	250	mg/kg	ND		0.028	ND		0.028	ND		0.027	-		-
2,4,5-Trichlorophenol						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
2,4,6-Trichlorophenol						mg/kg	ND		0.11	ND		0.11	ND		0.11	-		-
2,4-Dichlorophenol						mg/kg	ND		0.17	ND		0.17	ND		0.16	-		-
2,4-Dimethylphenol						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
2,4-Dinitrophenol						mg/kg	ND		0.91	ND		0.89	ND		0.86	-		-
2,4-Dinitrotoluene						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
2,6-Dinitrotoluene						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
2-Chloronaphthalene						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
2-Chlorophenol						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
2-Methylnaphthalene						mg/kg	ND		0.23	ND		0.22	0.48		0.21	-		-
2-Methylphenol	0.33	100	100	500	1000	mg/kg	ND		0.19	ND		0.18	0.035	J	0.18	-		-
2-Nitroaniline						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
2-Nitrophenol						mg/kg	ND		0.41	ND		0.4	ND		0.39	-		-
3,3'-Dichlorobenzidine						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
3-Methylphenol/4-Methylphenol	0.33	34	100	500	1000	mg/kg	ND		0.27	ND		0.27	0.14	J	0.26	-		-
3-Nitroaniline						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
4,6-Dinitro-o-cresol						mg/kg	ND		0.49	ND		0.48	ND		0.46	-		-
4-Bromophenyl phenyl ether						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
4-Chloroaniline						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
4-Chlorophenyl phenyl ether						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
4-Nitroaniline						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
4-Nitrophenol						mg/kg	ND		0.27	ND		0.26	ND		0.25	-		-
Acenaphthene	20	100	100	500	1000	mg/kg	0.029	J	0.15	ND		0.15	0.19		0.14	-		-
Acenaphthylene	100	100	100	500	1000	mg/kg	0.12	J	0.15	0.044	J	0.15	5.4		0.14	-		-
Acetophenone						mg/kg	ND		0.19	ND		0.18	0.05	J	0.18	-		-
Anthracene	100	100	100	500	1000	mg/kg	0.12		0.11	ND		0.11	2.1		0.11	-		-
Benzo(a)anthracene	1	1	1	5.6	11	mg/kg	0.37		0.11	0.11		0.11	**8.3**	**E**	**0.11**	**5.9**		**0.54**
Benzo(a)pyrene	1	1	1	1	1.1	mg/kg	0.45		0.15	0.1J		0.15	**8.1**	**E**	**0.14**	**6.5**		**0.72**
Benzo(b)fluoranthene	1	1	1	5.6	11	mg/kg	0.67		0.11	0.15		0.11	**11**	**E**	**0.11**	**8.8**		**0.54**
Benzo(ghi)perylene	100	100	100	500	1000	mg/kg	0.31		0.15	0.075	J	0.15	6.8		0.14	-		-
Benzo(k)fluoranthene	0.8	1	3.9	56	110	mg/kg	0.16		0.11	0.042	J	0.11	**2.6**		**0.11**	-		-
Benzoic Acid						mg/kg	ND		0.62	ND		0.6	ND		0.58	-		-
Benzyl Alcohol						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
Biphenyl						mg/kg	ND		0.43	ND		0.42	0.1	J	0.41	-		-
Bis(2-chloroethoxy)methane						mg/kg	ND		0.2	ND		0.2	ND		0.19	-		-
Bis(2-chloroethyl)ether						mg/kg	ND		0.17	ND		0.17	ND		0.16	-		-
Bis(2-chloroisopropyl)ether						mg/kg	ND		0.23	ND		0.22	ND		0.21	-		-
Bis(2-ethylhexyl)phthalate						mg/kg	ND		0.19	ND		0.18	0.16	J	0.18	-		-
Butyl benzyl phthalate						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
Carbazole						mg/kg	0.056	J	0.19	ND		0.18	0.56		0.18	-		-
Chrysene	1	1	3.9	56	110	mg/kg	0.41		0.11	0.12		0.11	**8.6**	**E**	**0.11**	**5.9**		**0.54**
Di-n-butylphthalate						mg/kg	ND		0.19	ND		0.18	0.053	J	0.18	-		-
Di-n-octylphthalate						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
Dibenzo(a,h)anthracene	0.33	0.33	0.33	0.56	1.1	mg/kg	0.065	J	0.11	0.022	J	0.11	**1.7**		**0.11**	-		-
Dibenzofuran	7	14	59	350	1000	mg/kg	0.028	J	0.19	ND		0.18	0.29		0.18	-		-
Diethyl phthalate						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
Dimethyl phthalate						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
Fluoranthene	100	100	100	500	1000	mg/kg	0.72		0.11	0.15		0.11	12	E	0.11	7.4		0.54
Fluorene	30	100	100	500	1000	mg/kg	0.037	J	0.19	ND		0.18	0.38		0.18	-		-
Hexachlorobenzene	0.33	0.33	1.2	6	12	mg/kg	ND		0.11	ND		0.11	ND		0.11	-		-
Hexachlorobutadiene						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-

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						SAMPLE ID:	**B-8 (4-4.5)**			**B-9 (3.5-4)**			**B-10 (3.5-4)**			**B-10 (3.5-4)**		
						LAB ID:	**L2432305-09**			**L2432305-10**			**L2432804-01**			**L2432804-01 R1**		
						COLLECTION DATE:	**6/10/2024**			**6/10/2024**			**6/11/2024**			**6/11/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
Hexachlorocyclopentadiene						mg/kg	ND		0.54	ND		0.53	ND		0.51	-		-
Hexachloroethane						mg/kg	ND		0.15	ND		0.15	ND		0.14	-		-
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5	5.6	11	mg/kg	0.25		0.15	0.077	J	0.15	**6.7**		**0.14**	-		-
Isophorone						mg/kg	ND		0.17	ND		0.17	ND		0.16	-		-
n-Nitrosodi-n-propylamine						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
Naphthalene	12	100	100	500	1000	mg/kg	0.036	J	0.19	ND		0.18	1.7		0.18	-		-
NDPA/DPA						mg/kg	ND		0.15	ND		0.15	ND		0.14	-		-
Nitrobenzene						mg/kg	ND		0.17	ND		0.17	ND		0.16	-		-
p-Chloro-m-cresol						mg/kg	ND		0.19	ND		0.18	ND		0.18	-		-
Pentachlorophenol	0.8	2.4	6.7	6.7	55	mg/kg	ND		0.15	ND		0.15	ND		0.14	-		-
Phenanthrene	100	100	100	500	1000	mg/kg	0.42		0.11	0.08	J	0.11	2.5		0.11	-		-
Phenol	0.33	100	100	500	1000	mg/kg	ND		0.19	ND		0.18	0.098	J	0.18	-		-
Pyrene	100	100	100	500	1000	mg/kg	0.65		0.11	0.15		0.11	14	E	0.11	8.3		0.54
TOTAL METALS																		
Aluminum, Total						mg/kg	8310		8.75	15200		8.58	6580		8.44	-		-
Antimony, Total						mg/kg	0.523	J	4.38	ND		4.29	2.58	J	4.22	-		-
Arsenic, Total	13	16	16	16	16	mg/kg	4.18		0.875	4.14		0.858	**63.5**		**0.844**	-		-
Barium, Total	350	350	400	400	10000	mg/kg	64.6		0.875	51.3		0.858	195		0.844	-		-
Beryllium, Total	7.2	14	72	590	2700	mg/kg	0.307	J	0.438	0.424	J	0.429	0.342	J	0.422	-		-
Cadmium, Total	2.5	2.5	4.3	9.3	60	mg/kg	0.265	J	0.875	0.098	J	0.858	0.804	J	0.844	-		-
Calcium, Total						mg/kg	7420		8.75	1010		8.58	2760		8.44	-		-
Chromium, Total						mg/kg	21.6		0.875	24.9		0.858	42.7		0.844	-		-
Cobalt, Total						mg/kg	6.53		1.75	7.48		1.72	6.93		1.69	-		-
Copper, Total	50	270	270	270	10000	mg/kg	23.4		0.875	12.2		0.858	**125**		**0.844**	-		-
Iron, Total						mg/kg	17400		4.38	23900		4.29	24000		4.22	-		-
Lead, Total	63	400	400	1000	3900	mg/kg	58		4.38	9.03		4.29	**1,050**		**4.22**	-		-
Magnesium, Total						mg/kg	4060		8.75	3340		8.58	2650		8.44	-		-
Manganese, Total	1600	2000	2000	10000	10000	mg/kg	395		0.875	128		0.858	289		0.844	-		-
Mercury, Total	0.18	0.81	0.81	2.8	5.7	mg/kg	0.07	J	0.072	0.048	J	0.071	**0.33**		**0.07**	-		-
Nickel, Total	30	140	310	310	10000	mg/kg	15.6		2.19	14.1		2.14	19.1		2.11	-		-
Potassium, Total						mg/kg	1710		219	774		214	1220		211	-		-
Selenium, Total	3.9	36	180	1500	6800	mg/kg	ND		1.75	0.229	J	1.72	ND		1.69	-		-
Silver, Total	2	36	180	1500	6800	mg/kg	ND		0.438	ND		0.429	0.843		0.422	-		-
Sodium, Total						mg/kg	278		175	213		172	198		169	-		-
Thallium, Total						mg/kg	0.496	J	1.75	0.555	J	1.72	0.577	J	1.69	-		-
Vanadium, Total						mg/kg	28.9		0.875	33.5		0.858	39.8		0.844	-		-
Zinc, Total	109	2200	10000	10000	10000	mg/kg	51.8		4.38	33.7		4.29	**332**		**4.22**	-		-
VOLATILE ORGANIC COMPOUNDS (VOCs)																		
1,1,1,2-Tetrachloroethane						mg/kg	ND		0.00063	ND		0.00052	ND		0.00047	-		-
1,1,1-Trichloroethane	0.68	100	100	500	1000	mg/kg	ND		0.00063	ND		0.00052	0.01		0.00047	-		-
1,1,2,2-Tetrachloroethane						mg/kg	ND		0.00063	ND		0.00052	ND		0.00047	-		-
1,1,2-Trichloroethane						mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
1,1-Dichloroethane	0.27	19	26	240	480	mg/kg	ND		0.0013	ND		0.001	0.001		0.00095	-		-
1,1-Dichloroethene	0.33	100	100	500	1000	mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
1,1-Dichloropropene						mg/kg	ND		0.00063	ND		0.00052	ND		0.00047	-		-
1,2,3-Trichlorobenzene						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
1,2,3-Trichloropropane						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
1,2,4,5-Tetramethylbenzene						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
1,2,4-Trichlorobenzene						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
1,2,4-Trimethylbenzene	3.6	47	52	190	380	mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
1,2-Dibromo-3-chloropropane						mg/kg	ND		0.0038	ND		0.0031	ND		0.0028	-		-
1,2-Dibromoethane						mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
1,2-Dichlorobenzene	1.1	100	100	500	1000	mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
1,2-Dichloroethane	0.02	2.3	3.1	30	60	mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
1,2-Dichloroethene, Total						mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
1,2-Dichloropropane						mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	**B-8 (4-4.5)**			**B-9 (3.5-4)**			**B-10 (3.5-4)**			**B-10 (3.5-4)**		
						LAB ID:	**L2432305-09**			**L2432305-10**			**L2432804-01**			**L2432804-01 R1**		
						COLLECTION DATE:	**6/10/2024**			**6/10/2024**			**6/11/2024**			**6/11/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
1,3,5-Trimethylbenzene	8.4	47	52	190	380	mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
1,3-Dichlorobenzene	2.4	17	49	280	560	mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
1,3-Dichloropropane						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
1,3-Dichloropropene, Total						mg/kg	ND		0.00063	ND		0.00052	ND		0.00047	-		-
1,4-Dichlorobenzene	1.8	9.8	13	130	250	mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
1,4-Dioxane	0.1	9.8	13	130	250	mg/kg	ND		0.1	ND		0.084	ND		0.076	-		-
2,2-Dichloropropane						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
2-Butanone	0.12	100	100	500	1000	mg/kg	ND		0.013	ND		0.01	ND		0.0095	-		-
2-Hexanone						mg/kg	ND		0.013	ND		0.01	ND		0.0095	-		-
4-Methyl-2-pentanone						mg/kg	ND		0.013	ND		0.01	ND		0.0095	-		-
Acetone	0.05	100	100	500	1000	mg/kg	0.0089	J	0.013	0.015		0.01	ND		0.0095	-		-
Acrylonitrile						mg/kg	ND		0.0051	ND		0.0042	ND		0.0038	-		-
Benzene	0.06	2.9	4.8	44	89	mg/kg	ND		0.00063	ND		0.00052	ND		0.00047	-		-
Bromobenzene						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
Bromochloromethane						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
Bromodichloromethane						mg/kg	ND		0.00063	ND		0.00052	ND		0.00047	-		-
Bromoform						mg/kg	ND		0.0051	ND		0.0042	ND		0.0038	-		-
Bromomethane						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
Carbon disulfide						mg/kg	ND		0.013	ND		0.01	ND		0.0095	-		-
Carbon tetrachloride	0.76	1.4	2.4	22	44	mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
Chlorobenzene	1.1	100	100	500	1000	mg/kg	ND		0.00063	ND		0.00052	ND		0.00047	-		-
Chloroethane						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
Chloroform	0.37	10	49	350	700	mg/kg	ND		0.0019	ND		0.0016	ND		0.0014	-		-
Chloromethane						mg/kg	ND		0.0051	ND		0.0042	ND		0.0038	-		-
cis-1,2-Dichloroethene	0.25	59	100	500	1000	mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
cis-1,3-Dichloropropene						mg/kg	ND		0.00063	ND		0.00052	ND		0.00047	-		-
Dibromochloromethane						mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
Dibromomethane						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
Dichlorodifluoromethane						mg/kg	ND		0.013	ND		0.01	ND		0.0095	-		-
Ethyl ether						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
Ethylbenzene	1	30	41	390	780	mg/kg	ND		0.0013	ND		0.001	0.00036	J	0.00095	-		-
Hexachlorobutadiene						mg/kg	ND		0.0051	ND		0.0042	ND		0.0038	-		-
Isopropylbenzene						mg/kg	ND		0.0013	ND		0.001	0.00046	J	0.00095	-		-
Methyl tert butyl ether	0.93	62	100	500	1000	mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
Methylene chloride	0.05	51	100	500	1000	mg/kg	ND		0.0063	0.003	J	0.0052	ND		0.0047	-		-
n-Butylbenzene	12	100	100	500	1000	mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
n-Propylbenzene	3.9	100	100	500	1000	mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
Naphthalene	12	100	100	500	1000	mg/kg	ND		0.0051	ND		0.0042	ND		0.0038	-		-
o-Chlorotoluene						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
o-Xylene						mg/kg	ND		0.0013	ND		0.001	0.00096		0.00095	-		-
p-Chlorotoluene						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
p-Diethylbenzene						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
p-Ethyltoluene						mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
p-Isopropyltoluene						mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
p/m-Xylene						mg/kg	ND		0.0025	ND		0.0021	0.0026		0.0019	-		-
sec-Butylbenzene	11	100	100	500	1000	mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
Styrene						mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
tert-Butylbenzene	5.9	100	100	500	1000	mg/kg	ND		0.0025	ND		0.0021	ND		0.0019	-		-
Tetrachloroethene	1.3	5.5	19	150	300	mg/kg	ND		0.00063	ND		0.00052	ND		0.00047	-		-
Toluene	0.7	100	100	500	1000	mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
trans-1,2-Dichloroethene	0.19	100	100	500	1000	mg/kg	ND		0.0019	ND		0.0016	ND		0.0014	-		-
trans-1,3-Dichloropropene						mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
trans-1,4-Dichloro-2-butene						mg/kg	ND		0.0063	ND		0.0052	ND		0.0047	-		-
Trichloroethene	0.47	10	21	200	400	mg/kg	ND		0.00063	ND		0.00052	ND		0.00047	-		-

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

SAMPLE ID:							**B-8 (4-4.5)**			**B-9 (3.5-4)**			**B-10 (3.5-4)**			**B-10 (3.5-4)**		
LAB ID:							**L2432305-09**			**L2432305-10**			**L2432804-01**			**L2432804-01 R1**		
COLLECTION DATE:							**6/10/2024**			**6/10/2024**			**6/11/2024**			**6/11/2024**		
SAMPLE MATRIX:							**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
Trichlorofluoromethane						mg/kg	ND		0.0051	ND		0.0042	ND		0.0038	-		-
Vinyl acetate						mg/kg	ND		0.013	ND		0.01	ND		0.0095	-		-
Vinyl chloride	0.02	0.21	0.9	13	27	mg/kg	ND		0.0013	ND		0.001	ND		0.00095	-		-
Xylenes, Total	0.26	100	100	500	1000	mg/kg	ND		0.0013	ND		0.001	0.0036		0.00095	-		-

NOTES:
ND - Analyte was not detected.
J - Estimated value.
I - The lower value for the two columns has been reported due to obvious interference.
P - The RPD between the results for the two columns exceeds the method-specific criteria.
E - Concentration of analyte exceeds range of calibration curve and/or linear range of instrument.
Q - Sample qualifier.
mg/kg - Milligrams per kilogram.

KEY:

	Value Exceeds USCO.
	Value Exceeds RSCO.
	Value Exceeds RRSCO.
	Value Exceeds CSCO.
	Value Exceeds ISCO.

USCO: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
RSCO: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
RRSCO: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
CSCO: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
ISCO: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	**B-12 (3-3.5)**			**B-12 (3-3.5)**			**B-14 (6.5-7)**			**B-16 (3.5-4)**		
						LAB ID:	**L2432804-03**			**L2432804-03 R1**			**L2433160-04**			**L2432804-07**		
						COLLECTION DATE:	**6/11/2024**			**6/11/2024**			**6/12/2024**			**6/11/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
GENERAL CHEMISTRY																		
Cyanide, Total	27	27	27	27	10000	mg/kg	0.32	J	1	-		-	ND		1	0.46	J	1.1
Solids, Total						%	90.4		0.1	-		-	91.6		0.1	91.2		0.1
ORGANOCHLORINE PESTICIDES																		
4,4'-DDD	0.0033	2.6	13	92	180	mg/kg	ND		0.00167	-		-	ND		0.00166	ND		0.00172
4,4'-DDE	0.0033	1.8	8.9	62	120	mg/kg	ND		0.00167	-		-	0.000935	J	0.00166	ND		0.00172
4,4'-DDT	0.0033	1.7	7.9	47	94	mg/kg	ND		0.00167	-		-	0.00274		0.00166	ND		0.00172
Aldrin	0.005	0.019	0.097	0.68	1.4	mg/kg	ND		0.00167	-		-	ND		0.00166	ND		0.00172
Alpha-BHC	0.02	0.097	0.48	3.4	6.8	mg/kg	ND		0.000697	-		-	ND		0.000691	ND		0.000716
Beta-BHC	0.036	0.072	0.36	3	14	mg/kg	ND		0.00167	-		-	ND		0.00166	ND		0.00172
Chlordane						mg/kg	ND		0.0139	-		-	0.0395		0.0138	ND		0.0143
cis-Chlordane	0.094	0.91	4.2	24	47	mg/kg	ND		0.00209	-		-	0.00306	IP	0.00207	ND		0.00215
Delta-BHC	0.04	100	100	500	1000	mg/kg	ND		0.00167	-		-	ND		0.00166	ND		0.00172
Dieldrin	0.005	0.039	0.2	1.4	2.8	mg/kg	ND		0.00105	-		-	0.000705	J	0.00104	ND		0.00107
Endosulfan I	2.4	4.8	24	200	920	mg/kg	ND		0.00167	-		-	ND		0.00166	ND		0.00172
Endosulfan II	2.4	4.8	24	200	920	mg/kg	ND		0.00167	-		-	ND		0.00166	ND		0.00172
Endosulfan sulfate	2.4	4.8	24	200	920	mg/kg	ND		0.000697	-		-	ND		0.000691	ND		0.000716
Endrin	0.014	2.2	11	89	410	mg/kg	ND		0.000697	-		-	ND		0.000691	ND		0.000716
Endrin aldehyde						mg/kg	ND		0.00209	-		-	ND		0.00207	ND		0.00215
Endrin ketone						mg/kg	ND		0.00167	-		-	ND		0.00166	ND		0.00172
Heptachlor	0.042	0.42	2.1	15	29	mg/kg	ND		0.000837	-		-	ND		0.00083	ND		0.000859
Heptachlor epoxide						mg/kg	ND		0.00314	-		-	ND		0.00311	ND		0.00322
Lindane	0.1	0.28	1.3	9.2	23	mg/kg	ND		0.000697	-		-	ND		0.000691	ND		0.000716
Methoxychlor						mg/kg	ND		0.00314	-		-	ND		0.00311	ND		0.00322
Toxaphene						mg/kg	ND		0.0314	-		-	ND		0.0311	ND		0.0322
trans-Chlordane						mg/kg	ND		0.00209	-		-	0.00529		0.00207	ND		0.00215
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)																		
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)						mg/kg	ND		0.00434	-		-	ND		0.000723	ND		0.0008
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)						mg/kg	ND		0.00434	-		-	ND		0.000723	0.000342	J	0.0008
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
Perfluorobutanesulfonic Acid (PFBS)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
Perfluorobutanoic Acid (PFBA)						mg/kg	ND		0.00434	-		-	ND		0.000723	ND		0.0008
Perfluorodecanesulfonic Acid (PFDS)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
Perfluorodecanoic Acid (PFDA)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
Perfluorododecanoic Acid (PFDoA)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
Perfluoroheptanesulfonic Acid (PFHpS)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
Perfluoroheptanoic Acid (PFHpA)						mg/kg	ND		0.00108	-		-	ND		0.000181	0.000066	J	0.0002
Perfluorohexanesulfonic Acid (PFHxS)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
Perfluorohexanoic Acid (PFHxA)						mg/kg	ND		0.00108	-		-	0.000051	J	0.000181	0.000073	J	0.0002
Perfluorononanoic Acid (PFNA)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
Perfluorooctanesulfonamide (PFOSA)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
Perfluorooctanesulfonic Acid (PFOS)	0.00088	0.0088	0.044	0.440	0.440	mg/kg	0.000685	J	0.00108	-		-	0.000234		0.000181	**0.00172**		**0.0002**
Perfluorooctanoic Acid (PFOA)	0.00066	0.0066	0.033	0.500	0.600	mg/kg	ND		0.00108	-		-	0.000075	J	0.000181	0.000392		0.0002
Perfluoropentanoic Acid (PFPeA)						mg/kg	ND		0.00217	-		-	ND		0.000361	0.000112	J	0.0004
Perfluorotetradecanoic Acid (PFTeDA)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
Perfluorotridecanoic Acid (PFTrDA)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
Perfluoroundecanoic Acid (PFUnA)						mg/kg	ND		0.00108	-		-	ND		0.000181	ND		0.0002
PFOA/PFOS, Total						mg/kg	0.000685	J	0.00108	-		-	0.000309	J	0.000181	0.00211		0.0002
POLYCHLORINATED BIPHENYLS (PCBs)																		
Aroclor 1016	0.1	1	1	1	25	mg/kg	ND		0.0536	-		-	ND		0.0518	ND		0.263
Aroclor 1221	0.1	1	1	1	25	mg/kg	ND		0.0536	-		-	ND		0.0518	ND		0.263
Aroclor 1232	0.1	1	1	1	25	mg/kg	ND		0.0536	-		-	ND		0.0518	ND		0.263
Aroclor 1242	0.1	1	1	1	25	mg/kg	ND		0.0536	-		-	ND		0.0518	ND		0.263
Aroclor 1248	0.1	1	1	1	25	mg/kg	ND		0.0536	-		-	ND		0.0518	ND		0.263
Aroclor 1254	0.1	1	1	1	25	mg/kg	ND		0.0536	-		-	ND		0.0518	0.0832	J	0.263
Aroclor 1260	0.1	1	1	1	25	mg/kg	ND		0.0536	-		-	ND		0.0518	ND		0.263
Aroclor 1262	0.1	1	1	1	25	mg/kg	ND		0.0536	-		-	ND		0.0518	ND		0.263
Aroclor 1268	0.1	1	1	1	25	mg/kg	ND		0.0536	-		-	ND		0.0518	ND		0.263
PCBs, Total	0.1	1	1	1	25	mg/kg	ND		0.0536	-		-	ND		0.0518	0.0832	J	0.263

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	**B-12 (3-3.5)**			**B-12 (3-3.5)**			**B-14 (6.5-7)**			**B-16 (3.5-4)**		
						LAB ID:	**L2432804-03**			**L2432804-03 R1**			**L2433160-04**			**L2432804-07**		
						COLLECTION DATE:	**6/11/2024**			**6/11/2024**			**6/12/2024**			**6/11/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)																		
1,2,4,5-Tetrachlorobenzene						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
1,2,4-Trichlorobenzene						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
1,2-Dichlorobenzene	1.1	100	100	500	1000	mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
1,3-Dichlorobenzene	2.4	17	49	280	560	mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
1,4-Dichlorobenzene	1.8	9.8	13	130	250	mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
1,4-Dioxane	0.1	9.8	13	130	250	mg/kg	ND		0.14	-		-	ND		0.27	ND		0.027
2,4,5-Trichlorophenol						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
2,4,6-Trichlorophenol						mg/kg	ND		0.55	-		-	ND		1.1	ND		0.11
2,4-Dichlorophenol						mg/kg	ND		0.82	-		-	ND		1.6	ND		0.16
2,4-Dimethylphenol						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
2,4-Dinitrophenol						mg/kg	ND		4.4	-		-	ND		8.7	ND		0.88
2,4-Dinitrotoluene						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
2,6-Dinitrotoluene						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
2-Chloronaphthalene						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
2-Chlorophenol						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
2-Methylnaphthalene						mg/kg	11		1.1	-		-	ND		2.2	0.32		0.22
2-Methylphenol	0.33	100	100	500	1000	mg/kg	0.15	J	0.91	-		-	ND		1.8	ND		0.18
2-Nitroaniline						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
2-Nitrophenol						mg/kg	ND		2	-		-	ND		3.9	ND		0.39
3,3'-Dichlorobenzidine						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
3-Methylphenol/4-Methylphenol	0.33	34	100	500	1000	mg/kg	**0.53**	**J**	**1.3**	-		-	ND		2.6	0.078	J	0.26
3-Nitroaniline						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
4,6-Dinitro-o-cresol						mg/kg	ND		2.4	-		-	ND		4.7	ND		0.48
4-Bromophenyl phenyl ether						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
4-Chloroaniline						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
4-Chlorophenyl phenyl ether						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
4-Nitroaniline						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
4-Nitrophenol						mg/kg	ND		1.3	-		-	ND		2.5	ND		0.26
Acenaphthene	20	100	100	500	1000	mg/kg	3.8		0.73	-		-	ND		1.4	0.54		0.15
Acenaphthylene	100	100	100	500	1000	mg/kg	3.3		0.73	-		-	ND		1.4	1.7		0.15
Acetophenone						mg/kg	ND		0.91	-		-	ND		1.8	0.16	J	0.18
Anthracene	100	100	100	500	1000	mg/kg	13		0.55	-		-	ND		1.1	2.7		0.11
Benzo(a)anthracene	1	1	1	5.6	11	mg/kg	**19**		**0.55**	-		-	ND		1.1	**4.4**		**0.11**
Benzo(a)pyrene	1	1	1	1	1.1	mg/kg	**15**		**0.73**	-		-	ND		1.4	**4.3**		**0.15**
Benzo(b)fluoranthene	1	1	1	5.6	11	mg/kg	**17**		**0.55**	-		-	ND		1.1	**6.9**		**0.11**
Benzo(ghi)perylene	100	100	100	500	1000	mg/kg	8.8		0.73	-		-	ND		1.4	3.6		0.15
Benzo(k)fluoranthene	0.8	1	3.9	56	110	mg/kg	**6.4**		**0.55**	-		-	ND		1.1	**1.4**		**0.11**
Benzoic Acid						mg/kg	ND		3	-		-	ND		5.8	ND		0.59
Benzyl Alcohol						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
Biphenyl						mg/kg	1.5	J	2.1	-		-	ND		4.1	0.062	J	0.42
Bis(2-chloroethoxy)methane						mg/kg	ND		0.99	-		-	ND		2	ND		0.2
Bis(2-chloroethyl)ether						mg/kg	ND		0.82	-		-	ND		1.6	ND		0.16
Bis(2-chloroisopropyl)ether						mg/kg	ND		1.1	-		-	ND		2.2	ND		0.22
Bis(2-ethylhexyl)phthalate						mg/kg	ND		0.91	-		-	ND		1.8	0.61		0.18
Butyl benzyl phthalate						mg/kg	ND		0.91	-		-	28		1.8	0.43		0.18
Carbazole						mg/kg	3.1		0.91	-		-	ND		1.8	0.69		0.18
Chrysene	1	1	3.9	56	110	mg/kg	**17**		**0.55**	-		-	ND		1.1	**4.2**		**0.11**
Di-n-butylphthalate						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
Di-n-octylphthalate						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
Dibenzo(a,h)anthracene	0.33	0.33	0.33	0.56	1.1	mg/kg	**2.3**		**0.55**	-		-	ND		1.1	**0.7**		**0.11**
Dibenzofuran	7	14	59	350	1000	mg/kg	6.5		0.91	-		-	ND		1.8	0.41		0.18
Diethyl phthalate						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
Dimethyl phthalate						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
Fluoranthene	100	100	100	500	1000	mg/kg	37	E	0.55	45		2.7	0.33	J	1.1	6.5		0.11
Fluorene	30	100	100	500	1000	mg/kg	8.4		0.91	-		-	ND		1.8	0.51		0.18
Hexachlorobenzene	0.33	0.33	1.2	6	12	mg/kg	ND		0.55	-		-	ND		1.1	ND		0.11
Hexachlorobutadiene						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18

Table 2.2
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2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	**B-12 (3-3.5)**			**B-12 (3-3.5)**			**B-14 (6.5-7)**			**B-16 (3.5-4)**		
						LAB ID:	**L2432804-03**			**L2432804-03 R1**			**L2433160-04**			**L2432804-07**		
						COLLECTION DATE:	**6/11/2024**			**6/11/2024**			**6/12/2024**			**6/11/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
Hexachlorocyclopentadiene						mg/kg	ND		2.6	-		-	ND		5.2	ND		0.52
Hexachloroethane						mg/kg	ND		0.73	-		-	ND		1.4	ND		0.15
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5	5.6	11	mg/kg	**8.5**		**0.73**	-		-	ND		1.4	**3.3**		**0.15**
Isophorone						mg/kg	ND		0.82	-		-	ND		1.6	ND		0.16
n-Nitrosodi-n-propylamine						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
Naphthalene	12	100	100	500	1000	mg/kg	**27**		**0.91**	-		-	ND		1.8	0.46		0.18
NDPA/DPA						mg/kg	ND		0.73	-		-	ND		1.4	ND		0.15
Nitrobenzene						mg/kg	ND		0.82	-		-	ND		1.6	ND		0.16
p-Chloro-m-cresol						mg/kg	ND		0.91	-		-	ND		1.8	ND		0.18
Pentachlorophenol	0.8	2.4	6.7	6.7	55	mg/kg	ND		0.73	-		-	ND		1.4	ND		0.15
Phenanthrene	100	100	100	500	1000	mg/kg	38	E	0.55	42		2.7	0.28	J	1.1	3.3		0.11
Phenol	0.33	100	100	500	1000	mg/kg	0.21	J	0.91	-		-	ND		1.8	0.066	J	0.18
Pyrene	100	100	100	500	1000	mg/kg	32		0.55	-		-	0.3	J	1.1	6		0.11
TOTAL METALS																		
Aluminum, Total						mg/kg	2500		8.54	-		-	3500		8.27	4250		8.43
Antimony, Total						mg/kg	0.84	J	4.27	-		-	ND		4.14	10.9		4.22
Arsenic, Total	13	16	16	16	16	mg/kg	**59.3**		**0.854**	-		-	0.64	J	0.827	9.28		0.843
Barium, Total	350	350	400	400	10000	mg/kg	86.9		0.854	-		-	41.7		0.827	249		0.843
Beryllium, Total	7.2	14	72	590	2700	mg/kg	0.298	J	0.427	-		-	0.112	J	0.414	0.286	J	0.422
Cadmium, Total	2.5	2.5	4.3	9.3	60	mg/kg	ND		0.854	-		-	ND		0.827	0.93		0.843
Calcium, Total						mg/kg	6000		8.54	-		-	2030		8.27	4180		8.43
Chromium, Total						mg/kg	7.61		0.854	-		-	25		0.827	23.9		0.843
Cobalt, Total						mg/kg	3.55		1.71	-		-	1.5	J	1.65	4.63		1.69
Copper, Total	50	270	270	270	10000	mg/kg	**54.3**		**0.854**	-		-	8.9		0.827	**118**		**0.843**
Iron, Total						mg/kg	20700		4.27	-		-	3920		4.14	22100		4.22
Lead, Total	63	400	400	1000	3900	mg/kg	**168**		**4.27**	-		-	61.9		4.14	**1,640**		**4.22**
Magnesium, Total						mg/kg	611		8.54	-		-	1170		8.27	1710		8.43
Manganese, Total	1600	2000	2000	10000	10000	mg/kg	117		0.854	-		-	38.8		0.827	162		0.843
Mercury, Total	0.18	0.81	0.81	2.8	5.7	mg/kg	0.103		0.075	-		-	ND		0.069	**0.185**		**0.074**
Nickel, Total	30	140	310	310	10000	mg/kg	13.9		2.13	-		-	6.38		2.07	20.2		2.11
Potassium, Total						mg/kg	362		213	-		-	311		207	555		211
Selenium, Total	3.9	36	180	1500	6800	mg/kg	0.267	J	1.71	-		-	ND		1.65	0.237	J	1.69
Silver, Total	2	36	180	1500	6800	mg/kg	0.714		0.427	-		-	ND		0.414	0.953		0.422
Sodium, Total						mg/kg	156	J	171	-		-	64.7	J	165	157	J	169
Thallium, Total						mg/kg	0.386	J	1.71	-		-	ND		1.65	0.49	J	1.69
Vanadium, Total						mg/kg	31.9		0.854	-		-	6.53		0.827	43		0.843
Zinc, Total	109	2200	10000	10000	10000	mg/kg	76.5		4.27	-		-	31.8		4.14	**576**		**4.22**
VOLATILE ORGANIC COMPOUNDS (VOCs)																		
1,1,1,2-Tetrachloroethane						mg/kg	ND		3.7	-		-	ND		0.00053	ND		0.00061
1,1,1-Trichloroethane	0.68	100	100	500	1000	mg/kg	ND		3.7	-		-	ND		0.00053	ND		0.00061
1,1,2,2-Tetrachloroethane						mg/kg	ND		3.7	-		-	ND		0.00053	ND		0.00061
1,1,2-Trichloroethane						mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
1,1-Dichloroethane	0.27	19	26	240	480	mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
1,1-Dichloroethene	0.33	100	100	500	1000	mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
1,1-Dichloropropene						mg/kg	ND		3.7	-		-	ND		0.00053	ND		0.00061
1,2,3-Trichlorobenzene						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
1,2,3-Trichloropropane						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
1,2,4,5-Tetramethylbenzene						mg/kg	12	J	15	-		-	ND		0.0021	ND		0.0024
1,2,4-Trichlorobenzene						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
1,2,4-Trimethylbenzene	3.6	47	52	190	380	mg/kg	**27**		**15**	-		-	ND		0.0021	ND		0.0024
1,2-Dibromo-3-chloropropane						mg/kg	ND		22	-		-	ND		0.0032	ND		0.0037
1,2-Dibromoethane						mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
1,2-Dichlorobenzene	1.1	100	100	500	1000	mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
1,2-Dichloroethane	0.02	2.3	3.1	30	60	mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
1,2-Dichloroethene, Total						mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
1,2-Dichloropropane						mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012

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						SAMPLE ID:	**B-12 (3-3.5)**			**B-12 (3-3.5)**			**B-14 (6.5-7)**			**B-16 (3.5-4)**		
						LAB ID:	**L2432804-03**			**L2432804-03 R1**			**L2433160-04**			**L2432804-07**		
						COLLECTION DATE:	**6/11/2024**			**6/11/2024**			**6/12/2024**			**6/11/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
1,3,5-Trimethylbenzene	8.4	47	52	190	380	mg/kg	**11**	**J**	**15**	-		-	ND		0.0021	ND		0.0024
1,3-Dichlorobenzene	2.4	17	49	280	560	mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
1,3-Dichloropropane						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
1,3-Dichloropropene, Total						mg/kg	ND		3.7	-		-	ND		0.00053	ND		0.00061
1,4-Dichlorobenzene	1.8	9.8	13	130	250	mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
1,4-Dioxane	0.1	9.8	13	130	250	mg/kg	ND		600	-		-	ND		0.085	ND		0.098
2,2-Dichloropropane						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
2-Butanone	0.12	100	100	500	1000	mg/kg	ND		74	-		-	ND		0.011	ND		0.012
2-Hexanone						mg/kg	ND		74	-		-	ND		0.011	ND		0.012
4-Methyl-2-pentanone						mg/kg	ND		74	-		-	ND		0.011	ND		0.012
Acetone	0.05	100	100	500	1000	mg/kg	ND		74	-		-	ND		0.011	ND		0.012
Acrylonitrile						mg/kg	ND		30	-		-	ND		0.0043	ND		0.0049
Benzene	0.06	2.9	4.8	44	89	mg/kg	ND		3.7	-		-	ND		0.00053	0.00044	J	0.00061
Bromobenzene						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
Bromochloromethane						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
Bromodichloromethane						mg/kg	ND		3.7	-		-	ND		0.00053	ND		0.00061
Bromoform						mg/kg	ND		30	-		-	ND		0.0043	ND		0.0049
Bromomethane						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
Carbon disulfide						mg/kg	ND		74	-		-	ND		0.011	ND		0.012
Carbon tetrachloride	0.76	1.4	2.4	22	44	mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
Chlorobenzene	1.1	100	100	500	1000	mg/kg	ND		3.7	-		-	ND		0.00053	ND		0.00061
Chloroethane						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
Chloroform	0.37	10	49	350	700	mg/kg	ND		11	-		-	ND		0.0016	ND		0.0018
Chloromethane						mg/kg	ND		30	-		-	ND		0.0043	ND		0.0049
cis-1,2-Dichloroethene	0.25	59	100	500	1000	mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
cis-1,3-Dichloropropene						mg/kg	ND		3.7	-		-	ND		0.00053	ND		0.00061
Dibromochloromethane						mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
Dibromomethane						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
Dichlorodifluoromethane						mg/kg	ND		74	-		-	ND		0.011	ND		0.012
Ethyl ether						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
Ethylbenzene	1	30	41	390	780	mg/kg	ND		7.4	-		-	ND		0.0011	0.0004	J	0.0012
Hexachlorobutadiene						mg/kg	ND		30	-		-	ND		0.0043	ND		0.0049
Isopropylbenzene						mg/kg	3.4	J	7.4	-		-	ND		0.0011	0.00059	J	0.0012
Methyl tert butyl ether	0.93	62	100	500	1000	mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
Methylene chloride	0.05	51	100	500	1000	mg/kg	ND		37	-		-	ND		0.0053	ND		0.0061
n-Butylbenzene	12	100	100	500	1000	mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
n-Propylbenzene	3.9	100	100	500	1000	mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
Naphthalene	12	100	100	500	1000	mg/kg	**2,500**	**E**	**30**	**2,300**		**60**	ND		0.0043	ND		0.0049
o-Chlorotoluene						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
o-Xylene						mg/kg	9.2		7.4	-		-	ND		0.0011	0.0012		0.0012
p-Chlorotoluene						mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
p-Diethylbenzene						mg/kg	13	J	15	-		-	ND		0.0021	ND		0.0024
p-Ethyltoluene						mg/kg	7	J	15	-		-	ND		0.0021	ND		0.0024
p-Isopropyltoluene						mg/kg	4.3	J	7.4	-		-	ND		0.0011	ND		0.0012
p/m-Xylene						mg/kg	13	J	15	-		-	ND		0.0021	0.0026		0.0024
sec-Butylbenzene	11	100	100	500	1000	mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
Styrene						mg/kg	6	J	7.4	-		-	ND		0.0011	ND		0.0012
tert-Butylbenzene	5.9	100	100	500	1000	mg/kg	ND		15	-		-	ND		0.0021	ND		0.0024
Tetrachloroethene	1.3	5.5	19	150	300	mg/kg	ND		3.7	-		-	0.00044	J	0.00053	0.00055	J	0.00061
Toluene	0.7	100	100	500	1000	mg/kg	ND		7.4	-		-	ND		0.0011	0.00074	J	0.0012
trans-1,2-Dichloroethene	0.19	100	100	500	1000	mg/kg	ND		11	-		-	ND		0.0016	ND		0.0018
trans-1,3-Dichloropropene						mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
trans-1,4-Dichloro-2-butene						mg/kg	ND		37	-		-	ND		0.0053	ND		0.0061
Trichloroethene	0.47	10	21	200	400	mg/kg	ND		3.7	-		-	ND		0.00053	ND		0.00061

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

SAMPLE ID:							**B-12 (3-3.5)**			**B-12 (3-3.5)**			**B-14 (6.5-7)**			**B-16 (3.5-4)**		
LAB ID:							**L2432804-03**			**L2432804-03 R1**			**L2433160-04**			**L2432804-07**		
COLLECTION DATE:							**6/11/2024**			**6/11/2024**			**6/12/2024**			**6/11/2024**		
SAMPLE MATRIX:							**SOIL**			**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
Trichlorofluoromethane						mg/kg	ND		30	-		-	ND		0.0043	ND		0.0049
Vinyl acetate						mg/kg	ND		74	-		-	ND		0.011	ND		0.012
Vinyl chloride	0.02	0.21	0.9	13	27	mg/kg	ND		7.4	-		-	ND		0.0011	ND		0.0012
Xylenes, Total	0.26	100	100	500	1000	mg/kg	**22**	**J**	**7.4**	-		-	ND		0.0011	0.0038		0.0012

NOTES:
ND - Analyte was not detected.
J - Estimated value.
I - The lower value for the two columns has been reported due to obvious interference.
P - The RPD between the results for the two columns exceeds the method-specific criteria.
E - Concentration of analyte exceeds range of calibration curve and/or linear range of instrument.
Q - Sample qualifier.
mg/kg - Milligrams per kilogram.

KEY:

Value Exceeds USCO.
Value Exceeds RSCO.
Value Exceeds RRSCO.
Value Exceeds CSCO.
Value Exceeds ISCO.

USCO: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
RSCO: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
RRSCO: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
CSCO: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
ISCO: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	B-19 (4-4.5)			B-25 (3-3.5)			B-25 (3-3.5)		
						LAB ID:	L2433160-07			L2433831-03			L2433831-03 R1		
						COLLECTION DATE:	6/12/2024			6/14/2024			6/14/2024		
						SAMPLE MATRIX:	SOIL			SOIL			SOIL		
	USCO	RSCO	RRSCO	CSCO	ISCO	Units	Results	Q	RL	Results	Q	RL	Results	Q	RL
GENERAL CHEMISTRY															
Cyanide, Total	27	27	27	27	10000	mg/kg	ND		1.1	ND		1.6	-		-
Solids, Total						%	90.7		0.1	62.9		0.1	-		-
ORGANOCHLORINE PESTICIDES															
4,4'-DDD	0.0033	2.6	13	92	180	mg/kg	ND		0.00166	ND		0.00244	-		-
4,4'-DDE	0.0033	1.8	8.9	62	120	mg/kg	ND		0.00166	ND		0.00244	-		-
4,4'-DDT	0.0033	1.7	7.9	47	94	mg/kg	**0.0046**		**0.00166**	ND		0.00244	-		-
Aldrin	0.005	0.019	0.097	0.68	1.4	mg/kg	ND		0.00166	ND		0.00244	-		-
Alpha-BHC	0.02	0.097	0.48	3.4	6.8	mg/kg	ND		0.000692	ND		0.00102	-		-
Beta-BHC	0.036	0.072	0.36	3	14	mg/kg	ND		0.00166	ND		0.00244	-		-
Chlordane						mg/kg	ND		0.0138	ND		0.0203	-		-
cis-Chlordane	0.094	0.91	4.2	24	47	mg/kg	0.000836	J	0.00208	ND		0.00304	-		-
Delta-BHC	0.04	100	100	500	1000	mg/kg	ND		0.00166	ND		0.00244	-		-
Dieldrin	0.005	0.039	0.2	1.4	2.8	mg/kg	ND		0.00104	ND		0.00152	-		-
Endosulfan I	2.4	4.8	24	200	920	mg/kg	ND		0.00166	ND		0.00244	-		-
Endosulfan II	2.4	4.8	24	200	920	mg/kg	ND		0.00166	ND		0.00244	-		-
Endosulfan sulfate	2.4	4.8	24	200	920	mg/kg	ND		0.000692	ND		0.00102	-		-
Endrin	0.014	2.2	11	89	410	mg/kg	ND		0.000692	ND		0.00102	-		-
Endrin aldehyde						mg/kg	ND		0.00208	ND		0.00304	-		-
Endrin ketone						mg/kg	ND		0.00166	ND		0.00244	-		-
Heptachlor	0.042	0.42	2.1	15	29	mg/kg	ND		0.000831	ND		0.00122	-		-
Heptachlor epoxide						mg/kg	ND		0.00312	ND		0.00457	-		-
Lindane	0.1	0.28	1.3	9.2	23	mg/kg	ND		0.000692	ND		0.00102	-		-
Methoxychlor						mg/kg	ND		0.00312	ND		0.00457	-		-
Toxaphene						mg/kg	ND		0.0312	ND		0.0457	-		-
trans-Chlordane						mg/kg	ND		0.00208	ND		0.00304	-		-
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)															
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)						mg/kg	ND		0.000711	ND		0.000788	-		-
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)						mg/kg	ND		0.000711	ND		0.000788	-		-
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)						mg/kg	ND		0.000178	ND		0.000197	-		-
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)						mg/kg	ND		0.000178	ND		0.000197	-		-
Perfluorobutanesulfonic Acid (PFBS)						mg/kg	ND		0.000178	ND		0.000197	-		-
Perfluorobutanoic Acid (PFBA)						mg/kg	0.000068	J	0.000711	ND		0.000788	-		-
Perfluorodecanesulfonic Acid (PFDS)						mg/kg	ND		0.000178	ND		0.000197	-		-
Perfluorodecanoic Acid (PFDA)						mg/kg	0.000319		0.000178	ND		0.000197	-		-
Perfluorododecanoic Acid (PFDoA)						mg/kg	0.000105	J	0.000178	ND		0.000197	-		-
Perfluoroheptanesulfonic Acid (PFHpS)						mg/kg	ND		0.000178	ND		0.000197	-		-
Perfluoroheptanoic Acid (PFHpA)						mg/kg	0.0001	J	0.000178	ND		0.000197	-		-
Perfluorohexanesulfonic Acid (PFHxS)						mg/kg	ND		0.000178	ND		0.000197	-		-
Perfluorohexanoic Acid (PFHxA)						mg/kg	0.000055	J	0.000178	0.000051	J	0.000197	-		-
Perfluorononanoic Acid (PFNA)						mg/kg	0.000124	J	0.000178	ND		0.000197	-		-
Perfluorooctanesulfonamide (PFOSA)						mg/kg	ND		0.000178	ND		0.000197	-		-
Perfluorooctanesulfonic Acid (PFOS)	0.00088	0.0088	0.044	0.440	0.440	mg/kg	0.00037		0.000178	0.00242		0.000197	-		-
Perfluorooctanoic Acid (PFOA)	0.00066	0.0066	0.033	0.500	0.600	mg/kg	0.000204		0.000178	ND		0.000197	-		-
Perfluoropentanoic Acid (PFPeA)						mg/kg	0.000058	J	0.000356	0.000102	J	0.000394	-		-
Perfluorotetradecanoic Acid (PFTeDA)						mg/kg	ND		0.000178	ND		0.000197	-		-
Perfluorotridecanoic Acid (PFTrDA)						mg/kg	0.000063	J	0.000178	ND		0.000197	-		-
Perfluoroundecanoic Acid (PFUnA)						mg/kg	0.000196		0.000178	ND		0.000197	-		-
PFOA/PFOS, Total						mg/kg	0.000574		0.000178	0.00242		0.000197	-		-
POLYCHLORINATED BIPHENYLS (PCBs)															
Aroclor 1016	0.1	1	1	1	25	mg/kg	ND		0.0518	ND		0.0726	-		-
Aroclor 1221	0.1	1	1	1	25	mg/kg	ND		0.0518	ND		0.0726	-		-
Aroclor 1232	0.1	1	1	1	25	mg/kg	ND		0.0518	ND		0.0726	-		-
Aroclor 1242	0.1	1	1	1	25	mg/kg	ND		0.0518	ND		0.0726	-		-
Aroclor 1248	0.1	1	1	1	25	mg/kg	ND		0.0518	ND		0.0726	-		-
Aroclor 1254	0.1	1	1	1	25	mg/kg	0.0127	J	0.0518	ND		0.0726	-		-
Aroclor 1260	0.1	1	1	1	25	mg/kg	0.013	J	0.0518	ND		0.0726	-		-
Aroclor 1262	0.1	1	1	1	25	mg/kg	ND		0.0518	ND		0.0726	-		-
Aroclor 1268	0.1	1	1	1	25	mg/kg	ND		0.0518	ND		0.0726	-		-
PCBs, Total	0.1	1	1	1	25	mg/kg	0.0257	J	0.0518	ND		0.0726	-		-

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	**B-19 (4-4.5)**			**B-25 (3-3.5)**			**B-25 (3-3.5)**		
						LAB ID:	**L2433160-07**			**L2433831-03**			**L2433831-03 R1**		
						COLLECTION DATE:	**6/12/2024**			**6/14/2024**			**6/14/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)															
1,2,4,5-Tetrachlorobenzene						mg/kg	ND		0.18	ND		0.26	-		-
1,2,4-Trichlorobenzene						mg/kg	ND		0.18	ND		0.26	-		-
1,2-Dichlorobenzene	1.1	100	100	500	1000	mg/kg	ND		0.18	ND		0.26	-		-
1,3-Dichlorobenzene	2.4	17	49	280	560	mg/kg	ND		0.18	ND		0.26	-		-
1,4-Dichlorobenzene	1.8	9.8	13	130	250	mg/kg	ND		0.18	ND		0.26	-		-
1,4-Dioxane	0.1	9.8	13	130	250	mg/kg	ND		0.027	ND		0.039	-		-
2,4,5-Trichlorophenol						mg/kg	ND		0.18	ND		0.26	-		-
2,4,6-Trichlorophenol						mg/kg	ND		0.11	ND		0.16	-		-
2,4-Dichlorophenol						mg/kg	ND		0.16	ND		0.23	-		-
2,4-Dimethylphenol						mg/kg	ND		0.18	ND		0.26	-		-
2,4-Dinitrophenol						mg/kg	ND		0.86	ND		1.2	-		-
2,4-Dinitrotoluene						mg/kg	ND		0.18	ND		0.26	-		-
2,6-Dinitrotoluene						mg/kg	ND		0.18	ND		0.26	-		-
2-Chloronaphthalene						mg/kg	ND		0.18	ND		0.26	-		-
2-Chlorophenol						mg/kg	ND		0.18	ND		0.26	-		-
2-Methylnaphthalene						mg/kg	0.055	J	0.21	12	E	0.31	14		3.1
2-Methylphenol	0.33	100	100	500	1000	mg/kg	ND		0.18	0.057	J	0.26	-		-
2-Nitroaniline						mg/kg	ND		0.18	ND		0.26	-		-
2-Nitrophenol						mg/kg	ND		0.38	ND		0.56	-		-
3,3'-Dichlorobenzidine						mg/kg	ND		0.18	ND		0.26	-		-
3-Methylphenol/4-Methylphenol	0.33	34	100	500	1000	mg/kg	ND		0.26	0.047	J	0.37	-		-
3-Nitroaniline						mg/kg	ND		0.18	ND		0.26	-		-
4,6-Dinitro-o-cresol						mg/kg	ND		0.46	ND		0.67	-		-
4-Bromophenyl phenyl ether						mg/kg	ND		0.18	ND		0.26	-		-
4-Chloroaniline						mg/kg	ND		0.18	ND		0.26	-		-
4-Chlorophenyl phenyl ether						mg/kg	ND		0.18	ND		0.26	-		-
4-Nitroaniline						mg/kg	ND		0.18	ND		0.26	-		-
4-Nitrophenol						mg/kg	ND		0.25	ND		0.36	-		-
Acenaphthene	20	100	100	500	1000	mg/kg	0.11	J	0.14	11	E	0.21	14		2.1
Acenaphthylene	100	100	100	500	1000	mg/kg	0.69		0.14	2.1		0.21	-		-
Acetophenone						mg/kg	ND		0.18	ND		0.26	-		-
Anthracene	100	100	100	500	1000	mg/kg	0.78		0.11	22	E	0.16	31		1.6
Benzo(a)anthracene	1	1	1	5.6	11	mg/kg	**2.1**		**0.11**	**19**	**E**	**0.16**	**25**		**1.6**
Benzo(a)pyrene	1	1	1	1	1.1	mg/kg	**1.7**		**0.14**	**12**	**E**	**0.21**	**18**		**2.1**
Benzo(b)fluoranthene	1	1	1	5.6	11	mg/kg	**2.2**		**0.11**	**12**	**E**	**0.16**	**19**		**1.6**
Benzo(ghi)perylene	100	100	100	500	1000	mg/kg	1		0.14	5.9		0.21	-		-
Benzo(k)fluoranthene	0.8	1	3.9	56	110	mg/kg	**0.82**		**0.11**	**3**		**0.16**	-		-
Benzoic Acid						mg/kg	ND		0.58	ND		0.84	-		-
Benzyl Alcohol						mg/kg	ND		0.18	0.4		0.26	-		-
Biphenyl						mg/kg	ND		0.41	2.3		0.59	-		-
Bis(2-chloroethoxy)methane						mg/kg	ND		0.19	ND		0.28	-		-
Bis(2-chloroethyl)ether						mg/kg	ND		0.16	ND		0.23	-		-
Bis(2-chloroisopropyl)ether						mg/kg	ND		0.21	ND		0.31	-		-
Bis(2-ethylhexyl)phthalate						mg/kg	ND		0.18	ND		0.26	-		-
Butyl benzyl phthalate						mg/kg	ND		0.18	ND		0.26	-		-
Carbazole						mg/kg	0.098	J	0.18	4.2		0.26	-		-
Chrysene	1	1	3.9	56	110	mg/kg	**1.9**		**0.11**	**17**	**E**	**0.16**	**23**		**1.6**
Di-n-butylphthalate						mg/kg	ND		0.18	ND		0.26	-		-
Di-n-octylphthalate						mg/kg	ND		0.18	ND		0.26	-		-
Dibenzo(a,h)anthracene	0.33	0.33	0.33	0.56	1.1	mg/kg	0.25		0.11	**1.7**		**0.16**	-		-
Dibenzofuran	7	14	59	350	1000	mg/kg	0.083	J	0.18	**8.5**		**0.26**	-		-
Diethyl phthalate						mg/kg	ND		0.18	ND		0.26	-		-
Dimethyl phthalate						mg/kg	ND		0.18	ND		0.26	-		-
Fluoranthene	100	100	100	500	1000	mg/kg	2.8		0.11	29	E	0.16	45		1.6
Fluorene	30	100	100	500	1000	mg/kg	0.19		0.18	12	E	0.26	15		2.6
Hexachlorobenzene	0.33	0.33	1.2	6	12	mg/kg	ND		0.11	ND		0.16	-		-
Hexachlorobutadiene						mg/kg	ND		0.18	ND		0.26	-		-

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Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	**B-19 (4-4.5)**			**B-25 (3-3.5)**			**B-25 (3-3.5)**		
						LAB ID:	**L2433160-07**			**L2433831-03**			**L2433831-03 R1**		
						COLLECTION DATE:	**6/12/2024**			**6/14/2024**			**6/14/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
Hexachlorocyclopentadiene						mg/kg	ND		0.51	ND		0.74	-		-
Hexachloroethane						mg/kg	ND		0.14	ND		0.21	-		-
Indeno(1,2,3-cd)pyrene	0.5	0.5	0.5	5.6	11	mg/kg	**1**		**0.14**	**5.6**		**0.21**	-		-
Isophorone						mg/kg	ND		0.16	ND		0.23	-		-
n-Nitrosodi-n-propylamine						mg/kg	ND		0.18	ND		0.26	-		-
Naphthalene	12	100	100	500	1000	mg/kg	0.074	J	0.18	11	E	0.26	**15**		**2.6**
NDPA/DPA						mg/kg	ND		0.14	ND		0.21	-		-
Nitrobenzene						mg/kg	ND		0.16	ND		0.23	-		-
p-Chloro-m-cresol						mg/kg	ND		0.18	ND		0.26	-		-
Pentachlorophenol	0.8	2.4	6.7	6.7	55	mg/kg	ND		0.14	ND		0.21	-		-
Phenanthrene	100	100	100	500	1000	mg/kg	1.6		0.11	33	E	0.16	55		1.6
Phenol	0.33	100	100	500	1000	mg/kg	0.037	J	0.18	ND		0.26	-		-
Pyrene	100	100	100	500	1000	mg/kg	2.4		0.11	33	E	0.16	50		1.6
TOTAL METALS															
Aluminum, Total						mg/kg	10700		8.57	10900		12.4	-		-
Antimony, Total						mg/kg	ND		4.28	0.487	J	6.18	-		-
Arsenic, Total	13	16	16	16	16	mg/kg	5.22		0.857	7.12		1.24	-		-
Barium, Total	350	350	400	400	10000	mg/kg	79.1		0.857	**387**		**1.24**	-		-
Beryllium, Total	7.2	14	72	590	2700	mg/kg	0.33	J	0.428	0.441	J	0.618	-		-
Cadmium, Total	2.5	2.5	4.3	9.3	60	mg/kg	ND		0.857	0.682	J	1.24	-		-
Calcium, Total						mg/kg	5830		8.57	4790		12.4	-		-
Chromium, Total						mg/kg	25.8		0.857	28.3		1.24	-		-
Cobalt, Total						mg/kg	7.91		1.71	8.36		2.47	-		-
Copper, Total	50	270	270	270	10000	mg/kg	**54.8**		**0.857**	**69**		**1.24**	-		-
Iron, Total						mg/kg	20000		4.28	20200		6.18	-		-
Lead, Total	63	400	400	1000	3900	mg/kg	**69.8**		**4.28**	**365**		**6.18**	-		-
Magnesium, Total						mg/kg	5450		8.57	4830		12.4	-		-
Manganese, Total	1600	2000	2000	10000	10000	mg/kg	219		0.857	292		1.24	-		-
Mercury, Total	0.18	0.81	0.81	2.8	5.7	mg/kg	**0.261**		**0.07**	**0.259**		**0.104**	-		-
Nickel, Total	30	140	310	310	10000	mg/kg	17.2		2.14	21.3		3.09	-		-
Potassium, Total						mg/kg	1730		214	2040		309	-		-
Selenium, Total	3.9	36	180	1500	6800	mg/kg	ND		1.71	0.491	J	2.47	-		-
Silver, Total	2	36	180	1500	6800	mg/kg	0.471		0.428	0.388	J	0.618	-		-
Sodium, Total						mg/kg	103	J	171	112	J	247	-		-
Thallium, Total						mg/kg	0.752	J	1.71	0.729	J	2.47	-		-
Vanadium, Total						mg/kg	36.8		0.857	34.8		1.24	-		-
Zinc, Total	109	2200	10000	10000	10000	mg/kg	79.1		4.28	**694**		**6.18**	-		-
VOLATILE ORGANIC COMPOUNDS (VOCs)															
1,1,1,2-Tetrachloroethane						mg/kg	ND		0.00048	ND		0.00091	-		-
1,1,1-Trichloroethane	0.68	100	100	500	1000	mg/kg	ND		0.00048	ND		0.00091	-		-
1,1,2,2-Tetrachloroethane						mg/kg	ND		0.00048	ND		0.00091	-		-
1,1,2-Trichloroethane						mg/kg	ND		0.00097	ND		0.0018	-		-
1,1-Dichloroethane	0.27	19	26	240	480	mg/kg	ND		0.00097	ND		0.0018	-		-
1,1-Dichloroethene	0.33	100	100	500	1000	mg/kg	ND		0.00097	ND		0.0018	-		-
1,1-Dichloropropene						mg/kg	ND		0.00048	ND		0.00091	-		-
1,2,3-Trichlorobenzene						mg/kg	ND		0.0019	ND		0.0036	-		-
1,2,3-Trichloropropane						mg/kg	ND		0.0019	ND		0.0036	-		-
1,2,4,5-Tetramethylbenzene						mg/kg	ND		0.0019	0.00047	J	0.0036	-		-
1,2,4-Trichlorobenzene						mg/kg	ND		0.0019	ND		0.0036	-		-
1,2,4-Trimethylbenzene	3.6	47	52	190	380	mg/kg	ND		0.0019	ND		0.0036	-		-
1,2-Dibromo-3-chloropropane						mg/kg	ND		0.0029	ND		0.0055	-		-
1,2-Dibromoethane						mg/kg	ND		0.00097	ND		0.0018	-		-
1,2-Dichlorobenzene	1.1	100	100	500	1000	mg/kg	ND		0.0019	ND		0.0036	-		-
1,2-Dichloroethane	0.02	2.3	3.1	30	60	mg/kg	ND		0.00097	ND		0.0018	-		-
1,2-Dichloroethene, Total						mg/kg	ND		0.00097	ND		0.0018	-		-
1,2-Dichloropropane						mg/kg	ND		0.00097	ND		0.0018	-		-

