



PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT

1500, 1514, 1518, 1526 AND 1532 VAN DYKE STREET AND 8029 COE AVENUE
DETROIT, MICHIGAN 48214

SME Project Number: 086124.00.03B.006
September 20, 2022

Funded by: The City of Detroit, Cooperative Agreement #BF00E02492





The Kramer Building
43980 Plymouth Oaks Blvd.
Plymouth, MI 48170-2584

T (734) 454-9900

www.sme-usa.com

September 20, 2022

Ms. Anita Harrington
City of Detroit
2 Woodward Avenue
Detroit, Michigan 48226

Via E-mail: harringtona@detroitmi.gov

RE: Phase II Environmental Site Assessment Report
1500, 1514, 1518, 1526 and 1532 Van Dyke Street
and 8029 Coe Avenue
Detroit, Michigan 48214
SME Project No. 086124.00.03B.006

Dear Ms. Harrington:

We have completed the Phase II Environmental Site Assessment (ESA) of the above-referenced property, hereinafter referred to as the Property. Our Phase II ESA was funded by the City of Detroit United States Environmental Protection Agency (USEPA) Hazardous or Petroleum Substances Assessment Grant. We conducted the Phase II ESA in accordance with the Sampling and Analysis Plan prepared for the project, which was approved by the USEPA via email on January 10, 2022, except whereas noted in the report. The Scope of the Phase II ESA was based on the objectives of the grantee.

Thank you for the opportunity to provide these services. If you have any questions concerning this report, or if additional services are required, please call.

Sincerely,

SME

Natalie C. Stoflet
Senior Staff Geologist

Anita H. Ketola, CHMM
Project Consultant

Enclosures: SME Phase II Environmental Site Assessment Report Dated:
September 20, 2022

Distribution: Ms. Anita Harrington

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1. INTRODUCTION

We prepared this report to document the results of a Phase II Environmental Site Assessment (ESA) of the vacant residential lots located at 1500, 1514, 1518, 1526 and 1532 Van Dyke Street and 8029 Coe Avenue in Detroit, Wayne County, Michigan, herein after referred to as “the Property”. The Property location is shown on Figure 1. The assessment activities were funded by a United States Environmental Protection Agency (USEPA) Brownfield Assessment Coalition Grant (BF00E02492) for hazardous substances and petroleum awarded to the City of Detroit. The City of Detroit intends to support the redevelopment of the Brownfield site through use of USEPA assessment grant funds provided by the City of Detroit. We conducted the assessment in general accordance with the EPA-approved Sampling and Analysis Plan (SAP), dated January 10, 2022 and provided as Appendix A, and Quality Assurance Project Plan (QAPP) approved on February 3, 2021.

1.1 SITE DESCRIPTION AND BACKGROUND

At the time of this assessment, the Property consisted of approximately 0.7-acres of land with two residential structures; one vacant and one occupied. The remainder of the Property consisted of gravel or grassed-covered land with scattered trees. The Property was developed as residential land from at least 1897 to the mid-1900s. From 1910 to the late 1970s, the Property was developed with five dwellings along Van Dyke Street. A store, a barber, and a tailor/clothing cleaner were located near the southwest corner of the Property, and an additional dwelling was located at the southeast corner of the Property. Various outbuildings/automotive storage garages were located along the unnamed alley that bordered the Property to the east. City of Detroit records identified the use of an unknown 275-gallon underground storage tank (UST) utilized at the 1500 Van Dyke Street commercial parcel in 1941, and a 220-gallon UST on the 1532 Van Dyke Street residential parcel in 1949. From the 1980s to 2020, various buildings on the Property were razed, and portions of the Property were depicted as grass-covered, vacant lots. A Property Features Diagram is provided as Figure 2.

At the time of assessment activities, the surrounding area consisted primarily of residential developments with a church located to the west. Van Dyke Street, Coe Avenue, and an unnamed alley adjoined the Property to the west, south, and east, respectively. The surrounding areas consisted primarily of residential developments with an eastern adjoining “building contractor” until the 1930s. From the late 1930s to the 1970s, a church adjoined the Property to the west, and additional commercial developments, including a creamery, and a warehouse/machine shop adjoined the Property to the southwest. A previous Phase I ESA for the southern Property parcels also identified two USTs associated with the eastern-adjoining church. A gasoline UST was also located in the Van Dyke Street right-of-way, south of the Property. From the 1970s to 2020, numerous surrounding buildings were razed. A Baseline Environmental Assessment (BEA) report for the southern-adjoining site identified concentrations of arsenic, selenium, mercury and tetrachloroethylene exceeding applicable Part 201 Residential Cleanup Criteria in soil. No groundwater samples were collected as part of the southern-adjoining BEA assessment.

Our knowledge of suspected environmental impact on the Property was developed through completion of a Phase I ESA prepared by SME, dated December 21, 2021, which identified the following recognized environmental conditions (RECs):

- The potential for unknown or unreported releases associated with the past use of the Property as a clothing cleaner, the former presence of an unknown 275-gallon UST, and the potential for buried demolition debris and/or fill of unknown origin to be present.
- The potential for the presence of and/or releases from a 220-gallon heating oil UST on the 1532 Van Dyke Street parcel.

- The potential for the migration of unknown or unreported releases associated with southwestern-adjointing former machine shop (1461 and 1463 Van Dyke Street), as well as USTs on the western-adjointing site (1511 Van Dyke Street) and to the south in the Van Dyke Street right-of way.
- The potential for the migration of known contamination onto the Property associated with the southern-adjointing site (1462 Van Dyke Street).

No RECs were identified on the occupied residential parcel located at 1514 Van Dyke Street.

1.2 PURPOSE

We designed the original scope and prepared the Sampling and Analysis Plan for this Phase II ESA to further evaluate the RECs identified during the Phase I ESA and to help determine the following:

- If contamination associated with the RECs identified in the Phase I ESA is present.
- If contamination is present, evaluate whether current environmental conditions warrant remediation.

2. SCOPE OF ASSESSMENT

2.1 GENERAL SCOPE

We completed the following scope of services at the Property:

- SME contacted the Michigan Underground Utility Safety Notification System (MISSDIG) to have underground utilities cleared. We also prepared a site-specific safety plan for the field work using SME's Health and Safety Checklist. This included a Job Hazard Analysis for each activity performed on site;
- Monitored contractor, GPRS, as technician completed a geophysical survey in the northern and southern portions of the Property (portions of 1532 and 1500 Van Dyke Street, and 8029 Coe Avenue) to evaluate the potential presence of suspected USTs;
- SME advanced five soil borings (SB1 through SB5) at the Property to screen for environmental impairment. We also collected two groundwater samples from temporary monitoring wells installed within two of the soil borings (SB2 and SB3). Refer to Figure 3 for the sample locations;
- Logged and field screened soil samples;
- Collected soil and groundwater samples for chemical analyses;
- Collected field QC samples;
- Submitted the samples for selected contaminants of concern; and
- Prepared this summary report.

2.2 SAMPLING LOCATION AND RATIONALE

Our sample locations and respective rationales are provided below:

- Two soil borings (SB1 and SB2), one of which was converted into a temporary monitoring well (SB2), were advanced in the northwest portion of the Property to evaluate potential buried demolition debris/fill material associated with the former residential structures on the Property at 1518 and 1526 Van Dyke.
- Three soil borings (SB3 through SB5), one of which was converted into a temporary monitoring well (SB3), were advanced in the southern portion of the Property to evaluate potential buried demolition debris/fill material associated with the former structures on the Property, as well as the known former UST use at 1500 Van Dyke Street and 8029 Coe Avenue. Additionally, the soil borings were advanced to evaluate the potential migration of contaminants onto the Property from off-site developments that previously adjoined the Property to the south and west.

The sampling locations are shown on Figure 3, and summaries of soil and groundwater samples collected and analyzed during this assessment are presented in Tables 1 and 2, respectively.

3. PROCEDURES

Summaries of our procedures for the geophysical survey, soil borings, temporary monitoring well install, sampling activities, decontamination, and chemical analyses are summarized in the following subsections. SME's field representative collected soil and groundwater samples according to the methods described in our standard operating procedures (SOPs), available in the EPA-approved QAPP.

3.1 GEOPHYSICAL SURVEY METHODOLOGY

A geophysical survey was conducted to evaluate the potential presence of USTs on the Property. Ground Penetrating Radar (GPR) data was collected using a cart-mounted 250 Mhz Noggin Plus GPR system, as well as electromagnetic (EM) data using an EM pipe locator. The data was collected along profiles spaced approximately 2-feet apart and was viewed in real time. The estimated signal penetration depth was approximately four feet below the ground surface (bgs). The findings of the geophysical survey are discussed in Section 4.1 and the geophysical survey report is provided in Appendix B.

3.2 SOIL SAMPLING

We advanced the soil borings using hydraulically driven, direct-push equipment on a track-mounted all-terrain vehicle (ATV). Each soil sample was collected using a 4-foot long, 2-inch outside-diameter, GeoProbe® MacroCore® Sampler fitted with a single-use, disposable, acetate liner. The soil in each sample liner was visually evaluated, and representative samples were collected from each soil unit for visual classification in general accordance with the ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

A portion of each soil sample was used for field screening of ionizable vapors using a calibrated photoionization detector (PID) equipped with a 10.6 eV lamp. Field screening consisted of placing a portion of the sample in a sealed plastic bag for headspace analysis for the emission of ionizable vapors. The tip of the PID was inserted in the headspace of the bag, and PID readings were recorded on our soil boring logs. Detailed information regarding the soil conditions encountered at each boring are documented on the soil boring logs in Appendix C.

The amount of soil collected at each sampling location was dependent upon the chemical analysis requirements. First, soil samples intended for volatile organic compound (VOC) laboratory analysis were removed from the sample liner and placed in methanol-preserved 40-milliliter (mL) glass vials following U.S. EPA Method 5035A. Soil volumes sufficient for analysis of polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and/or metals were then removed from the sample liner and homogenized prior to transfer to pre-cleaned, 8-ounce, glass jars provided by the analytical laboratory.

3.3 GROUNDWATER SAMPLING

Temporary monitoring wells were installed in soil borings SB2 and SB3. Each of the temporary monitoring wells were constructed with a 5-foot-long, 1-inch diameter, 0.010-inch slotted (10-slot) PVC screen with a prefabricated silica sand pack. Each of the wells were installed such that the screen at each location intersected the depth at which groundwater was encountered during drilling activities.

After gauging the depth to water and total well depth of each temporary monitoring well, we purged the well using a variable flow rate, portable peristaltic pump fitted with clean, 0.375-inch inside diameter (ID) silicone and polyethylene tubing, at a low flow pumping rate of approximately 100 milliliters/minute (mL/min).

After purging, we collected a groundwater sample from each of the temporary groundwater monitoring wells using the portable peristaltic pump fitted with 3/8-inch ID polyethylene/silicone tubing, operated at the low flow pumping rate. The groundwater samples were transferred directly into the following laboratory-supplied containers: 40-mL glass vials preserved with hydrochloric acid (VOCs), one-liter amber colored glass jar (SVOCs and PCBs), and 250-mL plastic bottle preserved with nitric acid (metals). Samples were labeled according to location, depth, time, and date and immediately stored in a cooler containing ice. Samples were submitted to Fibertec laboratory under standard chain of custody control procedures.

3.4 SOIL BORING RESTORATION

We returned residual soil cuttings and purged groundwater to their corresponding borehole after soil and groundwater sampling activities were completed; filled the remaining space in the boreholes with bentonite chips; and restored the surface materials.

3.5 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

3.5.1 FIELD QA

SME's field representative wore a new pair of disposable nitrile sampling gloves during collection of each sample to minimize cross-contamination. Direct-push sampling equipment was decontaminated with high-pressure, hot water before use and between sample locations. We decontaminated other soil sampling equipment with a laboratory grade detergent and distilled water wash and rinsed equipment with distilled water before each use. New, pre-cleaned well materials and tubing were used for the collection of the groundwater samples.

Fibertec supplied the pre-cleaned containers used for sample collection. After sample collection, the containerized soil and groundwater samples were kept cool (i.e., kept on ice or refrigerated) until delivery to the analytical laboratory. SME's field representative followed chain-of-custody procedures to document the sample handling sequence. Field instrument calibration, sample handling and custody requirements, laboratory analytical methods, analysis reporting limits (RLs), QA/QC procedures, and reporting protocols were consistent with those described in the USEPA-approved QAPP applicable to this assessment.

3.5.2 FIELD QC

We collected field duplicate soil and groundwater samples to evaluate matrix homogeneity and the precision of sampling activities. We collected soil and groundwater samples for site-specific matrix spike and matrix spike duplicate analyses to evaluate sample matrix recovery and accuracy. We collected one aqueous equipment blank to evaluate the potential for cross-contamination during sample collection. We also included one aqueous trip blank to evaluate the potential for cross-contamination during sample storage and transport to the laboratory and one methanol blank to evaluate potential contaminants in the laboratory-provided methanol.

3.6 CHEMICAL ANALYSES

We submitted six soil samples and three groundwater samples to Fibertec for chemical analysis of VOCs, PAHs, PCBs, and/or metals (arsenic, barium, cadmium, total chromium, copper, lead, mercury, selenium, silver, and zinc).

Additionally, as total chromium was measured at a concentration above the most restrictive criterion for hexavalent chromium in multiple soil samples, the soil samples SB1 (2 feet to 4 feet), SB2 (4 feet to 6 feet), and SB5 (3 feet to 5 feet) were selected for analysis of hexavalent chromium. Soil samples SB1 (2 feet to 4 feet), SB2 (4 feet to 6 feet), and SB4 (3 feet to 4 feet) were also analyzed for fractional lead.

Fibertec analyzed the samples using the reference methods listed below:

- VOCs – U.S. EPA Method 8260 (soil and groundwater)
- PAHs – U.S. EPA Method 8270 (soil and groundwater)
- PCBs – U.S. EPA Method 8082 (soil and groundwater)
- Arsenic, barium, cadmium, chromium, copper, lead, selenium, silver, and zinc – U.S. EPA Method 6020 (soil and groundwater)
- Mercury – U.S. EPA Method 7471 (soil and groundwater)
- Hexavalent chromium – U.S. EPA Method 7196 (soil)
- Fractional lead – U.S. EPA 6020 (soil)

The laboratory analysis reports, complete list of specific analytical reference methods, reporting limits, and chain of custody documentation for the samples collected on the Property are included in Appendix D.

4. RESULTS

Detailed information regarding the soil conditions encountered at each boring are documented in the soil boring logs, provided in Appendix C. The surface and subsurface conditions encountered are summarized below.

4.1 GEOPHYSICAL SURVEY RESULTS

The geophysical survey identified several underground utilities throughout the Property; however, reflections consistent with a UST were not identified. The geophysical report prepared by GPRS is provided in Appendix B.

4.2 SURFACE AND SUBSURFACE CONDITIONS

Descriptions of the soil conditions encountered at the soil boring locations are documented on the soil boring logs (Appendix C). The surface of the Property consisted primarily of fill material comprised of topsoil, sandy silt, silty clay, trace organics, and occasional roots. The surface was generally underlain by layers of fill material comprised of silty clay with sand, cinders, and concrete, brick, and metal fragments to a maximum approximate depth of 7.5 feet bgs and lean clay to a total investigated depth of 12 feet bgs. No PID measurements greater than 1 part per million (ppm) were noted during field screening of the soil samples. Staining was observed from approximately 6 feet to 8 feet bgs in soil boring SB3. Additionally, a layer of black clay was observed at approximately 7.5 feet bgs at the fill material/native lean clay interface in soil boring SB3. No odors or staining were observed in the remaining soil samples recovered from the soil borings.

Groundwater was encountered at approximately 5 feet to 6 feet bgs in soil borings SB2 and SB3, respectively, during drilling activities. The saturated zone observed during drilling consisted of either fill material or clay. No odors or sheens were noted on the collected groundwater samples.

4.3 RESULTS OF CHEMICAL ANALYSES

Results from the chemical analyses performed on soil and groundwater samples collected during our assessment are summarized in the following paragraphs and are presented in Tables 1 and 2, respectively. We compared the soil and groundwater chemical analysis results to the Part generic residential cleanup criteria (Part 201 criteria) to determine if the Property is a "facility," as defined in Part 201. In addition, soil and groundwater concentrations were also compared to Residential Volatilization to Indoor Air Pathway (VIAP) Screening Levels. Laboratory analysis reports and chain-of-custody documentation are included in Appendix D.

4.3.1 SOIL SAMPLE RESULTS

Concentrations of tetrachloroethylene, phenanthrene, arsenic, lead (fine fraction), mercury, and selenium were measured above one or more of their respective Part 201 residential criteria. No other target analytes were measured in concentrations exceeding the Part 201 criteria. In addition, the measured soil concentrations of tetrachloroethylene, phenanthrene, and mercury exceeded the residential soil VIAP Screening Levels. Target analytes identified in concentrations greater than Part 201 criteria are depicted on the Soil Analytical Results Diagram, provided as Figure 4.

4.3.2 GROUNDWATER SAMPLE RESULTS

Concentrations of tetrachloroethylene, arsenic, chromium (total), lead, selenium, and zinc were measured in one or more of the groundwater samples above Part 201 generic cleanup criteria. No other target compounds were measured at concentrations exceeding their respective Part 201 criteria. In addition, the

measured groundwater concentration of tetrachloroethylene exceeded the residential shallow groundwater VIAP Screening Levels. Target analytes identified in concentrations greater than Part 201 criteria are depicted on the Groundwater Analytical Results Diagram, provided as Figure 5.

4.4 DATA VERIFICATION/VALIDATION AND USABILITY

We evaluated the representativeness of the data collected during our subsurface assessment to determine if the data set was valid and of usable quality. Our discussion of quality control samples and our conclusions are summarized in the following subsections. The laboratory QC results are detailed in the Case Narratives included in Appendix D.

4.4.1 FIELD QC

No VOCs were detected above laboratory RLs in the trip blank, which indicates that cross-contamination did not occur during sample storage and transport to the laboratory. No analyzed constituents were detected above laboratory reporting limits in the equipment blank, which indicates that the equipment used for sampling was not contaminated.

4.4.2 LABORATORY QC

Fibertec reported that the laboratory control samples/laboratory control sample duplicate (LCS/LCSD), surrogate recoveries, and results from analyses of the continuing calibration verification (CCV) samples and method blanks were within acceptance limits except as discussed in the following bullets.

- Multiple VOCs for various soil and groundwater samples were qualified as estimated due to high CCV, laboratory control sample (LCS), and/or laboratory control sample duplicate (LCSD). These constituents were not measured at concentrations above reporting limits in the respective soil or groundwater samples; therefore, these potential high biases do not materially affect our conclusions.
- The mercury concentrations identified in a majority of the groundwater samples (SB2 (6 feet to 11 feet), SB3 (5 feet to 10 feet), DUP GW, and Equipment Blank) were qualified due to high LCS. Fibertec reported that the results may be biased high but were not measured in concentrations above laboratory reporting limits in the groundwater samples; therefore, these potential high biases do not materially affect our conclusions.
- The concentrations of benzo(b)fluoranthene and benzo(k)fluoranthene in groundwater sample SB3(5 feet to 10 feet) were qualified as the spiked sample recovery was high for the matrix spike duplicate (MSD). The LCS was acceptable. Fibertec reported that the results may be biased high, but were below laboratory reporting limits; therefore, these potential high biases do not materially affect our conclusions.
- Acetone, 2-butanone, 2-hexanone, and 2-methylnaphthalene concentrations were qualified for various groundwater samples (including the MS/MSD groundwater sample) due to low LCS and/or LCSD. Fibertec reported that the analytical results may be biased low. These compounds were not measured at concentrations above their respective laboratory reporting limits. The reporting limits for these compounds were at least two times lower than the applicable lowest Part 201 criteria; therefore, this potential low bias does not materially affect our conclusions.
- The RPD for zinc was exceeded in the MS/MSD sample which correlates with groundwater sample SB3(5 feet to 10 feet). Fibertec reported that the exceedance indicates increased variability with the analytical results.

- The hexavalent chromium concentrations for soil samples SB1(2 feet to 4 feet), SB2(4 feet to 6 feet), and SB3(5 feet to 7 feet) were qualified as having estimated results due to the samples exceeding the hold time by three days. Concentrations of hexavalent chromium were not identified above the laboratory reporting limit. Additionally, the laboratory reporting limit was at least two times lower than the lowest applicable Part 201 criteria; therefore, the potential low biases do not materially affect our conclusions.

It is our opinion that the data set generated is of usable quality and meets the project-specific objective of identifying if the Property is a facility.

5. CONCLUSIONS

We conducted a Phase II ESA of the vacant residential properties located at 1500, 1514, 1518, 1526 and 1532 Van Dyke Street and 8029 Coe Avenue in Detroit, Wayne County, Michigan. We designed the scope of the Phase II ESA to further evaluate the RECs identified in our Phase I ESA, dated December 21, 2021.

The findings of the geophysical survey did not identify the presence of a UST on the Property. The results of our Phase II ESA activities indicate the Property meets the definition of a “facility” as defined by Part 201 based on the presence of tetrachloroethylene, phenanthrene, and various metals identified in the soil and/or groundwater at concentrations exceeding their respective Residential Part 201 Generic Cleanup Criteria. In addition, concentrations of soil and groundwater for tetrachloroethylene, phenanthrene, and/or mercury also exceeded residential VIAP Screening Levels. We recommend a prospective purchaser prepare and submit a Baseline Environmental Assessment (BEA) report to the Michigan Department of Environment Great Lakes and Energy (EGLE) to obtain cleanup liability protection for existing contamination at the Property. The BEA report must be completed prior to or within 45 days of acquisition and submitted to EGLE prior to or within six months of acquisition. We also recommend a Plan to Comply with Due Care Compliance be prepared to assist the new owner with complying with Part 201 Section 07a (Due Care) obligations as owner of a contaminated property.

The conclusions in this report are based on visual observations and chemical results from samples collected from the area of investigation only. If additional surface, subsurface, or chemical data become available after the date of issue of this report, the conclusions contained in this report may require modification after SME has reviewed the additional information. This review by SME of additional information would be conducted upon receipt of a request from the client.

In the process of obtaining information in preparation of this report, procedures were followed that represent reasonable practices and principles in a manner consistent with that level of care and skill ordinarily exercised by members of this profession currently practicing under similar conditions.

REPORT PREPARED BY:

Natalie C. Stoflet
Senior Staff Geologist

REPORT REVIEWED BY:

Anita H. Ketola, CHMM
Project Consultant

SENIOR REVIEW BY:

Bret B. Stuntz
Senior Consultant

6. REFERENCES

1. Part 201 of 1994 PA 451, as amended, the Natural Resources and Environmental Protection Act.
2. Michigan Department of Environmental Quality, Promulgated Cleanup Criteria, R 299.44, R 299.46, and R 299.49, Part 201 Generic Residential Cleanup Criteria and Screening Levels and associated Footnotes, December 30, 2013; GSI Criteria Updated June 25, 2018.
3. Michigan Residential Volatilization to Indoor Air Pathway Screening Levels, September 4, 2020.
4. SME, Phase I Environmental Site Assessment, 1500, 1514, 1518, 1526, and 1532 Van Dyke Street and 8029 Coe Avenue, Detroit, Michigan, December 21, 2021.

FIGURES

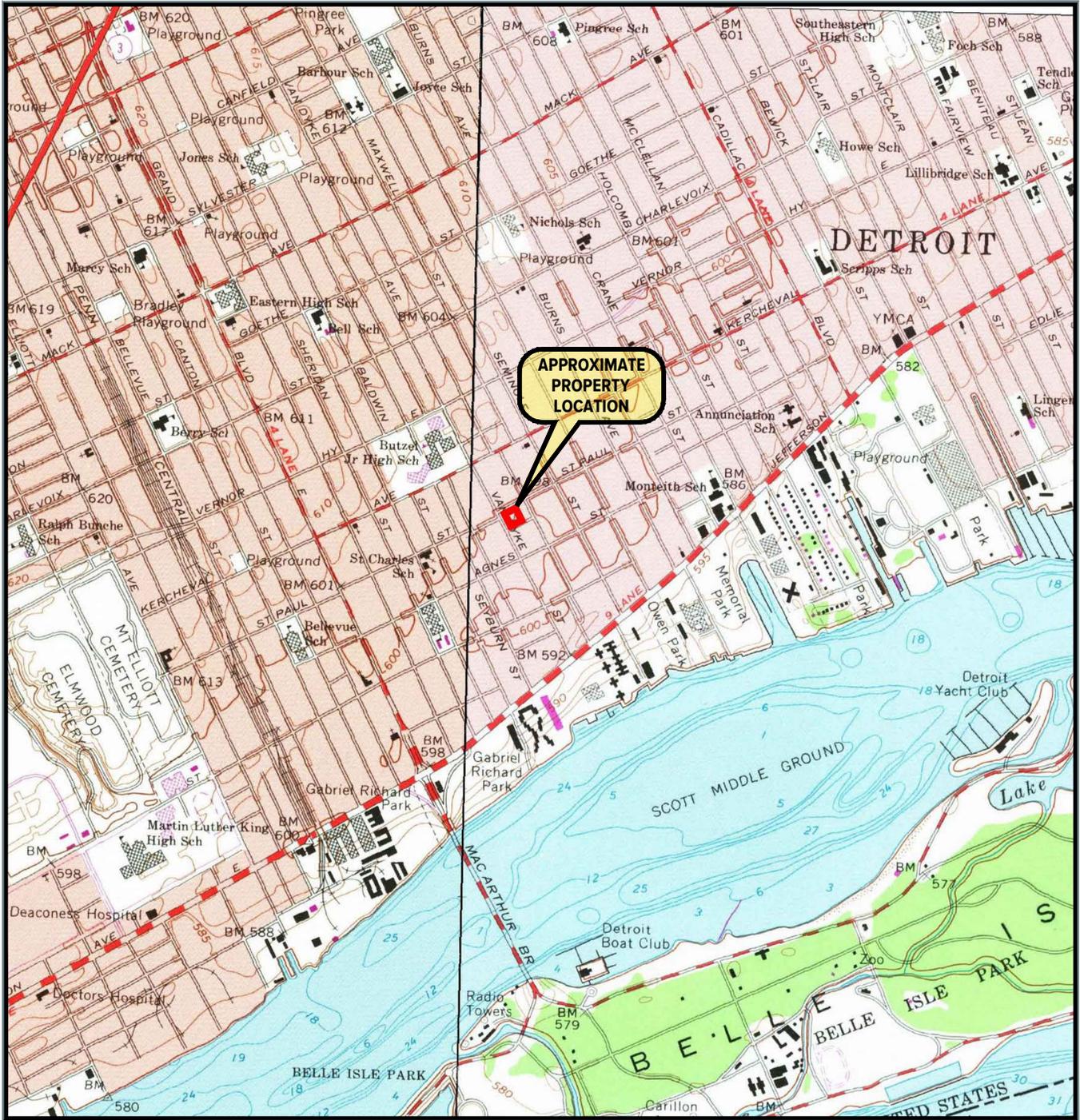
FIGURE 1: PROPERTY LOCATION MAP

FIGURE 2: PROPERTY FEATURES DIAGRAM

FIGURE 3: SAMPLE LOCATION DIAGRAM

FIGURE 4: SOIL ANALYTICAL RESULTS DIAGRAM

FIGURE 5: GROUNDWATER ANALYTICAL RESULTS DIAGRAM



Base map obtained from ERIS®

USGS QUADRANGLE(S) REFERENCED

BELLE ISLE (MI) 1980



SCALE: 1" = 2000'

No.	Revision Date	Date
		07/28/2022
	Drawn By	MNR
	Designed By	NS
	Scale	1" = 2000'
	Project	086124.00.03B.006

PROPERTY LOCATION MAP
1500, 1514, 1518, 1526, 1532,
VAN DYKE STREET, AND 8029 COE AVENUE
DETROIT, MICHIGAN

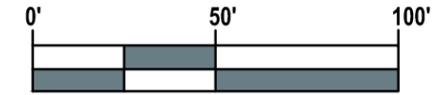


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Figure No. 1

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PLOT DATE: Jul 28, 2022 - 7:32am - matt.nowakrochford



GRAPHIC SCALE: 1" = 50'

LEGEND

- - - - - APPROXIMATE PROPERTY BOUNDARY
- - - - - APPROXIMATE PARCEL BOUNDARY

NOTE:
BASE DRAWING INFORMATION TAKEN FROM
GOOGLE EARTH PRO WITH IMAGE DATE 3-14-2020
AND SITE RECONNAISSANCE.



Project
**1500, 1514, 1518,
1526, 1532, VAN DYKE
STREET, AND
8029 COE AVENUE**

Project Location
DETROIT, MICHIGAN

Sheet Name
**PROPERTY FEATURES
DIAGRAM**

No.	Revision Date

Date **07/28/2022**

CADD **MNR**

Designer **NS**

Scale **AS NOTED**

Project **086124.00.03B.006**

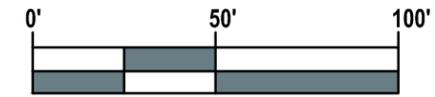
Figure No. **2**

DRAWING NOTE: SCALE DEPICTED IS MEANT FOR 11" X 17"
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GPR SURVEY COMPLETED TO EVALUATED POTENTIAL PRESENCE OF USTs AT 1500 AND 1532 VAN DYKE STREET AND 8029 COE AVENUE PARCELS



GRAPHIC SCALE: 1" = 50'

LEGEND

- - - - - APPROXIMATE PROPERTY BOUNDARY
- - - - - APPROXIMATE PARCEL BOUNDARY
- ⊕ APPROXIMATE SOIL BORING LOCATION
- ⊕ APPROXIMATE SOIL BORING LOCATION WITH TEMPORARY MONITORING WELL

NOTE:
BASE DRAWING INFORMATION TAKEN FROM
GOOGLE EARTH PRO WITH IMAGE DATE 3-14-2020
AND SITE RECONNAISSANCE.