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	**B-19 (4-4.5)**			**B-25 (3-3.5)**			**B-25 (3-3.5)**		
						LAB ID:	**L2433160-07**			**L2433831-03**			**L2433831-03 R1**		
						COLLECTION DATE:	**6/12/2024**			**6/14/2024**			**6/14/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
1,3,5-Trimethylbenzene	8.4	47	52	190	380	mg/kg	ND		0.0019	ND		0.0036	-		-
1,3-Dichlorobenzene	2.4	17	49	280	560	mg/kg	ND		0.0019	0.00042	J	0.0036	-		-
1,3-Dichloropropane						mg/kg	ND		0.0019	ND		0.0036	-		-
1,3-Dichloropropene, Total						mg/kg	ND		0.00048	ND		0.00091	-		-
1,4-Dichlorobenzene	1.8	9.8	13	130	250	mg/kg	ND		0.0019	0.0014	J	0.0036	-		-
1,4-Dioxane	0.1	9.8	13	130	250	mg/kg	ND		0.078	ND		0.15	-		-
2,2-Dichloropropane						mg/kg	ND		0.0019	ND		0.0036	-		-
2-Butanone	0.12	100	100	500	1000	mg/kg	ND		0.0097	ND		0.018	-		-
2-Hexanone						mg/kg	ND		0.0097	ND		0.018	-		-
4-Methyl-2-pentanone						mg/kg	ND		0.0097	ND		0.018	-		-
Acetone	0.05	100	100	500	1000	mg/kg	0.0053	J	0.0097	ND		0.018	-		-
Acrylonitrile						mg/kg	ND		0.0039	ND		0.0073	-		-
Benzene	0.06	2.9	4.8	44	89	mg/kg	ND		0.00048	ND		0.00091	-		-
Bromobenzene						mg/kg	ND		0.0019	ND		0.0036	-		-
Bromochloromethane						mg/kg	ND		0.0019	ND		0.0036	-		-
Bromodichloromethane						mg/kg	ND		0.00048	ND		0.00091	-		-
Bromoform						mg/kg	ND		0.0039	ND		0.0073	-		-
Bromomethane						mg/kg	ND		0.0019	ND		0.0036	-		-
Carbon disulfide						mg/kg	ND		0.0097	ND		0.018	-		-
Carbon tetrachloride	0.76	1.4	2.4	22	44	mg/kg	ND		0.00097	ND		0.0018	-		-
Chlorobenzene	1.1	100	100	500	1000	mg/kg	ND		0.00048	ND		0.00091	-		-
Chloroethane						mg/kg	ND		0.0019	ND		0.0036	-		-
Chloroform	0.37	10	49	350	700	mg/kg	ND		0.0014	ND		0.0027	-		-
Chloromethane						mg/kg	ND		0.0039	ND		0.0073	-		-
cis-1,2-Dichloroethene	0.25	59	100	500	1000	mg/kg	ND		0.00097	ND		0.0018	-		-
cis-1,3-Dichloropropene						mg/kg	ND		0.00048	ND		0.00091	-		-
Dibromochloromethane						mg/kg	ND		0.00097	ND		0.0018	-		-
Dibromomethane						mg/kg	ND		0.0019	ND		0.0036	-		-
Dichlorodifluoromethane						mg/kg	ND		0.0097	ND		0.018	-		-
Ethyl ether						mg/kg	ND		0.0019	ND		0.0036	-		-
Ethylbenzene	1	30	41	390	780	mg/kg	ND		0.00097	ND		0.0018	-		-
Hexachlorobutadiene						mg/kg	ND		0.0039	ND		0.0073	-		-
Isopropylbenzene						mg/kg	ND		0.00097	ND		0.0018	-		-
Methyl tert butyl ether	0.93	62	100	500	1000	mg/kg	ND		0.0019	0.0011	J	0.0036	-		-
Methylene chloride	0.05	51	100	500	1000	mg/kg	ND		0.0048	ND		0.0091	-		-
n-Butylbenzene	12	100	100	500	1000	mg/kg	ND		0.00097	ND		0.0018	-		-
n-Propylbenzene	3.9	100	100	500	1000	mg/kg	ND		0.00097	ND		0.0018	-		-
Naphthalene	12	100	100	500	1000	mg/kg	ND		0.0039	0.022		0.0073	-		-
o-Chlorotoluene						mg/kg	ND		0.0019	ND		0.0036	-		-
o-Xylene						mg/kg	ND		0.00097	ND		0.0018	-		-
p-Chlorotoluene						mg/kg	ND		0.0019	ND		0.0036	-		-
p-Diethylbenzene						mg/kg	ND		0.0019	0.00065	J	0.0036	-		-
p-Ethyltoluene						mg/kg	ND		0.0019	ND		0.0036	-		-
p-Isopropyltoluene						mg/kg	ND		0.00097	0.0011	J	0.0018	-		-
p/m-Xylene						mg/kg	ND		0.0019	ND		0.0036	-		-
sec-Butylbenzene	11	100	100	500	1000	mg/kg	ND		0.00097	ND		0.0018	-		-
Styrene						mg/kg	ND		0.00097	ND		0.0018	-		-
tert-Butylbenzene	5.9	100	100	500	1000	mg/kg	ND		0.0019	ND		0.0036	-		-
Tetrachloroethene	1.3	5.5	19	150	300	mg/kg	ND		0.00048	ND		0.00091	-		-
Toluene	0.7	100	100	500	1000	mg/kg	ND		0.00097	ND		0.0018	-		-
trans-1,2-Dichloroethene	0.19	100	100	500	1000	mg/kg	ND		0.0014	ND		0.0027	-		-
trans-1,3-Dichloropropene						mg/kg	ND		0.00097	ND		0.0018	-		-
trans-1,4-Dichloro-2-butene						mg/kg	ND		0.0048	ND		0.0091	-		-
Trichloroethene	0.47	10	21	200	400	mg/kg	ND		0.00048	ND		0.00091	-		-

Table 2.2
Summary of Soil Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

						SAMPLE ID:	**B-19 (4-4.5)**			**B-25 (3-3.5)**			**B-25 (3-3.5)**		
						LAB ID:	**L2433160-07**			**L2433831-03**			**L2433831-03 R1**		
						COLLECTION DATE:	**6/12/2024**			**6/14/2024**			**6/14/2024**		
						SAMPLE MATRIX:	**SOIL**			**SOIL**			**SOIL**		
	USCO	**RSCO**	**RRSCO**	**CSCO**	**ISCO**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
Trichlorofluoromethane						mg/kg	ND		0.0039	ND		0.0073	-		-
Vinyl acetate						mg/kg	ND		0.0097	ND		0.018	-		-
Vinyl chloride	0.02	0.21	0.9	13	27	mg/kg	ND		0.00097	ND		0.0018	-		-
Xylenes, Total	0.26	100	100	500	1000	mg/kg	ND		0.00097	ND		0.0018	-		-

NOTES:
ND - Analyte was not detected.
J - Estimated value.
I - The lower value for the two columns has been reported due to obvious interference.
P - The RPD between the results for the two columns exceeds the method-specific criteria.
E - Concentration of analyte exceeds range of calibration curve and/or linear range of instrument.
Q - Sample qualifier.
mg/kg - Milligrams per kilogram.

KEY:

	Value Exceeds USCO.
	Value Exceeds RSCO.
	Value Exceeds RRSCO.
	Value Exceeds CSCO.
	Value Exceeds ISCO.

USCO: New York NYCRR Part 375 New York Unrestricted use Criteria Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
RSCO: New York NYCRR Part 375 Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
RRSCO: New York NYCRR Part 375 Restricted-Residential Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
CSCO: New York NYCRR Part 375 Commercial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.
ISCO: New York NYCRR Part 375 Industrial Criteria, New York Restricted use Criteria per 6 NYCRR Part 375 Environmental Remediation Programs, effective December 14, 2006.

Table 2.4
Summary of Groundwater Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

SAMPLE ID:			TWP-1			TWP-2			TB20240612			TWP-1			TWP-2			TB20240614		
LAB ID:			L2433160-01			L2433160-02			L2433160-03			L2433831-11			L2433831-12			L2433831-13		
COLLECTION DATE:			6/12/2024			6/12/2024			6/10/2024			6/14/2024			6/14/2024			6/14/2024		
SAMPLE MATRIX:			GROUNDWATER			GROUNDWATER			TRIP BLANK			GROUNDWATER			GROUNDWATER			TRIP BLANK		
ANALYTE	**NY-AWQS**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
GENERAL CHEMISTRY																				
Cyanide, Total	200	ug/l	ND		5	3	J	5	-		-	-		-	-		-	-		-
ORGANOCHLORINE PESTICIDES																				
4,4'-DDD	0.3	ug/l	ND		0.029	ND		0.029	-		-	-		-	-		-	-		-
4,4'-DDE	0.2	ug/l	ND		0.029	ND		0.029	-		-	-		-	-		-	-		-
4,4'-DDT	0.2	ug/l	ND		0.029	ND		0.029	-		-	-		-	-		-	-		-
Aldrin	0	ug/l	ND		0.014	ND		0.014	-		-	-		-	-		-	-		-
Alpha-BHC	0.01	ug/l	ND		0.014	ND		0.014	-		-	-		-	-		-	-		-
Beta-BHC	0.04	ug/l	ND		0.014	ND		0.014	-		-	-		-	-		-	-		-
Chlordane	0.05	ug/l	ND		0.143	ND		0.143	-		-	-		-	-		-	-		-
cis-Chlordane		ug/l	ND		0.014	ND		0.014	-		-	-		-	-		-	-		-
Delta-BHC	0.04	ug/l	ND		0.014	ND		0.014	-		-	-		-	-		-	-		-
Dieldrin	0.004	ug/l	ND		0.029	ND		0.029	-		-	-		-	-		-	-		-
Endosulfan I		ug/l	ND		0.014	ND		0.014	-		-	-		-	-		-	-		-
Endosulfan II		ug/l	ND		0.029	ND		0.029	-		-	-		-	-		-	-		-
Endosulfan sulfate		ug/l	ND		0.029	ND		0.029	-		-	-		-	-		-	-		-
Endrin	0	ug/l	ND		0.029	ND		0.029	-		-	-		-	-		-	-		-
Endrin aldehyde	5	ug/l	ND		0.029	ND		0.029	-		-	-		-	-		-	-		-
Endrin ketone	5	ug/l	ND		0.029	ND		0.029	-		-	-		-	-		-	-		-
Heptachlor	0.04	ug/l	ND		0.014	ND		0.014	-		-	-		-	-		-	-		-
Heptachlor epoxide	0.03	ug/l	ND		0.014	ND		0.014	-		-	-		-	-		-	-		-
Lindane	0.05	ug/l	ND		0.014	ND		0.014	-		-	-		-	-		-	-		-
Methoxychlor	35	ug/l	ND		0.143	ND		0.143	-		-	-		-	-		-	-		-
Toxaphene	0.06	ug/l	ND		0.143	ND		0.143	-		-	-		-	-		-	-		-
trans-Chlordane		ug/l	ND		0.014	ND		0.014	-		-	-		-	-		-	-		-
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)																				
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)		ug/l	-		-	-		-	-		-	ND		0.00752	ND		0.00555	-		-
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)		ug/l	-		-	-		-	-		-	ND		0.00752	ND		0.00555	-		-
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)		ug/l	-		-	-		-	-		-	ND		0.00188	ND		0.00139	-		-
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)		ug/l	-		-	-		-	-		-	ND		0.00188	ND		0.00139	-		-
Perfluorobutanesulfonic Acid (PFBS)		ug/l	-		-	-		-	-		-	0.0246		0.00188	0.0233		0.00139	-		-
Perfluorobutanoic Acid (PFBA)		ug/l	-		-	-		-	-		-	0.0177		0.00752	0.0122		0.00555	-		-
Perfluorodecanesulfonic Acid (PFDS)		ug/l	-		-	-		-	-		-	ND		0.00188	ND		0.00139	-		-
Perfluorodecanoic Acid (PFDA)		ug/l	-		-	-		-	-		-	0.00122	JF	0.00188	0.00135	J	0.00139	-		-
Perfluorododecanoic Acid (PFDoA)		ug/l	-		-	-		-	-		-	ND		0.00188	ND		0.00139	-		-
Perfluoroheptanesulfonic Acid (PFHpS)		ug/l	-		-	-		-	-		-	ND		0.00188	0.000479	J	0.00139	-		-
Perfluoroheptanoic Acid (PFHpA)		ug/l	-		-	-		-	-		-	0.0085		0.00188	0.0049		0.00139	-		-
Perfluorohexanesulfonic Acid (PFHxS)		ug/l	-		-	-		-	-		-	0.00407		0.00188	0.00302		0.00139	-		-
Perfluorohexanoic Acid (PFHxA)		ug/l	-		-	-		-	-		-	0.00895		0.00188	0.00703		0.00139	-		-
Perfluorononanoic Acid (PFNA)		ug/l	-		-	-		-	-		-	0.00274		0.00188	0.00197		0.00139	-		-
Perfluorooctanesulfonamide (PFOSA)		ug/l	-		-	-		-	-		-	ND		0.00188	ND		0.00139	-		-
Perfluorooctanesulfonic Acid (PFOS)	0.0027	ug/l	-		-	-		-	-		-	**0.024**		**0.00188**	**0.023**		**0.00139**	-		-
Perfluorooctanoic Acid (PFOA)	0.0067	ug/l	-		-	-		-	-		-	**0.0413**		**0.00188**	**0.019**		**0.00139**	-		-
Perfluoropentanoic Acid (PFPeA)		ug/l	-		-	-		-	-		-	0.0103		0.00376	0.00869		0.00278	-		-
Perfluorotetradecanoic Acid (PFTeDA)		ug/l	-		-	-		-	-		-	ND		0.00188	ND		0.00139	-		-
Perfluorotridecanoic Acid (PFTrDA)		ug/l	-		-	-		-	-		-	ND		0.00188	ND		0.00139	-		-
Perfluoroundecanoic Acid (PFUnA)		ug/l	-		-	-		-	-		-	ND		0.00188	ND		0.00139	-		-
PFOA/PFOS, Total		ug/l	-		-	-		-	-		-	0.0653		0.00188	0.042		0.00139	-		-
POLYCHLORINATED BIPHENYLS (PCBs)																				
Aroclor 1016	0.09	ug/l	ND		0.071	ND		0.071	-		-	-		-	-		-	-		-
Aroclor 1221	0.09	ug/l	ND		0.071	ND		0.071	-		-	-		-	-		-	-		-
Aroclor 1232	0.09	ug/l	ND		0.071	ND		0.071	-		-	-		-	-		-	-		-
Aroclor 1242	0.09	ug/l	ND		0.071	ND		0.071	-		-	-		-	-		-	-		-
Aroclor 1248	0.09	ug/l	ND		0.071	ND		0.071	-		-	-		-	-		-	-		-
Aroclor 1254	0.09	ug/l	ND		0.071	ND		0.071	-		-	-		-	-		-	-		-
Aroclor 1260	0.09	ug/l	ND		0.071	ND		0.071	-		-	-		-	-		-	-		-
Aroclor 1262	0.09	ug/l	ND		0.071	ND		0.071	-		-	-		-	-		-	-		-
Aroclor 1268	0.09	ug/l	ND		0.071	ND		0.071	-		-	-		-	-		-	-		-
PCBs, Total		ug/l	ND		0.071	ND		0.071	-		-	-		-	-		-	-		-
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs)																				
1,2,4,5-Tetrachlorobenzene	5	ug/l	ND		10	ND		10	-		-	-		-	-		-	-		-
1,2,4-Trichlorobenzene	5	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-

Table 2.4
Summary of Groundwater Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

	SAMPLE ID:		TWP-1			TWP-2			TB20240612			TWP-1			TWP-2			TB20240614		
	LAB ID:		L2433160-01			L2433160-02			L2433160-03			L2433831-11			L2433831-12			L2433831-13		
	COLLECTION DATE:		6/12/2024			6/12/2024			6/10/2024			6/14/2024			6/14/2024			6/14/2024		
	SAMPLE MATRIX:		GROUNDWATER			GROUNDWATER			TRIP BLANK			GROUNDWATER			GROUNDWATER			TRIP BLANK		
ANALYTE	NY-AWQS	Units	Results	Q	RL	Results	Q	RL	Results	Q	RL	Results	Q	RL	Results	Q	RL	Results	Q	RL
1,2-Dichlorobenzene	3	ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
1,3-Dichlorobenzene	3	ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
1,4-Dichlorobenzene	3	ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
2,4,5-Trichlorophenol		ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
2,4,6-Trichlorophenol		ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
2,4-Dichlorophenol	1	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
2,4-Dimethylphenol	50	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
2,4-Dinitrophenol	10	ug/l	ND		20	ND		20	-		-	-		-	-		-	-		-
2,4-Dinitrotoluene	5	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
2,6-Dinitrotoluene	5	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
2-Chlorophenol		ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
2-Methylphenol		ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
2-Nitroaniline	5	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
2-Nitrophenol		ug/l	ND		10	ND		10	-		-	-		-	-		-	-		-
3,3'-Dichlorobenzidine	5	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
3-Methylphenol/4-Methylphenol		ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
3-Nitroaniline	5	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
4,6-Dinitro-o-cresol		ug/l	ND		10	ND		10	-		-	-		-	-		-	-		-
4-Bromophenyl phenyl ether		ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
4-Chloroaniline	5	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
4-Chlorophenyl phenyl ether		ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
4-Nitroaniline	5	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
4-Nitrophenol		ug/l	ND		10	ND		10	-		-	-		-	-		-	-		-
Acetophenone		ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
Benzoic Acid		ug/l	ND		50	ND		50	-		-	-		-	-		-	-		-
Benzyl Alcohol		ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
Biphenyl		ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
Bis(2-chloroethoxy)methane	5	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
Bis(2-chloroethyl)ether	1	ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
Bis(2-chloroisopropyl)ether	5	ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
Bis(2-ethylhexyl)phthalate	5	ug/l	ND		3	ND		3	-		-	-		-	-		-	-		-
Butyl benzyl phthalate	50	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
Carbazole		ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
Di-n-butylphthalate	50	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
Di-n-octylphthalate	50	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
Dibenzofuran		ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
Diethyl phthalate	50	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
Dimethyl phthalate	50	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
Hexachlorocyclopentadiene	5	ug/l	ND		20	ND		20	-		-	-		-	-		-	-		-
Isophorone	50	ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
n-Nitrosodi-n-propylamine		ug/l	ND		5	ND		5	-		-	-		-	-		-	-		-
NDPA/DPA	50	ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
Nitrobenzene	0.4	ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
p-Chloro-m-cresol		ug/l	ND		2	ND		2	-		-	-		-	-		-	-		-
Phenol	1	ug/l	ND		5	**5**		**5**	-		-	-		-	-		-	-		-
SVOCs by SIM																				
2-Chloronaphthalene	10	ug/l	ND		0.2	ND		0.2	-		-	-		-	-		-	-		-
2-Methylnaphthalene		ug/l	ND		0.1	ND		0.1	-		-	-		-	-		-	-		-
Acenaphthene	20	ug/l	ND		0.1	0.04	J	0.1	-		-	-		-	-		-	-		-
Acenaphthylene		ug/l	ND		0.1	ND		0.1	-		-	-		-	-		-	-		-
Anthracene	50	ug/l	ND		0.1	ND		0.1	-		-	-		-	-		-	-		-
Benzo(a)anthracene	0.002	ug/l	ND		0.1	ND		0.1	-		-	-		-	-		-	-		-
Benzo(a)pyrene	0	ug/l	ND		0.1	ND		0.1	-		-	-		-	-		-	-		-
Benzo(b)fluoranthene	0.002	ug/l	ND		0.1	ND		0.1	-		-	-		-	-		-	-		-
Benzo(ghi)perylene		ug/l	ND		0.1	ND		0.1	-		-	-		-	-		-	-		-
Benzo(k)fluoranthene	0.002	ug/l	ND		0.1	ND		0.1	-		-	-		-	-		-	-		-
Chrysene	0.002	ug/l	ND		0.1	ND		0.1	-		-	-		-	-		-	-		-
Dibenzo(a,h)anthracene		ug/l	ND		0.1	ND		0.1	-		-	-		-	-		-	-		-
Fluoranthene	50	ug/l	0.06	J	0.1	0.05	J	0.1	-		-	-		-	-		-	-		-
Fluorene	50	ug/l	0.05	J	0.1	ND		0.1	-		-	-		-	-		-	-		-
Hexachlorobenzene	0.04	ug/l	ND		0.8	ND		0.8	-		-	-		-	-		-	-		-
Hexachlorobutadiene	0.5	ug/l	ND		0.5	ND		0.5	-		-	-		-	-		-	-		-

Table 2.4
Summary of Groundwater Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

SAMPLE ID:			TWP-1			TWP-2			TB20240612			TWP-1			TWP-2			TB20240614		
LAB ID:			L2433160-01			L2433160-02			L2433160-03			L2433831-11			L2433831-12			L2433831-13		
COLLECTION DATE:			6/12/2024			6/12/2024			6/10/2024			6/14/2024			6/14/2024			6/14/2024		
SAMPLE MATRIX:			GROUNDWATER			GROUNDWATER			TRIP BLANK			GROUNDWATER			GROUNDWATER			TRIP BLANK		
ANALYTE	**NY-AWQS**	**Units**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**	**Results**	**Q**	**RL**
Hexachloroethane	5	ug/l	ND		0.8	ND		0.8	-		-	-		-	-		-	-		-
Indeno(1,2,3-cd)pyrene	0.002	ug/l	ND		0.1	ND		0.1	-		-	-		-	-		-	-		-
Naphthalene	10	ug/l	0.09	J	0.1	0.04	J	0.1	-		-	-		-	-		-	-		-
Pentachlorophenol	1	ug/l	ND		0.8	ND		0.8	-		-	-		-	-		-	-		-
Phenanthrene	50	ug/l	0.13		0.1	ND		0.1	-		-	-		-	-		-	-		-
Pyrene	50	ug/l	ND		0.1	0.05	J	0.1	-		-	-		-	-		-	-		-
TOTAL METALS																				
Aluminum, Total		ug/l	1,310		10	27.3		10	-		-	-		-	-		-	-		-
Antimony, Total	3	ug/l	ND		4	ND		4	-		-	-		-	-		-	-		-
Arsenic, Total	25	ug/l	0.63		0.5	ND		0.5	-		-	-		-	-		-	-		-
Barium, Total	1000	ug/l	236.9		0.5	85.63		0.5	-		-	-		-	-		-	-		-
Beryllium, Total	3	ug/l	ND		0.5	ND		0.5	-		-	-		-	-		-	-		-
Cadmium, Total	5	ug/l	0.12J	J	0.2	ND		0.2	-		-	-		-	-		-	-		-
Calcium, Total		ug/l	120,000		100	128,000		100	-		-	-		-	-		-	-		-
Chromium, Total	50	ug/l	6.21		1	0.59	J	1	-		-	-		-	-		-	-		-
Cobalt, Total		ug/l	4.7		0.5	0.47	J	0.5	-		-	-		-	-		-	-		-
Copper, Total	200	ug/l	9.9		1	0.77	J	1	-		-	-		-	-		-	-		-
Iron, Total	300	ug/l	**3,100**		**50**	53.8		50	-		-	-		-	-		-	-		-
Lead, Total	25	ug/l	2.22		1	ND		1	-		-	-		-	-		-	-		-
Magnesium, Total	35000	ug/l	**41,000**		**70**	**51,500**		**70**	-		-	-		-	-		-	-		-
Manganese, Total	300	ug/l	**706.2**		**1**	44.74		1	-		-	-		-	-		-	-		-
Mercury, Total	0.7	ug/l	ND		0.2	ND		0.2	-		-	-		-	-		-	-		-
Nickel, Total	100	ug/l	6.45		2	1.07	J	2	-		-	-		-	-		-	-		-
Potassium, Total		ug/l	5,490		100	3,830		100	-		-	-		-	-		-	-		-
Selenium, Total	10	ug/l	7.44		5	2.16	J	5	-		-	-		-	-		-	-		-
Silver, Total	50	ug/l	ND		0.4	ND		0.4	-		-	-		-	-		-	-		-
Sodium, Total	20000	ug/l	**26,100**		**100**	**60,800**		**100**	-		-	-		-	-		-	-		-
Thallium, Total	0.5	ug/l	ND		1	ND		1	-		-	-		-	-		-	-		-
Vanadium, Total		ug/l	4.82	J	5	ND		5	-		-	-		-	-		-	-		-
Zinc, Total	2000	ug/l	20.54		10	4.09	J	10	-		-	-		-	-		-	-		-
VOLATILE ORGANIC COMPOUNDS (VOCs)																				
1,1,1,2-Tetrachloroethane	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,1,1-Trichloroethane	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,1,2,2-Tetrachloroethane	5	ug/l	ND		0.5	ND		0.5	ND		0.5	-		-	-		-	ND		0.5
1,1,2-Trichloroethane	1	ug/l	ND		1.5	ND		1.5	ND		1.5	-		-	-		-	ND		1.5
1,1-Dichloroethane	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,1-Dichloroethene	5	ug/l	ND		0.5	ND		0.5	ND		0.5	-		-	-		-	ND		0.5
1,1-Dichloropropene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,2,3-Trichlorobenzene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,2,3-Trichloropropane	0.04	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,2,4,5-Tetramethylbenzene	5	ug/l	ND		2	ND		2	ND		2	-		-	-		-	ND		2
1,2,4-Trichlorobenzene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,2,4-Trimethylbenzene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,2-Dibromo-3-chloropropane	0.04	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,2-Dibromoethane	0.0006	ug/l	ND		2	ND		2	ND		2	-		-	-		-	ND		2
1,2-Dichlorobenzene	3	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,2-Dichloroethane	0.6	ug/l	ND		0.5	ND		0.5	ND		0.5	-		-	-		-	ND		0.5
1,2-Dichloroethene, Total		ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,2-Dichloropropane	1	ug/l	ND		1	ND		1	ND		1	-		-	-		-	ND		1
1,3,5-Trimethylbenzene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,3-Dichlorobenzene	3	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,3-Dichloropropane	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,3-Dichloropropene, Total		ug/l	ND		0.5	ND		0.5	ND		0.5	-		-	-		-	ND		0.5
1,4-Dichlorobenzene	3	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
1,4-Dioxane		ug/l	ND		250	ND		250	ND		250	-		-	-		-	ND		250
2,2-Dichloropropane	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
2-Butanone	50	ug/l	ND		5	ND		5	ND		5	-		-	-		-	ND		5
2-Hexanone	50	ug/l	ND		5	ND		5	ND		5	-		-	-		-	ND		5
4-Methyl-2-pentanone		ug/l	ND		5	ND		5	ND		5	-		-	-		-	ND		5
Acetone	50	ug/l	ND		5	ND		5	ND		5	-		-	-		-	ND		5
Acrylonitrile	5	ug/l	ND		5	ND		5	ND		5	-		-	-		-	ND		5
Benzene	1	ug/l	ND		0.5	ND		0.5	ND		0.5	-		-	-		-	ND		0.5

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	SAMPLE ID:		TWP-1			TWP-2			TB20240612			TWP-1			TWP-2			TB20240614		
	LAB ID:		L2433160-01			L2433160-02			L2433160-03			L2433831-11			L2433831-12			L2433831-13		
	COLLECTION DATE:		6/12/2024			6/12/2024			6/10/2024			6/14/2024			6/14/2024			6/14/2024		
	SAMPLE MATRIX:		GROUNDWATER			GROUNDWATER			TRIP BLANK			GROUNDWATER			GROUNDWATER			TRIP BLANK		
ANALYTE	NY-AWQS	Units	Results	Q	RL	Results	Q	RL	Results	Q	RL	Results	Q	RL	Results	Q	RL	Results	Q	RL
Bromobenzene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Bromochloromethane	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Bromodichloromethane	50	ug/l	ND		0.5	ND		0.5	ND		0.5	-		-	-		-	ND		0.5
Bromoform	50	ug/l	ND		2	ND		2	ND		2	-		-	-		-	ND		2
Bromomethane	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Carbon disulfide	60	ug/l	ND		5	ND		5	ND		5	-		-	-		-	ND		5
Carbon tetrachloride	5	ug/l	ND		0.5	ND		0.5	ND		0.5	-		-	-		-	ND		0.5
Chlorobenzene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Chloroethane	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Chloroform	7	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Chloromethane		ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
cis-1,2-Dichloroethene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
cis-1,3-Dichloropropene	0.4	ug/l	ND		0.5	ND		0.5	ND		0.5	-		-	-		-	ND		0.5
Dibromochloromethane	50	ug/l	ND		0.5	ND		0.5	ND		0.5	-		-	-		-	ND		0.5
Dibromomethane	5	ug/l	ND		5	ND		5	ND		5	-		-	-		-	ND		5
Dichlorodifluoromethane	5	ug/l	ND		5	ND		5	ND		5	-		-	-		-	ND		5
Ethyl ether		ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Ethylbenzene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Hexachlorobutadiene	0.5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Isopropylbenzene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Methyl tert butyl ether	10	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Methylene chloride	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
n-Butylbenzene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
n-Propylbenzene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Naphthalene	10	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
o-Chlorotoluene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
o-Xylene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
p-Chlorotoluene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
p-Diethylbenzene		ug/l	ND		2	ND		2	ND		2	-		-	-		-	ND		2
p-Ethyltoluene		ug/l	ND		2	ND		2	ND		2	-		-	-		-	ND		2
p-Isopropyltoluene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
p/m-Xylene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
sec-Butylbenzene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Styrene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
tert-Butylbenzene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Tetrachloroethene	5	ug/l	ND		0.5	ND		0.5	ND		0.5	-		-	-		-	ND		0.5
Toluene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
trans-1,2-Dichloroethene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
trans-1,3-Dichloropropene	0.4	ug/l	ND		0.5	ND		0.5	ND		0.5	-		-	-		-	ND		0.5
trans-1,4-Dichloro-2-butene	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Trichloroethene	5	ug/l	ND		0.5	ND		0.5	ND		0.5	-		-	-		-	ND		0.5
Trichlorofluoromethane	5	ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5
Vinyl acetate		ug/l	ND		5	ND		5	ND		5	-		-	-		-	ND		5
Vinyl chloride	2	ug/l	ND		1	ND		1	ND		1	-		-	-		-	ND		1
Xylenes, Total		ug/l	ND		2.5	ND		2.5	ND		2.5	-		-	-		-	ND		2.5

NOTES:
ND - Analyte was not detected.
J - Estimated value.
Q - Sample qualifier.
µg/l - Micrograms per liter.
NY-AWQS - New York TOGS 1.1.1 Ambient Water Quality Standards criteria reflects all addendum to criteria through June 2004.

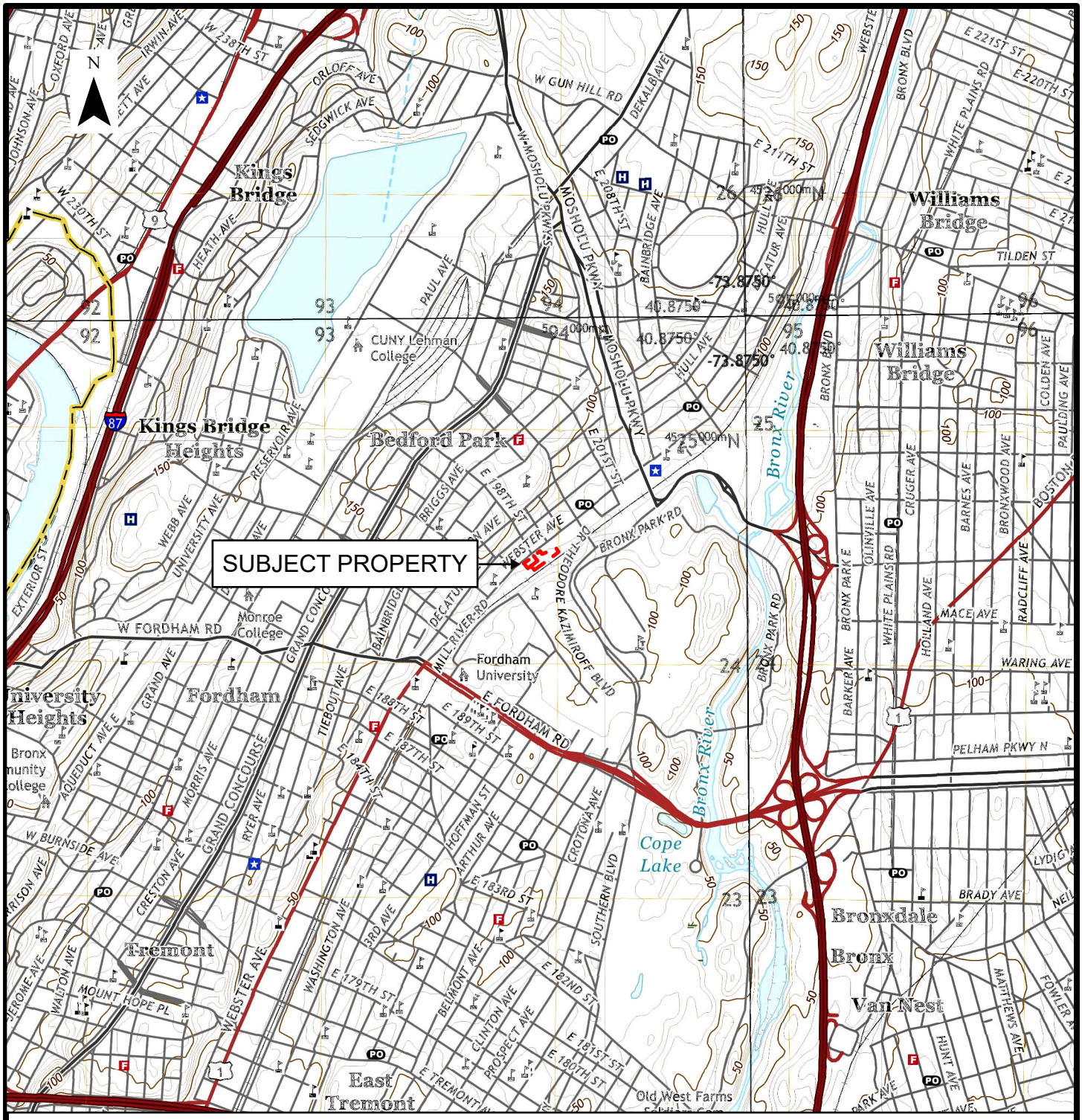
KEY:
Result Exceeds NY-AWQS.

Table 2.6
Summary of Soil Vapor Analytical Results
2752-2768 Webster Avenue
Bronx, NY
SESI Project 13581A
September 2024

SAMPLE ID:							SV-1		SV-3		SV-2	
SAMPLING DATE:							6/12/2024		6/12/2024		6/12/2024	
	NY-SSC-A	NY-SSC-B	NY-SSC-C	NY-SSC-D	NY-SSC-E	NY-SSC-F	Results	RL	Results	RL	Results	RL
VOCs (ug/m^3)												
1,1,1-Trichloroethane		100					4.42	2.18	22	3.21	ND	3.9
1,2,4-Trimethylbenzene				60			**629**	1.97	**846**	2.89	**1,140**	3.51
1,3,5-Trimethylbenzene				60			**263**	1.97	**353**	2.89	**487**	3.51
1,3-Butadiene							ND	0.885	4.51	1.3	ND	1.58
2,2,4-Trimethylpentane				60			3.49	1.87	8.69	2.75	ND	3.33
2-Butanone							6.02	2.95	16.9	4.34	27.5	5.25
4-Ethyltoluene							245	1.97	353	2.89	469	3.51
4-Methyl-2-pentanone							ND	4.1	6.68	6.02	13.2	7.29
Acetone							30.6	4.75	62.7	6.98	259	8.48
Benzene				60			1.34	1.28	3.93	1.88	9.97	2.28
Carbon disulfide							5.36	1.25	24.7	1.83	36.1	2.22
Chloroform							ND	1.95	12.6	2.87	ND	3.49
Cyclohexane				60			4.78	1.38	19.1	2.02	21	2.46
Dichlorodifluoromethane							3.07	1.98	8.46	2.91	9.1	3.53
Ethanol							ND	18.8	ND	27.7	52.4	33.5
Ethylbenzene				60			5.43	1.74	12.5	2.55	13.3	3.1
Freon-114							ND	2.8	ND	4.11	15.9	4.99
Heptane					200		2.66	1.64	4.67	2.41	12.7	2.93
Isopropanol							ND	2.46	19.4	3.61	17.7	4.38
n-Hexane					200		2.35	1.41	7.44	2.07	40.9	2.52
Naphthalene				60			36.7	2.1	44	3.08	**74.5**	3.74
o-Xylene				60			25	1.74	48.2	2.55	59.1	3.1
p/m-Xylene					200		24.4	3.47	50.4	5.13	54.7	6.21
Tertiary butyl Alcohol							13.4	3.03	21.7	4.46	80.6	5.4
Tetrachloroethene		100					7.05	2.71	ND	3.99	ND	4.84
Tetrahydrofuran							ND	2.95	7.73	4.34	ND	5.25
Toluene						300	4.22	1.51	10.4	2.22	12.5	2.69
Trichlorofluoromethane							2.33	2.25	33.6	3.3	ND	4.01

Notes:
ug/m^3: Micrograms per cubic meter.
ND: Not detected.
Bold: Elevated Concentration.
Action Required by NYSDOH Decision Matrix.
NY-SSC-A: New York DOH Matrix A Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, and updated May 2017.
NY-SSC-B: New York DOH Matrix B Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, and updated May 2017.
NY-SSC-C: New York DOH Matrix C Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, and updated May 2017.
NY-SSC-D: New York DOH Matrix D Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, February, 2024.
NY-SSC-E: New York DOH Matrix E Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, February, 2024.

Figures



REFERENCE:

UNITED STATES GEOLOGICAL SURVEY (USGS)
CENTRAL PARK, NY USGS QUADRANGLE - 2019

LEGEND:

SITE BOUNDARY

SCALE: 1" = 2,000'

0 1,000 2,000 4,000 FEET

2752-2768 WEBSTER AVENUE
BRONX, NEW YORK

SITE LOCATION MAP

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL
959 ROUTE 46E, 3RD FLOOR, PARSIPPANY, NJ 07054 PH: 973.808.9050

FIG-1.1
DRAWN BY: KBV
CHECKED BY: AR
SCALE: AS NOTED
DATE: 10/14/2025
JOB NO: 13581A

Y:\GIS\Project_Numbers\13581\APRX_PROJECT\APRX_Phase1_Prj_No.aprx, 10/14/2025 3:06 PM, Kim Vanderklein, LAYOUT: FIG-3.1



REFERENCE:

NEW YORK STATE, MAXAR; NYS OFFICE OF INFORMATION TECHNOLOGY SERVICES - GIS PROGRAM OFFICE, NYS DEPT OF TAXATION AND FINANCE'S OFFICE OF REAL PROPERTY TAX SERVICES

LEGEND:

SITE BOUNDARY

SCALE: 1" = 100'

0 50 100 200 FEET

FIG-2.1

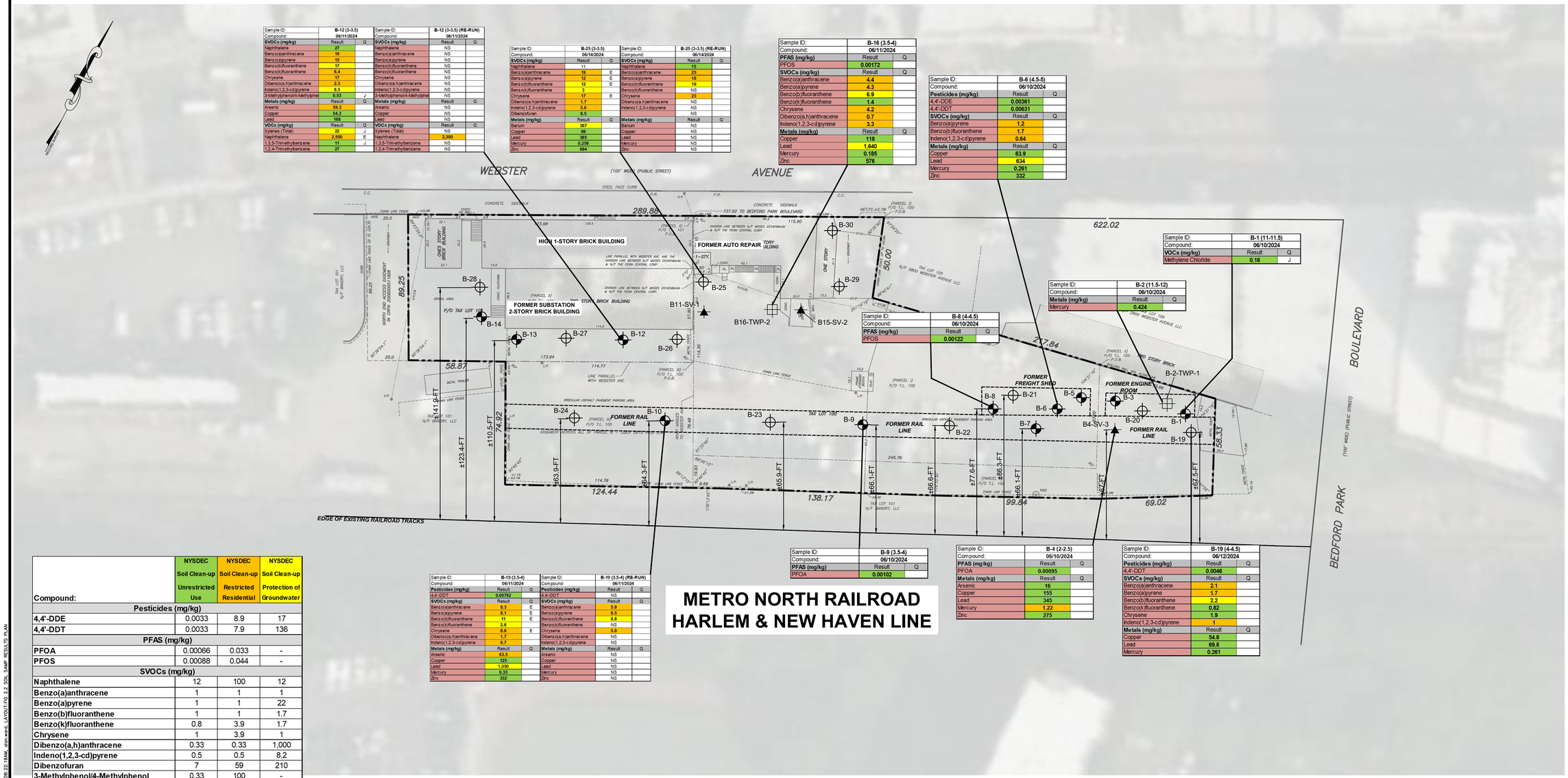
2752-2768 WEBSTER AVENUE
BRONX, NEW YORK

SITE PLAN

SESI CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | SITE CIVIL
959 ROUTE 46E, 3RD FLOOR, PARSIPPANY, NJ 07054 PH: 973.808.9050

DRAWN BY:	KBV
CHECKED BY:	CM
SCALE:	AS NOTED
DATE:	10/14/2025
JOB NO.:	13581A

Y:\GIS\Project_Numbers\13581\APRX_PROJECT\APRX_Phase1_Prj_No.aprx, 10/14/2025 3:31 PM, Kim Vanderklein, LAYOUT: FIG-3.2



Sample ID:	B-12 (3-3.5)		Sample ID:	B-12 (3-3.5) (RE-RUN)	
Compound:	06/11/2024		Compound:	06/11/2024	
SVOCs (mg/kg)	Result	Q	**SVOCs (mg/kg)**	Result	Q
Naphthalene	27		Naphthalene	NS	
Benzo(a)anthracene	19		Benzo(a)anthracene	NS	
Benzo(a)pyrene	15		Benzo(a)pyrene	NS	
Benzo(b)fluoranthene	17		Benzo(b)fluoranthene	NS	
Benzo(k)fluoranthene	6.4		Benzo(k)fluoranthene	NS	
Chrysene	17		Chrysene	NS	
Dibenzo(a,h)anthracene	2.3		Dibenzo(a,h)anthracene	NS	
Indeno(1,2,3-cd)pyrene	8.5		Indeno(1,2,3-cd)pyrene	NS	
3-Methylphenol/4-Methylphe	0.53	J	3-Methylphenol/4-Methylphe	NS	
Metals (mg/kg)	Result	Q	**Metals (mg/kg)**	Result	Q
Arsenic	59.3		Arsenic	NS	
Copper	54.3		Copper	NS	
Lead	168		Lead	NS	
VOCs (mg/kg)	Result	Q	**VOCs (mg/kg)**	Result	Q
Xylenes (Total)	22	J	Xylenes (Total)	NS	
Naphthalene	2,500	E	Naphthalene	2,300	
1,3,5-Trimethylbenzene	11	J	1,3,5-Trimethylbenzene	NS	
1,2,4-Trimethylbenzene	27		1,2,4-Trimethylbenzene	NS	

Sample ID:	B-25 (3-3.5)		Sample ID:	B-25 (3-3.5) (RE-RUN)	
Compound:	06/14/2024		Compound:	06/14/2024	
SVOCs (mg/kg)	Result	Q	**SVOCs (mg/kg)**	Result	Q
Naphthalene	11		Naphthalene	15	
Benzo(a)anthracene	19	E	Benzo(a)anthracene	25	
Benzo(a)pyrene	12	E	Benzo(a)pyrene	18	
Benzo(b)fluoranthene	12	E	Benzo(b)fluoranthene	19	
Benzo(k)fluoranthene	3		Benzo(k)fluoranthene	NS	
Chrysene	17	E	Chrysene	23	
Dibenzo(a,h)anthracene	1.7		Dibenzo(a,h)anthracene	NS	
Indeno(1,2,3-cd)pyrene	5.6		Indeno(1,2,3-cd)pyrene	NS	
Dibenzofuran	8.5		Dibenzofuran	NS	
Metals (mg/kg)	Result	Q	**Metals (mg/kg)**	Result	Q
Barium	387		Barium	NS	
Copper	69		Copper	NS	
Lead	365		Lead	NS	
Mercury	0.259		Mercury	NS	
Zinc	694		Zinc	NS	

Sample ID:	B-16 (3.5-4)	
Compound:	06/11/2024	
PFAS (mg/kg)	Result	Q
PFOS	0.00172	
SVOCs (mg/kg)	Result	Q
Benzo(a)anthracene	4.4	
Benzo(a)pyrene	4.3	
Benzo(b)fluoranthene	6.9	
Benzo(k)fluoranthene	1.4	
Chrysene	4.2	
Dibenzo(a,h)anthracene	0.7	
Indeno(1,2,3-cd)pyrene	3.3	
Metals (mg/kg)	Result	Q
Copper	118	
Lead	1,640	
Mercury	0.185	
Zinc	576	

Sample ID:	B-6 (4.5-5)	
Compound:	06/10/2024	
Pesticides (mg/kg)	Result	Q
4,4'-DDE	0.00361	
4,4'-DDT	0.00631	
SVOCs (mg/kg)	Result	Q
Benzo(a)pyrene	1.2	
Benzo(b)fluoranthene	1.7	
Indeno(1,2,3-cd)pyrene	0.64	
Metals (mg/kg)	Result	Q
Copper	63.9	
Lead	634	
Mercury	0.261	
Zinc	332	

Sample ID:	B-1 (11-11.5)	
Compound:	06/10/2024	
VOCs (mg/kg)	Result	Q
Methylene Chloride	0.16	J

Sample ID:	B-2 (11.5-12)	
Compound:	06/10/2024	
Metals (mg/kg)	Result	Q
Mercury	0.424	

Sample ID:	B-8 (4-4.5)	
Compound:	06/10/2024	
PFAS (mg/kg)	Result	Q
PFOS	0.00122	

Sample ID:	B-10 (3.5-4)		Sample ID:	B-10 (3.5-4) (RE-RUN)	
Compound:	06/11/2024		Compound:	06/11/2024	
Pesticides (mg/kg)	Result	Q	**Pesticides (mg/kg)**	Result	Q
4,4'-DDT	0.00792		4,4'-DDT	NS	
SVOCs (mg/kg)	Result	Q	**SVOCs (mg/kg)**	Result	Q
Benzo(a)anthracene	8.3	E	Benzo(a)anthracene	5.9	
Benzo(a)pyrene	8.1	E	Benzo(a)pyrene	6.5	
Benzo(b)fluoranthene	11	E	Benzo(b)fluoranthene	8.8	
Benzo(k)fluoranthene	2.6		Benzo(k)fluoranthene	NS	
Chrysene	8.6	E	Chrysene	5.9	
Dibenzo(a,h)anthracene	1.7		Dibenzo(a,h)anthracene	NS	
Indeno(1,2,3-cd)pyrene	6.7		Indeno(1,2,3-cd)pyrene	NS	
Metals (mg/kg)	Result	Q	**Metals (mg/kg)**	Result	Q
Arsenic	63.5		Arsenic	NS	
Copper	125		Copper	NS	
Lead	1,050		Lead	NS	
Mercury	0.33		Mercury	NS	
Zinc	332		Zinc	NS	

Sample ID:	B-9 (3.5-4)	
Compound:	06/10/2024	
PFAS (mg/kg)	Result	Q
PFOA	0.00102	

Sample ID:	B-4 (2-2.5)	
Compound:	06/10/2024	
PFAS (mg/kg)	Result	Q
PFOA	0.00095	
Metals (mg/kg)	Result	Q
Arsenic	16	
Copper	155	
Lead	345	
Mercury	1.22	
Zinc	275	

Sample ID:	B-19 (4-4.5)	
Compound:	06/12/2024	
Pesticides (mg/kg)	Result	Q
4,4'-DDT	0.0046	
SVOCs (mg/kg)	Result	Q
Benzo(a)anthracene	2.1	
Benzo(a)pyrene	1.7	
Benzo(b)fluoranthene	2.2	
Benzo(k)fluoranthene	0.82	
Chrysene	1.9	
Indeno(1,2,3-cd)pyrene	1	
Metals (mg/kg)	Result	Q
Copper	54.8	
Lead	69.8	
Mercury	0.261	

Compound:	NYSDEC Soil Clean-up Unrestricted Use	NYSDEC Soil Clean-up Restricted Residential	NYSDEC Soil Clean-up Protection of Groundwater
Pesticides (mg/kg)			
4,4'-DDE	0.0033	8.9	17
4,4'-DDT	0.0033	7.9	136
PFAS (mg/kg)			
PFOA	0.00066	0.033	-
PFOS	0.00088	0.044	-
SVOCs (mg/kg)			
Naphthalene	12	100	12
Benzo(a)anthracene	1	1	1
Benzo(a)pyrene	1	1	22
Benzo(b)fluoranthene	1	1	1.7
Benzo(k)fluoranthene	0.8	3.9	1.7
Chrysene	1	3.9	1
Dibenzo(a,h)anthracene	0.33	0.33	1,000
Indeno(1,2,3-cd)pyrene	0.5	0.5	8.2
Dibenzofuran	7	59	210
3-Methylphenol/4-Methylphenol	0.33	100	-
VOCs (mg/kg)			
Acetone	0.05	100	0.05
Naphthalene	12	100	12
Methylene Chloride	0.05	100	0.05
1,3,5-Trimethylbenzene	8.4	52	8.4
1,2,4-Trimethylbenzene	3.6	52	3.6
Xylenes (Total)	0.26	100	1.6
Metals (mg/kg)			
Arsenic	13	16	16
Barium	350	400	820
Copper	50	270	1,720
Lead	63	400	450
Mercury	0.18	0.81	0.73
Zinc	109	10,000	2,480

NOTE:

1. THIS PLAN IS FOR LOCATING BORINGS AND ASSOCIATED DATA ONLY. OTHER SITE WORK SHOWN HERE IS NOT INTENDED FOR CONSTRUCTION.
2. mg/kg - MILLIGRAMS PER KILOGRAM.
3. PFAS - PER - AND POLYFLUOROALKYL SUBSTANCES.
4. VOCS - VOLATILE ORGANIC COMPOUNDS
5. SVOCS - SEMI-VOLATILE ORGANIC COMPOUNDS
6. NYSDEC- NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

REFERENCE:

1. EXISTING CONDITIONS & BOUNDARY ARE TAKEN FROM "A.L.T.A./N.S.P.S. LAND TITLE SURVEY" FOR 2740 WEBSTE AVENUE AND 2768 WEBSTER AVENUE, PREPARED BY EMPIRE STATE LAND SURVEYOR, P.C., DATED MARCH 5, 2021.
2. NEARMAP AERIAL, MARCH 8, 2024.

LEGEND:

- PROPERTY BOUNDARY
- B23 - ENVIRONMENTAL AND GEOTECHNICAL BORING NUMBER & APPROX. LOCATION
- B9 - ENVIRONMENTAL BORING NUMBER & APPROX. LOCATION
- B15-SV-1 - SOIL BORING/SOIL VAPOR NUMBER & APPROX. LOCATION
- B-2-TWP-1 - SOIL BORING/TEMPORARY WELL NUMBER & APPROX. LOCATION

Scale: 1"= 30'
0 15 30 60 90 120

NYS Education Law
Unauthorized alterations or additions to this plan are a violation of section 7209 (2) of the New York State Education Law. Copies of this map not having the seal of the engineer shall not be valid.

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959 ROUTE 46E, 3RD FLOOR, PARSIPPANY, NJ 07054 PH: 973.808.9050

dwg by: KBV
chk by: AR
scale: AS NOTED
date: 02/28/2025

rev	date	description	by

2752-2768 WEBSTER AVENUE
BRONX, NEW YORK

title: SOIL SAMPLE RESULTS PLAN

job no. 13581A
drawing no.

FIG 2.2

1 of 1

N:\ACAD\13581A\CADD\ENVIRONMENTAL\PHASE II\SOIL RESULTS MAP.DWG 12/16/25 08:22:19AM dbaLward LAYOUT:FIG 2.2 SOIL SAMP. RESULTS PLAN

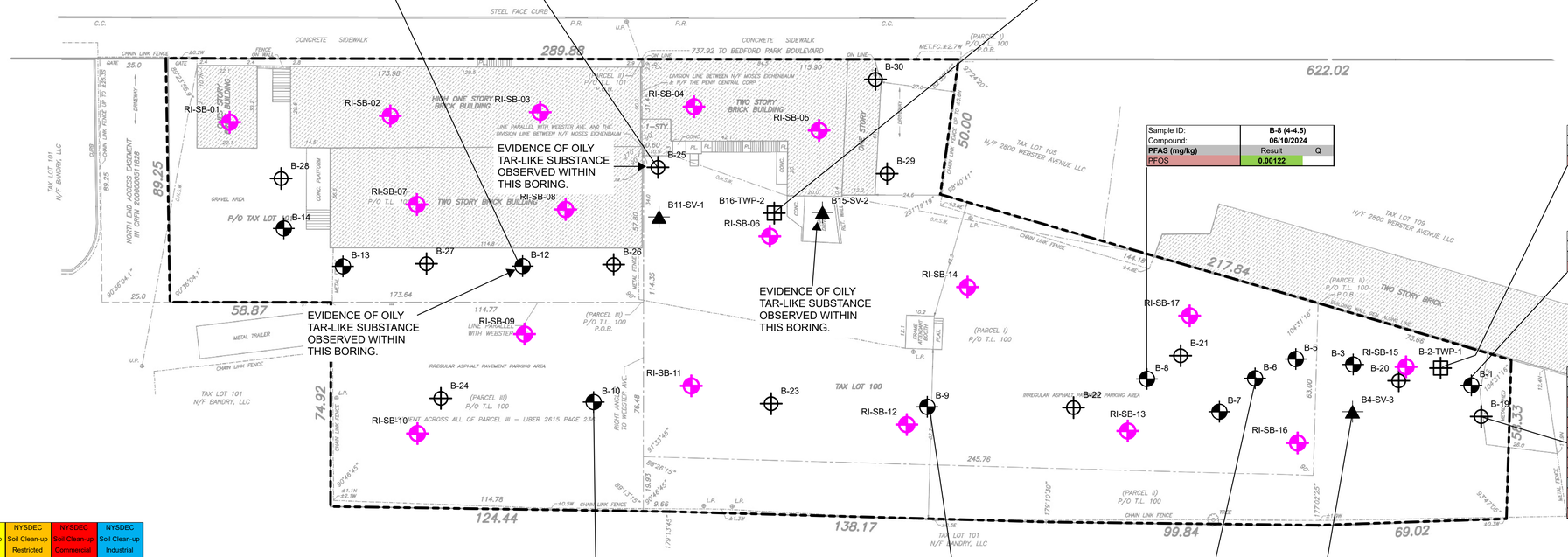
Sample ID:	B-12 (3-3.5) (RE-RUN)	
Compound:	06/11/2024	
SVOCs (mg/kg)	Result	Q
Naphthalene	NS	
Benzo(a)anthracene	NS	
Benzo(a)pyrene	NS	
Benzo(b)fluoranthene	NS	
Benzo(k)fluoranthene	NS	
Chrysene	NS	
Dibenzo(a,h)anthracene	NS	
Indeno(1,2,3-cd)pyrene	NS	
3-Methylphenol/4-Methylph	NS	
Metals (mg/kg)	Result	Q
Arsenic	NS	
Copper	NS	
Lead	NS	
VOCs (mg/kg)	Result	Q
Xylenes (Total)	NS	
Naphthalene	23,000	
1,3,5-Trimethylbenzene	NS	
1,2,4-Trimethylbenzene	NS	

Sample ID:	B-12 (3-3.5)	
Compound:	06/11/2024	
SVOCs (mg/kg)	Result	Q
Naphthalene	27	
Benzo(a)anthracene	19	
Benzo(a)pyrene	15	
Benzo(b)fluoranthene	17	
Benzo(k)fluoranthene	6.4	
Chrysene	17	
Dibenzo(a,h)anthracene	2.3	
Indeno(1,2,3-cd)pyrene	6.8	
3-Methylphenol/4-Methylph	0.53	J
Metals (mg/kg)	Result	Q
Arsenic	59.3	
Copper	54.3	
Lead	168	
VOCs (mg/kg)	Result	Q
Xylenes (Total)	22	J
Naphthalene	25,000	E
1,3,5-Trimethylbenzene	11	J
1,2,4-Trimethylbenzene	27	

Sample ID:	B-25 (3-3.5)	
Compound:	06/14/2024	
SVOCs (mg/kg)	Result	Q
Benzo(a)anthracene	19	E
Benzo(a)pyrene	12	E
Benzo(b)fluoranthene	12	E
Benzo(k)fluoranthene	3	
Chrysene	17	E
Dibenzo(a,h)anthracene	1.7	
Indeno(1,2,3-cd)pyrene	5.6	
Dibenzofuran	8.5	
Metals (mg/kg)	Result	Q
Barium	387	
Copper	69	
Lead	365	
Mercury	0.259	
Zinc	694	

Sample ID:	B-25 (3-3.5) (RE-RUN)	
Compound:	06/14/2024	
SVOCs (mg/kg)	Result	Q
Benzo(a)anthracene	25	
Benzo(a)pyrene	18	
Benzo(b)fluoranthene	19	
Benzo(k)fluoranthene	NS	
Chrysene	23	
Dibenzo(a,h)anthracene	NS	
Indeno(1,2,3-cd)pyrene	NS	
	NS	
Metals (mg/kg)	Result	Q
Barium	NS	
Copper	NS	
Lead	NS	
Mercury	NS	
Zinc	NS	

Sample ID:	B-16 (3.5-4)	
Compound:	06/11/2024	
PFAS (mg/kg)	Result	Q
PFOS	0.00172	
SVOCs (mg/kg)	Result	Q
Benzo(a)anthracene	4.4	
Benzo(a)pyrene	4.3	
Benzo(b)fluoranthene	6.9	
Benzo(k)fluoranthene	1.4	
Chrysene	4.2	
Dibenzo(a,h)anthracene	0.7	
Indeno(1,2,3-cd)pyrene	3.3	
Metals (mg/kg)	Result	Q
Copper	118	
Lead	1,640	
Mercury	0.185	
Zinc	576	
VOCs (mg/kg)	Result	Q
Xylenes (Total)	22	J
Naphthalene	25,000	E
1,3,5-Trimethylbenzene	11	J
1,2,4-Trimethylbenzene	27	



Sample ID:	B-8 (4-4.5)	
Compound:	06/10/2024	
PFAS (mg/kg)	Result	Q
PFOS	0.00122	

Sample ID:	B-2 (11.5-12)	
Compound:	06/10/2024	
Metals (mg/kg)	Result	Q
Mercury	0.424	

Sample ID:	B-1 (11-11.5)	
Compound:	06/10/2024	
VOCs (mg/kg)	Result	Q
Methylene Chloride	0.16	J

Sample ID:	B-19 (4-4.5)	
Compound:	06/12/2024	
Pesticides (mg/kg)	Result	Q
4,4'-DDT	0.0046	
SVOCs (mg/kg)	Result	Q
Benzo(a)anthracene	2.1	
Benzo(a)pyrene	1.7	
Benzo(b)fluoranthene	2.2	
Benzo(k)fluoranthene	0.82	
Chrysene	1.9	
Indeno(1,2,3-cd)pyrene	1	
Metals (mg/kg)	Result	Q
Copper	54.8	
Lead	69.8	
Mercury	0.261	

Sample ID:	B-10 (3.5-4)	
Compound:	06/11/2024	
Pesticides (mg/kg)	Result	Q
4,4'-DDT	0.00792	
SVOCs (mg/kg)	Result	Q
Benzo(a)anthracene	8.3	E
Benzo(a)pyrene	8.1	E
Benzo(b)fluoranthene	11	E
Benzo(k)fluoranthene	2.6	
Chrysene	8.6	E
Dibenzo(a,h)anthracene	1.7	
Indeno(1,2,3-cd)pyrene	6.7	
Metals (mg/kg)	Result	Q
Arsenic	63.5	
Copper	125	
Lead	1,050	
Mercury	0.33	
Zinc	332	

Sample ID:	B-10 (3.5-4) (RE-RUN)	
Compound:	06/11/2024	
Pesticides (mg/kg)	Result	Q
4,4'-DDT	NS	
SVOCs (mg/kg)	Result	Q
Benzo(a)anthracene	5.9	
Benzo(a)pyrene	6.5	
Benzo(b)fluoranthene	8.8	
Benzo(k)fluoranthene	NS	
Chrysene	5.9	
Dibenzo(a,h)anthracene	NS	
Indeno(1,2,3-cd)pyrene	NS	
Metals (mg/kg)	Result	Q
Arsenic	NS	
Copper	NS	
Lead	NS	
Mercury	NS	
Zinc	NS	

Sample ID:	B-9 (3.5-4)	
Compound:	06/10/2024	
PFAS (mg/kg)	Result	Q
PFOA	0.00102	

Sample ID:	B-6 (4.5-5)	
Compound:	06/10/2024	
Pesticides (mg/kg)	Result	Q
4,4'-DDE	0.00361	
4,4'-DDT	0.00631	
SVOCs (mg/kg)	Result	Q
Benzo(a)pyrene	1.2	
Benzo(b)fluoranthene	1.7	
Indeno(1,2,3-cd)pyrene	0.64	
Metals (mg/kg)	Result	Q
Copper	63.9	
Lead	634	
Mercury	0.261	
Zinc	332	

Sample ID:	B-4 (2-2.5)	
Compound:	06/10/2024	
PFAS (mg/kg)	Result	Q
PFOA	0.00095	
Metals (mg/kg)	Result	Q
Arsenic	16	
Copper	155	
Lead	345	
Mercury	1.22	
Zinc	275	

Compound:	NYSDEC Soil Clean-up Unrestricted Use	NYSDEC Soil Clean-up Residential	NYSDEC Soil Clean-up Restricted Residential	NYSDEC Soil Clean-up Commercial	NYSDEC Soil Clean-up Industrial
Pesticides (mg/kg)					
4,4'-DDE	0.0033	1.8	8.9	62	120
4,4'-DDT	0.0033	1.7	7.9	47	94
PFAS (mg/kg)					
PFOA	0.00066	0.0066	0.033	0.500	0.6
PFOS	0.00088	0.0088	0.044	0.440	0.44
SVOCs (mg/kg)					
Naphthalene	12	100	100	500.0	1,000
Benzo(a)anthrac	1	1	1	5.6	11
Benzo(a)pyrene	1	1	1	1	8.1
Benzo(b)fluorant	1	1	1	5.6	11
Benzo(k)fluorant	0.8	1	3.9	56	110
Chrysene	1	1	3.9	56	110
Dibenzo(a,h)anth	0.33	0.33	0.33	0.56	1.1
Indeno(1,2,3-cd)p	0.5	0.5	0.5	5.6	11
Dibenzofuran	7	14	59	350.0	1,000
3-Methylphenol/4	0.33	34	100	500.0	1,000
VOCs (mg/kg)					
Acetone	0.05	100	100	500.0	1,000
Naphthalene	12	100	100	500.0	1,000
Methylene Chlori	0.05	51	100	500	1,000
1,3,5-Trimethylbe	8.4	47	52	190	380
1,2,4-Trimethylbe	3.6	47	52	190	380
Metals (mg/kg)					
Arsenic	13	16	16	16	16
Barium	350	350	400	400	10,000
Copper	50	270	270	270	10,000
Lead	63	400	400	1,000	3,900
Mercury	0.18	0.81	0.81	2.8	5.7
Zinc	109	2,200	10,000	10,000	10,000

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NOTE:
1. THIS PLAN IS FOR LOCATING BORINGS AND ASSOCIATED DATA ONLY. OTHER SITE WORK SHOWN HERE IS NOT INTENDED FOR CONSTRUCTION.
2. MG/KG - MILLIGRAMS PER KILOGRAM.
3. PFAS - PER - AND POLYFLUOROALKYL SUBSTANCES.
4. VOCS - VOLATILE ORGANIC COMPOUNDS
5. SVOCS - SEMI-VOLATILE ORGANIC COMPOUNDS
6. NYSDEC - NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

REFERENCE:
1. EXISTING CONDITIONS AND BOUNDARY ARE TAKEN FROM "A.L.T.A./N.S.P.S. LAND TITLE SURVEY" FOR 2740 WEBSTER AVENUE AND 2768 WEBSTER AVENUE, PREPARED BY EMPIRE STATE LAND SURVEYOR, P.C., DATED MARCH 5, 2021.

LEGEND:

- PROPOSED REMEDIAL INVESTIGATION SOIL SAMPLE NO. AND APPROX. LOCATION
- ENVIRONMENTAL AND GEOTECHNICAL BORING NUMBER & APPROX. LOCATION
- ENVIRONMENTAL BORING NUMBER & APPROX. LOCATION
- SOIL BORING/ TEMPORARY WELL NUMBER & APPROX. LOCATION
- SOIL BORING/SOIL VAPOR NUMBER & APPROX. LOCATION
- SITE LOCATION

SCALE: 1" = 30'
0 15 30 60 90 120 FEET

no.	date	description	by

dwg by: KBV
chk by: AR
scale: AS NOTED
date: 10/14/2025

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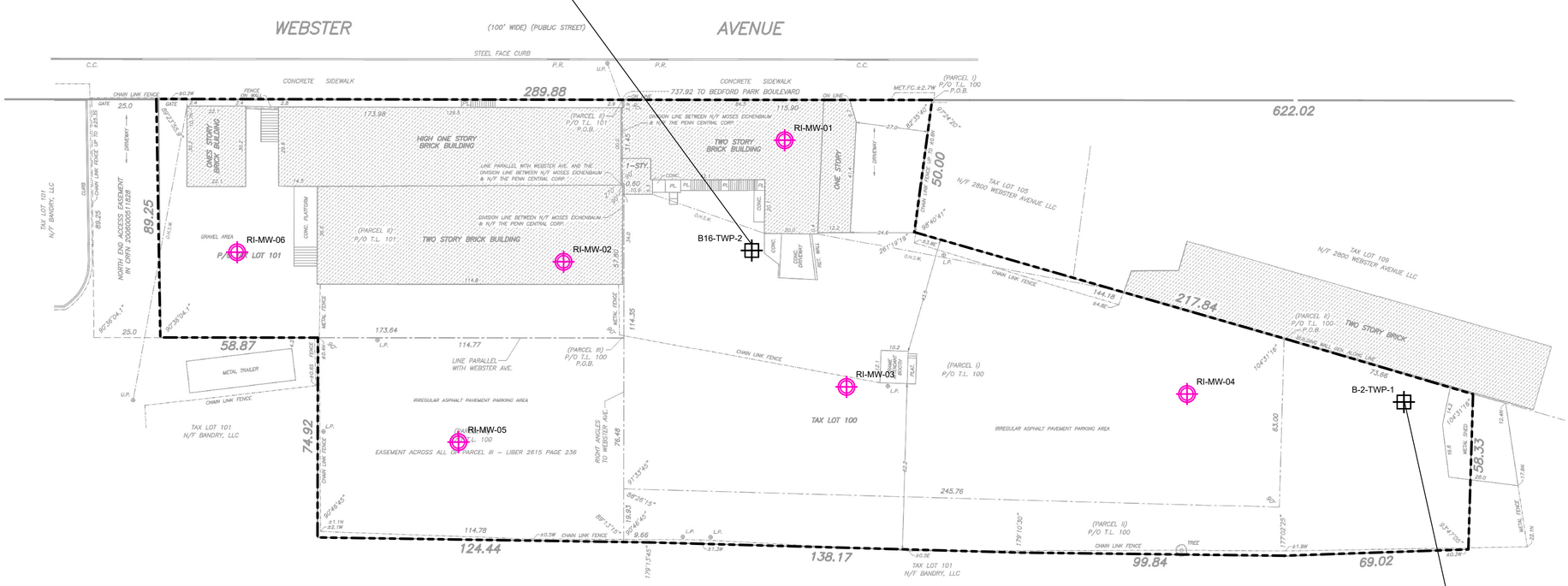
project: 2752-2768 WEBSTER AVENUE BRONX, NEW YORK

title: LOCATION OF PROPOSED REMEDIAL INVESTIGATION SOIL BORINGS

job no.: 13581A
drawing no: FIG-3.1

Y:\GIS\Project_Numbers\13581\FINAL_MAPS, 10/14/2025 3:15 PM, Kim Vanderklein, LAYOUT: FIG-

Sample ID:	TWP-2	
Compound:	06/12/2024	
SVOCs (µg/L)	Result	Q
Phenol	5	
Metals (µg/L)	Result	Q
Magnesium	51,500	
Sodium	60,800	



Sample ID:	TWP-1	
Compound:	06/12/2024	
Metals (µg/L)	Result	Q
Iron	3,100	
Magnesium	41,000	
Manganese	706.2	
Sodium	26,100	

Compound:	NYSDEC TOGS AWQS
SVOCs (mg/kg)	
Phenol	1
Metals (mg/kg)	
Iron	300
Magnesium	35,000
Manganese	300
Sodium	20,000

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NOTE:
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2. MGL - MICROGRAMS PER LITER.
3. SVOCS - SEMI-VOLATILE ORGANIC COMPOUNDS.
4. NYSDEC- NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION.
5. PFAS - PER - AND POLYFLUOROALKYL SUBSTANCES.

REFERENCE:
1. EXISTING CONDITIONS AND BOUNDARY ARE TAKEN FROM "A.L.T.A./N.S.P.S. LAND TITLE SURVEY" FOR 2740 WEBSTER AVENUE AND 2768 WEBSTER AVENUE, PREPARED BY EMPIRE STATE LAND SURVEYOR, P.C., DATED MARCH 5, 2021.

LEGEND:
- PROPOSED REMEDIAL INVESTIGATION GROUNDWATER WELL SAMPLE NO. AND APPROX. LOCATION
- SOIL BORING/ TEMPORARY WELL NUMBER & APPROX. LOCATION

Shape_Leng
1264.44945692

SCALE: 1" = 30'
0 15 30 60 90 120 FEET

rev	date	description	by

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chk by: AR
scale: AS NOTED
date: 10/14/2025

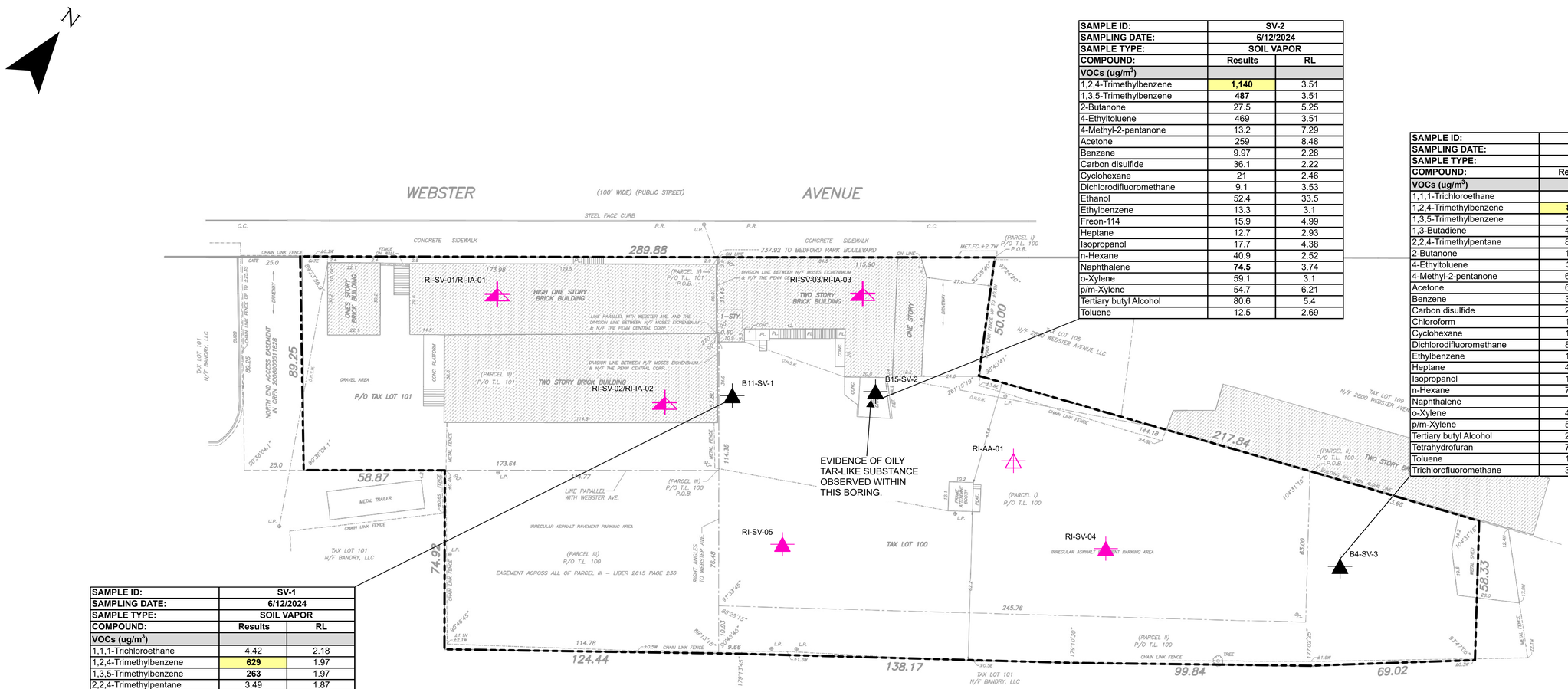
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project: 2752-2768 WEBSTER AVENUE BRONX, NEW YORK

title: LOCATION OF PROPOSED REMEDIAL INVESTIGATION GROUNDWATER MONITORING WELLS

job no.: 13581A
drawing no: FIG-3.2

Y:\GIS\Project_Numbers\13581\FINAL_MAPS, 10/14/2025 3:17 PM, Kim Vandeklein, LAYOUT FIG-



SAMPLE ID:	SV-2	
SAMPLING DATE:	6/12/2024	
SAMPLE TYPE:	SOIL VAPOR	
COMPOUND:	Results	RL
VOCs (ug/m^3)		
1,2,4-Trimethylbenzene	**1,140**	3.51
1,3,5-Trimethylbenzene	**487**	3.51
2-Butanone	27.5	5.25
4-Ethyltoluene	469	3.51
4-Methyl-2-pentanone	13.2	7.29
Acetone	259	8.48
Benzene	9.97	2.28
Carbon disulfide	36.1	2.22
Cyclohexane	21	2.46
Dichlorodifluoromethane	9.1	3.53
Ethanol	52.4	33.5
Ethylbenzene	13.3	3.1
Freon-114	15.9	4.99
Heptane	12.7	2.93
Isopropanol	17.7	4.38
n-Hexane	40.9	2.52
Naphthalene	**74.5**	3.74
o-Xylene	59.1	3.1
p/m-Xylene	54.7	6.21
Tertiary butyl Alcohol	80.6	5.4
Toluene	12.5	2.69

SAMPLE ID:	SV-3	
SAMPLING DATE:	6/12/2024	
SAMPLE TYPE:	SOIL VAPOR	
COMPOUND:	Results	RL
VOCs (ug/m^3)		
1,1,1-Trichloroethane	22	3.21
1,2,4-Trimethylbenzene	**846**	2.89
1,3,5-Trimethylbenzene	**353**	2.89
1,3-Butadiene	4.51	1.3
2,2,4-Trimethylpentane	8.69	2.75
2-Butanone	16.9	4.34
4-Ethyltoluene	353	2.89
4-Methyl-2-pentanone	6.68	6.02
Acetone	62.7	6.98
Benzene	3.93	1.88
Carbon disulfide	24.7	1.83
Chloroform	12.6	2.87
Cyclohexane	19.1	2.02
Dichlorodifluoromethane	8.46	2.91
Ethylbenzene	12.5	2.55
Heptane	4.67	2.41
Isopropanol	19.4	3.61
n-Hexane	7.44	2.07
Naphthalene	44	3.08
o-Xylene	48.2	2.55
p/m-Xylene	50.4	5.13
Tertiary butyl Alcohol	21.7	4.46
Tetrahydrofuran	7.73	4.34
Toluene	10.4	2.22
Trichlorofluoromethane	33.6	3.3

SAMPLE ID:	SV-1	
SAMPLING DATE:	6/12/2024	
SAMPLE TYPE:	SOIL VAPOR	
COMPOUND:	Results	RL
VOCs (ug/m^3)		
1,1,1-Trichloroethane	4.42	2.18
1,2,4-Trimethylbenzene	**629**	1.97
1,3,5-Trimethylbenzene	**263**	1.97
2,2,4-Trimethylpentane	3.49	1.87
2-Butanone	6.02	2.95
4-Ethyltoluene	245	1.97
Acetone	30.6	4.75
Benzene	1.34	1.28
Carbon disulfide	5.36	1.25
Cyclohexane	4.78	1.38
Dichlorodifluoromethane	3.07	1.98
Ethylbenzene	5.43	1.74
Heptane	2.66	1.64
n-Hexane	2.35	1.41
Naphthalene	36.7	2.1
o-Xylene	25	1.74
p/m-Xylene	24.4	3.47
Tertiary butyl Alcohol	13.4	3.03
Tetrachloroethene	7.05	2.71
Toluene	4.22	1.51
Trichlorofluoromethane	2.33	2.25

COMPOUND:	NY-SSC-A	NY-SSC-B	NY-SSC-C	NY-SSC-D	NY-SSC-E	NY-SSC-F
	VOCs (ug/m^3)					
1,1,1-Trichloroethane	-	100	-	-	-	-
1,2,4-Trimethylbenzene	-	-	-	60	-	-
1,3,5-Trimethylbenzene	-	-	-	60	-	-
1,3-Butadiene	-	-	-	-	-	-
2,2,4-Trimethylpentane	-	-	-	60	-	-
2-Butanone	-	-	-	-	-	-
4-Ethyltoluene	-	-	-	-	-	-
4-Methyl-2-pentanone	-	-	-	-	-	-
Acetone	-	-	-	-	-	-
Benzene	-	-	-	60	-	-
Carbon disulfide	-	-	-	-	-	-
Chloroform	-	-	-	-	-	-
Cyclohexane	-	-	-	60	-	-
Dichlorodifluoromethane	-	-	-	-	-	-
Ethanol	-	-	-	-	-	-
Ethylbenzene	-	-	-	60	-	-
Freon-114	-	-	-	-	-	-
Heptane	-	-	-	-	200	-
Isopropanol	-	-	-	-	-	-
n-Hexane	-	-	-	-	200	-
Naphthalene	-	-	-	60	-	-
o-Xylene	-	-	-	60	-	-
p/m-Xylene	-	-	-	-	200	-
Tertiary butyl Alcohol	-	-	-	-	-	-
Tetrachloroethene	-	100	-	-	-	-
Tetrahydrofuran	-	-	-	-	-	-
Toluene	-	-	-	-	-	300
Trichlorofluoromethane	-	-	-	-	-	-

Notes:
ug/m^3: Micrograms per cubic meter.
ND: Not detected.
Bold: Elevated Concentration.
Action Required by NYSDOH Decision Matrix.
NY-SSC-A: New York DOH Matrix A Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, and updated May 2017.
NY-SSC-B: New York DOH Matrix B Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, and updated May 2017.
NY-SSC-C: New York DOH Matrix C Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, October 2006, and updated May 2017.
NY-SSC-D: New York DOH Matrix D Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, February, 2024.
NY-SSC-E: New York DOH Matrix E Sub-slab Vapor Concentrations Criteria per Guidance for Evaluating Soil Vapor Intrusion, February, 2024.

NOTE:
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REFERENCE:
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LEGEND:

RI-AA-01 — PROPOSED REMEDIAL INVESTIGATION AMBIENT AIR SAMPLE NO. AND APPROX. LOCATION

RI-SV-01/ RI-IA-01 — PROPOSED REMEDIAL INVESTIGATION CO-LOCATED SOIL VAPOR AND INDOOR AIR SAMPLE NO. AND APPROX. LOATION

RI-SV-04 — PROPOSED REMEDIAL INVESTIGATION SOIL VAPOR SAMPLE NO. AND APPROX. LOATION

SOIL VAPOR SAMPLE NO AND APPROX LOCATION

SITE BOUNDARY

SCALE: 1" = 30'
0 15 30 60 90 120 FEET

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project: 2752-2768 WEBSTER AVENUE BRONX, NEW YORK

title: LOCATION OF PROPOSED REMEDIAL INVESTIGATION SOIL VAPOR POINTS

job no.: 13581A
drawing no: FIG-3.3

Y:\GIS\Project_Numbers\13581\FINAL_MAPS, 10/14/2025 5:57 PM, Kim Vanderklein, LAYOUT: FIG-

Appendix A:

Previous Environmental Reports (Electronic)

Appendix B:

Quality Assurance Project Plan (QAPP)

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Site Civil

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Parsippany, NJ 07054
973.808.9050
www.sesi.org

QUALITY ASSURANCE PROJECT PLAN

For

Proposed Mixed-Use Development
2752-2768 Webster Avenue
Block 3273; Lot 100 (Former Lots 91 and 100)
Bronx, Bronx County, NY

Prepared for:

South Bronx Development I LLC

SESI Project No:
13581A

Date:
October 2025

Table of Contents

LIST OF ACRONYMS i
1.0 PROJECT DESCRIPTION 1
2.0 PROJECT ORGANIZATION 1
2.1 PROJECT PRINCIPAL 1
2.2 PRINCIPAL ENGINEER 1
2.3 PROJECT MANAGER 2
2.4 REMEDIAL INVESTIGATION PROGRAM MANAGER 2
2.5 FIELD TEAM LEADER 2
2.6 QUALITY ASSURANCE OFFICER 2
3.0 QA/QC OBJECTIVES FOR MEASUREMENT OF DATA 2
3.1 COMPLETENESS 3
3.2 REPRESENTATIVENESS 3
3.3 COMPARABILITY 4
3.4 PRECISION AND ACCURACY 4
4.0 SAMPLING PROCEDURES 5
4.1 SAMPLING PROGRAM 5
4.1.1 DRILLING/SAMPLING PROCEDURES 5
4.1.2 MONITORING WELL COMPLETION 6
4.1.3 WELL DEVELOPMENT 6
4.1.4 DECONTAMINATION 7
4.1.5 PFAS SAMPLING CONSIDERATIONS 7
4.2 GROUNDWATER SAMPLING PROGRAM. 8
4.2.1 WELL EVACUATION 8
4.2.2 SAMPLING PROCEDURE 8
4.3 SOIL VAPOR SAMPLING 9
4.4 SAMPLE PRESERVATION AND SHIPMENT 10
5.0 SAMPLE CUSTODY 10
5.1 FIELD SAMPLE CUSTODY 10
5.2 LABORATORY SAMPLE CUSTODY 11
5.3 FINAL EVIDENCE FILES 11
6.0 CALIBRATION PROCEDURES 12
7.0 ANALYTICAL PROCEDURES 12

7.1 VOLATILE ORGANICS (VOA) 12
7.2 SEMI-VOLATILE ORGANIC COMPOUNDS 12
7.3 PESTICIDE AND PCB COMPOUNDS 13
7.4 METALS 13
7.5 PER- AND POLYFLUOROALKYL SUBSTANCES 13
7.6 SITE SPECIFICITY OF ANALYSES 15

TABLES

TABLE 7.1 SAMPLE CONTAINERIZATION (EMBEDDED)

TABLE 7.2 SAMPLING PROCEDURE FOR MONITORING WELLS USING VOLUME AVERAGED PURGING (EMBEDDED)

TABLE 7.3 SAMPLING PROCEDURE FOR MONITORING WELLS USING LOW-STESS (LOW-FLOW) METHODS (EMBEDDED)

TABLE 7.4 PFAS COMPOUND LIST AND REPORTING AND METHOD DETECTION LIMITS FOR SOIL AND GORUNDWATER (EMBEDDED)

LIST OF ACRONYMS

Acronym	Definition
AAS	Absorption Spectroscopy
ASP	Analytical Service Protocol
BCP	Brownfield Cleanup Program
DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Accreditation Program
GC/MS	Gas Chromatography/Mass Spectrometry
HAS	Hollow-stem Auger
HDPE	High-Density Polyethylene
LDPE	Low-density Polyethylene
LFPS	Low Flow Purging Sampling
MDL	Method Detection Limit
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCB	Polychlorinated Biphenyls
PFAS	Per- and polyfluoroalkyl substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PPE	Personal Protective Equipment
PTFE	Polytetrafluoroethylene
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RIWP	Remedial Investigation Work Plan
SESI	SESI Consulting Engineers, Inc.
TIC	Tentatively Identified Compound
TCL	Target Compound List
VOC	Volatile Organic Compound
USEPA	United States Environmental Protection Agency

1.0 PROJECT DESCRIPTION

This document presents the quality assurance project plan (QAPP) for the Remedial Investigation Work Plan (RIWP) for the proposed development of the property located at 2752-2768 Webster Avenue in the Bronx, Bronx County, New York (the Site). The Site consists of a 1.4-acre area parcel and is identified as Block 3273, Lots 100 (Former Lots 91 and 100) on local tax maps. The Site is located in a mixed-use commercial and residential neighborhood and is bounded by mixed-use commercial/residential buildings to the north, a Metro-North railroad and Fordham University and Preparatory School to the south, a warehouse to the east, and a laydown yard and parking lot to the west.

The Site is improved with one (1) approximately 9,350-square feet (sf) one-to-two-story warehouse and one (1) approximately 2,330-sf two-story former automotive repair garage building. The buildings were constructed in 1906. The Site was initially developed prior to 1896. Railroad tracks have been present at the Site since at least 1896. Historical Site operations included a sewer pipe yard in 1900, freight house from 1900 to 1950, engine room in 1945, cold storage and substation from at least 1978 to 2007, and automotive repair from at least 1992 to 2010. SESI identified that the most recent operations at the Site included a substation, cold storage facility, alcohol/liquor distributor, restaurants, and automotive repair garages. The Site is currently vacant and was recently acquired by the Requestor South Bronx Development I LLC after their members performed environmental due diligence with respect to the Site.

2.0 PROJECT ORGANIZATION

The RIWP will be conducted by Soils Engineering Services, Inc. (SESI), on behalf of South Bronx Development I LLC. The organization of SESI's key project management and field staff, and respective areas of responsibility, is presented below.

2.1 PROJECT PRINCIPAL

Justin Protasiewicz, PE

Provide technical and administrative oversight and guidance throughout the project, assist in securing company resources, participate in technical review of deliverables, and attend key meetings as needed.

2.2 PRINCIPAL ENGINEER

Justin Protasiewicz, PE

Provide technical guidance and review of reports, analytical data. Will have key involvement in screening and development of remedial alternatives.

2.3 PROJECT MANAGER

Anthony Raposo, PE

Responsible for maintaining the day-to-day schedule for completing the fieldwork and deliverables according to BCP program requirements and client expectations.

2.4 REMEDIAL INVESTIGATION PROGRAM MANAGER

Anthony Raposo, PE

Responsible for coordinating and directing field efforts of SESI staff and subcontractors, and for maintaining that work is done according to QAPP specifications.

2.5 FIELD TEAM LEADER

Samuel Bauer

Responsible for overseeing field work during the RI, including observing subcontractors, maintaining field notes, and collecting samples of various environmental media, in accordance with the NYSDEC-approved Work Plan.

2.6 QUALITY ASSURANCE OFFICER

Anthony Raposo, PE

Responsible for reviewing sampling procedures and certify that the data was collected and analyzed using the appropriate procedures.

3.0 QA/QC OBJECTIVES FOR MEASUREMENT OF DATA

In cases where NYSDOH ELAP Certification exists for a specific group or category of parameters, the laboratories performing analysis in connection with this project will have appropriate NYSDOH ELAP Certification. Analytical Service Protocol (ASP, January 2005) Category B deliverables are required for all samples.

Detection limits set by NYSDEC-ASP (January 2005) will be used for all sample analyses unless otherwise noted. If NYSDEC-ASP-dictated detection limits prove insufficient to assess project goals (i.e., comparison to drinking water standards or attainment of ARARs), then ASP Special Analytical Services (SAS) or other appropriate methods will be utilized.

The quality assurance/quality control objectives for all measurement data include completeness, representativeness, comparability, precision and accuracy.

3.1 COMPLETENESS

The analyses performed must be appropriate and inclusive. The parameters selected for analysis are chosen to meet the objectives of the study.

Completeness of the analyses will be assessed by comparing the number of parameters intended to be analyzed with the number of parameters successfully determined and validated. Data must meet QC acceptance criteria for 100 percent or more of requested determinations.

3.2 REPRESENTATIVENESS

Samples must be taken of the population and, where appropriate, the population will be characterized statistically to express the degree to which the data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process, or environmental condition.

Non-dedicated sampling devices will be cleaned between sampling points by washing and rinsing with Alconox® detergent, followed by a thorough rinse with distilled water. Specific cleaning techniques are described in the Field Sampling Procedure. Two types of blank samples will accompany each sample set where Target Compound List (TCL) volatiles are to be analyzed (water matrix only). A trip blank, consisting of a 40 ml VOA vial of organic-free water prepared by the laboratory, will accompany each set of sample bottles from the laboratory to the field and back. This bottle will remain sealed throughout the shipment and sampling process. This blank will be analyzed for TCL volatile organic compounds along with the groundwater samples to ensure that contamination with TCL volatile compounds has not occurred during the bottle preparation, shipment and sampling phase of the project. In order to check for contaminant carryover when non-dedicated sampling equipment is used, a rinsate blank will be submitted to the laboratory. This blank will also be analyzed for TCL volatile organic compounds. The TCL compounds are identified in the United States Environmental Protection Agency (USEPA) Contract Laboratory Program dated October 2016.

The analysis results obtained from the determination of identical parameters in field duplicate samples can be used to further assess the representativeness of the sample data.

3.3 COMPARABILITY

Consistency in the acquisition, preparation, handling and analysis of samples is necessary in order for the results to be compared where appropriate. Additionally, the results obtained from analyses of the samples will be compared with the results obtained in previous studies, if available.

To ensure the comparability of analytical results with those obtained in previous or future testing, all samples will be analyzed by NYSDEC-approved methods. The NYSDEC-ASP mandated holding times for various analyses will be strictly adhered to.

3.4 PRECISION AND ACCURACY

The validity of the data produced will be assessed for precision and accuracy. Analytical methods which will be used include gas chromatography/mass spectrometry (GC/MS), gas chromatography (GC), colorimetry, atomic spectroscopy, gravimetric and titrimetric techniques. The following outlines the procedures for evaluating precision and accuracy, routine monitoring procedures, and corrective actions to maintain analytical quality control. All data evaluations will be consistent with NYSDEC-ASP procedures (June 2000). Data will be 100 percent compliant with NYSDEC-ASP requirements.

The number of duplicate, spiked and blank samples analyzed will be a minimum of 1 duplicate for every 20 samples per each medium of groundwater and soil. The inclusion and frequency of analysis of field blanks will be on the order of one per every 20 samples (soil) but not more than one per day. For the aqueous matrix field blanks will be collected at a frequency of one per day. Samples to be analyzed for volatile organic compounds will be accompanied by a trip blank for each shipment and field blanks (water matrix) or field blanks (soil).

Quality assurance audit samples will be prepared and submitted by the laboratory QA manager for each analytical procedure used. The degree of accuracy and the recovery of analyte to be expected for the analysis of QA samples and spiked samples depend upon the matrix, method of analysis, and compound or element being determined. The concentration of the analyte relative to the detection limit is also a major factor in determining the accuracy of the measurement. The lower end of the analytical range for most analyses is generally accepted to be five times the detection limit. At or above this level, the determination and spike recoveries for metals in water samples will be expected to range from 75 to 125 percent. The recovery of organic surrogate compounds and matrix spiking compounds determined by GC/MS will be compared to the guidelines for recovery of individual compounds as established by the United States Environmental Protection Agency Contract Laboratory Program dated 7/85 or as periodically updated.

The quality of results obtained for inorganic ion and demand parameters will be assessed by comparison of QC data with laboratory control charts for each test.

4.0 SAMPLING PROCEDURES

4.1 SAMPLING PROGRAM

The sampling program for this project will include soil, groundwater, soil vapor, indoor air, and ambient air. Soil samples will be collected from split spoon sampling or macrocore devices retrieved from soil borings. Groundwater samples will be collected from groundwater monitoring wells using low flow purging techniques. Soil vapor samples will be collected from vapor points screened in the vadose zone using Summa Canisters. Indoor and ambient air samples will be collected using Summa Canisters.

4.1.1 DRILLING/SAMPLING PROCEDURES

Soil and groundwater samples will be collected by means of a soil boring program. Soil borings shall be completed using the hollow stem auger drilling methods, direct push methods, or rotary drilling methods, whichever methods are determined to be best suited to site conditions by the SESI project manager and SESI field team leader.

Soil samples will be collected from soil borings and analyzed in accordance with the NYSDEC-approved Work Plan. Monitoring wells for groundwater sample collection will be installed in select completed soil borings. Either hollow stem auger (HSA) or direct push drilling methods may be utilized for monitoring well completion.

Samples of the encountered overburden materials shall be collected continuously during drilling so that a complete soil profile is examined and described by the SESI field geologist. The sampling method employed shall be ASTM D-1586/Split Barrel Sampling using a standard 2-foot long, 2-inch outside diameter split-spoon sampler with a 140-pound hammer, in cases where HSA methods are used. Upon retrieval of the sampling barrel, the collected sample shall be placed in glass jars and labeled, stored on site (on ice in a cooler if necessary), and transmitted to the appropriate testing laboratory or storage facility. Chain-of-custody procedures will be practiced following Section 15, EPA-600/4-82-029, Handbook for Sampling and Sample Preservation of Water and Waste Waters.

A geologist or engineer will be on site during the drilling operations to fully describe each soil sample, following the New York State Soil Description Procedure, and to retain representative portions of each sample.

The drilling contractor will be responsible for obtaining accurate and representative samples, informing the geologist of changes in drilling pressure, keeping a separate general log of soils encountered including blow counts [i.e., the number of blows from a soil sampling drive weight (140 pounds)] required to drive the split-spoon sampler in 6-inch increments and installing monitoring wells to levels directed by the supervising geologist following specifications further outlined in this protocol.

4.1.2 MONITORING WELL COMPLETION

Monitoring wells will be constructed of 0.010-inch slot size PVC well screen and riser casing. Other materials utilized for completion will be washed silica sand (Q-Rock No. 4 or approved equivalent) bentonite grout, Portland cement, and a protective steel locking well casing and cap with locks. The depth of the wells will be determined based on the depth to water, type of contaminant and field conditions encountered.

The monitoring well installation method for wells installed within unconsolidated sediments shall be to place the screen and riser assembly into the casing once the screen interval has been selected. At that time, a washed silica sand pack will be placed around the well screen if required to prevent screen plugging. If a sand pack is not warranted, the auger string will be pulled back to allow the native aquifer material to collapse 2 to 3 feet above the top of the screen. Bentonite pellets will then be added to the annulus between the casing and the inside auger to ensure proper sealing. Cement/bentonite grout will continue to be added during the extraction of the augers until the entire aquifer thickness has been sufficiently sealed off from horizontal and/or vertical flow above the screened interval. During placement of sand and bentonite pellets, frequent measurements will be made to check the height of the sand pack and thickness of bentonite layers by a weighted drop tape measure.

A bolt-down protective curb box will be installed, flush with the ground, or steel “stick-up” protective casing and secured by a Portland cement seal. The cement seal shall extend laterally at least 1 foot in all directions from the protective casing and shall slope gently away to drain water away from the well.

4.1.3 WELL DEVELOPMENT

All monitoring wells will be developed or cleared of all fine-grained materials and sediments that have settled in or around the well during installation so that the screen is transmitting representative portions of the groundwater. The development will be by one of two methods, pumping or bailing groundwater from the well until it yields relatively sediment-free water.

A decontaminated pump or bailer will be used and subsequently decontaminated after each use following procedures outlined in the Decontamination Protocol. Pumping or bailing will cease when the turbidity falls below 50 NTUs or until specific conductivity, pH, and temperature are stable (i.e., consecutive readings are within 10 percent with no overall upward or downward trends in measurements). Well development water will be contained in drums and properly disposed off-site.

4.1.4 DECONTAMINATION

All drilling equipment and associated tools including augers, drill rods, sampling equipment, wrenches and any other equipment or tools that have come in contact with contaminated materials will be decontaminated before any drilling on site begins, between each well, and prior to removing any equipment from the site. The preferred decontamination procedure will be to scrape the equipment from any residual soils and then rinse with water and Alconox®. Every effort will be made to minimize the generation of contaminated water, which will be drummed, to extent possible, for disposal.

4.1.5 PFAS SAMPLING CONSIDERATIONS

This section contains the materials limitations for per- and polyfluoroalkyl substances (PFAS) sampling in accordance with the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (April 2023).

The groundwater samples will be analyzed for PFAS using USEPA Method 1633A. Reporting limits for PFOA and PFOS will not exceed 2 nanograms per liter (ng/L). Category B deliverables and an electronic data deliverable will be completed.

PFAS are very persistent in the environment and in the human body. Due to their presence in a variety of products, persistence in the environment and very low drinking water standards, care must be used when groundwater sampling for PFAS to avoid cross contamination from the sampling equipment and personal protective equipment (PPE).

No fabric softener will be used on clothing to be worn in field. Cosmetics, moisturizers, hand cream, unauthorized sunscreen, insect repellent or other related products will not be used the morning of sampling. The field samplers will wear powder-free nitrile gloves while filling and sealing the sample bottles. The sampling equipment components and sample containers will not come in contact with material that may potentially contain PFAS such as aluminum foil, low density polyethylene (LDPE), glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners

with a PTFE layer. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials will be avoided. Food and drink packaging materials will be avoided, as well.

Sampling will be performed using certified PFAS-free sampling materials such as stainless steel, high density polyethylene (HDPE), PVC, silicone, acetate or polypropylene pump and tubing. Rinse water must be laboratory-provided certified PFAS-free distilled or de-ionized water. Standard two step decontamination using Alconox® detergent and clean certified PFAS-free water rinse will be performed for equipment that does come in contact with PFAS materials.

No waterproof field books, plastic clipboards, binders, or spiral hard cover will be used for PFAS containers. No adhesives (i.e. Post-It® Notes), sharpies, or permanent markers will be used for PFAS containers. The PFAS containers will be labeled with ballpoint pens. PFAS samples will be stored in separate cooler filled with regular ice only with no chemical (blue) ice packs.

Pre-cleaned sample bottles with closures, coolers, sample labels and a chain of custody form will be provided by the laboratory.

4.2 GROUNDWATER SAMPLING PROGRAM.

4.2.1 WELL EVACUATION

Prior to sampling a monitoring well, the static water level will be recorded. All well data will be recorded on a field sampling record. The wells will be sampled in accordance with the USEPA guidelines for the Low Flow Purging Sampling (LFPS). The purpose of LFPS is to collect groundwater samples from monitoring wells that are representative of ambient groundwater conditions in the aquifer. The LFPS method reduces turbidity which is needed particularly when sampling for metals.

4.2.2 SAMPLING PROCEDURE

The wells will be sampled using the LFPS technique. A flow rate of 100 ml to 250 ml per minute is used to purge the wells. Drawdown should not exceed 0.3 feet. QED bladder pumps or peristaltic pumps are used for this method. The pump intake is lowered to the mid-point of the water column or as subsurface features such as bedrock fractures or more permeable zones warrant. At the initiation of low flow purging a water level is recorded as well as field parameters. Field parameters are then monitored every five minutes during low flow purging using a flow through cell. When three consecutive measurements of pH differ by 0.1 units or less, with ORP within 10 mv or less, turbidity varies 10 percent or less, conductivity differs by 3 percent or less and dissolved oxygen

by 10 percent or less, sampling may begin. Flow through cells are used so continuous real time readings are made. When the parameters stabilize the flow through cell is disconnected and sample bottles are filled directly from the tubing.

4.3 SOIL VAPOR SAMPLING

Soil vapor sampling will be conducted in accordance with NYSDOH Guidance for Evaluating Soil Vapor Intrusion in New York State (October 2006, amended in February 2024). Soil vapor samples will be collected in the vadose zone from shallow (5 feet) well points. Each vapor point will be installed in a shallow boring drilled either by hand-operated equipment (e.g. hand auger or percussion hammer drill), or by a small truck-mounted drill rig. Drilling equipment used shall be based on soil conditions, and the method that provides the most practical approach.

Each vapor point will consist of an inert sampling tube (polyethylene, stainless steel, or Teflon®) with a 6-inch screened section at the bottom through which soil vapors can be sampled. The screen slot size will be 0.0075 inches. A sampling zone will be created around the screened section by backfilling with 1 to 2 feet of porous coarse sand or glass beads, and at least three feet of bentonite will be placed above the porous sampling zone to form a seal from the surface. Native clean soil will be packed around the remaining annulus to the ground surface.

Each designated soil vapor sampling location will be purged of a minimum of three volumes using a low volume pump, and then attached to a regulator, and secured with a clamp. The regulator will then be attached to a 1-liter summa canister.

The regulator will be set to collect a soil vapor sample at a flow rate of less than 0.2 liters per minute. After the summa canister is filled, the valve will be closed.

Each canister will be listed according to a specific sample I.D. on a chain of custody form. Sample canisters will be delivered to the laboratory within 24 hours and analyzed for VOCs by method TO-15. The detection limit for VOCs will be 1 $\mu g/m^3$ or less.

The soil vapor sampling effort will include the use of inert helium tracer gas to verify that the soil vapor samples are not diluted by ambient air. The atmosphere around the sampling tube will be enriched with the tracer gas, and the soil vapor sample will be collected in the presence of the enriched tracer atmosphere. This will be accomplished by placing an inverted plastic pail over the sampling point and filling the pail with the tracer gas via a small tube penetrating the site of the pail. Refer to NYSDOH Guidance for Evaluating Soil Vapor Intrusion in New York State (October 2006 amended in February 2024).

Weather conditions in the 48 hours prior to the test, and during the test, will be noted, including average wind speed, precipitation, temperature, and barometric pressure.

4.4 SAMPLE PRESERVATION AND SHIPMENT

Since all bottles will contain the necessary preservatives as shown in Table 7.1, they need only be filled. The 40 ml VOA vials must be filled brim full with no air bubbles. The other bottles should be filled to within about 1 inch from the top.

The bottles will be sent from the laboratory in coolers which will be organized on a per site basis. Following sample collection, the bottles should be placed on ice in the shipping cooler. The samples will be cooled to 4°C, but not frozen.

Final packing and shipment of coolers will be performed in accordance with guidelines outlined in the ASP.

5.0 SAMPLE CUSTODY

The program for sample custody and sample transfer is in compliance with the NYSDEC-ASP, as periodically updated. If samples may be needed for legal purposes, chain-of-custody procedures, as defined by NEIC Policies and Procedures (USEPA-330/9-78-001-R, Revised June 1988) will be used. Sample chain-of-custody is initiated by the laboratory with selection and preparation of the sample containers. To reduce the chance for error, the number of personnel handling the samples should be minimized.

5.1 FIELD SAMPLE CUSTODY

A chain-of-custody record accompanies the samples from initial sample container selection and preparation at the laboratory, shipment to the field for sample containment and preservation, and return to the laboratory. Two copies of this record follow the samples to the laboratory. The laboratory maintains one file copy and the completed original is returned to the site inspection team. Individual sample containers provided by the laboratory are used for shipping samples. The shipping containers are insulated and ice is used to maintain samples at approximately 4°C until samples are returned and in the custody of the laboratory. All sample bottles within each shipping container are individually labeled and controlled. Samples are to be shipped to the laboratory within 24-48 hours of the day of collection depending on parameter holding times.

Each sample shipping container is assigned a unique identification number by the laboratory. This number is recorded on the chain-of-custody record and is marked with indelible ink on the outside of the shipping container. The field sampler will indicate the sample designation/location number in the space provided on the appropriate chain-of-custody form for each sample collected. The shipping container is closed and a seal provided by the laboratory is affixed to the latch. This seal must be broken to open the

container, and this indicates possible tampering if the seal is broken before receipt at the laboratory. The laboratory will contact the site investigation team leader and the sample will not be analyzed if tampering is apparent.

5.2 LABORATORY SAMPLE CUSTODY

The site investigation team leader or Project Quality Assurance Officer notifies the laboratory of upcoming field sampling activities and the subsequent transfer of samples to the laboratory. This notification will include information concerning the number and type of samples to be shipped as well as the anticipated date of arrival.

The laboratory sample program meets the following criteria:

- The laboratory has designated a sample custodian who is responsible for maintaining custody of the samples and for maintaining all associated records documenting that custody.
- Upon receipt of the samples, the custodian will check the original chain-of-custody documents and compare them with the labeled contents of each sample container for correctness and traceability. The sample custodian signs the chain-of-custody record and records the date and time received.
- Care is exercised to annotate any labeling or descriptive errors. In the event of discrepant documentation, the laboratory will immediately contact the site investigation team leader as part of the corrective action process. A qualitative assessment of each sample container is performed to note any anomalies, such as broken or leaking bottles. This assessment is recorded as part of the incoming chain-of-custody procedure.
- The samples are stored in a secured area at a temperature of approximately 4°C until analyses are to commence.
- A laboratory chain-of-custody record accompanies the sample or sample fraction through final analysis for control.
- A copy of the chain-of-custody form will accompany the laboratory report and will become a permanent part of the project records.

5.3 FINAL EVIDENCE FILES

Final evidence files include all originals of laboratory reports and are maintained under documented control in a secure area.

A sample or an evidence file is under custody if:

- It is in your possession; it is in your view, after being in your possession.
- It was in your possession and you placed it in a secure area.
- It is in a designated secure area.

6.0 CALIBRATION PROCEDURES

Instruments and equipment used to gather, generate or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the appropriate manufacturer's specifications or project specific requirements. The procedures for instrument calibration, calibration verification, and the frequency of calibrations are described in the ASP. The calibration of instruments used for the determination of metals will be as described in the appropriate CLP standard operating procedures.

Calibration of other instruments required for measurements associated with these analyses will be in accordance with the manufacturer's recommendations and the standard operating procedures of the laboratory.

7.0 ANALYTICAL PROCEDURES

Analytical procedures shall conform to the most recent revision of the NYSDEC-ASP (June 2005) and are summarized on Table 7.1. In the absence of USEPA or NYSDEC guidelines, appropriate procedures shall be submitted for approval by NYSDEC prior to use.

The procedures for the sample preparation and analysis for organic compounds are as specified in the NYSDEC-ASP. Analytical cleanups are mandatory where matrix interferences are noted. No sample shall be diluted any more than 1 to 5 times. The sample shall be either re-extracted, re-sonicated, re-stream distilled, etc. or be subjected to any one analytical cleanup noted in SW846 or a combination thereof. The analytical laboratory shall expend such effort and discretion to demonstrate good laboratory practice and demonstrate an attempt to best achieve the method detection limit.

7.1 VOLATILE ORGANICS (VOA)

For the analysis of water samples for Target Compound List (TCL), volatile organic compounds (VOCs), no sample preparation is required. The analytical procedure for volatiles is detailed in NYSDEC-ASP (Volume I, Section D-I). A measured portion of the sample is placed in the purge and trap apparatus and the sample analysis is performed by gas chromatography/mass spectrometry for the first round. USEPA Method 8260C will be used, plus tentatively identified compounds (TICs). USEPA Methods 8010 or 8020 (gas chromatography with different detectors) will be used if subsequent rounds with lower limits of detection are warranted.

7.2 SEMI-VOLATILE ORGANIC COMPOUNDS

The extraction and analytical procedures used for preparation of water, soil and sediment samples for the analysis of the TCL semi-volatile organic compounds are described in NYSDEC-ASP Volume I, Section D-III. USEPA Method 8270D will be used, plus tentatively identified compounds (TICs).

Instrument calibration, compound identification, and quantitation are performed as described in Section 6 of this document and in the NYSDEC-ASP.

7.3 PESTICIDE AND PCB COMPOUNDS

The sample preservation procedures for gas chromatography for pesticides and PCB's will be as described in the NYSDEC-ASP methods (Section D-IV). The analysis of standard mixes, blanks and spiked samples will be performed at the prescribed frequency with adherence to the 72-hour requirement described in the method.

7.4 METALS

Water, soil and waste samples will be analyzed for the metals listed in Table 7.1. The detection limits for these metals are as specified in the NYSDEC-ASP, Section D-V. The instrument detection limits will be determined using calibration standards and procedures specified in the NYSDEC-ASP. The detection limits for individual samples may be higher due to the sample matrix. The procedures for these analyses will be as described in the NYSDEC-ASP.

The analyses for metals will be performed by atomic absorption spectroscopy (AAS) or inductively-coupled plasma emission spectroscopy (ICPES), as specified in the ASP with regard to AAS flame analysis.

7.5 PER- AND POLYFLUOROALKYL SUBSTANCES

The NYSDEC has developed a list of 40 PFAS Analytes List on Table 7.1 for remedial programs. These are:

- Perfluorobutanesulfonic acid
- Perfluoropentanesulfonic acid
- Perfluorohexanesulfonic acid
- Perfluoroheptanesulfonic acid
- Perfluorooctanesulfonic acid
- Perfluorononanesulfonic acid
- Perfluorodecanesulfonic acid
- Perfluorododecanesulfonic acid
- Perfluorobutanoic acid
- Perfluoropentanoic acid
- Perfluorohexanoic acid
- Perfluoroheptanoic acid

- Perfluorooctanoic acid
- Perfluorononanoic acid
- Perfluorodecanoic acid
- Perfluoroundecanoic acid
- Perfluorododecanoic acid
- Perfluorotridecanoic acid
- Perfluorotetradecanoic acid
- Perfluorohexadecanoic acid
- Hexafluoropropylene oxide dimer acid
- 4,8-Dioxa-3H-perfluorononanoic acid
- Perfluoro-3-methoxypropanoic acid
- Perfluoro-4-methoxybutanoic acid
- Nonafluoro-3,6-dioxaheptanoic acid
- 4:2 Fluorotelomer sulfonic acid
- 6:2 Fluorotelomer sulfonate
- 8:2 Fluorotelomer sulfonate
- 3:3 Fluorotelomer carboxylic acid
- 5:3 Fluorotelomer carboxylic acid
- 7:3 Fluorotelomer carboxylic acid
- Perfluroroctane sulfonamide
- N-methylperfluorooctane sulfonamide
- N-ethylperfluorooctane sulfonamide
- N-methyl perfluorooctanesulfonamidoacetic acid
- N-ethyl perfluorooctanesulfonamidoacetic acid
- N-methylperfluorooctane sulfonamidoethanol
- N-ethylperfluorooctane sulfonamidoethanol
- 9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)
- 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)
- Perfluoro(2-ethoxyethane) sulfonic acid

Currently, ELAP does not offer certification for PFAS compounds in matrices other than finished drinking water. Per the NYSDEC July 2023 guidance on emergent contaminant sampling, the analytical procedure for soil and groundwater sampling of PFAS is

Modified EPA Method 1633A. The reporting limit for PFAS in soil samples is 0.5 ug/kg. Reporting limits for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) in groundwater should not exceed 2 ng/L.

7.6 SITE SPECIFICITY OF ANALYSES

Work plans prepared for remedial investigation waste sites contain recommendations for the chemical parameters to be determined for each site. Thus, some or all of the referenced methods will apply to the analysis of samples collected at the individual waste sites. Analyses of Target Compound List (TCL) analytes will be performed on all samples.

TABLE 7.1 – SAMPLE CONTAINERIZATION

PARAMETER & ANALYTICAL METHOD	NO.	BOTTLE TYPE	PRESERVATIVE(1)	HOLDING TIME
Aqueous Samples				
SVOCs (BNAs) – USEPA 8270D or E	2	1-liter amber glass bottle	Ice to 4°C	7 days (until extraction) 40 days (extracted)
Pesticides – USEPA 8081B	2	1-liter amber glass bottle	Ice to 4°C	7 days (until extraction) 40 days (extracted)
PCBs – USEPA 8082A	2	1-liter amber glass bottle	Ice to 4°C	7 days (until extraction) 40 days (extracted)
VOCs – USEPA 8260C or D	2	40 mL, glass vial with septum cap	Hydrochloric Acid to pH <2 Ice to 4°C	14 days
Metals(2) – 6010C or D, Mercury 7470A	1	1-liter, plastic bottle	Nitric acid to pH <2 NaOH for cyanide Ice to 4°C	180 days Mercury: 28 days
Cyanide – SM 4500-CN-E	1	1-liter, plastic	Sodium Hydroxide to pH >12 Ice to 4°C	14 days
PFAS Compounds – USEPA Method 1633A	2	500 ml HDPE or Polypropylene with non-Teflon lid	Chilled to 0 - 6 °C	14 days
Soil, Sediment, Solid Waste Samples				
VOCs – USEPA 8260C or D	3	15-gram EnCore samplers	Chilled to 0 - 6°C	14 days
SVOCs (BNAs) and 1,4-Dioxane – USEPA 8270D SIM if RL cannot be reached	1	4-oz. glass jar with Teflon lid	Chilled to 0 - 6°C	14 days (until extraction, 40 days extracted)
Pesticides – USEPA 8081B	1	4-oz. glass jar with Teflon lid	Chilled to 0 - 6°C	14 days (until extraction) 40 days (extracted)

PARAMETER & ANALYTICAL METHOD	NO.	BOTTLE TYPE	PRESERVATIVE(1)	HOLDING TIME
PCBs – USEPA 8082A	1	4-oz. glass jar with Teflon lid	Chilled to 0 - 6°C	none
Metals(2) – 6010C or D, Mercury 7471B	1	4-oz. glass jar with Teflon lid	Chilled to 0 - 6°C	180 days Cyanide: 14 days Mercury: 28 days
PFAS Compounds – USEPA Method 1633A	2	500 ml HDPE or Polypropylene with non-Teflon lid	Chilled to 0 - 6°C	28 days
Soil Vapor / Indoor Air Samples				
VOCs – USEPA TO-15	1	Summa Canister	None	30 days

(1) All samples will be preserved with ice during collection and shipment to 0-6 degrees C.
(2) From verified time of sample receipt by the analytical laboratory (within 24 to 48 hours of collection).
(3) A complete list of compounds is provided on Table 7.1.

TABLE 7.2 – SAMPLING PROCEDURE FOR MONITORING WELLS USING VOLUME AVERAGED PURGING

1. Initial static water level recorded with an electric contact probe accurate to the nearest 0.1 foot.

2. Sampling device and electric contact probe decontaminated.
    a. Sampling device and probe are rinsed with pesticide-grade methanol and distilled water.
    b. Methanol is collected into a large funnel which empties into a five- gallon container.

3. Sampling device lowered into well.
    a. Bailer lowered by dedicated PVC or polypropylene line.

4. Sample taken.
    a. Sample is poured slowly from the open end of the bailer with the sample bottle tilted so that aeration and turbulence are minimized.
    b. Duplicate sample is collected when appropriate.

5. Samples are capped, labeled and placed in laboratory coolers with ice packs or bagged ice.

6. All equipment is cleaned with successive rinses of pesticide-grade methanol and distilled water.
    a. Dedicated line is disposed of or left at well site.

7. Equipment/wash blanks are collected when non-dedicated sampling equipment is used.

8. Chain-of-custody forms are completed in triplicate.
    a. The original and one carbon copy are put into a zip-lock bag and placed into the cooler.

9. The original will be returned following sample analysis.
    a. A second carbon copy is kept on file.

10. Cooler is sealed with strapping tape and chain-of-custody seals to assure integrity and to prevent tampering of sample.