Project
**1500, 1514, 1518,
1526, 1532, VAN DYKE
STREET, AND
8029 COE AVENUE**

Project Location
DETROIT, MICHIGAN

Sheet Name
**SAMPLE LOCATION
DIAGRAM**

No.	Revision Date

Date **07/28/2022**

CADD **MNR**

Designer **NS**

Scale **AS NOTED**

Project **086124.00.03B.006**

Figure No.
3

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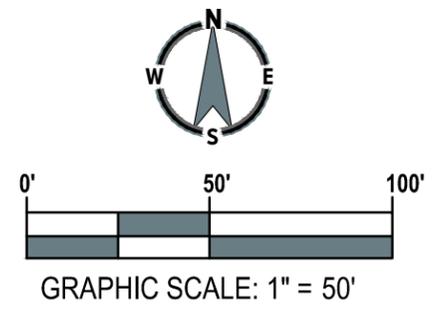
SB1 (2'-4')	
6/13/2022	
Arsenic	8,000
Lead, Fine Fraction	494,000
Mercury	250
SB1 DUP1 (2'-4')	
6/13/2022	
Selenium	520

SB2 (4'-6')	
6/13/2022	
Arsenic	7,000
Selenium	440

SB4 (3'-4')	
6/13/2022	
Tetrachloroethylene	150
Phenanthrene	9,600

SB3 (5'-7')	
6/13/2022	
Tetrachloroethylene	460
Phenanthrene	2,500
Arsenic	7,600

SB5 (3'-5')	
6/13/2022	
Arsenic	8,900



LEGEND

- - - - - APPROXIMATE PROPERTY BOUNDARY
- - - - - APPROXIMATE PARCEL BOUNDARY
- APPROXIMATE SOIL BORING LOCATION
- APPROXIMATE SOIL BORING LOCATION WITH TEMPORARY MONITORING WELL

- NOTES:
1. BASE DRAWING INFORMATION TAKEN FROM GOOGLE EARTH PRO WITH IMAGE DATE 3-14-2020 AND SITE RECONNAISSANCE.
 2. CONCENTRATIONS ARE SHOWN IN MICROGRAMS PER KILOGRAM (µg/kg) AND EXCEED ONE OR MORE PART 201 GENERIC RESIDENTIAL CLEANUP CRITERIA.



Project
 1500, 1514, 1518,
 1526, 1532, VAN DYKE
 STREET, AND
 8029 COE AVENUE

Project Location
 DETROIT, MICHIGAN

Sheet Name
 SOIL ANALYTICAL
 RESULTS DIAGRAM

No.	Revision Date

Date 07/28/2022
CADD MNR
Designer NS
Scale AS NOTED

Project
 086124.00.03B.006

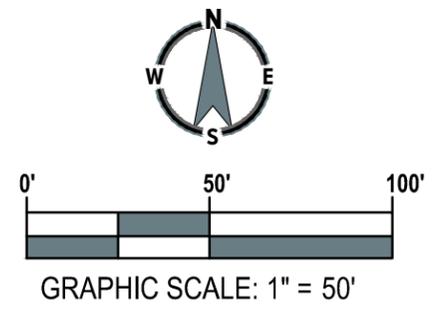
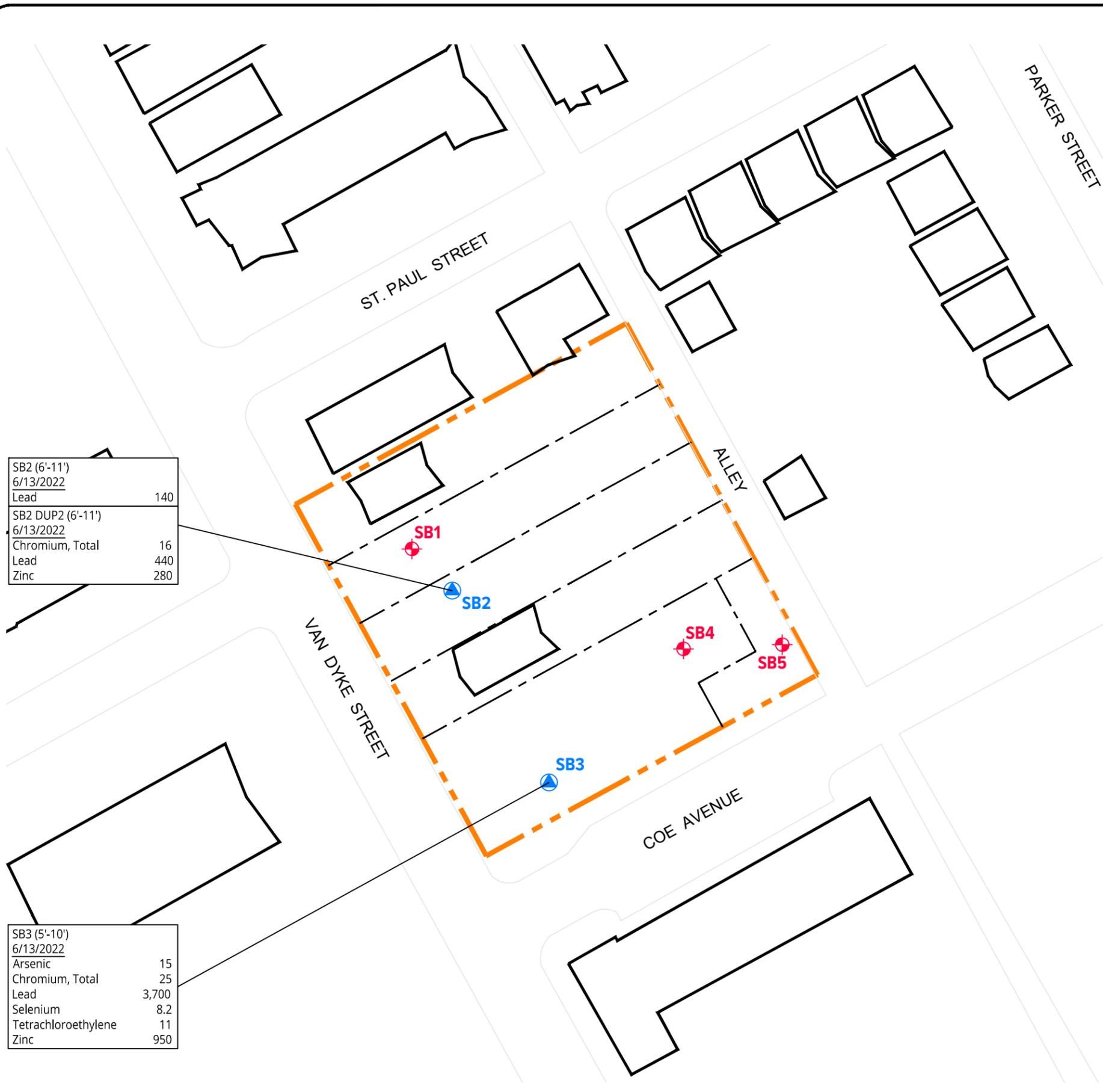
Figure No.
 4

DRAWING NOTE: SCALE DEPICTED IS MEANT FOR 11" X 17" AND WILL SCALE INCORRECTLY IF PRINTED ON ANY OTHER SIZE MEDIA
 NO REPRODUCTION SHALL BE MADE WITHOUT THE PRIOR CONSENT OF SME
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SB2 (6'-11')	
6/13/2022	
Lead	140
SB2 DUP2 (6'-11')	
6/13/2022	
Chromium, Total	16
Lead	440
Zinc	280

SB3 (5'-10')	
6/13/2022	
Arsenic	15
Chromium, Total	25
Lead	3,700
Selenium	8.2
Tetrachloroethylene	11
Zinc	950



LEGEND

- - - - - APPROXIMATE PROPERTY BOUNDARY
- - - - - APPROXIMATE PARCEL BOUNDARY
- ⊕ APPROXIMATE SOIL BORING LOCATION
- ⊕ APPROXIMATE SOIL BORING LOCATION WITH TEMPORARY MONITORING WELL

- NOTES:
- BASE DRAWING INFORMATION TAKEN FROM GOOGLE EARTH PRO WITH IMAGE DATE 3-14-2020 AND SITE RECONNAISSANCE.
 - CONCENTRATIONS ARE SHOWN IN MICROGRAMS PER LITER (µg/L) AND EXCEED ONE OR MORE PART 201 GENERIC RESIDENTIAL CLEANUP CRITERIA.



Project
1500, 1514, 1518, 1526, 1532, VAN DYKE STREET, AND 8029 COE AVENUE

Project Location
DETROIT, MICHIGAN

Sheet Name
GROUNDWATER ANALYTICAL RESULTS DIAGRAM

No.	Revision Date

Date	07/28/2022
CADD	MNR
Designer	NS
Scale	AS NOTED

Project **086124.00.03B.006**

Figure No. **5**

DRAWING NOTE: SCALE DEPICTED IS MEANT FOR 11" X 17" AND WILL SCALE INCORRECTLY IF PRINTED ON ANY OTHER SIZE MEDIA
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TABLES

TABLE 1: SUMMARY OF ANALYTICAL RESULTS – SOIL

TABLE 2: SUMMARY OF ANALYTICAL RESULTS – GROUNDWATER



TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS
VAN DYKE ST AND COE AVENUE PARCELS
DETROIT, MI
SME PROJECT NO.: 086124.00.03B.006

Constituent	CAS #	Part 201 Generic Residential Cleanup Criteria							VIAP Screening Levels	Statewide Default Background Levels	Chemical Analysis Results						Maximum Concentration Measured at Property	
		Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria	Direct Contact Criteria	Soil Saturation Concentration Screening Levels			Residential Volatilization to Indoor Air Pathway (VIAP) Screening Levels	Sample Identification						
												Depth (Feet)						
												Date Collected						
												Sample Location Address						
SB1	DUP Soil (SB1)	SB2	SB3	SB4	SB5	SB1	DUP Soil (SB1)	SB2	SB3	SB4	SB5							
(2'-4')	(2'-4')	(4'-6')	(5'-7')	(3'-4')	(3'-5')	(2'-4')	(2'-4')	(4'-6')	(5'-7')	(3'-4')	(3'-5')							
6/13/2022	6/13/2022	6/13/2022	6/13/2022	6/13/2022	6/13/2022	6/13/2022	6/13/2022	6/13/2022	6/13/2022	6/13/2022	6/13/2022							
1526 Van Dyke Street	1526 Van Dyke Street	1518 Van Dyke Street	1500 Van Dyke Street	1500 Van Dyke Street	8029 Coe Avenue	1526 Van Dyke Street	1526 Van Dyke Street	1518 Van Dyke Street	1500 Van Dyke Street	1500 Van Dyke Street	8029 Coe Avenue							
VOCs	CAS #																	
Acetone	67-64-1	15,000	34,000	290,000,000	190,000,000	1,000,000,000	23,000,000	110,000,000	260,000	NA	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	0	
Acrylonitrile	107-13-1	100	100	6,600	10,000	46,000,000	16,000	8,300,000	1.2	NA	<100	<100	<100	<100	<100	<100	0	
Benzene	71-43-2	100	4,000 (X)	1,600	79,000	380,000,000	180,000	400,000	1.7	NA	<50	<50	<50	<50	<50	<50	0	
Bromobenzene	108-86-1	550	NA	310,000	450,000	530,000,000	540,000	760,000	160	NA	<100	<100	<100	<100	<100	<100	0	
Bromochloromethane	74-97-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	<100	<100	<100	<100	0	
Bromodichloromethane	75-27-4	1,600	ID	1,200	19,000	84,000,000	110,000	1,500,000	0.61	NA	<100	<100	<100	<100	<100	<100	0	
Bromofrom	75-25-2	1,600	ID	150,000	900,000	2,800,000,000	820,000	870,000	45	NA	<100	<100	<100	<100	<100	<100	0	
Bromomethane	74-83-9	200	100	860	140,000	330,000,000	320,000	2,200,000	0.90	NA	<200	<200	<200	<200	<200	<200	0	
2-Butanone (MEK)	78-93-3	260,000	44,000	54,000,000	35,000,000	1,000,000,000	120,000,000	27,000,000	31,000	NA	<750	<750	<750	<750	<750	<750	0	
n-Butylbenzene	104-51-8	1,600	ID	ID	ID	1,000,000,000	2,500,000	10,000,000	550	NA	<50	<50	<50	<50	<50	<50	0	
sec-Butylbenzene	135-98-8	1,600	ID	ID	ID	400,000,000	2,500,000	10,000,000	3,800	NA	<50	<50	<50	<50	<50	<50	0	
tert-Butylbenzene	98-06-6	1,600	ID	ID	ID	670,000,000	2,500,000	10,000,000	0.64	NA	<50	<50	<50	<50	<50	<50	0	
Carbon disulfide	75-15-0	16,000	ID	76,000	19,000,000	1,000,000,000	7,200,000	280,000	52	NA	<250	<250	<250	<250	<250	<250	0	
Carbon tetrachloride	56-23-5	100	760 (X)	190	28,000	130,000,000	96,000	390,000	0.31	NA	<50	<50	<50	<50	<50	<50	0	
Chlorobenzene	108-90-7	2,000	500	120,000	2,100,000	1,000,000,000	4,300,000	260,000	82	NA	<50	<50	<50	<50	<50	<50	0	
Chloroethane	75-00-3	8,600	22,000 (X)	2,900,000	280,000,000	1,000,000,000	2,600,000	950,000	330	NA	<250	<250	<250	<250	<250	<250	0	
Chloroform	67-66-3	1,600	7,000	7,200	270,000	1,300,000,000	1,200,000	1,500,000	0.26	NA	<50	<50	<50	<50	<50	<50	0	
Chloromethane	74-87-3	5,200	ID	2,300	1,000,000	1,000,000,000	1,600,000	1,100,000	6.9	NA	<250	<250	<250	<250	<250	<250	0	
o-Chlorotoluene	95-49-8	3,300	ID	270,000	6,300,000	1,000,000,000	4,500,000	500,000	200	NA	<50	<50	<50	<50	<50	<50	0	
Dibromochloropropane	96-12-8	10	ID	220	260	560,000	4,400	1,200	DATA	NA	<250	<250	<250	<250	<250	<250	0	
Dibromochloromethane	124-48-1	1,600	ID	3,900	33,000	130,000,000	110,000	610,000	0.40	NA	<100	<100	<100	<100	<100	<100	0	
Dibromomethane	74-95-3	1,600	NA	ID	ID	ID	2,500,000	2,000,000	3.5	NA	<250	<250	<250	<250	<250	<250	0	
1,2-Dichlorobenzene	95-50-1	14,000	280	11,000,000	52,000,000	1,000,000,000	19,000,000	210,000	1,500	NA	<100	<100	<100	<100	<100	<100	0	
1,3-Dichlorobenzene	541-73-1	170	680	26,000	110,000	200,000,000	200,000	170,000	10	NA	<100	<100	<100	<100	<100	<100	0	
1,4-Dichlorobenzene	106-46-7	1,700	360	19,000	110,000	450,000,000	400,000	NA	23	NA	<100	<100	<100	<100	<100	<100	0	
Dichlorodifluoromethane	75-71-8	95,000	ID	900,000	1,000,000,000	1,000,000,000	52,000,000	1,000,000	12	NA	<250	<250	<250	<250	<250	<250	0	
1,1-Dichloroethane	75-34-3	18,000	15,000	230,000	14,000,000	1,000,000,000	27,000,000	890,000	2.6	NA	<50	<50	<50	<50	<50	<50	0	
1,2-Dichloroethane	107-06-2	100	7,200 (X)	2,100	26,000	120,000,000	91,000	1,200,000	0.82	NA	<50	<50	<50	<50	<50	<50	0	
cis-1,2-Dichloroethylene	156-59-2	1,400	12,000	22,000	990,000	1,000,000,000	2,500,000	640,000	2.1	NA	<50	<50	<50	<50	<50	<50	0	
trans-1,2-Dichloroethylene	156-60-5	2,000	30,000	23,000	2,000,000	1,000,000,000	3,800,000	1,400,000	12	NA	<50	<50	<50	<50	<50	<50	0	
1,1-Dichloroethylene	75-35-4	140	2,600	62	13,000	62,000,000	200,000	570,000	2.6	NA	<50	<50	<50	<50	<50	<50	0	
1,2-Dichloropropane	78-87-5	100	4,600 (X)	4,000	110,000	270,000,000	140,000	550,000	2.1	NA	<50	<50	<50	<50	<50	<50	0	
cis-1,3-Dichloropropylene	10061-01-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<50	<50	<50	<50	<50	<50	0	
trans-1,3-Dichloropropylene	10061-02-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	<50	<50	<50	<50	<50	<50	0	
Ethylbenzene	100-41-4	1,500	360	87,000	2,200,000	1,000,000,000	22,000,000	140,000	12	NA	<50	<50	<50	<50	<50	<50	0	
Ethylene dibromide	106-93-4	20	110 (X)	670	3,300	14,000,000	92	890,000	0.074	NA	<50	<50	<50	<50	<50	<50	0	
2-Hexanone	591-78-6	20,000	ID	990,000	1,400,000	1,000,000,000	32,000,000	2,500,000	210	NA	<2,500	<2,500	<2,500	<2,500	<2,500	<2,500	0	
Isopropyl benzene	98-82-8	91,000	3,200	400,000	2,800,000	1,000,000,000	25,000,000	390,000	3.8	NA	<250	<250	<250	<250	<250	<250	0	
4-Methyl-2-pentanone (MIBK)	108-10-1	36,000	ID	37,000,000	67,000,000	1,000,000,000	56,000,000	2,700,000	3,300	NA	<2,500	<2,500	<2,500	<2,500	<2,500	<2,500	0	
Methylene chloride	75-09-2	100	30,000 (X)	45,000	1,400,000	1,000,000,000	1,300,000	2,300,000	130	NA	<100	<100	<100	<100	<100	<100	0	
Methyl-tert-butyl ether (MTBE)	1634-04-4	800	140,000 (X)	9,900,000	87,000,000	1,000,000,000	1,500,000	5,900,000	74	NA	<250	<250	<250	<250	<250	<250	0	
2-Methylnaphthalene	91-57-6	57,000	4,200	2,700,000	1,500,000	670,000,000	8,100,000	NA	1,700	NA	<330	<330	<330	<330	<330	<330	0	
Naphthalene	91-20-3	35,000	730	250,000	300,000	200,000,000	16,000,000	NA	67	NA	<330	<330	<330	<330	<330	<330	0	
n-Propylbenzene	103-65-1	1,600	ID	ID	ID	1,000,000,000	2,500,000	10,000,000	1,800	NA	<100	<100	<100	<100	<100	<100	0	
Styrene	100-42-5	2,700	2,100 (X)	250,000	1,400,000	1,000,000,000	400,000	520,000	150	NA	<50	<50	<50	<50	<50	<50	0	
1,1,1,2-Tetrachloroethane	630-20-6	1,500	ID	6,200	100,000	420,000,000	480,000	440,000	3.2	NA	<100	<100	<100	<100	<100	<100	0	
1,1,2,2-Tetrachloroethane	79-34-5	170	1,600 (X)	4,300	14,000	54,000,000	53,000	870,000	2.7	NA	<50	<50	<50	<50	<50	<50	0	
Tetrachloroethylene	127-18-4	100	11,200	11,000	1,100,000	1,000,000,000	200,000	88,000	6.2	NA	<50	<50	<50	460	150	78	460	
Toluene	108-88-3	16,000	5,400	330,000	12,000,000	1,000,000,000	50,000,000	250,000	3,700	NA	<50	<50	<50	<50	<50	<50	0	
1,2,4-Trichlorobenzene	120-82-1	4,200	5,900 (X)	9,600,000	28,000,000	1,000,000,000	990,000	1,100,000	53	NA	<250	<250	<250	<250	<250	<250	0	
1,1,1-Trichloroethane	71-55-6	4,000	1,800	250,000	28,000,000	1,000,000,000	500,000,000	460,000	450	NA	<50	<50	<50	<50	<50	<50	0	
1,1,2-Trichloroethane	79-00-5	100	6,600 (X)	4,600	44,000	190,000,000	180,000	920,000	0.37	NA	<50	<50	<50	<50	<50	<50	0	
Trichloroethylene	79-01-6	100	4,000	1,000	57,000	130,000,000	110,000	500,000	0.33	NA	<50	<50	<50	<50	<50	<50	0	
Trichlorofluoromethane	75-69-4	52,000	NA	2,80														

TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS
VAN DYKE ST AND COE AVENUE PARCELS
DETROIT, MI
SME PROJECT NO.: 086124.00.03B.006

Constituent	Part 201 Generic Residential Cleanup Criteria									VIAP Screening Levels	Chemical Analysis Results						Maximum Concentration Measured at Property						
	Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Soil Volatilization to Indoor Air Inhalation Criteria	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria	Direct Contact Criteria	Soil Saturation Concentration Screening Levels	Residential Volatilization to Indoor Air Pathway (VIAP) Screening Levels	Statewide Default Background Levels		Sample Identification												
											Depth (Feet)							Date Collected					
											Sample Location Address							SB1	DUP Soil (SB1)	SB2	SB3	SB4	SB5
																		(2'-4')	(2'-4')	(4'-6')	(5'-7')	(3'-4')	(3'-5')
						6/13/2022	6/13/2022	6/13/2022	6/13/2022	6/13/2022	6/13/2022												
						1526 Van Dyke Street	1526 Van Dyke Street	1518 Van Dyke Street	1500 Van Dyke Street	1500 Van Dyke Street	8029 Coe Avenue												
Polynuclear Aromatic Hydrocarbons (PAHs)																							
Acenaphthene	83-32-9	300,000	8,700	190,000,000	81,000,000	1,000,000,000	41,000,000	NA	200,000	NA	<330	<330	<330	<330	<330	<330	0						
Acenaphthylene	208-96-8	5,900	ID	1,600,000	2,200,000	1,000,000,000	1,600,000	NA	DATA	NA	<330	<330	<330	<330	<330	<330	0						
Anthracene	120-12-7	41,000	ID	1,000,000,000	1,000,000,000	1,000,000,000	230,000,000	NA	13,000,000	NA	<330	<330	<330	500	<330	<330	500						
Benzo(a)anthracene	56-55-3	NLL	NLL	NLV	NLV	ID	20,000	NA	160,000	NA	<330	<330	<330	1,100	<330	<330	1,100						
Benzo(a)pyrene	50-32-8	NLL	NLL	NLV	NLV	1,500,000	2,000	NA	NA	NA	<330	<330	<330	950	<330	<330	950						
Benzo(b)fluoranthene	205-99-2	NLL	NLL	ID	ID	ID	20,000	NA	NA	NA	<330	<330	<330	1,400	<330	<330	1,400						
Benzo(g,h,i)perylene	191-24-2	NLL	NLL	NLV	NLV	800,000,000	2,500,000	NA	NA	NA	<330	<330	<330	430	<330	<330	430						
Benzo(k)fluoranthene	207-08-9	NLL	NLL	NLV	NLV	ID	200,000	NA	NA	NA	<330	<330	<330	580	<330	<330	580						
Chrysene	218-01-9	NLL	NLL	ID	ID	ID	2,000,000	NA	NA	NA	<330	<330	<330	1,100	<330	<330	1,100						
Dibenzo(a,h)anthracene	53-70-3	NLL	NLL	NLV	NLV	ID	2,000	NA	NA	NA	<330	<330	<330	<330	<330	<330	0						
Fluoranthene	206-44-0	730,000	5,500	1,000,000,000	740,000,000	1,000,000,000	46,000,000	NA	NA	NA	<330	<330	<330	2,500	<330	<330	2,500						
Fluorene	86-73-7	390,000	5,300	580,000,000	130,000,000	1,000,000,000	27,000,000	NA	470,000	NA	<330	<330	<330	<330	<330	<330	0						
Indeno(1,2,3-cd)pyrene	193-39-5	NLL	NLL	NLV	NLV	ID	20,000	NA	NA	NA	<330	<330	<330	540	<330	<330	540						
2-Methylnaphthalene	91-57-6	57,000	4,200	2,700,000	1,500,000	670,000,000	8,100,000	NA	1,700	NA	<330	<330	<330	<330	<330	<330	0						
Naphthalene	91-20-3	35,000	730	250,000	300,000	200,000,000	16,000,000	NA	67	NA	<330	<330	<330	<330	<330	<330	0						
Phenanthrene	85-01-8	56,000	2,100	2,800,000	160,000	6,700,000	1,600,000	NA	1,700	NA	<330	<330	<330	2,500	<330	<330	2,500						
Pyrene	129-00-0	480,000	ID	1,000,000,000	650,000,000	1,000,000,000	29,000,000	NA	250,000	NA	<330	<330	<330	2,300	<330	<330	2,300						
Other Analyzed PAHs	CS	CS	CS	CS	CS	CS	CS	CS	CS	NA	<RL	<RL	<RL	<RL	<RL	<RL	NA						
Polychlorinated Biphenyls (PCBs)																							
PCB, Aroclor 1016	12674-11-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	<100	<100	<100	<100	0						
PCB, Aroclor 1221	11104-28-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	<100	<100	<100	<100	0						
PCB, Aroclor 1232	11141-16-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	<100	<100	<100	<100	0						
PCB, Aroclor 1242	53469-21-9	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	<100	<100	<100	<100	0						
PCB, Aroclor 1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	<100	<100	<100	<100	0						
PCB, Aroclor 1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	<100	<100	<100	<100	0						
PCB, Aroclor 1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	<100	<100	<100	<100	0						
PCB, Aroclor 1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	<100	<100	<100	<100	0						
PCB, Aroclor 1268	11100-14-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	<100	<100	<100	<100	0						
Total PCBs	1336-36-3	NLL	NLL	3,000,000	7,900,000	5,200,000	4,000	NA	NA	NA	<100	<100	<100	<100	<100	<100	0						
Metals																							
Arsenic	7440-38-2	5,800	5,800	NLV	NLV	910,000	7,600	NA	NA	5,800	8,000	4,400	7,000	7,600	9,600	8,900	9,600						
Barium	7440-39-3	1,300,000	440,000*	NLV	NLV	150,000,000	37,000,000	NA	NA	75,000	87,000	83,000	150,000	81,000	73,000	58,000	150,000						
Cadmium	7440-43-9	6,000	3,600*	NLV	NLV	1,700,000	550,000	NA	NA	1,200	410	330	230	220	400	330	410						
Chromium, Total**	7440-47-3	1,000,000,000	2,900,000,000*	NLV	NLV	330,000,000	790,000,000	NA	NA	18,000 (total)	17,000	12,000	20,000	19,000	14,000	16,000	20,000						
Chromium VI**	18540-29-9	30,000	3,300	NLV	NLV	260,000	2,500,000	NA	NA	NA	<460	NE	<580	<480	NE	NE	0						
Copper	7440-50-8	5,800,000	75,000*	NLV	NLV	130,000,000	20,000,000	NA	NA	32,000	19,000	11,000	29,000	32,000	26,000	17,000	32,000						
Lead	7439-92-1	700,000	5,100,000*	NLV	NLV	100,000,000	400,000	NA	NA	21,000	270,000	200,000	110,000	90,000	78,000	34,000	270,000						
Lead, Coarse Fraction	7439-92-1	NA	NA	NLV	NLV	100,000,000	400,000	NA	NA	21,000	354,000	NE	120,000	NE	53,600	NE	354,000						
Lead, Fine Fraction	7439-92-1	NA	NA	NLV	NLV	100,000,000	400,000	NA	NA	21,000	494,000	NE	136,000	NE	109,000	NE	494,000						
Lead, Total (Calculated)	7439-92-1	700,000	5,100,000*	NLV	NLV	100,000,000	400,000	NA	NA	21,000	359,000	NE	120,000	NE	56,100	NE	359,000						
Mercury	7439-97-6	1,700	130	NLV	NLV	20,000,000	160,000	NA	NA	130	250	73	91	<50	<50	<50	250						
Selenium	7782-49-2	4,000	410	NLV	NLV	130,000,000	2,600,000	NA	NA	410	370	520	440	300	210	350	520						
Silver	7440-22-4	4,500	1,000	NLV	NLV	6,700,000	2,500,000	NA	NA	1,000	<100	<100	<100	<100	<100	<100	0						
Zinc	7440-66-6	2,400,000	170,000*	NLV	NLV	ID	170,000,000	NA	NA	47,000	140,000	160,000	130,000	85,000	110,000	66,000	160,000						



TABLE 1
SUMMARY OF SOIL ANALYTICAL RESULTS
VAN DYKE ST AND COE AVENUE PARCELS
DETROIT, MI
SME PROJECT NO.: 086124.00.03B.006

Notes:

- Concentrations reported in micrograms per kilogram ($\mu\text{g}/\text{kg}$).
- Analytical results were compared to the December 30, 2013 Promulgated Cleanup Criteria, Residential and/or Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels, updated June 25, 2018.
- Analytical results were also compared to the EGLE September 4, 2020 Residential Volatilization to Indoor Air Pathway (VIAP) Screening Levels.
- Results exceeding one or more criteria are shaded, as are the criteria exceeded.
- Refer to the analytical report for the full list of analytes.
- CS - Criterion is specific to individual constituent.
- <RL - Analytical result was below laboratory reporting limit.
- ID - Insufficient data to develop criteria.
- NA - Not applicable.
- NE - Not evaluated.
- NLV - Not likely to volatilize.
- NLL - Not likely to leach.
- * = GSI Protection was calculated for the indicated metals using the EGLE spreadsheet for calculating GSI. A default water hardness value of 150 mg/kg as CaCO_3 was used to calculate GSI. Results are presented for surface water receiving bodies not protected as a drinking water source.
- *italicized* - the respective criterion was below the Statewide Default Background Level (SDBL) and therefore the value defaulted to the SDBL value.
- ** - Total chromium results compared to trivalent chromium criteria because hexavalent chromium was analyzed and not measured above the laboratory reporting limit in the three soil samples that had the highest total chromium concentration.
- Concentrations were also compared to, and found to be below, the ambient and indoor air criteria and the soil saturation concentration screening levels.
- Laboratory indicated that there was not sufficient sample to complete the additional fine and coarse lead fraction analysis.



TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
VAN DYKE ST AND COE AVENUE PARCELS
DETROIT, MI
SME PROJECT NO.: 086124.00.03B.006

Constituent	Part 201 Generic Cleanup Criteria								Volatilization to Indoor Air Pathway (VIAP) Screening Levels		Chemical Analysis Results Sample Identification Depth (Feet) Date Collected Sample Location Address			Maximum Concentration Measured at Property
	Residential Drinking Water Protection Criteria	Non Residential Drinking Water Protection Criteria	Groundwater Surface Water Interface Protection Criteria	Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Non Residential Groundwater Volatilization to Indoor Air Inhalation Criteria	Water Solubility	Flammability and Explosivity Screening Level	Residential Shallow Groundwater	Residential Groundwater Not in Contact	SB2	DUP GW (SB2)	SB3		
										(6'-11')	(6'-11')	(5'-10')		
										6/13/2022	6/13/2022	6/13/2022		
										1518 Van Dyke Street	1518 Van Dyke Street	1500 Van Dyke Street		
VOCS	CAS #													
Acetone	67-64-1	730	2,100	1,700	1,000,000,000	1,000,000,000	1,000,000,000	15,000,000	NA	NA	<50	<50	<50	0
Acrylonitrile	107-13-1	2.6	11	2	34,000	190,000	75,000,000	6,400,000	4.6	140	<2.0	<2.0	<2.0	0
Benzene	71-43-2	5	5	200	5,600	35,000	1,750,000	68,000	1.0	28	<1.0	<1.0	<1.0	0
Bromobenzene	108-86-1	18	50	NA	180,000	390,000	413,000	ID	62	1,800	<1.0	<1.0	<1.0	0
Bromochloromethane	74-97-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0	<1.0	<1.0	0
Bromodichloromethane	75-27-4	80	80	ID	4,800	37,000	6,740,000	ID	1.2	34	<1.0	<1.0	<1.0	0
Bromofom	75-25-2	80	80	ID	470,000	3,100,000	3,100,000	ID	89	2,700	<1.0	<1.0	<1.0	0
Bromomethane	74-83-9	10	29	35	4,000	9,000	14,500,000	ID	2.1	55	<5.0	<5.0	<5.0	0
2-Butanone (MEK)	78-93-3	13,000	38,000	2,200	240,000,000	240,000,000	240,000,000	ID	2,600	4,300,000	<25	<25	<25	0
n-Butylbenzene	104-51-8	80	230	ID	ID	ID	NA	ID	44	1,100	<1.0	<1.0	<1.0	0
sec-Butylbenzene	135-98-8	80	230	ID	ID	ID	NA	ID	270	8,100	<1.0	<1.0	<1.0	0
tert-Butylbenzene	98-06-6	80	230	ID	ID	ID	NA	ID	770	1.8	<1.0	<1.0	<1.0	0
Carbon disulfide (R)	75-15-0	800	2,300	ID	250,000	550,000	1,190,000	13,000	92	2,100	<5.0	<5.0	<5.0	0
Carbon tetrachloride	56-23-5	5.0	5	45	370	2,400	793,000	ID	0.41	7.7	<1.0	<1.0	<1.0	0
Chlorobenzene	108-90-7	100	100	25	210,000	470,000	472,000	160,000	33	940	<1.0	<1.0	<1.0	0
Chloroethane	75-00-3	430	1,700	1,100	5,700,000	5,700,000	5,740,000	110,000	620	15,000	<5.0	<5.0	<5.0	0
Chloroform	67-68-3	80	80	350	28,000	180,000	7,920,000	ID	0.49	14	<1.0	<1.0	<1.0	0
Chloromethane	74-87-3	260	1,100	ID	8,600	45,000	6,340,000	36,000	15	380	<5.0	<5.0	<5.0	0
o-Chlorotoluene	95-49-8	150	420	ID	220,000	370,000	373,000	ID	50	1,400	<5.0	<5.0	<5.0	0
Dibromochloropropane	96-12-8	0.2	0.2	ID	220	1,200	1,230	NA	45,000	45,000	<1.0	<1.0	<1.0	0
Dibromochloromethane	124-48-1	80	80	ID	14,000	110,000	2,600,000	ID	0.78	23	<5.0	<5.0	<5.0	0
Dibromomethane	74-95-3	80	230	NA	ID	ID	11,000,000	ID	8.8	260	<5.0	<5.0	<5.0	0
1,2-Dichlorobenzene	95-50-1	600	600	13	160,000	160,000	156,000	NA	370	11,000	<1.0	<1.0	<1.0	0
1,3-Dichlorobenzene	541-73-1	7	19	28	18,000	41,000	111,000	ID	2.6	75	<1.0	<1.0	<1.0	0
1,4-Dichlorobenzene	106-46-7	75	75	17	16,000	74,000	73,800	NA	5.9	170	<1.0	<1.0	<1.0	0
Dichlorodifluoromethane	75-71-8	1,700	4,800	ID	220,000	300,000	300,000	ID	13	49	<5.0	<5.0	<5.0	0
1,1-Dichloroethane	75-34-3	880	2,500	740	1,000,000	2,300,000	5,060,000	380,000	4.7	130	<1.0	<1.0	<1.0	0
1,2-Dichloroethane	107-06-2	5	5	360	9,600	59,000	8,520,000	2,500,000	1.4	41	<1.0	<1.0	<1.0	0
cis-1,2-Dichloroethylene	156-59-2	70	70	620	93,000	210,000	3,500,000	530,000	3.4	95	<1.0	<1.0	<1.0	0
trans-1,2-Dichloroethylene	156-60-5	100	100	1,500	85,000	200,000	6,300,000	230,000	16	390	<1.0	<1.0	<1.0	0
1,1-Dichloroethylene	75-35-4	7	7	130	200	1,300	2,250,000	97,000	4.7	130	<1.0	<1.0	<1.0	0
1,2-Dichloropropane	78-87-5	5	5	230	16,000	36,000	2,800,000	550,000	2.6	74	<1.0	<1.0	<1.0	0
cis-1,3-Dichloropropylene	10061-01-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	0
trans-1,3-Dichloropropylene	10061-02-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	<0.50	0
Ethylbenzene	100-41-4	74	74	18	110,000	170,000	169,000	43,000	2.8	74	<1.0	<1.0	<1.0	0
Ethylene dibromide	106-93-4	0.05	0.05	5.7	2,400	15,000	4,200,000	ID	0.13	3.8	<1.0	<1.0	<1.0	0
2-Hexanone	591-78-6	1,000	2,900	ID	4,200,000	8,700,000	16,000,000	NA	660	20,000	<5.0	<5.0	<5.0	0
Isopropyl benzene	98-82-8	800	2,300	28	56,000	56,000	29,000	29,000	0.60	15	<5.0	<5.0	<5.0	0
4-Methyl-2-pentanone (MIBK)	108-10-1	1,800	5,200	ID	20,000,000	20,000,000	20,000,000	ID	200	300,000	<5.0	<5.0	<5.0	0
Methylene chloride	75-09-2	5	5	1,500	220,000	1,400,000	17,000,000	ID	79	8,400	<5.0	<5.0	<5.0	0
Methyl-tert-butyl ether (MTBE)	1634-04-4	40	40	7,100	47,000,000	47,000,000	46,800,000	ID	250	7,400	<5.0	<5.0	<5.0	0
2-Methylnaphthalene	91-57-6	260	750	19	25,000	25,000	24,600	ID	66	2,000	<5.0	<5.0	<5.0	0
Naphthalene	91-20-3	520	1,500	11	31,000	31,000	31,000	NA	4.2	130	<5.0	<5.0	<5.0	0
n-Propylbenzene	103-65-1	80	230	ID	ID	ID	NA	ID	43	6,100	<1.0	<1.0	<1.0	0
Styrene	100-42-5	100	100	80	170,000	310,000	310,000	140,000	33	960	<1.0	<1.0	<1.0	0
1,1,1,2-Tetrachloroethane	630-20-6	77	320	ID	15,000	96,000	1,100,000	ID	3.1	89	<1.0	<1.0	<1.0	0

Notes are found on the last page of this table.



TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
VAN DYKE ST AND COE AVENUE PARCELS
DETROIT, MI
SME PROJECT NO.: 086124.00.03B.006

Constituent		Part 201 Generic Cleanup Criteria								Volatilization to Indoor Air Pathway (VIAP) Screening Levels		Chemical Analysis Results Sample Identification Depth (Feet) Date Collected Sample Location Address			Maximum Concentration Measured at Property
		Identical Drinking Protection Criteria	Residential Drinking Protection Criteria	Indoor Surface Water Interface Protection Criteria	Initial Groundwater Utilization to Indoor Inhalation Criteria	Residential Groundwater Utilization to Indoor Inhalation Criteria	Water Solubility	Permeability and Porosity Screening Level	Initial Shallow Groundwater	Initial Groundwater Not in Contact	SB2	DUP GW (SB2)	SB3		
											(6'-11')	(6'-11')	(5'-10')		
											6/13/2022	6/13/2022	6/13/2022		
1,1,2,2-Tetrachloroethane	79-34-5	9	35	78	12,000	77,000	2,970,000	ID	2.4	71	<1.0	<1.0	<1.0	0	
Tetrachloroethylene	127-18-4	5	5	60	25,000	170,000	200,000	ID	1.5	130	<1.0	<1.0	11	11	
Toluene	108-88-3	790	790	270	530,000	530,000	526,000	61,000	300	41,000	<1.0	1.7	<1.0	1.7	
1,2,4-Trichlorobenzene	120-82-1	70	70	99	300,000	300,000	300,000	NA	3.8	110	<5.0	<5.0	<5.0	0	
1,1,1-Trichloroethane	71-55-6	200	200	89	660,000	1,300,000	1,330,000	ID	180	14,000	<1.0	<1.0	<1.0	0	
1,1,2-Trichloroethane	79-00-5	5	5	330	17,000	110,000	4,420,000	NA	0.47	14	<1.0	<1.0	<1.0	0	
Trichloroethylene	79-01-6	5	5	200	2,200	4,900	1,100,000	ID	0.073	10	<1.0	<1.0	<1.0	0	
Trichlorofluoromethane	75-69-4	2,600	7,300	NA	1,100,000	1,100,000	1,100,000	ID	22	190	<1.0	<1.0	<1.0	0	
1,2,3-Trichloropropane	96-18-4	42	120	NA	8,300	18,000	1,900,000	NA	1.9	57	<1.0	<1.0	<1.0	0	
1,2,3-Trimethylbenzene	526-73-8	NA	NA	NA	NA	NA	NA	NA	43	1,200	<1.0	<1.0	<1.0	0	
1,2,4-Trimethylbenzene	95-63-6	63	63	17	56,000	56,000	55,890	56,000	25	670	1.5	1.7	<1.0	1.7	
1,3,5-Trimethylbenzene	108-67-8	72	72	45	61,000	61,000	61,150	ID	18	470	<1.0	<1.0	<1.0	0	
Vinyl chloride	75-01-4	2	2	13	1,100	13,000	2,760,000	33,000	0.12	2.1	<1.0	<1.0	<1.0	0	
Xylene, m- and p-	XYLMP	NA	NA	NA	NA	NA	NA	NA	NA	NA	<2.0	3.1	<2.0	3.1	
Xylene, o-	95-47-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.0	1.2	<1.0	1.2	
Xylenes	1330-20-7	280	280	41	190,000	190,000	186,000	70,000	75	2,000	<3.0	4.3	<3.0	4.3	
Polynuclear Aromatic Hydrocarbons (PAHs)															
Acenaphthene	83-32-9	1,300	3,900	38	4,200	4,200	4,240	ID	3,900	3,900	<5.0	<5.0	<5.0	0	
Acenaphthylene	208-96-8	52	150	ID	3,900	3,900	3,930	ID	65	65	<5.0	<5.0	<5.0	0	
Anthracene	120-12-7	43	43	ID	43	43	43	ID	43	43	<5.0	<5.0	<5.0	0	
Benzo(g,h,i)perylene	191-24-2	1	1	ID	NLV	NLV	0	ID	NA	NA	<1.0	<1.0	<1.0	0	
Benzo(k)fluoranthene	207-08-9	1	1	NA	NLV	NLV	1	ID	NA	NA	<1.0	<1.0	<1.0	0	
Benzoanthracene	56-55-3	2	9	ID	NLV	NLV	9	ID	9.4	9.4	<1.0	<1.0	<1.0	0	
Benzo(a)fluoranthene	205-99-2	1.5	1.5	ID	ID	ID	2	ID	NA	NA	<1.0	<1.0	<1.0	0	
Benzo(b)fluoranthene	50-32-8	5	5	ID	NLV	NLV	2	ID	NA	NA	<1.0	<1.0	<1.0	0	
Chrysene	218-01-9	1.6	1.6	ID	ID	ID	2	ID	NA	NA	<1.0	<1.0	<1.0	0	
Dibenzo(a,h)anthracene	53-70-3	2	2	ID	NLV	NLV	2	ID	NA	NA	<2.0	<2.0	<2.0	0	
Fluoranthene	206-44-0	210	210	2	210	210	206	ID	NA	NA	<1.0	<1.0	<1.0	0	
Fluorene	86-73-7	880	2,000	12	2,000	2,000	1,980	ID	1,700	1,700	<5.0	<5.0	<5.0	0	
Indeno(1,2,3-cd)pyrene	193-39-5	2	2	ID	NLV	NLV	0	ID	NA	NA	<2.0	<2.0	<2.0	0	
2-Methylnaphthalene	91-57-6	260	750	19	25,000	25,000	24,600	ID	66	2,000	<5.0	<5.0	<5.0	0	
Naphthalene	91-20-3	520	1,500	11	31,000	31,000	31,000	NA	4.2	130	<5.0	<5.0	<5.0	0	
Phenanthrene	85-01-8	52	150	2	1,000	1,000	1,000	ID	9.5	290	<2.0	<2.0	<2.0	0	
Pyrene	129-00-0	140	140	ID	140	140	135	ID	140	140	<5.0	<5.0	<5.0	0	
Polychlorinated Biphenyls (PCBs)															
PCB, Aroclor 1016	12674-11-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.20	<0.20	<0.20	0	
PCB, Aroclor 1221	11104-28-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.20	<0.20	<0.20	0	
PCB, Aroclor 1232	11141-16-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.20	<0.20	<0.20	0	
PCB, Aroclor 1242	53469-21-9	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.20	<0.20	<0.20	0	
PCB, Aroclor 1248	12672-29-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.20	<0.20	<0.20	0	
PCB, Aroclor 1254	11097-69-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.20	<0.20	<0.20	0	
PCB, Aroclor 1260	11096-82-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.20	<0.20	<0.20	0	
PCB, Aroclor 1262	37324-23-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.20	<0.20	<0.20	0	
PCB, Aroclor 1268	11100-14-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.20	<0.20	<0.20	0	
Total PCBs	1336-36-3	0.50	0.50	0.2	45	45	45	ID	NA	NA	<0.20	<0.20	<0.20	0	
Metals															
Arsenic	7440-38-2	10	10	10	NLV	NLV	NA	ID	NA	NA	<5.0	9.1	15	15	
Barium	7440-39-3	2,000	2,000	670*	NLV	NLV	NA	ID	NA	NA	120	220	350	350	
Cadmium	7440-43-9	5	5	3.0*	NLV	NLV	NA	ID	NA	NA	<1.0	<1.0	2.6	3	
Chromium, Total	7440-47-3	100	100	11	NLV	NLV	NA	ID	NA	NA	<10	16	25	25	
Copper	7440-50-8	1,000	1,000	13*	NLV	NLV	NA	ID	NA	NA	15	40	94	94	
Lead	7439-92-1	4.0	4.0	34*	NLV	NLV	NA	ID	NA	NA	140	440	3,700	3,700	
Mercury	7439-97-6	2.0	2.0	0.0013	56	56	56	ID	0.088	2.5	<0.20	<0.20	<0.20	0	
Selenium	7782-49-2	50	50	5	NLV	NLV	NA	ID	NA	NA	<5.0	<5.0	8.2	8.2	
Silver	7440-22-4	34	98	0.2	NLV	NLV	NA	ID	NA	NA	<0.20	<0.20	<0.20	0	
Zinc	7440-66-6	2,400	5,000	170*	NLV	NLV	NA	ID	NA	NA	87	280	950	950	

Notes are found on the last page of this table.



TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
VAN DYKE ST AND COE AVENUE PARCELS
DETROIT, MI
SME PROJECT NO.: 086124.00.03B.006

Notes:

- Concentrations reported in micrograms per liter (µg/L).
- Analytical results were compared to December 21, 2020 Promulgated Cleanup Criteria, Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels.
- Analytical results were also compared to the EGLE September 4, 2020 Residential Volatilization to Indoor Air Pathway (VIAP) Screening Levels.
- Results exceeding one or more criteria are shaded, as are the criteria exceeded.
- Refer to the analytical report for the full list of analytes.
- CS - Criterion is specific to individual constituent.
- <RL - Analytical result was below laboratory reporting limit.
- NE - Not evaluated.
- NA - Not available.
- ID - Insufficient data to develop criterion.
- NLV - Not likely to volatilize under most soil conditions.
- * = GSI Protection was calculated for the indicated metals using the EGLE spreadsheet for calculating GSI. A default water hardness value of 150 mg/kg as CaCO₃ was used to calculate GSI. Results are presented for surface water receiving bodies not protected as a drinking water source.

APPENDIX A
SAMPLING AND ANALYSIS PLAN

SAMPLING AND ANALYSIS PLAN

1500 VAN DYKE
1500, 1514, 1518, 1826, 1832 VAN DYKE STREET, AND 8029 COE AVENUE
DETROIT, MICHIGAN

SME Project Number: 086124.00.03B.TBD
January 10, 2021

Prepared for: The City of Detroit, Cooperative Agreement BF#00E02492

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1. INTRODUCTION

SME's project team prepared this Sampling and Analysis Plan (SAP) as a requirement of the United States Environmental Protection Agency (USEPA) brownfields grant program prior to using assessment grant funds for environmental assessment. The City of Detroit intends to use its hazardous substances grant funds to conduct an environmental assessment of the Property herein referred to as 1500 Van Dyke site located at 1500, 1514, 1518, 1826, 1532 Van Dyke Street and 8029 Coe Avenue in Detroit, Wayne County, Michigan (the Property). The general location of the Property is shown on Figure 1. The Property was determined to be eligible for the use of hazardous substances funds on June 17, 2021. The Quality Assurance Project Plan (QAPP) was approved by the USEPA on February 3, 2021.

The objective of the proposed environmental assessment is to evaluate current Property environmental conditions for the purpose of supporting environmental due diligence and liability management for the prospective Property purchaser prior to the planned acquisition and redevelopment of the Property for residential and retail use, and to evaluate potential due care/safe use considerations for the planned redevelopment. Descriptions of the Property history and current environmental conditions; strategies and procedures for soil and groundwater sampling; chemical analyses of collected soil and groundwater samples; data evaluation and reporting; and the estimated project schedule are presented in the following sections.

2. PROPERTY HISTORY, CURRENT CONDITIONS, ENVIRONMENTAL CONDITIONS, AND PLANNED PROPERTY ASSESSMENT

A summary of the Property history, current Property conditions, and environmental concerns are presented in the following subsections. The planned Property assessment is also summarized.

2.1 PROPERTY HISTORY

SME conducted a Phase I ESA of the Property and documented our assessment in a report dated December 21, 2021. We documented the Property history and environmental conditions in our Phase I ESA report. A summary is provided below.

The Property was residential land from at least 1897 to the mid-1900s. From 1910 to the late 1970s, the Property was developed with five dwellings along Van Dyke. A store, a barber and a tailor/clothing cleaner were located near the southwest corner of the Property, and an additional dwelling was located at the southeast corner of the Property. Various other outbuildings/automotive storage garages were located along the unnamed alley that bordered the Property to the east. From the 1980s to 2020, various buildings on the Property were razed, and portions of the Property were depicted as grass-covered, vacant lots. At the time of the reconnaissance, only two residential structures remained; one vacant and one occupied. The remainder of the Property consisted of trees or gravel and grassed-covered areas. Additionally, City of Detroit records identified the use of an unknown 275-gallon tank utilized at 1500 Van Dyke commercial parcel in 1941 and a 220-gallon tank on the 1532 Van Dyke residential parcel in 1949.

Surrounding areas consisted primarily of residential developments with an eastern adjoining "building contractor" until the 1930s. From the late 1930s to the 1970s, a church adjoined the Property to the west, and additional commercial developments, including a creamery, and a warehouse/machine shop adjoined to the southwest. The previous Phase I ESA for the southern Property parcels also identified two underground storage tanks (USTs) associated with the eastern-adjointing church. A gasoline tank was also located in the Van Dyke right-of-way, south of the Property. From the 1970s to 2020, numerous surrounding buildings were razed. At the time of the site reconnaissance, surrounding areas consisted primarily of residential developments with a church to the west. A Baseline Environmental Assessment (BEA) report for the southern-adjointing site identified concentrations of arsenic, selenium, mercury and

tetrachloroethylene exceeding applicable Part 201 Residential Cleanup Criteria in soil. No groundwater samples were collected as part of the assessment.

We identified the following recognized environmental conditions in our report:

- The potential for unknown or unreported releases associated with the past use of the Property as a clothing cleaner, the former presence of an unknown 275-gallon tank, and the potential for buried demolition debris and/or fill of unknown origin to be present.
- The potential for the presence of and/or releases from a 220-gallon heating oil UST on the 1532 Van Dyke Street parcel.
- The potential for the migration of unknown or unreported releases associated with southwestern-adjointing former machine shop (1461 and 1463 Van Dyke), as well as USTs on the western-adjointing site (1511 Van Dyke) and to the south in the Van Dyke right-of way.
- The potential for the migration of known contamination associated with the southern-adjointing site (1462 Van Dyke).

This assessment is intended to evaluate the RECs identified by SME and to assist with safe use planning for the redevelopment of the site.

2.2 CURRENT CONDITIONS

The site is shown on Figure 2 and consisted of approximately 0.7 acres of land with two residential structures. Property is currently owned by the various entities. The area north, east, and south of the Property consisted of residential land, the area to the west consisted of a church.

Based on our review of topographic maps, groundwater is anticipated to flow to the east-southeast toward the Rouge River.

2.3 PLANNED PROPERTY ASSESSMENT

We designed the proposed assessment activities to evaluate current Property environmental conditions for the purpose of supporting environmental due diligence and liability management for the purchaser, and to assist with safe use planning for the redevelopment of the site. The assessment will include the collection and chemical analyses of soil and groundwater samples to screen for environmental impact. Upon receipt of analytical testing results, soil and groundwater data will be tabulated and compared to Part 201 criteria to assess if the Property is a “facility” as defined by Part 201.

3. SAMPLING PLAN

The sampling plan for the assessment activities is presented in this section. The sampling plan includes a summary of the planned soil and groundwater sampling locations; rationales for sample locations; and descriptions of procedures and methods for field sampling.

3.1 SUMMARY OF SAMPLING LOCATIONS

We will complete a geophysical survey of the unoccupied 1532 Van Dyke residential parcel and 1500 Van Dyke and 8029 Coe Avenue parcels to assess for former abandoned USTs. We will advance two soil boring locations (SB1 and SB2) on the vacant, former residential parcels (1526 and 1518 Van Dyke) within the footprint of the former structures and collect a water sample from one of the parcels (if encountered). We will advance three boring on each of the two southern parcels (1500 Van Dyke and 8029 Coe Avenue) to evaluate potential shallow fill at the site, evaluate metallic anomalies (if encountered) during the geophysical survey and collect up to two groundwater samples, if encountered.

The proposed soil and groundwater sampling locations are shown on Figure 2. Specific sampling objectives, rationales for the sample locations and depths, and target analytes are summarized in Table 1. The rationales for the selection of sample intervals at each boring are further discussed in Section 3.2.1. The proposed soil boring locations were selected to provide both targeted coverage and general coverage of the Property; however, it should be noted that the actual locations of the borings will be determined at the time of sampling based on access and field conditions.

3.2 SAMPLING PROCEDURES AND METHODS

Soil and groundwater sampling, quality control (QC) sampling, and waste management procedures and methods are summarized in this subsection. Sampling activities will be conducted in accordance with the approved project QAPP.

3.2.1 SOIL AND GROUNDWATER SAMPLING

SME's field representative will collect soil and groundwater samples according to the methods described in the following standard operating procedures that are included in the project QAPP:

- SOP 1 – Soil and Groundwater Sampling Using Direct-Push Methods
- SOP 2 – Soil Sampling with a Hand Auger
- SOP 4 – Methanol Preservation
- SOP 7 – Field Measurements Using a Photoionization Detector (PID) as applicable, included in the QAPP
- SOP 9 – Decontamination of Field Equipment
- SOP 10 – Sample Labeling, Sampling Handling and Chain of Custody

Sampling targets, proposed boring depths, rationales for the sample locations and depths, and target analytes are summarized in Table 1. Our proposed sampling plan and additional details on our sample selection procedure are provided below:

- We will use hydraulic, direct-push soil sampling equipment or a hand auger (in areas where access is limited) to collect continuous soil samples from each boring, visually classify them in the field, and note physical indicators of man-made materials and environmental contamination.
- We will field-screen the soil samples using a portable PID to identify the potential presence of volatile organic compounds (VOCs).
- We will collect soil samples for chemical analyses in accordance with the plan described in Table 1 and summarized as follows:
 - We will collect one soil sample from each soil boring SB1 through SB5, to conduct chemical analysis. Sample preference will be based on evidence of impact in the following descending order of importance: 1) elevated PID measurements, 2) olfactory evidence and 3) visual observation of unnatural coloration, man-made debris, or other evidence of fill. If no evidence of impact or fill is observed, we will collect a soil sample from the upper two feet to evaluate shallow soil for historical surface spills, leaks or other releases.

- At the borings where groundwater sampling is planned, if groundwater is encountered, we will install temporary, 1-inch-diameter polyvinyl chloride (PVC) well assemblies fitted with a 5-foot-long, pre-packed well screen in the open borehole. We will collect a groundwater sample from the temporary well using a peristaltic pump at low-flow sampling rates. The pH, temperature, and conductivity of the purge water will be monitored until judged stable prior to collecting a groundwater sample.
- After completion of soil and/or groundwater sampling at each boring location, we will place purge water and soil cuttings back into their respective boreholes, fill the remaining space with bentonite, and restore the ground surface to match surrounding conditions.

3.2.2 QUALITY CONTROL/QUALITY ASSURANCE

We will minimize the potential for cross-contamination by using new, disposable, nitrile sampling gloves for collection of each soil and groundwater sample; using new acetate liners for direct-push soil sampling; using new polyethylene and/or silicone sample tubing for collection of each groundwater sample; decontaminating soil sampling equipment before each use; and calibrating field instruments in accordance with manufacturer's instructions.

SME's field representative will collect quality control (QC) samples as summarized in Table 1 in accordance with SOP 6, Field Quality Control Samples, in the QAPP. The sample handling and custody requirements, laboratory analytical methods, analysis reporting limits, and reporting protocols will be consistent with those described in the project QAPP.

3.2.3 WASTE MANAGEMENT

We will manage investigation-derived wastes as described in SOP 12, Investigative Derived Wastes, in the QAPP.

4. ANALYSIS PLAN

Fibertec Environmental Services, Inc. (Fibertec) of Michigan will analyze soil, groundwater, and water samples for one or more of the following analytes or analyte groups to screen for the potential presence of impact:

- Volatile organic compounds (VOCs)
- Polynuclear aromatic hydrocarbons (PAHs)
- Polychlorinated Biphenyls (PCBs)
- MI Metals (arsenic, barium, cadmium, total chromium, copper, lead, mercury, selenium, and silver, and zinc)

Fibertec will analyze the samples using the following USEPA Methods:

- VOCs – Method 8260 for soil and groundwater
- PAHs – Method 8270
- PCBs – Method 8082
- Metals – Method 6020

If total lead is measured in soil at a concentration above 75,000 µg/kg, the soil sample may also be analyzed for fine/coarse lead fractions using Method 6020. In addition, if total chromium is measured in a soil sample at concentrations above the most restrictive Part 201 criterion, we may submit the soil sample from each soil type with the highest total chromium concentration for chemical analysis of hexavalent chromium using USEPA Method 7196.

Laboratory testing, analysis method reporting limits (RLs), QA/QC procedures, and reporting protocols used or performed by Fibertec will be consistent with those described in the project QAPP.

5. DATA EVALUATION AND REPORTING

We will review the data collected during this site assessment to verify/validate the data and evaluate if the data can be used for the purpose of the project (i.e., data usability). Following data review, verification, and validation, we will prepare a summary report detailing the assessment findings. The report will be a Phase II ESA report if no contamination is found, and a Baseline Environmental Assessment (BEA) report for submission to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) if contamination is found during the assessment.

6. ESTIMATED SCHEDULE

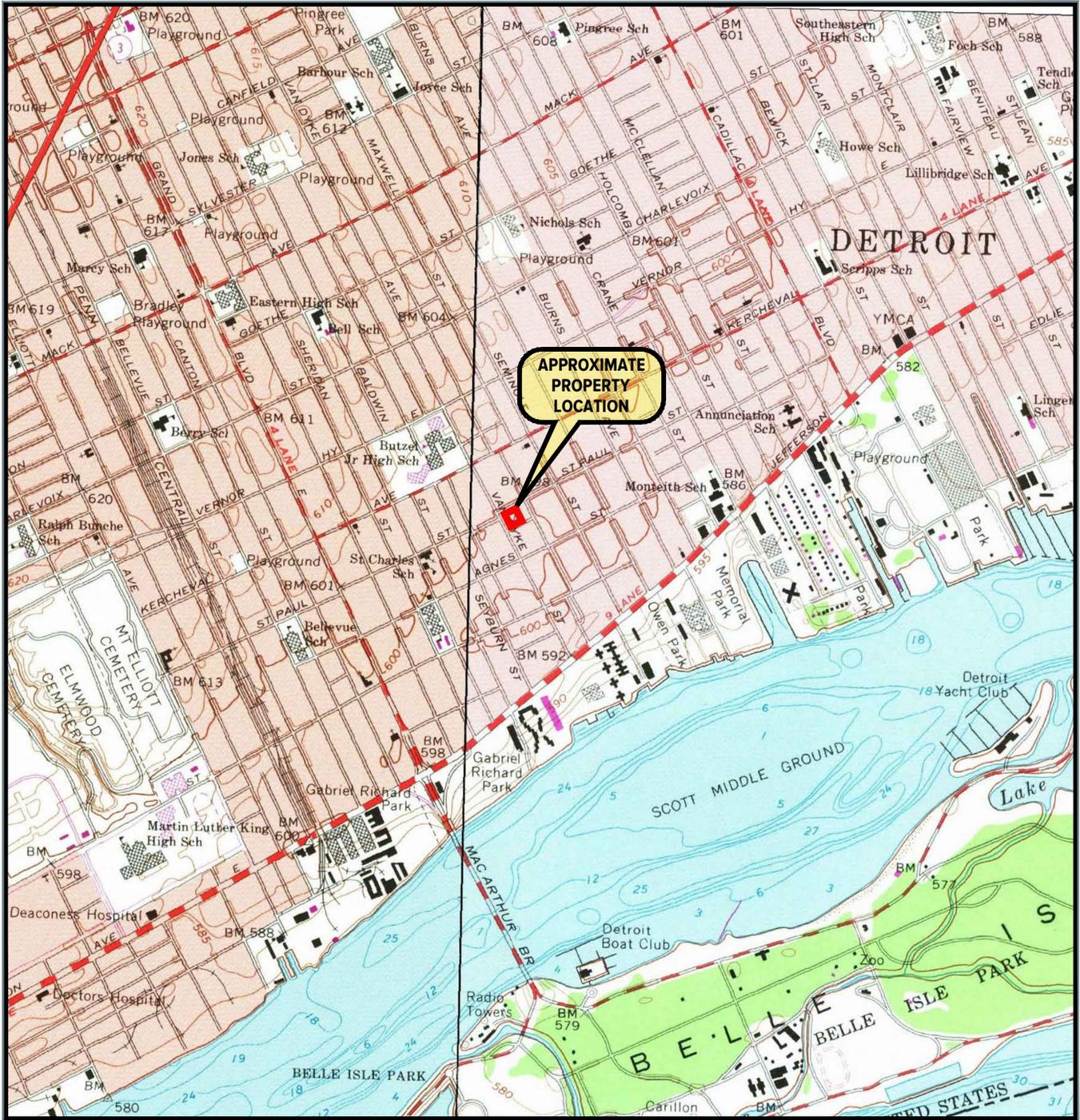
The environmental activities described in this SAP are to be implemented according to the estimated schedule presented below. This schedule is in weeks relative to USEPA approval of the SAP.