TABLE 7.3 – SAMPLING PROCEDURE FOR MONITORING WELLS USING LOW-STESS (LOW-FLOW) METHODS

1. Initial static water level recorded with an electric contact probe accurate to the nearest 0.1 foot.

2. Sampling device is lowered into well. Slowly lower the pump, safety cable, tubing and electrical lines into the well to the depth specified for that well. Pump intake must be no less than 2 feet from the bottom of the well to prevent disturbance and resuspension of sediments which may be at the bottom of the well.

3. Measure water level again: Before starting the pump, measure the water level again with the pump in the well. Leave the water level measuring device in the well.

4. Purge Well: Start pumping the well at 200 to 500 milliliters per minute (ml/min). The water level should be monitored approximately every five minutes. Ideally, a steady flow rate should be maintained that results in a stabilized water level (drawdown of 0.3 ft or less). Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to ensure stabilization of the water level. As noted above, care should be taken to maintain pump suction and to avoid entrainment of air in the tubing. Record each adjustment made to the pumping rate and the water level measured immediately after each adjustment.

5. Monitor Indicator Parameters: During purging of the well, monitor and record the field indicator parameters (turbidity, temperature, specific conductance, pH, Eh, and DO) approximately every five minutes. The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings as follows (Puls and Barcelona, 1996):

    a. 0.1 for pH
    b. 3% for specific conductance (conductivity)
    c. 10 mv for redox potential
    d. 10% for DO and turbidity

6. Dissolved oxygen and turbidity usually require the longest time to achieve stabilization. The pump must not be removed from the well between purging and sampling.

7. Collect Samples: Collect samples at a flow rate between 100 and 250 ml/min and such that drawdown of the water level within the well does not exceed the maximum allowable drawdown of 0.3 ft. VOC samples must be collected first and directly into sample containers. All sample containers should be filled with minimal turbulence by allowing the ground water to flow from the tubing gently down the inside of the container.

8. Ground water samples to be analyzed for volatile organic compounds (VOCs) require pH adjustment. The appropriate EPA Program Guidance should be consulted to determine whether pH adjustment is necessary. If pH adjustment is necessary for VOC sample preservation, the amount of acid to be added to each sample vial prior to sampling should be determined, drop by drop, on a separate and

equal volume of water (e.g., 40 ml). Groundwater purged from the well prior to sampling can be used for this purpose.

9. Remove Pump and Tubing: After collection of the samples, the tubing, unless permanently installed, must be properly discarded or dedicated to the well for resampling by hanging the tubing inside the well.

10. Measure and record well depth.

11. Close and lock the well.

12. Samples are capped, labeled and placed in laboratory coolers with ice packs or bagged ice.

13. All equipment is cleaned with successive rinses of pesticide-grade methanol and distilled water.

    a. Dedicated line is disposed of or left at well site.

14. Equipment/wash blanks are collected when non-dedicated sampling equipment is used.

15. Chain-of-custody forms are completed in triplicate.

    a. The original and one carbon copy are put into a zip-lock bag and placed into the cooler. The original will be returned following sample analysis.
    b. A second carbon copy is kept on file.

16. Cooler is sealed with strapping tape and chain-of-custody seals to assure integrity and to prevent tampering of sample.

Table 7.4 – PFAS COMPOUND LIST AND REPORTING AND METHOD DETECTION LIMITS FOR SOIL AND GORUNDWATER

	PFAS	Reporting Limit — Groundwater (ng/l)
1	Perfluorobutanesulfonic acid (PFBS)	1.6
2	Perfluoropentanesulfonic acid (PFPeS)	1.6
3	Perfluorohexanesulfonic acid (PFHxS)	1.6
4	Perfluoroheptanesulfonic acid (PFHpS)	1.6
5	Perfluorooctanesulfonic acid (PFOS)	1.6
6	Perfluorononanesulfonic acid (PFNS)	1.6
7	Perfluorodecanesulfonic acid (PFDS)	1.6
8	Perfluorododecanesulfonic acid (PFDoS)	1.6
9	Perfluorobutanoic acid (PFBA)	6.4
10	Perfluoropentanoic acid (PFPeA)	3.2
11	Perfluorohexanoic acid (PFHxA)	1.6
12	Perfluoroheptanoic acid (PFHpA)	1.6
13	Perfluorooctanoic acid (PFOA)	1.6
14	Perfluorononanoic acid (PFNA)	1.6
15	Perfluorodecanoic acid (PFDA)	1.6
16	Perfluoroundecanoic acid (PFUnA)	1.6
17	Perfluorododecanoic acid (PFDoA)	1.6
18	Perfluorotridecanoic acid (PFTrDA)	1.6
19	Perfluorotetradecanoic acid (PFTeDA)	1.6
20	Hexafluoropropylene oxide dimer acid (HFPO-DA)	6.4
21	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	6.4
22	Perfluoro-3-methoxypropanoic acid (PFMPA)	3.2
23	Perfluoro-4-methoxybutanoic acid (PFMBA)	3.2
24	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	3.2
25	4:2 Fluorotelomer sulfonic acid (4:2-FTS)	6.4
26	6:2 Fluorotelomer sulfonic acid (6:2-FTS)	6.4
27	8:2 Fluorotelomer sulfonic acid (8:2-FTS)	6.4
28	3:3 Fluorotelomer carboxylic acid (3:3 FTCA)	8.0
29	5:3 Fluorotelomer carboxylic acid (5:3 FTCA)	40
30	7:3 Fluorotelomer carboxylic acid (7:3 FTCA)	40
31	Perfluorooctane sulfonamide (PFOSA)	1.6
32	N-methylperfluorooctane sulfonamide (NMeFOSA)	1.6
33	N-ethylperfluorooctane sulfonamide (NEtFOSA)	1.6
34	N-methylperfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	1.6
35	N-ethylperfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	1.6
36	N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)	16
37	N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	16
38	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major) (9CL-PF3ONS)	6.4
39	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor) (11CL-PF3OUDS)	6.4

	PFAS	Reporting Limit — Groundwater (ng/l)
40	Perfluoro(2-ethoxyethane) sulfonic acid (PFEESA)	3.2
41	Perfluorohexadecanoic acid (PFHxDA)[1]	~
	1,4-dioxane	5

	PFAS	Reporting Limit — Soil (ng/g)
1	Perfluorobutanesulfonic acid (PFBS)	0.2
2	Perfluoropentanesulfonic acid (PFPeS)	0.2
3	Perfluorohexanesulfonic acid (PFHxS)	0.2
4	Perfluoroheptanesulfonic acid (PFHpS)	0.2
5	Perfluorooctanesulfonic acid (PFOS)	0.2
6	Perfluorononanesulfonic acid (PFNS)	0.2
7	Perfluorodecanesulfonic acid (PFDS)	0.2
8	Perfluorododecanesulfonic acid (PFDoS)	0.2
9	Perfluorobutanoic acid (PFBA)	0.8
10	Perfluoropentanoic acid (PFPeA)	0.4
11	Perfluorohexanoic acid (PFHxA)	0.2
12	Perfluoroheptanoic acid (PFHpA)	0.2
13	Perfluorooctanoic acid (PFOA)	0.2
14	Perfluorononanoic acid (PFNA)	0.2
15	Perfluorodecanoic acid (PFDA)	0.2
16	Perfluoroundecanoic acid (PFUnA)	0.2
17	Perfluorododecanoic acid (PFDoA)	0.2
18	Perfluorotridecanoic acid (PFTrDA)	0.2
19	Perfluorotetradecanoic acid (PFTeDA)	0.2
20	Hexafluoropropylene oxide dimer acid (HFPO-DA)	0.8
21	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	0.8
22	Perfluoro-3-methoxypropanoic acid (PFMPA)	0.4
23	Perfluoro-4-methoxybutanoic acid (PFMBA)	0.4
24	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	0.4
25	4:2 Fluorotelomer sulfonic acid (4:2-FTS)	0.8
26	6:2 Fluorotelomer sulfonic acid (6:2-FTS)	0.8
27	8:2 Fluorotelomer sulfonic acid (8:2-FTS)	0.8
28	3:3 Fluorotelomer carboxylic acid (3:3 FTCA)	1.0
29	5:3 Fluorotelomer carboxylic acid (5:3 FTCA)	5.0
30	7:3 Fluorotelomer carboxylic acid (7:3 FTCA)	5.0
31	Perfluorooctane sulfonamide (PFOSA)	0.2
32	N-methylperfluorooctane sulfonamide (NMeFOSA)	0.2
33	N-ethylperfluorooctane sulfonamide (NEtFOSA)	0.2
34	N-methylperfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	0.2
35	N-ethylperfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	0.2
36	N-methylperfluorooctane sulfonamidoethanol	2.0

	PFAS	Reporting Limit — Soil (ng/g)
	(NMeFOSE)	
37	N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	2.0
38	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major) (9CL-PF3ONS)	0.8
39	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor) (11CL-PF3OUdS)	0.8
40	Perfluoro(2-ethoxyethane) sulfonic acid (PFEESA)	0.4
41	Perfluorohexadecanoic acid (PFHxDA)[1]	~

Source: EPA Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS, Second Draft Method 1633, November 2022

Data for this table are derived from the single-laboratory validation study and are only provided as examples for this draft method. The data will be updated to reflect the interlaboratory study results in a subsequent revision. Therefore, these criteria will change after interlaboratory validation.

[1] This compound was not listed in the EPA Method 1633 2nd draft and currently no known values exist

Appendix C:

Emerging Contaminant Sampling Plan

SESI
CONSULTING ENGINEERS

Geotechnical
Environmental
Site Civil

959 Route 46E, Fl 3, Ste 300
Parsippany, NJ 07054
973.808.9050
www.sesi.org

SOIL AND GROUNDWATER SAMPLING PLAN FOR EMERGING CONTAMINANTS

For

Proposed Mixed-Use Development
2752-2768 Webster Avenue
Block 3273; Lot 100 (Former Lots 91 and 100)
Bronx, Bronx County, NY

Prepared for:

South Bronx Development I LLC

SESI Project No:
13581A

Date:
October 2025

Table of Contents

LIST OF ACRONYMS ..... **i**
1.0 PROJECT DESCRIPTION **1**
2.0 SOIL SAMPLING PLAN **1**
3.0 GROUNDWATER SAMPLING PLAN **4**
4.0 SOIL SAMPLE COLLECTION AND HANDLING **5**
5.0 SAMPLE SHIPMENT **6**

TABLES

TABLE 2.1 PFAS COMPOUNDS LIST

LIST OF ACRONYMS

Acronym	Definition
DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Accreditation Program
HDPE	High-Density Polyethylene
LDPE	Low-density Polyethylene
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
ng/L	Nanogram per liter
NYSDEC	New York State Department of Environmental Conservation
PFAS	Per and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PTFE	Polytetrafluoroethylene
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
TAL	Target Analyte List
TCL	Target Compound List
ug/kg	micrograms pers kilogram
USEPA	United States Environmental Protection Agency

1.0 PROJECT DESCRIPTION

This document presents the Soil and Groundwater Plan for Emerging Contaminants for the Remedial Investigation Work Plan for the proposed development at 2752-2768 Webster Avenue, Bronx, Bronx County, New York (the "Site"). The Site is identified as Block 3273, Lot 110 (Former Lots 91 and 100) on local tax maps and totals approximately 1.4-acres in size. The Site is located in a mixed-use commercial and residential neighborhood and is bounded by mixed-use commercial/residential buildings to the north, a Metro-North railroad and Fordham University and Preparatory School to the south, a warehouse to the east, and a laydown yard and parking lot to the west. The closest notable surface water body is the Bronx River located approximately 0.48 miles east of the Subject Property.

The Site is improved with one (1) approximately 9,350-square feet (sf) one-to-two-story warehouse and one (1) approximately 2,330-sf two-story former automotive repair garage building. The buildings were constructed in 1906. The Site was initially developed prior to 1896. Railroad tracks have been present at the Site since at least 1896. Historical Site operations included a sewer pipe yard in 1900, freight house from 1900 to 1950, engine room in 1945, cold storage and substation from at least 1978 to 2007, and automotive repair from at least 1992 to 2010. SESI identified that the most recent operations at the Site included a substation, cold storage facility, alcohol/liquor distributor, restaurants, and automotive repair garages. The Site is currently vacant and was recently acquired by the Requestor South Bronx Development I LLC after their members performed environmental due diligence with respect to the Site.

2.0 SOIL SAMPLING PLAN

The sampling will be performed in accordance with the New York State Department of Environmental Conservation (NYSDEC) Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs, dated April 2023. The soil samples will be sent via chain of custody to an Environmental Laboratory Accreditation Program (ELAP)-certified laboratory and analyzed for Target Compound List / Target Analyte List plus 30 tentatively identified compounds (TCL/TAL+30), 1,4-dioxane and the per and polyfluoroalkyl substances (PFAS) compounds listed in Table 2.1. The soil samples will be analyzed for PFAS using Method 1633A. Reporting limits for each PFAS compound will not exceed 0.5 micrograms per kilogram (ug/kg). NYSDEC will be informed if detection limits on certain PFAS compounds cannot be met by the laboratory. Category B deliverables and an electronic data deliverable will be completed. A data usability summary report (DUSR) will be prepared by a data validator for all the analyses including PFAS and 1,4-dioxane. The method detection limit (MDL) for 1,4-dioxane will be no higher than 0.1 mg/kg (ppm).

Because PFAS compounds must be analyzed at concentrations in the ng/kg range, precautions must be taken to prevent cross-contamination during sampling events. Field sampling equipment that is used at multiple sites or sampling locations could become highly contaminated with PFAS. Soil sampling at this Site will involve the use of non-dedicated equipment, such as a Geoprobe direct push drill rig, which could be a source of cross-contamination. Decontamination procedures outlined in this document will be followed to avoid cross contamination and equipment will be verified as PFAS-free. Special care and consideration will be given to the field sampling

equipment when stored and handled outside the Site boundaries or between different sample locations.

Items that may be directly in contact with the soil, including spoons, bowls, and direct push equipment, including any split spoon or sampling barrels, have a high likelihood of cross-contamination occurring if the proper decontamination procedures are not followed. These items should be known to be PFAS free. Items that will not directly contact the soil, including field books, Post-It® Notes, aluminum foil, recycled paper towels, binders, or spiral hard cover notebook, can be a source of PFAS contamination. Every effort will be made to ensure these items are PFAS-free.

For the sampling equipment, the following items, materials, and procedures will be used for decontamination:

- Municipal drinking water may be used for decontamination if it is known to be PFAS-free. Commercially available deionized water in a high-density polyethylene (HDPE) container may also be used for decontamination.
- Standard two step decontamination using Alconox® detergent and PFAS-free triple water rinse will be performed for the sampling equipment.
- Sampling equipment may be scrubbed with polyethylene or a polyvinyl chloride (PVC) brush to remove particulates.
- The sampling equipment components will not come in contact with material that may potentially contain PFAS such as aluminum foil, low density polyethylene (LDPE), polytetrafluoroethylene (PTFE, Teflon®) or other fluoropolymers.
- Soil sampling equipment will be decontaminated between each sampling point and at the conclusion of the workday. This is to ensure sampling equipment is decontaminated ahead of time for the next sampling event.

Equipment rinsate blanks will be collected daily for the equipment that comes in contact with the soil samples and is decontaminated and reused. If all the sampling materials are disposable, no field blanks will be collected. Field duplicates will be collected on a frequency of one (1) per 20 samples. One matrix spike and matrix spike duplicate (MS/MSD) will also be collected on a frequency of one (1) per 20 samples. A trip blank will accompany each laboratory shipment which includes analysis for volatile organic compounds.

Table 2.1 – PFAS Compounds List

	PFAS
1	Perfluorobutanesulfonic acid (PFBS)
2	Perfluoropentanesulfonic acid (PFPeS)
3	Perfluorohexanesulfonic acid (PFHxS)
4	Perfluoroheptanesulfonic acid (PFHpS)
5	Perfluorooctanesulfonic acid (PFOS)
6	Perfluorononanesulfonic acid (PFNS)
7	Perfluorodecanesulfonic acid (PFDS)
8	Perfluorododecanesulfonic acid (PFDoS)
9	Perfluorobutanoic acid (PFBA)
10	Perfluoropentanoic acid (PFPeA)
11	Perfluorohexanoic acid (PFHxA)
12	Perfluoroheptanoic acid (PFHpA)
13	Perfluorooctanoic acid (PFOA)
14	Perfluorononanoic acid (PFNA)
15	Perfluorodecanoic acid (PFDA)
16	Perfluoroundecanoic acid (PFUnA)
17	Perfluorododecanoic acid (PFDoA)
18	Perfluorotridecanoic acid (PFTrDA)
19	Perfluorotetradecanoic acid (PFTeDA)
20	Hexafluoropropylene oxide dimer acid (HFPO-DA)
21	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)
22	Perfluoro-3-methoxypropanoic acid (PFMPA)
23	Perfluoro-4-methoxybutanoic acid (PFMBA)

	PFAS
24	Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)
25	4:2 Fluorotelomer sulfonic acid (4:2-FTS)
26	6:2 Fluorotelomer sulfonic acid (6:2-FTS)
27	8:2 Fluorotelomer sulfonic acid (8:2-FTS)
28	3:3 Fluorotelomer carboxylic acid (3:3 FTCA)
29	5:3 Fluorotelomer carboxylic acid (5:3 FTCA)
30	7:3 Fluorotelomer carboxylic acid (7:3 FTCA)
31	Perfluorooctane sulfonamide (PFOSA)
32	N-methylperfluorooctane sulfonamide (NMeFOSA)
33	N-ethylperfluorooctane sulfonamide (NEtFOSA)
34	N-methylperfluorooctane sulfonamidoacetic acid (N-MeFOSAA)
35	N-ethylperfluorooctane sulfonamidoacetic acid (N-EtFOSAA)
36	N-methylperfluorooctane sulfonamidoethanol (NMeFOSE)
37	N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)
38	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major) (9CL-PF3ONS)
39	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor) (11CL-PF3OUDS)
40	Perfluoro(2-ethoxyethane) sulfonic acid (PFEESA)
41	Perfluorohexadecanoic acid (PFHxDA)

Source: EPA Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS, Second Draft Method 1633, November 2022

3.0 GROUNDWATER SAMPLING PLAN

The sampling will be performed in accordance with the NYSDEC Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Remedial Programs, dated April 2023, the NYSDEC

July 2018 letter on Groundwater Sampling for Emerging Contaminants, and the PFAS Groundwater Samples from Monitoring Well Sample Protocols Revision 1.2 August 9, 2019. The groundwater samples will be sent via chain of custody in a cooler at 4 degrees C to an ELAP-certified laboratory and analyzed for TCL/TAL+30, 1,4-dioxane and the PFAS compounds listed in Table 2.1. The groundwater samples will be analyzed for PFAS using Modified USEPA Method 1633A. Reporting limits for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) will not exceed 2 nanogram per liter (ng/L). Category B deliverables and an electronic data deliverable will be completed. A DUSR will be prepared by a data validator for all the analyses including PFAS and 1,4-dioxane. The MDL for 1,4-dioxane will be no higher than 0.35 µg/l (ppb). In order to get the appropriate detection limit, the lab will run EPA Method 8270 in "selective ion monitoring" (SIM) mode for 1,4-dioxane.

PFAS are very persistent in the environment and in the human body. There is evidence that exposure to PFAS can lead to adverse human health effects. EPA established the health advisory levels for PFAS in drinking water at 4 parts per trillion. Due to their presence in a variety of products, persistence in the environment and very low drinking water standards, care must be used when groundwater sampling for PFAS to avoid cross contamination from the sampling equipment and personal protective equipment (PPE).

4.0 SOIL SAMPLE COLLECTION AND HANDLING

The following considerations will be observed:

- No fabric softener will be used on clothing to be worn by the sampling personnel in the field. Clothing that contains PTFE material (including GORE-TEX®) or that has been waterproofed with PFAS-containing materials will be avoided.
- Cosmetics, moisturizers, hand cream, unauthorized sunscreen, insect repellant or other related products will not be used by the sampling staff on sampling days.
- Food and drink packaging materials such as pre-wrapped food or snacks (i.e. candy bars, microwave popcorn, etc.) will not be used in the sampling and staging areas.
- Sampling will be conducted with powderless nitrile gloves. The gloves will be changed frequently any time there is an opportunity for cross-contamination during sampling, including, but not limited to:
    a. Immediately prior to sample collection
    b. Each time sampling equipment is placed in and then removed from soil at a new location
    c. Handling of any sample, including quality assurance/quality control (QA/QC) samples
    d. After the handling of any non-dedicated sampling equipment
    e. After contact with non-decontaminated surfaces
    f. After decontamination of sampling equipment

g. When judged necessary by field personnel

- HDPE or polypropylene sample bottles with Teflon®-free caps, provided by the laboratory will be used. Sample containers will not come in contact with material that may potentially contain PFAS.
- Bottles will only be opened immediately prior to sampling.
- Dust and fibers will be kept out of sample bottles.
- The sample caps will never be placed directly on the ground during sampling. If the sampling staff must set the sample bottle cap down during sample collection and a second member of the sampling crew (wearing a fresh pair of powderless nitrile gloves) is not available, the cap will be set on a clean surface (cotton sheeting, HDPE sheeting, triple rinsed cooler lid, etc.).
- Regular size Sharpie® and thicker markers will be avoided. Fine and Ultra-Fine point Sharpie® markers may be used. Ballpoint pens may be used when labeling sample containers. If ballpoint pens do not write on the sample container labels, preprinted labels from the laboratory may be used.
- Sample bottles, coolers, sample labels and a chain of custody form will be provided by the analytical laboratory.

PFAS samples will be collected prior to collecting non-PFAS samples.

5.0 SAMPLE SHIPMENT

The documentation in USEPA Draft 1633A will be used as a guide for thermal preservation and holding times for soil or other samples. Samples will be chilled during storage and shipment and will not exceed 50°F (10º C) during the first 48 hours after collection.

The following procedures will be used by SESI for sample shipment:

- Regular ice will be used to cool and maintain the samples at or below 42.8°F (6°C). Chemical or blue ice may be used if it is known to be PFAS-free and the samples can be cooled and maintained at or below 42.8°F (6°C) during collection and through transit to the laboratory.
- The coolers will be periodically checked to ensure samples are well iced and at the proper temperature. Refresh with regular ice if needed. The ice may be double bagged in LDPE

resealable storage bags. LDPE may be used if an equipment blank demonstrates the LDPE is PFAS-free.

- Chain of Custody and other forms will be single bagged in LDPE (e.g. Ziploc®) storage bags and taped to the inside of the cooler lid. LDPE may be used if an equipment blank demonstrates the LDPE is PFAS-free.
- The cooler(s) will be taped closed with a custody seal and picked up by the laboratory within 24 hrs.

Appendix D:

Typical Boring/Well Construction Log

SESI CONSULTING ENGINEERS	PROJECT NAME:	90-02 168th St	MONITORING WELL NO.	
	PROJECT LOCATION:	Queens, NY	JOB NO.	
			GROUND ELEVATION:	NA

BORING BY:	DATE STARTED		DEVELOPMENT PERIOD		INSIDE CASING DIAMETER (in)	
INSPECTOR:	DATE COMPLETED		DEVELOPMENT METHOD		BOREHOLE DIAMETER (in)	
NJ DEP PERMIT NO.:	DATE DEVELOPED		DEVELOPMENT RATE	NA	INITIAL WATER LEVEL (ft):	

WELL CONSTRUCTION	DEPTH (ft)	Sample	Blows on Spoon 0/6	6/12	12/18	18/24	REC (in)	SOIL DESCRIPTION AND STRATIFICATION	P.I.D.
	0								
Top of Sand Pack									0
Top of Screen									0
Sand									0
Pack Size: #2									0
	45								0
Screen Size: 0.010									0
									0
									0
									0
	49.5								
Bottom of Screen	50								0
Bottom of Boring									
Sand									
Pack Size:									

SESI CONSULTING ENGINEERS

PROJECT NAME:		GEOPROBE NO.	
LOCATION:		JOB NO.	
METHOD:		GROUND ELEVATION:	
GEOPROBE BY:	DATE STARTED:		GROUNDWATER TABLE DEPTH:
INSPECTOR:	DATE COMPLETED:	0 Hr.	24 Hr. / Date

DEPTH (ft)	RECOVERY (in)	SAMPLE TUBE No.	DEPTH FROM (ft)	DEPTH TO (ft)	ENVIRONMENTAL SOIL SAMPLE NAME	SOIL DESCRIPTION AND STRATIFICATION	PID
0							
5							
10							
15							
20							
25							
30							
35							
40							

Nominal I.D. of Hole	in.
Nominal I.D. of Barrel Sampler	1⅜ in

The subsurface information shown hereon was obtained for the design and estimating purposes for our client. It is made available to authorized users only that they may have access to the same information available to our client. It is presented in good faith, but it is not intended as a substitute for investigations, interpretations or judgment of such authorized users. Information on the logs should not be relied upon without the geotechnical engineers recommendations contained in the report from which these logs were extracted.

Pp: Pocket Penetrometer; DP: Direct Push

Approximate Change in Strata: _____ Inferred Change in Strata: _ _ _ _ _ _ _ _ _ _ _ _

Soil descriptions represent a field identification after D. M. Burmister unless otherwise noted.

FIGURE #

Appendix E:

Health and Safety Plan (HASP)

SESI
CONSULTING ENGINEERS

Geotechnical
Environmental
Site Civil

959 Route 46E, Fl 3, Ste 300
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HEALTH AND SAFETY PLAN

For

Proposed Mixed-Use Development
2752-2768 Webster Avenue
Block 3273; Lot 100 (Former Lots 91 and 100)
Bronx, Bronx County, NY

Prepared for:
South Bronx Development I LLC

SESI Project No:
13581A

Date:
October 2025

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Disclaimer: This Health and Safety Plan (HASP) is based upon information provided [and, if applicable, conditions discovered during a site visit], and is limited by the project scope.

The HASP should be periodically reviewed and updated based on a number of factors, including but not limited to: (1) changes in applicable governmental requirements; (2) changes in procedures at the site; and (3) site conditions which were unknown to SESI Consulting Engineers (SESI) as of the time the HASP was prepared.

This HASP has been prepared for the sole and exclusive use of Client listed above, and may not be relied upon by any other person without the express written consent and authorization of SESI.

SITE-SPECIFIC HEALTH AND SAFETY PLAN

For

Proposed Mixed-Use Development
2752-2768 Webster Avenue
Block 3273; Lot 100 (Former Lots 91 and 100)
Bronx, Bronx County, NY
SESI Project No.: 13581A

Prepared by:

_____

Anthony Raposo, PE
SESI - Project Manager

Approved by:

_____

Justin Protasiewicz, PE
SESI - Principal

Table of Contents

LIST OF ACRONYMS I
HEALTH AND SAFETY PLAN SUMMARY 1
1.0 INTRODUCTION 2
1.1 OBJECTIVE 2
1.2 SITE AND FACILITY DESCRIPTION 2
1.3 POLICY STATEMENT 2
1.4 REFERENCES 3
1.5 DEFINITIONS 3
2.0 PROJECT SCOPE OF WORK 4
3.0 ROLES AND RESPONSIBILITIES 4
3.1 ALL PERSONNEL 4
3.2 KEY SAFETY PERSONNEL 4
3.2.1 PROJECT OFFICER (PO) 4
3.2.2 PROJECT MANAGER (PM) 5
3.2.3 HEALTH AND SAFETY MANAGER (HSM) 5
3.2.4 SITE SAFETY OFFICER (SSO) 5
3.2.5 FIELD SUPERVISOR (FS) 5
3.2.6 FIELD PERSONNEL (FP) 6
3.3 SUBCONTRACTORS 6
3.4 STOP WORK AUTHORITY 7
3.5 ALL ON-SITE PERSONNEL 7
3.6 VISITORS 7
4.0 PERSONAL PROTECTIVE EQUIPMENT 8
4.1 LEVELS OF PROTECTION 8
4.1.1 LEVEL D PROTECTION 8
4.1.2 MODIFIED LEVEL D PROTECTION 8
4.1.3 LEVEL C PROTECTION 9
4.2 SELECTION OF PPE 9
4.3 SITE RESPIRATORY PROTECTION PROGRAM 9
4.4 USING PPE 10
4.4.1 DONNING PROCEDURES 10
4.4.2 DOFFING PROCEDURES 10

4.5 SELECTION MATRIX 11
5.0 AIR AND NOISE MONITORING 11
5.1 AIR MONITORING 11
5.2 NOISE MONITORING 12
5.3 MONITORING EQUIPMENT MAINTENANCE AND CALIBRATION 12
5.4 ACTION LEVELS 12
6.0 WORK ZONES AND DECONTAMINATION 13
6.1 WORK ZONES 13
6.1.1 AUTHORIZATION TO ENTER 13
6.1.2 SITE ORIENTATION AND HAZARD BRIEFING 13
6.1.3 CERTIFICATION DOCUMENTS 13
6.1.4 ENTRY LOG 14
6.1.5 ENTRY REQUIREMENTS 14
6.1.6 EMERGENCY ENTRY AND EXIT 14
6.1.7 CONTAMINATION CONTROL ZONES 14
6.1.8 EXCLUSION ZONE (EZ) 14
6.1.9 CONTAMINATION REDUCTION ZONE 14
6.1.10 SUPPORT ZONE (SZ) 14
6.1.11 POSTING 14
6.1.12 SITE INSPECTIONS 15
6.2 DECONTAMINATION 15
6.2.1 PERSONNEL DECONTAMINATION 15
6.2.2 EQUIPMENT DECONTAMINATION 15
6.2.3 PERSONAL PROTECTIVE EQUIPMENT DECONTAMINATION 15
7.0 TRAINING AND MEDICAL SURVEILLANCE 15
7.1 TRAINING 15
7.1.1 GENERAL 15
7.1.2 BASIC 40-HOUR COURSE 16
7.1.3 SUPERVISOR COURSE 16
7.1.4 SITE-SPECIFIC TRAINING 16
7.1.5 DAILY SAFETY MEETINGS 16
7.1.6 FIRST AID AND CPR 17
7.2 MEDICAL SURVEILLANCE 17
7.2.1 MEDICAL EXAMINATION 17

7.2.2 PRE-PLACEMENT MEDICAL EXAMINATION....17
7.2.3 OTHER MEDICAL EXAMINATIONS....17
7.2.4 PERIODIC EXAM....18
7.2.5 MEDICAL RESTRICTION....18
8.0 GENERAL SAFETY PRACTICES....18
8.1 GENERAL SAFETY RULES....18
8.2 BUDDY SYSTEM....19
8.3 HEAT STRESS....20
8.4 HEAT STRESS SAFETY PRECAUTIONS....21
8.5 COLD STRESS....22
8.6 SAFETY PRECAUTIONS FOR COLD STRESS PREVENTION....23
8.7 SAFE WORK PRACTICES....24
8.8 BIOLOGICAL HAZARDS....24
8.8.1 TICK BORNE DISEASES....24
8.8.2 POISONOUS PLANTS....25
8.8.3 SNAKES....25
8.8.4 SPIDERS....25
8.9 NOISE....26
8.10 SPILL CONTROL....26
8.11 SANITATION....27
8.11.1 BREAK AREA....27
8.11.2 POTABLE WATER....27
8.11.3 SANITARY FACILITIES....27
8.11.4 LAVATORY....27
8.12 EMERGENCY EQUIPMENT....27
8.13 LOCKOUT/TAGOUT PROCEDURES....28
8.14 ELECTRICAL SAFETY....28
8.15 LIFTING SAFETY....29
8.16 LADDER SAFETY....29
8.17 TRAFFIC SAFETY....30
9.0 SITE-SPECIFIC HAZARDS AND CONTROL MEASURES....31
9.1 EVALUATION OF HAZARDS....31
9.1.1 HAZARD CHARACTERISTICS....31
9.1.2 POTENTIAL HEALTH AND SAFETY HAZARDS....31

9.2 FIELD ACTIVITIES, HAZARDS, AND CONTROL PROCEDURES 32
9.2.1 MOBILIZATION/CONSTRUCTION STAKEOUT 32
9.2.2 DEMOLITION/SITE CLEARING 33
9.2.3 EXCAVATION AND CUT/FILL OPERATIONS 34
9.2.3.1 EXCAVATION/TRENCHING 34
9.2.3.2 HEAVY EQUIPMENT OPERATION 35
9.2.3.3 DISTURBANCE/HANDLING OF CONTAMINATED MATERIAL 36
9.2.4 DRILLING/SUBSURFACE INTRUSION ACTIVITIES 36
9.2.5 SUBSURFACE CHEMICAL SAMPLE COLLECTION/ANALYSIS 40
9.2.6 UST CLOSURE 40
9.2.6.1 WORKING IN CONFINED SPACES 40
9.2.6.2 WORKING WITH COMPRESSED AIR 41
9.2.7 DECONTAMINATION 41
9.2.8 DEMOBILIZATION 41
9.3 CHEMICAL HAZARDS 42
10.0 EMERGENCY PROCEDURES 43
10.1 GENERAL 43
10.2 EMERGENCY RESPONSE 44
10.2.1 FIRE 44
10.2.2 CONTAMINANT RELEASE 44
10.3 MEDICAL EMERGENCY 44
10.3.1 EMERGENCY CARE STEPS 44
10.4 FIRST AID - GENERAL 45
10.4.1 FIRST AID - INHALATION 45
10.4.2 FIRST AID - INGESTION 45
10.4.3 FIRST AID - SKIN CONTACT 45
10.4.4 FIRST AID - EYE CONTACT 45
10.5 REPORTING INJURIES, ILLNESSES, AND SAFETY INCIDENTS 46
10.6 EMERGENCY INFORMATION 46
10.6.1 DIRECTIONS TO HOSPITAL 46
11.0 LOGS, REPORTS, AND RECORD KEEPING 48
11.1 HASP FIELD CHANGE REQUEST 48
11.2 MEDICAL AND TRAINING RECORDS 48
11.3 EXPOSURE RECORDS 49

11.4 ACCIDENT/INCIDENT REPORT 49
11.5 OSHA FORM 200 49
11.6 ON-SITE HEALTH AND SAFETY FIELD LOGBOOKS 49
11.7 SAFETY DATA SHEETS 49
12.0 COVID-19 RESPONSE ACTION PLAN 49

LIST OF FIGURES

Figure No. **Title**

Fig-1 Directions to Hospital

LIST OF EMBEDDED TABLES

Table	Title	Page
1.	Key Safety Personnel	7
2.	PPE Selection Matrix	11
3.	Airborne Contaminant Action Levels	12
4.	Work/Rest Schedule	21
5.	Wind Chill Temperature Chart	22
6	List of Primary Contaminants	43
7	Emergency Contacts	47

LIST OF ATTACHMENTS

Attachment 1 Air Monitoring Log

Attachment 2 OSHA Poster

Attachment 3 Field Change Request Form

Attachment 4 Injury Report Form

Attachment 5 Signatory Page

Attachment 6 Safety Data Sheets

LIST OF ACRONYMS

Acronym	Definition
ACGIH	American Conference of Governmental Industrial Hygienists
COC	Contaminants(s) of Concern
CRZ	Contamination Reduction Zone
EMS	Emergency Medical Services
EZ	Exclusion Zone
FS	Field Supervisor
GFCI	Ground Fault Circuit Interrupter
HASP	Health and Safety Plan
HSM	Health and Safety Manager
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
NIOSH	National Institute for Occupational Safety and Health
NRR	Noise Reduction Rating
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
PEL	Permissible Exposure Limit
PFD	Personal Flotation Device
PID	Photoionization Detector
PM	Project Manager
PO	Project Officer
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
SESI	SESI Consulting Engineers
SSO	Site Safety Officer
SVOC	Semi-Volatile Organic Compound
SZ	Support Zone
TLV	Threshold Limit Value
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound

HEALTH AND SAFETY PLAN SUMMARY

The chemical hazards associated with site operations are related to inhalation, ingestion, and skin exposure to site Chemicals of Concern (COCs). COCs at the site include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, pesticides, and per- and polyfluoroalkyl substances (PFAS). Concentrations of airborne COCs during site tasks may be measurable and will require air monitoring during certain operations.

The potential for inhalation of site COCs is low. The potential for dermal contact with soils containing site COCs during remedial operations is moderate.

The following table summarizes airborne contaminant action levels that will be used to determine the procedures and protective equipment necessary based on conditions as measured at the site.

Parameter	Reading	Action
Dust	0 to .5 mg/m3	Normal operations
	0.5 to 1 mg/m3	Begin soil wetting procedure (Level C protection would be needed beyond this point)
	> 1 mg/m3	Stop work, fully implement dust control plan
Oxygen	≤ 19.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
	> 19.5% to < 23.5%	Normal operations
	≥ 23.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Carbon Monoxide	0 ppm to ≤ 20 ppm	Normal operations
	> 20 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area

The level of personal protection selected will be based on air monitoring of the work environment and an assessment by the Field Supervisor and Site Safety Officer. The following table presents a selection matrix to determine appropriate Personal Protective Equipment.

Task	Anticipated Level of Protection
Mobilization	Level D
Subsurface Intrusive Activities (Mass Excavation, Drilling, Soil Grouting)	Modified Level D/Level C
Earthwork/Grading	Level D
Additional Chemical Sampling / Delineation	Modified Level D/Level C
Decontamination	Modified Level D
Demobilization	Level D

1.0 INTRODUCTION

1.1 OBJECTIVE

The objective of this Health and Safety Plan (HASP) is to provide a mechanism for establishing safe working conditions during remedial action activities. The safety organization, procedures, and protective equipment have been established based on an analysis of potential physical, chemical, and biological hazards. Specific hazard control methodologies have been evaluated and selected to minimize the potential of injury, illness, or other hazardous incidents.

The HASP was written to meet the requirements of all applicable Federal, State, and local health and safety regulations, including 29 CFR 1910.120. The HASP is based on current knowledge regarding the specific chemical and physical hazards that are known or anticipated at the Site. This HASP is a dynamic document, for which changes and/or revisions may be realized as changes in scope and/or site conditions are encountered. Should revised documents be produced, said revised documents will refer to the specific changes and why they were made.

1.2 SITE AND FACILITY DESCRIPTION

This document presents the health and safety plan (HASP) for the Remedial Investigation Work Plan (RIWP) for the proposed development of the property located at 2752-2768 Webster Avenue in the Bronx, Bronx County, New York (the Site). The Site consists of a portion of a 1.4-acre area parcel and is identified as Block 3273, Lot 11 (former Lots 91 and 100 on local tax maps). The Site is located in a mixed-use commercial and residential neighborhood and is bounded by mixed-use commercial/residential buildings to the north, a Metro-North railroad and Fordham University and Preparatory School to the south, a warehouse to the east, and a laydown yard and parking lot to the west.

The Site is improved with one (1) approximately 9,350-square feet (sf) one-to-two-story warehouse and one (1) approximately 2,330-sf two-story former automotive repair garage building. The buildings were constructed in 1906. The Site was initially developed prior to 1896. Railroad tracks have been present at the Site since at least 1896. Historical Site operations included a sewer pipe yard in 1900, freight house from 1900 to 1950, engine room in 1945, cold storage and substation from at least 1978 to 2007, and automotive repair from at least 1992 to 2010. SESI identified that the most recent operations at the Site included a substation, cold storage facility, alcohol/liquor distributor, restaurants, and automotive repair garages. The Site is currently vacant and was recently acquired by the Requestor South Bronx Development I LLC after their members performed environmental due diligence with respect to the Site

1.3 POLICY STATEMENT

The policy of SESI Consulting Engineers (SESI) is to provide a safe and healthful work environment. No aspect of operations is of greater importance than injury and illness prevention. A fundamental principle of safety management is that all injuries, illnesses, and incidents are preventable. SESI will take every reasonable step to eliminate or control hazards in order to minimize the possibility of injury, illness, or incident.

This HASP prescribes the procedures that must be followed by SESI personnel during activities at the site. Operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the Project Manager (PM) and the Health and Safety Manager (HSM). This document will be reviewed periodically by the HSM to ensure that it is current and technically correct. Any changes in site conditions and/or the scope of work will require a review and modification to this HASP. Such changes will be completed in the form of an addendum or a revision to the plan.

The provisions of this plan are mandatory for all SESI personnel and are advisory for all contractors, and subcontractors assigned to the project. ***Subcontractors will be responsible for preparing their own site-specific HASPs that meet the basic requirements outlined in this HASP.*** All visitors to SESI work areas at the site must abide by the requirements of this plan.

1.4 REFERENCES

This HASP complies with applicable Occupational Safety and Health Administration (OSHA) regulations, United States Environmental Protection Agency (USEPA) regulations, and SESI health and safety policies and procedures. This plan follows the guidelines established in the following:

- *Standard Operating Safety Guides*, USEPA (Publication 9285.1-03, June 1992).
- *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, NIOSH, OSHA, USCG, USEPA (86116, October 1985).
- *Title 29 of the Code of Federal Regulations* (CFR), Part 1910.
- *Title 29 of the Code of Federal Regulations* (CFR), Part 1926.
- *Pocket Guide to Chemical Hazards*, DHHS, PHS, CDC, NIOSH (2004).
- *Threshold Limit Values*, ACGIH (2005).
- *Guide to Occupational Exposure Values*, ACGIH (2005).
- *Quick Selection Guide to Chemical Protective Clothing*, Forsberg, K. and S.Z. Mansdorf, 2nd Ed. (1993).

1.5 DEFINITIONS

The following definitions (listed alphabetically) are applicable to this HASP:

- *Contamination Reduction Zone (CRZ)* - Area between the exclusion zone and support zone that provides a transition between contaminated and clean areas. Decontamination stations are located in this zone.
- *Exclusion Zone (EZ)* - Any portions of the site where hazardous substances are, or are reasonably suspected to be present, and pose an exposure hazard to on-site personnel.
- *Incident* - All losses, including first aid cases, injuries, illnesses, spills/leaks, equipment and property damage, motor vehicle accidents, regulatory violations, fires, and business interruptions.
- *On-Site Personnel* - All SESI and subcontractors involved with the project.
- *Project* - All on-site work performed under the scope of work.
- *Site* - The area described in Section 1.2, Site and Facility Description, where the work is to be performed by SESI personnel and subcontractors.

- *Support Zone (SZ)* - All areas of the site except the EZ and CRZ. The SZ surrounds the CRZ and EZ. Support equipment and break areas are located in this zone.
- *Subcontractor* - Includes contractor personnel hired by SESI.
- *Visitor* - All other personnel, except the on-site personnel.
- *Work Area* - The portion of the site where work activities are actively being performed. This area may change daily as work progresses and includes the SZ, CRZ, and EZ. If the work area is located in an area on the site that is not contaminated, or suspected of being contaminated, the entire work area may be a SZ.

2.0 PROJECT SCOPE OF WORK

This HASP contains information for the following tasks that SESI is anticipated to conduct at the Site. Should additional and/or different tasks be identified, amendments to this HASP will be required to address these changed items.

- Mobilization/Sample location stakeout;
- Soil Borings and Monitoring Well Installation;
- Soil Vapor Sampling;
- Excavation of contaminated soil “hot spots”;
- Earthwork and grading;
- Chemical sampling of soil and groundwater; and
- Decontamination and demobilization/site restoration.

3.0 ROLES AND RESPONSIBILITIES

3.1 ALL PERSONNEL

All SESI project personnel must adhere to the procedures outlined in this HASP during the performance of their work. Each person is responsible for completing tasks safely and reporting any unsafe acts or conditions to their supervisor. No person may work in a manner that conflicts with these procedures. After due warnings, the PM will dismiss from the site any SESI employee or subcontractor who violates safety procedures.

All SESI project personnel will receive training in accordance with applicable regulations and be familiar with the requirements and procedures contained in this HASP prior to initiating site activities. In addition, all SESI personnel will attend an initial hazard briefing prior to beginning work at the site.

The roles of key safety personnel and subcontractors are outlined in the following sections. Key project personnel and contacts are summarized in **Table 1** on page 7.

3.2 KEY SAFETY PERSONNEL

3.2.1 PROJECT OFFICER (PO)

The PO is responsible for providing resources to assure project activities are completed in accordance with this HASP, and for meeting all regulatory and contractual requirements.

3.2.2 PROJECT MANAGER (PM)

The PM is responsible for verifying that project activities are completed in accordance with the requirements of this HASP. The PM is responsible for confirming that the Field Supervisor (FS) has the equipment, materials, and qualified personnel to fully implement the safety requirements of this HASP, and/or that subcontractors assigned to this project meet the requirements established by SESI. It is also the responsibility of the PM to:

- Consult with the HSM on site health and safety issues;
- Verify that subcontractors meet health and safety requirements prior to commencing work;
- Verify that all incidents are thoroughly investigated;
- Approve, in writing, addenda or modifications of this HASP; and
- Suspend work or modify work practices, as necessary, for personal safety, protection of property, and regulatory compliance.

3.2.3 HEALTH AND SAFETY MANAGER (HSM)

The HSM or his designee, the health and safety manager (HSM), has overall responsibility for the technical health and safety aspects of the project, including review and approval of this HASP. Inquiries regarding health and safety procedures, project procedures, and other technical or regulatory issues should be addressed to this individual. The HSM or his designee must approve changes or addenda to this HASP.

3.2.4 SITE SAFETY OFFICER (SSO)

The SSO is responsible for field health and safety issues, including the execution of this HASP. Questions in the field regarding health and safety procedures, project procedures, and other technical or regulatory issues should be addressed to this individual. The SSO will advise the PM on health and safety issues and will establish and coordinate the project air-monitoring program if one is deemed necessary (see Section 5.1, Air Monitoring). The SSO is the primary site contact on health and safety matters. It is the responsibility of the SSO to:

- Provide on-site technical assistance, if necessary;
- Participate in all accident/incident reports and ensure that they are reported to the HSM, client, and PM within 24 hours;
- Coordinate site and personal air monitoring as required, including equipment maintenance and calibration;
- Conduct site safety orientation training and safety meetings;
- Verify that project personnel have received the required physical examinations and medical certifications;
- Review site activities with respect to compliance with this HASP;
- Maintain required health and safety documents and records; and
- Assist the FS in instructing field personnel on project hazards and protective procedures.

3.2.5 FIELD SUPERVISOR (FS)

The FS is responsible for implementing this HASP, including communicating requirements to on-site personnel and subcontractors. The FS will be responsible for informing the PM

of changes in the work plan, procedures, or site conditions so that those changes may be addressed in this HASP. Other responsibilities are to:

- Consult with the SSO on site health and safety issues;
- Stop work, as necessary, for personal safety, protection of property, and regulatory compliance;
- Obtain a site map and determine and post routes to medical facilities and emergency telephone numbers;
- Notify local public emergency representatives (as appropriate) of the nature of the site operations, and post their telephone numbers (i.e., local fire department personnel who would respond for a confined space rescue);
- Observe on-site project personnel for signs of ill health effects;
- Investigate and report any incidents to the SSO;
- Verify that all on-site personnel have had applicable training;
- Verify that on-site personnel are informed of the physical, chemical, and biological hazards associated with the site activities, and the procedures and protective equipment necessary to control the hazards; and
- Issue/obtain any required work permits (hot work, confined space, etc.).

3.2.6 FIELD PERSONNEL (FP)

All SESI field personnel are responsible for following the Health and Safety procedures specified in this HASP and work practices specified in applicable operation procedures. Some specific responsibilities include, but are not limited to:

- Reading and understanding the HASP;
- Reporting all accidents, incidents, injuries, or illnesses to the FS;
- Complying with the requests of the SSO;
- Immediately communicating newly identified hazards or noncompliance issues to the FS or SSO; and
- Stopping work in cases of immediate danger.

3.3 SUBCONTRACTORS

Subcontractors and their personnel must understand and comply with applicable regulations and site requirements established in this HASP. Subcontractors will prepare their own site-specific HASP that must be consistent with the requirements of this HASP.

All subcontractor personnel will receive training in accordance with applicable regulations and be familiar with the requirements and procedures contained in this HASP prior to initiating site activities. All subcontractor personnel will attend an initial hazard briefing prior to beginning work at the site. Additionally, on-site subcontractor personnel must conduct daily site safety meetings.

Subcontractors must designate individuals to function as the PM, HSM, SSO, and FS. In some firms the HSM to be carried out by the PM. This is acceptable provided the PM has the required knowledge, training, and experience to properly address all hazards associated with the work, and to prepare, approve, and oversee the execution of the site-specific HASP. A subcontractor may designate the same person to perform the duties of both the SSO and the FS. However, depending on the level of complexity of a contractor's scope of work, it may be infeasible for one person to perform both functions satisfactorily.

3.4 STOP WORK AUTHORITY

Every SESI employee and subcontractor is empowered, expected, and has the responsibility to stop the work of another co-worker if the working conditions or behaviors are considered unsafe.

3.5 ALL ON-SITE PERSONNEL

All on-site SESI personnel (including SESI subcontractors) must read and acknowledge their understanding of their respective HASPs before commencing work and abide by the requirements of the plans. All on-site SESI personnel shall sign their HASP Acknowledgement Form following their review of their HASP.

All SESI project personnel will receive training in accordance with applicable regulations and be familiar with the requirements and procedures contained in this HASP prior to initiating site activities. In addition, all on-site personnel will attend an initial hazard briefing provided by the SSO prior to beginning work at the site and conduct daily safety meetings thereafter.

On-site personnel will immediately report the following to the FS or SSO:

- Personal injuries and illnesses no matter how minor;
- Unexpected or uncontrolled release of chemical substances;
- Symptoms of chemical exposure;
- Unsafe or hazardous situations;
- Unsafe or malfunctioning equipment;
- Changes in site conditions that may affect the health and safety of project personnel;
- Damage to equipment or property; and
- Situations or activities for which they are not properly trained.

3.6 VISITORS

All SESI personnel and subcontractors visiting the Site must check in with the FS. Visitors will be cautioned to avoid skin contact with surfaces, soils, groundwater, or other materials that may impacted or be suspected to be impacted by constituents of concern (COCs).

Visitors requesting to observe work at the site must don appropriate personal protective equipment (PPE) prior to entry to the work area and must have the appropriate training and medical clearances to do so. If respiratory protective devices are necessary, visitors who wish to enter the work area must have been respirator-trained and fit tested for a respirator within the past 12 months.

Table 1 – Key Safety Personnel

SESI Personnel		
Role	**Name**	**Address/Telephone No.**
Project Officer (PO)	Justin Protasiewicz	Parsippany, NJ/973-808-9050
Project Manager (PM)	Justin Protasiewicz	Parsippany, NJ/973-808-9050
Senior Project Engineer (SPE)	Justin Protasiewicz	Parsippany, NJ/973-808-9050

Health and Safety Manager (HSM)	Justin Protasiewicz	Parsippany, NJ/973-808-9050
Site Safety Officer (SSO)	Anthony Raposo	Parsippany, NJ/973-808-9050
Field Supervisor (FS)	Anthony Raposo	Parsippany, NJ/973-808-9050
Field Personnel	TBD	
Subcontractors		
Company/Role	**Name**	**Address/Telephone No.**
Drilling Subcontractor - TBD	TBD	TBD
Analytical Lab - TBD	TBD	TBD

4.0 PERSONAL PROTECTIVE EQUIPMENT

4.1 LEVELS OF PROTECTION

PPE is required to safeguard site personnel from various hazards. Varying levels of protection may be required depending on the levels of COCs and the degree of physical hazard. This section presents the various levels of protection and defines the conditions of use for each level. A summary of the levels is presented in **Table 2** on page 11.

4.1.1 LEVEL D PROTECTION

The minimum level of protection that will be required of project personnel at the site will be Level D, which will be worn when site conditions or air monitoring indicates no inhalation hazard exists. The following equipment will be used:

- Work clothing as prescribed by weather;
- Steel toe work boots, meeting American National Standards Institute (ANSI) Z41;
- Safety glasses or goggles, meeting ANSI Z87;
- Leather work gloves and/or nitrile surgical gloves;
- Hard hat, meeting ANSI Z89, when falling object hazards are present;
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used); and
- PFD if working on or near the water.

4.1.2 MODIFIED LEVEL D PROTECTION

Modified Level D will be used when airborne contaminants are not present at levels of concern, but site activities present an increased potential for skin contact with contaminated materials. Modified Level D consists of:

- Nitrile gloves worn over nitrile surgical gloves;
- Latex/polyvinyl chloride (PVC) overboots when contact with COC-impacted media is anticipated;
- Steel toe work boots, meeting ANSI Z41;
- Safety glasses or goggles, meeting ANSI Z87;
- Face shield in addition to safety glasses or goggles when projectiles or splash hazards exist (e.g. during Power Washing activities);
- Hard hat, meeting ANSI Z89, when falling object hazards are present;
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used);
- Tyvek® suit (polyethylene coated Tyvek® suits for handling liquids) when body contact with COC-impacted media is anticipated; and

- PFD if working on or near the water.

4.1.3 LEVEL C PROTECTION

Level C protection will be required when the airborne concentration of COC reaches one-half of the OSHA Permissible Exposure Limit or ACGIH TLV. The following equipment will be used for Level C protection:

- Full-face, air-purifying respirator with combination organic vapor/HEPA cartridges;
- Polyethylene-coated Tyvek® suit, with ankles and cuffs taped to boots and gloves;
- Nitrile gloves worn over nitrile surgical gloves;
- Steel toe work boots, meeting ANSI Z41;
- Chemical-resistant boots with steel toes or latex/PVC overboots over steel toe boots;
- Hard hat, meeting ANSI Z89;
- Hearing protection (if noise levels exceed 85 dBA, then hearing protection with a USEPA NRR of at least 20 dBA must be used); and
- PFD if working on or near the water.

4.2 SELECTION OF PPE

Equipment for personal protection will be selected based on the potential for contact, site conditions, ambient air quality, and the judgment of supervising site personnel and health and safety professionals. The PPE used will be chosen to be effective against the COCs present on the site.

4.3 SITE RESPIRATORY PROTECTION PROGRAM

Respiratory protection is an integral part of employee health and safety at the site due to potentially hazardous concentrations of airborne COCs. The site respiratory protection program will consist of the following (as a minimum):

- All on-site personnel who may use respiratory protection will have an assigned respirator.
- All on-site personnel who may use respiratory protection will have been fit tested and trained in the use of a full-face air-purifying respirator within the past 12 months. Documentation of the fit test must be provided to the SSO prior to commencement of work.
- All on-site personnel who may use respiratory protection must within the past year have been medically certified as being capable of wearing a respirator. Documentation of the medical certification must be provided to the SSO, prior to commencement of site work.
- Only cleaned, maintained, NIOSH-approved respirators will be used.
- If respirators are used, the respirator cartridge is to be properly disposed of at the end of each work shift, or when load-up or breakthrough occurs.
- Contact lenses are not to be worn when a respirator is worn.
- All on-site personnel who may use respiratory protection must be clean-shaven. Mustaches and sideburns are permitted, but they must not touch the sealing surface of the respirator.
- Respirators will be inspected, and a negative pressure test performed prior to each use.

- After each use, the respirator will be wiped with a disinfectant, cleansing wipe. When used, the respirator will be thoroughly cleaned at the end of the work shift. The respirator will be stored in a clean plastic bag, away from direct sunlight in a clean, dry location, in a manner that will not distort the face piece.

4.4 USING PPE

Depending upon the level of protection selected, specific donning and doffing procedures may be required. The procedures presented in this section are mandatory if Modified Level D or Level C PPE is used. All personnel entering the EZ must put on the required PPE in accordance with the requirements of this HASP. When leaving the EZ, PPE will be removed in accordance with the procedures listed, to minimize the spread of COCs.

4.4.1 DONNING PROCEDURES

These procedures are mandatory only if Modified Level D or Level C PPE is used on the site:

- Remove bulky outerwear. Remove street clothes and store in clean location;
- Put on work clothes or coveralls;
- Put on the required chemical protective coveralls;
- Put on the required chemical protective boots or boot covers;
- Tape the legs of the coveralls to the boots with duct tape;
- Put on the required chemical protective gloves;
- Tape the wrists of the protective coveralls to the gloves;
- Don the required respirator and perform appropriate fit check (Level C);
- Put hood or head covering over-head and respirator straps and tape hood to facepiece (Level C); and
- Don remaining PPE, such as safety glasses or goggles and hard hat.

When these procedures are instituted, one person must remain outside the work area to ensure that each person entering has the proper protective equipment.

4.4.2 DOFFING PROCEDURES

The following procedures are only mandatory if Modified Level D or Level C PPE is required for the site. Whenever a person leaves the work area, the following decontamination sequence will be followed:

- Upon entering the CRZ, rinse contaminated materials from the boots or remove contaminated boot covers;
- Clean reusable protective equipment;
- Remove protective garments, equipment, and respirator (Level C). All disposable clothing should be placed in plastic bags, which are labeled with contaminated waste labels;
- Wash hands, face, and neck (or shower if necessary);
- Proceed to clean area and dress in clean clothing; and
- Clean and disinfect respirator for next use.

All disposable equipment, garments, and PPE must be bagged in plastic bags, labeled for disposal. See Section 7, Decontamination, for detailed information on decontamination stations.

4.5 SELECTION MATRIX

The level of personal protection selected will be based on air monitoring of the work environment and an assessment by the FS and SSO of the potential for skin contact with COCs. The PPE selection matrix is presented in **Table 2** below. This matrix is based on information available at the time this plan was written. The Airborne Contaminant Action Levels in **Table 3** on page 12, Airborne Contaminant Action Levels, should be used to verify that the PPE prescribed in these matrices is appropriate.

Table 2 – PPE Selection Matrix

Task	Anticipated Level of Protection
Mobilization	Level D
Subsurface Intrusive Activities (Excavation, Drilling)	Modified Level D/Level C
Earthwork/Grading	Level D
Chemical Sampling / Delineation	Modified Level D/Level C
Decontamination	Modified Level D
Demobilization	Level D

5.0 AIR AND NOISE MONITORING

5.1 AIR MONITORING

Air monitoring, sampling, and testing will be conducted to determine employee exposure to airborne constituents. The monitoring results will dictate work procedures and the selection of PPE. The SESI SSO will be responsible for defining appropriate air monitoring procedures and for utilizing the air monitoring results to determine appropriate procedures and PPE for project personnel. Air monitoring results should be recorded in field notebooks or on an air monitoring log (see Attachment 1 for a copy of the Air Monitoring Log). Any deviations from the procedures listed here should be documented and explained in the Air Monitoring Log.

The monitoring devices to be used are a PDR1000 particulate monitor (or equivalent) and a Rae Systems MultiRAE detector (PID with a 11.7 eV lamp/oxygen/LEL/hydrogen sulfide sensors). Colorimetric detector tubes may be utilized to estimate airborne concentrations of benzene and should be onsite during any activities that may result in elevated PID readings including drilling, excavating, and groundwater sampling.

Air monitoring will be conducted continuously with the LEL/Oxygen meter during drilling in areas where flammable vapors or gases are suspect. All work activity must stop where tests indicate the concentration of flammable vapors exceeds 10% of the LEL at a location with a potential ignition source. Such an area must be ventilated to reduce the concentration to an acceptable level.

5.2 NOISE MONITORING

Noise monitoring may be conducted as required. Hearing protection is mandatory for all employees in noise hazardous areas, such as around heavy equipment. As a general rule, sound levels that cause speech interference at normal conversation distance should require the use of hearing protection.

5.3 MONITORING EQUIPMENT MAINTENANCE AND CALIBRATION

All direct-reading instrumentation calibrations should be conducted under the approximate environmental conditions the instrument will be used. Instruments must be calibrated before and after use, noting the reading(s) and any adjustments that are necessary. All air monitoring equipment calibrations, including the standard used for calibration, must be documented on a calibration log or in the field notebook. All completed health and safety documentation/forms must be reviewed by the SSO and maintained by the FS.