- Field sampling.....Week 2
- Laboratory analyses Weeks 3 through 4
- Data evaluation and reporting Weeks 4 through 6

FIGURES

FIGURE 1: PROPERTY LOCATION MAP

FIGURE 2: PROPOSED SAMPLE LOCATION DIAGRAM



Base map obtained from ERIS®

USGS QUADRANGLE(S) REFERENCED

BELLE ISLE (MI) 1980



SCALE: 1" = 2000'

No.	Revision Date	Date
		9/27/2021
	Drawn By	JAB
	Designed By	AHK
	Scale	1" = 2000'
	Project	086124.00.03A.006

PROPERTY LOCATION MAP
1500, 1514, 1518, 1526, 1532,
VAN DYKE STREET, AND 8029 COE AVENUE
DETROIT, MICHIGAN

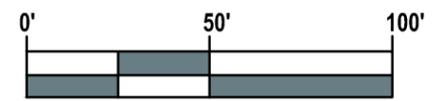


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Figure No. 1

\\Sme-inc\p\WIP\086124.00\CAD\DWGS\Env\086124.00.03A.006\rev0\086124.00.03A.006-Phase 1.dwg

Plot Date: Sep 30, 2021 - 11:31am - julie.blake



GRAPHIC SCALE: 1" = 50'

LEGEND

- - - - - APPROXIMATE PROPERTY BOUNDARY
- - - - - APPROXIMATE PARCEL BOUNDARY
- Proposed Soil Boring Location
- Proposed Soil Boring Location with Temporary Groundwater Sample

NOTE:
BASE DRAWING INFORMATION TAKEN FROM
GOOGLE EARTH PRO WITH IMAGE DATE 3-14-2020
AND SITE RECONNAISSANCE.



Project
**1500, 1514, 1518,
1526, 1532, VAN DYKE
STREET, AND
8029 COE AVENUE**

Project Location
DETROIT, MICHIGAN

Sheet Name
**PROPOSED
SAMPLE LOCATION
DIAGRAM**
1/3/2022

No.	Revision Date

Date 9/27/2021
CADD JAB
Designer AHK
Scale AS NOTED

Project
086124.00.03A.006

Figure No.
2

DRAWING NOTE: SCALE DEPICTED IS MEANT FOR 11" X 17" AND WILL SCALE INCORRECTLY IF PRINTED ON ANY OTHER SIZE MEDIA
NO REPRODUCTION SHALL BE MADE WITHOUT THE PRIOR CONSENT OF SME
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TABLE
ANALYSES SUMMARY TABLE



TABLE 1
PROPOSED SAMPLE COLLECTION AND ANALYSES
 1500, 1514, 1518, 1826, 1532 Van Dyke Street and 8029 Coe Avenue
 Detroit, Michigan
 SME Project No. 086124.00.03B.TBD

Sample Target	Sample ID	Planned Boring Depth (feet bgs)	Target Sample		Media	ANALYTES			
			Sample Depth (feet bgs)	Rationale		VOCs ³	PAHs ³	PCBs ⁴	Metals ⁴
Evaluate potential buried demolition debris/fill associated with the former structures on the Property (1526 and 1518 Van Dyke).	SB1 and SB2	12'	Evidence of impact ²	Evaluate soil within the footprint of the former structures and potential migration from adjacent adjacent industrial site..	Soil	2	2	2	2
		12/GW ¹	Evidence of impact ²	Anticipated maximum depth to groundwater. Groundwater sample at one location.	Groundwater	1	1	1	1
Evaluate potential buried demolition debris/fill associated with the former structures on the Property and known former UST use (1500 Van Dyke and 8029 Coe), and evaluate for potential off-site migration from the south and west prior developments.	SB3 through SB5	12'	'Evidence of impact ²	Evaluate potential shallow fill, due care boring.	Soil	3	3	3	3
		12/GW ¹	Evidence of impact ²	Anticipated maximum depth to groundwater. Groundwater sample at one location.	Groundwater	2	2	2	2
SUBTOTALS					Soil	5	5	5	5
					Groundwater	3	3	3	3
QC SAMPLES	Trip Blank/Methanol				Soil	1	0	0	0
					Groundwater	0	0	0	0
	Equipment Blank				Soil	0	0	0	0
					Groundwater	1	1	1	1
	Field Duplicate				Soil	1	1	1	1
					Groundwater	1	1	1	1
	Matrix Spike/ Matrix Spike Duplicate				Soil	0	0	0	0
					Groundwater	2	2	2	2
Subtotal QC Samples				Soil	2	1	1	1	
				Groundwater	4	4	4	4	
TOTAL SAMPLES					Soil	7	6	6	6
					Groundwater	7	7	7	7

NOTES:

¹ - The soil boring will be advanced to 12 feet below ground surface (bgs).

² - Evidence of impact is determined from PID screenings, presence of debris, odors, and/or staining (see Section 3.3.1).

³ - VOCs - Volatile Organic Compounds; PAHs - Polynuclear Aromatic Hydrocarbons; PCBs - Polychlorinated Biphenyls.

⁴ - Metals - arsenic, barium, cadmium, total chromium, copper, lead, mercury, selenium, and silver, and zinc. If total lead is measured in soil at a concentration above 75,000 µg/kg, the soil sample may also be analyzed for fine/coarse lead fractions. Soil samples may also be analyzed for hexavalent chromium depending on total chromium results.

If total chromium is measured in a soil sample at concentrations above the most restrictive Part 201 criterion, we may submit the soil sample from each soil type with the highest total chromium concentration for chemical analysis of hexavalent chromium using USEPA Method 7196

ATTACHMENTS
HEALTH AND SAFETY PLAN



SITE INFORMATION AND HEALTH/SAFETY CHECKLIST

This form shall be completed prior to field activities and signed by the Project Manager and field personnel. The original shall be filed in the project's blue file. A copy of this form shall be taken into the field by field personnel.

Project Name: _____ SME Project No.: _____

Client Contact Name: _____ Phone No.: _____

SME Project Manager: _____

Site Name: _____

Site Location: _____

Site Conditions/Use/Planned Work Activities:

Estimated Start Date: _____

Estimated Duration of Project: _____

GENERAL EMERGENCY INSTRUCTIONS & INFORMATION

Name of Nearest Hospital: _____

Hospital Address: _____

Hospital Telephone: _____

Emergency Number 911

In case of an emergency, please follow the general instructions below:

1. Cease Operation
2. Call Emergency Number: 911
3. Contact Project Manager Cell phone: _____
4. Alternative Contact, if PM is unavailable: _____

Hospital map and directions shall be attached if the work will be conducted at a location where cellular services are limited, when nearest hospital is 15 minutes or more from the worksite, and/or as deemed necessary by the Project Manager

ON SITE PERSONNEL

SME Personnel: _____

SME Site Safety Officer, if applicable: _____

- (For HAZWOPER sites)

SME Competent Person/Person In Responsible Charge: _____

- (For Silica Disturbance or Roadway Projects)

Site Contact/Affiliation: _____

Site Contact Phone Number: _____

Subcontractors and Phone Numbers: _____

Other Contractors/Operations: _____

Authorized Visitor(s): _____

POTENTIAL HAZARDS

CHEMICAL SAFETY HAZARDS

1. Potential Chemical Source(s) (e.g.: Possible undocumented fill, underground storage tanks)

2. Potential Chemical Hazards (e.g.: VOCs, Lead, BTEX)

3. Based on current information, are Immediately Dangerous to Life and Health (IDLH) exposure hazards present or expected? Yes No

4. If Chemical Concentrations are known at the site, are conditions above regulatory direct contact and/or inhalation criterion? Yes No

5. Potential Exposure Routes (check all that apply):

- | | |
|--|---|
| <input type="checkbox"/> Inhalation of Volatiles | <input type="checkbox"/> Inhalation of Particulates |
| <input type="checkbox"/> Ingestion | <input type="checkbox"/> Dermal Contact |

Append available health and safety information for constituents of concern associated with this site that personnel could encounter during work, as published by the National Institute of Occupational Safety and Health (NIOSH) or as found on International Chemical Safety Cards, Safety Data Sheets, Agency for Toxic Substances and Disease Registry (ATSDR) ToxFaqs fact sheets, etc.

PHYSICAL SAFETY HAZARDS

Potential Safety Hazards (check all that apply)

- | | | |
|---|---|---|
| <input type="checkbox"/> Slip/Trip/Fall | <input type="checkbox"/> Electrical Hazard | <input type="checkbox"/> Mechanical/Machinery |
| <input type="checkbox"/> Lock Out Tag Out | <input type="checkbox"/> Excavations | <input type="checkbox"/> Confined Space |
| <input type="checkbox"/> Heat Stress | <input type="checkbox"/> Cold Stress | <input type="checkbox"/> Noise |
| <input type="checkbox"/> Fall Hazard | <input type="checkbox"/> Biological Hazards | |
| <input type="checkbox"/> Other (specify): | | |

REQUIRED PERSONAL PROTECTIVE EQUIPMENT AND SAFETY EQUIPMENT

1. Specific Personal Protective Equipment Needed:

- | | | | | |
|---|---|---------------------------------------|-----------------------------------|------------------------------------|
| <input type="checkbox"/> Hard Hat | <input type="checkbox"/> Safety-Toe Boots | <input type="checkbox"/> Gloves: | | |
| <input type="checkbox"/> Safety Glasses | <input type="checkbox"/> Safety Goggles | <input type="checkbox"/> Impact | <input type="checkbox"/> Leather | |
| | | <input type="checkbox"/> Jersey | <input type="checkbox"/> Nitrile | |
| | | <input type="checkbox"/> Drillers | | |
| | | <input type="checkbox"/> Other: _____ | | |
| <input type="checkbox"/> Ear Plugs | <input type="checkbox"/> Ear Muffs | High-Visibility Garment: | <input type="checkbox"/> Class II | <input type="checkbox"/> Class III |

Disposable Suit (specify type): _____

First Aid Kit Fire Extinguisher Safety Harness Other (specify): _____

2. Respirator required? Yes No (If yes, specify type) _____

Type of filter cartridges _____

3. Monitoring Required? Yes No (If yes, specify type)

Photoionization Detector Multiple Gas Meter Combustible Gas Meter

Colorimetric/Drager sorbent tubes (if needed based on PID readings)

Other (specify): _____

Attach applicable Job Hazard Analysis (JHA) forms for the work tasks to be completed. Refer to chemical fact sheets for Action Levels or Permissible Exposure Limits associated with monitoring results. Use appended forms to record calibration and instrument readings if instrument does not have integrated logging function.

4. Sanitation and Toilet Facilities:

Are toilet facilities available for SME Team Members to use on the project site or within 5 minutes of the project site? Yes No (If no, answer the following question)

If facilities are not available, what type of toilet facilities will SME provide?

- Portable toilet (i.e Porta-Potty) Portable toilet kit

SME Project Name _____ SME Project No. _____

Checklist Completed by: _____ Date: _____

Approved by Safety Representative: _____ Date: _____

Project Manager Review: _____ Date: _____

ACKNOWLEDGMENT OF PROJECT HEALTH AND SAFETY PLAN (HASP) AND SITE INFORMATION AND HEALTH/SAFETY CHECKLIST

SME personnel working at the site or visiting the site must review the Site Information and Health/Safety Checklist, and sign below acknowledging that they understand the hazards and will abide by the requirements of the checklist.

NAME	SIGNATURE	DATE	COMPANY NAME

APPENDIX A

JOB HAZARD ANALYSIS FORMS AND HEALTH AND SAFETY INFORMATION FOR CONSTITUENTS OF CONCERN



Job Hazard Analysis

Project Task

Environmental Direct-Push Soil Borings

SME Group:

ENVIRONMENTAL

Task Equipment:

Direct-push boring rig, buckets, decontamination brushes, trowel/spoon, zip top plastic bags, utility knife, sample containers, groundwater pump, well and pump tubing, disposable groundwater filters, labels, cooler, sampling log, chain-of-custody form, multiple gas meter, photoionization detector, and environmental sampling kit, (vapor implants, sample tubing, and tracer gas kit, as applicable)

Personal Protective Equipment Required:

Hard hat, safety glasses, safety boots, protective gloves, hearing protection, high visibility vest, appropriate clothing for weather, flame-retardant clothing (as needed)

Sequence of Project Task

Potential Hazards

Procedure(s) or Protective Measure(s)

1. Mobilize/demobilize to project site

A. Struck by and Mechanical - traffic hazards

A. Inspect vehicle prior to departure and make sure equipment/systems are fully operational. Wear safety belt while in transit. Practice safe driving techniques (do not speed, do not tailgate, signal when turning or changing lanes) and obey traffic signals/signs. Review weather forecast and plan appropriately. Do not talk or text on cell phone while vehicle is in motion.

2. Advance soil borings for environmental assessment using direct push drilling equipment.

B. Fire/explosion - underground utilities and fuel lines

B. Verify clear of underground utilities with site owner. Contact 811 or a private utility locating service for utility clearance. Conduct GPR clearance of boring locations. Verify utility marks consistent with positive response status.

3. Collect soil, groundwater, and/or soil gas samples for chemical analysis.

C. Slip, trip and fall

C. Keep work area clean – good housekeeping. Be aware of surroundings (e.g. pits, ruts, jagged debris, etc.)

D. Mechanical - moving parts on direct-push equipment

D. Stay clear of moving equipment. Do not wear loose clothes or other items that can get caught on the percussion hammer, mast, or other machine equipment. Keep clear line of sight with operator.

E. Electrical shock – hazard from mast contacting overhead utilities

E. Look up prior to raising drill mast. Maintain at least 20-foot clearance between overhead lines and the drill mast. Wear FR suits and use grounding rod and cable when boring near electrical transmission lines and within or near electrical substations.

F. Extreme temperature weather

F. Dress appropriately for conditions. Hot weather - Monitor for heat exhaustion and heat stroke. Take frequent breaks in cool area. Cold weather - Monitor for frostbite and hypothermia. Take frequent breaks in a warm area.

G. Ergonomic-back/muscle strain from lifting heavy drill rods

G. Use appropriate lifting techniques.

H. Noise – from equipment operation

H. Wear ear plugs or muffs.



Job Hazard Analysis

Project Task

Environmental Direct-Push Soil Borings

SME Group:

ENVIRONMENTAL

	I. Struck by - other moving vehicles on site	I. Wear high visibility vest.
	J. Struck by - overhead equipment and falling tools	J. Wear hard hat, safety glasses, and safety boots.
	K. Struck by - flying debris	K. Wear hard hat and safety glasses.
	L. Mechanical - pinch points from equipment/tools	L. Wear protective gloves.
	M. Chemical toxic – hazards associated with exposure to contaminated soils/groundwater	M. Wear appropriate personal protective equipment, including gloves, during sample collection. Conduct air monitoring for contaminants of concern. Wash hands/face before eating, drinking, smoking, chewing, etc. and at the end of each shift. Refer to the project Health and Safety Checklist for project specific chemicals of concern and the appropriate procedures and protective measures.
	N. Chemical toxic – hazards associated with exposure to preservatives used in sample containers	N. Wear appropriate personal protective equipment, including gloves, during sample container handling and sample collection. Wash hands/face before eating, drinking, smoking, chewing, etc. and at the end of each shift. Refer to the safety data sheets for common preservatives and the appropriate procedures and protective measures (1).
	O. Mechanical – laceration/cut hazard from use of utility knife to open core liners	O. Wear protective gloves while cutting open liner sleeve. Use cutting motion away from body.

1. Include the sample container preservation safety data sheets in Appendix A of the Health and Safety Checklist.



Job Hazard Analysis

Project Task

Excavation Monitoring and Sampling

SME Group:

ENVIRONMENTAL

Task Equipment:

Trowel/spoon, shovel, hand auger with extensions, zip top plastic bags, sample containers, labels, cooler, sampling log, chain-of-custody form, multiple gas meter, photoionization detector, and environmental sampling kit

Personal Protective Equipment Required:

Hard hat, safety glasses, safety boots, protective gloves, hearing protection, high visibility vest (Class II or Class III), appropriate clothing for weather

Sequence of Project Task

Potential Hazards

Procedure(s) or Protective Measure(s)

1. Mobilize/demobilize to project site

A. Struck by and Mechanical -traffic hazards

A. Inspect vehicle prior to departure and make sure equipment/systems are fully operational. Wear safety belt while in transit. Practice safe driving techniques (do not speed, do not tailgate, signal when turning or changing lanes) and obey traffic signals/signs. Review weather forecast and plan appropriately. Do not talk or text on cell phone while vehicle is in motion.

2. Observe excavation activities

B. Fire/explosion - underground utilities and fuel lines

B. Verify clear of underground utilities with site owner. Contact 811 or a private utility locating service for utility clearance. Conduct GPR clearance of excavation area prior to start. Verify utility marks consistent with positive response status.

C. Slip, trip and fall

C. Keep work area clean – good housekeeping. Be aware of surroundings (e.g. pits, ruts, jagged debris, etc.). Navigate project site carefully avoiding equipment, materials, and other obstructions.

D. Excavation – collapse

D. Maintain a safe distance from edges of excavations. Do not enter an excavation unless the excavation sidewalls have been adequately braced or shored in accordance with OSHA requirements. Be aware of soil types within excavations and associated sloping requirements. Verify means of safe egress is available every 25 lateral feet prior to entry. **DO NOT RIDE BUCKET OF EXCAVATOR TO ENTER OR EXIT.**

E. Chemical/toxic – confined space hazards from excavation 4 ft. and deeper

E. Operate combustion-powered equipment away from excavations. Use a multiple-gas meter to measure combustible gas concentrations and oxygen levels prior to entry and during work activities. Exit work area if lower explosive limit reading exceeds 10%, carbon monoxide reading exceeds 40 ppm, and/or oxygen level is less than 19.5% or greater than 23.5%.

F. Struck by - other moving vehicles/equipment on site

F. Wear high visibility vest. Keep clear line of sight with operators. Establish hand signal communication procedures prior to commencement of work.

G. Electrical shock – hazard from equipment contacting overhead utilities

G. Maintain at least 20-foot clearance between overhead lines and the operating machinery. Use grounding rod and cable when digging near electrical transmission lines and within or near electrical substations.



Job Hazard Analysis

Project Task

Excavation Monitoring and Sampling

SME Group:

ENVIRONMENTAL

	H. Struck by - flying debris and overhead hazard from falling objects.	H. Wear hard hat and safety glasses. Do not work under excavator buckets whether loaded or unloaded. Stay clear of excavation equipment during operation and deposition of soils spoils
	I. Noise - from equipment operation	I. Wear ear plugs or muffs.
	J. Extreme temperature/weather	J. Dress appropriately for conditions. Hot weather-Monitor for heat exhaustion and heat stroke. Take frequent breaks in cool area. Cold weather - Monitor for frostbite and hypothermia. Take frequent breaks in a warm area.
3. Excavation soil sample collection.	K. Chemical toxic – hazards associated with contaminated soils/groundwater.	K. Wear appropriate personal protective equipment, including gloves, during sample collection. Conduct air monitoring for contaminants of concern. Wash hands/face before eating, drinking, smoking, chewing, etc. and at the end of each shift. Refer to the project Health and Safety Checklist for project specific chemicals of concern and the appropriate procedures and protective measures.

This fact sheet answers the most frequently asked health questions (FAQs) about arsenic. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to higher than average levels of arsenic occur mostly in the workplace, near hazardous waste sites, or in areas with high natural levels. At high levels, inorganic arsenic can cause death. Exposure to lower levels for a long time can cause a discoloration of the skin and the appearance of small corns or warts. Arsenic has been found in at least 1,149 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Arsenic in animals and plants combines with carbon and hydrogen to form organic arsenic compounds.

Inorganic arsenic compounds are mainly used to preserve wood. Copper chromated arsenate (CCA) is used to make "pressure-treated" lumber. CCA is no longer used in the U.S. for residential uses; it is still used in industrial applications. Organic arsenic compounds are used as pesticides, primarily on cotton fields and orchards.

What happens to arsenic when it enters the environment?

- Arsenic occurs naturally in soil and minerals and may enter the air, water, and land from wind-blown dust and may get into water from runoff and leaching.
- Arsenic cannot be destroyed in the environment. It can only change its form.
- Rain and snow remove arsenic dust particles from the air.
- Many common arsenic compounds can dissolve in water. Most of the arsenic in water will ultimately end up in soil or sediment.
- Fish and shellfish can accumulate arsenic; most of this arsenic is in an organic form called arsenobetaine that is much less harmful.

How might I be exposed to arsenic?

- Ingesting small amounts present in your food and water or breathing air containing arsenic.
- Breathing sawdust or burning smoke from wood treated with arsenic.
- Living in areas with unusually high natural levels of arsenic in rock.
- Working in a job that involves arsenic production or use, such as copper or lead smelting, wood treating, or pesticide application.

How can arsenic affect my health?

Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs.

Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet.

Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso.

Skin contact with inorganic arsenic may cause redness and swelling.

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Almost nothing is known regarding health effects of organic arsenic compounds in humans. Studies in animals show that some simple organic arsenic compounds are less toxic than inorganic forms. Ingestion of methyl and dimethyl compounds can cause diarrhea and damage to the kidneys

How likely is arsenic to cause cancer?

Several studies have shown that ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the liver, bladder, and lungs. Inhalation of inorganic arsenic can cause increased risk of lung cancer. The Department of Health and Human Services (DHHS) and the EPA have determined that inorganic arsenic is a known human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic arsenic is carcinogenic to humans.

How can arsenic affect children?

There is some evidence that long-term exposure to arsenic in children may result in lower IQ scores. There is also some evidence that exposure to arsenic in the womb and early childhood may increase mortality in young adults.

There is some evidence that inhaled or ingested arsenic can injure pregnant women or their unborn babies, although the studies are not definitive. Studies in animals show that large doses of arsenic that cause illness in pregnant females, can also cause low birth weight, fetal malformations, and even fetal death. Arsenic can cross the placenta and has been found in fetal tissues. Arsenic is found at low levels in breast milk.

How can families reduce the risks of exposure to arsenic?

If you use arsenic-treated wood in home projects, you should wear dust masks, gloves, and protective clothing to decrease exposure to sawdust.

- If you live in an area with high levels of arsenic in water or soil, you should use cleaner sources of water and limit contact with soil.
- If you work in a job that may expose you to arsenic, be aware that you may carry arsenic home on your clothing, skin, hair, or tools. Be sure to shower and change clothes before going home.

Is there a medical test to determine whether I've been exposed to arsenic?

There are tests available to measure arsenic in your blood, urine, hair, and fingernails. The urine test is the most reliable test for arsenic exposure within the last few days. Tests on hair and fingernails can measure exposure to high levels of arsenic over the past 6-12 months. These tests can determine if you have been exposed to above-average levels of arsenic. They cannot predict whether the arsenic levels in your body will affect your health.

Has the federal government made recommendations to protect human health?

The EPA has set limits on the amount of arsenic that industrial sources can release to the environment and has restricted or cancelled many of the uses of arsenic in pesticides. EPA has set a limit of 0.01 parts per million (ppm) for arsenic in drinking water.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit (PEL) of 10 micrograms of arsenic per cubic meter of workplace air ($10 \mu\text{g}/\text{m}^3$) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Arsenic (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about barium and barium compounds. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to barium occurs mostly in the workplace or from drinking contaminated water. Ingesting drinking water containing levels of barium above the EPA drinking water guidelines for relatively short periods of time can cause gastrointestinal disturbances and muscle weakness. Ingesting high levels for a long time can damage the kidneys. Barium and barium compounds have been found in at least 798 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is barium?

Barium is a silvery-white metal which exists in nature only in ores containing mixtures of elements. It combines with other chemicals such as sulfur or carbon and oxygen to form barium compounds.

Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. They are also used to make paint, bricks, ceramics, glass, and rubber.

Barium sulfate is sometimes used by doctors to perform medical tests and to take x-rays of the gastrointestinal tract.

What happens to barium when it enters the environment?

- Barium gets into the air during the mining, refining, and production of barium compounds, and from the burning of coal and oil.
- The length of time that barium will last in air, land, water, or sediments depends on the form of barium released.
- Barium compounds, such as barium sulfate and barium carbonate, which do not dissolve well in water, can last a long time in the environment.
- Barium compounds, such as barium chloride, barium nitrate, or barium hydroxide, that dissolve easily in water usually do not last in these forms for a long time in the environment. The barium in these compounds that is dissolved in water quickly combines with sulfate or carbonate that are naturally found in water and become

the longer lasting forms (barium sulfate and barium carbonate).

- Fish and aquatic organisms can accumulate barium.

How might I be exposed to barium?

- Ingesting small amounts present in your food and water or breathing air containing very low levels of barium.
- Living in areas with unusually high natural levels of barium in the drinking water.
- Working in a job that involves barium production or use.
- Living or working near waste sites where barium has been disposed of.

How can barium affect my health?

The health effects of the different barium compounds depend on how well the compound dissolves in water or in the stomach contents. Barium compounds that do not dissolve well, such as barium sulfate, are not generally harmful.

Barium has been found to potentially cause gastrointestinal disturbances and muscular weakness when people are exposed to it at levels above the EPA drinking water standards for relatively short periods of time. Some people who eat or drink amounts of barium above background levels found in food and water for a short period may experience vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness. Eating or drinking very large amounts of barium compounds that easily dissolve can cause changes in heart

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rhythm or paralysis and possibly death. Animals that drank barium over long periods had damage to the kidneys, decreases in body weight, and some died.

How likely is barium to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified barium as to its carcinogenicity. The EPA has determined that barium is not likely to be carcinogenic to humans following ingestion and that there is insufficient information to determine whether it will be carcinogenic to humans following inhalation exposure.

How can barium affect children?

We do not know whether children will be more or less sensitive than adults to barium toxicity. A study in rats that swallowed barium found a decrease in newborn body weight; we do not know if a similar effect would be seen in humans.

How can families reduce the risk of exposure to barium?

- The greatest potential source of barium exposure is through food and drinking water. However, the amount of barium in foods and drinking water are typically too low to be of concern.

Is there a medical test to determine whether I've been exposed to barium?

There is no routine medical test to determine whether you have been exposed to barium. Doctors can measure barium in body tissues and fluids, such as bones, blood, urine, and feces, using very complex instruments. These tests cannot be used to predict the extent of the exposure or potential health effects.

The geometric mean barium level measured in the U.S. general population aged 6 and older is reported by the Centers for Disease Control and Prevention (CDC) as 1.56 µg/g creatinine (measured in urine).

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2.0 milligrams of barium per liter of drinking water (2.0 mg/L), which is the same as 2 ppm.

The Occupational Safety and Health Administration (OSHA) has set Permissible Exposure Limits (PELs) of 0.5 milligrams of soluble barium compounds per cubic meter of workplace air (0.5 mg/m³) for 8 hour shifts and 40 hour work weeks. The OSHA limits for barium sulfate dust are 15 mg/m³ of total dust and 5 mg/m³ for respirable fraction.

The National Institute for Occupational Safety and Health (NIOSH) has set Recommended Exposure Limits (RELs) of 0.5 mg/m³ for soluble barium compounds. The NIOSH has set RELs of 10 mg/m³ (total dust) for barium sulfate and 5 mg/m³ (respirable fraction).

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Barium and Compounds (*Update*). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

http://www.cdc.gov/exposurereport/pdf/FourthReport_UpdatedTables_Sep2012.pdf

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Human Health Sciences, 1600 Clifton Road NE, Mailstop F-57, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaqs/index.asp>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about cadmium. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to cadmium happens mostly in the workplace where cadmium products are made. The general population is exposed from breathing cigarette smoke or eating cadmium contaminated foods. Cadmium damages the kidneys, lungs, and bones. Cadmium has been found in at least 1,014 of the 1,669 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is cadmium?

Cadmium is a natural element in the earth's crust. It is usually found as a mineral combined with other elements such as oxygen (cadmium oxide), chlorine (cadmium chloride), or sulfur (cadmium sulfate, cadmium sulfide).

All soils and rocks, including coal and mineral fertilizers, contain some cadmium. Most cadmium used in the United States is extracted during the production of other metals like zinc, lead, and copper. Cadmium does not corrode easily and has many uses, including batteries, pigments, metal coatings, and plastics.

What happens to cadmium when it enters the environment?

- Cadmium enters soil, water, and air from mining, industry, and burning coal and household wastes.
- Cadmium does not break down in the environment, but can change forms.
- Cadmium particles in air can travel long distances before falling to the ground or water.
- Some forms of cadmium dissolve in water.
- Cadmium binds strongly to soil particles.
- Fish, plants, and animals take up cadmium from the environment.

How might I be exposed to cadmium?

- Eating foods containing cadmium; low levels are found in all foods (highest levels are found in shellfish, liver, and kidney meats).
- Smoking cigarettes or breathing cigarette smoke.
- Breathing contaminated workplace air.
- Drinking contaminated water.
- Living near industrial facilities which release cadmium into the air.

How can cadmium affect my health?

Breathing high levels of cadmium can severely damage the lungs. Eating food or drinking water with very high levels severely irritates the stomach, leading to vomiting and diarrhea.

Long-term exposure to lower levels of cadmium in air, food, or water leads to a buildup of cadmium in the kidneys and possible kidney disease. Other long-term effects are lung damage and fragile bones.

How likely is cadmium to cause cancer?

The Department of Health and Human Services (DHHS) has determined that cadmium and cadmium compounds are known human carcinogens.

ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>

How can cadmium affect children?

The health effects in children are expected to be similar to the effects seen in adults (kidney, lung, and bone damage depending on the route of exposure).

A few studies in animals indicate that younger animals absorb more cadmium than adults. Animal studies also indicate that the young are more susceptible than adults to a loss of bone and decreased bone strength from exposure to cadmium.

We don't know if cadmium causes birth defects in people. The babies of animals exposed to high levels of cadmium during pregnancy had changes in behavior and learning ability. There is also some information from animal studies that high enough exposures to cadmium before birth can reduce body weights and affect the skeleton in the developing young.

How can families reduce the risks of exposure to cadmium?

- In the home, store substances that contain cadmium safely, and keep nickel-cadmium batteries out of reach of young children.
- Cadmium is a component of tobacco smoke. Avoid smoking in enclosed spaces like inside the home or car in order to limit exposure to children and other family members.
- If you work with cadmium, use all safety precautions to avoid carrying cadmium-containing dust home from work on your clothing, skin, hair, or tools.
- A balanced diet can reduce the amount of cadmium taken into the body from food and drink.

Is there a medical test to determine whether I've been exposed to cadmium?

Cadmium can be measured in blood, urine, hair, or nails. Urinary cadmium has been shown to accurately reflect the amount of cadmium in the body.

The amount of cadmium in your blood shows your recent exposure to cadmium. The amount of cadmium in your urine shows both your recent and your past exposure.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to cadmium in drinking water at concentrations of 0.04 ppm for up to 10 days is not expected to cause any adverse effects in a child.

The EPA has determined that lifetime exposure to 0.005 ppm cadmium is not expected to cause any adverse effects.

The FDA has determined that the cadmium concentration in bottled drinking water should not exceed 0.005 ppm.

The Occupational Health and Safety Administration (OSHA) has limited workers' exposure to an average of 5 µg/m³ for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Toxicological Profile for Cadmium (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about chromium. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to chromium occurs from ingesting contaminated food or drinking water or breathing contaminated workplace air. Chromium(VI) at high levels can damage the nose and cause cancer. Ingesting high levels of chromium(VI) may result in anemia or damage to the stomach or intestines. Chromium(III) is an essential nutrient. Chromium has been found in at least 1,127 of the 1,669 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is chromium?

Chromium is a naturally occurring element found in rocks, animals, plants, and soil. It can exist in several different forms. Depending on the form it takes, it can be a liquid, solid, or gas. The most common forms are chromium(0), chromium(III), and chromium(VI). No taste or odor is associated with chromium compounds.

The metal chromium, which is the chromium(0) form, is used for making steel. Chromium(VI) and chromium(III) are used for chrome plating, dyes and pigments, leather tanning, and wood preserving.

What happens to chromium when it enters the environment?

- Chromium can be found in air, soil, and water after release from the manufacture, use, and disposal of chromium-based products, and during the manufacturing process.
- Chromium does not usually remain in the atmosphere, but is deposited into the soil and water.
- Chromium can easily change from one form to another in water and soil, depending on the conditions present.
- Fish do not accumulate much chromium in their bodies from water.

How might I be exposed to chromium?

- Eating food containing chromium(III).

- Breathing contaminated workplace air or skin contact during use in the workplace.
- Drinking contaminated well water.
- Living near uncontrolled hazardous waste sites containing chromium or industries that use chromium.

How can chromium affect my health?

Chromium(III) is an essential nutrient that helps the body use sugar, protein, and fat.

Breathing high levels of chromium(VI) can cause irritation to the lining of the nose, nose ulcers, runny nose, and breathing problems, such as asthma, cough, shortness of breath, or wheezing. The concentrations of chromium in air that can cause these effects may be different for different types of chromium compounds, with effects occurring at much lower concentrations for chromium(VI) compared to chromium(III).

The main health problems seen in animals following ingestion of chromium(VI) compounds are irritation and ulcers in the stomach and small intestine and anemia. Chromium(III) compounds are much less toxic and do not appear to cause these problems.

Sperm damage and damage to the male reproductive system have also been seen in laboratory animals exposed to chromium(VI).

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Skin contact with certain chromium(VI) compounds can cause skin ulcers. Some people are extremely sensitive to chromium(VI) or chromium(III). Allergic reactions consisting of severe redness and swelling of the skin have been noted.

How likely is chromium to cause cancer?

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have determined that chromium(VI) compounds are known human carcinogens. In workers, inhalation of chromium(VI) has been shown to cause lung cancer. Chromium(VI) also causes lung cancer in animals. An increase in stomach tumors was observed in humans and animals exposed to chromium(VI) in drinking water.

How can chromium affect children?

It is likely that health effects seen in children exposed to high amounts of chromium will be similar to the effects seen in adults.

We do not know if exposure to chromium will result in birth defects or other developmental effects in people. Some developmental effects have been observed in animals exposed to chromium(VI).

How can families reduce the risks of exposure to chromium?

- Children should avoid playing in soils near uncontrolled hazardous waste sites where chromium may have been discarded.
- Chromium is a component of tobacco smoke. Avoid smoking in enclosed spaces like inside the home or car in order to limit exposure to children and other family members.
- Although chromium(III) is an essential nutrient, you should avoid excessive use of dietary supplements containing chromium.

Is there a medical test to determine whether I've been exposed to chromium?

Since chromium(III) is an essential element and naturally occurs in food, there will always be some level of chromium in your body. Chromium can be measured in hair, urine, and blood.

Higher than normal levels of chromium in blood or urine may indicate that a person has been exposed to chromium. However, increases in blood and urine chromium levels cannot be used to predict the kind of health effects that might develop from that exposure.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to chromium in drinking water at concentrations of 1 mg/L for up to 10 days is not expected to cause any adverse effects in a child.

The FDA has determined that the chromium concentration in bottled drinking water should not exceed 1 mg/L.

The Occupational Health and Safety Administration (OSHA) has limited workers' exposure to an average of 0.0005 mg/m³ chromium(VI), 0.5 mg/m³ chromium(III), and 1.0 mg/m³ chromium(0) for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Toxicological Profile for Chromium (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about copper. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Copper is a metal that occurs naturally in the environment, and also in plants and animals. Low levels of copper are essential for maintaining good health. High levels can cause harmful effects such as irritation of the nose, mouth and eyes, vomiting, diarrhea, stomach cramps, nausea, and even death. Copper has been found in at least 906 of the 1,647 National Priority Sites identified by the Environmental Protection Agency (EPA).

What is copper?

Copper is a metal that occurs naturally throughout the environment, in rocks, soil, water, and air. Copper is an essential element in plants and animals (including humans), which means it is necessary for us to live. Therefore, plants and animals must absorb some copper from eating, drinking, and breathing.

Copper is used to make many different kinds of products like wire, plumbing pipes, and sheet metal. U.S. pennies made before 1982 are made of copper, while those made after 1982 are only coated with copper. Copper is also combined with other metals to make brass and bronze pipes and faucets.

Copper compounds are commonly used in agriculture to treat plant diseases like mildew, for water treatment and, as preservatives for wood, leather, and fabrics.

What happens to copper when it enters the environment?

- Copper is released into the environment by mining, farming, and manufacturing operations and through waste water releases into rivers and lakes. Copper is also released from natural sources, like volcanoes, windblown dusts, decaying vegetation, and forest fires.
- Copper released into the environment usually attaches to particles made of organic matter, clay, soil, or sand.
- Copper does not break down in the environment. Copper

compounds can break down and release free copper into the air, water, and foods.

How might I be exposed to copper?

- You may be exposed to copper from breathing air, drinking water, eating foods, or having skin contact with copper, particulates attached to copper, or copper-containing compounds.
- Drinking water may have high levels of copper if your house has copper pipes and acidic water.
- Lakes and rivers that have been treated with copper compounds to control algae, or that receive cooling water from power plants, can have high levels of copper. Soils can also contain high levels of copper, especially if they are near copper smelting plants.
- You may be exposed to copper by ingesting copper-containing fungicides, or if you live near a copper mine or where copper is processed into bronze or brass.
- You may be exposed to copper if you work in copper mines or if you grind metals containing copper.

How can copper affect my health?

Everyone must absorb small amounts of copper every day because copper is essential for good health. High levels of copper can be harmful. Breathing high levels of copper can cause irritation of your nose and throat. Ingesting high levels of copper can cause nausea, vomiting, and diarrhea. Very-high doses of copper can cause damage to your liver and kidneys, and can even cause death.

ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>

How likely is copper to cause cancer?

We do not know whether copper can cause cancer in humans. The EPA has determined that copper is not classifiable as to human carcinogenicity.

How can copper affect children?

Exposure to high levels of copper will result in the same type of effects in children and adults. We do not know if these effects would occur at the same dose level in children and adults. Studies in animals suggest that the young children may have more severe effects than adults, but we don't know if this would also be true in humans. There is a very small percentage of infants and children who are unusually sensitive to copper.

We do not know if copper can cause birth defects or other developmental effects in humans. Studies in animals suggest that high levels of copper may cause a decrease in fetal growth.

How can families reduce the risk of exposure to copper?

The most likely place to be exposed to copper is through drinking water, especially if your water is corrosive and you have copper pipes in your house. The best way to lower the level of copper in your drinking water is to let the water run for at least 15 seconds first thing in the morning before drinking or using it. This reduces the levels of copper in tap water dramatically.

If you work with copper, wear the necessary protective clothing and equipment, and always follow safety procedures. Shower and change your clothes before going home each day.

Is there a medical test to show whether I've been exposed to copper?

Copper is found throughout the body; in hair, nails, blood, urine, and other tissues. High levels of copper in these samples can show that you have been exposed to higher-than normal levels of copper. These tests cannot tell whether you will experience harmful effects. Tests to measure copper levels in the body are not usually available at a doctor's office because they require special equipment, but the doctor can send samples to a specialty laboratory.

Has the federal government made recommendations to protect human health?

The EPA requires that levels of copper in drinking water be less than 1.3 mg of copper per one liter of drinking water (1.3 mg/L).

The U.S. Department of Agriculture has set the recommended daily allowance for copper at 900 micrograms of copper per day ($\mu\text{g/day}$) for people older than eight years old.

The Occupational Safety and Health Administration (OSHA) requires that levels of copper in the air in workplaces not exceed 0.1 mg of copper fumes per cubic meter of air (0.1 mg/m^3) and 1.0 mg/m^3 for copper dusts.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2004. Toxicological Profile for Copper. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

What happens to lead when it enters the environment?

- Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- When lead is released to the air, it may travel long distances before settling to the ground.
- Once lead falls onto soil, it usually sticks to soil particles.
- Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

- Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.

- Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.

- Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.

- Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services

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(DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

- Avoid exposure to sources of lead.
- Do not allow children to chew on mouth surfaces that may have been painted with lead-based paint.
- If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.
- Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children
- If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces

often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to determine whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter ($\mu\text{g}/\text{dL}$). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a blood lead level of 10 $\mu\text{g}/\text{dL}$ to be a level of concern for children.

EPA limits lead in drinking water to 15 μg per liter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for lead (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

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This fact sheet answers the most frequently asked health questions (FAQs) about mercury. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to mercury occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Mercury, at high levels, may damage the brain, kidneys, and developing fetus. This chemical has been found in at least 714 of 1,467 National Priorities List sites identified by the Environmental Protection Agency.

What is mercury?

(Pronounced mŭr/kyə-rē)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make.

Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

What happens to mercury when it enters the environment?

- Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants.
- It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.

- Methylmercury may be formed in water and soil by small organisms called bacteria.
- Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

How might I be exposed to mercury?

- Eating fish or shellfish contaminated with methylmercury.
- Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.
- Release of mercury from dental work and medical treatments.
- Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).
- Practicing rituals that include mercury.

How can mercury affect my health?

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea,

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vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

How likely is mercury to cause cancer?

There are inadequate human cancer data available for all forms of mercury. Mercuric chloride has caused increases in several types of tumors in rats and mice, and methylmercury has caused kidney tumors in male mice. The EPA has determined that mercuric chloride and methylmercury are possible human carcinogens.

How can mercury affect children?

Very young children are more sensitive to mercury than adults. Mercury in the mother's body passes to the fetus and may accumulate there. It can also pass to a nursing infant through breast milk. However, the benefits of breast feeding may be greater than the possible adverse effects of mercury in breast milk.

Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage.

How can families reduce the risk of exposure to mercury?

Carefully handle and dispose of products that contain mercury, such as thermometers or fluorescent light bulbs. Do not vacuum up spilled mercury, because it will vaporize and increase exposure. If a large amount of mercury has been spilled, contact your health department. Teach children not to play with shiny, silver liquids.

Properly dispose of older medicines that contain mercury. Keep all mercury-containing medicines away from children.

Pregnant women and children should keep away from

rooms where liquid mercury has been used.

Learn about wildlife and fish advisories in your area from your public health or natural resources department.

Is there a medical test to show whether I've been exposed to mercury?

Tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury and to inorganic forms of mercury. Mercury in whole blood or in scalp hair is measured to determine exposure to methylmercury. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2 parts of mercury per billion parts of drinking water (2 ppb).

The Food and Drug Administration (FDA) has set a maximum permissible level of 1 part of methylmercury in a million parts of seafood (1 ppm).

The Occupational Safety and Health Administration (OSHA) has set limits of 0.1 milligram of organic mercury per cubic meter of workplace air (0.1 mg/m³) and 0.05 mg/m³ of metallic mercury vapor for 8-hour shifts and 40-hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about selenium. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: People may be exposed to low levels of selenium daily through food and water. Selenium is a trace mineral needed in small amounts for good health, but exposure to much higher levels can result in neurological effects and brittle hair and deformed nails. Occupational inhalation exposure to selenium vapors may cause dizziness, fatigue, irritation of mucous membranes, and respiratory effects. This substance has been found in at least 508 of the 1,636 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is selenium?

Selenium is a naturally occurring mineral element that is distributed widely in nature in most rocks and soils. In its pure form, it exists as metallic gray to black hexagonal crystals, but in nature it is usually combined with sulfide or with silver, copper, lead, and nickel minerals. Most processed selenium is used in the electronics industry, but it is also used: as a nutritional supplement; in the glass industry; as a component of pigments in plastics, paints, enamels, inks, and rubber; in the preparation of pharmaceuticals; as a nutritional feed additive for poultry and livestock; in pesticide formulations; in rubber production; as an ingredient in antidandruff shampoos; and as a constituent of fungicides. Radioactive selenium is used in diagnostic medicine.

What happens to selenium when it enters the environment?

- Selenium occurs naturally in the environment and can be released by both natural and manufacturing processes.
- Selenium dust can enter the air from burning coal and oil. This selenium dust will eventually settle over the land and water.
- It also enters water from rocks and soil, and from agricultural and industrial waste. Some selenium compounds will dissolve in water, and some will settle to the bottom as particles.

- Insoluble forms of selenium will remain in soil, but soluble forms are very mobile and may enter surface water from soils.
- Selenium may accumulate up the food chain.

How might I be exposed to selenium?

- The general population is exposed to very low levels of selenium in air, food, and water. The majority of the daily intake comes from food.
- People working in or living near industries where selenium is produced, processed, or converted into commercial products may be exposed to higher levels of selenium in the air.
- People living in the vicinity of hazardous waste sites or coal burning plants may also be exposed to higher levels of selenium.

How can selenium affect my health?

Selenium has both beneficial and harmful effects. Low doses of selenium are needed to maintain good health. However, exposure to high levels can cause adverse health effects. Short-term oral exposure to high concentrations of selenium may cause nausea, vomiting, and diarrhea. Chronic oral exposure to high concentrations of selenium compounds can produce a disease called selenosis. The major signs of selenosis are hair loss, nail brittleness, and neurological abnormalities (such as numbness and other odd sensations).

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in the extremities).

Brief exposures to high levels of elemental selenium or selenium dioxide in air can result in respiratory tract irritation, bronchitis, difficulty breathing, and stomach pains. Longer-term exposure to either of these air-borne forms can cause respiratory irritation, bronchial spasms, and coughing.

Levels of these forms of selenium that would be necessary to produce such effects are normally not seen outside of the workplace.

Animal studies have shown that very high amounts of selenium can affect sperm production and the female reproductive cycle. We do not know if similar effects would occur in humans.

How likely is selenium to cause cancer?

Studies of laboratory animals and people show that most selenium compounds probably do not cause cancer. In fact, studies in humans suggest that lower-than-normal selenium levels in the diet might increase the risk of cancer.

The International Agency for Research on Cancer (IARC) has determined that selenium and selenium compounds are not classifiable as to their carcinogenicity to humans.

The EPA has determined that one specific form of selenium, selenium sulfide, is a probable human carcinogen. Selenium sulfide is not present in foods and is a very different chemical from the organic and inorganic selenium compounds found in foods and in the environment.

How can selenium affect children?

It is likely that the health effects seen in children exposed to selenium will be similar to the effects seen in adults.

However, one study found that children may be less susceptible to the health effects of selenium than adults. Selenium compounds have not been shown to cause birth defects in humans or in other mammals.

How can families reduce the risk of exposure to selenium?

Certain dietary supplements and shampoos contain selenium; these should be used according to the

manufacturer's directions.

Children living near waste sites that contain selenium or coal burning plants should be encouraged to wash their hands before eating and to avoid putting their unwashed hands in their mouths.

Is there a medical test to show whether I've been exposed to selenium?

Low levels of selenium are normally found in body tissues and urine. Blood and urine tests for selenium are most useful for people who have recently been exposed to high levels. Toenail clippings can be used to determine longer-term exposure. These tests are not usually available at your doctor's office, but your doctor can send the samples to a laboratory that can perform the tests. None of these tests, however, can predict whether you will experience any health effects.

Has the federal government made recommendations to protect human health?

The EPA restricts the amount of selenium allowed in public water supplies to 50 parts total selenium per billion parts of water (50 ppb).

The Occupational Safety and Health Administration (OSHA) sets a limit of 0.2 mg selenium/m³ of workroom air for an 8-hour work shift.

ATSDR and the EPA have determined that 5 micrograms of selenium per kilogram of body weight taken daily would not be expected to cause any adverse health effects over a lifetime of such intake.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2003. Toxicological Profile for Selenium (Update) Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about silver. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Silver is an element found naturally in the environment. At very high levels, it may cause argyria, a blue-gray discoloration of the skin and other organs. This chemical has been found in at least 27 of the 1,177 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is silver?

(Pronounced sĭl'vər)

Silver is a naturally occurring element. It is found in the environment combined with other elements such as sulfide, chloride, and nitrate. Pure silver is "silver" colored, but silver nitrate and silver chloride are powdery white and silver sulfide and silver oxide are dark-gray to black. Silver is often found as a by-product during the retrieval of copper, lead, zinc, and gold ores.

Silver is used to make jewelry, silverware, electronic equipment, and dental fillings. It is also used to make photographs, in brazing alloys and solders, to disinfect drinking water and water in swimming pools, and as an antibacterial agent. Silver has also been used in lozenges and chewing gum to help people stop smoking.

What happens to silver when it enters the environment?

- Silver may be released into the air and water through natural processes such as the weathering of rocks.
- Human activities such as the processing of ores, cement manufacture, and the burning of fossil fuel may release silver into the air.

- It may be released into water from photographic processing.
- Rain may wash silver out of soil into the groundwater.
- Silver does not appear to concentrate to a significant extent in aquatic animals.

How might I be exposed to silver?

- Breathing low levels in air.
- Swallowing it in food or drinking water.
- Carrying out activities such as jewelry-making, soldering, and photography.
- Using anti-smoking lozenges or other medicines containing it.

How can silver affect my health?

Exposure to high levels of silver for a long period of time may result in a condition called argyria, a blue-gray discoloration of the skin and other body tissues. Lower-level exposures to silver may also cause silver to be deposited in the skin and other parts of the body; however, this is not known to be harmful. Argyria is a permanent effect, but it appears to be a cosmetic problem that may not be otherwise harmful to health.

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Exposure to high levels of silver in the air has resulted in breathing problems, lung and throat irritation, and stomach pains. Skin contact with silver can cause mild allergic reactions such as rash, swelling, and inflammation in some people.

Animal studies have shown that swallowing silver results in the deposit of silver in the skin. One study in mice found that the animals exposed to silver in drinking water were less active than unexposed animals.

No studies are available on whether silver affects reproduction or causes developmental problems in people.

How likely is silver to cause cancer?

No studies are available on whether silver may cause cancer in people. The only available animal studies showed both positive and negative results when silver was implanted under the skin.

The EPA has determined that silver is not classifiable as to human carcinogenicity.

Is there a medical test to show whether I've been exposed to silver?

Silver can be measured in the blood, urine, feces, and body tissues of exposed people. Silver builds up in the body, and the best way to learn if past exposure has occurred is to look for silver in samples of skin. Tests for silver are not commonly done at a doctor's office because they require special equipment. Although doctors can find out if a person has been exposed to silver by doing these tests, they cannot tell whether any health effects will occur.

Has the federal government made recommendations to protect human health?

The EPA recommends that the concentration of silver in

drinking water not exceed 0.10 milligrams per liter of water (0.10 mg/L) because of the skin discoloration that may occur.

The EPA requires that spills or accidental releases of 1,000 pounds or more of silver be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) limits silver in workplace air to 0.01 milligrams per cubic meter (0.01 mg/m³) for an 8-hour workday, 40-hour workweek. The National Institute of Occupational Safety and Health (NIOSH) also recommends that workplace air contain no more than 0.01 mg/m³ silver.

The American Conference of Governmental Industrial Hygienists (ACGIH) recommends that workplace air contain no more than 0.1 mg/m³ silver metal and 0.01 mg/m³ soluble silver compounds.

The federal recommendations have been updated as of July 1999.

Glossary

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Milligram (mg): One thousandth of a gram.

National Priorities List: A list of the nation's worst hazardous waste sites.

Soluble: Capable of being dissolved in water.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1990. Toxicological profile for silver. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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This fact sheet answers the most frequently asked health questions (FAQs) about zinc. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Zinc is a naturally occurring element. Exposure to high levels of zinc occurs mostly from eating food, drinking water, or breathing workplace air that is contaminated. Low levels of zinc are essential for maintaining good health. Exposure to large amounts of zinc can be harmful. It can cause stomach cramps, anemia, and changes in cholesterol levels. Zinc has been found in at least 985 of the 1,662 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is zinc?

Zinc is one of the most common elements in the earth's crust. It is found in air, soil, and water, and is present in all foods. Pure zinc is a bluish-white shiny metal.

Zinc has many commercial uses as coatings to prevent rust, in dry cell batteries, and mixed with other metals to make alloys like brass, and bronze. A zinc and copper alloy is used to make pennies in the United States.

Zinc combines with other elements to form zinc compounds. Common zinc compounds found at hazardous waste sites include zinc chloride, zinc oxide, zinc sulfate, and zinc sulfide. Zinc compounds are widely used in industry to make paint, rubber, dyes, wood preservatives, and ointments.

What happens to zinc when it enters the environment?

- Some is released into the environment by natural processes, but most comes from human activities like mining, steel production, coal burning, and burning of waste.
- It attaches to soil, sediments, and dust particles in the air.
- Rain and snow remove zinc dust particles from the air.
- Depending on the type of soil, some zinc compounds can move into the groundwater and into lakes, streams, and rivers.
- Most of the zinc in soil stays bound to soil particles and

does not dissolve in water.

- It builds up in fish and other organisms, but it does not build up in plants.

How might I be exposed to zinc?

- Ingesting small amounts present in your food and water.
- Drinking contaminated water or a beverage that has been stored in metal containers or flows through pipes that have been coated with zinc to resist rust.
- Eating too many dietary supplements that contain zinc.
- Working on any of the following jobs: construction, painting, automobile mechanics, mining, smelting, and welding; manufacture of brass, bronze, or other zinc-containing alloys; manufacture of galvanized metals; and manufacture of machine parts, rubber, paint, linoleum, oilcloths, batteries, some kind of glass, ceramics, and dyes.

How can zinc affect my health?

Zinc is an essential element in our diet. Too little zinc can cause problems, but too much zinc is also harmful.

Harmful effects generally begin at levels 10-15 times higher than the amount needed for good health. Large doses taken by mouth even for a short time can cause stomach cramps, nausea, and vomiting. Taken longer, it can cause anemia and decrease the levels of your good cholesterol. We do not know if high levels of zinc affect reproduction in humans. Rats that were fed large amounts of zinc became infertile.

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Inhaling large amounts of zinc (as dusts or fumes) can cause a specific short-term disease called metal fume fever. We do not know the long-term effects of breathing high levels of zinc.

Putting low levels of zinc acetate and zinc chloride on the skin of rabbits, guinea pigs, and mice caused skin irritation. Skin irritation will probably occur in people.

How likely is zinc to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified zinc for carcinogenicity. Based on incomplete information from human and animal studies, the EPA has determined that zinc is not classifiable as to its human carcinogenicity.

How can zinc affect children?

Zinc is essential for proper growth and development of young children. It is likely that children exposed to very high levels of zinc will have similar effects as adults. We do not know whether children are more susceptible to the effects of excessive intake of zinc than the adults.

We do not know if excess zinc can cause developmental effects in humans. Animal studies have found decreased weight in the offspring of animals that ingested very high amounts of zinc.

How can families reduce the risks of exposure to zinc?

- Children living near waste sites that contain zinc may be exposed to higher levels of zinc through breathing contaminated air, drinking contaminated drinking water, touching or eating contaminated soil.
- Discourage your children from eating soil or putting their hands in their mouths and teach them to wash their hands frequently and before eating.
- If you use medicines or vitamin supplements containing

zinc, make sure you use them appropriately and keep them out of the reach of children.

Is there a medical test to determine whether I've been exposed to zinc?

There are tests available to measure zinc in your blood, urine, hair, saliva, and feces. These tests are not usually done in the doctor's office because they require special equipment. High levels of zinc in the feces can mean high recent zinc exposure. High levels of zinc in the blood can mean high zinc consumption and/or high exposure. Tests to measure zinc in hair may provide information on long-term zinc exposure; however, the relationship between levels in your hair and the amount of zinc you were exposed to is not clear.

Has the federal government made recommendations to protect human health?

The EPA recommends that drinking water should contain no more than 5 milligrams per liter of water (5 mg/L) because of taste. The EPA requires that any release of 1,000 pounds (or in some cases 5,000 pounds) into the environment be reported to the agency.

To protect workers, the Occupational Safety and Health Administration (OSHA) has set an average limit of 1 mg/m³ for zinc chloride fumes and 5 mg/m³ for zinc oxide (dusts and fumes) in workplace air during an 8-hour workday, 40-hour workweek.

Similarly, the National Institute for Occupational Safety and Health (NIOSH) has set the same standards for up to a 10-hour workday over a 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2005. Toxicological Profile for Zinc (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



International Chemical Safety Cards

ACENAPHTHENE

ICSC: 1674








1,2-Dihydroacenaphthylene
1,8-Ethylenenaphthalene
C₁₂H₁₀
Molecular mass: 154.2



ICSC # 1674
CAS # 83-32-9
RTECS # [AB1000000](#)
UN # 3077
October 12, 2006 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray. Dry powder. Foam. Carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See NOTES.	PREVENT DISPERSION OF DUST!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety goggles	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: P2 filter respirator for harmful particles. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants . Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.	UN Hazard Class: 9 UN Packing Group: III Signal: Warning Enviro Very toxic to aquatic life with long lasting effects

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1674

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

ACENAPHTHENE

ICSC: 1674

<p>I M P O R T A N T A C T I V E</p>	<p>PHYSICAL STATE; APPEARANCE: WHITE TO BEIGE CRYSTALS</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS: On combustion, forms toxic gases including carbon monoxide. Reacts with strong oxidants .</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV not established. MAK not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.</p> <p>INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed .</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: See Notes.</p>
<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 279°C Melting point: 95°C Density: 1.2 g/cm³ Solubility in water, g/100 ml at 25°C: 0.0004</p>	<p>Vapour pressure, Pa at 25°C: 0.3 Relative vapour density (air = 1): 5.3 Flash point: 135°C o.c. Auto-ignition temperature: >450 °C Octanol/water partition coefficient as log Pow: 3.9 - 4.5</p>
<p>ENVIRONMENTAL DATA</p>	<p>The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment. It is strongly advised that this substance does not enter the environment.</p>	
<p>NOTES</p>		
<p>Acenaphthene occurs as a pure substance and also as a component of polyaromatic hydrocarbon (PAH) mixtures. Human population studies have associated PAH's exposure with cancer and cardiovascular diseases. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.</p> <p style="text-align: right;">Transport Emergency Card: TEC (R)-90GM7-III</p>		
<p>ADDITIONAL INFORMATION</p>		
<p> </p>		
<p>ICSC: 1674</p>		<p>ACENAPHTHENE</p>

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

ANTHRACENE

ICSC: 0825

	
<p>Anthracin Paranaphthalene $C_{14}H_{10} / (C_6H_4CH)_2$ Molecular mass: 178.2</p>	
<p>ICSC # 0825 CAS # 120-12-7 RTECS # CA9350000 March 24, 1999 Validated</p>	

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION	Cough. Sore throat.	Ventilation (not if powder), local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety spectacles, face shield, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain.	Do not eat, drink, or smoke during work.	Rinse mouth. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place Do NOT let this chemical enter the environment. (Extra personal protection: P2 filter respirator for harmful particles).	Separated from strong oxidants. Well closed.	

SEE IMPORTANT INFORMATION ON BACK

Prepared in the context of cooperation between the International Programme on Chemical Safety & the

ICSC: 0825

Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

ANTHRACENE

ICSC: 0825

I M P O R T A N T A D A T A	<p>PHYSICAL STATE; APPEARANCE: WHITE CRYSTALS OR FLAKES.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS: The substance decomposes on heating, under influence of strong oxidants producing acrid, toxic fume, causing fire and explosion hazard.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance slightly irritates the skin and the respiratory tract.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis under the influence of UV light.</p>
PHYSICAL PROPERTIES	<p>Boiling point: 342°C Melting point: 218°C Density: 1.25-1.28 g/cm³ Solubility in water, g/100 ml at 20 °C: 0.00013 Vapour pressure, Pa at 25°C: 0.08</p>	<p>Relative vapour density (air = 1): 6.15 Flash point: 121°C Auto-ignition temperature: 538°C Explosive limits, vol% in air: 0.6-? Octanol/water partition coefficient as log Pow: 4.5 (calculated)</p>
ENVIRONMENTAL DATA	<p>The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.</p>	
NOTES		
<p>Green oil, Tetra-olive N2G are trade names.</p> <p style="text-align: right;">NFPA Code: H0; F1; R;</p>		
ADDITIONAL INFORMATION		
<p>ICSC: 0825 ANTHRACENE</p> <p style="text-align: center;">(C) IPCS, CEC, 1994</p>		



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International Chemical Safety Cards

BENZ(a)ANTHRACENE

ICSC: 0385








1,2-Benzoanthracene
Benzo(a)anthracene
2,3-Benzphenanthrene
Naphthanthracene
 $C_{18}H_{12}$
Molecular mass: 228.3

ICSC # 0385
CAS # 56-55-3
RTECS # [CV9275000](#)
EC # 601-033-00-9
October 23, 1995 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.		Water spray, powder. In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles , face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect		Well closed.	T symbol N symbol

remainder, then remove to safe place.
 Personal protection: complete protective clothing including self-contained breathing apparatus.