All air monitoring equipment will be maintained and calibrated in accordance with the specific manufacturer's procedures. Preventive maintenance and repairs will be conducted in accordance with the respective manufacturer's procedures. When applicable, only manufacturer-trained and/or authorized personnel will be allowed to perform instrument repairs or preventive maintenance.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the SSO must be responsible for immediately removing the instrument from service and obtaining a replacement unit. If the instrument is essential for safe operation during a specific activity, that activity must cease until an appropriate replacement unit is obtained. The SSO will be responsible for ensuring a replacement unit is obtained and/or repairs are initiated on the defective equipment.

5.4 ACTION LEVELS

Table 3 below presents airborne contaminant action levels that will be used to determine the procedures and protective equipment necessary based on conditions as measured at the site.

Table 3 – Airborne Contaminant Action Levels

Parameter	Reading	Action
Total Hydrocarbons	0 ppm to ≤ 1 ppm	Normal operations; continue hourly breathing zone monitoring
	> 1 ppm to 5 ppm	Increase monitoring frequency to every 15 minutes and use benzene detector tube to screen for the presence of benzene
	≥ 5 ppm to ≤ 50 ppm	Upgrade to Level C PPE; continue screening for benzene
	> 50 ppm	Stop work; investigate cause of reading
	At any reading > 5 ppm	Monitor perimeter per CAMP
Benzene	≥ 1 ppm to 5 ppm	Upgrade to Level C PPE
	> 5 ppm	Stop work; investigate cause of reading

Parameter	Reading	Action
Dust	0 to .05 mg/m3	Normal operations
	0.05 to 0.1 mg/m3	Begin soil wetting procedure (Level C protection would be needed beyond this point)
	> 0.15 mg/m3	Stop work, fully implement dust control plan
Oxygen	≤ 19.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
	> 19.5% to < 23.5%	Normal operations
	≥ 23.5%	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Carbon Monoxide	0 ppm to ≤ 20 ppm	Normal operations
	> 20 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Hydrogen Sulfide	0 ppm to ≤ 5 ppm	Normal operations
	> 5 ppm	Stop work, evacuate confined spaces/work area, investigate cause of reading, and ventilate area
Flammable Vapors (LEL)	< 10% LEL	Normal operations
	≥ 10% LEL	Stop work, ventilate area, investigate source of vapors

6.0 WORK ZONES AND DECONTAMINATION

6.1 WORK ZONES

6.1.1 AUTHORIZATION TO ENTER

Only personnel with the appropriate training and medical certifications (if respirators are required) will be allowed to work at the project site. The FS will maintain a list of authorized persons; only personnel on the authorized persons list will be allowed to enter the site work areas.

6.1.2 SITE ORIENTATION AND HAZARD BRIEFING

No person will be allowed in the work area during site operations without first being given a site orientation and hazard briefing. This orientation will be presented by the FS or SSO and will consist of a review of this HASP. This review must cover the chemical, physical, and biological hazards, protective equipment, safe work procedures, and emergency procedures for the project. Following this initial meeting, daily safety meetings will be held each day before work begins.

All people entering the site work areas, including visitors, must document their attendance at this briefing, as well as the daily safety meetings on the forms included with this plan.

6.1.3 CERTIFICATION DOCUMENTS

A training and medical file may be established for the project and kept on site during all site operations. Specialty training, such as first aid/cardiopulmonary resuscitation (CPR) certificates, as well as current medical clearances for all project field personnel required to wear respirators, will be maintained within that file. All project personnel must provide their training and medical documentation to the SSO prior to starting work.

6.1.4 ENTRY LOG

A log-in/log-out sheet will be maintained at the site by the FS. Personnel must sign in and out on a log sheet as they enter and leave the work area, and the FS may document entry and exit in the field notebook.

6.1.5 ENTRY REQUIREMENTS

In addition to the authorization, hazard briefing, and certification requirements listed above, no person will be allowed in any SESI work area unless they are wearing the minimum PPE as described in Section 4.0.

6.1.6 EMERGENCY ENTRY AND EXIT

People who must enter the work area on an emergency basis will be briefed of the hazards by the FS or SSO. All activities will cease in the event of an emergency. People exiting the work area because of an emergency will gather in a designated safe area for a head count. The FS is responsible for ensuring that all people who entered the work area have exited in the event of an emergency.

6.1.7 CONTAMINATION CONTROL ZONES

Contamination control zones are maintained to prevent the spread of contamination and to prevent unauthorized people from entering hazardous areas.

6.1.8 EXCLUSION ZONE (EZ)

An EZ may consist of a specific work area or may be the entire area of potential contamination. All employees entering an EZ must use the required PPE and must have the appropriate training and medical clearance for hazardous waste work. The EZ is the defined area where there is a possible respiratory and/or contact health hazard. Cones, caution tape, or a posted site diagram will identify the location of each EZ.

6.1.9 CONTAMINATION REDUCTION ZONE

The CRZ or transition area will be established, if necessary, to perform decontamination of personnel and equipment. All personnel entering or leaving the EZ will pass through this area to prevent any cross-contamination. Tools, equipment, and machinery will be decontaminated in a specific location. The decontamination of all personnel will be performed on site adjacent to the EZ. Personal protective outer garments and respiratory protection will be removed in the CRZ and prepared for cleaning or disposal. This zone is the only appropriate corridor between the EZ and the support zone (SZ) discussed below.

6.1.10 SUPPORT ZONE (SZ)

The SZ is a clean area outside the CRZ located to prevent employee exposure to hazardous substances. Eating and drinking will be permitted in the support area only after proper decontamination. Smoking may be permitted in the SZ, subject to site requirements.

6.1.11 POSTING

Work areas will be prominently marked and delineated using cones, caution tape, or a posted site diagram.

6.1.12 SITE INSPECTIONS

The FS will conduct a daily inspection of site activities, equipment, and procedures to verify that the required elements are in place.

6.2 DECONTAMINATION

6.2.1 PERSONNEL DECONTAMINATION

All personnel wearing Modified Level D or Level C protective equipment in the EZ must undergo personal decontamination prior to entering the SZ. The personnel decontamination area will consist of the following stations at a minimum:

- *Station 1*: Personnel leaving the contaminated zone will remove the gross contamination from their outer clothing and boots.
- *Station 2*: Personnel will remove their outer garment and gloves and dispose of it in properly labeled containers. Personnel will then decontaminate their hard hats, and boots with an aqueous solution of detergent or other appropriate cleaning solution. These items are then hand carried to the next station.
- *Station 3*: Personnel will thoroughly wash their hands and face before leaving the CRZ. Respirators will be sanitized and then placed in a clean plastic bag.

6.2.2 EQUIPMENT DECONTAMINATION

All vehicles that have entered the EZ will be decontaminated at the decontamination pad prior to leaving the zone. If the level of vehicle contamination is low, decontamination may be limited to rinsing of tires and wheel wells with water. If the vehicle is significantly contaminated, steam cleaning or pressure washing of vehicles and equipment may be required.

6.2.3 PERSONAL PROTECTIVE EQUIPMENT DECONTAMINATION

Where and whenever possible, single-use, external protective clothing must be used for work within the EZ or CRZ. This protective clothing must be disposed of in properly labeled containers. Reusable protective clothing will be rinsed at the site with detergent and water. The rinsate will be collected for disposal.

When removed from the CRZ, the respirator will be thoroughly cleaned with soap and water. The respirator face piece, straps, valves, and covers must be thoroughly cleaned at the end of each work shift, and ready for use prior to the next shift. Respirator parts may be disinfected with a solution of bleach and water (mixed at 2% bleach by volume), or by using a spray disinfectant

7.0 TRAINING AND MEDICAL SURVEILLANCE

7.1 TRAINING

7.1.1 GENERAL

All on-site project personnel who work in areas where they may be exposed to site contaminants must be trained as required by OSHA Regulation 29 CFR 1910.120 (HAZWOPER). Field employees also must receive a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor. Personnel who completed their initial training more than 12 months prior to the start of the project must

have completed an eight-hour refresher course within the past 12 months. The FS must have completed an additional eight hours of supervisory training and must have a current first-aid/CPR certificate (See Attachment 2).

7.1.2 BASIC 40-HOUR COURSE

The following is a list of the topics typically covered in a 40-hour HAZWOPER training course:

- General safety procedures;
- Physical hazards (fall protection, noise, heat stress, cold stress);
- Names and job descriptions of key personnel responsible for site health and safety;
- Safety, health, and other hazards typically present at hazardous waste sites;
- Use, application, and limitations of PPE;
- Work practices by which employees can minimize risks from hazards;
- Safe use of engineering controls and equipment on site;
- Medical surveillance requirements;
- Recognition of symptoms and signs which might indicate overexposure to hazards;
- Worker right-to-know (Hazard Communication OSHA 1910.1200);
- Routes of exposure to contaminants;
- Engineering controls and safe work practices;
- Components of a health and safety program and a site-specific HASP;
- Decontamination practices for personnel and equipment;
- Confined-space entry procedures; and
- General emergency response procedures.

7.1.3 SUPERVISOR COURSE

Management and supervisors must receive an additional eight hours of training, which typically includes:

- General site safety and health procedures;
- PPE programs; and
- Air monitoring techniques.

7.1.4 SITE-SPECIFIC TRAINING

Site-specific training will be accomplished by on-site personnel reading this HASP, and through a thorough site briefing by the PM, FS, or SSO on the contents of this HASP before work begins. The review must include a discussion of the chemical, physical, and biological hazards; the protective equipment and safety procedures; and emergency procedures.

7.1.5 DAILY SAFETY MEETINGS

Daily safety meetings will be held to cover the work to be accomplished, the hazards anticipated, the PPE and procedures required to minimize site hazards, and emergency procedures. The FS or SSO should present these meetings prior to beginning the day's fieldwork. No work will be performed in an EZ before a daily safety meeting has been held. An additional safety meeting must also be held prior to new tasks, or if new hazards are encountered. The daily safety meetings will be logged in the field notebook.

7.1.6 FIRST AID AND CPR

At least one employee current in first aid/CPR will be assigned to the work crew and will be on the site during operations. Site records will document the presence of this individual. Refresher training in first aid (triennially) and CPR (annually) is required to keep the certificate current. These individuals must also receive training regarding the precautions and protective equipment necessary to protect against exposure to blood-borne pathogens.

7.2 MEDICAL SURVEILLANCE

7.2.1 MEDICAL EXAMINATION

All personnel who are potentially exposed to site contaminants must participate in a medical surveillance program as defined by OSHA at 29 CFR 1910.120 (f).

7.2.2 PRE-PLACEMENT MEDICAL EXAMINATION

All potentially exposed personnel must have completed a comprehensive medical examination prior to assignment, and periodically thereafter as defined by applicable regulations. The pre-placement and periodic medical examinations typically include the following elements:

- Medical and occupational history questionnaire;
- Physical examination;
- Complete blood count, with differential;
- Liver enzyme profile;
- Chest X-ray, at a frequency determined by the physician;
- Pulmonary function test;
- Audiogram;
- Electrocardiogram for persons older than 45 years of age, or if indicated during the physical examination;
- Drug and alcohol screening, as required by job assignment;
- Visual acuity; and
- Follow-up examinations, at the discretion of the examining physician or the corporate medical director.

The examining physician provides the employee with a letter summarizing his findings and recommendations, confirming the worker's fitness for work and ability to wear a respirator. Documentation of medical clearance will be available for each employee during all project site work.

Subcontractors will certify that all their employees have successfully completed a physical examination by a qualified physician. The physical examinations must meet the requirements of 29 CFR 1910.120 and 29 CFR 1910.134. Subcontractors will supply copies of the medical examination certificate for each on-site employee.

7.2.3 OTHER MEDICAL EXAMINATIONS

In addition to pre-employment, annual, and exit physicals, personnel may be examined:

- At employee request after known or suspected exposure to toxic or hazardous materials; and

- At the discretion of the SSO, HSM, or occupational physician in anticipation of, or after known or suspected exposure to toxic or hazardous materials.

7.2.4 PERIODIC EXAM

Following the placement examination, all employees must undergo a periodic examination, similar in scope to the placement examination. For employees potentially exposed over 30 days per year, the frequency of periodic examinations will be annual. For employees potentially exposed less than 30 days per year, the frequency for periodic examinations will be 24 months.

7.2.5 MEDICAL RESTRICTION

When the examining physician identifies a need to restrict work activity, the employee's supervisor must communicate the restriction to the employee and the SSO. The terms of the restriction will be discussed with the employee and the supervisor.

8.0 GENERAL SAFETY PRACTICES

8.1 GENERAL SAFETY RULES

General safety rules for site activities include, but are not limited to, the following:

- At least one copy of this HASP must be in a location at the site that is readily available to personnel, and all project personnel shall review the plan prior to starting work.
- Consume or use food, beverages, chewing gum, and tobacco products only in the SZ or other designated area outside the EZ and CRZ. Cosmetics shall not be applied in the EZ or CRZ.
- Wash hands before eating, drinking, smoking, or using toilet facilities.
- Wear all PPE as required and stop work and replace damaged PPE immediately.
- Secure disposable coveralls, boots, and gloves at the wrists and legs and ensure closure of the suit around the neck.
- Upon skin contact with materials that may be impacted by COCs, remove contaminated clothing and wash the affected area immediately. Contaminated clothing must be changed. Any skin contact with materials potentially impacted by COCs must be reported to the FS or SSO immediately. If needed, medical attention should be sought.
- Practice contamination avoidance. Avoid contact with surfaces either suspected or known to be impacted by COCs, such as standing water, mud, or discolored soil. Equipment must be stored on elevated or protected surfaces to reduce the potential for incidental contamination.
- Remove PPE as required in the CRZ to limit the spread of COC-containing materials.
- At the end of each shift or as required, dispose of all single-use coveralls, soiled gloves, and respirator cartridges in designated receptacles designated for this purpose.
- Removing soil containing site COCs from protective clothing or equipment with compressed air, shaking, or any other means that disperses contaminants into the air is prohibited.

- Inspect all non-disposable PPE for contamination in the CRZ. Any PPE found to be contaminated must be decontaminated or disposed of appropriately.
- Recognize emergency signals used for evacuation, injury, fire, etc.
- Report all injuries, illnesses, and unsafe conditions or work practices to the FS or SSO.
- Use the "buddy system" during all operations requiring Level C PPE, and when appropriate, during Modified Level D operations.
- Obey all warning signs, tags, and barriers. Do not remove any warnings unless authorized to do so.
- Use, adjust, alter, and repair equipment only if trained and authorized to do so, and in accordance with the manufacturer's directions.
- Personnel are to perform only tasks for which they have been properly trained and will advise their supervisor if they have been assigned a task for which they are not trained.
- The presence or consumption of alcoholic beverages or illicit drugs during the workday, including breaks, is strictly prohibited. Notify your supervisor if you must take prescription or over-the-counter drugs that indicate they may cause drowsiness or, that you should not operate heavy equipment.
- Remain upwind during site activities whenever possible.

8.2 BUDDY SYSTEM

On-site personnel must use the buddy system as required by operations. Use of the "buddy system" is required during all operations requiring Level C to Level A PPE, and when appropriate, during Level D operations. Crewmembers must observe each other for signs of chemical exposure, and heat or cold stress. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin coloration;
- Changes in coordination;
- Changes in demeanor;
- Excessive salivation and pupillary response; and
- Changes in speech pattern.

Crewmembers must also be aware of the potential exposure to possible safety hazards, unsafe acts, or non-compliance with safety procedures.

Field personnel must inform their partners or fellow crewmembers of non-visible effects of exposure to toxic materials that they may be experiencing. The symptoms of such exposure may include, but are not limited to:

- Headaches;
- Dizziness;
- Nausea;
- Blurred vision;
- Cramps; and
- Irritation of eyes, skin, or respiratory tract.

If protective equipment or noise levels impair communications, prearranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

8.3 HEAT STRESS

Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, etc., as well as the physical and conditioning characteristics of the individual. Since heat stress is one of the most common illnesses associated with heavy outdoor work conducted with direct solar load and, in particular, because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Personnel must be aware of the types and causes of heat-related illnesses and be able to recognize the signs and symptoms of these illnesses in both themselves and their co-workers.

Heat rashes are one of the most common problems in hot work environments. Commonly known as prickly heat, a heat rash is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

Heat cramps are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused both by too much or too little salt.

Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (plus or minus 0.3% NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Drinking commercially available carbohydrate electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

Heat exhaustion occurs from increased stress on various body organs due to inadequate blood circulation, cardiovascular insufficiency, or dehydration. Signs and symptoms include pale, cool, moist skin; heavy sweating; dizziness; nausea; headache, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment.

Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, which is a medical emergency.

Workers suffering from heat exhaustion should be removed from the hot environment, be given fluid replacement, and be encouraged to get adequate rest.

Heat stroke is the most serious form of heat stress. Heat stroke occurs when the body's system of temperature regulation fails and the body's temperature rises to critical levels.

This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 41°C (105.8°F). If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of workload and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.

If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The worker should be placed in a shady area and the outer clothing should be removed. The worker's skin should be wetted and air movement around the worker should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment.

Regardless of the worker's protestations, no employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat stroke or exhaustion, that person may be predisposed to additional heat injuries.

8.4 HEAT STRESS SAFETY PRECAUTIONS

Heat stress monitoring and work rest cycle implementation should commence when the ambient adjusted temperature exceeds 72°F. A minimum work rest regimen and procedures for calculating ambient adjusted temperature are described in **Table 4** below.

Table 4 – Work/Rest Schedule

Adjusted Temperature[b]	Work/Rest Regimen Normal Work Ensemble[c]	Work/Rest Regimen Impermeable Ensemble
90ºF (32.2ºC) or above	After each 45 minutes of work	After each 15 minutes of work
87.5º - 90ºF (30.8º-32.2ºC)	After each 60 minutes of work	After each 30 minutes of work
82.5º - 87.5ºF (28.1º - 30.8ºC)	After each 90 minutes of work	After each 60 minutes of work
77.5º - 82.5ºF (25.3º - 28.1ºC)	After each 120 minutes of work	After each 90 minutes of work
72.5º - 77.5ºF (30.8º - 32.2ºC)	After each 150 minutes of work	After each 120 minutes of work

a. For work levels of 250 kilocalories/hour (Light-Moderate Type of Work)
b. Calculate the adjusted air temperature (ta adj) by using this equation: ta adj °F = ta °F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)
c. A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.
d. The information presented above was generated using the information provided in the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) Handbook.

In order to determine if the work rest cycles are adequate for the personnel and specific site conditions, additional monitoring of individual heart rates will be conducted during the rest cycle. To check the heart rate, count the radial pulse for 30 seconds at the beginning of the rest period. If the heart rate exceeds 110 beats per minute, shorten the next work period by one third and maintain the same rest period.
Additionally, one or more of the following control measures can be used to help control heat stress and are mandatory if any site worker has a heart rate (measure immediately prior to rest period) exceeding 115 beats per minute:

- Site workers will be encouraged to drink plenty of water and electrolyte replacement fluids throughout the day.
- On-site drinking water will be kept cool (50 to 60°F).
- A work regimen that will provide adequate rest periods for cooling down will be established, as required.
- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps.
- Cooling devices, such as vortex tubes or cooling vests, should be used when personnel must wear impermeable clothing in conditions of extreme heat.
- Employees should be instructed to monitor themselves and co-workers for signs of heat stress and to take additional breaks as necessary.
- A shaded rest area must be provided. All breaks should take place in the shaded rest area.
- Employees must not be assigned to other tasks during breaks.
- Employees must remove impermeable garments during rest periods. This includes white Tyvek-type garments.

All employees must be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

8.5 COLD STRESS

Cold stress normally occurs in temperatures at or below freezing, or under certain circumstances, in temperatures of 40°F. Extreme cold for a short time may cause severe injury to exposed body surfaces or result in profound generalized cooling, causing death. Areas of the body that have high surface area-to-volume ratio, such as fingers, toes, and ears, are the most susceptible. Two factors influence the development of a cold weather injury: ambient temperature and the velocity of the wind. For instance, 10°F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at 18°F. An equivalent chill temperature chart relating the actual dry bulb temperature and wind velocity is presented in **Table 5** below.

Table 5 – Wind Chill Temperature Chart

Estimated Wind Speed (in mph)	Actual Temperature Reading (ºF)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (ºF)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121

25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect.)	**LITTLE DANGER Maximum danger of false sense of security.**				**INCREASING DANGER Danger from freezing of exposed flesh within one minute.**			**GREAT DANGER Flesh may freeze within 30 seconds.**				
	Trench foot and immersion foot may occur at any point on this chart.											

[This chart was developed by the U.S. Army Research Institute of Environmental Medicine, Natick, MA (Source: ACGIH Threshold Limit Values for Chemical Substances and Physical Agents)].

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of tissue damage associated with frostbite. Frostbite of the extremities can be categorized into:

- *Frost Nip or Incipient Frostbite* - characterized by sudden blanching or whitening of skin.
- *Superficial Frostbite* - skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- *Deep Frostbite* - tissues are cold, pale, and solid; extremely serious injury.

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. It can be fatal. Its symptoms are usually exhibited in five stages: 1) shivering; 2) apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95°F; 3) unconsciousness, glassy stare, slow pulse, and slow respiratory rate; 4) freezing of the extremities; and 5) death. Trauma sustained in freezing or sub-zero conditions requires special attention because an injured worker is predisposed to secondary cold injury. Special provisions must be made to prevent hypothermia and secondary freezing of damaged tissues in addition to providing for first aid treatment. To avoid cold stress, site personnel must wear protective clothing appropriate for the level of cold and physical activity. In addition to protective clothing, preventive safe work practices, additional training, and warming regimens may be utilized to prevent cold stress.

8.6 SAFETY PRECAUTIONS FOR COLD STRESS PREVENTION

For air temperature of 0°F or less, mittens should be used to protect the hands. For exposed skin, continuous exposure should not be permitted when air speed and temperature results in a wind chill temperature of -25°F.

At air temperatures of 36°F or less, field personnel who become immersed in water or whose clothing becomes wet must be immediately provided with a change of clothing and be treated for hypothermia.

If work is done at normal temperature or in a hot environment before entering the cold, the field personnel must ensure that their clothing is not wet as a consequence of sweating. Wet field personnel must change into dry clothes prior to entering the cold area.

If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work must be modified or suspended until adequate clothing is made available or until weather conditions improve.

Field personnel handling evaporative liquid (e.g., gasoline, alcohol, or cleaning fluids) at air temperatures below 40°F must take special precaution to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling.

8.7 SAFE WORK PRACTICES

Direct contact between bare skin and cold surfaces (< 20°F) should be avoided. Metal tool handles and/or equipment controls should be covered by thermal insulating material.

For work performed in a wind chill temperature at or below 10°F, workers should be under constant protective observation (buddy system). The work rate should be established to prevent heavy sweating that will result in wet clothing. For heavy work, rest periods must be taken in heated shelters and workers should be provided with an opportunity to change into dry clothing if needed.

Field personnel should be provided the opportunity to become accustomed to cold-weather working conditions and required protective clothing. Work should be arranged in such a way that sitting or standing still for long periods is minimized.

During the warming regimen (rest period), field personnel should be encouraged to remove outer clothing to permit sweat evaporation or to change into dry work clothing. Dehydration, or loss of body fluids, occurs insidiously in the cold environment and may increase susceptibility to cold injury due to a significant change in blood flow to the extremities. Fluid replacement with warm, sweet drinks and soups is recommended. The intake of coffee should be limited because of diuretic and circulatory effects.

8.8 BIOLOGICAL HAZARDS

Biological hazards may include poison ivy, snakes, thorny bushes and trees, ticks, mosquitoes, spiders, and other pests.

8.8.1 TICK BORNE DISEASES

Lyme Disease - The disease commonly occurs in summer and is transmitted by the bite of infected ticks. “Hot spots” in the United States include New York, New Jersey, Pennsylvania, Massachusetts, Connecticut, Rhode Island, Minnesota, and Wisconsin.

Erlichiosis - The disease also commonly occurs in summer and is transmitted by the bite of infected ticks. “Hot spots” in the United States include New York, Massachusetts, Connecticut, Rhode Island, Minnesota, and Wisconsin.

These diseases are transmitted primarily by the deer tick, which is smaller and redder than the common wood tick. The disease may be transmitted by immature ticks, which are small and hard to see. The tick may be as small as a period on this page.

Symptoms of Lyme disease include a rash or a peculiar red spot, like a bull’s eye, which expands outward in a circular manner. The victim may have headache, weakness, fever, a stiff neck, and swelling and pain in the joints, and eventually, arthritis. Symptoms of erlichiosis include muscle and joint aches, flu-like symptoms, but there is typically no skin rash.

Rocky Mountain Spotted Fever (RMSF) - This disease is transmitted via the bite of an infected tick. The tick must be attached 4 to 6 hours before the disease-causing organism (Rickettsia rickettsii) becomes reactivated and can infect humans. The primary symptom of RMSF is the sudden appearance of a moderate-to-high fever. The fever may persist for two to three weeks. The victim may also have a headache, deep muscle pain, and chills. A rash appears on the hands and feet on about the third day and eventually spreads to all parts of the body. For this reason, RMSF may be confused with measles or meningitis. The disease may cause death, if untreated, but if identified and treated promptly, death is uncommon.

Control - Tick repellant containing diethyltoluamide (DEET) should be used when working in tick-infested areas, and pant legs should be tucked into boots. In addition, workers should search the entire body every three or four hours for attached ticks. Ticks should be removed promptly and carefully without crushing, since crushing can squeeze the disease-causing organism into the skin. A gentle and steady pulling action should be used to avoid leaving the head or mouth parts in the skin. Hands should be protected with surgical gloves when removing ticks.

8.8.2 POISONOUS PLANTS

Poisonous plants may be present in the work area. Personnel should be alerted to its presence and instructed on methods to prevent exposure.

Control - The main control is to avoid contact with the plant, cover arms and hands, and frequently wash potentially exposed skin. Particular attention must be given to avoiding skin contact with objects or protective clothing that have touched the plants. Treat every surface that may have touched the plant as contaminated, and practice contamination avoidance. If skin contact is made, the area should be washed immediately with soap and water and observed for signs of reddening.

8.8.3 SNAKES

The possibility of encountering snakes exists, specifically for personnel working in wooded/vegetated areas. Snake venoms are complex and include proteins, some of which have enzymatic activity. The effects produced by venoms include neurotoxic effects with sensory, motor, cardiac, and respiratory difficulties; cytotoxic effects on red blood cells, blood vessels, heart muscle, kidneys, and lungs; defects in coagulation; and effects from local release of substances by enzymatic actions. Other noticeable effects of venomous snakebites include swelling, edema, and pain around the bite, and the development of ecchymosis (the escape of blood into tissues from ruptured blood vessels).

Control - To minimize the threat of snakebites, all personnel walking through vegetated areas must be aware of the potential for encountering snakes, and the need to avoid actions potentiating encounters, such as turning over logs, etc. If a snakebite occurs, an attempt should be made to safely identify the snake via size and markings. The victim must be transported to the nearest hospital within 30 minutes; first aid consists of applying a constriction band and washing the area around the wound to remove any unabsorbed venom.

8.8.4 SPIDERS

Personnel may encounter spiders during work activities.

Two spiders are of concern, the black widow and the brown recluse. Both prefer dark sheltered areas such as basements, equipment sheds and enclosures, and around woodpiles or other scattered debris. The black widow is shiny black, approximately one inch long, and found throughout the United States. There is a distinctive red hourglass marking on the underside of the black widows body. The bite of a black widow is seldom fatal to healthy adults, but effects include respiratory distress, nausea, vomiting, and muscle spasms. The brown recluse is smaller than the black widow and gets its name from its brown coloring and behavior. The brown recluse is more prevalent in the southern United States. The brown recluse has a distinctive violin shape on the top of its body. The bite of the brown recluse is painful and the bite site ulcerates and takes many weeks to heal completely.

Control - To minimize the threat of spider bites, all personnel walking through vegetated areas must be aware of the potential for encountering these arachnids. Personnel need to avoid actions that may result in encounters, such as turning over logs, and placing hands in dark places such as behind equipment or in corners of equipment sheds or enclosures. If a spider bite occurs, the victim must be transported to the nearest hospital as soon as possible; first aid consists of applying ice packs and washing the area around the wound to remove any unabsorbed venom.

8.9 NOISE

Exposure to noise over the OSHA action level can cause temporary impairment of hearing; prolonged and repeated exposure can cause permanent damage to hearing. The risk and severity of hearing loss increases with the intensity and duration of exposure to noise. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of accidents on site.

Control - All personnel must wear hearing protection, with a Noise Reduction Rating (NRR) of at least 20, when noise levels exceed 85 dBA. When it is difficult to hear a co-worker at normal conversation distance, the noise level is approaching or exceeding 85 dBA, and hearing protection is necessary. All site personnel who may be exposed to noise must also receive baseline and annual audiograms and training as to the causes and prevention of hearing loss. Noise monitoring is discussed in Section 5.2, Noise Monitoring.

Whenever possible, equipment that does not generate excessive noise levels will be selected for this project. If the use of noisy equipment is unavoidable, barriers or increased distance will be used to minimize worker exposure to noise, if feasible.

8.10 SPILL CONTROL

All personnel must take every precaution to minimize the potential for spills during site operations. All on-site personnel shall immediately report any discharge, no matter how small, to the FS.

Spill control equipment and materials will be located on the site at locations that present the potential for discharge. All sorbent materials used for the cleanup of spills will be containerized and labeled appropriately. In the event of a spill, the FS will follow the provisions in Section 10.0, Emergency Procedures, to contain and control released materials and to prevent their spread to off-site areas.

8.11 SANITATION

Site sanitation will be maintained according to OSHA requirements.

8.11.1 BREAK AREA

Breaks must be taken in the SZ, away from the active work area after site personnel go through decontamination procedures. There will be no smoking, eating, drinking, or chewing gum or tobacco in any area other than the SZ.

8.11.2 POTABLE WATER

The following rules apply to all field operations:

- An adequate supply of potable water will be provided at each project site. Potable water must be kept away from hazardous materials or media, and contaminated clothing or equipment.
- Portable containers used to dispense drinking water must be capable of being tightly closed and must be equipped with a tap dispenser. Water must not be consumed directly from the container (drinking from the tap is prohibited) nor may it be removed from the container by dipping.
- Containers used for drinking water must be clearly marked and shall not be used for any other purpose.
- Disposable drinking cups must be provided. A sanitary container for dispensing cups and a receptacle for disposing of used cups is required.

8.11.3 SANITARY FACILITIES

Access to facilities for washing before eating, drinking, or smoking, or alternate methods such as waterless hand-cleaner and paper towels will be provided.

8.11.4 LAVATORY

If permanent toilet facilities are not available, an appropriate number of portable chemical toilets will be provided. This requirement does not apply to mobile crews or to normally unattended site locations so long as employees at these locations have transportation immediately available to nearby toilet facilities.

8.12 EMERGENCY EQUIPMENT

Adequate emergency equipment for the activities being conducted on site and as required by applicable sections of 29 CFR 1910 and 29 CFR 1926 will be on site prior to the commencement of project activities. Personnel will be provided with access to emergency equipment, including, but not limited to, the following:

- Fire extinguishers of adequate size, class, number, and location as required by applicable sections of 29 CFR 1910 and 1926;
- Industrial first aid kits of adequate size for the number of personnel on site; and
- Emergency eyewash and/or shower if required by operations being conducted on site.

8.13 LOCKOUT/TAGOUT PROCEDURES

Only fully qualified and trained personnel will perform maintenance procedures. Before maintenance begins, lockout/tagout procedures per OSHA 29 CFR 1910.147 will be followed.

Lockout is the placement of a device that uses a positive means, such as lock, to hold an energy or material-isolating device such that the equipment cannot be operated until the lockout device is removed. If a device cannot be locked out, a tagout system shall be used. Tagout is the placement of a warning tag on an energy or material isolating device indicating that the equipment controls may not be operated until the personnel who attached the tag remove the tag.

8.14 ELECTRICAL SAFETY

Electricity may pose a particular hazard to site workers due to the use of portable electrical equipment. If wiring or other electrical work is needed, a qualified electrician must perform it.

General electrical safety requirements include:

- All electrical wiring and equipment must be a type listed by Underwriters Laboratories (UL), Factory Mutual Engineering Corporation (FM), or other recognized testing or listing agency.
- All installations must comply with the National Electrical Safety Code (NESC), the National Electrical Code (NEC), or USCG regulations.
- Portable and semi-portable tools and equipment must be grounded by a multi-conductor cord having an identified grounding conductor and a multi-contact polarized plug-in receptacle.
- Tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double insulated tools must be distinctly marked and listed by UL or FM.
- Live parts of wiring or equipment must be guarded to prevent persons or objects from touching them.
- Electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.
- All circuits must be protected from overload.
- Temporary power lines, switchboxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage.
- Plugs and receptacles must be kept out of water unless of an approved submersible construction.
- All extension cord outlets must be equipped with ground fault circuit interrupters (GFCI).
- Attachment plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.
- Extension cords or cables must be inspected prior to each use and replaced if worn or damaged. Cords and cables must not be fastened with staples, hung from nails, or suspended by bare wire.

- Flexible cords must be used only in continuous lengths without splice, with the exception of molded or vulcanized splices made by a qualified electrician.

8.15 LIFTING SAFETY

Using proper lifting techniques may prevent back strain or injury. The fundamentals of proper lifting include:

- Consider the size, shape, and weight of the object to be lifted. A mechanical lifting device or additional persons must be used to lift an object if it cannot be lifted safely alone.
- The hands and the object should be free of dirt or grease that could prevent a firm grip.
- Gloves must be used, and the object inspected for metal slivers, jagged edges, burrs, or rough or slippery surfaces.
- Fingers must be kept away from points that could crush or pinch them, especially when putting an object down.
- Feet must be placed far enough apart for balance. The footing should be solid and the intended pathway should be clear.
- The load should be kept as low as possible, close to the body with the knees bent.
- To lift the load, grip firmly and lift with the legs, keeping the back as straight as possible.
- A worker should not carry a load that he or she cannot see around or over.
- When putting an object down, the stance and position are identical to that for lifting; the legs are bent at the knees, and the back is straight as the object is lowered.

8.16 LADDER SAFETY

When portable ladders are used for access to an upper landing surface, the ladder side rails shall extend at least 3 feet (9 m) above the upper landing surface to which the ladder is used to gain access; or, when such an extension is not possible because of the ladder's length, then the ladder shall be secured at its top to a rigid support that will not deflect, and a grasping device, such as a grabrail, shall be provided to assist employees in mounting and dismounting the ladder. In no case shall the extension be such that ladder deflection under a load would, by itself, cause the ladder to slip off its support.

- Ladders shall be maintained free of oil, grease, and other slipping hazards.
- Ladders shall not be loaded beyond the maximum intended load for which they were built, or beyond their manufacturer's rated capacity.
- Ladders shall be used only for the purpose for which they were designed.
- Non-self-supporting ladders shall be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).
- Wood job-made ladders with spliced side rails shall be used at an angle such that the horizontal distance is one-eighth the working length of the ladder.
- Fixed ladders shall be used at a pitch no greater than 90 degrees from the horizontal, as measured to the back side of the ladder.
- Ladders shall be used only on stable and level surfaces unless secured to prevent accidental displacement.

- Ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Slip-resistant feet shall not be used as a substitute for care in placing, lashing, or holding a ladder that is used upon slippery surfaces, including, but not limited to, flat metal or concrete surfaces that are constructed so they cannot be prevented from becoming slippery.
- Ladders placed in any location where they can be displaced by workplace activities or traffic, such as in passageways, doorways, or driveways, shall be secured to prevent accidental displacement, or a barricade shall be used to keep the activities or traffic away from the ladder.
- The area around the top and bottom of ladders shall be kept clear.
- The top of a non-self-supporting ladder shall be placed with the two rails supported equally unless it is equipped with a single support attachment.
- Ladders shall not be moved, shifted, or extended while occupied.
- Ladders shall have non-conductive side rails if they are used where the employee or the ladder could contact exposed energized electrical equipment.
- The top, top step, or the step labeled that it or any step above it should not be used as a step.
- Cross-bracing on the rear section of stepladders shall not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.
- Ladders shall be inspected by the HSM for visible defects on a daily basis and after any occurrence that could affect their safe use.
- Portable ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps; broken or split rails; corroded components; or other faulty or defective components shall either be immediately marked in a manner that readily identifies them as defective or be tagged with “Do Not Use” or similar language and shall be withdrawn from service.
- Fixed ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps; broken or split rails; or corroded components; shall be withdrawn from service.
- Ladder repairs shall restore the ladder to a condition meeting its original design criteria, before the ladder is returned to use.
- Single-rail ladders shall not be used.
- When ascending or descending a ladder, the user shall face the ladder.
- Each employee shall use at least one hand to grasp the ladder when progressing up and/or down the ladder.
- An employee shall not carry any object or load that could cause the employee to lose balance and fall.

8.17 TRAFFIC SAFETY

The project site may be located adjacent to a public roadway where exposure to vehicular traffic is likely. Traffic may also be encountered as vehicles enter and exit the area. To minimize the likelihood of project personnel and activities being affected by traffic, the following procedures will be implemented.

Cones must be placed along the shoulder of the roadway starting 100 feet from the work area to alert passing motorists to the presence of personnel and equipment. A “Slow” or “Men Working” sign must be placed at the first cone. Barricades with flashing lights should be placed between the roadway and the work area.

During activities along a roadway, equipment will be aligned parallel to the roadway to the extent feasible, facing into the oncoming traffic so as to place a barrier between the work crew and the oncoming traffic. All crewmembers must remain behind the equipment and the traffic barrier.

All site personnel who are potentially exposed to vehicular traffic must wear an outer layer of orange warning garments, such as vests, jackets, or shirts. If work is performed in hours of dusk or darkness, workers will be outfitted with reflective garments either orange, white (including silver-coated reflective coatings or elements that reflect white light), yellow, fluorescent red-orange, or fluorescent yellow-orange.

The flow of traffic into and out of the adjacent business must be assessed, and precautions taken to warn motorists of the presence of workers and equipment. Where possible, vehicles should be aligned to provide physical protection of people and equipment.

9.0 SITE-SPECIFIC HAZARDS AND CONTROL MEASURES

9.1 EVALUATION OF HAZARDS

The evaluation of hazards is provided as a quick reference as to the known conditions for the Site, wherein the level of detail for each of the subsections is identified.

9.1.1 HAZARD CHARACTERISTICS

Existing information for Site:
__X__ Detailed _____ Preliminary _____ None

Hazardous/Contaminated Material Form(s):
__X__ Solid __X__ Liquid _____ Sludge ___ Gas X Vapor

Containment Type(s):
_____ Drum _____ Tank _____ Pit _____ Debris
_____ Pond _____ Lagoon Other:

Hazardous Material Characteristics:
__X__ Volatile _____ Corrosive _____ Reactive _____ Radioactive
_____ Ignitable __X__ Toxic _____ Unknown

Routes of Exposure:
__X__ Oral __X__ Dermal __X__ Eye __X__ Respiratory

9.1.2 POTENTIAL HEALTH AND SAFETY HAZARDS

__X__ Heat
__X__ Cold
_____ Confined space entry
_____ Oxygen depletion
_____ Asphyxiation
__X__ Excavation
__X__ Cave-ins
_____ Congested areas
__X__ General Construction
__X__ Physical injury
__X__ Electrical hazards
__X__ Handling and product transfer
__X__ Fire
__X__ Explosion

__X__ Falls, slippage
__X__ Biological Hazards
__X__ Plants – Poison Ivy, Poison Oak
__X__ Insects – Ticks
__X__ Insects – Mosquitoes
__X__ Insects – Bees and Wasps
__X__ Rats and Mice
__X__ Heavy equipment
_____ Non-ionizing Radiation (i.e. UV, IR, etc.)
_____ Other: Potential Ignition Hazard.

9.2 FIELD ACTIVITIES, HAZARDS, AND CONTROL PROCEDURES

The following task-specific safety analyses identify potential health, safety, and environmental hazards associated with each type of field activity. Because of the complex and changing nature of field projects, supervisors must continually inspect the site to identify hazards that may affect on-site personnel, the community, or the environment. The FS must be aware of these changing conditions and discuss them with the PM whenever these changes impact employee health, safety, the environment, or performance of the project. The FS will keep on-site personnel informed of the changing conditions, and the PM will write and/or approve addenda or revisions to this HASP as necessary.

9.2.1 MOBILIZATION/CONSTRUCTION STAKEOUT

Description of Tasks

Site mobilization will include establishing excavation locations, determining the location of utilities and other installations, and establishing work areas. Mobilization will also include setting up equipment and establishing a temporary site office. A break area will be set up outside of regulated work areas. Mobilization may involve clearing areas for the SZ and CRZ. During this initial phase, project personnel will walk the site to confirm the existence of anticipated hazards and identify safety and health issues that may have arisen since the writing of this plan.

Hazard Identification

The hazards of this phase of activity are associated with heavy equipment operation, manual materials handling, installation of temporary on-site facilities, and manual site preparation.

Manual materials handling and manual site preparation may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion, and laceration hazards. Installation of temporary field office and support facilities may expose personnel to electrical hazards, underground and overhead utilities, and physical injury due to the manual lifting and moving of materials. The work area presents slip, trip, and fall hazards from scattered debris and irregular walking surfaces. Rainy weather may cause wet, muddy, slick walking surfaces, and unstable soil. Freezing weather hazards include frozen, slick, and irregular walking surfaces.

Environmental hazards include plants, such as poison ivy and poison oak; aggressive fauna, such as ticks, fleas, mosquitoes, wasps, spiders, and snakes; weather, such as sunburn, lightning, rain, and heat- or cold-related illnesses; and pathogens, such as rabies, Lyme disease, and blood-borne pathogens.

Controls
Control procedures for these hazards are discussed in Section 8.0, General Safety Practices.

9.2.2 DEMOLITION/SITE CLEARING

Description of Tasks
Site clearance will involve manual or mechanical removal of objects impeding access to the construction footprint. These obstructions are both natural and man-made items and will include, but not be limited to, fabricated metal and concrete structures, trees, vegetation, rubble, and miscellaneous trash/debris.

Hazard Identification
Hazards associated with demolition and site clearance include personnel working in and around potentially unstable structures, or locations of potential contact with hazardous chemicals, utilities, and/or falling objects. This task will involve manual, as well as mechanical demolition/clearance efforts so exertion and equipment hazards exist.

Controls
PPE – Personnel shall be protected from hazards of irritant and toxic plants and suitably instructed in the first aid treatment available.

Preparatory Operations – Prior to permitting employees to start demolition operations, an engineering survey shall be made, by a licensed Professional Engineer, of the structure to determine the stability of the structure. Any adjacent structure shall where personnel may be exposed shall also be similarly checked. The PO shall have in writing evidence that such a survey has been performed. All structural instabilities shall be shored or braced, under the supervision of a licensed Professional Engineer, prior to access by an FP.

Utilities – All electric, gas, water, steam, sewer, and other service lines shall be shut off, caped, or otherwise controlled, outside the building line before demolition work is started. In each case, any utility company that is involved shall be notified in advance. If it is necessary to maintain any power, water or other utilities during demolition, such lines shall be temporarily relocated, as necessary.

Hazardous Substances – It shall also be determined if any type of hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous substances have been used in any pipes, tanks, or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started.

Falling Debris/Objects – No material shall be dropped to any point lying outside the exterior walls of the structure unless the area is effective protected. Access to the area where falling objects/debris may be encountered must be gated and controlled.

Structural Collapse – Structural or load supporting members on any floor shall not be cut or removed until all stories above such a floor have been demolished and removed. Walls, which are to serve as retaining walls against which debris will be piled, shall not be so used unless capable of safely supporting the imposed load. Mechanical equipment shall not be used on floors or working surfaces unless such floors or surfaces are not of sufficient strength to support the imposed load.

Rollover Guards – All equipment used in site clearing operations shall be equipped with rollover guards meeting the applicable requirements. In addition, rider-operated equipment shall be equipped with an overhead and rear canopy guard meeting the applicable requirements.

Inspections – During demolition, continuing inspections by a licensed Professional Engineer shall be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, walls, or loosened material. No FP shall be permitted to work where such hazards exist until they are corrected by shoring, bracing, or other effective means.

9.2.3 EXCAVATION AND CUT/FILL OPERATIONS

9.2.3.1 EXCAVATION/TRENCHING

Description of Tasks

This task includes the excavation of contaminated soils and superficial debris. Excavation depths vary across the site.

Hazard Identification

The hazards of this activity are associated with heavy equipment operation, subsurface intrusion, manual materials handling, stockpiling, and disposal. Subsurface intrusion presents hazards associated with negotiating buried utilities, cave-ins of the excavated areas, and regress methods for personnel working inside the excavated areas. Disruption of contaminated soil also presents a health hazard.

Controls

Underground Utilities – The estimated locations of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during the excavation work, shall be determined prior to opening an excavation. Utility companies or owners shall be contacted ("Call Before You Dig") within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation.

When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by save and acceptable means. While the excavation is open, underground installations shall be protected, supported, or removed, as necessary, to safeguard site personnel.

Cave-Ins – Project personnel in an excavation shall be protected from cave-ins by an adequate protective system, except when:

- Excavations are made entirely in stable rock or excavations are less than five feet in depth and examination of the ground by the SSO provides no indication of a potential cave-in.
- Protective systems shall have the capacity to resist, without failure, all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

Project personnel shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least two feet from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by the SSO for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the SSO prior to the start of work and as needed throughout operations. Inspections shall also be made after every rainstorm or other hazard-increasing occurrence. These inspections are only required when project personnel exposure can be reasonably anticipated.

Where the SSO finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed personnel shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

Excavation Egress – A stairway, ladder, ramp, or other safe means of egress shall be located in trench excavations that are four feet or more in depth so as to require no more than 25 feet or lateral travel for project personnel.

9.2.3.2 HEAVY EQUIPMENT OPERATION

Description of Tasks
Heavy equipment to be used for this task include, but are not limited to, excavators, dozers, dump trucks, and water sprayers (if required).

Hazard Identification
The most common type of accident that occurs in material handling operations is the "caught between" situation when a load is being handled and an object gets caught between two moving parts of the equipment. Operation of the heavy construction equipment may produce harmful noise.

Controls
Equipment Inspection – All vehicles in use shall be checked prior to operation to ensure that all parts, equipment, and accessories that affect safe operations are in proper operating condition and free from defects. All defects shall be corrected before the vehicle is placed in service.

Ground Guides – No personnel shall use any motor vehicle, earthmoving, or compacting equipment having an obstructed view to the rear, unless:

- The vehicle has a reverse signal alarm distinguishable from the surrounding noise level; or
- The vehicle is backed up only when an observer signals that it is safe to do so.

Blocking – Heavy machinery, equipment, or parts thereof that are suspended or held aloft shall be substantially blocked to prevent falling or shifting before employees are permitted to work under or between them.

Noise – Control measures for noise are addressed in Section 4.9.

Traffic – Control measures for traffic are addressed in Section 8.17.

9.2.3.3 DISTURBANCE/HANDLING OF CONTAMINATED MATERIAL

Description of Tasks
After the contaminated soil is excavated from below the Site's surface, the material will be stockpiled, dried, and either transported offsite or relocated and backfilled on site.

Hazard Identification
The hazards associated with materials handling include contact of the contaminated material with project personnel, or cross contamination with other site soil.

Controls
Cross Contamination – Following excavation, contaminated soil stockpiles will be placed on a structure constructed to separate the material from the site soil and collect any groundwater leachate. The material shall be covered to prevent storm water erosion or migration of contaminants through storm water.

Air Monitoring – Air and particulate monitoring will be conducted during soil excavation activities to assess the potential for exposure to airborne COCs. If the results of air monitoring indicate the presence of organic vapors or particulates in a concentration causing concern, personnel will upgrade to Level C protection. Refer to Section 5.1, Air Monitoring, for a description of air monitoring requirements and action levels. A description of each level of personal protection is included in Section 4.0, Personal Protective Equipment.

Traffic – Control measures for traffic are addressed in Section 8.17.

9.2.4 DRILLING/SUBSURFACE INTRUSION ACTIVITIES

Description of Tasks
Site mobilization will include establishing excavation locations, determining the location of utilities and other installations, and establishing work areas. Mobilization will also include setting up equipment and establishing a temporary site office. A break area will be set up outside of regulated work areas. Mobilization may involve clearing areas for the SZ and CRZ. During this initial phase, project personnel will walk the site to confirm the existence of anticipated hazards and identify safety and health issues that may have arisen since the writing of this plan.

Hazard Identification
The primary physical hazards for this activity are associated with the use of soil boring and grouting equipment. The equipment is hydraulically powered and uses static force and dynamic percussion force to advance sampling and penetrating tubes.

Accidents can occur as a result of improperly placing the equipment on uneven or unstable terrain or failing to adequately secure the equipment prior to the start of operations. Overhead utility lines can create hazardous conditions if contacted by the equipment.

Underground installations such as electrical lines, conduit, and product lines pose a significant hazard if contacted.

Controls

Geoprobe and Drill Rig Safety Procedures - The operator of the equipment must possess required state or local licenses to perform such work. All members of the crew shall receive site-specific training prior to beginning work.

The operator is responsible for the safe operation of the rig, as well as the crew's adherence to the requirements of this HASP. The operator must ensure that all safety equipment is in proper condition and is properly used. The members of the crew must follow all instructions of the operator, wear all personal protective equipment, and be aware of all hazards and control procedures. The operator and crew must participate in the Daily Safety Meetings and be aware of all emergency procedures.

Equipment Inspection - Each day, prior to the start of work, the rig and associated equipment must be inspected by the operator. The following items must be inspected:

- Vehicle condition;
- Proper storage of equipment;
- Condition of all hydraulic lines;
- Fire extinguisher; and
- First aid kit.

Equipment Set Up - The drill rig must be properly blocked and leveled prior to raising the derrick. The wheels which remain on the ground must be chocked. The leveling jacks shall not be raised until the derrick is lowered. The rig shall be moved only after the derrick has been lowered.

All well sites will be inspected by the driller prior to the location of the rig to verify a stable surface exists. This is especially important in areas where soft, unstable terrain is common.

The drill rig must be properly blocked and leveled prior to raising the derrick. Blocking provides a more stable drilling structure by evenly distributing the weight of the rig. Proper blocking ensures that differential settling of the rig does not occur.

When the ground surface is soft or otherwise unstable, wooden blocks, at least 24" by 24" and 4" to 8" thick shall be placed between the jack swivels and the ground. The emergency brake shall be engaged, and the wheels that are on the ground shall be chocked.

Rules for Intrusive Activity - Before beginning any intrusive activity, the existence and location of underground pipe, conduit, electrical equipment, and other installations will be determined. This will be done, if possible, by contacting the appropriate client representative to mark the location of the lines. "Call Before You Dig" will verify the potential for encountering subsurface utilities. If the client's knowledge of the area is incomplete, an appropriate device, such as a magnetometer, will be used to locate the line.

Combustible gas readings of the general work area will be made regularly in areas where and/or during operations when the presence of flammable vapors or gases is suspected, such as during intrusive activities (see Section 5.1). Operations must be suspended and

corrective action taken if the airborne flammable concentration reaches 10% of the LEL in the immediate area (a one-foot radius) of the point of drilling, or near any other ignition sources.

Overhead Electrical Clearances - If equipment is operated in the vicinity of overhead power lines, the power to the lines must be shut off or the equipment must be positioned and blocked such that no part, including cables, can come within the minimum clearances as follows:

Nominal System Voltage	Minimum Required Clearance
0-50kV	10 feet
51-100kV	12 feet
101-200kV	15 feet
201-300kV	20 feet
301-500kV	25 feet
501-750kV	35 feet
751-1,000kV	45 feet

When the drill rig is in transit, with the boom lowered and no load, the equipment clearance must be at least 4 feet for voltages less than 50kV, 10 feet for voltages of 50 kV to 345 kV, and 16 feet for voltages above 345 kV.

Hoisting Operations - Drillers should never engage the rotary clutch without watching the rotary table, and ensuring it is clear of personnel and equipment.

Unless the drawworks is equipped with an automatic feed control, the brake should not be left unattended without first being tied down.

Drill pipe, auger strings or casing should be picked up slowly. Drill pipe should not be hoisted until the driller is sure that the pipe is latched in the elevator, or the derrickman has signaled that he may safely hoist the pipe.

During instances of unusual loading of the derrick or mast, such as when making an unusually hard pull, only the driller should be on the rig floor; no one else should be on the rig or derrick.

The brakes on the drawworks of the drill rig should be tested by the driller each day. The brakes should be thoroughly inspected by a competent individual each week.

A hoisting line with a load imposed should not be permitted to be in direct contact with any derrick member or stationary equipment, unless it has been specifically designed for line contact.

Workers should never stand near the borehole whenever any wire line device is being run.

Hoisting control stations should be kept clean and controls labeled as to their functions.

Catline Operations - Only experienced workers will be allowed to operate the cathead controls. The kill switch must be clearly labeled and operational prior to operation of the catline. The cathead area must be kept free of obstructions and entanglements.

The operator should not use more wraps than necessary to pick up the load. More than one layer of wrapping is not permitted.

Personnel should not stand near, step over, or go under a cable or catline which is under tension.

Employees rigging loads on catlines shall:

- Keep out from under the load;
- Keep fingers and feet where they will not be crushed;
- Be sure to signal clearly when the load is being picked;
- Use standard visual signals only and not depend on shouting to coworkers; and
- Make sure the load is properly rigged, since a sudden jerk in the catline will shift or drop the load.

Wire Rope - When two wires are broken or rust or corrosion is found adjacent to a socket or end fitting, the wire rope shall be removed from service or re-socketed. Special attention shall be given to the inspection of end fittings on boom support, pendants, and guy ropes.

Wire rope removed from service due to defects shall be cut up or plainly marked as being unfit for further use as rigging.

Wire rope clips attached with U-bolts shall have the U-bolts on the dead or short end of the rope; the clip nuts shall be re-tightened immediately after initial load carrying use and at frequent intervals thereafter.

When a wedge socket fastening is used, the dead or short end of the wire rope shall have a clip attached to it or looped back and secured to itself by a clip; the clip shall not be attached directly to the live end.

Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

Except for eye splices in the ends of wires and for endless wire rope slings, wire rope used in hoisting, lowering, or pulling loads, shall consist of one continuous piece without knot or splice.

An eye splice made in any wire rope shall have not less that five full tucks.

Wire rope shall not be secured by knots. Wire rope clips shall not be used to splice rope.

Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire clips or knots.

Pipe/Auger Handling - Pipe and auger sections shall be transported by cart or carried by two persons. Individuals should not carry auger or pipe sections without assistance.

Workers should not be permitted on top of the load during loading, unloading, or transferring of pipe or rolling stock.

Employees should be instructed never to try to stop rolling pipe or casing; they should be instructed to stand clear of rolling pipe.

Slip handles should be used to lift and move slips. Employees are not permitted to kick slips into position.

When pipe is being hoisted, personnel should not stand where the bottom end of the pipe could whip and strike them.

Pipe and augers stored in racks, catwalks or on flatbed trucks should be secured to prevent rolling.

9.2.5 SUBSURFACE CHEMICAL SAMPLE COLLECTION/ANALYSIS

Description of Tasks
This sub-task consists of the collection of soil samples for subsequent field and laboratory analysis. The physical hazards of soil sampling are primarily associated with the sample collection methods, procedures utilized, and the environment itself.

Hazard Identification
Incidental contact with COCs is the primary hazard associated with sampling the stabilized material. This contact may occur through the manipulation of sample media and equipment, manual transfer of media into sample containers, and proximity of operations to the breathing zone. The primary hazards associated with these sampling procedures are not potentially serious; however, other operations in the area, or the conditions under which samples must be collected, may present chemical and physical hazards. The hazards directly associated with sampling procedures are generally limited to strains/sprains and potential eye hazards. Potential chemical hazards may include contact with media containing site COCs and potential contact with chemicals used for equipment decontamination.

Controls
PPE – To control dermal exposure during sampling activities, a minimum of Level D protection will be worn. If necessary, based on field observations and site conditions, air monitoring may be conducted during sediment sampling activities. If the results of air monitoring indicate the presence of airborne contaminants in a concentration causing concern, personnel will upgrade to Level C protection. Refer to Section 5.1, Air Monitoring, for a description of air monitoring requirements and action levels. A description of each level of personal protection is included in Section 4.0, Personal Protective Equipment.

9.2.6 UST CLOSURE

9.2.6.1 WORKING IN CONFINED SPACES

Description of Tasks
Working in confined spaces in not anticipated for this project.

Hazard Identification

Hazard identification such as the entrance into confined spaces will be evaluated if necessary.

Controls
All personnel required to enter into confined or enclosed spaces must be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of required protective and emergency equipment. The PO shall comply with all specific regulations that apply to work in dangerous or potentially dangerous areas.

9.2.6.2 WORKING WITH COMPRESSED AIR

Description of Tasks
The proposed method of purging the USTs includes the injection of compressed gas into the tank and attached piping network.

Hazard Identification
Uncontrolled release of the highly pressured air can cause injury to FP during this task. Cylinders must also be properly managed to ensure they are not compromised during storage and/or use.

Controls
Pressure Regulation – Compressed air used for cleaning purposes shall be reduced to less than 30 pounds per square inch and then only with effective chip guarding and personal protective equipment.

Cylinder Storage – Valve protection caps shall be in place and secured when compressed gas cylinders are transported, moved, or stored. Cylinder valves shall be closed when work is finished and when cylinders are empty or are moved. Compressed gas cylinders shall be secured in an upright position at all times, except if necessary for short periods of time when cylinders are actually being hoisted or carried. Cylinders shall be placed in a location where they cannot become part of an electrical circuit.

9.2.7 DECONTAMINATION

All equipment will be decontaminated before leaving the site. Personnel involved in decontamination activities may be inadvertently exposed to skin contact with contaminated materials and chemicals brought from the EZ. Personnel involved in decontamination activities must wear PPE that is, at a minimum, one level below the level worn by personnel working in the EZ.

9.2.8 DEMOBILIZATION

Demobilization involves the removal of all tools, equipment, supplies, and vehicles brought to the site. The hazards of this phase of activity are associated with heavy equipment operation and manual materials handling.

Manual materials handling may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion, and laceration hazards. Heavy equipment operation presents noise and vibration hazards, and hot surfaces, to operators. Personnel in the vicinity of heavy equipment operation may be exposed to physical hazards resulting in fractures, contusions, and lacerations and may be exposed to high noise levels. The work area presents slip, trip, and fall hazards from scattered debris and irregular walking

surfaces. Rainy weather may cause wet, muddy, slick walking surfaces, and unstable soil. Freezing weather hazards include frozen, slick, and irregular walking surfaces.

Environmental hazards include plants, such as poison ivy and poison oak; aggressive fauna, such as ticks, fleas, mosquitoes, wasps, spiders, and snakes; weather, such as sunburn, lightning, rain, and heat-or cold-related illnesses; and pathogens, such as rabies, Lyme disease, and blood-borne pathogens.

Control procedures for these hazards are discussed in Section 8.0, General Safety Practices.

9.3 CHEMICAL HAZARDS

The chemical hazards associated with site operations are related to inhalation, ingestion, and skin exposure to site COCs. Concentrations of airborne COCs during site tasks may be measurable and will require air monitoring during certain operations. Air monitoring requirements for site tasks are outlined in Section 5.1. COCs at the site include VOCs, SVOCs, metals, PCBs, pesticides, and PFAS.

The potential for inhalation of site COCs is low. The potential for dermal contact with soils containing site COCs during remedial operations is moderate. Table 6 lists the primary contaminants that have been identified at the Site and the media in which they are present.