R: 45-50/53
 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0385

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZ(a)ANTHRACENE

ICSC: 0385

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS TO YELLOW - BROWN FLUORESCENT FLAKES OR POWDER.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS:</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: A2 (suspected human carcinogen); (ACGIH 2004). MAK: Carcinogen category: 2 (as pyrolysis product of organic materials) (DFG 2005).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is probably carcinogenic to humans.</p>
PHYSICAL PROPERTIES	Sublimation point: 435°C Melting point: 162°C Relative density (water = 1): 1.274 Solubility in water: none	Vapour pressure, Pa at 20°C: 292 Octanol/water partition coefficient as log Pow: 5.61
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in seafood.	
NOTES		
This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. Tetrathene is a common name. Card has been partly updated in October 2005 and August 2006: see sections Occupational Exposure Limits, EU classification.		



ADDITIONAL INFORMATION

ICSC: 0385

BENZ(a)ANTHRACENE

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

BENZO(a)PYRENE

ICSC: 0104






Benz(a)pyrene
3,4-Benzopyrene
Benzo(d,e,f)chrysene
C₂₀H₁₂
Molecular mass: 252.3



ICSC # 0104
CAS # 50-32-8
RTECS # DJ3675000
EC # 601-032-00-3
October 17, 2005 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first		Separated from strong oxidants.	T symbol N symbol R: 45-46-60-61-43-50/53 S: 53-45-60-61

to prevent dusting. Carefully collect remainder, then remove to safe place.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0104

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(a)PYRENE

ICSC: 0104

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: PALE-YELLOW CRYSTALS</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Reacts with strong oxidants causing fire and explosion hazard.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: Exposure by all routes should be carefully controlled to levels as low as possible A2 (suspected human carcinogen); (ACGIH 2005). MAK: Carcinogen category: 2; Germ cell mutagen group: 2; (DFG 2005).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is carcinogenic to humans. May cause heritable genetic damage to human germ cells. Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
PHYSICAL PROPERTIES	Boiling point: 496°C Melting point: 178.1°C Density: 1.4 g/cm ³	Solubility in water: none (<0.1 g/100 ml) Vapour pressure : negligible Octanol/water partition coefficient as log Pow: 6.04
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, in plants and in molluscs. The substance may cause long-term effects in the aquatic environment.	
NOTES		
Do NOT take working clothes home. Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.		
ADDITIONAL INFORMATION		
ICSC: 0104 BENZO(a)PYRENE		

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720



Benz(e)acephenanthrylene
 2,3-Benzofluoranthene
 Benzo(e)fluoranthene
 3,4-Benzofluoranthene
 $C_{20}H_{12}$
 Molecular mass: 252.3

ICSC # 0720
 CAS # 205-99-2
 RTECS # [CU1400000](#)
 EC # 601-034-00-4
 March 25, 1999 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61	
SEE IMPORTANT INFORMATION ON BACK			

ICSC: 0720

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALS</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Upon heating, toxic fumes are formed.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: A2 (suspected human carcinogen); (ACGIH 2004). MAK: Carcinogen category: 2; (DFG 2004).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and through the skin.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans. May cause genetic damage in humans.</p>
PHYSICAL PROPERTIES	Boiling point: 481°C Melting point: 168°C Solubility in water: none	Octanol/water partition coefficient as log Pow: 6.12
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality.	
NOTES		
Benzo(b)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing benzo(b)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m ³ . Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Card has been partly updated in October 2005. See section Occupational Exposure Limits.		
ADDITIONAL INFORMATION		
ICSC: 0720 BENZO(b)FLUORANTHENE (C) IPCS, CEC, 1994		



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International Chemical Safety Cards

BENZO(ghi)PERYLENE

ICSC: 0739

	
<p>1,12-Benzoperylene 1,12-Benzperylene $C_{22}H_{12}$ Molecular mass: 276.3</p>	
<p>ICSC # 0739 CAS # 191-24-2 RTECS # DI6200500 October 18, 1999 Validated</p>	

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions.	NO open flames.	In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE		PACKAGING & LABELLING
Sweep spilled substance into covered containers. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Well closed.		
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0739	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.		

International Chemical Safety Cards

BENZO(ghi)PERYLENE

ICSC: 0739

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: PALE YELLOW-GREEN CRYSTALS.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Upon heating, toxic fumes are formed.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and through the skin.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</p>
PHYSICAL PROPERTIES	Boiling point: 550°C Melting point: 278°C Density: 1.3 g/cm ³	Solubility in water: none Octanol/water partition coefficient as log Pow: 6.58
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air and water.	
NOTES		
Benzo(ghi)perylene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. Data are insufficiently available on the effect of this substance on human health, therefore utmost care must be taken.		
ADDITIONAL INFORMATION		
ICSC: 0739 BENZO(ghi)PERYLENE (C) IPCS, CEC, 1994		
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

International Chemical Safety Cards

BENZO(k)FLUORANTHENE

ICSC: 0721



Dibenzo(b,jk)fluorene
 8,9-Benzofluoranthene
 11,12-Benzofluoranthene
 $C_{20}H_{12}$
 Molecular mass: 252.3

ICSC # 0721
 CAS # 207-08-9
 RTECS # **DF6350000**
 EC # 601-036-00-5
 March 25, 1999 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety spectacles or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

Prepared in the context of cooperation between the International Programme on Chemical Safety & the

ICSC: 0721

Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(k)FLUORANTHENE

ICSC: 0721

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: YELLOW CRYSTALS</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Upon heating, toxic fumes are formed.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV not established. MAK: Carcinogen category: 2; (DFG 2004).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and through the skin.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans.</p>
PHYSICAL PROPERTIES	Boiling point: 480°C Melting point: 217°C Solubility in water: none	Octanol/water partition coefficient as log Pow: 6.84
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in crustacea and in fish.	
NOTES		
Benzo(k)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing benzo(k)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m ³ . Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Card has been partly updated in October 2005. See section Occupational Exposure Limits.		
ADDITIONAL INFORMATION		
ICSC: 0721 BENZO(k)FLUORANTHENE (C) IPCS, CEC, 1994		



**IMPORTANT
LEGAL
NOTICE:**

Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHRYSENE

ICSC: 1672








Benzoaphenanthrene
1,2-Benzophenanthrene
1,2,5,6-Dibenzonaphthalene
 $C_{18}H_{12}$
Molecular mass: 228.3



ICSC # 1672
CAS # 218-01-9
RTECS # [GC0700000](#)
UN # 3077
EC # 601-048-00-0
October 12, 2006 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray. Dry powder. Foam. Carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES		Safety goggles	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING
Personal protection: P3 filter respirator for toxic particles. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable		Separated from strong oxidants, Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.	T symbol N symbol R: 45-68-50/53

containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.

S: 53-45-60-61
 UN Hazard Class: 9
 UN Packing Group: III
 Signal: Warning
 Health haz-Enviro
 Suspected of causing cancer
 Very toxic to aquatic life
 Toxic to aquatic life with long lasting effects

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1672

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CHRYSENE

ICSC: 1672

<p>I M P O R T A N T D A T A</p>	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS TO BEIGE CRYSTALS OR POWDER</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>CHEMICAL DANGERS: The substance decomposes on burning producing toxic fumes . Reacts violently with strong oxidants.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2006). MAK: skin absorption (H); Carcinogen category: 2 (DFG 2007).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.</p> <p>INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed .</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans.</p>
<p>PHYSICAL PROPERTIES</p>	<p>Boiling point: 448°C Melting point: 254 - 256°C Density: 1.3 g/cm³</p>	<p>Solubility in water: very poor Octanol/water partition coefficient as log Pow: 5.9</p>
<p>ENVIRONMENTAL DATA</p>	<p>The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in seafood. It is strongly advised that this substance does not enter the environment.</p>	
<p>NOTES</p>		
<p>Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. This substance does not usually occur as a pure substance but as a component of polyaromatic hydrocarbon (PAH) mixtures. Human population studies have associated PAH's exposure with cancer and cardiovascular diseases.</p>		

Transport Emergency Card: TEC (R)-90GM7-III
 Card has been partially updated in January 2008: see Occupational Exposure Limits.

ADDITIONAL INFORMATION

ICSC: 1672

CHRYSENE

(C) IPCS, CEC, 1994

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International Chemical Safety Cards

DIBENZO(a,h)ANTHRACENE

ICSC: 0431








1,25,6-Dibenzanthracene
 $C_{22}H_{14}$
 Molecular mass: 278.4

ICSC # 0431
 CAS # 53-70-3
 RTECS # [HN2625000](#)
 EC # 601-041-00-2
 October 23, 1995 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
• INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
• SKIN	Redness. Swelling. Itching.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: P3 filter respirator for toxic particles.	Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0431 Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

DIBENZO(a,h)ANTHRACENE

ICSC: 0431

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS CRYSTALLINE POWDER.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS:</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: The substance may have effects on the skin, resulting in photosensitization. This substance is probably carcinogenic to humans.</p>
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PHYSICAL PROPERTIES	Boiling point: 524°C Melting point: 267°C Relative density (water = 1): 1.28	Solubility in water: none Octanol/water partition coefficient as log Pow: 6.5
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ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in seafood.	
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NOTES

This is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. DBA is a commonly used name. This substance is one of many polycyclic aromatic hydrocarbons (PAH). Card has been partly updated in October 2005. See section EU classification.

ADDITIONAL INFORMATION

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ICSC: 0431	DIBENZO(a,h)ANTHRACENE
(C) IPCS, CEC, 1994	

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U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

INDENO(1,2,3-cd)PYRENE

ICSC: 0730



o-Phenylene pyrene
 2,3-Phenylene pyrene
 $C_{22}H_{12}$
 Molecular mass: 276.3

ICSC # 0730
 CAS # 193-39-5
 RTECS # [NK9300000](#)
 March 25, 1999 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.		

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0730

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

INDENO(1,2,3-cd)PYRENE

ICSC: 0730

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: YELLOW CRYSTALS</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Upon heating, toxic fumes are formed.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV not established. MAK: Carcinogen category: 2; (DFG 2004).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and through the skin.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: This substance is possibly carcinogenic to humans.</p>
PHYSICAL PROPERTIES	<p>Boiling point: 536°C Melting point: 164°C Solubility in water: none</p>	<p>Octanol/water partition coefficient as log Pow: 6.58</p>
ENVIRONMENTAL DATA	<p>This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in fish.</p>	
NOTES		
<p>Indeno(1,2,3-cd)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco. ACGIH recommends environment containing Indeno(1,2,3-c,d)pyrene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m³. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Card has been partly updated in October 2005. See section Occupational Exposure Limits.</p>		
ADDITIONAL INFORMATION		
<div style="display: flex; justify-content: space-between;"> ICSC: 0730 INDENO(1,2,3-cd)PYRENE </div> <p>(C) IPCS, CEC, 1994</p>		
IMPORTANT LEGAL	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed</p>	

NOTICE:

requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

2-METHYLNAPHTHALENE

ICSC: 1276






beta-Methylnaphthalene
 $C_{11}H_{10}$
 Molecular mass: 142.2



ICSC # 1276
 CAS # 91-57-6
 RTECS # [QJ9635000](#)
 September 10, 1997 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Powder , foam , carbon dioxide .
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
• INHALATION	Cough.	Local exhaust.	Fresh air, rest.
• SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• EYES	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.	Marine pollutant.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1276 Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

2-METHYLNAPHTHALENE

ICSC: 1276

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: CRYSTALS</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: The substance decomposes on heating producing acrid smoke and irritating fumes.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV: 0.5 ppm as TWA; (skin); A4 (not classifiable as a human carcinogen); (ACGIH 2008). MAK not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.</p> <p>INHALATION RISK: No indication can be given about the rate in which a harmful concentration in the air is reached on evaporation of this substance at 20° C.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance irritates the eyes.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Lungs may be affected by repeated or prolonged exposure.</p>
PHYSICAL PROPERTIES	Boiling point: 241°C Melting point: 35°C Relative density (water = 1): 1.00	Solubility in water, g/100 ml at 25°C: 0.003 Vapour pressure, Pa at °C: 9 Octanol/water partition coefficient as log Pow: 3.86
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.	
NOTES		
Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Card has been partially updated in February 2009: see Occupational Exposure Limits,		
ADDITIONAL INFORMATION		
ICSC: 1276 2-METHYLNAPHTHALENE (C) IPCS, CEC, 1994		
IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	



International Chemical Safety Cards

PYRENE

ICSC: 1474

	
<p>Benzo (d,e,f) phenanthrene beta-Pyrene C₁₆H₁₀ Molecular mass: 202.26</p>	
<p>ICSC # 1474 CAS # 129-00-0 RTECS # UR2450000 November 27, 2003 Validated</p>	

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking.	Water spray, carbon dioxide, dry powder, alcohol-resistant foam, or polymer foam.
EXPLOSION			
EXPOSURE			
•INHALATION		Avoid inhalation of dust .	Fresh air, rest.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder . Do NOT let this chemical enter the environment. (Extra personal protection: P2 filter respirator for harmful particles.)	Separated from strong oxidants. Keep in a well-ventilated room.	Do not transport with food and feedstuffs.

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1474	Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.
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International Chemical Safety Cards

PYRENE

ICSC: 1474

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: PALE YELLOW OR COLOURLESS SOLID IN VARIOUS FORMS</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: The substance decomposes on heating producing irritating fumes .</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV not established. MAK not established.</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation , through the skin and by ingestion .</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: Exposure to sun may provoke an irritating effect of pyrene on skin and lead to chronic skin discoloration.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</p>
PHYSICAL PROPERTIES	<p>Boiling point: 404°C Melting point: 151°C Density: 1.27 g/cm³</p>	<p>Solubility in water: 0.135 mg/l at 25°C Vapour pressure, Pa at °C: 0.08 Octanol/water partition coefficient as log Pow: 4.88</p>
ENVIRONMENTAL DATA	<p>Bioaccumulation of this chemical may occur in crustacea,in fish,in milk,in algae andin molluscs. It is strongly advised that this substance does not enter the environment.</p>	
NOTES		
<p>Pyrene is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, pyrene may be encountered as a laboratory chemical in its pure form. Health effects of exposure to the substance have not been investigated adequately. See ICSC 1415 Coal-tar pitch.</p>		
ADDITIONAL INFORMATION		
<div style="display: flex; justify-content: space-between;"> ICSC: 1474 PYRENE </div> <p>(C) IPCS, CEC, 1994</p>		
IMPORTANT LEGAL NOTICE:	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the</p>	

U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

Benzene		Formula: C ₆ H ₆	CAS#: 71-43-2	RTECS#: CY1400000	IDLH: Ca [500 ppm]
Conversion: 1 ppm = 3.19 mg/m ³		DOT: 1114 130			
Synonyms/Trade Names: Benzol, Phenyl hydride					
Exposure Limits: NIOSH REL: Ca TWA 0.1 ppm ST 1 ppm See Appendix A			OSHA PEL: [1910.1028] TWA 1 ppm ST 5 ppm See Appendix F		Measurement Methods (see Table 1): NIOSH 1500, 1501, 3700, 3800 OSHA 12, 1005
Physical Description: Colorless to light-yellow liquid with an aromatic odor. [Note: A solid below 42°F.]					
Chemical & Physical Properties: MW: 78.1 BP: 176°F Sol: 0.07% FLP: 12°F IP: 9.24 eV Sp.Gr: 0.88 VP: 75 mmHg FRZ: 42°F UEL: 7.8% LEL: 1.2% Class IB Flammable Liquid		Personal Protection/Sanitation (see Table 2): Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Eyewash Quick drench		Respirator Recommendations (see Tables 3 and 4): NIOSH ¥: ScbaF: Pd, Pp/ SaF: Pd, Pp: AScba Escape: GmFOv/ScbaE See Appendix E (page 351)	
Incompatibilities and Reactivities: Strong oxidizers, many fluorides & perchlorates, nitric acid					
Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Abs, Ing, Con SY: Irrit eyes, skin, nose, resp sys; dizz; head, nau, staggered gait; anor, lass; dermat; bone marrow depres; [carc] TO: Eyes, skin, resp sys, blood, CNS, bone marrow [leukemia]			First Aid (see Table 6): Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		

Ethyl benzene		Formula: CH ₃ CH ₂ C ₆ H ₅	CAS#: 100-41-4	RTECS#: DA0700000	IDLH: 800 ppm [10%LEL]
Conversion: 1 ppm = 4.34 mg/m ³		DOT: 1175 130			
Synonyms/Trade Names: Ethylbenzol, Phenylethane					
Exposure Limits: NIOSH REL: TWA 100 ppm (435 mg/m ³) ST 125 ppm (545 mg/m ³) OSHA PEL†: TWA 100 ppm (435 mg/m ³)			Measurement Methods (see Table 1): NIOSH 1501 OSHA 7, 1002		
Physical Description: Colorless liquid with an aromatic odor.					
Chemical & Physical Properties: MW: 106.2 BP: 277°F Sol: 0.01% FLP: 55°F IP: 8.76 eV Sp.Gr: 0.87 VP: 7 mmHg FRZ: -139°F UEL: 6.7% LEL: 0.8% Class IB Flammable Liquid		Personal Protection/Sanitation (see Table 2): Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.		Respirator Recommendations (see Tables 3 and 4): NIOSH/OSHA 800 ppm: CcrOv*/GmFOv/PapRov*/ Sa*/ScbaF §: ScbaF: Pd, Pp/ SaF: Pd, Pp: AScba Escape: GmFOv/ScbaE	
Incompatibilities and Reactivities: Strong oxidizers					
Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Ing, Con SY: Irrit eyes, skin, muc memb; head; dermat; narco, coma TO: Eyes, skin, resp sys, CNS			First Aid (see Table 6): Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		

Naphthalene		Formula: C ₁₀ H ₈	CAS#: 91-20-3	RTECS#: QJ0525000	IDLH: 250 ppm
Conversion: 1 ppm = 5.24 mg/m ³		DOT: 1334 133 (crude or refined); 2304 133 (molten)			
Synonyms/Trade Names: Naphthalin, Tar camphor, White tar					
Exposure Limits: NIOSH REL: TWA 10 ppm (50 mg/m ³) ST 15 ppm (75 mg/m ³) OSHA PEL†: TWA 10 ppm (50 mg/m ³)				Measurement Methods (see Table 1): NIOSH 1501 OSHA 35	
Physical Description: Colorless to brown solid with an odor of mothballs. [Note: Shipped as a molten solid.]					
Chemical & Physical Properties: MW: 128.2 BP: 424°F Sol: 0.003% FLP: 174°F IP: 8.12 eV Sp.Gr: 1.15 VP: 0.08 mmHg MLT: 176°F UEL: 5.9% LEL: 0.9% Combustible Solid, but will take some effort to ignite.		Personal Protection/Sanitation (see Table 2): Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily		Respirator Recommendations (see Tables 3 and 4): NIOSH/OSHA 100 ppm: CcrOv95*/Sa* 250 ppm: Sa:Cf*/CcrFOv100/ PaprovHie*/ ScbaF/SaF §: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba Escape: GmFOv100/ScbaE	
Incompatibilities and Reactivities: Strong oxidizers, chromic anhydride					
Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Abs, Ing, Con SY: Irrit eyes; head, conf, excitement, mal; nau, vomit, abdom pain; irrit bladder; profuse sweat; jaun; hema, renal shutdown; derm, optical neuritis, corn damage TO: Eyes, skin, blood, liver, kidneys, CNS			First Aid (see Table 6): Eye: Irr immed Skin: Molten flush immed/sol-liq soap wash prompt Breath: Resp support Swallow: Medical attention immed		

Toluene		Formula: C ₆ H ₅ CH ₃	CAS#: 108-88-3	RTECS#: XS5250000	IDLH: 500 ppm
Conversion: 1 ppm = 3.77 mg/m ³		DOT: 1294 130			
Synonyms/Trade Names: Methyl benzene, Methyl benzol, Phenyl methane, Toluol					
Exposure Limits: NIOSH REL: TWA 100 ppm (375 mg/m ³) ST 150 ppm (560 mg/m ³) OSHA PEL†: TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum peak)				Measurement Methods (see Table 1): NIOSH 1500, 1501, 3800, 4000 OSHA 111	
Physical Description: Colorless liquid with a sweet, pungent, benzene-like odor.					
Chemical & Physical Properties: MW: 92.1 BP: 232°F Sol(74°F): 0.07% FLP: 40°F IP: 8.82 eV Sp.Gr: 0.87 VP: 21 mmHg FRZ: -139°F UEL: 7.1% LEL: 1.1% Class IB Flammable Liquid		Personal Protection/Sanitation (see Table 2): Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.		Respirator Recommendations (see Tables 3 and 4): NIOSH 500 ppm: CcrOv*/Paprov*/ GmFOv/Sa*/ScbaF §: ScbaF:Pd,Pp/SaF:Pd,Pp:AScba Escape: GmFOv/ScbaE	
Incompatibilities and Reactivities: Strong oxidizers					
Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Abs, Ing, Con SY: Irrit eyes, nose; lass, conf, euph, dizz, head; dilated pupils, lac; anxi, musc ftg, insom; pares; derm; liver, kidney damage TO: Eyes, skin, resp sys, CNS, liver, kidneys			First Aid (see Table 6): Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		

m-Xylene		Formula: C ₈ H ₄ (CH ₃) ₂	CAS#: 108-38-3	RTECS#: ZE2275000	IDLH: 900 ppm
Conversion: 1 ppm = 4.34 mg/m ³		DOT: 1307 130			
Synonyms/Trade Names: 1,3-Dimethylbenzene; meta-Xylene; m-Xylol					
Exposure Limits: NIOSH REL: TWA 100 ppm (435 mg/m ³) ST 150 ppm (655 mg/m ³) OSHA PEL†: TWA 100 ppm (435 mg/m ³)				Measurement Methods (see Table 1): NIOSH 1501, 3800 OSHA 1002	
Physical Description: Colorless liquid with an aromatic odor.					
Chemical & Physical Properties: MW: 106.2 BP: 282°F Sol: Slight FLP: 82°F IP: 8.56 eV Sp.Gr: 0.86 VP: 9 mmHg FRZ: -54°F UEL: 7.0% LEL: 1.1% Class IC Flammable Liquid		Personal Protection/Sanitation (see Table 2): Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.		Respirator Recommendations (see Tables 3 and 4): NIOSH/OSHA 900 ppm: CcrOv*/Paprov*/Sa*/ScbaF §: ScbaF: Pd, Pp/SaF: Pd, Pp: AScba Escape: GmFOv/ScbaE	
Incompatibilities and Reactivities: Strong oxidizers, strong acids					
Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Abs, Ing, Con SY: Irrit eyes, skin, nose, throat; dizz, excitement, drow, inco, staggering gait; corn vacuolization; anor, nau, vomit, abdom pain; derm TO: Eyes, skin, resp sys, CNS, GI tract, blood, liver, kidneys				First Aid (see Table 6): Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	

o-Xylene		Formula: C ₈ H ₄ (CH ₃) ₂	CAS#: 95-47-6	RTECS#: ZE2450000	IDLH: 900 ppm
Conversion: 1 ppm = 4.34 mg/m ³		DOT: 1307 130			
Synonyms/Trade Names: 1,2-Dimethylbenzene; ortho-Xylene; o-Xylol					
Exposure Limits: NIOSH REL: TWA 100 ppm (435 mg/m ³) ST 150 ppm (655 mg/m ³) OSHA PEL†: TWA 100 ppm (435 mg/m ³)				Measurement Methods (see Table 1): NIOSH 1501, 3800 OSHA 1002	
Physical Description: Colorless liquid with an aromatic odor.					
Chemical & Physical Properties: MW: 106.2 BP: 292°F Sol: 0.02% FLP: 90°F IP: 8.56 eV Sp.Gr: 0.88 VP: 7 mmHg FRZ: -13°F UEL: 6.7% LEL: 0.9% Class IC Flammable Liquid		Personal Protection/Sanitation (see Table 2): Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.		Respirator Recommendations (see Tables 3 and 4): NIOSH/OSHA 900 ppm: CcrOv*/Paprov*/Sa*/ScbaF §: ScbaF: Pd, Pp/SaF: Pd, Pp: AScba Escape: GmFOv/ScbaE	
Incompatibilities and Reactivities: Strong oxidizers, strong acids					
Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Abs, Ing, Con SY: Irrit eyes, skin, nose, throat; dizz, excitement, drow, inco, staggering gait; corn vacuolization; anor, nau, vomit, abdom pain; derm TO: Eyes, skin, resp sys, CNS, GI tract, blood, liver, kidneys				First Aid (see Table 6): Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	

p-Xylene		Formula: C ₆ H ₄ (CH ₃) ₂	CAS#: 106-42-3	RTECS#: ZE2625000	IDLH: 900 ppm
Conversion: 1 ppm = 4.41 mg/m ³		DOT: 1307 130			
Synonyms/Trade Names: 1,4-Dimethylbenzene; para-Xylene; p-Xylol					
Exposure Limits: NIOSH REL: TWA 100 ppm (435 mg/m ³) ST 150 ppm (655 mg/m ³) OSHA PEL†: TWA 100 ppm (435 mg/m ³)				Measurement Methods (see Table 1): NIOSH 1501, 3800 OSHA 1002	
Physical Description: Colorless liquid with an aromatic odor. [Note: A solid below 56°F.]					
Chemical & Physical Properties: MW: 106.2 BP: 281°F Sol: 0.02% FLP: 81°F IP: 8.44 eV Sp.Gr: 0.86 VP: 9 mmHg FRZ: 56°F UEL: 7.0% LEL: 1.1% Class IC Flammable Liquid		Personal Protection/Sanitation (see Table 2): Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.		Respirator Recommendations (see Tables 3 and 4): NIOSH/OSHA 900 ppm: CcrOv*/PapOv*/Sa*/ScbaF §: ScbaF: Pd, Pp/SaF: Pd, Pp: AScba Escape: GmFOv/ScbaE	
Incompatibilities and Reactivities: Strong oxidizers, strong acids					
Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Abs, Ing, Con SY: Irrit eyes, skin, nose, throat; dizz, excitement, drow, inco, staggering gait; corn vacuolization; anor, nau, vomit, abdom pain; derm TO: Eyes, skin, resp sys, CNS, GI tract, blood, liver, kidneys				First Aid (see Table 6): Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	

1,2,3-Trimethylbenzene		Formula: C ₆ H ₃ (CH ₃) ₃	CAS#: 526-73-8	RTECS#: DC3300000	IDLH: N.D.
Conversion: 1 ppm = 4.92 mg/m ³		DOT:			
Synonyms/Trade Names: Hemellitol [Note: Hemimellitene is a mixture of the 1,2,3-isomer with up to 10% of related aromatics such as the 1,2,4-isomer.]					
Exposure Limits: NIOSH REL: TWA 25 ppm (125 mg/m ³) OSHA PEL†: none				Measurement Methods (see Table 1): OSHA PV2091	
Physical Description: Clear, colorless liquid with a distinctive, aromatic odor.					
Chemical & Physical Properties: MW: 120.2 BP: 349°F Sol: Low FLP: ? IP: 8.48 eV Sp.Gr: 0.89 VP(62°F): 1 mmHg FRZ: -14°F UEL: 6.6% LEL: 0.8% Flammable Liquid		Personal Protection/Sanitation (see Table 2): Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.		Respirator Recommendations (see Tables 3 and 4): Not available.	
Incompatibilities and Reactivities: Oxidizers, nitric acid					
Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Ing, Con SY: Irrit eyes, skin, nose, throat, resp sys; bron; hypochromic anemia; head, drow, lass, dizz, nau, inco; vomit, conf, chemical pneu (aspir liquid) TO: Eyes, skin, resp sys, CNS, blood				First Aid (see Table 6): Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed	

1,2,4-Trimethylbenzene		Formula: C ₈ H ₃ (CH ₃) ₃	CAS#: 95-63-6	RTECS#: DC3325000	IDLH: N.D.
Conversion: 1 ppm = 4.92 mg/m ³		DOT:			
Synonyms/Trade Names: Asymmetrical trimethylbenzene, psi-Cumene, Pseudocumene [Note: Hemimellitene is a mixture of the 1,2,3-isomer with up to 10% of related aromatics such as the 1,2,4-isomer.]					
Exposure Limits: NIOSH REL: TWA 25 ppm (125 mg/m ³) OSHA PEL†: none				Measurement Methods (see Table 1): OSHA PV2091	
Physical Description: Clear, colorless liquid with a distinctive, aromatic odor.					
Chemical & Physical Properties: MW: 120.2 BP: 337°F Sol: 0.006% FLP: 112°F IP: 8.27 eV Sp.Gr: 0.88 VP(56°F): 1 mmHg FRZ: -77°F UEL: 6.4% LEL: 0.9% Class II Flammable Liquid		Personal Protection/Sanitation (see Table 2): Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.		Respirator Recommendations (see Tables 3 and 4): Not available.	
Incompatibilities and Reactivities: Oxidizers, nitric acid					
Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Ing, Con SY: Irrit eyes, skin, nose, throat, resp sys; bron; hypochromic anemia; head, drow, lass, dizz, nau, inco; vomit, conf, chemical pneu (aspir liquid) TO: Eyes, skin, resp sys, CNS, blood				First Aid (see Table 6): Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed	

Tetrachloroethylene		Formula: C ₂ Cl ₄	CAS#: 127-18-4	RTECS#: KX3850000	IDLH: Ca [150 ppm]
Conversion: 1 ppm = 6.78 mg/m ³		DOT: 1897 180			
Synonyms/Trade Names: Perchloroethylene, Perchloroethylene, Perk, Tetrachloroethylene					
Exposure Limits: NIOSH REL: Ca Minimize workplace exposure concentrations. See Appendix A OSHA PEL†: TWA 100 ppm C 200 ppm (for 5 mins. in any 3-hr. period), with a maximum peak of 300 ppm				Measurement Methods (see Table 1): NIOSH 1003 OSHA 1001	
Physical Description: Colorless liquid with a mild, chloroform-like odor.					
Chemical & Physical Properties: MW: 185.8 BP: 250°F Sol: 0.02% FLP: NA IP: 9.32 eV Sp.Gr: 1.62 VP: 14 mmHg FRZ: -2°F UEL: NA LEL: NA Noncombustible Liquid, but decomposes in a fire to hydrogen chloride and phosgene.		Personal Protection/Sanitation (see Table 2): Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash Quick drench		Respirator Recommendations (see Tables 3 and 4): NIOSH ⌘: Sobaf: Pd, Pp/ SaF: Pd, Pp: ASoba Escape: GmFOv/SobaE	
Incompatibilities and Reactivities: Strong oxidizers; chemically-active metals such as lithium, beryllium & barium; caustic soda; sodium hydroxide; potash					
Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Abs, Ing, Con SY: Irrit eyes, skin, nose, throat, resp sys; nau; flush face, neck; dizz, inco; head, drow; skin eryt; liver damage; [canc] TO: Eyes, skin, resp sys, liver, kidneys, CNS [in animals: liver tumors]				First Aid (see Table 6): Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	

Trichloroethylene		Formula: ClCH=CCl ₂	CAS#: 79-01-8	RTECS#: KX4550000	IDLH: Ca [1000 ppm]
Conversion: 1 ppm = 5.37 mg/m ³		DOT: 1710 160			
Synonyms/Trade Names: Ethylene trichloride, TCE, Trichloroethene, Trilene					
Exposure Limits: NIOSH REL: Ca See Appendix A See Appendix C OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)			Measurement Methods (see Table 1): NIOSH 1022, 3800 OSHA 1001		
Physical Description: Colorless liquid (unless dyed blue) with a chloroform-like odor.					
Chemical & Physical Properties: MW: 131.4 BP: 189°F Sol: 0.1% FLP: ? IP: 9.45 eV Sp.Gr: 1.48 VP: 58 mmHg FRZ: -99°F UEL(77°F): 10.5% LEL(77°F): 8% Combustible Liquid, but burns with difficulty.		Personal Protection/Sanitation (see Table 2): Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash Quick drench		Respirator Recommendations (see Tables 3 and 4): NIOSH ☒: ScbaF:Pd,Pp/SaF:Pd,Pp:AScoba Escape: GmFOv/ScbaE	
Incompatibilities and Reactivities: Strong caustics & alkalis; chemically-active metals (such as barium, lithium, sodium, magnesium, titanium & beryllium)					
Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Abs, Ing, Con SY: Irrit eyes, skin; head, vis dist, lass, dizz, tremor, drow, nau, vomit; derm; card arrhy, pares; liver inj; [carc] TO: Eyes, skin, resp sys, heart, liver, kidneys, CNS [in animals: liver & kidney cancer]			First Aid (see Table 6): Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		

Vinyl chloride		Formula: CH ₂ =CHCl	CAS#: 75-01-4	RTECS#: KU9825000	IDLH: Ca [N.D.]
Conversion: 1 ppm = 2.58 mg/m ³		DOT: 1088 116P (inhibited)			
Synonyms/Trade Names: Chloroethene, Chloroethylene, Ethylene monochloride, Monochloroethene, Monochloroethylene, VC, Vinyl chloride monomer (VCM)					
Exposure Limits: NIOSH REL: Ca See Appendix A OSHA PEL: [1910.1017] TWA 1 ppm C 5 ppm [15-minute]			Measurement Methods (see Table 1): NIOSH 1007 OSHA 4, 75		
Physical Description: Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations. [Note: Shipped as a liquefied compressed gas.]					
Chemical & Physical Properties: MW: 62.5 BP: 7°F Sol(77°F): 0.1% FLP: NA (Gas) IP: 9.99 eV RGasD: 2.21 VP: 3.3 atm FRZ: -256°F UEL: 33.0% LEL: 3.6% Flammable Gas		Personal Protection/Sanitation (see Table 2): Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite wash		Respirator Recommendations (see Tables 3 and 4): NIOSH ☒: ScbaF:Pd,Pp/SaF:Pd,Pp:AScoba Escape: GmFS/ScobaE See Appendix E (page 351)	
Incompatibilities and Reactivities: Copper, oxidizers, aluminum, peroxides, iron, steel [Note: Polymerizes in air, sunlight, or heat unless stabilized by inhibitors such as phenol. Attacks iron & steel in presence of moisture.]					
Exposure Routes, Symptoms, Target Organs (see Table 5): ER: Inh, Con (liquid) SY: Lass; abdom pain, GI bleeding; enlarged liver; pallor or cyan of extremities; liquid: frostbite; [carc] TO: Liver, CNS, blood, resp sys, lymphatic sys [liver cancer]			First Aid (see Table 6): Eye: Frostbite Skin: Frostbite Breath: Resp support		

APPENDIX B

SME HEALTH AND SAFETY FORMS

- Work Related Injury, Illness, and Vehicular Incident Analysis Report
- Near Miss Incident Analysis Report
- Post-Work Subcontractor Safety Assessment Form
- Confined Space Checklist
- Fall Protection Checklist
- Excavation Safety Checklist
- Calibration Log
- Direct Reading Measurement Log



**WORK-RELATED INCIDENT ILLNESS / INJURY / VEHICULAR
INCIDENT ANALYSIS REPORT**

Notify Human Resources and Safety immediately by telephone or email then complete and return this form within 24 hours of incident. For incidents involving serious injury requiring hospitalization or a fatality, notify Human Resources and Safety immediately by telephone and email this form as soon as practical.