Table 6 – List of Primary Contaminants

Media: Soil		
Pesticides	**Maximum Concentration (mg/kg)**	**Applicable Monitoring Instrument**
4,4-DDE	0.00409	Not Applicable
4,4-DDT	0.00792	Not Applicable
PFAS	**Maximum Concentration (mg/kg)**	**Applicable Monitoring Instrument**
PFOS	0.00172	Not Applicable
PFOA	0.00102	Not Applicable
SVOCs	**Maximum Concentration (mg/kg)**	**Applicable Monitoring Instrument**
3-Methylphenol/ 4-Methylphenol	0.53	PID
Benzo(a)anthracene	25	PID
Benzo(a)pyrene	18	PID
Benzo(b)fluoranthene	19	PID
Benzo(k)fluoranthene	6.4	PID
Chrysene	23	PID
Dibenzo(a,h)anthracene	2.3	PID
Dibenzofuran	8.5	PID
Indeno(1,2,3-cd)rene	8.5	PID

Total Metals	Maximum Concentration (mg/kg)	Applicable Monitoring Instrument
Arsenic, Total	63.5	Not Applicable
Barium, Total	387	Not Applicable
Copper, Total	155	Not Applicable
Lead, Total	1,640	Not Applicable
Mercury, Total	1.22	Not Applicable
Zinc, Total	694	Not Applicable
VOCs	**Maximum Concentration (mg/kg)**	**Applicable Monitoring Instrument**
1,2,4-Trimethylbenzene	27	PID
1,3,5-Trimethylbenzene	11	PID
Methylene Chloride	0.16	PID
Naphthalene	2,500	PID
Xylenes, Total	22	PID
Media: Groundwater		
PFAS	**Maximum Concentration (ug/L)**	**Applicable Monitoring Instrument**
PFOS	0.024	Not Applicable
PFOA	0.0413	Not Applicable
SVOCs	**Maximum Concentration (ug/L)**	**Applicable Monitoring Instrument**
Phenol	5	Not Applicable
Metals	**Maximum Concentration (ug/L)**	**Applicable Monitoring Instrument**
Iron, total	3,100	Not Applicable
Magnesium, total	51,500	Not Applicable
Manganese, total	706.2	Not Applicable
Sodium, total	60,800	Not Applicable
Media: Soil Vapor		
VOCs	**Maximum Concentration (ug/m^3)**	**Applicable Monitoring Instrument**
1,2,4-trimethylbenzene	1,140	PID

10.0 EMERGENCY PROCEDURES

10.1 GENERAL

Prior to the start of operations, the work area will be evaluated for the potential for fire, contaminant release, or other catastrophic event. Unusual conditions or events, activities,

chemicals, and conditions will be reported to the FS/SSO immediately.

The FS/SSO will establish evacuation routes and assembly areas for the site. All personnel entering the site will be informed of this route and the assembly area.

10.2 EMERGENCY RESPONSE

If an incident occurs, the following steps will be taken:

- The FS/SSO will evaluate the incident and assess the need for assistance and/or evacuation;
- The FS/SSO will call for outside assistance as needed;
- The FS/SSO will ensure the PM is notified promptly of the incident; and
- The FS/SSO will take appropriate measures to stabilize the incident scene.

10.2.1 FIRE

In the case of a fire at the site, the FS/SSO will assess the situation and direct fire-fighting activities. The FS/SSO will ensure that the PM is immediately notified of any fires. Site personnel will attempt to extinguish the fire with available extinguishers, if safe to do so. In the event of a fire that site personnel are unable to safely extinguish with one fire extinguisher, the local fire department will be summoned.

10.2.2 CONTAMINANT RELEASE

In the event of a contaminant release, the following steps will be taken:

- Notify FS/SSO immediately;
- Evacuate immediate area of release;
- Conduct air monitoring to determine needed level of PPE; and
- Don required level of PPE and prepare to implement control procedures.

The FS/SSO has the authority to commit resources as needed to contain and control released material and to prevent its spread to off-site areas.

10.3 MEDICAL EMERGENCY

All employee injuries must be promptly reported to the SSO/FS, who will:

- Ensure that the injured employee receives prompt first aid and medical attention;
- In emergency situations, the worker is to be transported by appropriate means to the nearest urgent care facility (normally a hospital emergency room); and
- If the injured person is a SESI employee, notify SESI at 973-808-9050.

10.3.1 EMERGENCY CARE STEPS

Survey the scene. Determine if it is safe to proceed. Try to determine if the conditions that caused the incident are still a threat. Protect yourself from exposure before attempting to rescue the victim.

- Do a primary survey of the victim. Check for airway obstruction, breathing, and pulse. Assess likely routes of chemical exposure by examining the eyes, mouth, nose, and skin of the victim for symptoms.

- Phone Emergency Medical Services (EMS). Give the location, telephone number used, caller's name, what happened, number of victims, victim's condition, and help being given.
- Maintain airway and perform rescue breathing as necessary.
- Perform CPR as necessary.
- Do a secondary survey of the victim. Check vital signs and do a head-to-toe exam.

Treat other conditions as necessary. If the victim can be moved, take him/her to a location away from the work area where EMS can gain access.

10.4 FIRST AID - GENERAL

All persons must report any injury or illness to their immediate supervisor or the FS. Trained personnel will provide first aid. Injuries and illnesses requiring medical treatment must be documented. The FS and SSO must fill out an accident/incident report as soon as emergency conditions no longer exist and first aid and/or medical treatment has been ensured. The report must be completed and submitted to the PM within 24 hours after the incident.

If first-aid treatment is required, first aid kits are kept at the CRZ. If treatment beyond first aid is required, the injured person(s) should be transported to the medical facility. If the injured person is not ambulatory or shows any sign of not being in a comfortable and stable condition for transport, then an ambulance/paramedics should be summoned. If there is any doubt as to the injured worker's condition, it is best to let the local paramedic or ambulance service examine and transport the worker.

10.4.1 FIRST AID - INHALATION

Any employee complaining of symptoms of chemical overexposure as described in Section 4, General Site Safety Procedures, will be removed from the work area and transported to the designated medical facility for examination and treatment.

10.4.2 FIRST AID - INGESTION

Call EMS and consult a poison control center for advice. If available, refer to the MSDS for treatment information. If the victim is unconscious, keep them on their side and clear the airway if vomiting occurs.

10.4.3 FIRST AID - SKIN CONTACT

Project personnel who have had skin contact with contaminants will, unless the contact is severe, proceed through the CRZ, to the wash area. Personnel will remove any contaminated clothing, and then flush the affected area with water for at least 15 minutes. The worker should be transported to the medical facility if he/she shows any sign of skin reddening, irritation, or if he/she requests a medical examination.

10.4.4 FIRST AID - EYE CONTACT

Project personnel who have had contaminants splashed in their eyes or who have experienced eye irritation while in the EZ, must immediately proceed to the eyewash station in the CRZ. Do not decontaminate prior to using the eyewash. Remove whatever protective clothing is necessary to use the eyewash. Flush the eye with clean running water for at least 15 minutes. Arrange prompt transport to the designated medical facility.

10.5 REPORTING INJURIES, ILLNESSES, AND SAFETY INCIDENTS

Injuries and illnesses, however minor, will be reported to the FS immediately. The FS will complete an injury report and submit it to the HSM, and the PM by end of shift.

10.6 EMERGENCY INFORMATION

The means to summon local public response agencies such as police, fire, and ambulance will be reviewed in the daily safety meeting. These agencies are identified in **Table 7** below.

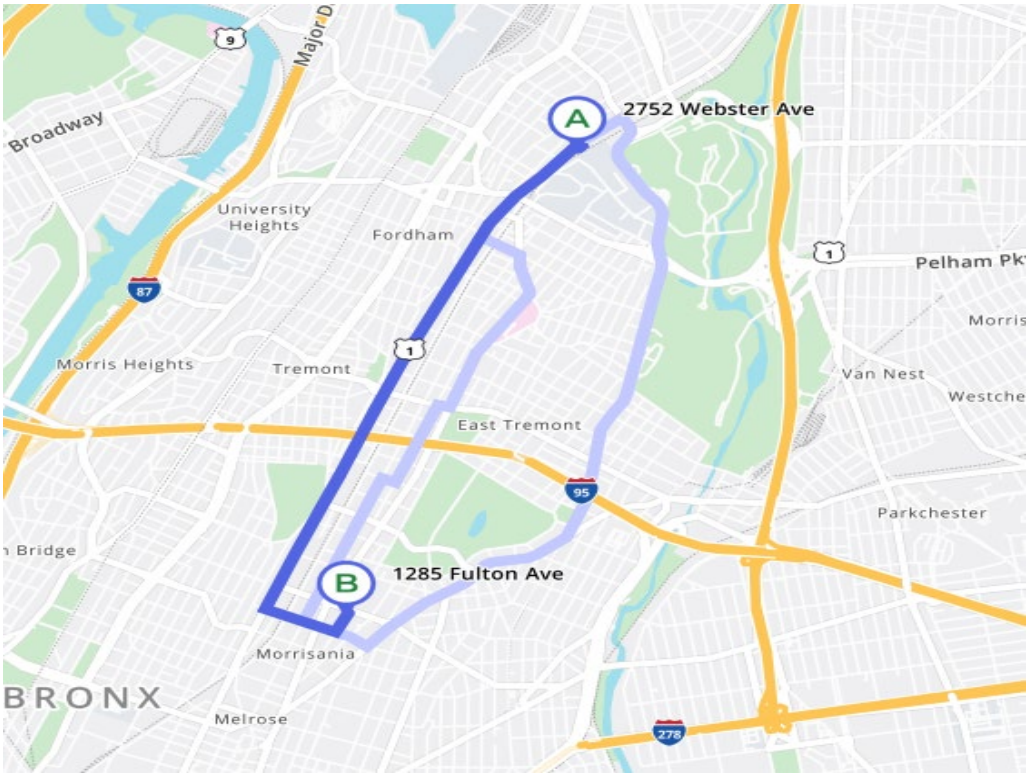
Table 7 – Emergency Contacts

Local Emergency Contacts	**Telephone No.**
EMERGENCY	911
Montefiore New Rochelle Hospital	(914) 632-5000
Police Emergency	911
Fire Emergency	911
Rescue Squad	911
Ambulance	911
Miscellaneous Contacts	**Telephone No.**
N.Y. Poison Control Center	(800) 222-1222
National Response Center and Terrorist Hotline	(800) 424-8802
Center for Disease Control	(800) 311-3435
Utility Mark-Out	(800) 962-7962

10.6.1 DIRECTIONS TO HOSPITAL

BronxCare Health System
1285 Fulton Avenue, Bronx NY
(718) 518-3700

Fig-1: Directions to Hospital


A
2752 Webster Ave
B
1285 Fulton Ave
Broadway
University Heights
Fordham
Morris Heights
Tremont
East Tremont
Pelham Pk
Van Nest
Parkchester
Morrisania
Melrose
BRONX
9
87
1
95
278

18 min (3.05 miles)

via **US-1 and Webster Ave**

Start
2752 Webster Ave

Head toward Webster Ave.
Go for 197 ft.

Turn left onto Webster Ave.
Go for 2.3 mi.

Turn left onto E 170th St.
Go for 0.2 mi.

Turn right onto 3rd Ave.
Go for 0.3 mi.

Turn left onto E 168th St.
Go for 397 ft.

Turn left onto Fulton Ave.
Go for 0.1 mi.

End at
1285 Fulton Ave
Bronx, New York 10456-0580

11.0 LOGS, REPORTS, AND RECORD KEEPING

The following is a summary of required health and safety logs, reports, and record keeping for the operations at the subject site.

11.1 HASP FIELD CHANGE REQUEST

To be completed for initiating a change to the HASP. PM approval is required. The original will be kept in the project file (See Attachment 3).

11.2 MEDICAL AND TRAINING RECORDS

The HSM must obtain and keep a log of personnel meeting appropriate training and medical qualifications for the site work. The log will be kept in the project file. Each company's Human Resources Department will maintain medical records, in accordance with 29 CFR 1910.1020.

11.3 EXPOSURE RECORDS

Any personnel monitoring results, laboratory reports, calculations, and air sampling data sheets are part of an employee exposure record. These records will be kept in accordance with 29 CFR 1910.1020. For SESI employees, the originals will be sent to the Human Resources Manager. For subcontractor employees, the original file will be sent to the subcontractor employer with a copy maintained in the SESI project file.

11.4 ACCIDENT/INCIDENT REPORT

Any accident/incident reports must be completed following procedures given in Section 10.5 of this HASP. The originals will be sent to the HSM for maintenance. A copy of the forms will be kept in the project file. (See Attachment 4)

11.5 OSHA FORM 200

An OSHA Form 200 (Log of Occupational Injuries and Illnesses) will be kept at the project site. All recordable injuries or illnesses will be recorded on this form. At the end of the project, the original will be sent to the Human Resources Manager for maintenance. Subcontractor employees must also meet the requirements of maintaining an OSHA 200 Form. The accident/incident report meets the requirements of the OSHA Form 101 (Supplemental Record), which must be maintained with the OSHA Form 200 for all recordable injuries or illnesses.

11.6 ON-SITE HEALTH AND SAFETY FIELD LOGBOOKS

The HSM or designee will maintain an on-site health and safety log book in which daily Site conditions, activities, personnel, and significant events will be recorded. Calibration records and personnel monitoring results, if available, will also be recorded in the field logbook. The original logbook will be kept in the project file.

Whenever any personnel monitoring is conducted onsite, the monitoring results will be noted in the filed logbook. These will become part of the exposure records file and will be maintained by the HSM.

A signatory page is included (See Attachment 5) and is to be signed by those working on and/or visiting the site.

11.7 SAFETY DATA SHEETS

Safety Data Sheets (SDS) will be obtained and kept on file at the project site for each hazardous chemical brought to, use, or stored at the Site (See Attachment 6).

12.0 COVID-19 RESPONSE ACTION PLAN

SESI is concerned with the safety and well-being of its employees, vendors, subcontractors, and others with access to its offices and job sites, with particular emphasis on the unique challenges posed by COVID-19.

SESI has established the following protocols in keeping with the recommendations of the CDC and other sources including State Governor Executive Orders for work taking place on construction sites.

We request that all SESI employees, vendors, and subcontractors help with our prevention efforts while at work.

In order to minimize the spread of COVID-19, we must all cooperate in doing the following:

- Frequently wash your hands with soap and water for at least 20 seconds. When soap and running water are unavailable, use an alcohol-based hand rub with at least 60% alcohol. Always wash hands that are visibly soiled.
- Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow.
- Discourage handshaking, avoid touching your eyes, nose, or mouth with unwashed hands.
- Limit the sharing of tools, machinery, equipment, phones, desks, and computers.
- Wear cloth face coverings on all construction sites.
- Avoid close contact with people who are sick.
- Employees who have symptoms (i.e., fever, cough, or shortness of breath) should notify their supervisor and stay home—DO NOT GO TO WORK.
- Sick employees should follow CDC-recommended steps. Employees should not return to work until the criteria to discontinue home isolation are met, in consultation with healthcare providers and state and local health departments.

The following are the specific jobsite protocols and response actions to be taken in the event someone on site has been in contact with, or has themselves, the COVID-19 virus:

OFFICE/JOBSITE PROTOCOL

- If an employee/worker exhibits COVID-19 symptoms, the employee/worker must remain at home until he or she is symptom free for 72 hours (3 full days) without the use of fever-reducing or other symptom-altering medicines (e.g. acetaminophen, cough suppressants). SESI will similarly require an employee or worker that reports to work with symptoms to return home until they are symptom free for 72 hours (3 full days).
- Limit person to person contact, and when unavoidable, maintain CDC distancing guidelines.
- Avoid eating lunch in groups.
- Avoid in-person meetings if possible. If an in-person meeting is necessary, conduct it in a well-ventilated area with enough space for attendees to distance themselves from one another. Field jobsite meetings should be conducted in smaller group meetings (no more than 5 persons when possible) versus one large meeting.
- Only workers necessary to the execution of the work should be at the jobsites. No non-essential visitors should be permitted at the worksite.

RESPONSE ACTION TRIGGER EVENTS:

- an employee/worker at work has tested positive for COVID-19
- an employee/worker at work has suspected, but unconfirmed, case of COVID-19
- an employee/worker self-reported that they came in contact with someone who had a presumptive positive case of COVID-19
- an employee/worker has been exposed to the virus but only found out after they have interacted with others

RESPONSE ACTIONS:

- Upon occurrence of any of the Trigger Events above, employees/subcontractors shall notify SESI Management about the suspected employee/worker infected with, or exposed to, COVID-19.
- SESI Management will investigate the incident to confirm the report is valid.
- Employees/Subcontractors shall investigate their respective infected employee(s) and report the following to SESI Management and HR:
    - Identify all individuals who worked in proximity (six feet) of the infected employee/worker,
    - Employee(s)/Worker(s) infected with the COVID-19 virus, and employee(s)/worker(s) that came in contact with the infected employee/worker shall be sent home for a period of 14 days,
    - Do not identify the infected employee/worker by name to avoid violation of privacy/confidentiality laws, and,
    - Keep SESI Management informed of progress and updates.

- If an infected person was in the office, SESI will clean and disinfect common areas and surfaces, in accordance with CDC recommendations.
- SESI Management will notify affected employees/workers of the Trigger Event and instruct them to take the response actions above.

- SESI Management policy requires written documentation from a health care professional, that confirmed infected employees can return to work.

Except for circumstances in which SESI is legally required to report workplace occurrences of communicable disease, the confidentiality of all medical conditions will be maintained in accordance with applicable law and to the extent practical under the circumstances. When required, the number of persons who will be informed of an employee's/worker's condition will be kept at the minimum needed to appropriately notify other potentially affected employees/workers of Trigger Events and to attempt to minimize the potential for transmission of the virus.

Attachment 1:
Air Monitor Log

Air Monitoring: Sample Collection and Analysis

Date & Time of Monitoring	Task / Operation Being	Substance(s)/ Hazard(s) Being	Monitoring Location	Type/Method of Monitoring	Monitoring Results	Exposure Limits	Required Action

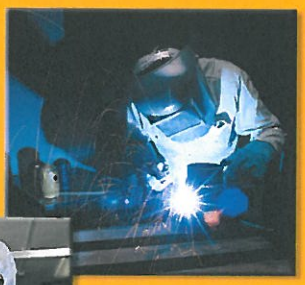
Attachment 2:
OSHA Poster

Job Safety and Health

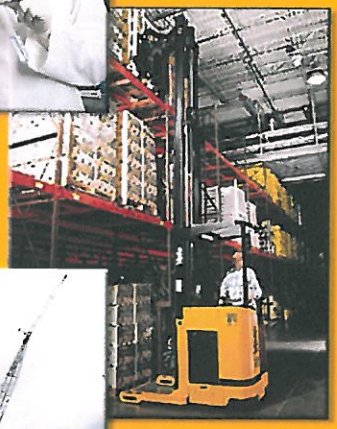
It's the law!

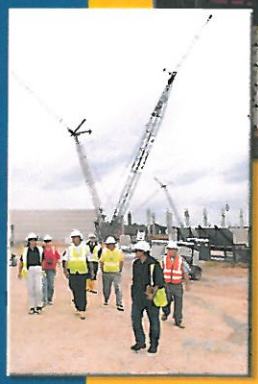
OSHA®

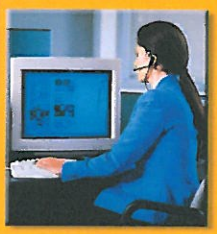
Occupational Safety and Health Administration
U.S. Department of Labor











EMPLOYEES:

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.
- You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have the right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violations.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records and records of your exposures to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.
- You must comply with all occupational safety and health standards issued under the *OSH Act* that apply to your own actions and conduct on the job.

EMPLOYERS:

- You must furnish your employees a place of employment free from recognized hazards.
- You must comply with the occupational safety and health standards issued under the *OSH Act*.

This free poster available from OSHA –
The Best Resource for Safety and Health

Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

1-800-321-OSHA (6742)
www.osha.gov

OSHA 3165-02 2012R

Attachment 3:
Field Change Request Form

HEALTH & SAFETY PLAN
CHANGE NOTICE

Pages _____ of _____

Project: H&S-CN

1) HASP VERSION: _____ SECTION: _____ PAGE (s): _____

RE: --- Change to existing HASP Anticipated Revision Date: _____
--- Addition to existing HASP
--- Other: _____
_____CONT._____

2) PROPOSED CHANGE: _____
_____
_____
_____

3) REASON FOR PROPOSED CHANGE(s):
--- Required by SPEC or Change Order --- Other: _____
--- Disposition of Deficiency _____CONT._____
--- Change in Regulatory or Other Requirements
--- Operational Experience

4) EXHIBITS ATTACHED ____ NO ____ YES (If YES, describe) _____
_____CONT._____

5) PMK APPROVALS PROJECT MANAGER: _____ Date: _____
SITE MANAGER: _____ Date: _____
H&S MANAGER: _____ Date: _____

Client Approval Required: ____ NO ____ YES (If YES, date submitted) _____

6) CLIENT APPROVAL _____ APPROVED _____ REMANDED _____ REJECTED

Comments: _____
_____
_____ CONT._____

Client Representative: _____Date: _____

7) DISTRIBUTION AFTER APPROVAL

X HASP UPDATE LIST --- OTHER: _____
X CLIENT _____
X PROJECT FILES _____

8) PREPARED BY: _____Date: _____
Title: _____

Attachment 4:

Injury Report Form

OSHA's Form 301
Injury and Illness Incident Report

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

This *Injury and Illness Incident Report* is one of the first forms you must fill out when a recordable work-related injury or illness has occurred. Together with the *Log of Work-Related Injuries and Illnesses* and the accompanying *Summary*, these forms help the employer and OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the information asked for on this form.

According to Public Law 91-596 and 29 CFR 1904, OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains.

If you need additional copies of this form, you may photocopy and use as many as you need.

Completed by _____

Title _____

Phone (_____)_____-_____ Date ___/___/___

Information about the employee

1) Full name _____

2) Street _____

City _____ State _____ ZIP _____

3) Date of birth ___/___/___

4) Date hired ___/___/___

5) ☐ Male
☐ Female

Information about the physician or other health care professional

6) Name of physician or other health care professional _____

_____

7) If treatment was given away from the worksite, where was it given?

Facility _____

Street _____

City _____ State _____ ZIP _____

8) Was employee treated in an emergency room?
☐ Yes
☐ No

9) Was employee hospitalized overnight as an in-patient?
☐ Yes
☐ No

Information about the case

10) Case number from the *Log* _____ *(Transfer the case number from the Log after you record the case.)*

11) Date of injury or illness ___/___/___

12) Time employee began work _____ AM / PM

13) Time of event _____ AM / PM ☐ Check if time cannot be determined

14) ***What was the employee doing just before the incident occurred?*** Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific. *Examples:* "climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."

15) ***What happened?*** Tell us how the injury occurred. *Examples:* "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."

16) ***What was the injury or illness?*** Tell us the part of the body that was affected and how it was affected; be more specific than "hurt," "pain," or sore." *Examples:* "strained back"; "chemical burn, hand"; "carpal tunnel syndrome."

17) ***What object or substance directly harmed the employee?*** *Examples:* "concrete floor"; "chlorine"; "radial arm saw." *If this question does not apply to the incident, leave it blank.*

18) ***If the employee died, when did death occur?*** Date of death ___/___/___

Public reporting burden for this collection of information is estimated to average 22 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Persons are not required to respond to the collection of information unless it displays a current valid OMB control number. If you have any comments about this estimate or any other aspects of this data collection, including suggestions for reducing this burden, contact: US Department of Labor, OSHA Office of Statistical Analysis, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

OSHA's Form 300 (Rev. 01/2004)

Log of Work-Related Injuries and Illnesses

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

Year 20__ __

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

You must record information about every work-related death and about every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid. You must also record significant work-related injuries and illnesses that are diagnosed by a physician or licensed health care professional. You must also record work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR Part 1904.8 through 1904.12. Feel free to use two lines for a single case if you need to. You must complete an Injury and Illness Incident Report (OSHA Form 301) or equivalent form for each injury or illness recorded on this form. If you're not sure whether a case is recordable, call your local OSHA office for help.

Establishment name _____

City _____ State _____

Identify the person			Describe the case			Classify the case (CHECK ONLY ONE box for each case based on the most serious outcome for that case:)				Enter the number of days the injured or ill worker was:		Check the "Injury" column or choose one type of illness:					
								Remained at Work				(M)					
(A) Case no.	(B) Employee's name	(C) Job title (*e.g., Welder*)	(D) Date of injury or onset of illness	(E) Where the event occurred (*e.g., Loading dock north end*)	(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (*e.g., Second degree burns on right forearm from acetylene torch*)	Death (G)	Days away from work (H)	Job transfer or restriction (I)	Other recordable cases (J)	Away from work (K)	On job transfer or restriction (L)	Injury (1)	Skin disorder (2)	Respiratory condition (3)	Poisoning (4)	Hearing loss (5)	All other illnesses (6)
____			__/__ month/day			☐	☐	☐	☐	____ days	____ days	☐	☐	☐	☐	☐	☐
____			__/__ month/day			☐	☐	☐	☐	____ days	____ days	☐	☐	☐	☐	☐	☐
____			__/__ month/day			☐	☐	☐	☐	____ days	____ days	☐	☐	☐	☐	☐	☐
____			__/__ month/day			☐	☐	☐	☐	____ days	____ days	☐	☐	☐	☐	☐	☐
____			__/__ month/day			☐	☐	☐	☐	____ days	____ days	☐	☐	☐	☐	☐	☐
____			__/__ month/day			☐	☐	☐	☐	____ days	____ days	☐	☐	☐	☐	☐	☐
____			__/__ month/day			☐	☐	☐	☐	____ days	____ days	☐	☐	☐	☐	☐	☐
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____			__/__ month/day			☐	☐	☐	☐	____ days	____ days	☐	☐	☐	☐	☐	☐
____			__/__ month/day			☐	☐	☐	☐	____ days	____ days	☐	☐	☐	☐	☐	☐
____			__/__ month/day			☐	☐	☐	☐	____ days	____ days	☐	☐	☐	☐	☐	☐
____			__/__ month/day			☐	☐	☐	☐	____ days	____ days	☐	☐	☐	☐	☐	☐
Page totals ➤						____	____	____	____	____	____	____	____	____	____	____	____

Be sure to transfer these totals to the Summary page (Form 300A) before you post it.

Public reporting burden for this collection of information is estimated to average 14 minutes per response, including time to review the instructions, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any other aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistical Analysis, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

Injury (1) Skin disorder (2) Respiratory condition (3) Poisoning (4) Hearing loss (5) All other illnesses (6)

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year 20__ __

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no work-related injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete and accurate before completing this summary.

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the Log. If you had no cases, write "0."

Employees, former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR Part 1904.35, in OSHA's recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
_____	_____	_____	_____
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
_____	_____
(K)	(L)

Injury and Illness Types

Total number of . . .	(M)		
(1) Injuries	_____	(4) Poisonings	_____
		(5) Hearing loss	_____
(2) Skin disorders	_____	(6) All other illnesses	_____
(3) Respiratory conditions	_____		

Post this Summary page from February 1 to April 30 of the year following the year covered by the form.

Public reporting burden for this collection of information is estimated to average 58 minutes per response, including time to review the instructions, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any other aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistical Analysis, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

Establishment information

Your establishment name _____

Street _____

City _____ State _____ ZIP _____

Industry description (*e.g., Manufacture of motor truck trailers*)

_____

Standard Industrial Classification (SIC), if known (*e.g., 3715*)

__ __ __ __

OR

North American Industrial Classification (NAICS), if known (e.g., 336212)

__ __ __ __ __ __

Employment information *(If you don't have these figures, see the Worksheet on the back of this page to estimate.)*

Annual average number of employees _____

Total hours worked by all employees last year _____

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

_____ _____
Company executive Title

( ) - / /
Phone Date

Attachment 5:
Signatory Page

Attachment 5 – Site-Specific Health and Safety Orientation Signatory Page
HEALTH AND SAFETY PLAN

Title	Name	Signature
Project Manager:	TBD	
Health and Safety Manager:	TBD	

I have read the attached Health and Safety Plan (HASP) and have received site-specific information and orientation regarding the identified physical, chemical, and biological hazards anticipated at this site. My signature certifies that I understand the procedures, equipment, and restrictions applicable to this project site and agree to abide by them.

Signature	Printed Name	Company	Date

Attachment 5– Health and Safety Orientation Signatory Page (continued)

Signature	Printed Name	Company	Date

Attachment 6:

Safety Data Sheets

SAFETY DATA SHEET

Version 6.0
Revision Date 05/25/2018
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,2,4-Trichlorobenzene

Product Number : 296104
Brand : Sigma-Aldrich
Index-No. : 602-087-00-6

CAS-No. : 120-82-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302

Skin irritation (Category 2), H315

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H315 Causes skin irritation.

H400	Very toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Molecular weight	:	181.45 g/mol
CAS-No.	:	120-82-1
EC-No.	:	204-428-0
Index-No.	:	602-087-00-6

Hazardous components

Component	Classification	Concentration
1,2,4-Trichlorobenzene		
	Acute Tox. 4; Skin Irrit. 2; Aquatic Acute 1; Aquatic Chronic 2; H302, H315, H400, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

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
Soak up with inert absorbent material and dispose of as hazardous waste. 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 inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,2,4-Trichlorobenzene	120-82-1	C	5 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Eye irritation		

		C	5 ppm 40 mg/m3	USA. NIOSH Recommended Exposure Limits
		C	5 ppm 40 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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 respirator with multi-purpose combination (US) or type ABEK (EN 14387) 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).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	16.0 °C (60.8 °F)

f)	Initial boiling point and boiling range	214.0 °C (417.2 °F)
g)	Flash point	110.0 °C (230.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 6.6 %(V) Lower explosion limit: 2.5 %(V)
k)	Vapour pressure	1.3 hPa at 40.0 °C (104.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.45 g/cm3
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	log Pow: 4.00
p)	Auto-ignition temperature	571.0 °C (1059.8 °F)
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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

LD50 Oral - Rat - 756.0 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Convulsions or effect on seizure threshold.
Inhalation: No data available

Inhalation: No data available
Dermal: No data available

LD50 Dermal - Rat - 6,139 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Convulsions or effect on seizure threshold.
No data available
No data available

Skin corrosion/irritation
No data available

Skin - Rabbit
Result: Skin irritation

Serious eye damage/eye irritation
No data available
No data available

Respiratory or skin sensitisation
No data available
No data available

Germ cell mutagenicity

No data available
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available
No data available
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

Additional Information
RTECS: DC2100000

Nausea, Dizziness, Headache, Gastrointestinal disturbance, Liver injury may occur., Kidney injury may occur., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 1.32 mg/l - 96.0 h(1,2,4-Trichlorobenzene)
Toxicity to daphnia and	LC50 - Daphnia magna (Water flea) - 1.7 mg/l - 48 h(1,2,4-Trichlorobenzene)

other aquatic
invertebrates

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
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2321 Class: 6.1 Packing group: III
Proper shipping name: Trichlorobenzenes, liquid
Reportable Quantity (RQ) : 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 2321 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TRICHLOROBENZENES, LIQUID
Marine pollutant : yes

IATA
UN number: 2321 Class: 6.1 Packing group: III
Proper shipping name: Trichlorobenzenes, liquid

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,2,4-Trichlorobenzene	120-82-1	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,2,4-Trichlorobenzene	120-82-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,2,4-Trichlorobenzene	120-82-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,2,4-Trichlorobenzene	120-82-1	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H302	Harmful if swallowed.
H315	Causes skin irritation.
H400	Very toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956
Version: 6.0 Revision Date: 05/25/2018 Print Date: 06/28/2019

SAFETY DATA SHEET

Creation Date 01-Feb-2005 **Revision Date** 24-Dec-2021 **Revision Number** 5

1. Identification

Product Name **1,2,4-Trimethylbenzene**

Cat No. : **AC140090000; AC140090010; AC140090025; AC140090100; AC140090250**

CAS No 95-63-6
Synonyms Pseudocumene

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

Details of the supplier of the safety data sheet

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

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

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

2. Hazard(s) identification

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

Flammable liquids	Category 3
Acute Inhalation Toxicity - Vapors	Category 4
Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Warning

Hazard Statements

Flammable liquid and vapor
Causes skin irritation
Causes serious eye irritation
Harmful if inhaled
May cause respiratory irritation



Precautionary Statements
Prevention
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
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
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 if you feel unwell
Skin
If skin irritation occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Benzene, 1,2,4-trimethyl-	95-63-6	> 95

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water and drink afterwards plenty of water.
Most important symptoms and effects	Difficulty in breathing. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.
Unsuitable Extinguishing Media	No information available
Flash Point	48 °C / 118.4 °F
Method -	No information available
Autoignition Temperature	500 °C / 932 °F

Explosion Limits

Upper	6.4%
Lower	0.9%
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Flammable. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Vapors may form explosive mixtures with air.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	2	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges.
Environmental Precautions	Do not flush into surface water or sanitary sewer system.
Methods for Containment and Clean Up	Keep in suitable, closed containers for disposal. Soak up with inert absorbent material. Remove all sources of ignition. Take precautionary measures against static discharges. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Use spark-proof tools and explosion-proof equipment. Take precautionary measures against static discharges.

Storage. Keep away from heat, sparks and flame. Flammables area. Keep container tightly closed in a dry and well-ventilated place. Incompatible Materials. Oxidizing agent.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Benzene, 1,2,4-trimethyl-			TWA: 25 ppm TWA: 125 mg/m^3	

Legend

NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting equipment.

Personal Protective Equipment

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

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

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

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

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	aromatic
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-44 °C / -47.2 °F
Boiling Point/Range	168 °C / 334.4 °F @ 760 mmHg
Flash Point	48 °C / 118.4 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	6.4%
Lower	0.9%
Vapor Pressure	7 mmHg @ 44.4 °C
Vapor Density	4.15 (Air = 1.0)
Specific Gravity	0.880
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	500 °C / 932 °F

Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C9 H12
Molecular Weight	120.19

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability No information available.

Conditions to Avoid Keep away from open flames, hot surfaces and sources of ignition. Incompatible products.

Incompatible Materials Oxidizing agent

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Benzene, 1,2,4-trimethyl-	LD50 = 3280 mg/kg (Rat)	LD50 > 3160 mg/kg (Rabbit)	LC50 = 18 g/m³ (Rat) 4 h

Toxicologically Synergistic Products No information available

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

Irritation Irritating to eyes, respiratory system and skin

Sensitization No information available

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

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Benzene, 1,2,4-trimethyl-	95-63-6	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

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

12. Ecological information

Ecotoxicity

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

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Benzene, 1,2,4-trimethyl-	Not listed	LC50: 7.19 - 8.28 mg/L, 96h flow-through (Pimephales promelas)	Not listed	EC50: = 6.14 mg/L, 48h (Daphnia magna)

Persistence and Degradability Persistence is unlikely

Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Benzene, 1,2,4-trimethyl-	3.63

13. Disposal considerations

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

14. Transport information

DOT

UN-No UN1993
Proper Shipping Name Flammable liquid, n.o.s.
Technical Name Benzene, 1,2,4-trimethyl-
Hazard Class 3
Packing Group III

TDG

UN-No UN1993
Proper Shipping Name Flammable liquid, n.o.s.
Hazard Class 3
Packing Group III

IATA

UN-No UN1993
Proper Shipping Name Flammable liquid, n.o.s.
Hazard Class 3
Packing Group III

IMDG/IMO

UN-No UN1993
Proper Shipping Name Flammable liquid, n.o.s.
Hazard Class 3
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Benzene, 1,2,4-trimethyl-	95-63-6	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed

'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

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

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Benzene, 1,2,4-trimethyl-	95-63-6	X	-	202-436-9	X	X	X	X	X	KE-34410

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

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Benzene, 1,2,4-trimethyl-	95-63-6	> 95	1.0

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

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benzene, 1,2,4-trimethyl-	X	X	X	X	-

U.S. Department of Transportation

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

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

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Benzene, 1,2,4-trimethyl-	-	Use restricted. See item 75. (see link for restriction details)	-

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

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

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Benzene, 1,2,4-trimethyl-	95-63-6	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Benzene, 1,2,4-trimethyl-	95-63-6	Not applicable	Not applicable	Not applicable	Not applicable

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 01-Feb-2005
Revision Date 24-Dec-2021
Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

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

End of SDS

SAFETY DATA SHEET

Creation Date 25-Apr-2014 **Revision Date** 24-Dec-2021 **Revision Number** 7

1. Identification

Product Name **m-Cresol**

Cat No. : **AC110580000; AC110580010; AC110580025; AC110580100; AC110580250; AC110581000; AC110585000**

CAS No 108-39-4
Synonyms 3-Hydroxytoluene; 3-Methylphenol

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

Details of the supplier of the safety data sheet

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

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

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

2. Hazard(s) identification

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

Flammable liquids	Category 4
Acute oral toxicity	Category 3
Acute dermal toxicity	Category 3
Skin Corrosion/Irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
Combustible liquid
Causes severe skin burns and eye damage
May cause respiratory irritation
Toxic if swallowed or in contact with skin



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
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep cool
Response
Immediately call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
Wash contaminated clothing before reuse
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Ingestion
Rinse mouth
Do NOT induce vomiting
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS No	Weight %
m-Cresol	108-39-4	99

4. First-aid measures

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

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Immediate medical attention is required.

Inhalation Remove to fresh air. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required. If not breathing, give artificial respiration.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Most important symptoms and effects Difficulty in breathing. Causes burns by all exposure routes. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers. Water mist may be used to cool closed containers.

Unsuitable Extinguishing Media No information available

Flash Point 86 °C / 186.8 °F

Method - No information available

Autoignition Temperature 558 °C / 1036.4 °F

Explosion Limits

Upper	No data available
Lower	1 vol %
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Combustible material. Corrosive material. Risk of ignition. Containers may explode when heated. Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	2	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment as required. Remove all sources of ignition. Do not get in eyes, on skin, or on clothing. Take precautionary measures against static discharges.

Environmental Precautions Avoid release to the environment. See Section 12 for additional Ecological Information. Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Remove all sources of ignition. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Keep away from open flames, hot surfaces and sources of ignition. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks and flame. Protect from direct sunlight. Corrosives area. Incompatible Materials. Acids. Bases. Strong oxidizing agents. Acid anhydrides. Chloroformates.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
m-Cresol	TWA: 20 mg/m³ Skin		IDLH: 250 ppm TWA: 2.3 ppm TWA: 10 mg/m³	TWA: 20 mg/m³

Legend

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

Engineering Measures Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

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

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

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

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

9. Physical and chemical properties

Physical State	Liquid
Appearance	Clear
Odor	aromatic
Odor Threshold	No information available
pH	5 20 g/l water
Melting Point/Range	8 - 10 °C / 46.4 - 50 °F
Boiling Point/Range	203 °C / 397.4 °F @ 760 mmHg
Flash Point	86 °C / 186.8 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	1 vol %
Vapor Pressure	0.05 mbar @ 20 °C
Vapor Density	No information available
Specific Gravity	1.030
Solubility	20 g/l (20°C)

Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	558 °C / 1036.4 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C7 H8 O
Molecular Weight	108.14

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions. Light sensitive.

Conditions to Avoid Incompatible products. Exposure to light. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Acids, Bases, Strong oxidizing agents, Acid anhydrides, Chloroformates

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
m-Cresol	LD50 = 242 mg/kg (Rat)	LD50 = 2830 mg/kg (Rabbit)	LC50 > 710 mg/m³ (Rat) 1 h

Toxicologically Synergistic Products No information available

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

Irritation Causes burns by all exposure routes

Sensitization No information available

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

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
m-Cresol	108-39-4	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Product is a corrosive material. Use of gastric lavage or emesis is

contraindicated. Possible perforation of stomach or esophagus should be investigated

Endocrine Disruptor Information No information available

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

12. Ecological information

Ecotoxicity

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

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
m-Cresol	Not listed	LC50: = 8.9 mg/L, 96h flow-through (Oncorhynchus mykiss) LC50: 10 - 13.6 mg/L, 96h (Lepomis macrochirus) LC50: = 15.9 mg/L, 96h static (Brachydanio rerio) LC50: = 23.12 mg/L, 96h semi-static (Poecilia reticulata) LC50: = 55.9 mg/L, 96h flow-through (Pimephales promelas)	EC50 = 6.82 mg/L 5 min EC50 = 7.48 mg/L 15 min EC50 = 7.83 mg/L 30 min	LC50: = 18.8 mg/L, 48h (Daphnia magna)

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

Bioaccumulation/ Accumulation No information available.

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

Component	log Pow
m-Cresol	1.96

13. Disposal considerations

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

14. Transport information

DOT

UN-No	UN2076
Proper Shipping Name	CRESOLS, LIQUID
Hazard Class	6.1
Subsidiary Hazard Class	8
Packing Group	II

TDG

UN-No	UN2076
Proper Shipping Name	CRESOLS, LIQUID
Hazard Class	6.1
Subsidiary Hazard Class	8
Packing Group	II

IATA

UN-No	UN2076
Proper Shipping Name	CRESOLS, LIQUID
Hazard Class	6.1
Subsidiary Hazard Class	8
Packing Group	II

IMDG/IMO

UN-No	UN2076
Proper Shipping Name	CRESOLS, LIQUID
Hazard Class	6.1
Subsidiary Hazard Class	8
Packing Group	II

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
m-Cresol	108-39-4	X	ACTIVE	-

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

TSCA 12(b) - Notices of Export Not applicable

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

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
m-Cresol	108-39-4	X	-	203-577-9	X	X	X	X	X	KE-24793

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

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
m-Cresol	108-39-4	99	1.0

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

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
m-Cresol	X	-	-	-

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
m-Cresol	X		-

OSHA - Occupational Safety and Health Administration Not applicable

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

Component	Hazardous Substances RQs	CERCLA EHS RQs
m-Cresol	100 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
m-Cresol	X	X	X	X	-

U.S. Department of Transportation

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

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

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

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

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

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

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
m-Cresol	108-39-4	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
m-Cresol	108-39-4	Not applicable	Not applicable	Not applicable	Annex I - Y42

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 25-Apr-2014
Revision Date 24-Dec-2021
Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

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

materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Version 5.6
Revision Date 05/07/2018
Print Date 01/21/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 4,4′-DDT

Product Number : 31041
Brand : Sigma-Aldrich
Index-No. : 602-045-00-7

CAS-No. : 50-29-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 3), H311
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure, Oral (Category 1), H372
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 + H311 Toxic if swallowed or in contact with skin.
H351 Suspected of causing cancer.
H372 Causes damage to organs through prolonged or repeated exposure if swallowed.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and

	understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P281	Use personal protective equipment as required.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane
1,1-Bis(4-chlorophenyl)-2,2,2-trichloroethane

Formula : $C_{14}H_9Cl_5$
Molecular weight : 354.49 g/mol
CAS-No. : 50-29-3
EC-No. : 200-024-3
Index-No. : 602-045-00-7

Hazardous components

Component	Classification	Concentration
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane		
	Acute Tox. 3; Carc. 2; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H301 + H311, H351, H372, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting 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 vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

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.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	TWA	1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Confirmed animal carcinogen with unknown relevance to humans		

		TWA	0.5 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		TWA	1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		
		PEL	1 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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 N100 (US) or type P3 (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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: solid

b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 107 - 110 °C (225 - 230 °F) - lit.
f)	Initial boiling point and boiling range	260.0 °C (500.0 °F)
g)	Flash point	72.0 - 77.0 °C (161.6 - 170.6 °F)
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	0.0000021 hPa (0.0000016 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	0.99 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 6.91
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxidizing agents, Iron and iron salts.

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 87.0 mg/kg

Inhalation: No data available

LD50 Dermal - Rabbit - 300.0 mg/kg
Remarks: Behavioral:Tremor. Behavioral:Muscle weakness. Behavioral:Ataxia.

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Limited evidence of carcinogenicity in animal studies

IARC:	2A - Group 2A: Probably carcinogenic to humans (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)
IARC:	2A - Group 2A: Probably carcinogenic to humans (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)
NTP:	RAHC - Reasonably anticipated to be a human carcinogen (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)
NTP:	RAHC - Reasonably anticipated to be a human carcinogen (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.
	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Ingestion - Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: KJ3325000

CNS stimulation.

Pancreas. -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 0.01 mg/l - 96.0 h
	LC50 - Lepomis macrochirus (Bluegill) - 0.01 mg/l - 96.0 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.003400 mg/l - 96.0 h
	LOEC - Oncorhynchus mykiss (rainbow trout) - 150 mg/l - 3.0 d
	NOEC - Oncorhynchus mykiss (rainbow trout) - 113 mg/l - 3.0 d
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 0.00108 mg/l - 48 h
Toxicity to algae	LC100 - Scenedesmus quadricauda (Green algae) - > 20 mg/l - 7 d

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 20 d - 0.001 mg/l
	Bioconcentration factor (BCF): 46,670

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
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. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)
Reportable Quantity (RQ): 1 lbsMarine pollutant:yes
Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)
Marine pollutant:yes

IATA

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	2008-06-17
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	2008-06-17
WARNING! This product contains a chemical known to the State of California to cause cancer. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	2008-06-17
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	2008-06-17

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H301	Toxic if swallowed.
H301 + H311	Toxic if swallowed or in contact with skin.
H311	Toxic in contact with skin.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure if swallowed.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	2
Reactivity Hazard:	0

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.6 Revision Date: 05/07/2018 Print Date: 01/21/2019

SAFETY DATA SHEET

Version 5.6
Revision Date 05/07/2018
Print Date 06/22/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 4,4′-DDT

Product Number : 386340
Brand : Aldrich
Index-No. : 602-045-00-7

CAS-No. : 50-29-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 3), H311
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure, Oral (Category 1), H372
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 + H311 Toxic if swallowed or in contact with skin.
H351 Suspected of causing cancer.
H372 Causes damage to organs through prolonged or repeated exposure if swallowed.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and

	understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P281	Use personal protective equipment as required.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane 1,1-Bis(4-chlorophenyl)-2,2,2-trichloroethane
Formula	:	$C_{14}H_9Cl_5$
Molecular weight	:	354.49 g/mol
CAS-No.	:	50-29-3
EC-No.	:	200-024-3
Index-No.	:	602-045-00-7

Hazardous components

Component	Classification	Concentration
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane		
	Acute Tox. 3; Carc. 2; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H301 + H311, H351, H372, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting 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 vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

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.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	TWA	1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Confirmed animal carcinogen with unknown relevance to humans		

		TWA	0.5 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		TWA	1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		
		PEL	1 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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 N100 (US) or type P3 (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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: solid

b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 107 - 110 °C (225 - 230 °F) - lit.
f)	Initial boiling point and boiling range	260.0 °C (500.0 °F)
g)	Flash point	72.0 - 77.0 °C (161.6 - 170.6 °F)
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	0.0000021 hPa (0.0000016 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	0.99 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 6.91
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxidizing agents, Iron and iron salts.

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - 87.0 mg/kg

Inhalation: No data available

LD50 Dermal - Rabbit - 300.0 mg/kg
Remarks: Behavioral:Tremor. Behavioral:Muscle weakness. Behavioral:Ataxia.

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Limited evidence of carcinogenicity in animal studies

IARC:	2A - Group 2A: Probably carcinogenic to humans (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)
IARC:	2A - Group 2A: Probably carcinogenic to humans (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)
NTP:	RAHC - Reasonably anticipated to be a human carcinogen (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)
NTP:	RAHC - Reasonably anticipated to be a human carcinogen (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.
	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Ingestion - Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: KJ3325000

CNS stimulation.

Pancreas. -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 0.01 mg/l - 96.0 h
	LC50 - Lepomis macrochirus (Bluegill) - 0.01 mg/l - 96.0 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.003400 mg/l - 96.0 h
	LOEC - Oncorhynchus mykiss (rainbow trout) - 150 mg/l - 3.0 d
	NOEC - Oncorhynchus mykiss (rainbow trout) - 113 mg/l - 3.0 d
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 0.00108 mg/l - 48 h
Toxicity to algae	LC100 - Scenedesmus quadricauda (Green algae) - > 20 mg/l - 7 d

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 20 d - 0.001 mg/l
	Bioconcentration factor (BCF): 46,670

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
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. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)
Reportable Quantity (RQ): 1 lbsMarine pollutant:yes
Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)
Marine pollutant:yes

IATA

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. (1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

	CAS-No.	Revision Date
1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	1993-02-16

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	2008-06-17
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	2008-06-17
WARNING! This product contains a chemical known to the State of California to cause cancer. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	2008-06-17
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. 1,1,1-Trichloro-2,2-bis(4-chlorophenyl)ethane	50-29-3	2008-06-17

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H301	Toxic if swallowed.
H301 + H311	Toxic if swallowed or in contact with skin.
H311	Toxic in contact with skin.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure if swallowed.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	2
Reactivity Hazard:	0

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.6 Revision Date: 05/07/2018 Print Date: 06/22/2019

SAFETY DATA SHEET

Version 3.9
Revision Date 08/10/2016
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 4-Methylphenol

Product Number : 442418
Brand : Supelco
Index-No. : 604-004-00-9

CAS-No. : 106-44-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 3), H311
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 + H311 Toxic if swallowed or in contact with skin
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P260 Do not breathe dust or mist.
P264 Wash skin thoroughly after handling.

P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	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.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : *p*-Cresol
4-Methylphenol

Formula : C_7H_8O

Molecular weight : 108.14 g/mol

CAS-No. : 106-44-5

EC-No. : 203-398-6

Index-No. : 604-004-00-9

Hazardous components

Component	Classification	Concentration
p-Cresol		
	Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; Aquatic Acute 2; Aquatic Chronic 2; H301 + H311, H314, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting 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 vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

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.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

hygroscopic Air and light sensitive. Handle and store under inert gas.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
p-Cresol	106-44-5	TWA	2.3 ppm 10 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5 ppm 22 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Skin designation The value in mg/m3 is approximate.		
		TWA	20 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen Danger of cutaneous absorption		
		PEL	5 ppm 22 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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 N100 (US) or type P3 (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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 32 - 34 °C (90 - 93 °F) - lit.
f)	Initial boiling point and boiling range	202 °C (396 °F) - lit.
g)	Flash point	85.0 °C (185.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Lower explosion limit: 1.1 %(V)
k)	Vapour pressure	1.3 hPa (1.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.034 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 1.94
p)	Auto-ignition temperature	559.0 °C (1,038.2 °F)
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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxidizing agents, Bases

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 207.0 mg/kg
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Olfaction:Other changes. Behavioral:Convulsions or effect on seizure threshold. Gastrointestinal:Ulceration or bleeding from stomach.

LC50 Inhalation - Rat - 1 h - > 710 mg/m3

LD50 Dermal - Rabbit - 301.0 mg/kg
Remarks: Behavioral:Tremor. Gastrointestinal:Changes in structure or function of salivary glands. Kidney, Ureter, Bladder:Other changes.

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Severe skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Severe eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

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

Additional Information
RTECS: GO6475000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, laryngitis, Dizziness, Cardiovascular effects., Muscle cramps/spasms., Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - other fish - 16.00 - 24.00 mg/l - 24 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 7.9 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 1.4 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Does not bioaccumulate.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)
UN number: 3455 Class: 6.1 (8) Packing group: II
Proper shipping name: Cresols, solid
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 3455 Class: 6.1 (8) Packing group: II EMS-No: F-A, S-B
Proper shipping name: CRESOLS, SOLID

IATA
UN number: 3455 Class: 6.1 (8) Packing group: II
Proper shipping name: Cresols, solid

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date

p-Cresol	106-44-5	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
p-Cresol	106-44-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
p-Cresol	106-44-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
p-Cresol	106-44-5	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Dam.	Serious eye damage
H301	Toxic if swallowed.
H301 + H311	Toxic if swallowed or in contact with skin
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	2
Reactivity Hazard:	0

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.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.9 Revision Date: 08/10/2016 Print Date: 06/28/2019

SAFETY DATA SHEET

Version 3.4
Revision Date 06/26/2014
Print Date 11/09/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,3,5-Trimethoxybenzene

Product Number : 138827
Brand : Aldrich

CAS-No. : 621-23-8

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
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
P330 Rinse mouth.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Phloroglucinol trimethyl ether

Formula	:	$C_9H_{12}O_3$
Molecular Weight	:	168.19 g/mol
CAS-No.	:	621-23-8
EC-No.	:	210-673-4

Hazardous components

Component	Classification	Concentration
O,O,O-1,3,5-Trimethylresorcinol		
	Acute Tox. 4; H302	-

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Carbon 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
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

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.Normal measures for preventive fire protection.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 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.

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
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: colourless
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	Melting point/range: 50 - 53 °C (122 - 127 °F) - lit.
f)	Initial boiling point and boiling range	255 °C (491 °F) - lit.

g)	Flash point	86.00 °C (186.80 °F) - closed cup
h)	Evapouration 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	no data available
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	log Pow: 1.965
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
Inhalation: no data available

Dermal: no data available

no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

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

Additional Information
RTECS: DC2810000

12. ECOLOGICAL INFORMATION

12.1 Toxicity
no data available

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
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
O,O,O-1,3,5-Trimethylresorcinol	621-23-8	

New Jersey Right To Know Components

	CAS-No.	Revision Date
O,O,O-1,3,5-Trimethylresorcinol	621-23-8	

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
H302	Harmful if swallowed.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

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.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.4 Revision Date: 06/26/2014 Print Date: 11/09/2018

SAFETY DATA SHEET

Version 4.13
Revision Date 09/12/2018
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Arsenic

Product Number : 202657
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, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 3), H331
Carcinogenicity (Category 1B), H350
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H302	Harmful if swallowed.
H331	Toxic if inhaled.
H350	May cause cancer.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ 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.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
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 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	As
Molecular weight	:	74.92 g/mol
CAS-No.	:	7440-38-2
EC-No.	:	231-148-6
Index-No.	:	033-001-00-X

Hazardous components

Component	Classification	Concentration
Arsenic		
	Acute Tox. 4; Acute Tox. 3; Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H302, H331, H350, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting 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 vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

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.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.
Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Arsenic	7440-38-2	TWA	0.01 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Lung cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed human carcinogen		

		C	0.0020 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A 15 minute ceiling value		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
	-	inorganic arsenic plus methylated metabolites	35µg As/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of the workweek (After four or five consecutive working days with exposure)			

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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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 N100 (US) or type P3 (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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: light grey, black
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 (1,503 °F) - lit.
f)	Initial boiling point and boiling range	613 °C (1,135 °F) - 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 (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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
Stable under recommended storage conditions.

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
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Arsenic oxides
Other decomposition products - No data available

In the event of fire: see section 5

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

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity

Carcinogenicity

No data available

IARC:	1 - Group 1: Carcinogenic to humans (Arsenic)
NTP:	Known - Known to be human carcinogen (Arsenic)
OSHA:	OSHA specifically regulated carcinogen (Arsenic)

Reproductive toxicity

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: CG0525000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

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
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
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. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)
UN number: 1558 Class: 6.1 Packing group: II
Proper shipping name: Arsenic
Reportable Quantity (RQ): 1 lbsReportable Quantity (RQ): 1 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1558 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: ARSENIC
Marine pollutant:yes

IATA
UN number: 1558 Class: 6.1 Packing group: II
Proper shipping name: Arsenic

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Arsenic	7440-38-2	2015-11-23

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Reportable Quantity D004 lbs

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Arsenic	7440-38-2	2015-11-23

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Arsenic	7440-38-2	2015-11-23

	CAS-No.	Revision Date
Arsenic	7440-38-2	2015-11-23

New Jersey Right To Know Components

	CAS-No.	Revision Date
Arsenic	7440-38-2	2015-11-23

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Arsenic	7440-38-2	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H302	Harmful if swallowed.
H331	Toxic if inhaled.
H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.13 Revision Date: 09/12/2018 Print Date: 06/28/2019

SAFETY DATA SHEET

Version 6.1
Revision Date 05/28/2017
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Barium

Product Number : 474711
Brand : Aldrich

CAS-No. : 7440-39-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Substances and mixtures, which in contact with water, emit flammable gases (Category 2), H261

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H261 In contact with water releases flammable gases.

Precautionary statement(s)
P223 Do not allow contact with water.
P231 + P232 Handle under inert gas. Protect from moisture.
P280 Wear protective gloves/ eye protection/ face protection.
P335 + P334 Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

P402 + P404	Store in a dry place. Store in a closed container.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Ba
Molecular weight	:	137.33 g/mol
CAS-No.	:	7440-39-3
EC-No.	:	231-149-1

Hazardous components

Component	Classification	Concentration
Barium		
	Water-react. 2; H261	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Dry powder

5.2 Special hazards arising from the substance or mixture
Barium oxide

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. 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
Further processing of solid materials may result in the formation of combu formation should be taken into consideration before additional processing
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Store under inert gas.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Barium	7440-39-3	TWA	0.500000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye, skin, & Gastrointestinal irritation Muscular stimulation Not classifiable as a human carcinogen		
		TWA	0.500000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.500000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Eye irritation Muscular stimulation Skin irritation Gastrointestinal irritation Not classifiable as a human carcinogen		
		TWA	0.500000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Eye irritation Muscular stimulation Skin irritation Gastrointestinal irritation Not classifiable as a human carcinogen		

		TWA	0.5 mg/m3	USA. NIOSH Recommended Exposure Limits

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 industria situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Flame retardant protective clothing, 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 (EN 143) respirator cartridges as a backup to engineering controls. If th full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Pieces 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: 725 °C (1337 °F) - lit.
f)	Initial boiling point and boiling range	1,640 °C (2,984 °F) - 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	3.6 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Exposure to moisture

10.5 Incompatible materials
Oxidizing agents, Water, acids, Oxygen, Chlorinated solvents, Carbon dioxide (CO2), Halogens, Halogenated hydrocarbon, Alcohols, Sulphur compounds, Hydrogen sulfide gas

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Barium oxide
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data availableBarium
Inhalation: No data available(Barium)
Dermal: No data available(Barium)
No data available(Barium)

Skin corrosion/irritation
No data available(Barium)

Serious eye damage/eye irritation
No data available(Barium)

Respiratory or skin sensitisation
No data available(Barium)

Germ cell mutagenicity

No data available(Barium)

Carcinogenicity
This product is or contains a component that is not classifiable as to its classification.(Barium)
(Barium)
(Barium)

Reproductive toxicity
No data available(Barium)

No data available(Barium)

Specific target organ toxicity - single exposure
No data available(Barium)

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available(Barium)

Additional Information
RTECS: CQ8370000

Stomach/intestinal disorders, Nausea, Vomiting, Drowsiness, Dizziness, Gastrointestinal disturbance, Weakness, Tremors, Seizures.(Barium)
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.(Barium)

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	mortality NOEC - Cyprinodon variegatus (sheepshead minnow) - 500 mg/l - 96 h(Barium)
	LC50 - Cyprinodon variegatus (sheepshead minnow) - > 500 mg/l - 96 h(Barium)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available(Barium)

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber b highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1400 Class: 4.3 Packing group: II
Proper shipping name: Barium
Reportable Quantity (RQ) : 1000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1400 Class: 4.3 Packing group: II EMS-No: F-G, S-O
Proper shipping name: BARIUM

IATA
UN number: 1400 Class: 4.3 Packing group: II
Proper shipping name: Barium

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Barium	7440-39-3	2007-07-01

SARA 311/312 Hazards
Reactivity Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Barium	7440-39-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Barium	7440-39-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Barium	7440-39-3	2007-07-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H261 In contact with water releases flammable gases.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	
Flammability:	3
Physical Hazard	1

NFPA Rating

Health hazard:	0
Fire Hazard:	3
Reactivity Hazard:	1
Special hazard.I:	W

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956
Version: 6.1 Revision Date: 05/28/2017 Print Date: 06/28/2019

SAFETY DATA SHEET

Version 5.8
Revision Date 02/02/2018
Print Date 10/19/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benzo[*a*]pyrene

Product Number : 48564
Brand : Supelco
Index-No. : 601-032-00-3

CAS-No. : 50-32-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin sensitisation (Category 1), H317
Germ cell mutagenicity (Category 1B), H340
Carcinogenicity (Category 1B), H350
Reproductive toxicity (Category 1B), H360
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H317 May cause an allergic skin reaction.
H340 May cause genetic defects.
H350 May cause cancer.
H360 May damage fertility or the unborn child.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and

understood.

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 3,4-Benzpyrene
3,4-Benzopyrene
Benzo[def]chrysene
benzo[pqr]tetraphene

Formula : $C_{20}H_{12}$
Molecular weight : 252.31 g/mol
CAS-No. : 50-32-8
EC-No. : 200-028-5
Index-No. : 601-032-00-3

Hazardous components

Component	Classification	Concentration
Benzo[a]pyrene		
	Skin Sens. 1; Muta. 1B; Carc. 1B; Repr. 1B; Aquatic Acute 1; Aquatic Chronic 1; H317, H340, H350, H360, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

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.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Store at room temperature.
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
	Remarks	Cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section), see BEI® for Polycyclic Aromatic Hydrocarbons (PAHs) Exposure by all routes should be carefully controlled to levels as low		

		as possible. Suspected human carcinogen		
		Cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section), see BEI® for Polycyclic Aromatic Hydrocarbons (PAHs) Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
Benzo[a]pyrene	50-32-8	TWA	0.200000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.200000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		1910.1002 As used in §1910.1000 (Table Z-1), coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt (CAS 8052-42-4, and CAS 64742-93-4) is not covered under the 'coal tar pitch volatiles' standard OSHA specifically regulated carcinogen		
		TWA	0.100000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar products. cyclohexane-extractable fraction See Appendix C See Appendix A		
		TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		1910.1002 As used in §1910.1000 (Table Z-1), coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt (CAS 8052-42-4, and CAS 64742-93-4) is not covered under the 'coal tar pitch volatiles' standard OSHA specifically regulated carcinogen		
		TWA	0.1 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar products. cyclohexane-extractable fraction See Appendix C See Appendix A		
		TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological	Basis

				specimen	
	-	1-Hydroxypyrene		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			
		1-Hydroxypyrene		Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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 N100 (US) or type P3 (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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance — Form: solid

b) Odour — No data available

c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 177 - 180 °C (351 - 356 °F)
f)	Initial boiling point and boiling range	495 °C (923 °F)
g)	Flash point	No data available
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	1.35 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 5.97
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

LD50 Subcutaneous - Rat - 50 mg/kg

Skin corrosion/irritation
Skin - Mouse
Result: Mild skin irritation

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
Chronic exposure may cause dermatitis.

Germ cell mutagenicity
May alter genetic material.
In vivo tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	1 - Group 1: Carcinogenic to humans (Benzo[a]pyrene)
NTP:	RAHC - Reasonably anticipated to be a human carcinogen (Benzo[a]pyrene)
OSHA:	OSHA specifically regulated carcinogen (Benzo[a]pyrene)

Reproductive toxicity
May cause congenital malformation in the fetus.
Presumed human reproductive toxicant

May cause reproductive disorders.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.25 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 0.02 mg/l - 72 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 48 h - 0.0005 mg/l
	Bioconcentration factor (BCF): 3,208

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
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. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Benzo[a]pyrene)
Reportable Quantity (RQ): 1 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo[a]pyrene)
Marine pollutant:yes

IATA

UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benzo[a]pyrene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date

Benzo[a]pyrene	50-32-8	2007-03-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	1990-01-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H317	May cause an allergic skin reaction.
H340	May cause genetic defects.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Muta.	Germ cell mutagenicity

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.8 Revision Date: 02/02/2018 Print Date: 10/19/2018

SAFETY DATA SHEET

Version 6.1
Revision Date 07/17/2018
Print Date 01/21/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benzo[<I>b</>]fluoranthene

Product Number : 48490
Brand : Supelco
Index-No. : 601-034-00-4

CAS-No. : 205-99-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Carcinogenicity (Category 1B), H350

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H350 May cause cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	3,4-Benzofluoranthene
Formula	:	C<SB>20</>H<SB>12</>
Molecular weight	:	252.31 g/mol
CAS-No.	:	205-99-2
EC-No.	:	205-911-9
Index-No.	:	601-034-00-4

Hazardous components

Component	Classification	Concentration
Benz[e]acephenanthrylene		
	Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H350, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

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 formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

	Remarks	Cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section), see BEI® for Polycyclic Aromatic Hydrocarbons (PAHs) Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Benz[e]acephenanthrylene	205-99-2	1-Hydroxypyrene		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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

Impervious clothing, 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 N100 (US) or type P3 (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).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 163 - 165 °C (325 - 329 °F) - lit.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
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	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
TDLo Oral - Mouse - 7.57 mg/kg
Remarks: Liver:Changes in liver weight. Endocrine:Changes in thymus weight.
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.
Possible human carcinogen

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Benz[e]acephenanthrylene)
NTP:	RAHC - Reasonably anticipated to be a human carcinogen (Benz[e]acephenanthrylene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
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

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - > 1.024 mg/l - 24 h(Benz[e]acephenanthrylene)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available(Benz[e]acephenanthrylene)

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)
Not dangerous goods

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benz[e]acephenanthrylene)
Marine pollutant : yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benz[e]acephenanthrylene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Benz[e]acephenanthrylene	205-99-2	2007-03-01

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benz[e]acephenanthrylene	205-99-2	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benz[e]acephenanthrylene	205-99-2	2007-03-01

California Prop. 65 Components

, which is/are known to the State of California to cause cancer.	CAS-No.	Revision Date
For more information go to www.P65Warnings.ca.gov.	205-99-2	2007-09-28
Benz[e]acephenanthrylene		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H350 May cause cancer.

H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 6.1 Revision Date: 07/17/2018 Print Date: 01/21/2019

SAFETY DATA SHEET

Version 6.1
Revision Date 07/16/2018
Print Date 01/21/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benzo[<I>k</>]fluoranthene

Product Number : 48492
Brand : Supelco
Index-No. : 601-036-00-5

CAS-No. : 207-08-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Carcinogenicity (Category 1B), H350

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H350 May cause cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	C<SB>20</>H<SB>12</>
Molecular weight	:	252.31 g/mol
CAS-No.	:	207-08-9
EC-No.	:	205-916-6
Index-No.	:	601-036-00-5

Hazardous components

Component	Classification	Concentration
Benzo[k]fluoranthene		
	Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H350, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

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 formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Components with workplace control parameters
Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Benzo[k]fluoranthene	207-08-9	1-Hydroxypyrene		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls
Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.
Personal protective equipment
Eye/face protection
Safety glasses with side-shields conforming to EN166 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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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
Impervious clothing, 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 N100 (US) or type P3 (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).
Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 215 - 217 °C (419 - 423 °F) - lit.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
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	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
Carcinogenicity- Rat- Implant

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.
Possible human carcinogen

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Benzo[k]fluoranthene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Benzo[k]fluoranthene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
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

Additional Information
RTECS: DF6350000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available(Benzo[k]fluoranthene)

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
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. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benzo[k]fluoranthene)

Reportable Quantity (RQ) : 5000 lbs

no
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo[k]fluoranthene)
Marine pollutant : yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benzo[k]fluoranthene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzo[k]fluoranthene	207-08-9	1994-04-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzo[k]fluoranthene	207-08-9	1994-04-01

California Prop. 65 Components

, which is/are known to the State of California to cause cancer.	CAS-No.	Revision Date
For more information go to www.P65Warnings.ca.gov.	207-08-9	2007-09-28
Benzo[k]fluoranthene		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956
Version: 6.1 Revision Date: 07/16/2018 Print Date: 01/21/2019

SAFETY DATA SHEET

Version 6.1
Revision Date 07/17/2018
Print Date 01/21/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benz[*a*]anthracene

Product Number : 48563
Brand : Supelco
Index-No. : 601-033-00-9

CAS-No. : 56-55-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Carcinogenicity (Category 1B), H350

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H350 May cause cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1,2-Benzanthracene Tetraphene
Formula	:	C<SB>18</>H<SB>12</>
Molecular weight	:	228.29 g/mol
CAS-No.	:	56-55-3
EC-No.	:	200-280-6
Index-No.	:	601-033-00-9

Hazardous components

Component	Classification	Concentration
Benz[a]anthracene		
	Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H350, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

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 formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Store at room temperature.
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls
Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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
Impervious clothing, 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 N100 (US) or type P3 (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).
Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 157 - 159 °C (315 - 318 °F)
f)	Initial boiling point and boiling range	437.6 °C (819.7 °F)
g)	Flash point	No data available
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	No data available

n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available
Inhalation: No data available
Dermal: No data available
LD50 Intravenous - Rat - > 200 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.
Possible human carcinogen

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Benz[a]anthracene)

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Benz[a]anthracene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Benz[a]anthracene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Benz[a]anthracene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
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

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available(Benz[a]anthracene)

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
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. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)
Not dangerous goods
IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benz[a]anthracene)
Marine pollutant : yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benz[a]anthracene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24

	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Benz[a]anthracene	56-55-3	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Benz[a]anthracene	CAS-No. 56-55-3	Revision Date 2007-09-28
WARNING! This product contains a chemical known to the State of California to cause cancer. Benz[a]anthracene	CAS-No. 56-55-3	Revision Date 2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H350	May cause cancer.
H400	Very toxic to aquatic life.

H410 Very toxic to aquatic life with long lasting effects.

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956
Version: 6.1 Revision Date: 07/17/2018 Print Date: 01/21/2019

SAFETY DATA SHEET

Version 5.10
Revision Date 01/10/2018
Print Date 06/22/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : CHRYSENE, 98%

Product Number : 245186
Brand : Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 1B), H350
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H341	Suspected of causing genetic defects.
H350	May cause cancer.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : $C_{18}H_{12}$

Molecular weight : 228.29 g/mol

Hazardous components

Component	Classification	Concentration
Chrysene		
	Muta. 2; Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H341, H350, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

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.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
	Remarks	Cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section), see BEI® for Polycyclic Aromatic Hydrocarbons (PAHs) Exposure by all routes should be carefully controlled to levels as low as possible. Confirmed animal carcinogen with unknown relevance to humans		
Chrysene	218-01-9	TWA	0.200000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.200000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		1910.1002 As used in §1910.1000 (Table Z-1), coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt (CAS 8052-42-4, and CAS 64742-93-4) is not covered under the 'coal tar pitch volatiles' standard OSHA specifically regulated carcinogen		
		TWA	0.100000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar products. cyclohexane-extractable fraction See Appendix C		

		See Appendix A		
		PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
	-	1-Hydroxypyrene		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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
Impervious clothing, 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 N100 (US) or type P3 (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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: solid

		Colour: white, light yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	253.0 °C (487.4 °F)
f)	Initial boiling point and boiling range	448.0 °C (838.4 °F)
g)	Flash point	No data available
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	No data available
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	log Pow: 5.73
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

LD50 Intraperitoneal - Mouse - > 320 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.
In vitro tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Chrysene)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	OSHA specifically regulated carcinogen (Chrysene)

Reproductive toxicity
No data available

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

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 1.90 mg/l - 2 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
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
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. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Chrysene)
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Chrysene)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Chrysene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Chrysene	218-01-9	1994-04-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Chrysene	218-01-9	1994-04-01

	CAS-No.	Revision Date
Chrysene	218-01-9	1994-04-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Chrysene	218-01-9	1994-04-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Chrysene	218-01-9	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.10 Revision Date: 01/10/2018 Print Date: 06/22/2019

SAFETY DATA SHEET

Version 6.1
Revision Date 03/12/2019
Print Date 06/22/2019

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Copper

Product Number : 31284
Brand : Aldrich
CAS-No. : 7440-50-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : Cu
Molecular weight : 63.55 g/mol
CAS-No. : 7440-50-8
EC-No. : 231-159-6

Component	Classification	Concentration

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Copper,		
		<= 100 %

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

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.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 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

Copper oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions

No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

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6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Store under inert gas. Air sensitive.
Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Copper,	7440-50-8	TWA	1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Irritation Gastrointestinal metal fume fever		
		TWA	0.2 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Irritation Gastrointestinal metal fume fever		

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		TWA	1 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	0.1 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

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Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Wire Colour: light red
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 1,083.4 °C (1,982.1 °F)
f)	Initial boiling point and boiling range	2,567 °C 4,653 °F
g)	Flash point	()No data available
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	8.940 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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

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SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong acids, Strong oxidizing agents, Acid chlorides, Halogens

10.6 Hazardous decomposition products
Other decomposition products - No data available
Hazardous decomposition products formed under fire conditions. - Copper oxides
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available
Inhalation: No data available
Dermal: No data available
LD50 Intraperitoneal - Mouse - 3.5 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

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Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: GL5325000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

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SECTION 15: Regulatory information

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Copper,	CAS-No. 7440-50-8	Revision Date 1993-02-16

Copper,	CAS-No. 7440-50-8	Revision Date 1993-02-16

New Jersey Right To Know Components

Copper,	CAS-No. 7440-50-8	Revision Date 1993-02-16

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 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.

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Version: 6.1 Revision Date: 03/12/2019 Print Date: 06/22/2019

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MATERIAL SAFETY DATA SHEET

Date Printed: 20.10.2018
Date Updated: 07.05.2009
Version 1.4

Section 1 - Product and Company Information

Product Name	1,2:5,6-DIBENZANTHRACENE, 97% (NO BULK ORDERS ALLOWED)
Product Number	D31400
Brand	ALDRICH
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
1,2:5,6-DIBENZANTHRACENE	53-70-3	Yes

Formula	C22H14
Synonyms	1,2:5,6-Benzanthracene * DB(a,h)A * 1,2,5,6-Dba * 1,2,5,6-Dibenzanthraceen (Dutch) * 1,2:5,6-Dibenzanthracene * 1,2:5,6-Dibenz(a)anthracene * Dibenzo(a,h)anthracene * 1,2:5,6-Dibenzoanthracene * RCRA waste number U063
RTECS Number:	HN2625000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic. Dangerous for the environment.
May cause cancer. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Target organ(s): Lungs. Liver. Calif. Prop. 65 carcinogen.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 2
FLAMMABILITY: 0
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE
In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (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.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Wash thoroughly after handling.

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	0.004 MG/M3
Poland		NDSCh	-
Poland		NDSP	-

Section 9 - Physical/Chemical Properties

Appearance: Physical State: Solid

Property	Value	At Temperature or Pressure
Molecular Weight	278,3500 AMU	
pH	N/A	
BP/BP Range	524,000 °C	760,000 mmHg
MP/MP Range	262,000 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	N/A	
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Refractive Index	N/A	
Optical Rotation	N/A	
Miscellaneous Data	N/A	

Solubility N/A

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)
Lungs. Liver.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Species: Rat
Route of Application: Intratracheal
Dose: 100 MG/KG
Result: Tumorigenic:Carcinogenic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

Species: Mouse
Route of Application: Oral
Dose: 4160 MG/KG
Exposure Time: 26W
Frequency: I
Result: Lungs, Thorax, or Respiration:Tumors. Tumorigenic:Carcinogenic by RTECS criteria.

Species: Mouse
Route of Application: Skin
Dose: 1200 MG/KG
Exposure Time: 50W
Frequency: I
Result: Tumorigenic:Tumors at site or application. Tumorigenic:Carcinogenic by RTECS criteria. Skin and Appendages: Other: Tumors.

Species: Mouse
Route of Application: Subcutaneous
Dose: 445 UG/KG
Result: Skin and Appendages: Other: Tumors.
Tumorigenic:Carcinogenic by RTECS criteria. Tumorigenic:Tumors
at site or application.

Species: Mouse
Route of Application: Intravenous
Dose: 40 MG/KG
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax,
or Respiration:Tumors. Liver:Tumors.

Species: Mouse
Route of Application: Implant
Dose: 80 MG/KG
Result: Kidney, Ureter, Bladder:Tumors. Tumorigenic:Carcinogenic
by RTECS criteria.

Species: Mouse
Route of Application: Multiple
Dose: 40 MG/KG
Exposure Time: 12D
Frequency: I
Result: Tumorigenic:Tumors at site or application. Lungs,
Thorax, or Respiration:Tumors. Tumorigenic:Equivocal tumorigenic
agent by RTECS criteria.

Species: Guinea pig
Route of Application: Subcutaneous
Dose: 250 MG/KG
Exposure Time: 24D
Frequency: I
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS
criteria. Tumorigenic:Tumors at site or application. Lungs,
Thorax, or Respiration:Tumors.

Species: Guinea pig
Route of Application: Intravenous
Dose: 30 MG/KG
Result: Tumorigenic:Tumors at site or application. Lungs,
Thorax, or Respiration:Tumors. Tumorigenic:Equivocal tumorigenic
agent by RTECS criteria.

Species: Pigeon
Route of Application: Intramuscular
Dose: 6 MG/KG
Result: Tumorigenic:Carcinogenic by RTECS criteria.
Liver:Tumors. Tumorigenic:Tumors at site or application.

Species: Frog
Route of Application: Intrarenal
Dose: 12 MG/KG
Result: Kidney, Ureter, Bladder:Kidney tumors. Lungs, Thorax, or
Respiration:Tumors. Tumorigenic:Neoplastic by RTECS criteria.

Species: Mouse
Route of Application: Implant
Dose: 14 MG/KG

Result: Tumorigenic:Neoplastic by RTECS criteria.
Tumorigenic:Tumors at site or application.

Species: Mouse
Route of Application: Subcutaneous
Dose: 78 UG/KG
Result: Tumorigenic:Neoplastic by RTECS criteria.
Tumorigenic:Tumors at site or application.

Species: Mouse
Route of Application: Oral
Dose: 4520 MG/KG
Exposure Time: 36W
Frequency: C
Result: Tumorigenic:Carcinogenic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Gastrointestinal:Tumors.

Species: Mouse
Route of Application: Implant
Dose: 200 MG/KG
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma. Tumorigenic:Tumors at site or application.

Species: Mouse
Route of Application: Skin
Dose: 6 UG/KG
Result: Tumorigenic:Neoplastic by RTECS criteria. Skin and Appendages: Other: Tumors.

Species: Mouse
Route of Application: Subcutaneous
Dose: 6 MG/KG
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application.

Species: Mouse
Route of Application: Skin
Dose: 400 MG/KG
Exposure Time: 40W
Frequency: I
Result: Tumorigenic:Neoplastic by RTECS criteria. Skin and Appendages: Other: Tumors.

Species: Mouse
Route of Application: Implant
Dose: 100 MG/KG
Result: Tumorigenic:Carcinogenic by RTECS criteria. Kidney, Ureter, Bladder:Tumors. Tumorigenic:Tumors at site or application.

Species: Rat
Route of Application: Subcutaneous
Dose: 135 MG/KG
Exposure Time: 9W
Frequency: I
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Tumorigenic:Tumors at site or application.

Species: Mouse

Route of Application: Subcutaneous
Dose: 400 MG/KG
Exposure Time: 10W
Frequency: I
Result: Tumorigenic:Neoplastic by RTECS criteria.
Tumorigenic:Tumors at site or application.

IARC CARCINOGEN LIST

Rating: Group 2A

NTP CARCINOGEN LIST

Rating: Anticipated to be a carcinogen.

CHRONIC EXPOSURE - MUTAGEN
Result: Laboratory experiments have shown mutagenic effects.

Species: Human
Dose: 360 NMOL/L
Cell Type: Embryo
Mutation test: DNA

Species: Human
Dose: 100 UMOL/L
Cell Type: fibroblast
Mutation test: Unscheduled DNA synthesis

Species: Human
Dose: 10 MG/L
Cell Type: Other cell types
Mutation test: Unscheduled DNA synthesis

Species: Human
Dose: 100 NMOL/L
Cell Type: HeLa cell
Mutation test: Unscheduled DNA synthesis

Species: Human
Dose: 54 UG/L
Cell Type: lymphocyte
Mutation test: Mutation in mammalian somatic cells.

Species: Rat
Route: Intratracheal
Dose: 25500 UG/KG
Exposure Time: 16H
Mutation test: Micronucleus test

Species: Rat
Route: Oral
Dose: 200 MG/KG
Mutation test: Morphological transformation.

Species: Rat
Dose: 100 UG/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Rat

Route: Intratracheal
Dose: 25560 UG/KG
Mutation test: DNA

Species: Rat
Route: Intratracheal
Dose: 51150 UG/KG
Mutation test: Sister chromatid exchange

Species: Mouse
Route: Intraperitoneal
Dose: 500 MG/KG
Mutation test: Micronucleus test

Species: Mouse
Dose: 4250 UG/L (+S9)
Cell Type: lymphocyte
Mutation test: Mutation in microorganisms

Species: Mouse
Dose: 500 UG/L
Cell Type: fibroblast
Mutation test: Morphological transformation.

Species: Mouse
Dose: 100 UG/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Mouse
Dose: 6 UMOL/L
Cell Type: liver
Mutation test: DNA

Species: Mouse
Route: Skin
Dose: 40 UMOL/KG
Mutation test: DNA

Species: Mouse
Dose: 1 MG/L
Cell Type: Other cell types
Mutation test: DNA

Species: Mouse
Dose: 1 MG/L
Cell Type: Other cell types
Mutation test: Other mutation test systems

Species: Mouse
Dose: 510 NMOL/L
Cell Type: Embryo
Mutation test: DNA

Species: Mouse
Dose: 510 NMOL/L
Cell Type: Embryo
Mutation test: Other mutation test systems

Species: Hamster

Dose: 56400 NMOL/L (+S9)
Cell Type: lung
Mutation test: Mutation in microorganisms

Species: Hamster
Dose: 2500 UG/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Hamster
Dose: 25 UG/L
Cell Type: kidney
Mutation test: Morphological transformation.

Species: Hamster
Dose: 5 MG/L
Exposure Time: 24H
Cell Type: fibroblast
Mutation test: DNA damage

Species: Hamster
Dose: 360 NMOL/L
Cell Type: Embryo
Mutation test: DNA

Species: Hamster
Dose: 5 MG/L
Cell Type: kidney
Mutation test: DNA damage

Species: Hamster
Dose: 1 MG/L
Cell Type: lung
Mutation test: DNA

Species: Hamster
Dose: 1 MG/L
Cell Type: lung
Mutation test: Other mutation test systems

Species: Hamster
Dose: 1 MMOL/L
Cell Type: fibroblast
Mutation test: Cytogenetic analysis

Species: Hamster
Route: Intraperitoneal
Dose: 900 MG/KG
Exposure Time: 24H
Mutation test: Sister chromatid exchange

Species: Hamster
Dose: 500 UG/L
Cell Type: lung
Mutation test: Mutation in mammalian somatic cells.

Species: Mammal
Dose: 2 NMOL/L
Cell Type: lymphocyte
Mutation test: DNA damage

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations. (DN)Requires special label: "Contains a substance which is regulated by Dannish work environmental law due to the risk of carcinogenic properties."

Section 14 - Transport Information

DOT
Proper Shipping Name: Environmentally hazardous substances, solid, n.o.s.
UN#: 3077
Class: 9
Packing Group: Packing Group III
Hazard Label: Class 9
PIH: Not PIH

IATA
Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s
IATA UN Number: 3077
Hazard Class: 9
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: T-N
Indication of Danger: Toxic. Dangerous for the environment.
R: 45-50/53
Risk Statements: May cause cancer. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 53-45-60-61
Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic. Dangerous for the environment.
Risk Statements: May cause cancer. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Wear suitable protective clothing, gloves, and eye/face protection. This

material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.
US Statements: Target organ(s): Lungs. Liver. Calif. Prop. 65 carcinogen.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
NOTES: This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes

UNITED STATES - STATE REGULATORY INFORMATION

CALIFORNIA PROP - 65
California Prop - 65: This product is or contains chemical(s) known to the state of California to cause cancer. This product is or contains chemical(s) known to the state of California to cause cancer.

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: Yes

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
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 Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.
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SAFETY DATA SHEET

Version 6.0
Revision Date 04/15/2019
Print Date 06/28/2019

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Dibenzofuran

Product Number : 236373
Brand : Aldrich
CAS-No. : 132-64-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Diphenylene oxide

Formula : $C_{12}H_8O$
Molecular weight : 168.19 g/mol
CAS-No. : 132-64-9

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EC-No. : 205-071-3

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

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.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 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

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions

No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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

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recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer 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
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder, finecrystalline Colour: white, beige
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 80 - 82 °C (176 - 180 °F) - lit.
f)	Initial boiling point and boiling range	154 - 155 °C 309 - 311 °F at 27 hPa - lit.
g)	Flash point	130 °C (266 °F) - closed cup
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	1.3 g/cm3 at 20 °C (68 °F)
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	log Pow: 4.12 - (Lit.), Potential bioaccumulation
p)	Auto-ignition temperature	No data available
q)	Decomposition	No data available

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temperature

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

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

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NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

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

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Hazardous properties cannot be excluded.
Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity
No data available

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
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No ecological problems are to be expected when the product is handled and used with due care and attention.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

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Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Dibenzofuran)
Reportable Quantity (RQ): 100 lbs
- Marine pollutant: yesPoison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Dibenzofuran)
Marine pollutant : yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Dibenzofuran)

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Dibenzofuran	132-64-9	2007-07-01

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Dibenzofuran	132-64-9	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Dibenzofuran	132-64-9	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

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SECTION 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.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.0 Revision Date: 04/15/2019 Print Date: 06/28/2019

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SAFETY DATA SHEET

Version 5.6
Revision Date 12/11/2017
Print Date 11/10/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Indeno[1,2,3-*cd*]pyrene

Product Number : 48499
Brand : Supelco

CAS-No. : 193-39-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Carcinogenicity (Category 2), H351

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H351 Suspected of causing cancer.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P281 Use personal protective equipment as required.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_{22}H_{12}$
Molecular weight	:	276.33 g/mol
CAS-No.	:	193-39-5
EC-No.	:	205-893-2

Hazardous components

Component	Classification	Concentration
Indeno[1,2,3-cd]pyrene		
	Carc. 2; H351	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. 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

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

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.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Store at room temperature.
Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.
Hazardous components without workplace control parameters

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Indeno[1,2,3-cd]pyrene	193-39-5	1-Hydroxypyrene (1-HP)		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 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.

Body Protection
Impervious clothing, 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 N100 (US) or type P3 (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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	163.6 °C (326.5 °F)
f)	Initial boiling point and boiling range	536.0 °C (996.8 °F)
g)	Flash point	No data available
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	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Indeno[1,2,3-cd]pyrene)
NTP:	RAHC - Reasonably anticipated to be a human carcinogen (Indeno[1,2,3-cd]pyrene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

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

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

No data available

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
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Indeno[1,2,3-cd]pyrene	193-39-5	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Indeno[1,2,3-cd]pyrene	193-39-5	1993-04-24

	CAS-No.	Revision Date
Indeno[1,2,3-cd]pyrene	193-39-5	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Indeno[1,2,3-cd]pyrene	193-39-5	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Indeno[1,2,3-cd]pyrene	CAS-No. 193-39-5	Revision Date 2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Carc.	Carcinogenicity
H351	Suspected of causing cancer.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.6 Revision Date: 12/11/2017 Print Date: 11/10/2018

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.0 Revision Date 10.11.2016
Print Date 17.07.2019
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Iron Metal Clinical

Product Number : NIST937
Brand : Sigma-Aldrich
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

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 Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

2.2 Label elements

2.3 Other hazards - none

SECTION 3: Composition/information on ingredients

SECTION 4: First aid measures

4.1 Description of first aid measures

No data available

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media
No data available

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
No data available

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
For personal protection see section 8.

6.2 Environmental precautions
No data available

6.3 Methods and materials for containment and cleaning up
No data available

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
No data available

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

8.2 Exposure controls
No data available

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	No data available
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
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	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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

SECTION 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
No data available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Skin corrosion/irritation

Serious eye damage/eye irritation

Respiratory or skin sensitisation

Germ cell mutagenicity

Carcinogenicity

Reproductive toxicity

Specific target organ toxicity - single exposure

Specific target organ toxicity - repeated exposure

Aspiration hazard

Additional Information
RTECS: Not available

SECTION 12: Ecological information

12.1 Toxicity

12.2 Persistence and degradability

12.3 Bioaccumulative potential

12.4 Mobility in soil

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods
No data available

SECTION 14: Transport information

14.1 UN number
ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name
ADR/RID: Not dangerous goods
IMDG: Not dangerous goods
IATA: Not dangerous goods

14.3 Transport hazard class(es)
ADR/RID: - IMDG: - IATA: -

14.4 Packaging group
ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards
ADR/RID: no IMDG Marine pollutant: no IATA: no

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

SAFETY DATA SHEET

Version 4.11
Revision Date 10/12/2018
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Lead

Product Number : 391352
Brand : Aldrich

CAS-No. : 7439-92-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)

H302	Harmful if swallowed.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.

P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Pb
Molecular weight	:	207.20 g/mol
CAS-No.	:	7439-92-1
EC-No.	:	231-100-4

Hazardous components

Component	Classification	Concentration
Lead		
	Acute Tox. 4; Carc. 2; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H302, H351, H372, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

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.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
	Remarks	See 1910.1025		
Lead	7439-92-1	TWA	0.05 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Confirmed animal carcinogen with unknown relevance to humans		
		TWA	0.05 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Hematologic effects Peripheral Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		

		TWA	0.05 mg/m3	USA. NIOSH Recommended Exposure Limits
		See Appendix C		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
	-	Lead	200 µg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
	Remarks	Not critical			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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 N100 (US) or type P3 (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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance — Form: powder

b) Odour — No data available

c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 327.4 °C (621.3 °F) - lit.
f)	Initial boiling point and boiling range	1,740 °C (3,164 °F) - 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	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong acids

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Lead oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity

Rat
Cytogenetic analysis

Carcinogenicity

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Lead)
NTP:	RAHC - Reasonably anticipated to be a human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Lead)
OSHA:	OSHA specifically regulated carcinogen (Lead)

Reproductive toxicity

Reproductive toxicity - Rat - Inhalation
Effects on Newborn: Biochemical and metabolic.

Reproductive toxicity - Rat - Oral
Effects on Newborn: Behavioral.

Reproductive toxicity - Mouse - Oral
Effects on Fertility: Female fertility index (e.g., # females pregnant per females mated). Effects on Fertility: Pre-implantation mortality (e.g., reduction in numbe corpora lutea).

May damage fertility. May damage the unborn child.

Developmental Toxicity - Rat - Inhalation
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow).

Developmental Toxicity - Rat - Oral
Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow). Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Developmental Toxicity - Rat - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Developmental Toxicity - Mouse - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: OF7525000

anemia

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	mortality LOEC - Oncorhynchus mykiss (rainbow trout) - 1.19 mg/l - 96.0 h
	LC50 - Micropterus dolomieui - 2.2 mg/l - 96.0 h
	mortality NOEC - Salvelinus fontinalis - 1.7 mg/l - 10.0 d
Toxicity to daphnia and other aquatic invertebrates	mortality LOEC - Daphnia (water flea) - 0.17 mg/l - 24 h
	mortality NOEC - Daphnia (water flea) - 0.099 mg/l - 24 h
Toxicity to algae	mortality EC50 - Skeletonema costatum - 7.94 mg/l - 10 d

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential

Bioaccumulation	Oncorhynchus kisutch - 2 Weeks - 150 µg/l
	Bioconcentration factor (BCF): 12

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
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. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Lead)
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Lead)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Lead	7439-92-1	2015-11-23

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Lead	7439-92-1	2015-11-23

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Lead	7439-92-1	2015-11-23

	CAS-No.	Revision Date
Lead	7439-92-1	2015-11-23

New Jersey Right To Know Components

	CAS-No.	Revision Date
Lead	7439-92-1	2015-11-23

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Lead	7439-92-1	2009-02-01
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Lead	7439-92-1	2009-02-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H302	Harmful if swallowed.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.

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.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.11 Revision Date: 10/12/2018 Print Date: 06/28/2019

SAFETY DATA SHEET

Version 6.0
Revision Date 01/31/2017
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Magnesium

Product Number : 200905
Brand : Sigma-Aldrich
Index-No. : 012-002-00-9

CAS-No. : 7439-95-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable solids (Category 1), H228
Self-heating substances and mixtures (Category 1), H251
Substances and mixtures, which in contact with water, emit flammable gases (Category 2), H261

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H228 Flammable solid.
H251 Self-heating: may catch fire.
H261 In contact with water releases flammable gases.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P223 Keep away from any possible contact with water, because of violent

	reaction and possible flash fire.
P231 + P232	Handle under inert gas. Protect from moisture.
P235 + P410	Keep cool. Protect from sunlight.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P280	Wear protective gloves/ eye protection/ face protection.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P402 + P404	Store in a dry place. Store in a closed container.
P407	Maintain air gap between stacks/ pallets.
P413	Store bulk masses greater than .? kg/ .? lbs at temperatures not exceeding .? °C/ .? °F.
P420	Store away from other materials.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Combustible dust

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Mg
Molecular weight	:	24.31 g/mol
CAS-No.	:	7439-95-4
EC-No.	:	231-104-6
Index-No.	:	012-002-00-9

Hazardous components

Component	Classification	Concentration
Magnesium (non pyrophoric)		
	Flam. Sol. 1; Self-heat. 1; Water-react. 2; H228, H251, H261	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Move out of dangerous area.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. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. 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

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Dry powder

5.2 Special hazards arising from the substance or mixture
Magnesium oxide

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combu formation should be taken into consideration before additional processing
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Store under inert gas. Air and moisture sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls
Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 industria situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Flame retardant antistatic protective clothing., 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 (EN 143) respirator cartridges as a backup to engineering controls. If th full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Turnings
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 648 °C (1198 °F) - lit.
f)	Initial boiling point and boiling range	1,090 °C (1,994 °F) - lit.
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	May form combustible dust concentrations in air.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1 hPa at 621 °C (1150 °F)
l)	Vapour density	No data available
m)	Relative density	1.74 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available

o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	The substance or mixture is classified as self heating with the category 1.
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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Heat, flames and sparks. Exposure to moisture

10.5 Incompatible materials
Acids, Strong oxidizing agents, Acid chlorides, Halogens

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Magnesium oxide
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data availableMagnesium (non pyrophoric)
Inhalation: No data available(Magnesium (non pyrophoric))
Dermal: No data available(Magnesium (non pyrophoric))
No data available(Magnesium (non pyrophoric))

Skin corrosion/irritation
No data available(Magnesium (non pyrophoric))

Serious eye damage/eye irritation
No data available(Magnesium (non pyrophoric))

Respiratory or skin sensitisation
No data available(Magnesium (non pyrophoric))

Germ cell mutagenicity

No data available(Magnesium (non pyrophoric))

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available(Magnesium (non pyrophoric))

No data available(Magnesium (non pyrophoric))

Specific target organ toxicity - single exposure
No data available(Magnesium (non pyrophoric))

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available(Magnesium (non pyrophoric))

Additional Information
RTECS: Not available

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, chills, Fever, fatigue, muscle pain, joint pain, rash, Anorexia.(Magnesium (non pyrophoric))
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.(Magnesium (non pyrophoric))

Liver - Irregularities - Based on Human Evidence
Liver - Irregularities - Based on Human Evidence(Magnesium (non pyrophoric))

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available(Magnesium (non pyrophoric))

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber b highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1869 Class: 4.1 Packing group: III
Proper shipping name: Magnesium
Poison Inhalation Hazard: No

IMDG
UN number: 1869 Class: 4.1 Packing group: III EMS-No: F-G, S-G
Proper shipping name: MAGNESIUM

IATA
UN number: 1869 Class: 4.1 Packing group: III
Proper shipping name: Magnesium

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Reactivity Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Magnesium (non pyrophoric)	7439-95-4	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Magnesium (non pyrophoric)	7439-95-4	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Magnesium (non pyrophoric)	7439-95-4	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H228	Flammable solid.
H251	Self-heating: may catch fire.
H261	In contact with water releases flammable gases.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	2

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	2

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956
Version: 6.0 Revision Date: 01/31/2017 Print Date: 06/28/2019

SAFETY DATA SHEET

Version 6.1
Revision Date 05/28/2017
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Manganese

Product Number : 463728
Brand : Aldrich

CAS-No. : 7439-96-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H260 In contact with water releases flammable gases which may ignite spontaneously.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P223 Keep away from any possible contact with water, because of violent reaction and possible flash fire.
P231 + P232 Handle under inert gas. Protect from moisture.

P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P402 + P404	Store in a dry place. Store in a closed container.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Mn
Molecular weight	:	54.94 g/mol
CAS-No.	:	7439-96-5
EC-No.	:	231-105-1

Hazardous components

Component	Classification	Concentration
Manganese		
	Water-react. 1; Aquatic Acute 3; Aquatic Chronic 3; H260, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Dry powder Carbon dioxide (CO2)

Unsuitable extinguishing media
Water

5.2 Special hazards arising from the substance or mixture
Manganese/manganese oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

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
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. 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.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Moisture sensitive. Keep in a dry place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Manganese	7439-96-5	TWA	0.200000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC)		
		C	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		C	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		

		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		C	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.200000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) varies		
		TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment 2015 Adoption varies		
		TWA	0.020000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment 2015 Adoption varies		
		TWA	1 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Not classifiable as a human carcinogen varies		
		TWA	0.02 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Not classifiable as a human carcinogen varies		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 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.

Body Protection
Impervious clothing, Flame retardant protective clothing, 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 (EN 143) respirator cartridges as a backup to engineering controls. If th full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

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: 1,244 °C (2,271 °F) - lit.
f)	Initial boiling point and boiling range	1,962 °C (3,564 °F) - 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	7.3 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Exposure to moisture

10.5 Incompatible materials
acids, Halogens, Bases, Phosphorus, Sulphur oxides, Peroxides

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Manganese/manganese oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 9,000 mg/kg(Manganese)
Inhalation: No data available(Manganese)
Dermal: No data available(Manganese)
No data available(Manganese)

Skin corrosion/irritation
Skin - Rabbit(Manganese)
Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit(Manganese)
Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation
No data available(Manganese)

Germ cell mutagenicity

No data available(Manganese)

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available(Manganese)

May cause reproductive disorders.(Manganese)

Specific target organ toxicity - single exposure
No data available(Manganese)

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available(Manganese)

Additional Information
RTECS: OO9275000

Men exposed to manganese dusts showed a decrease in fertility. Chronic man system. Early symptoms include languor, sleepiness and weakness in the le disturbances such as uncontrollable laughter and a spastic gait with tend cases. High incidence of pneumonia has been found in workers exposed to t(Manganese)

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence(Manganese)

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 40 mg/l - 48 h(Manganese)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available(Manganese)

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber b highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)
Poison Inhalation Hazard: No

IMDG
UN number: 3208 Class: 4.3 Packing group: I EMS-No: F-G, S-N
Proper shipping name: METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S. (Manganese)

IATA
UN number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

SARA 311/312 Hazards
Reactivity Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H260	In contact with water releases flammable gases which may ignite spontaneously.
H402	Harmful to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	2

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	2
Special hazard.I:	W

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956
Version: 6.1 Revision Date: 05/28/2017 Print Date: 06/28/2019

SAFETY DATA SHEET

Version 3.15
Revision Date 03/05/2018
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Mercury

Product Number : 215457
Brand : Sigma-Aldrich
Index-No. : 080-001-00-0

CAS-No. : 7439-97-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Inhalation (Category 2), H330
Reproductive toxicity (Category 1B), H360
Specific target organ toxicity - repeated exposure (Category 1), H372
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H330 Fatal if inhaled.
H360 May damage fertility or the unborn child.
H372 Causes damage to organs through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ 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.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
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 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Hg
Molecular weight	:	200.59 g/mol
CAS-No.	:	7439-97-6
EC-No.	:	231-106-7
Index-No.	:	080-001-00-0

Hazardous components

Component	Classification	Concentration
Mercury		
	Acute Tox. 2; Repr. 1B; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H330, H360, H372, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting 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 breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

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
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal. In some instances, a mercury spill kit may be used. Please consult with your site EHS representative to determine the most appropriate clean up method.Soak up with inert absorbent material and dispose of as hazardous waste. 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 inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Store under inert gas.
Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Mercury	7439-97-6	C	0.1 mg/m3	USA. NIOSH Recommended Exposure Limits
	Remarks	Potential for dermal absorption		
		CEIL	1.0mg/10m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		TWA	0.05 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		

		TWA	0.025 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Kidney damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	0.05 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		

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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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 respirator with multi-purpose combination (US) or type ABEK (EN 14387) 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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: silver, white

b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -38.87 °C (-37.97 °F) - lit.
f)	Initial boiling point and boiling range	356.6 °C (673.9 °F) - 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	< 0.01 hPa (< 0.01 mmHg) at 20 °C (68 °F) 1 hPa (1 mmHg) at 126 °C (259 °F)
l)	Vapour density	6.93 - (Air = 1.0)
m)	Relative density	13.55 g/cm3 at 25 °C (77 °F)
n)	Water solubility	0.00006 g/l at 25 °C (77 °F)
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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

Relative vapour density	6.93 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Ammonia, Azides, Nitrates, Chlorates, Copper

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Mercury/mercury oxides.
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

LC50 Inhalation - Rat - male - 2 h - < 27 mg/m3

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
Presumed human reproductive toxicant

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: OV4550000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	mortality LC50 - Cyprinus carpio (Carp) - 0.160 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential

Bioaccumulation	Carassius auratus (goldfish) - 1,789 d - 0.25 µg/l

Bioconcentration factor (BCF): 155,986

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
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. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2809 Class: 8 (6.1) Packing group: III
Proper shipping name: A. W. Mercury
Reportable Quantity (RQ): 1 lbs
Poison Inhalation Hazard: No

IMDG

IATA
UN number: 2809 Class: 8 (6.1) Packing group: III
Proper shipping name: Mercury

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Mercury	7439-97-6	2015-11-23

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Mercury	7439-97-6	2015-11-23

	CAS-No.	Revision Date
Mercury	7439-97-6	2015-11-23

New Jersey Right To Know Components

	CAS-No.	Revision Date
Mercury	7439-97-6	2015-11-23

California Prop. 65 Components

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Mercury	CAS-No. 7439-97-6	Revision Date 2013-12-20

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H330	Fatal if inhaled.
H360	May damage fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Repr.	Reproductive toxicity

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.15 Revision Date: 03/05/2018 Print Date: 06/28/2019

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006
Version 6.0 Revision Date 10.11.2016
Print Date 21.01.2019
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Methylene chloride

Product Number : M1550000
Brand : Sigma-Aldrich
REACH No. : A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No. : 75-09-2

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 Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008
Skin irritation (Category 2), H315
Eye irritation (Category 2), H319
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - repeated exposure, Oral (Category 2), Liver, Blood, H373
Specific target organ toxicity - repeated exposure, Inhalation (Category 2), Central nervous system, H373

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008
Pictogram



Signal word Warning

Hazard statement(s)
H315 Causes skin irritation.

H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H373	May cause damage to organs (Liver, Blood) through prolonged or repeated exposure if swallowed.
H373	May cause damage to organs (Central nervous system) through prolonged or repeated exposure if inhaled.

Precautionary statement(s)	
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	CH2Cl2
Molecular weight	:	84.93 g/mol
CAS-No.	:	75-09-2

Hazardous ingredients according to Regulation (EC) No 1272/2008

Component		Classification	Concentration
Methylene chloride			
CAS-No. EC-No. Index-No.	75-09-2 200-838-9 602-004-00-3	Skin Irrit. 2; Eye Irrit. 2; Carc. 2; STOT SE 3; STOT RE 2; H315, H319, H351, H336, H335, H373, H373	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 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. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

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

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 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
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non Combustible Liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 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.

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 (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engine 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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	-97.0 °C
f)	Initial boiling point and boiling range	40.0 °C at 1,013.2 hPa
g)	Flash point	No data available
h)	Evaporation rate	0.71
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 19 %(V) Lower explosion limit: 12 %(V)
k)	Vapour pressure	470.9 hPa at 20.0 °C
l)	Vapour density	2.93 - (Air = 1.0)
m)	Relative density	1.32 g/cm3
n)	Water solubility	slightly soluble
o)	Partition coefficient: n-octanol/water	log Pow: 1.25
p)	Auto-ignition temperature	556.1 °C 662.0 °C
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

Relative vapour density 2.93 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heat, flames and sparks. Exposure to sunlight.

10.5 Incompatible materials

Alkali metals, Aluminum, Strong oxidizing agents, Bases, Amines, Magnesium, Strong acids and strong bases, Vinyl compounds

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - > 2,000 mg/kg(Methylene chloride)
LC50 Inhalation - Rat - 52,000 mg/m3(Methylene chloride)
LD50 Dermal - Rat - > 2,000 mg/kg(Methylene chloride)
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit(Methylene chloride)
Result: Irritating to skin. - 24 h
(Draize Test)

Serious eye damage/eye irritation
Eyes - Rabbit(Methylene chloride)
Result: Irritating to eyes. - 24 h
(Draize Test)

Respiratory or skin sensitisation
No data available(Methylene chloride)

Germ cell mutagenicity

(Methylene chloride)
Rat
DNA damage

Carcinogenicity
Limited evidence of carcinogenicity in animal studies(Methylene chloride)
Suspected human carcinogens(Methylene chloride)

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

No data available(Methylene chloride)

Specific target organ toxicity - single exposure
May cause respiratory irritation.(Methylene chloride)
May cause drowsiness or dizziness.(Methylene chloride)

Specific target organ toxicity - repeated exposure
Inhalation - May cause damage to organs through prolonged or repeated exposure. - Central nervous system
Oral - May cause damage to organs through prolonged or repeated exposure. - Liver, Blood

Aspiration hazard
No data available(Methylene chloride)

Additional Information
RTECS: Not available

Dichloromethane is metabolized in the body producing carbon monoxide which blood, reducing the oxygen-carrying capacity of the blood., Acts as a simple asphyxiant by displacing air., anesthetic effects, Difficulty in breathing, Headache, Dizziness, Prolonged or repeated contact with skin may cause:, defatting, Dermatitis, Contact with eyes can cause:, Redness, Blurred vision, Provokes tears., Effects due to ingestion may include:, Gastrointestinal discomfort, Central nervous system depression, Paresthesia., Drowsiness, Convulsions, Conjunctivitis., Pulmonary edema. Effects may be delayed., Irregular breathing., Stomach/intestinal disorders, Nausea, Vomiting, Increased liver enzymes., Weakness, Heavy or prolonged skin exposure may result in the absorption of harmful amounts of material., Abdominal pain(Methylene chloride)
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.(Methylene chloride)

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 193.00 mg/l - 96 h(Methylene chloride)
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 130 mg/l - 96 h(Methylene chloride)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 1,682.00 mg/l - 48 h(Methylene chloride)

12.2 Persistence and degradability

Biodegradability	Result: < 26 % - Not readily biodegradable. (OECD Test Guideline 301C)

12.3 Bioaccumulative potential
Does not bioaccumulate.

12.4 Mobility in soil
No data available(Methylene chloride)

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number
ADR/RID: IMDG: IATA:

14.2 UN proper shipping name
ADR/RID:
IMDG:
IATA:

14.3 Transport hazard class(es)
ADR/RID: IMDG: IATA:

14.4 Packaging group
ADR/RID: IMDG: IATA:

14.5 Environmental hazards
ADR/RID: IMDG Marine pollutant: IATA:

14.6 Special precautions for user
No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical safety assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure if inhaled.

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.

SAFETY DATA SHEET

Version 6.1
Revision Date 05/26/2018
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Naphthalene

Product Number : 147141
Brand : Aldrich
Index-No. : 601-052-00-2

CAS-No. : 91-20-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable solids (Category 2), H228

Acute toxicity, Oral (Category 4), H302

Carcinogenicity (Category 2), H351

Acute aquatic toxicity (Category 1), H400

Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)

H228	Flammable solid.
H302	Harmful if swallowed.
H351	Suspected of causing cancer.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting equipment.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Molecular weight	:	128.17 g/mol
CAS-No.	:	91-20-3
EC-No.	:	202-049-5
Index-No.	:	601-052-00-2

Hazardous components

Component	Classification	Concentration
Naphthalene		
	Flam. Sol. 2; Acute Tox. 4; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H228, H302, H351, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

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
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

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.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): 4.1B: Flammable solid hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Naphthalene	91-20-3	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Hemolytic anemia Upper Respiratory Tract irritation Cataract Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	10 ppm 50 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	15 ppm 75 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	10 ppm 50 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		PEL	0.1 ppm 0.5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Naphthalene	91-20-3	1-Naphthol + 2-Naphthol			ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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, Flame retardant antistatic protective clothing., 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 N100 (US) or type P3 (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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: flakes, granules Colour: white
b)	Odour	aromatic
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 80 - 82 °C (176 - 180 °F) - lit.
f)	Initial boiling point and boiling range	218 °C (424 °F) - lit.
g)	Flash point	80.0 °C (176.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 5.9 %(V) Lower explosion limit: 0.9 %(V)
k)	Vapour pressure	1.3 hPa at 53.0 °C (127.4 °F) 0.04 hPa at 25.0 °C(77.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.085 g/cm3 at 24.7 °C (76.5 °F)
n)	Water solubility	0.0308 g/l at 25 °C (77 °F) - OECD Test Guideline 105 - slightly soluble
o)	Partition coefficient: n-octanol/water	log Pow: 3.4 at 25 °C (77 °F)
p)	Auto-ignition temperature	526.0 °C (978.8 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	1.05 mm2/s at 81.5 °C (178.7 °F) -
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	31.8 mN/m at 100.0 °C (212.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 490.0 mg/kg
LC50 Inhalation - Rat - male and female - 4 h - > 0.4 mg/l
(OECD Test Guideline 403)
LD50 Dermal - Rabbit - 20,000 mg/kg
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation

Respiratory or skin sensitisation
Maximisation Test - Guinea pig
Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
Ames test
S. typhimurium
Result: negative

Rat - male
Result: negative

Carcinogenicity

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Naphthalene)
NTP:	RAHC - Reasonably anticipated to be a human carcinogen (Naphthalene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

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

Additional Information

Repeated dose toxicity - Rat - male and female - Oral - No observed adverse effect level - 100 mg/kg - Lowest observed adverse effect level - 400 mg/kg
RTECS: QJ0525000

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., Naphthalene is retinotoxic and systemic absorption of its vapors above 15ppm, may result in:, cataracts, optic neuritis, corneal injury, Eye irritation, Ingestion may provoke the following symptoms:, hemolytic anemia, hemoglobinuria, Nausea, Headache, Vomiting, Gastrointestinal disturbance, Convulsions, anemia, Kidney injury may occur., Seizures., Coma.

Heart -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Pimephales promelas (fathead minnow) - 7.9 mg/l - 96 h(Naphthalene) (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 2.16 mg/l - 48 h(Naphthalene)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d(Naphthalene) Result: 2 % - Not readily biodegradable.

12.3 Bioaccumulative potential

Bioaccumulation	Fish(Naphthalene) Bioconcentration factor (BCF): 427 - 1,158

12.4 Mobility in soil
No data available(Naphthalene)

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1334 Class: 4.1 Packing group: III

Proper shipping name: Naphthalene, refined
Reportable Quantity (RQ) : 100 lbs

Marine pollutant: no
Poison Inhalation Hazard: No

IMDG
UN number: 1334 Class: 4.1 Packing group: III EMS-No: F-A, S-G
Proper shipping name: NAPHTHALENE, REFINED
Marine pollutant : yes

IATA
UN number: 1334 Class: 4.1 Packing group: III
Proper shipping name: Naphthalene, refined

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Naphthalene	91-20-3	2007-03-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Naphthalene	91-20-3	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Naphthalene	91-20-3	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Naphthalene	91-20-3	2007-03-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Naphthalene	91-20-3	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H228	Flammable solid.
H302	Harmful if swallowed.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	2
Physical Hazard	2

NFPA Rating

Health hazard:	2
Fire Hazard:	2
Reactivity Hazard:	2

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956
Version: 6.1 Revision Date: 05/26/2018 Print Date: 06/28/2019

SAFETY DATA SHEET

Version 3.4
Revision Date 06/27/2014
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Heptadecafluorooctanesulfonic acid solution

Product Number : 77283
Brand : Aldrich

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
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 3), H331
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 1B), H360
Effects on or via lactation, H362
Specific target organ toxicity - repeated exposure (Category 1), H372
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H331 Toxic if inhaled.
H351 Suspected of causing cancer.
H360 May damage fertility or the unborn child.
H362 May cause harm to breast-fed children.
H372 Causes damage to organs through prolonged or repeated exposure.

H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P263	Avoid contact during pregnancy/ while nursing.
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.
P273	Avoid release to the environment.
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): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position 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.
P391	Collect spillage.
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 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Formula : $C_8HF_{17}O_3S$

Molecular Weight : 500.13 g/mol

Hazardous components

Component		Classification	Concentration
Heptadecafluorooctane-1-sulphonic acid			
CAS-No. EC-No. Index-No.	1763-23-1 217-179-8 607-624-00-8	Acute Tox. 4; Skin Corr. 1B; Eye Dam. 1; Carc. 2; Repr. 1B; Lact. ; STOT RE 1; Aquatic Acute 2; Aquatic Chronic 2; H302 + H332, H314, H351, H360, H362, H372, H411	30 - 60 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Carbon oxides, Sulphur oxides, Hydrogen fluoride

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
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

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
Soak up with inert absorbent material and dispose of as hazardous waste. 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 inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). 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.

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 respirator with multi-purpose combination (US) or type ABEK (EN 14387) 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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: light red
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	no data available
f)	Initial boiling point and boiling range	no data available
g)	Flash point	no data available
h)	Evapouration 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	1.250 g/cm3
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
no data available

Inhalation: no data available

Dermal: no data available

no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a

carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available
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

Additional Information
RTECS: Not available

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
no data available

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
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. 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

DOT (US)
UN number: 3265 Class: 8 Packing group: II
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (Heptadecafluorooctane-1-sulphonic acid)
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 3265 Class: 8 Packing group: II EMS-No: F-A, S-B
Proper shipping name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Heptadecafluorooctane-1-sulphonic acid)
Marine pollutant: No

IATA
UN number: 3265 Class: 8 Packing group: II
Proper shipping name: Corrosive liquid, acidic, organic, n.o.s. (Heptadecafluorooctane-1-sulphonic acid)

15. REGULATORY INFORMATION

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	
Heptadecafluorooctane-1-sulphonic acid	1763-23-1	2009-07-17

New Jersey Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	
Heptadecafluorooctane-1-sulphonic acid	1763-23-1	2009-07-17

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Dam.	Serious eye damage
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H331	Toxic if inhaled.
H351	Suspected of causing cancer.
H360	May damage fertility or the unborn child.
H362	May cause harm to breast-fed children.
H372	Causes damage to organs through prolonged or repeated exposure.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.
Lact.	Effects on or via lactation

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0

Reactivity Hazard: 0

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.4 Revision Date: 06/27/2014 Print Date: 06/28/2019

SAFETY DATA SHEET

Version 6.1
Revision Date 03/12/2019
Print Date 06/28/2019

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Perfluorooctanoic acid

Product Number : 171468
Brand : Aldrich
CAS-No. : 335-67-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Serious eye damage (Category 1), H318
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 1B), H360
Effects on or via lactation, H362
Specific target organ toxicity - repeated exposure (Category 1), Liver, H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

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Hazard statement(s)	
H302 + H332	Harmful if swallowed or if inhaled.
H318	Causes serious eye damage.
H351	Suspected of causing cancer.
H360	May damage fertility or the unborn child.
H362	May cause harm to breast-fed children.
H372	Causes damage to organs (Liver) through prolonged or repeated exposure.

Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P263	Avoid contact during pregnancy/ while nursing.
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 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338 + P310	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.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Pentadecafluorooctanoic acid Perfluorocaprylic acid Perfluorooctanoic acid
Formula	:	$C_8HF_{15}O_2$
Molecular weight	:	414.07 g/mol
CAS-No.	:	335-67-1
EC-No.	:	206-397-9

Component	Classification	Concentration
Pentadecafluorooctanoic acid		
	Acute Tox. 4; Eye Dam. 1; Carc. 2; Repr. 1B; Lact. ; STOT RE 1; H302, H332, H318, H351, H360, H362, H372	<= 100 %

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For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Move out of dangerous area.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
Continue rinsing eyes during transport to hospital.Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 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
Carbon oxides, Hydrogen fluoride

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

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.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.
Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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).

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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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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 N100 (US) or type P3 (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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: flakes Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	2.6 at 1 g/l
e)	Melting point/freezing point	Melting point/range: 55 - 56 °C (131 - 133 °F) - lit.
f)	Initial boiling point and boiling range	189 °C 372 °F at 981 hPa - lit.

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g)	Flash point	()No data available
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	0.69 hPa at 25 °C (77 °F)
l)	Vapour density	No data available
m)	Relative density	0.900 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Bases, Oxidizing agents, Reducing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen fluoride
Other decomposition products - No data available
In the event of fire: see section 5

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Inhalation: No data available
Dermal: No data available
LD50 Intraperitoneal - Rat - 189 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity

Rat
DNA damage

Rat
DNA damage

Carcinogenicity
Suspected human carcinogens

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Pentadecafluorooctanoic acid)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
Effects on or via lactation
Presumed human reproductive toxicant
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure. - Liver

Aspiration hazard
No data available

Additional Information
RTECS: RH0781000

Cough, Shortness of breath, Headache, Nausea, Vomiting

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

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SECTION 12: Ecological information

12.1 Toxicity
No data available

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
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. 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.

SECTION 14: Transport information

DOT (US)
UN number: 3261 Class: 8 Packing group: III
Proper shipping name: Corrosive solid, acidic, organic, n.o.s. (Pentadecafluorooctanoic acid)
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 3261 Class: 8 Packing group: III EMS-No: F-A, S-B
Proper shipping name: CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (Pentadecafluorooctanoic acid)

IATA
UN number: 3261 Class: 8 Packing group: III
Proper shipping name: Corrosive solid, acidic, organic, n.o.s. (Pentadecafluorooctanoic acid)

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SECTION 15: Regulatory information

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

Pentadecafluorooctanoic acid	CAS-No. 335-67-1	Revision Date

Pentadecafluorooctanoic acid	CAS-No. 335-67-1	Revision Date

New Jersey Right To Know Components

Pentadecafluorooctanoic acid	CAS-No. 335-67-1	Revision Date

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 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.

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SAFETY DATA SHEET

Version 5.8
Revision Date 07/28/2018
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Phenol

Product Number : P1037
Brand : Sigma-Aldrich
Index-No. : 604-001-00-2

CAS-No. : 108-95-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Germ cell mutagenicity (Category 2), H341
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled.
H314	Causes severe skin burns and eye damage.
H341	Suspected of causing genetic defects.
H373	May cause damage to organs through prolonged or repeated exposure.
H402	Harmful to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ 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.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
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 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338 + P310	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.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
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 Hazards not otherwise classified (HNOC) or not covered by GHS

Vesicant., Rapidly absorbed through skin.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Hydroxybenzene
Formula	:	C_6H_6O
Molecular weight	:	94.11 g/mol
CAS-No.	:	108-95-2
EC-No.	:	203-632-7
Index-No.	:	604-001-00-2
Registration number	:	01-2119471329-32-XXXX

Hazardous components

Component	Classification	Concentration
Phenol		
	Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; Muta. 2; STOT RE 2; Aquatic Acute 3; Aquatic Chronic 2; H301 + H311 + H331, H314, H341, H373, H402, H411	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting 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 vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

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.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C

Light sensitive. Handle and store under inert gas.
Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Phenol	108-95-2	TWA	5 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Upper Respiratory Tract irritation Lung damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	5 ppm 19 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		C	15.6 ppm 60 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption 15 minute ceiling value		
		TWA	5 ppm 19 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation The value in mg/m3 is approximate.		
		PEL	5 ppm 19 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Aromatic compound	-	Phenol	250mg/g Creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

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.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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 N100 (US) or type P3 (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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	6.0
e)	Melting point/freezing point	Melting point/range: 38 - 43 °C (100 - 109 °F)
f)	Initial boiling point and boiling range	182.0 °C (359.6 °F)
g)	Flash point	79.0 °C (174.2 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 8.6 %(V) Lower explosion limit: 1.7 %(V)
k)	Vapour pressure	6.3 hPa (4.7 mmHg) at 55.0 °C (131.0 °F) 0.5 hPa (0.4 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.07 g/cm3

n)	Water solubility	84 g/l at 20 °C (68 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 1.46
p)	Auto-ignition temperature	715.0 °C (1,319.0 °F)
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

Surface tension	38.2 mN/m at 50.0 °C (122.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Strong bases, Strong acids

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 410.0 - 650.0 mg/kg

LD50 Oral - Rat - 317.0 mg/kg
Remarks: Behavioral:Convulsions or effect on seizure threshold.