TEAM MEMBER MUST COMPLETE THE FOLLOWING

Team Member Name: _____ Team Member Title: _____

Team Member Group: _____ Team Member Office: _____

Team Leader: _____ Group Leader: _____

Incident Date: _____ Time: _____ Date Reported: _____ Last Day Worked: _____

Location of Incident: _____ County/State: _____

Witness(es): _____

What work activity was in progress when incident occurred? _____

Team Member Injured or Ill? YES NO Medical Treatment Required? YES NO

If yes, location of medical treatment: _____

If yes, what was the injury or illness?: _____

Description of incident and, if injured, object or substance that directly harmed Team Member:

Did Team Member return to work? YES NO Date Returned: _____

Did vehicle/equipment malfunction? YES NO Was there property damage? YES NO

Was there vehicle damage? YES NO If SME vehicle involved, vehicle #: _____

Describe malfunction and/or damage to vehicle/equipment or property:

Safety may use my name on the Summary of Incidents Report: Yes No

Team Member Signature: _____ Date: _____



WORK-RELATED INCIDENT ILLNESS / INJURY / VEHICULAR INCIDENT ANALYSIS REPORT

Notify Human Resources and Safety immediately by telephone or email then complete and return this form within 24 hours of incident. For incidents involving serious injury requiring hospitalization or a fatality, notify Human Resources and Safety immediately by telephone and email and follow with this form as soon as practical.

TEAM LEADER MUST COMPLETE THE FOLLOWING

Unsafe condition or Team Member action that led to the incident:

Action taken or to be taken to prevent similar incidents:

Team Leader Signature: _____ Date: _____

Submit to:

Incident Reporting Group Email - Incident@sme-usa.com

***Any additional medical documents should be sent directly to HR**



WORK-RELATED NEAR MISS INCIDENT ANALYSIS REPORT

Near Miss Incident Definition: A condition, situation or act that has the potential to cause injury to the Team Member or others nearby and/or vehicle and property damage which is narrowly avoided. For all near miss incidents complete and return within 24 hours of the near miss incident.

TEAM MEMBER MUST COMPLETE THE FOLLOWING

Team Member Name: _____ Team Member Title: _____

Team Member Group: _____ Team Member Office: _____

Team Leader: _____ Group Leader: _____

Date of Near Miss: _____ Time: _____ Date Reported: _____

Location of Near Miss: _____ County: _____

Witness(es): _____

What work activity was in progress when the near miss incident occurred? _____

Description of near miss:

Was there equipment malfunction? YES NO

Safety may use my name on the Summary of Incidents Report: Yes No

Team Member Signature: _____ Date: _____

TEAM LEADER MUST COMPLETE THE FOLLOWING

Unsafe condition, situation, or act that led to the near miss:

Action to be taken to prevent similar incidents in the future:

Team Leader Signature: _____ Date: _____

Submit to:

Incident Reporting Group Email - Incident@sme-usa.com

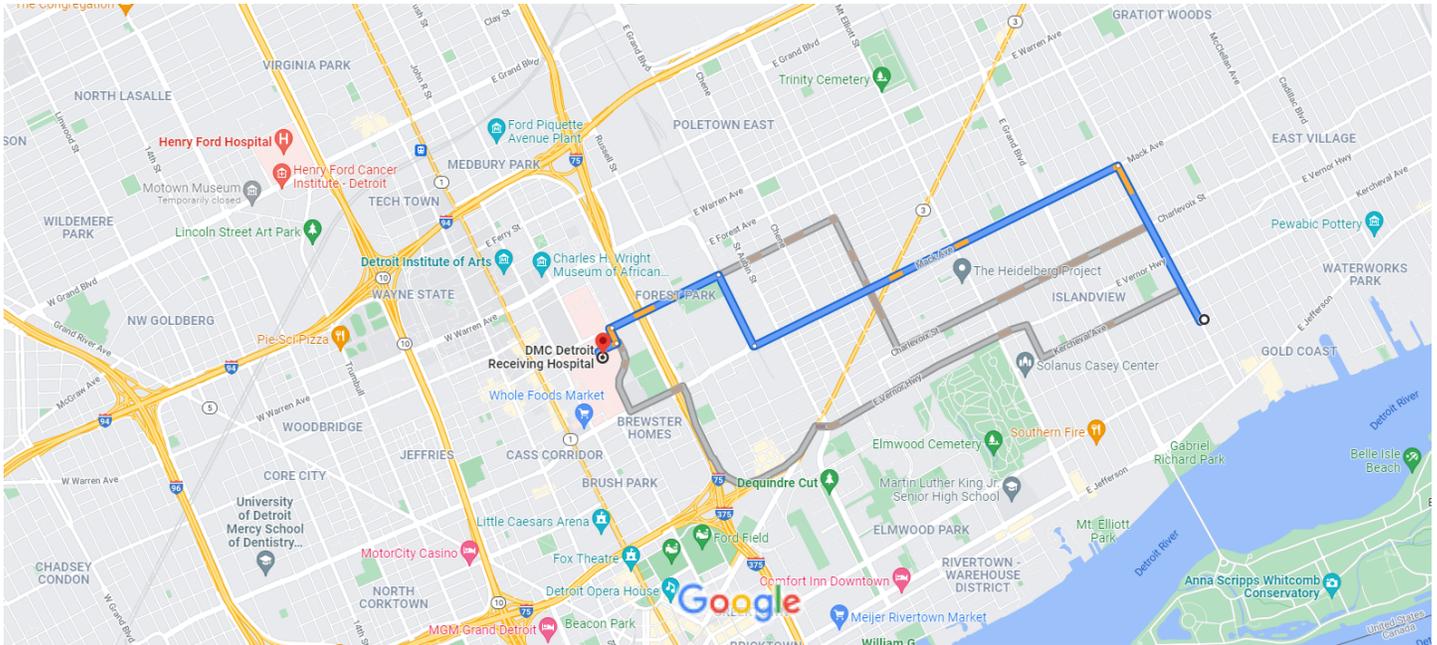
APPENDIX C

MAP AND DIRECTIONS FROM SITE TO NEAREST MEDICAL FACILITY



1500 Van Dyke Street, Detroit, MI to DMC Detroit Receiving Hospital

Drive 4.0 miles, 12 min



Map data ©2022 Google 2000 ft

1500 Van Dyke St
Detroit, MI 48214

- ↑ 1. Head northwest on Van Dyke St toward St Paul St
0.9 mi
- ↶ 2. Turn left onto Mack Ave
2.0 mi
- ↷ 3. Turn right onto Dequindre St
0.4 mi
- ↶ 4. Turn left onto E Canfield St
0.6 mi
- ↶ 5. Turn left onto St Antoine
472 ft
- ↷ 6. Turn right onto Detroit Receiving Dr
Destination will be on the right
0.1 mi

DMC Detroit Receiving Hospital
4201 St Antoine, Detroit, MI 48201

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the

map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

APPENDIX B
GEOPHYSICAL SURVEY



Summary of Scanning for Underground Storage Tanks (UST's)

Prepared For: SME

Prepared By:

Trey Merrell

trey.merrell@gprsinc.com

Project Manager-Southeast Michigan/Metro Detroit

248-207-8135

June 20, 2022

June 20, 2022

SME

Attn: Anita Ketola

Email: Anita.ketola@sme-USA.com

Site: 1500 Van Dyke, Detroit, MI

We appreciate the opportunity to provide this report for our work completed on June 13, 2022.

PURPOSE

The purpose of this project was to search for any suspected underground storage tanks (USTs) or suspected UST-related piping or other anomalies remaining on the property. The scope of work consisted of two locations measuring approximately .25ac combined. The interiors of buildings were excluded from the scope of this project. The client marked the desired locations prior to our scanning and our markings were then placed onto the surface using water-based spray paint.

EQUIPMENT

- **Underground Scanning GPR Antenna.** The antenna with frequencies ranging from 250 MHz-450 MHz is mounted in a stroller frame which rolls over the surface. The surface needs to be reasonably smooth and unobstructed in order to obtain readable scans. Obstructions such as curbs, landscaping, and vegetation will limit the feasibility of GPR. The data is displayed on a screen and marked in the field in real time. The total depth achieved can be as much as 8' or more with this antenna but can vary widely depending on the types of materials being scanned through. Some soil types such as clay may limit maximum depths to 3' or less. As depth increases, targets must be larger in order to be detected and non-metallic targets can be especially difficult to locate. Depths provided should always be treated as estimates as their accuracy can be affected by multiple factors. For more information, please visit: [Link](#)
- **GPS.** This handheld GPS unit offers accuracy down to 4 inches; however, the accuracy will depend on the satellite environment and obstructions and should not be considered to be survey-grade. Features can be collected as points, lines, or areas and then exported into Google Earth or overlaid on a CAD drawing. For more information, please visit: [Link](#)

PROCESS

The EM pipe locator was used to connect to accessible, traceable pipes that may be tank-related such as vent pipes or product lines. A current is induced onto the pipe which creates an electromagnetic field that can be traced using the receiver. We can then attempt to trace these pipes to their origin or end point and paint or flag their locations.

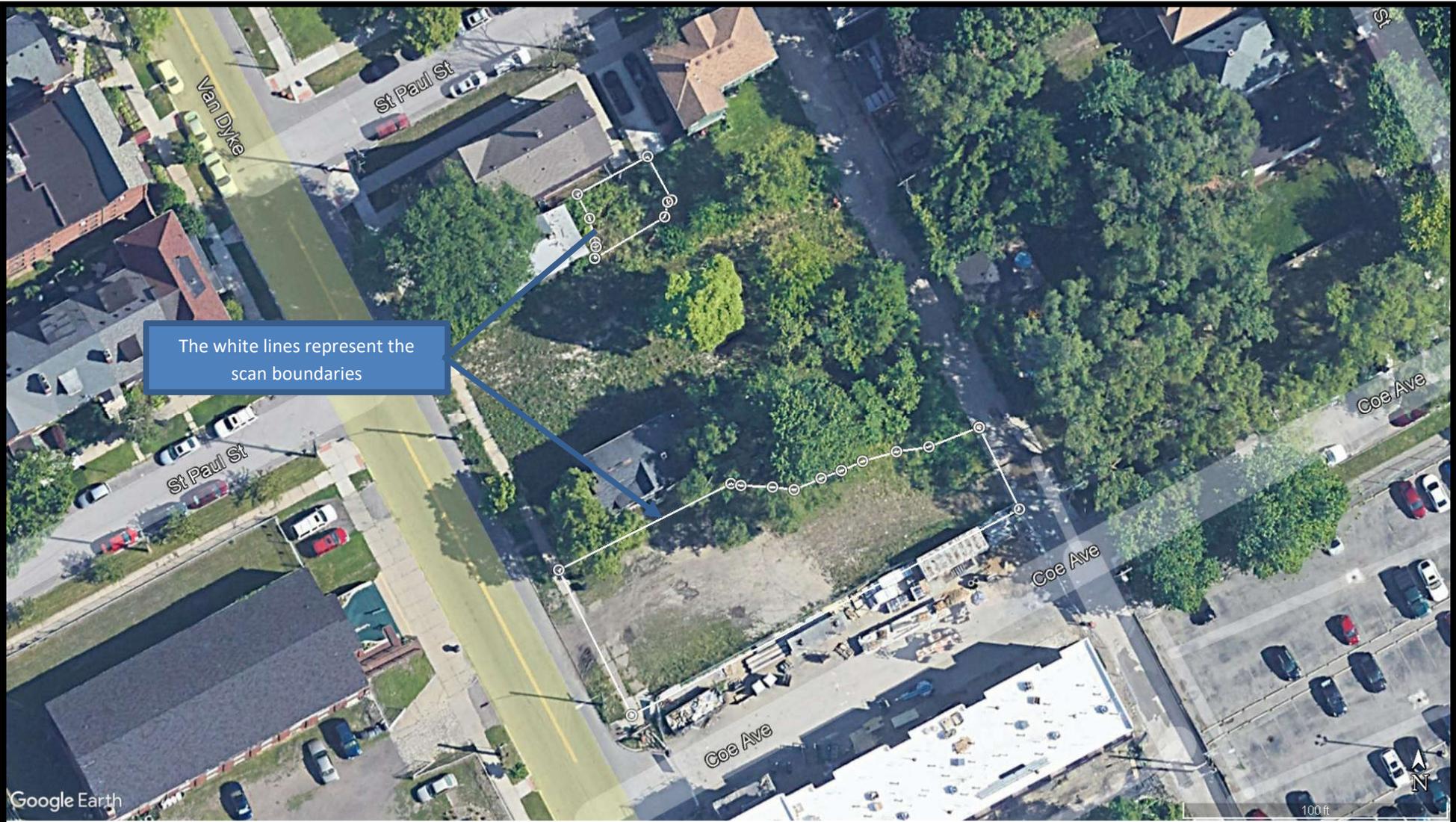
Initial GPR scans were collected in order to evaluate the data and calibrate the equipment. Based on these findings, a scanning strategy is formed, consisting of scanning the entire area in a grid with 2' scan spacing in order to locate any potential UST's that may remain at the site. The GPR data is viewed in real time and anomalies in the data were located and marked on the surface along with their depths using water-based spray paint. Relevant scan examples were saved and will be provided in this report.

LIMITATIONS

Please keep in mind that there are limitations to any subsurface investigation. The equipment may not achieve maximum effectiveness due to soil conditions, above ground obstructions, reinforced concrete, and a variety of other factors. No subsurface investigation or equipment can provide a complete image of what lies below. Our results should always be used in conjunction with as many methods as possible including consulting existing plans and drawings, exploratory excavation or potholing, visual inspection of above-ground features, and utilization of services such as One Call/811. Depths are dependent on many factors so depth accuracy can vary throughout a site and should be treated as estimates only. Relevant scan examples were saved and will be provided in this report.

FINDINGS

The subsurface conditions at the time of the scanning allowed for maximum GPR depth penetration of 4' in most areas. Multiple utilities were observed during the scanning; however, utility locating was not part of the scope of this project. The equipment and methods used did not detect reactions from potential UST's. The following pages will provide further explanation of the findings.



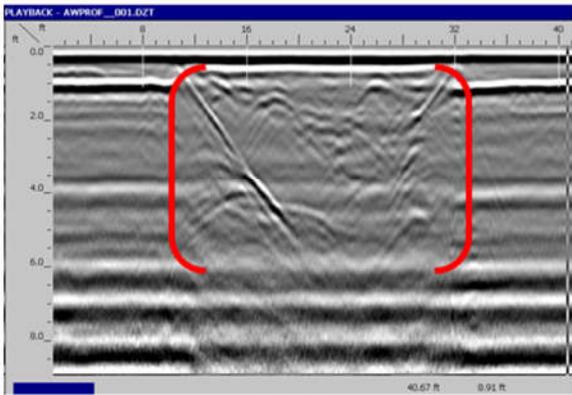
Prepared for: SME
 Prepared By: Trey Merrell
 Date of Scanning: 6/13/2022

Terms and Conditions
 GPRS does not provide land survey or civil engineering data collection or documentation. This is provided as a reference map of the field markings and is not survey-grade.

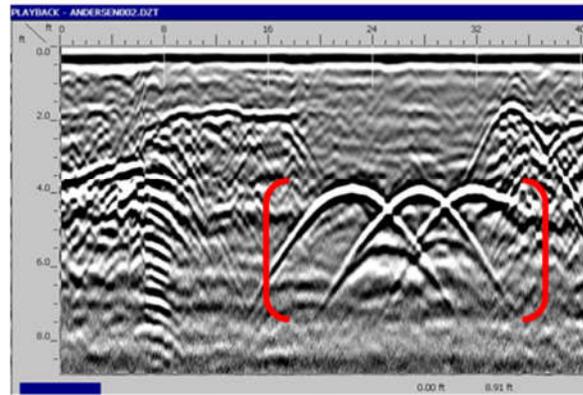
LEGEND			
	ELECTRIC		SANITARY
	WATER		STORM
	COMM		UNKNOWN
	GAS		

1500 Van Dyke, Detroit, MI

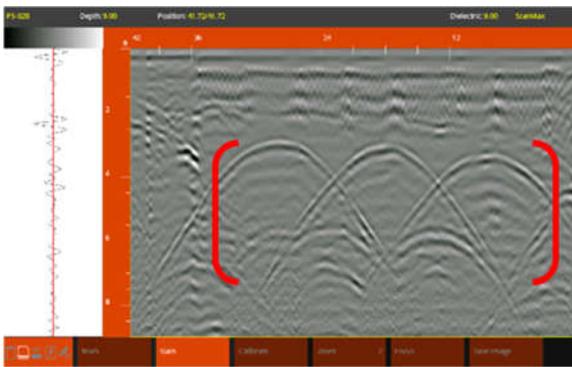
Prepared by:



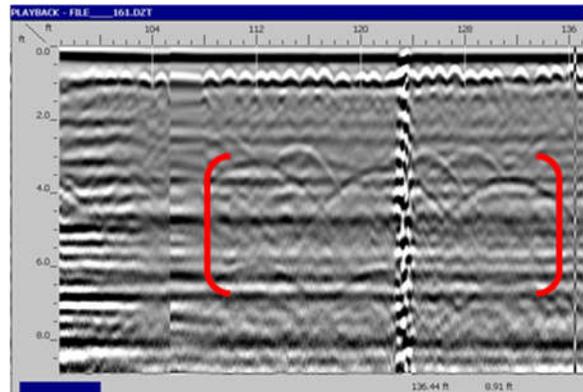
Sample GPR data screenshot showing a possible former tank pit or excavation. The change in the data from the excavation is apparent but GPR cannot determine whether this is due to a tank removal or whether tanks may still exist beyond the maximum depth of penetration of the GPR signal.



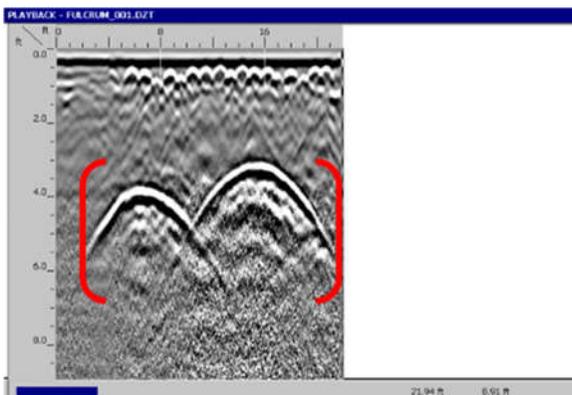
Sample GPR data screenshot showing three reactions from probable USTs. The diameters cannot be determined from these hyperbolas but they can be seen to be larger than a reaction from a typical utility.



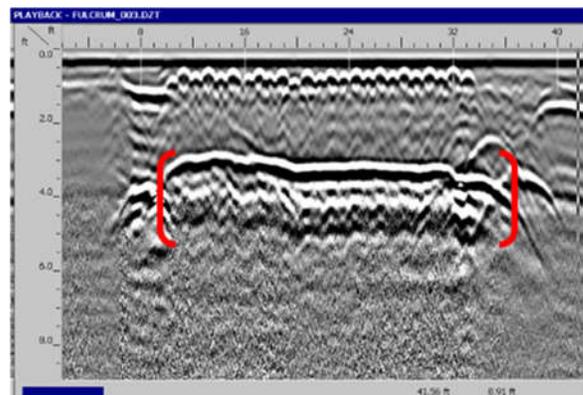
Sample GPR data screenshot showing three reactions from known USTs at an active fueling station. The concrete above the USTs is reinforced with wire mesh.



Sample GPR data screenshot showing three reactions from known USTs at an active fueling station. These USTs are non-metallic and therefore have a weaker reflection that is more difficult and sometimes impossible to identify in the GPR data.



Sample GPR data screenshot showing two potential USTs. These reactions are larger than a typical utility but large utilities can look identical to a UST.



Sample GPR data screenshot showing a scan collected parallel along the top one of the suspected USTs shown in the data to the left. A parallel scan is used to determine a clear beginning and end to the reaction to the reaction which is an indicator of a UST and to determine an approximate length.

Sample Data Screenshots.
(Not taken from this project)

Location:
previously collected from various sites





Site photo of the smaller scan area that depicts conditions at the time of the scan, facing west.



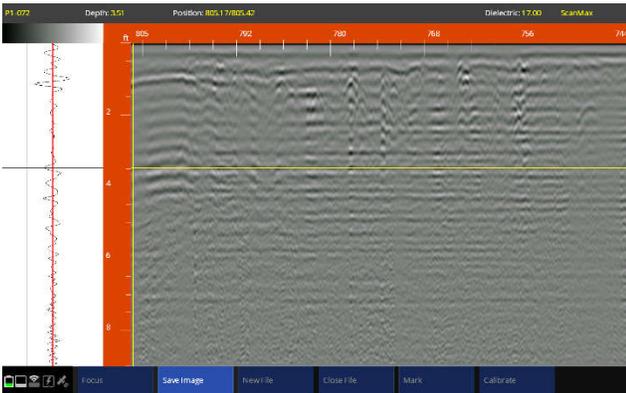
Site photo facing north of the smaller scan area.



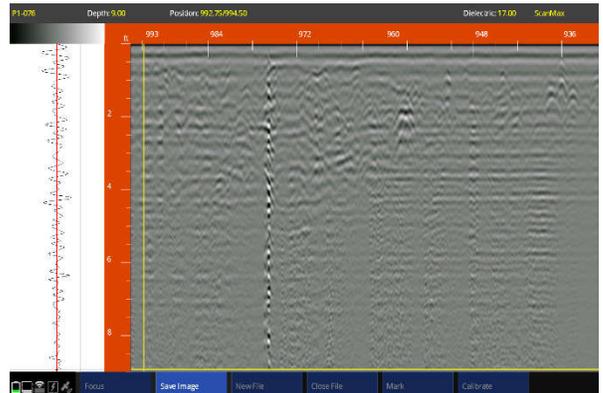
Site photo facing northeast of the larger scan area. Note the dense brush in the background that blocks a portion of the lot.



Site photo facing northwest of the larger scan area, obstructed area in the foreground.



Radar data taken from the larger scan area, from east to west. Typical of the area.



Sample radar data taken from the smaller scan area.

GPR Data Screenshots and Photos

1500 Van Dyke, Detroit, MI



CLOSING

GPRS, Inc. has been in business since 2001, specializing in underground storage tank location, concrete scanning, utility locating, and shallow void detection for projects throughout the United States. I encourage you to visit our website (www.gprsinc.com) and contact any of the numerous references listed.

The subsurface conditions at the time of the scanning allowed for maximum GPR depth penetration of 4' in most areas. Multiple utilities were observed during the scanning; however, utility locating was not part of the scope of this project. The equipment and methods used did not detect reactions from potential UST's.

GPRS appreciates the opportunity to offer our services, and we look forward to continuing to work with you on future projects. Please feel free to contact us for additional information or with any questions you may have regarding this report.

Signed,



Trey Merrell
Project Manager—Southeast Michigan/Metro Detroit



Direct: 248-207-8135
trey.merrell@gprsinc.com
www.gprsinc.com

Reviewed,



Parker Schings
Senior Project Manager—NW Ohio & SE Michigan



Direct: 419-376-5021
parker.schings@gprsinc.com
www.gprsinc.com

APPENDIX C
SOIL BORING LOGS

9/20/22 11:06:45 AM



BORING SB1

PAGE 1 OF 1

BORING DEPTH: 12 FEET

PROJECT NAME: 1500 Van Dyke, Detroit, MI

PROJECT NUMBER: 086124.00.03A.006

CLIENT: City of Detroit

PROJECT LOCATION: Detroit, MI

DATE STARTED: 6/13/22

COMPLETED: 6/13/22

BORING METHOD: Direct Push

OPERATOR: Fibertec

RIG NO.: Geoprobe

LOGGED BY: JL

CHECKED BY: AHK

DEPTH (FEET)	SYMBOLIC PROFILE	ELEVATION: Not Surveyed PROFILE DESCRIPTION	SAMPLE TYPE NO. INTERVAL	RECOVERY (inches)	PID (ppm)	SOIL ANALYTICAL SAMPLE ANALYZED	REMARKS
0							
2.0		FILL- TOPSOIL- Sandy SILT- Trace Organics, Occasional Roots- Dark Brown- Moist (ML)			<1		
4.0		FILL- SILTY CLAY with some Sand- Dark Brown- Moist (CL-ML)	LS1	50	<1		
5					<1		
10		LEAN CLAY with some Silt- Brown to Gray (CL)	LS2	60	<1		
12.0			LS3	24	<1		
END OF BORING AT 12.0 FEET.							
15							

GROUNDWATER & BACKFILL INFORMATION
GROUNDWATER WAS NOT ENCOUNTERED
BACKFILL METHOD: Soil Cuttings

NOTES: 1. Soil samples were classified according to ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) for environmental purposes only. Therefore, the boring logs and associated report(s) should not be used for geotechnical evaluation or design.
 2. The indicated stratification lines are approximate. The in-situ transitions between materials may be gradual.
 3. Listed depths under the profile description are rounded to the nearest tenth of a foot (e.g. 5.75 = 5.8). Refer to the report and attachments for actual sample depths and/or intervals (where applicable).
 4. The colors depicted on the symbolic profile are solely for visualization purposes and do not necessarily represent the in-situ colors encountered.

9/20/22 11:06:46 AM



BORING SB2

PAGE 1 OF 1

BORING DEPTH: 12 FEET

PROJECT NAME: 1500 Van Dyke, Detroit, MI

PROJECT NUMBER: 086124.00.03A.006

CLIENT: City of Detroit

PROJECT LOCATION: Detroit, MI

DATE STARTED: 6/13/22

COMPLETED: 6/13/22

BORING METHOD: Direct Push

OPERATOR: Fibertec

RIG NO.: Geoprobe

LOGGED BY: JL

CHECKED BY: AHK

DEPTH (FEET)	SYMBOLIC PROFILE	ELEVATION: Not Surveyed PROFILE DESCRIPTION	SAMPLE TYPE NO. INTERVAL	RECOVERY (inches)	PID (ppm)	SOIL ANALYTICAL SAMPLE ANALYZED	TEMPORARY WELL SCREEN	REMARKS
0								
2.0		FILL- TOPSOIL- SILTY CLAY with some sand, Trace Organics, Occasional Roots- Dark Brown- Moist (ML)			<1			
5.0		FILL- SILTY CLAY with some Sand, Occasional Cinders, Brick and Metal- Dark Brown- Moist (CL-ML)	LS1	48	<1			
6.0					<1			
10.0		LEAN CLAY with some Silt- Brown to Gray (CL)	LS2	60	<1			
12.0			LS3	24	<1			
END OF BORING AT 12.0 FEET.								
15								

GROUNDWATER & BACKFILL INFORMATION	
DURING BORING:	DEPTH (FT) 6.0
BACKFILL METHOD:	Soil Cuttings

NOTES: 1. Soil samples were classified according to ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) for environmental purposes only. Therefore, the boring logs and associated report(s) should not be used for geotechnical evaluation or design.
 2. The indicated stratification lines are approximate. The in-situ transitions between materials may be gradual.
 3. Listed depths under the profile description are rounded to the nearest tenth of a foot (e.g. 5.75 = 5.8). Refer to the report and attachments for actual sample depths and/or intervals (where applicable).
 4. The colors depicted on the symbolic profile are solely for visualization purposes and do not necessarily represent the in-situ colors encountered.
 5. A groundwater sample was collected from a temporary monitoring well. The well screen was set between 6 feet and 11 feet below ground surface.