LC50 Inhalation - Rat - 8 h - 900 mg/m3

LD50 Dermal - Rabbit - 630.0 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Severe skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive
(OECD Test Guideline 405)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
In vitro tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: SJ3325000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Circulatory collapse, tachypnea, paralysis, Convulsions, Coma., necrosis of mouth and G.I. Tract, Jaundice, respiratory failure, cardiac arrest To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Leuciscus idus (Golden orfe) - 14.00 - 25.00 mg/l - 48 h
	LC50 - Carassius auratus (goldfish) - 36.10 - 68.80 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 56 mg/l - 48 h
Toxicity to algae	EC50 - Chlorella vulgaris (Fresh water algae) - 370.00 mg/l - 96 h

12.2 Persistence and degradability

Biodegradability	Result: - Readily biodegradable.

12.3 Bioaccumulative potential

Bioaccumulation	Danio rerio (zebra fish) - 5 h - 2 mg/l Bioconcentration factor (BCF): 17.5 Remarks: Does not bioaccumulate.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1671 Class: 6.1 Packing group: II
Proper shipping name: Phenol, solid
Reportable Quantity (RQ): 1000 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 1671 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: PHENOL, SOLID
Marine pollutant:yes

IATA

UN number: 1671 Class: 6.1 Packing group: II
Proper shipping name: Phenol, solid

15. REGULATORY INFORMATION

SARA 302 Components

The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Phenol	108-95-2	2007-07-01

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Phenol	108-95-2	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Phenol	108-95-2	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Phenol	108-95-2	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Dam.	Serious eye damage
H301	Toxic if swallowed.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled.
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H331	Toxic if inhaled.
H341	Suspected of causing genetic defects.
H373	May cause damage to organs through prolonged or repeated exposure.

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.8 Revision Date: 07/28/2018 Print Date: 06/28/2019

SAFETY DATA SHEET

Version 6.2
Revision Date 05/28/2017
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Sodium

Product Number : 483745
Brand : Aldrich

CAS-No. : 7440-23-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Carcinogenicity (Category 1A), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H260 In contact with water releases flammable gases which may ignite spontaneously.
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
H350 May cause cancer.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P223	Keep away from any possible contact with water, because of violent reaction and possible flash fire.
P231 + P232	Handle under inert gas. Protect from moisture.
P260	Do not breathe dust or mist.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P281	Use personal protective equipment as required.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	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.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P402 + P404	Store in a dry place. Store in a closed container.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Reacts violently with water.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Formula : Na
Molecular weight : 22.99 g/mol

Hazardous components

Component		Classification	Concentration
Sodium			
CAS-No. EC-No. Index-No.	7440-23-5 231-132-9 011-001-00-0	Water-react. 1; Skin Corr. 1B; Eye Dam. 1; H260, H314	>= 90 - <= 100 %
Paraffin oils			
CAS-No. EC-No.	8012-95-1 232-384-2	Asp. Tox. 1; H304, H304	>= 90 - <= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Dry powder

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Sodium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. 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 formation of dust and aerosols.Further processing of solid materials may result in the formation of combu formation should be taken into consideration before additional processing
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Handle and store under inert gas. Air sensitive.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Paraffin oils	8012-95-1	STEL	10.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation 2015 Adoption Not classifiable as a human carcinogen		
		Upper Respiratory Tract irritation 2015 Adoption Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		

		TWA	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
		TWA	5 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	5 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10 mg/m3	USA. NIOSH Recommended Exposure Limits

Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 industria 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, Flame retardant protective clothing, 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 (EN 143) respirator cartridges as a backup to engineering controls. If th full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: Pieces

b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 97.8 °C (208.0 °F) - lit.
f)	Initial boiling point and boiling range	883 °C (1621 °F) - lit.
g)	Flash point	82 °C (180 °F)
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	0.97 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Air Do not allow water to enter container.
Exposure to moisture

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sodium oxides
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available
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

Additional Information
RTECS: Not available

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Aspiration may lead to:, lipid pneumonia, Effects due to ingestion may include:, laxative effect, Gastrointestinal disturbance, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

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
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber b highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chem scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1428 Class: 4.3 Packing group: I
Proper shipping name: Sodium
Reportable Quantity (RQ) : 10 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1428 Class: 4.3 Packing group: I EMS-No: F-G, S-N
Proper shipping name: SODIUM

IATA
UN number: 1428 Class: 4.3 Packing group: I
Proper shipping name: Sodium
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Reactivity Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Asp. Tox.	Aspiration hazard
Eye Dam.	Serious eye damage
H260	In contact with water releases flammable gases which may ignite spontaneously.
H304	May be fatal if swallowed and enters airways.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H350	May cause cancer.
Skin Corr.	Skin corrosion
Water-react.	Substances and mixtures, which in contact with water, emit flammable gases

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	4
Physical Hazard	2

NFPA Rating

Health hazard:	3
Fire Hazard:	4
Reactivity Hazard:	2
Special hazard.I:	W

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.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956
Version: 6.2 Revision Date: 05/28/2017 Print Date: 06/28/2019

SAFETY DATA SHEET

Version 4.19
Revision Date 08/07/2018
Print Date 11/10/2018

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Xylenes

Product Number : 247642
Brand : Sigma-Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - repeated exposure (Category 2), H373
Specific target organ toxicity - repeated exposure, Inhalation (Category 2), Central nervous system, Liver, Kidney, H373
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs (Central nervous system, Liver, Kidney)

	through prolonged or repeated exposure if inhaled.
H401	Toxic to aquatic life.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Xylene mixture of isomers

Formula : C_8H_{10}

Molecular weight : 106.17 g/mol

Registration number : 01-2119488216-32-XXXX

Hazardous components

Component	Classification	Concentration
Xylene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; STOT SE 3; STOT RE 2; Asp. Tox. 1; Aquatic Acute 2; H226, H304, H315, H332, H335, H373, H401	90 - 100 %
Ethylbenzene		
	Flam. Liq. 2; Acute Tox. 4; Carc. 2; STOT RE 2; Asp. Tox. 1; Aquatic Acute 2; H225, H304, H332, H351, H373, H401	20 - 30 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Dry powder Dry sand

Unsuitable extinguishing media
Do NOT use water jet.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

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
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

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 inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Xylene	1330-20-7	STEL	150 ppm 655 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		C	300 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		PEL	100 ppm 435 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	The value in mg/m3 is approximate.		
		TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
Ethylbenzene	100-41-4	TWA	20 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Cochlear impair Kidney damage (nephropathy) Upper Respiratory Tract irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		

		TWA	100 ppm 435 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	125 ppm 545 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		PEL	5 ppm 22 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	30 ppm 130 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
	-	Methylhippuric acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
alkylbenzene		Sum of mandelic acid and phenyl glyoxylic acid	0.15g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 and safety officer 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, Flame retardant antistatic protective clothing., 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 respirator with multi-purpose combination (US) or type ABEK (EN 14387) 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).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	< 0 °C (< 32 °F)
f)	Initial boiling point and boiling range	137 - 140 °C (279 - 284 °F) - lit.
g)	Flash point	25 °C (77 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 7 %(V) Lower explosion limit: 1.1 %(V)
k)	Vapour pressure	24 hPa (18 mmHg) at 37.70 °C (99.86 °F)
l)	Vapour density	3.67 - (Air = 1.0)
m)	Relative density	0.86 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition 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

Relative vapour density	3.67 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

LD50 Oral - Rat - male - 3,523 mg/kg
Remarks: (ECHA)

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Skin - Rabbit
Result: Irritations
Remarks: (IUCLID)

Drying-out effect resulting in rough and chapped skin. After long-term exposure to the chemical: Dermatitis

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

In animal experiments: - Mouse
Result: Does not cause skin sensitisation.
(OECD Test Guideline 429)

Germ cell mutagenicity
No data available

Mutagenicity (mammal cell test): chromosome aberration.
Result: negative
(National Toxicology Program)

Ames test
Salmonella typhimurium
Result: negative

Carcinogenicity

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Ethylbenzene)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available
Acute oral toxicity - Gastrointestinal disturbance
Acute inhalation toxicity - mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract, Inhalation may lead to the formation of oedemas in the respiratory tract.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Blurred vision, Incoordination., Headache, Nausea, Vomiting, Dizziness, Weakness, anemia, Prolonged or repeated exposure to skin causes defatting and dermatitis.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:
Systemic effects:
Headache, somnolence, Dizziness, euphoria, agitation, spasms, respiratory paralysis, Unconsciousness, narcosis, inebriation
Effect potentiated by: ethanol
Other dangerous properties can not be excluded.
Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence (Ethylbenzene)

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

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
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Toxic to aquatic life.
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes
Reportable Quantity (RQ): 100 lbsReportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1307 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: XYLENES

IATA
UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Ethylbenzene	100-41-4	2007-07-01
Xylene	1330-20-7	1993-04-24

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Reportable Quantity : F003 lbs

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Xylene	1330-20-7	1993-04-24
Ethylbenzene	100-41-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Xylene	1330-20-7	1993-04-24
Ethylbenzene	100-41-4	2007-07-01

California Prop. 65 Components

, which is/are known to the State of California to cause cancer.	CAS-No.	Revision Date
For more information go to www.P65Warnings.ca.gov.	100-41-4	2007-09-28
Ethylbenzene		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Asp. Tox.	Aspiration hazard
Carc.	Carcinogenicity
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H332	Harmful if inhaled.

H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure if inhaled.
H401	Toxic to aquatic life.
Skin Irrit.	Skin irritation
STOT RE	Specific target organ toxicity - repeated exposure
STOT SE	Specific target organ toxicity - single exposure

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.19 Revision Date: 08/07/2018 Print Date: 11/10/2018

SAFETY DATA SHEET

Version 6.0
Revision Date 05/28/2017
Print Date 06/28/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Zinc

Product Number : 324930
Brand : Aldrich
Index-No. : 030-001-00-1

CAS-No. : 7440-66-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Pyrophoric solids (Category 1), H250
Self-heating substances and mixtures (Category 1), H251
Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H250 Catches fire spontaneously if exposed to air.
H251 Self-heating: may catch fire.
H260 In contact with water releases flammable gases which may ignite spontaneously.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P222	Do not allow contact with air.
P223	Do not allow contact with water.
P231 + P232	Handle under inert gas. Protect from moisture.
P235 + P410	Keep cool. Protect from sunlight.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P402 + P404	Store in a dry place. Store in a closed container.
P407	Maintain air gap between stacks/ pallets.
P413	Store bulk masses greater than .? kg/ .? lbs at temperatures not exceeding .? °C/ .? °F.
P420	Store away from other materials.
P422	Store contents under inert gas.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Combustible dust

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Zn
Molecular weight	:	65.39 g/mol
CAS-No.	:	7440-66-6
EC-No.	:	231-175-3
Index-No.	:	030-001-00-1

Hazardous components

Component	Classification	Concentration
Zinc powder (pyrophoric)		
	Pyr. Sol. 1; Self-heat. 1; Water-react. 1; Aquatic Acute 1; Aquatic Chronic 1; H250, H251, H260, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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.Move out of dangerous area.

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. 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
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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
Dry powder

5.2 Special hazards arising from the substance or mixture
Zinc/zinc oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

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
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Further processing of solid materials may result in the formation of combu formation should be taken into consideration before additional processing
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Keep in a dry place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Components with workplace control parameters
Contains no substances with occupational exposure limit values.
Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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.

Protective gloves against thermal risks

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, 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 industria situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Flame retardant protective clothing, 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 (EN 143) respirator cartridges as a backup to engineering controls. If th full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

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: 420 °C (788 °F) - lit.
f)	Initial boiling point and boiling range	907 °C (1665 °F) - lit.
g)	Flash point	()No data available
h)	Evaporation rate	No data available

i)	Flammability (solid, gas)	May form combustible dust concentrations in air.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1 hPa at 487 °C (909 °F)
l)	Vapour density	No data available
m)	Relative density	7.133 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 5
p)	Auto-ignition temperature	The substance or mixture is classified as self heating with the category 1., The substance or mixture is pyrophoric with the category 1.
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
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Exposure to moisture

10.5 Incompatible materials
Strong acids and oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Zinc/zinc oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data availableZinc powder (pyrophoric)
Inhalation: No data available(Zinc powder (pyrophoric))
Dermal: No data available(Zinc powder (pyrophoric))
No data available(Zinc powder (pyrophoric))

Skin corrosion/irritation
No data available(Zinc powder (pyrophoric))

Serious eye damage/eye irritation
No data available(Zinc powder (pyrophoric))

Respiratory or skin sensitisation
Did not cause sensitisation on laboratory animals.(Zinc powder (pyrophoric))

Germ cell mutagenicity

No data available(Zinc powder (pyrophoric))

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available(Zinc powder (pyrophoric))

No data available(Zinc powder (pyrophoric))

Specific target organ toxicity - single exposure
No data available(Zinc powder (pyrophoric))

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available(Zinc powder (pyrophoric))

Additional Information
RTECS: ZG8600000

chills, dry throat, sweet taste, Fever, Cough, Nausea, Vomiting, Weakness(Zinc powder (pyrophoric))
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.(Zinc powder (pyrophoric))

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Cyprinus carpio (Carp) - 450.0 µg/l - 96.0 h(Zinc powder (pyrophoric))
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 0.068 mg/l - 48 h(Zinc powder (pyrophoric))
	mortality NOEC - Daphnia (water flea) - 0.101 - 0.14 mg/l - 7 d(Zinc powder (pyrophoric))

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Algae - 7 d at 16 °C - 5 µg/l(Zinc powder (pyrophoric))
	Bioconcentration factor (BCF): 466

12.4 Mobility in soil
No data available(Zinc powder (pyrophoric))

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber b highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1436 Class: 4.3 (4.2) Packing group: II
Proper shipping name: Zinc powder
Reportable Quantity (RQ) : 1000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1436 Class: 4.3 (4.2) Packing group: II EMS-No: F-G, S-O
Proper shipping name: ZINC POWDER
Marine pollutant : yes

IATA
UN number: 1436 Class: 4.3 (4.2) Packing group: II
Proper shipping name: Zinc powder

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Zinc powder (pyrophoric)	7440-66-6	1993-04-24

SARA 311/312 Hazards
Reactivity Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Zinc powder (pyrophoric)	7440-66-6	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Zinc powder (pyrophoric)	7440-66-6	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Zinc powder (pyrophoric)	7440-66-6	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H250	Catches fire spontaneously if exposed to air.
H251	Self-heating: may catch fire.
H260	In contact with water releases flammable gases which may ignite spontaneously.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	
Flammability:	3
Physical Hazard	1

NFPA Rating

Health hazard:	0
Fire Hazard:	3
Reactivity Hazard:	1
Special hazard.I:	W

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.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956
Version: 6.0 Revision Date: 05/28/2017 Print Date: 06/28/2019

Appendix F:

Community Air Monitoring Plan (CAMP)

SESI
CONSULTING ENGINEERS

Geotechnical
Environmental
Site Civil

959 Route 46E, Fl 3, Ste 300
Parsippany, NJ 07054
973.808.9050
www.sesi.org

COMMUNITY AIR MONITORING PLAN

For

Proposed Mixed-Use Development
2752-2768 Webster Avenue
Block 3273; Lot 100 (Former Lots 91 and 100)
Bronx, Bronx County, NY

Prepared for:

South Bronx Development I LLC

SESI Project No:
13581A

Date:
October 2025

Table of Contents

LIST OF ACRONYMS ..... **i**
1.0 INTRODUCTION **1**
2.0 OBJECTIVES **1**
3.0 METHODS **1**
3.1 CONTINUOUS MONITORNG 2
3.2 PERIODIC MONITORING 2
3.3 PARTICULATE MONITORING, RESPONSE LEVELS, AND ACTIONS 3
4.0 SPECIAL REQUIREMENTS FOR WORK WITHIN 20 FEET OF POTENTIALLY EXPOSED INDIVIDUAL STRUCTURES **4**

LIST OF ACRONYMS

Acronym	Definition
CAMP	Community Air Monitoring Plan
mcg/m^3	micrograms per cubic meter
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PID	Photoionization Detector
PM-10	Less than 10 micrometers
ppm	Parts Per Million
RI	Remedial Investigation
RIWP	Remedial Investigation Work Plan
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This document presents a Community Air Monitoring Plan (CAMP) for the Remedial Investigation Workplan (RIWP) for the proposed development of the property located at 2752-2768 Webster Avenue in the Bronx, Bronx County, New York (the Site). The Site consists of a 1.4-acre area parcel and is identified as Block 3273, Lot 100 (Former Lots 91 and 100) on local tax maps. The Site is located in a mixed-use commercial and residential neighborhood and is bounded by mixed-use commercial/residential buildings to the north, a Metro-North railroad and Fordham University and Preparatory School to the south, a warehouse to the east, and a laydown yard and parking lot to the west.

The Site is improved with one (1) approximately 9,350-square feet (sf) one-to-two-story warehouse and one (1) approximately 2,330-sf two-story former automotive repair garage building. The buildings were constructed in 1906. The Site was initially developed prior to 1896. Railroad tracks have been present at the Site since at least 1896. Historical Site operations included a sewer pipe yard in 1900, freight house from 1900 to 1950, engine room in 1945, cold storage and substation from at least 1978 to 2007, and automotive repair from at least 1992 to 2010. SESI identified that the most recent operations at the Site included a substation, cold storage facility, alcohol/liquor distributor, restaurants, and automotive repair garages. The Site is currently vacant and was recently acquired by the Requestor South Bronx Development I LLC after their members performed environmental due diligence with respect to the Site

2.0 OBJECTIVES

The objective of the CAMP is to provide a measure of protection for the downwind community from potential airborne contaminant releases that may arise during all ground intrusive activities, and potentially contaminated soil and material handling and staging. In addition, the CAMP is intended to ensure that dust and contaminants are not leaving the work zone.

3.0 METHODS

The CAMP will include continuous monitoring for particulate matter (e.g., airborne “dust”) and volatile organic compounds (VOCs) during the planned demolition and remediation

activities. Any CAMP exceedances will be reported to NYSDEC and NYSDOH on the same business day and as soon as possible. Notification of the exceedance will be sent via email along with the reason for the exceedance, the measure(s) taken to address the exceedance, and if the exceedance was resolved. In addition, the following NYSDEC and NYSDOH personnel will be provided weekly CAMP data summaries for review.

Name	Contact Information
NYSDEC Project Manager	TBD
NYSDOH Project Manager	TBD

3.1 CONTINUOUS MONITORNG

Continuous monitoring for particulates and VOCs will be conducted during all ground intrusive activities including soil borings, monitoring well installations, and soil vapor probe installations.

3.2 PERIODIC MONITORING

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

4.0 VOC MONITORNG, RESPONSE LEVELS, AND ACTIONS

VOC Monitoring, Response Levels, and Actions 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. The monitoring work will be performed using a photoionization detector (PID) equipped with a 10.6 ev lamp. The equipment will 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 (NYSDEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

3.3 PARTICULATE MONITORING, RESPONSE LEVELS, AND ACTIONS

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and

capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

4.0 SPECIAL REQUIREMENTS FOR WORK WITHIN 20 FEET OF POTENTIALLY EXPOSED INDIVIDUAL 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/m^3, 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.

Appendix G:

Citizen Participation Plan

NEW YORK STATE | Department of Environmental Conservation

Brownfield Cleanup Program

Citizen Participation Plan
for
Webster Ave Auto Repair and Substation Site

October 2025

Site #: _____
2752-2768 Webster Avenue
Bronx, NY 10458

Contents

Section **Page Number**

1. What is New York's Brownfield Cleanup Program? 3

2. Citizen Participation Activities 3

3. Major Issues of Public Concern 8

4. Site Information 8

5. Investigation and Cleanup Process 9

Appendix A - Project Contacts and Locations of Reports and Information 13

Appendix B - Site Contact List 15

Appendix C - Site Location Map 18

Appendix D – Brownfield Cleanup Program Process 19

* * * * *

Note: The information presented in this Citizen Participation Plan was current as of the date of its approval by the New York State Department of Environmental Conservation. Portions of this Citizen Participation Plan may be revised during the site's investigation and cleanup process.

Applicant: **South Bronx Development I LLC ("Applicant")**
Site Name: **Webster Ave Auto Repair and Substation Site ("Site")**
Site Address: **2752-2768 Webster Avenue, Bronx, NY 10458**
Site County: **County of Bronx**
Site Number: _____

1. What is New York's Brownfield Cleanup Program?

New York's Brownfield Cleanup Program (BCP) works with private developers to encourage the voluntary cleanup of contaminated properties known as "brownfields" so that they can be reused and developed. These uses include recreation, housing, and business.

A brownfield is any real property that is difficult to reuse or redevelop because of the presence or potential presence of contamination. A brownfield typically is a former industrial or commercial property where operations may have resulted in environmental contamination. A brownfield can pose environmental, legal, and financial burdens on a community. If a brownfield is not addressed, it can reduce property values in the area and affect economic development of nearby properties.

The BCP is administered by the New York State Department of Environmental Conservation (NYSDEC) which oversees Applicants who conduct brownfield site investigation and cleanup activities. An Applicant is a person who has requested to participate in the BCP and has been accepted by NYSDEC. The BCP contains investigation and cleanup requirements, ensuring that cleanups protect public health and the environment. When NYSDEC certifies that these requirements have been met, the property can be reused or redeveloped for the intended use.

For more information about the BCP, go online at:
http://www.dec.ny.gov/chemical/8450.html

2. Citizen Participation Activities

Why NYSDEC Involves the Public and Why It Is Important

NYSDEC involves the public to improve the process of investigating and cleaning up contaminated sites, and to enable citizens to participate more fully in decisions that affect their health, environment, and social well-being. NYSDEC provides opportunities for citizen involvement and encourages early two-way communication with citizens before decision makers form or adopt final positions.

Involving citizens affected and interested in site investigation and cleanup programs is important for many reasons. These include:

- Promoting the development of timely, effective site investigation and cleanup programs that protect public health and the environment;

- Improving public access to, and understanding of, issues and information related to a particular site and that site's investigation and cleanup process;

- Providing citizens with early and continuing opportunities to participate in NYSDEC's site investigation and cleanup process;

- Ensuring that NYSDEC makes site investigation and cleanup decisions that benefit from input that reflects the interests and perspectives found within the affected community;

- Encouraging dialogue to promote the exchange of information among the affected/interested public, State agencies, and other interested parties that strengthens trust among the parties, increases understanding of site and community issues and concerns, and improves decision making.

This Citizen Participation (CP) Plan provides information about how NYSDEC will inform and involve the public during the investigation and cleanup of the site identified above. The public information and involvement program will be carried out with assistance, as appropriate, from the Applicant.

Project Contacts

Appendix A identifies NYSDEC project contact(s) to whom the public should address questions or request information about the site's investigation and cleanup program. The public's suggestions about this CP Plan and the CP program for the site are always welcome. Interested people are encouraged to share their ideas and suggestions with the project contacts at any time.

Locations of Reports and Information

The locations of the reports and information related to the site's investigation and cleanup program also are identified in Appendix A. These locations provide convenient access to important project documents for public review and comment. Some documents may be placed on the NYSDEC web-site. If this occurs, NYSDEC will inform the public in fact sheets distributed about the site and by other means, as appropriate.

Site Contact List

Appendix B contains the site contact list. This list has been developed to keep the community informed about, and involved in, the site's investigation and cleanup process. The site contact list will be used periodically to distribute fact sheets that provide updates about the status of the project. These will include notifications of upcoming activities at the site (such as fieldwork), as well as availability of project documents and announcements about public comment periods.
The site contact list includes, at a minimum:

- chief executive officer and planning board chairperson of each county, city, town and village in which the site is located;
- residents, owners, and occupants of the site and properties adjacent to the site;
- the public water supplier which services the area in which the site is located;
- any person who has requested to be placed on the site contact list;
- the administrator of any school or day care facility located on or near the site for purposes of posting and/or dissemination of information at the facility;
- location(s) of reports and information.

The site contact list will be reviewed periodically and updated as appropriate. Individuals and organizations will be added to the site contact list upon request. Such requests should be submitted to the NYSDEC project contact(s) identified in Appendix A. Other additions to the site contact list may be made at the discretion of the NYSDEC project manager, in consultation with other NYSDEC staff as appropriate.

Note: The first site fact sheet (usually related to the draft Remedial Investigation Work Plan) is distributed both by paper mailing through the postal service and through DEC Delivers, its email listserv service. The fact sheet includes instructions for signing up with the appropriate county listserv to receive future notifications about the site. See http://www.dec.ny.gov/chemical/61092.html

Subsequent fact sheets about the site will be distributed exclusively through the listserv, except for households without internet access that have indicated the need to continue to receive site information in paper form. Please advise the NYSDEC site project manager identified in Appendix A if that is the case. Paper mailings may continue during the investigation and cleanup process for some sites, based on public interest and need.

CP Activities

The table at the end of this section identifies the CP activities, at a minimum, that have been and will be conducted during the site's investigation and cleanup program. The flowchart in Appendix D shows how these CP activities integrate with the site investigation and cleanup process. The public is informed about these CP activities through fact sheets and notices distributed at significant points during the program. Elements of the investigation and cleanup process that match up with the CP activities are explained briefly in Section 5.

- **Notices and fact sheets** help the interested and affected public to understand contamination issues related to a site, and the nature and progress of efforts to investigate and clean up a site.

- **Public forums, comment periods and contact with project managers** provide opportunities for the public to contribute information, opinions and perspectives that have potential to influence decisions about a site's investigation and cleanup.

The public is encouraged to contact project staff at any time during the site's investigation and cleanup process with questions, comments, or requests for information.

This CP Plan may be revised due to changes in major issues of public concern identified in Section 3 or in the nature and scope of investigation and cleanup activities. Modifications may include additions to the site contact list and changes in planned citizen participation activities.

Technical Assistance Grant

NYSDEC must determine if the site poses a significant threat to public health or the environment. This determination generally is made using information developed during the investigation of the site, as described in Section 5.

If the site is determined to be a significant threat, a qualifying community group may apply for a Technical Assistance Grant (TAG). The purpose of a TAG is to provide funds to the qualifying group to obtain independent technical assistance. This assistance helps the TAG recipient to interpret and understand existing environmental information about the nature and extent of contamination related to the site and the development/implementation of a remedy.

An eligible community group must certify that its membership represents the interests of the community affected by the site, and that its members' health, economic well-being or enjoyment of the environment may be affected by a release or threatened release of contamination at the site.

As of the date the declaration (page 2) was signed by the NYSDEC project manager, the significant threat determination for the site had not yet been made.

To verify the significant threat status of the site, the interested public may contact the NYSDEC project manager identified in Appendix A.

For more information about TAGs, go online at https://dec.ny.gov/regulatory/regulations/technical-assistance-grant-tag-guidance-handbook-der-14

Note: The table identifying the citizen participation activities related to the site's investigation and cleanup program follows on the next page:

Citizen Participation Activities	Timing of CP Activity(ies)
Application Process:	
• Prepare site contact list • Establish document repository(ies)	At time of preparation of application to participate in the BCP.
• Publish notice in Environmental Notice Bulletin (ENB) announcing receipt of application and 30-day public comment period • Publish above ENB content in local newspaper • Mail above ENB content to site contact list • Conduct 30-day public comment period	When NYSDEC determines that BCP application is complete. The 30-day public comment period begins on date of publication of notice in ENB. End date of public comment period is as stated in ENB notice. Therefore, ENB notice, newspaper notice, and notice to the site contact list should be provided to the public at the same time.
After Execution of Brownfield Site Cleanup Agreement (BCA):	
• Prepare Citizen Participation (CP) Plan	Before start of Remedial Investigation **Note:** Applicant must submit CP Plan to NYSDEC for review and approval within 20 days of the effective date of the BCA.
Before NYSDEC Approves Remedial Investigation (RI) Work Plan:	
• Distribute fact sheet to site contact list about proposed RI activities and announcing 30-day public comment period about draft RI Work Plan • Conduct 30-day public comment period	Before NYSDEC approves RI Work Plan. If RI Work Plan is submitted with application, public comment periods will be combined and public notice will include fact sheet. Thirty-day public comment period begins/ends as per dates identified in fact sheet.
After Applicant Completes Remedial Investigation:	
• Distribute fact sheet to site contact list that describes RI results	Before NYSDEC approves RI Report
Before NYSDEC Approves Remedial Work Plan (RWP):	
• Distribute fact sheet to site contact list about draft RWP and announcing 45-day public comment period • Public meeting by NYSDEC about proposed RWP (if requested by affected community or at discretion of NYSDEC project manager) • Conduct 45-day public comment period	Before NYSDEC approves RWP. Forty-five day public comment period begins/ends as per dates identified in fact sheet. Public meeting would be held within the 45-day public comment period.
Before Applicant Starts Cleanup Action:	
• Distribute fact sheet to site contact list that describes upcoming cleanup action	Before the start of cleanup action.
After Applicant Completes Cleanup Action:	
• Distribute fact sheet to site contact list that announces that cleanup action has been completed and that NYSDEC is reviewing the Final Engineering Report • Distribute fact sheet to site contact list announcing NYSDEC approval of Final Engineering Report and issuance of Certificate of Completion (COC)	At the time the cleanup action has been completed. **Note:** The two fact sheets are combined when possible if there is not a delay in issuing the COC.

3. Major Issues of Public Concern

This section of the CP Plan identifies major issues of public concern that relate to the site. Additional major issues of public concern may be identified during the course of the site's investigation and cleanup process.

There will be areas on the Site where soil excavation is necessary. Therefore, once the remediation commences, there may be concerns regarding odors, noise or truck traffic coming from the site. However, these impacts will be mitigated through implementation of a Health and Safety Plan (HASP) and Soil Management Plan (SMP) approved by NYSDEC, which will be designed to minimize these impacts. A Community Air Monitoring Plan (CAMP) will also be implemented to monitor dust and vapors to ensure the community is not impacted. Community Air Monitoring Plan implementation involves the placement of air monitoring stations upwind and downwind of where work is occurring to capture both dust and vapor emissions. If dust or emissions exceed a set threshold established by NYSDEC and the New York State Department of Health (NYSDOH), then work must cease and the cause of the issue must be corrected before work can proceed.

Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities.

The Site is located in an Environmental Justice Area. There is a large Hispanic-American population nearby. Therefore, all future fact sheets will be translated into Spanish.

For additional information, visit: https://statisticalatlas.com/zip/10458/Race-and-Ethnicity

For additional information, visit: https://www.census.gov/acs/www/about/why-we-ask-each-question/language/

4. Site Information

Appendix C contains a map identifying the location of the site.

Site Description

- **Location - 2752-2768 Webster Avenue, Bronx, NY 10458, County of Bronx**
- **Setting - urban**
- **Site size - 1.41 acres**

- **Adjacent properties - residential, commercial**

History of Site Use, Investigation, and Cleanup

Historically, the site was initially developed prior to 1896. Railroad tracks have been present at the site since at least 1896. Historical operations included a sewer pipe yard in 1900, freight house from 1900 to 1950, engine room in 1945, cold storage and railway substation from at least 1978 to 2007, and automotive repair from at least 1992 to 2010. The most recent operations at the site included the substation, cold storage facility, alcohol/liquor distributor, restaurants, and automotive repair garages.

The site was most recently occupied by a one-to-two-story warehouse and a two-story former automotive repair garage building, which was recently demolished. Therefore, the site is currently vacant.

The primary contaminants of concern are high levels of volatile organic compounds (VOCs) (i.e. flammable liquids used for solvents, paint and gasoline), semi-volatile organic compounds (SVOCs) (i.e. coal tar like material), metals (i.e. mercury, lead and arsenic), pesticides and Per- and Polyfluoroalkyl Substances (PFAS) (i.e. chemical used for heat, fire and stain resistant materials and firefighting foams) in soil; metals, SVOCs, and PFAS in groundwater; and VOCs in soil vapor. Therefore, all three environmental media - soil, groundwater and soil vapor - have been impacted.

Previous environmental assessments and investigation activities performed at the site show evidence of impact from the Site's previous commercial and industrial uses, which can be linked to and caused Site contamination above the applicable cleanup standards.

5. Investigation and Cleanup Process

Application

The Applicant has applied for and been accepted into New York's Brownfield Cleanup Program as a Volunteer. This means that the Applicant was not responsible for the disposal or discharge of the contaminants or whose ownership or operation of the site took place after the discharge or disposal of contaminants. The Volunteer must fully characterize the nature and extent of contamination onsite, and must conduct a "qualitative exposure assessment," a process that characterizes the actual or potential exposures of people, fish and wildlife to contaminants on the site and to contamination that has migrated from the site.

The Applicant in its Application proposes that the site will be used for mixed use restricted residential purposes.

To achieve this goal, the Applicant will conduct investigation activities at the site with oversight provided by NYSDEC. The Brownfield Cleanup Agreement executed by

NYSDEC and the Applicant sets forth the responsibilities of each party in conducting these activities at the site.

Investigation

The Applicant has submitted a Remedial Investigation Work Plan with the application. The planned site investigation has several goals:

The site investigation has several goals:

1) Define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected;
2) Identify the source(s) of the contamination;
3) Assess the impact of the contamination on public health and the environment; and
4) Provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

NYSDEC will use the information in the investigation report prepared after the investigation is implemented to determine if the site poses a significant threat to public health or the environment. If the site is a “significant threat,” it must be cleaned up using a remedy selected by NYSDEC from an analysis of alternatives prepared by the Applicant and approved by NYSDEC. If the site does not pose a significant threat, the Applicant may select the remedy from the approved analysis of alternatives.

Interim Remedial Measures

An Interim Remedial Measure (IRM) is an action that can be undertaken at a site when a source of contamination or exposure pathway can be effectively addressed before the site investigation and analysis of alternatives are completed. If an IRM is likely to represent all or a significant part of the final remedy, NYSDEC will require a 30-day public comment period.

Remedy Selection

When the investigation of the site has been determined to be complete, the project likely would proceed in one of two directions:

1. The Applicant may recommend in its investigation report that no action is necessary at the site. In this case, NYSDEC would make the investigation report available for public comment for 45 days. NYSDEC then would complete its review, make any necessary revisions, and, if appropriate, approve the investigation report. NYSDEC would then issue a “Certificate of Completion” (described below) to the Applicant.

or

2. The Applicant may recommend in its investigation report that action needs to be taken to address site contamination. After NYSDEC approves the investigation report, the Applicant may then develop a cleanup plan, officially called a “Remedial Work Plan”. The Remedial Work Plan describes the Applicant’s proposed remedy for addressing contamination related to the site.

When the Applicant submits a draft Remedial Work Plan for approval, NYSDEC would announce the availability of the draft plan for public review during a 45-day public comment period.

Cleanup Action

NYSDEC will consider public comments, and revise the draft cleanup plan if necessary, before approving the proposed remedy. The New York State Department of Health (NYSDOH) must concur with the proposed remedy. After approval, the proposed remedy becomes the selected remedy. The selected remedy is formalized in the site Decision Document.

The Applicant may then design and perform the cleanup action to address the site contamination. NYSDEC and NYSDOH oversee the activities. When the Applicant completes cleanup activities, it will prepare a Final Engineering Report (FER) that certifies that cleanup requirements have been achieved or will be achieved within a specific time frame. NYSDEC will review the report to be certain that the cleanup is protective of public health and the environment for the intended use of the site.

Certificate of Completion

When NYSDEC is satisfied that cleanup requirements have been achieved or will be achieved for the site, it will approve the FER. NYSDEC then will issue a Certificate of Completion (COC) to the Applicant. The COC states that cleanup goals have been achieved, and relieves the Applicant from future liability for site-related contamination, subject to certain conditions. The Applicant would be eligible to redevelop the site after it receives a COC.

Site Management

The purpose of site management is to ensure the safe reuse of the property if contamination will remain in place. Site management is the last phase of the site cleanup program. This phase begins when the COC is issued. Site management incorporates any institutional and engineering controls required to ensure that the remedy implemented for the site remains protective of public health and the environment. All significant activities are detailed in a Site Management Plan (SMP).

An *institutional control* is a non-physical restriction on use of the site, such as a deed restriction that would prevent or restrict certain uses of the property. An institutional

control may be used when the cleanup action leaves some contamination that makes the site suitable for some, but not all uses.

An *engineering control* is a physical barrier or method to manage contamination. Examples include caps, covers, barriers, fences, and treatment of water supplies.

Site management also may include the operation and maintenance of a component of the remedy, such as a system that pumps and treats groundwater. Site management continues until NYSDEC determines that it is no longer needed

Appendix A -
Project Contacts and Locations of Reports and Information

Project Contacts

For information about the site's investigation and cleanup program, the public may contact any of the following project staff:

New York State Department of Environmental Conservation (NYSDEC):

{insert name of project manager}
Project Manager
NYSDEC **{insert region # if applicable}**
Division of Environmental Remediation
{insert regional or central office address}
{insert a contact telephone number}

{insert name of regional citizen participation specialist or, if not available, a central office CPS contact}
Citizen Participation Specialist
NYSDEC **{insert region # if applicable}**
{insert regional or central office address}
{insert a contact telephone number}

New York State Department of Health (NYSDOH):

{insert name of project manager}
Project Manager
NYSDOH
{insert central or regional office address}
{insert a contact telephone number}
beei@health.ny.gov

Locations of Reports and Information

The facilities identified below are being used to provide the public with convenient access to important project documents: **{Instruction to preparer: add additional location(s) if appropriate.}**

NYSDEC DECinfo Locator (Maps and Information):
https://gisservices.dec.ny.gov/gis/dil/

NYSDEC DECinfo Locator (Documents):
https://extapps.dec.ny.gov/data/DecDocs/**CXXXXXX**/

New York Public Library
Bronx Library Center
Attn: Melissa Davis

Hours of Operation:

Monday:..... 9 AM–9 PM
Tuesday:..... 9 AM–9 PM

310 East Kingsbridge Road
Bronx, NY 10458
(718) 579-4244
https://www.nypl.org/locations/bronx-library-center

Wednesday:..... 9 AM–9 PM
Thursday:..... 9 AM–9 PM
Friday:..... 10 AM–8 PM
Saturday: ..... 10 AM–8 PM
Sunday: ..... 12 PM–6 PM

Bronx Community Board 7, District
Attn: Karla Cabrera Carrera , Manager
229-A East 204th Street
Bronx, NY 10548
(929) 496-0748
kcabreracarrere@cb.nyc.gov

Hours of Operation:

Monday:.....9 AM–5 PM
Tuesday:.....9 AM–5 PM
Wednesday....9 AM–5 PM
Thursday:.....9 AM–5 PM
Friday:.....9 AM–5 PM
Saturday: .....CLOSED
Sunday: .....CLOSED

Appendix B - Site Contact List

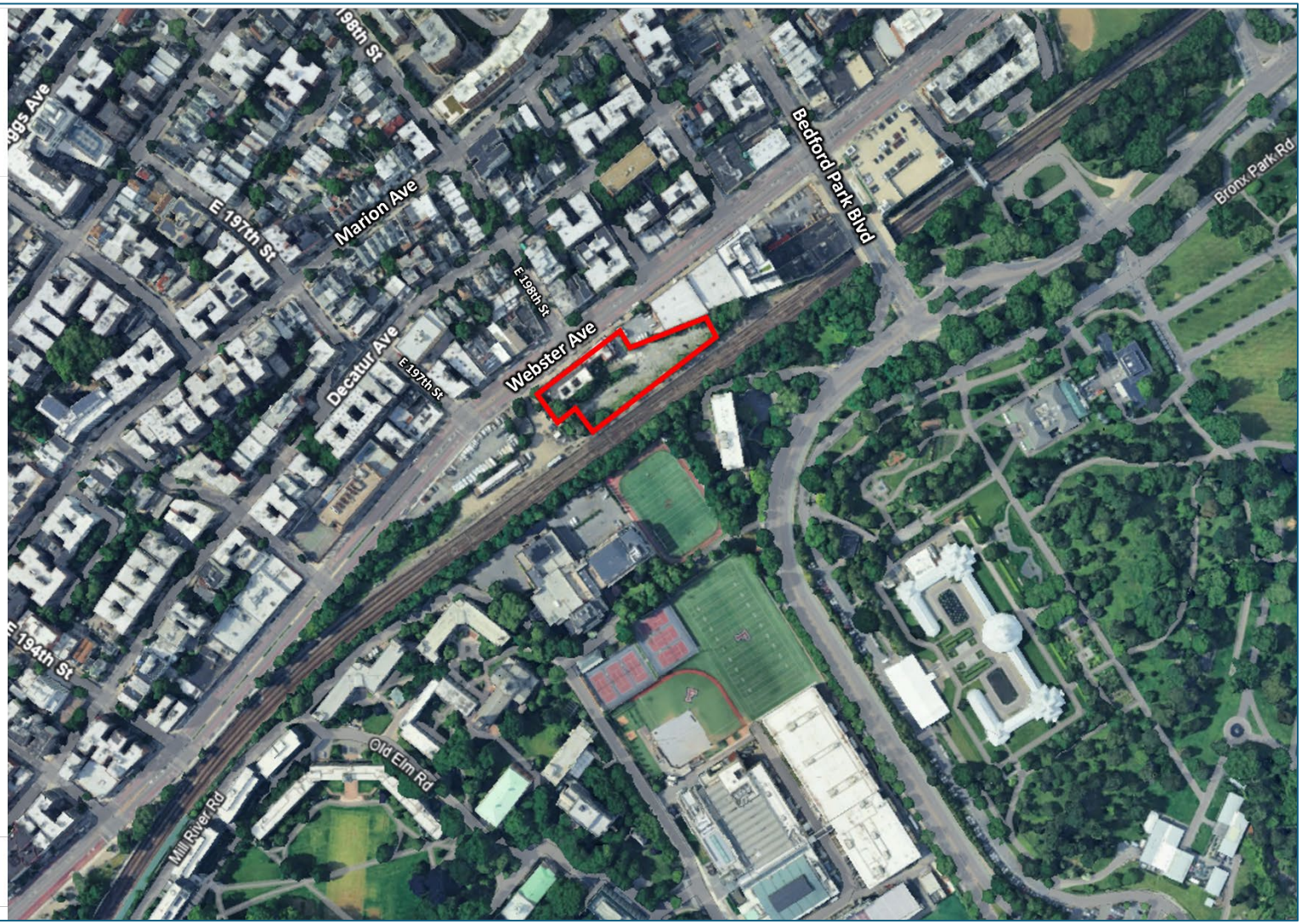
GOVERNMENT / MUNCIPALITIES		
Kirsten Gillibrand U.S. Senator 478 Russell Senate Office Building Washington, DC 20510	Charles Schumer U.S. Senator 322 Hart Senate Office Building Washington, DC 20510	Dan Garodnick City Planning and Zoning, Chair 1775 Grand Concourse, Suite 503 Bronx, NY 10458
Ritchie Torres U.S. House of Representatives 15th District 540 E Fordham Rd. Suite 2A Bronx, NY 10458	Gustavo Rivera New York State Senator 2432 Grand Concourse, Suite 506 Bronx, NY 10458	Vanessa Gibson Bronx Borough President 851 Grand Concourse, 3rd Floor Bronx, NY 10451
Eric Adams New York City, Mayor City Hall New York, NY 10007	Shaminder Singh NYC Mayor's Office of Environmental Remediation, Director 100 Gold Street, 2nd Floor New York, NY 10038	Juton Horstman Bronx Borough, Director of Planning and Development 851 Grand Concouorse, 3rd Floor Bronx, NY 10451
PUBLIC WATER AUTHORITY		
Michael Farnan NYC DEP, Water and Sewer Operations, Deputy Commissioner 59-17 Junction Boulevard, 13th Floor Flushing, NY 11373		
MEDIA		
Bronx Times Media Outlet 3602 East Tremont Avenue, Suite 205 Bronx, NY 10465		
DOCUMENT REPOSITORIES		
NYPL - Bronx Library Center Attn: Tisha Williams 310 East Kingsbridge Road Bronx, NY 10458	Karla Cabrera Carerra Bronx Community Board 7, District Manager 229-A East 204th Street Bronx, NY 10548	
PUBLIC SCHOOLS / DAYCARE CENTERS		
Tisha Williams Bronx Library Center, Managing Librarian 310 East Kingsbridge Road Bronx, NY 10458	Indhira Ventura Bronx Public School 54, Principal 2703 Webster Ave Bronx, NY 10458	Edward Gardella Theodore Roosevelt High School, Principal 500 E Fordham Rd Bronx, NY 10458
Michael Pontebbi P.S/M.S. 20, Principal 3050 Webster Ave Bronx, NY 10458	Andrea Johnson Public School 246 Poe Center, Principal 2641 Grand Concourse Bronx, NY 10468	Maureen Fullerton Public School 168, Principal 3050 Webster Ave Bronx, NY 10458

Maura Mast Fordham University, Dean 441 E Fordham Rd Bronx, NY 10458	Sharion Rana Little Angels Daycare, On-Site Provider 2746 Decatur Ave Apt B1 Bronx, NY 10458	Yvette Brown Bundles of Joy Daycare, On-Site Provider 2730 Decatur Ave Bronx, NY 10458
Keyla Ortiz Laugh and Learn Daycare, Chief Executive Officer 360 E 195th St Bronx, NY 10458	Cindy Del Villar Early Learning Family Group Daycare, Director 315 E 196th St Apt 2H Bronx, NY 10458	Michelle Minaya Baby Blossoms Day Care, Founder and Head of School 2789 Grand Concourse Bronx, NY 10468
Jorge Henriquez Vargas Tiny Bites Daycare LLC, Owner 2427 Webster Ave Bronx, NY 10458	Angela Peguero Angela's Little Angels Daycare, Owner 2625 Grand Concourse Apt BB Bronx, NY 10468	Liza Joaquin Happy Faces A+2 Early Learn Daycare, On-Site Provider 2707 Creston Ave Bronx, NY 10468
Sandivell Gonzalez Tiny Blessings Daycare, Teacher 2600 Creston Ave Bronx, NY 10468	Alondra Baez Alondra's Daycare, Owner 50 E 191st St, Apr 4-J Bronx, NY 10468	Mercedes Sandoval D'Jesus Daycare, Inc, Owner 50 E 191st St, Apt 3-P, 3rd Floor Bronx, NY 10468
Vinky Hernandez Little Hands Group Family Daycare, Provider 58 E 190th St Apt 3A Bronx, NY 10468		
ADJACENT PROPERTY OWNERS / OPERATORS		
Adjacent Property Owner of 2740 Webster Ave South Bronx Development I LLC 15 Verbena Avenue Suite 200 Floral Park, NY 11001	*Adjacent Property Owner of 2742 Webster Ave* South Bronx Development I LLC 15 Verbena Avenue Suite 200 Floral Park, NY 11001	*Adjacent Property Owner of 2800 Webster Ave* BR 2800 Webster, LLC 10 Clive Place East Northport, NY 11731
Adjacent Property Owner of 2748 Webster Ave South Bronx Development I LLC 15 Verbena Avenue Suite 200 Floral Park, NY 11001	*Adjacent Property Owner of 417 East Fordham Rd* Metropolitan Transportation Authority 2 Broadway New York, NY 10004	*Adjacent Property Operator of 2846 Webster Ave* Cherry Valley Marketplace 2852 Webster Ave Bronx, NY 10458
Adjacent Property Operator of 2800 Webster Ave Jerome Environmental Services, LLC 2800 Webster Ave Bronx, NY 10458	*Adjacent Property Owner of 2846 Webster Ave* J & S Tellerman LLC, c/o Graubard Millen & Miller 600 Third Avenue New York, NY 10016	*Adjacent Property Operator of 2749 Webster Ave* O & F Wines & Liquor 2753 Webster Ave Bronx, NY 10458
Adjacent Property Owner of 2749 Webster Ave 395 E 197th St LLC 235 River Avenue, Suite 220 Lakewood, NJ 8701	*Adjacent Property Operator of 2749 Webster Ave* Iglesia de Cristo Misionera Vision Pentecostal 2749 Webster Ave Bronx, NY 10458	*Adjacent Property Owner of 2765 Webster Ave* IRRR LLC 4 Beach Road Great Neck, NY 11023

Adjacent Property Owner of 2755 Webster Ave 2755 Webster Ave Realty LLC 17 Sun Valley Drive North Salem, NY 10560	*Adjacent Property Owner/Operator of 2763 Webster Ave* Part of the Solution 2759 Webster Avenue Bronx, NY 10458	*Adjacent Proeprty Operator of 2767 Webster Ave* La Nueva Dimencion Barber Shop 2767 Webster Ave Bronx, NY 10458
Adjacent Property Operator of 2765 Webster Ave El Nuevo Tenampa Mexican Restaurant 2765 Webster Ave Bronx, NY 10458	*Adjacent Property Owner of 2767 Webster Ave* IRRR LLC 4 Beach Road Great Neck, NY 11023	*Adjacent Property Owner of 2771 Webster Ave* IRRR LLC 4 Beach Road Great Neck, NY 11023
Adjacent Property Owner of 2769 Webster Ave IRRR LLC 4 Beach Road Great Neck, NY 11023	*Adjacent Property Operator of 2769 Webster Ave* L.M. Flower Shop 2769 Webster Ave Bronx, NY 10458	*Adjacent Property Operator of 2773 Webster Ave* Father & Son Deli Grocery 2773A Webster Ave Bronx, NY 10458
Adjacent Property Operator of 2771 Webster Ave Me & My Halal Restaurant 2771 Webster Ave Bronx, NY 10458	*Adjacent Property Owner of 2775 Webster Ave* 777 Webster LLC PO Box 4359 Great Neck, NY 11023	*Adjacent Property Owner of 2777 Webster Ave* 2777 Webster Ave LLC 2777 Webster Avenue Bronx, NY 10458
Adjacent Property Operator of 2773 Webster Ave M.V.T. Market Place 2773B Webster Ave Bronx, NY 10458	*Adjacent Property Operator of 2773 Webster Ave* KM12 Barber Shop 2773C Webster Ave Bronx, NY 10458	*Adjacent Property Operator of 2779 Webster Ave* Gomera Grullon, Inc Flat Fix 2779 Webster Ave Bronx, NY 10458
Adjacent Property Operator of 2777 Webster Ave Rush Hour Exotics Market 2777 Webster Avenue Bronx, NY 10458	*Adjacent Property Owner of 2779 Webster Ave* Iftikhar Ahmed 2779 Webster Ave Bronx, NY 10458	*Adjacent Property Operator of 398 Oliver Place* PostQuam Pressional New York 2783 Webster Ave Bronx, NY 10458
Adjacent Property Owner of 398 Oliver Place Oliver Gardens Housing Development Fund Corporation c/o Total Mgmt NYC 2493 Arthur Ave Bronx, NY 10458	*Adjacent Property Operator of 398 Oliver Place* Lizbeth Medical Spa 2781 Webster Ave Bronx, NY 10458	*Adjacent Property Operator of 398 Oliver Place* Empire City Multiservices 2787 Webster Ave Bronx, NY 10458

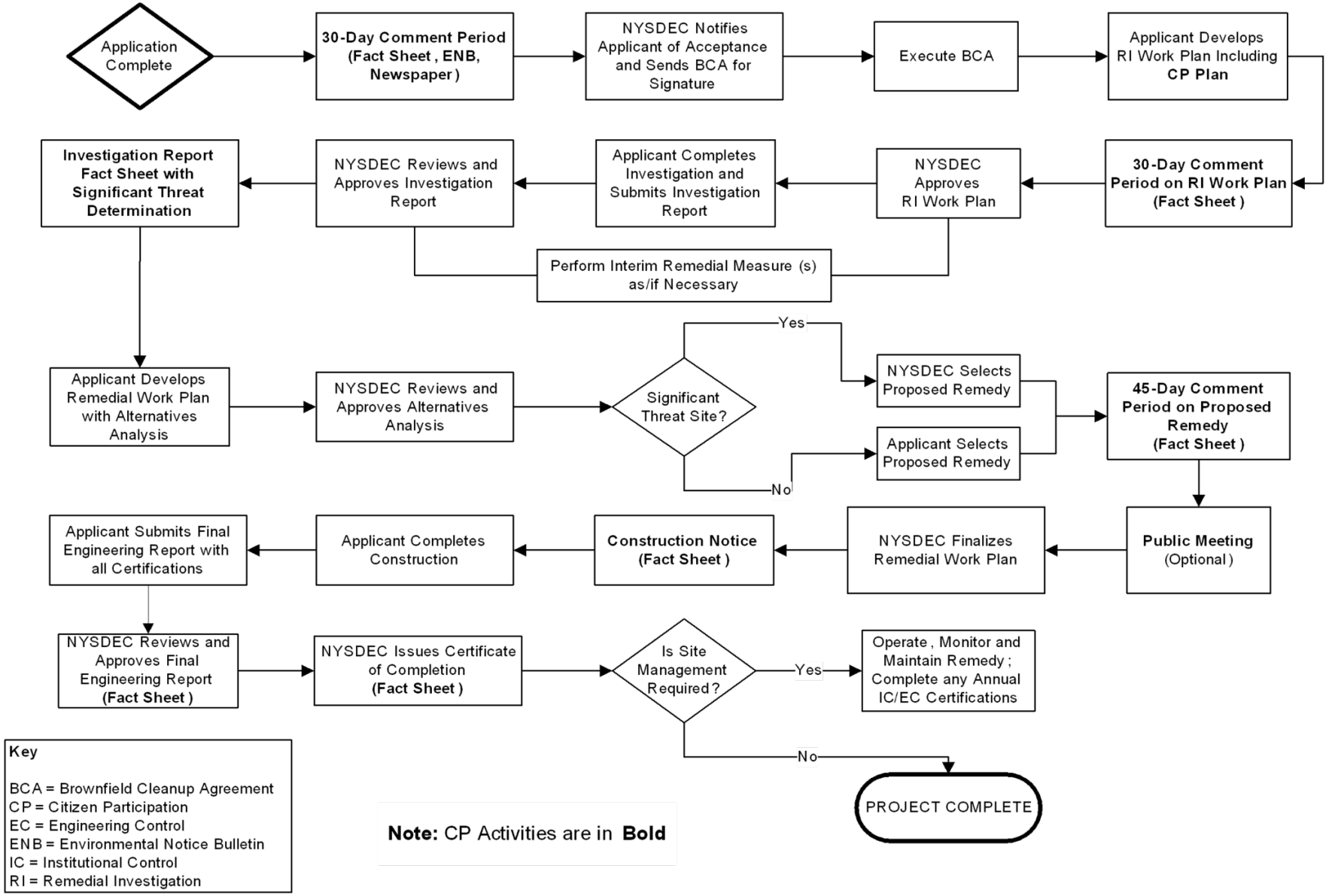
Appendix C - Site Location Map

Street Map
Webster Ave Auto Repair and Substation Site
2752 and 2768 Webster Avenue, Bronx, NY 10458



Legend:
Site Property Boundary

Appendix D – Brownfield Cleanup Program Process



Division of Environmental Remediation

Remedial Programs
Scoping Sheet for Major Issues of Public Concern

Site Name: Webster Ave Auto Repair and Substation Site

Site Number: _____

Site Address and County: 2752-2768 Webster Avenue, Bronx, NY 10458, County of Bronx

Remedial Party(ies): South Bronx Development I LLC

Note: For Parts 1. – 3. the individuals, groups, organizations, businesses and units of government identified should be added to the site contact list as appropriate.

Part 1. List major issues of public concern and information the community wants. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and information needs. **Use this information as an aid to prepare or update the Major Issues of Public Concern section of the site Citizen Participation Plan.**
Major issues of public concern are standards issues communities are concerned with in relation to brownfield site remediation projects.

How were these issues and/or information needs identified?
Concerns in relation to dust, noise and possible odors are standards issues of concern for communities with in relation to brownfield site remediation projects.

Part 2. List important information needed **from** the community, if applicable. Identify individuals, groups, organizations, businesses and/or units of government related to the information needed.
No information is needed at this time from the community.

How were these information needs identified?
N/A

Part 3. List major issues and information that need to be communicated **to** the community. Identify individuals, groups, organizations, businesses and/or units of government related to the issue(s) and/or information.
The major issues that need to be communicated to the community are summarized in this CPP. The community will receive periodic fact sheets that will update them in relation to the work being performed on the site so they can communicate any issues they may observed or may experience to the DEC or DOH.

How were these issues and/or information needs identified?
These issues and/or information needs are standard for all brownfield sites.

Part 4. Identify the following characteristics of the affected/interested community. This knowledge will help to identify and understand issues and information important to the community, and ways to effectively develop and implement the site citizen participation plan (mark all that apply):

a. Land use/zoning at and around site:
☒ **Residential** ☐ **Agricultural** ☒ **Recreational** ☒ **Commercial** ☐ **Industrial**

b. Residential type around site:
☒ **Urban** ☐ **Suburban** ☐ **Rural**

c. Population density around site:
☒ **High** ☐ **Medium** ☐ **Low**

d. Water supply of nearby residences:
☒ **Public** ☐ **Private Wells** ☐ **Mixed**

e. Is part or all of the water supply of the affected/interested community currently impacted by the site?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

f. Other environmental issues significantly impacted/impacting the affected community?
☐ **Yes** ☒ **No**

Provide details if appropriate:
Click here to enter text.

g. Is the site and/or the affected/interested community wholly or partly in an Environmental Justice Area?
☒ **Yes** ☐ **No**

h. Special considerations:
☒ **Language** ☐ **Age** ☐ **Transportation** ☐ **Other**

Explain any marked categories in **h:**
Large Hispanic Population therefore Facts Sheets will be translated into Spanish.

Part 5. The site contact list must include, at a minimum, the individuals, groups, and organizations identified in Part 2. of the Citizen Participation Plan under 'Site Contact List'. Are *other* individuals, groups, organizations, and units of government affected by, or interested in, the site, or its remedial program? (Mark and identify all that apply, then adjust the site contact list as appropriate.)

☐ **Non-Adjacent Residents/Property Owners:** Click here to enter text.

☐ **Local Officials:** Click here to enter text.

☐ **Media:** Click here to enter text.

☐ **Business/Commercial Interests:** Click here to enter text.

☐ **Labor Group(s)/Employees:** Click here to enter text.

☐ **Indian Nation:** Click here to enter text.

☐ **Citizens/Community Group(s):** Click here to enter text.

☐ **Environmental Justice Group(s):** Click here to enter text.

☐ **Environmental Group(s):** Click here to enter text.

☐ **Civic Group(s):** Click here to enter text.

☐ **Recreational Group(s):** Click here to enter text.

☐ **Other(s):** Click here to enter text.

Prepared/Updated By: Linda R. Shaw, Esq. **Date:** November 13. 2025

Reviewed/Approved By: Click here to enter text. **Date:** Click here to enter text.