9/20/22 11:06:47 AM



BORING SB3

PAGE 1 OF 1

BORING DEPTH: 12 FEET

PROJECT NAME: 1500 Van Dyke, Detroit, MI

PROJECT NUMBER: 086124.00.03A.006

CLIENT: City of Detroit

PROJECT LOCATION: Detroit, MI

DATE STARTED: 6/13/22

COMPLETED: 6/13/22

BORING METHOD: Direct Push

OPERATOR: Fibertec

RIG NO.: Geoprobe

LOGGED BY: JL

CHECKED BY: AHK

DEPTH (FEET)	SYMBOLIC PROFILE	ELEVATION: Not Surveyed	PROFILE DESCRIPTION	SAMPLE TYPE NO. INTERVAL	RECOVERY (inches)	PID (ppm)	SOIL ANALYTICAL SAMPLE ANALYZED	TEMPORARY WELL SCREEN	REMARKS
0									
1.0			FILL- TOPSOIL- SILTY CLAY with Sand, Trace Organics, Occasional Roots- Dark Brown- Moist (CL-ML)			<1			
5.0			FILL- SILTY CLAY with Sand, Brick Cinder and Concrete- Brown to Gray- Moist (CL-ML)	LS1	36	<1			
7.5				LS2	54	<1			Staining observed from 6 feet to 8 feet bgs. Black colored clay underneath fill layer.
10.0			LEAN CLAY- Gray (CL)			<1			
12.0				LS3	24	<1			
END OF BORING AT 12.0 FEET.									

GROUNDWATER & BACKFILL INFORMATION	
DURING BORING:	DEPTH (FT) 5.0
BACKFILL METHOD:	Soil Cuttings

NOTES: 1. Soil samples were classified according to ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) for environmental purposes only. Therefore, the boring logs and associated report(s) should not be used for geotechnical evaluation or design.
 2. The indicated stratification lines are approximate. The in-situ transitions between materials may be gradual.
 3. Listed depths under the profile description are rounded to the nearest tenth of a foot (e.g. 5.75 = 5.8). Refer to the report and attachments for actual sample depths and/or intervals (where applicable).
 4. The colors depicted on the symbolic profile are solely for visualization purposes and do not necessarily represent the in-situ colors encountered.
 5. A groundwater sample was collected from a temporary monitoring well. The well screen was set between 5 feet and 10 feet below ground surface.

9/20/22 11:06:47 AM



BORING SB4

PAGE 1 OF 1

BORING DEPTH: 12 FEET

PROJECT NAME: 1500 Van Dyke, Detroit, MI

PROJECT NUMBER: 086124.00.03A.006

CLIENT: City of Detroit

PROJECT LOCATION: Detroit, MI

DATE STARTED: 6/13/22

COMPLETED: 6/13/22

BORING METHOD: Direct Push

OPERATOR: Fibertec

RIG NO.: Geoprobe

LOGGED BY: JL

CHECKED BY: AHK

DEPTH (FEET)	SYMBOLIC PROFILE	ELEVATION: Not Surveyed PROFILE DESCRIPTION	SAMPLE TYPE NO. INTERVAL	RECOVERY (inches)	PID (ppm)	SOIL ANALYTICAL SAMPLE ANALYZED	REMARKS
0		FILL- TOPSOIL- SILTY CLAY with Some Organics- Occasional Roots- Dark Brown- Moist (CL-ML)			<1		
2.0		FILL- SILTY CLAY with Sand and Concrete- Brown to Gray- Moist (CL-ML)	LS1	42	<1		
5.0		LEAN CLAY- Gray (CL)		LS2	58	<1	
10			LS3	24	<1		
12.0		END OF BORING AT 12.0 FEET.					

GROUNDWATER & BACKFILL INFORMATION	<p>NOTES: 1. Soil samples were classified according to ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) for environmental purposes only. Therefore, the boring logs and associated report(s) should not be used for geotechnical evaluation or design.</p> <p>2. The indicated stratification lines are approximate. The in-situ transitions between materials may be gradual.</p> <p>3. Listed depths under the profile description are rounded to the nearest tenth of a foot (e.g. 5.75 = 5.8). Refer to the report and attachments for actual sample depths and/or intervals (where applicable).</p> <p>4. The colors depicted on the symbolic profile are solely for visualization purposes and do not necessarily represent the in-situ colors encountered.</p>
<p>GROUNDWATER WAS NOT ENCOUNTERED</p> <p>BACKFILL METHOD: Soil Cuttings</p>	

9/20/22 11:06:48 AM



BORING SB5

PAGE 1 OF 1

BORING DEPTH: 12 FEET

PROJECT NAME: 1500 Van Dyke, Detroit, MI

PROJECT NUMBER: 086124.00.03A.006

CLIENT: City of Detroit

PROJECT LOCATION: Detroit, MI

DATE STARTED: 6/13/22

COMPLETED: 6/13/22

BORING METHOD: Direct Push

OPERATOR: Fibertec

RIG NO.: Geoprobe

LOGGED BY: JL

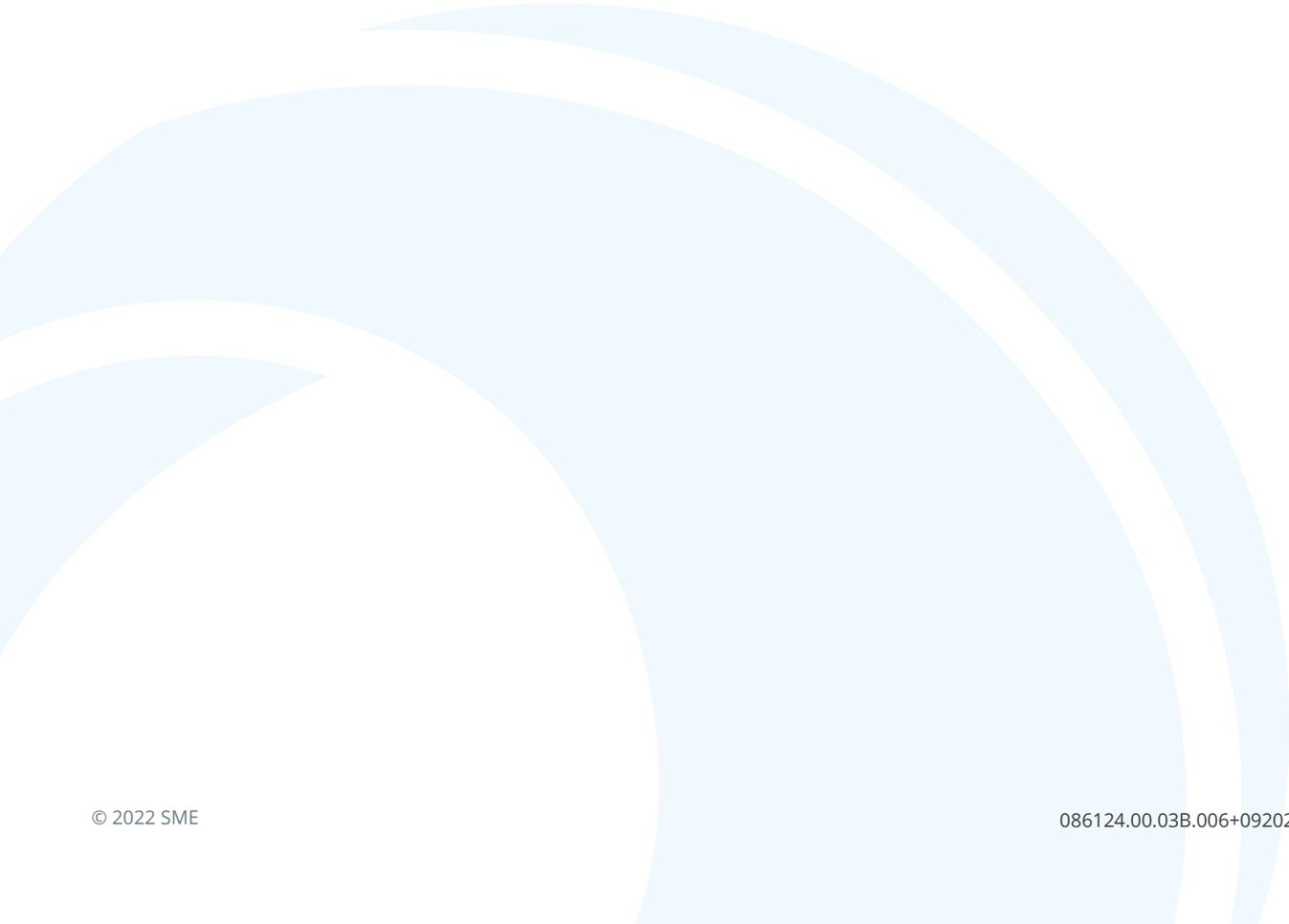
CHECKED BY: AHK

DEPTH (FEET)	SYMBOLIC PROFILE	ELEVATION: Not Surveyed PROFILE DESCRIPTION	SAMPLE TYPE NO. INTERVAL	RECOVERY (inches)	PID (ppm)	SOIL ANALYTICAL SAMPLE ANALYZED	REMARKS
0							
1.0		FILL- TOPSOIL- SILTY CLAY- Some Sand, Trace Organics, Occasional Roots- Dark Brown- Moist (CL-ML)			<1		
5.0		FILL- SILTY CLAY- some Sand and Brick Debris and Cinders- Brown- Moist	LS1	50	<1		
5.0					<1		
10.0		LEAN CLAY- Gray (CL)	LS2	60	<1		
10.0					<1		
12.0			LS3	24	<1		
12.0		END OF BORING AT 12.0 FEET.					
15.0							

GROUNDWATER & BACKFILL INFORMATION
GROUNDWATER WAS NOT ENCOUNTERED
BACKFILL METHOD: Soil Cuttings

NOTES: 1. Soil samples were classified according to ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) for environmental purposes only. Therefore, the boring logs and associated report(s) should not be used for geotechnical evaluation or design.
 2. The indicated stratification lines are approximate. The in-situ transitions between materials may be gradual.
 3. Listed depths under the profile description are rounded to the nearest tenth of a foot (e.g. 5.75 = 5.8). Refer to the report and attachments for actual sample depths and/or intervals (where applicable).
 4. The colors depicted on the symbolic profile are solely for visualization purposes and do not necessarily represent the in-situ colors encountered.

APPENDIX D
LABORATORY REPORTS





Thursday, June 30, 2022

Fibertec Project Number: A09128
Project Identification: 086124.00.03B.006 /086124.00.03B.006
Submittal Date: 06/14/2022

Ms. Anita Ketola
Soil and Materials Engineers, Inc. - Plymouth
43980 Plymouth Oaks Blvd
Plymouth, MI 48170

Dear Ms. Ketola,

Thank you for selecting Fibertec Environmental Services as your analytical laboratory. The samples you submitted have been analyzed in accordance with NELAC standards and the results compiled in the attached report. Any exceptions to NELAC compliance are noted in the report. These results apply only to those samples submitted. Please note TO-15 samples will be disposed of 7 calendar days after the reporting date. All other samples will be disposed of 30 days after the reporting date.

If you have any questions regarding these results or if we may be of further assistance to you, please contact me at (517) 699-0345.

Sincerely,

By Jacob Sutherland at 3:56 PM, Jun 30, 2022

For Daryl P. Strandbergh
Laboratory Director

Enclosures

1914 Holloway Drive
11766 E. Grand River
8660 S. Mackinaw Trail

Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB1 (2-4)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 09:15

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C Aliquot ID: **A09128-001** Matrix: **Soil/Solid**
Method: ASTM D2216-10 Description: **SB1 (2-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	14		%	1	1.0	06/15/22	MC220615	06/16/22	MC220615	LJK

Michigan 10 Elements by ICP/MS Aliquot ID: **A09128-001** Matrix: **Soil/Solid**
Method: EPA 0200.2/EPA 6020A Description: **SB1 (2-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Arsenic	8000		µg/kg	100	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
2. Barium	87000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
3. Cadmium	410		µg/kg	50	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
4. Chromium	17000		µg/kg	500	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
5. Copper	19000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
6. Lead	270000		µg/kg	1000	40	06/20/22	PT22F17A	06/20/22	T422F20A	CJA
7. Selenium	370		µg/kg	200	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
8. Silver	U		µg/kg	100	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
9. Zinc	140000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA

Mercury by CVAAS Aliquot ID: **A09128-001** Matrix: **Soil/Solid**
Method: EPA 7471B Description: **SB1 (2-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Mercury	250		µg/kg	50	10	06/16/22	PM22F16B	06/16/22	M722F16A	JLH

Polychlorinated Biphenyls (PCBs) Aliquot ID: **A09128-001** Matrix: **Soil/Solid**
Method: EPA 3546/EPA 8082A Description: **SB1 (2-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Aroclor-1016	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:26	SO22F17A	TKT
2. Aroclor-1221	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:26	SO22F17A	TKT
3. Aroclor-1232	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:26	SO22F17A	TKT
4. Aroclor-1242	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:26	SO22F17A	TKT
5. Aroclor-1248	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:26	SO22F17A	TKT
6. Aroclor-1254	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:26	SO22F17A	TKT
7. Aroclor-1260	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:26	SO22F17A	TKT
‡ 8. Aroclor-1262	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:26	SO22F17A	TKT
‡ 9. Aroclor-1268	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:26	SO22F17A	TKT

1914 Holloway Drive
11766 E. Grand River
8660 S. Mackinaw Trail

Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584



Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-001

Order: A09128
 Date: 06/30/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB1 (2-4)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 09:15

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 Aliquot ID: **A09128-001A** Matrix: **Soil/Solid**
 Method: **EPA 5035A/EPA 8260D** Description: **SB1 (2-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
3. Benzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
4. Bromobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
5. Bromochloromethane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
6. Bromodichloromethane	U	V+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
7. Bromoform	U	V+ L+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
8. Bromomethane	U		µg/kg	200	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
9. 2-Butanone	U		µg/kg	750	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
10. n-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
13. Carbon Disulfide	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
15. Chlorobenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
16. Chloroethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
17. Chloroform	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
18. Chloromethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U	V+ L+	µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
21. Dibromochloromethane	U	V+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
22. Dibromomethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
35. Ethylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
36. Ethylene Dibromide	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC

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F: (517) 699-0388
 F: (810) 220-3311
 F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB1 (2-4)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 09:15

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035
Method: EPA 5035A/EPA 8260D

Aliquot ID: A09128-001A **Matrix: Soil/Solid**
Description: SB1 (2-4)

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
37. 2-Hexanone	U	V+ L+	µg/kg	2500	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
38. Isopropylbenzene	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
39. 4-Methyl-2-pentanone	U	V+ L+	µg/kg	2500	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
40. Methylene Chloride	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
42. MTBE	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
43. Naphthalene	U		µg/kg	330	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
44. n-Propylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
45. Styrene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
46. 1,1,1,2-Tetrachloroethane	U	V+ L+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
48. Tetrachloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
49. Toluene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
50. 1,2,4-Trichlorobenzene	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
53. Trichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
59. Vinyl Chloride	U		µg/kg	40	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
60. m&p-Xylene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
61. o-Xylene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC
‡ 62. Xylenes	U		µg/kg	150	1.0	06/17/22	VJ22F17A	06/17/22 16:02	VJ22F17A	BRC

Polynuclear Aromatic Hydrocarbons (PNAs)
Method: EPA 3546/EPA 8270E

Aliquot ID: A09128-001 **Matrix: Soil/Solid**
Description: SB1 (2-4)

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
2. Acenaphthylene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
3. Anthracene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD

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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB1 (2-4)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 09:15

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-001** Matrix: **Soil/Solid**
Method: **EPA 3546/EPA 8270E** Description: **SB1 (2-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
4. Benzo(a)anthracene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
5. Benzo(a)pyrene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
6. Benzo(b)fluoranthene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
7. Benzo(ghi)perylene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
8. Benzo(k)fluoranthene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
9. Chrysene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
11. Fluoranthene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
12. Fluorene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
15. Naphthalene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
16. Phenanthrene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD
17. Pyrene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 12:38	SN22F20A	SJD

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F: (517) 699-0388
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F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB2 (4-6)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 09:45

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C Aliquot ID: **A09128-002** Matrix: **Soil/Solid**
Method: ASTM D2216-10 Description: **SB2 (4-6)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	31		%	1	1.0	06/15/22	MC220615	06/16/22	MC220615	LJK

Michigan 10 Elements by ICP/MS Aliquot ID: **A09128-002** Matrix: **Soil/Solid**
Method: EPA 0200.2/EPA 6020A Description: **SB2 (4-6)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Arsenic	7000		µg/kg	100	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
2. Barium	150000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
3. Cadmium	230		µg/kg	50	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
4. Chromium	20000		µg/kg	500	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
5. Copper	29000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
6. Lead	110000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
7. Selenium	440		µg/kg	200	10	06/20/22	PT22F17A	06/20/22	T422F20A	CJA
8. Silver	U		µg/kg	100	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
9. Zinc	130000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA

Mercury by CVAAS Aliquot ID: **A09128-002** Matrix: **Soil/Solid**
Method: EPA 7471B Description: **SB2 (4-6)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Mercury	91		µg/kg	50	10	06/16/22	PM22F16B	06/16/22	M722F16A	JLH

Polychlorinated Biphenyls (PCBs) Aliquot ID: **A09128-002** Matrix: **Soil/Solid**
Method: EPA 3546/EPA 8082A Description: **SB2 (4-6)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Aroclor-1016	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:38	SO22F17A	TKT
2. Aroclor-1221	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:38	SO22F17A	TKT
3. Aroclor-1232	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:38	SO22F17A	TKT
4. Aroclor-1242	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:38	SO22F17A	TKT
5. Aroclor-1248	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:38	SO22F17A	TKT
6. Aroclor-1254	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:38	SO22F17A	TKT
7. Aroclor-1260	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:38	SO22F17A	TKT
‡ 8. Aroclor-1262	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:38	SO22F17A	TKT
‡ 9. Aroclor-1268	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:38	SO22F17A	TKT

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F: (517) 699-0388
F: (810) 220-3311
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Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB2 (4-6)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 09:45

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 Aliquot ID: **A09128-002A** Matrix: **Soil/Solid**
Method: EPA 5035A/EPA 8260D Description: **SB2 (4-6)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
3. Benzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
4. Bromobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
5. Bromochloromethane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
6. Bromodichloromethane	U	V+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
7. Bromoform	U	V+ L+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
8. Bromomethane	U		µg/kg	200	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
9. 2-Butanone	U		µg/kg	750	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
10. n-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
13. Carbon Disulfide	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
15. Chlorobenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
16. Chloroethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
17. Chloroform	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
18. Chloromethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U	V+ L+	µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
21. Dibromochloromethane	U	V+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
22. Dibromomethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
35. Ethylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
36. Ethylene Dibromide	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC

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Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB2 (4-6)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 09:45

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035
Method: EPA 5035A/EPA 8260D

Aliquot ID: A09128-002A **Matrix: Soil/Solid**
Description: SB2 (4-6)

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
37. 2-Hexanone	U	V+ L+	µg/kg	2500	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
38. Isopropylbenzene	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
39. 4-Methyl-2-pentanone	U	V+ L+	µg/kg	2500	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
40. Methylene Chloride	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
42. MTBE	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
43. Naphthalene	U		µg/kg	330	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
44. n-Propylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
45. Styrene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
46. 1,1,1,2-Tetrachloroethane	U	V+ L+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
48. Tetrachloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
49. Toluene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
50. 1,2,4-Trichlorobenzene	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
53. Trichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
59. Vinyl Chloride	U		µg/kg	49	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
60. m&p-Xylene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
61. o-Xylene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC
‡ 62. Xylenes	U		µg/kg	150	1.0	06/17/22	VJ22F17A	06/17/22 16:27	VJ22F17A	BRC

Polynuclear Aromatic Hydrocarbons (PNAs)
Method: EPA 3546/EPA 8270E

Aliquot ID: A09128-002 **Matrix: Soil/Solid**
Description: SB2 (4-6)

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
2. Acenaphthylene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
3. Anthracene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD

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Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB2 (4-6)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 09:45

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-002** Matrix: **Soil/Solid**
Method: **EPA 3546/EPA 8270E** Description: **SB2 (4-6)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
4. Benzo(a)anthracene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
5. Benzo(a)pyrene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
6. Benzo(b)fluoranthene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
7. Benzo(ghi)perylene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
8. Benzo(k)fluoranthene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
9. Chrysene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
11. Fluoranthene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
12. Fluorene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
15. Naphthalene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
16. Phenanthrene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD
17. Pyrene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:05	SN22F20A	SJD

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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB2 (6-11)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 10:15

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Michigan 10 Elements by ICP/MS, Total Recoverable Aliquot ID: **A09128-003A** Matrix: **Ground Water**
Method: **EPA 3005A (Total Recoverable)/EPA 6020A** Description: **SB2 (6-11)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Arsenic	U		µg/L	5.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
2. Barium	120		µg/L	100	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
3. Cadmium	U		µg/L	1.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
4. Chromium	U		µg/L	10	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
5. Copper	15		µg/L	4.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
6. Lead	140		µg/L	3.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
7. Selenium	U		µg/L	5.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
8. Silver	U		µg/L	0.20	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
9. Zinc	87		µg/L	50	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA

Mercury by CVAAS, Total Aliquot ID: **A09128-003A** Matrix: **Ground Water**
Method: **EPA 7470A** Description: **SB2 (6-11)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Mercury	U	L+	µg/L	0.20	1.0	06/20/22	PM22F20A	06/20/22	M722F20A	JLH

Polychlorinated Biphenyls (PCBs) Aliquot ID: **A09128-003** Matrix: **Ground Water**
Method: **EPA 3510C/EPA 8082A** Description: **SB2 (6-11)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Aroclor-1016	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:03	SO22F20A	TKT
2. Aroclor-1221	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:03	SO22F20A	TKT
3. Aroclor-1232	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:03	SO22F20A	TKT
4. Aroclor-1242	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:03	SO22F20A	TKT
5. Aroclor-1248	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:03	SO22F20A	TKT
6. Aroclor-1254	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:03	SO22F20A	TKT
7. Aroclor-1260	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:03	SO22F20A	TKT
‡ 8. Aroclor-1262	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:03	SO22F20A	TKT
‡ 9. Aroclor-1268	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:03	SO22F20A	TKT

Volatile Organic Compounds (VOCs) by GC/MS Aliquot ID: **A09128-003B** Matrix: **Ground Water**
Method: **EPA 5030C/EPA 8260D** Description: **SB2 (6-11)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U		µg/L	50	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM

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8660 S. Mackinaw Trail	Cadillac, MI 49601	T: (231) 775-8368	F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB2 (6-11)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 10:15

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS						Aliquot ID: A09128-003B		Matrix: Ground Water			
Method: EPA 5030C/EPA 8260D						Description: SB2 (6-11)					
Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis			Init.
						P. Date	P. Batch	A. Date	A. Batch		
‡ 2. Acrylonitrile	U		µg/L	2.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
3. Benzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
4. Bromobenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
5. Bromochloromethane	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
6. Bromodichloromethane	U	V+ L+	µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
7. Bromoform	U	V+ L+	µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
8. Bromomethane	U		µg/L	5.0	1.0	06/23/22	VI22F23B	06/23/22 23:10	VI22F23B	BRC	
9. 2-Butanone	U	V+	µg/L	25	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
10. n-Butylbenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
11. sec-Butylbenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
12. tert-Butylbenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
13. Carbon Disulfide	U	V+ L+	µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
14. Carbon Tetrachloride	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
15. Chlorobenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
16. Chloroethane	U		µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
17. Chloroform	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
18. Chloromethane	U		µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
19. 2-Chlorotoluene	U		µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U	V+ L+	µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
21. Dibromochloromethane	U	V+ L+	µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
22. Dibromomethane	U		µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
23. 1,2-Dichlorobenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
24. 1,3-Dichlorobenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
25. 1,4-Dichlorobenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
26. Dichlorodifluoromethane	U		µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
27. 1,1-Dichloroethane	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
28. 1,2-Dichloroethane	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
29. 1,1-Dichloroethene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
30. cis-1,2-Dichloroethene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
31. trans-1,2-Dichloroethene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
32. 1,2-Dichloropropane	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
33. cis-1,3-Dichloropropene	U	V+	µg/L	0.50	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	
34. trans-1,3-Dichloropropene	U	V+ L+	µg/L	0.50	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM	

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Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-003

Order: A09128
 Date: 06/30/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB2 (6-11)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 10:15

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS Aliquot ID: **A09128-003B** Matrix: **Ground Water**
 Method: **EPA 5030C/EPA 8260D** Description: **SB2 (6-11)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
35. Ethylbenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
36. Ethylene Dibromide	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
37. 2-Hexanone	U	V+	µg/L	50	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
38. Isopropylbenzene	U		µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
39. 4-Methyl-2-pentanone	U	V+ L+	µg/L	50	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
40. Methylene Chloride	U		µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
‡ 41. 2-Methylnaphthalene	U		µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
42. MTBE	U		µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
43. Naphthalene	U		µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
44. n-Propylbenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
45. Styrene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
46. 1,1,1,2-Tetrachloroethane	U	V+ L+	µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
47. 1,1,2,2-Tetrachloroethane	U	V+	µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
48. Tetrachloroethene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
49. Toluene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
50. 1,2,4-Trichlorobenzene	U		µg/L	5.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
51. 1,1,1-Trichloroethane	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
‡ 52. 1,1,2-Trichloroethane	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
53. Trichloroethene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
54. Trichlorofluoromethane	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
55. 1,2,3-Trichloropropane	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
‡ 56. 1,2,3-Trimethylbenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
57. 1,2,4-Trimethylbenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
58. 1,3,5-Trimethylbenzene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
59. Vinyl Chloride	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
60. m&p-Xylene	U		µg/L	2.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
61. o-Xylene	U		µg/L	1.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM
‡ 62. Xylenes	U		µg/L	3.0	1.0	06/21/22	VM22F21B	06/21/22 17:00	VM22F21B	KCM

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-003** Matrix: **Ground Water**
 Method: **EPA 3535A/EPA 8270E** Description: **SB2 (6-11)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
2. Acenaphthylene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD

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8660 S. Mackinaw Trail	Cadillac, MI 49601	T: (231) 775-8368	F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB2 (6-11)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 10:15

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-003** Matrix: **Ground Water**
Method: **EPA 3535A/EPA 8270E** Description: **SB2 (6-11)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
3. Anthracene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
4. Benzo(a)anthracene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
5. Benzo(a)pyrene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
6. Benzo(b)fluoranthene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
7. Benzo(ghi)perylene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
8. Benzo(k)fluoranthene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
9. Chrysene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
10. Dibenzo(a,h)anthracene (SIM)	U		µg/L	2.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
11. Fluoranthene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
12. Fluorene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/L	2.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
14. 2-Methylnaphthalene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
15. Naphthalene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
16. Phenanthrene (SIM)	U		µg/L	2.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD
17. Pyrene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:09	S622F17D	SJD

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Cadillac, MI 49601

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F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB4 (3-4)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:00

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C Aliquot ID: **A09128-004** Matrix: **Soil/Solid**
Method: ASTM D2216-10 Description: **SB4 (3-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	12		%	1	1.0	06/15/22	MC220615	06/16/22	MC220615	LJK

Michigan 10 Elements by ICP/MS Aliquot ID: **A09128-004** Matrix: **Soil/Solid**
Method: EPA 0200.2/EPA 6020A Description: **SB4 (3-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Arsenic	9600		µg/kg	100	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
2. Barium	73000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
3. Cadmium	400		µg/kg	50	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
4. Chromium	14000		µg/kg	500	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
5. Copper	26000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
6. Lead	78000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
7. Selenium	210		µg/kg	200	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
8. Silver	U		µg/kg	100	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
9. Zinc	110000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA

Mercury by CVAAS Aliquot ID: **A09128-004** Matrix: **Soil/Solid**
Method: EPA 7471B Description: **SB4 (3-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Mercury	59		µg/kg	50	10	06/16/22	PM22F16B	06/16/22	M722F16A	JLH

Polychlorinated Biphenyls (PCBs) Aliquot ID: **A09128-004** Matrix: **Soil/Solid**
Method: EPA 3546/EPA 8082A Description: **SB4 (3-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Aroclor-1016	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:49	SO22F17A	TKT
2. Aroclor-1221	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:49	SO22F17A	TKT
3. Aroclor-1232	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:49	SO22F17A	TKT
4. Aroclor-1242	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:49	SO22F17A	TKT
5. Aroclor-1248	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:49	SO22F17A	TKT
6. Aroclor-1254	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:49	SO22F17A	TKT
7. Aroclor-1260	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:49	SO22F17A	TKT
‡ 8. Aroclor-1262	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:49	SO22F17A	TKT
‡ 9. Aroclor-1268	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 18:49	SO22F17A	TKT

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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB4 (3-4)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:00

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 Aliquot ID: **A09128-004A** Matrix: **Soil/Solid**
Method: EPA 5035A/EPA 8260D Description: **SB4 (3-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
3. Benzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
4. Bromobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
5. Bromochloromethane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
6. Bromodichloromethane	U	V+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
7. Bromoform	U	V+ L+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
8. Bromomethane	U		µg/kg	200	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
9. 2-Butanone	U		µg/kg	750	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
10. n-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
13. Carbon Disulfide	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
15. Chlorobenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
16. Chloroethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
17. Chloroform	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
18. Chloromethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U	V+ L+	µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
21. Dibromochloromethane	U	V+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
22. Dibromomethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
35. Ethylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
36. Ethylene Dibromide	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC

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F: (517) 699-0388
F: (810) 220-3311
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Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB4 (3-4)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:00

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035
Method: EPA 5035A/EPA 8260D

Aliquot ID: A09128-004A **Matrix: Soil/Solid**
Description: SB4 (3-4)

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
37. 2-Hexanone	U	V+ L+	µg/kg	2500	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
38. Isopropylbenzene	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
39. 4-Methyl-2-pentanone	U	V+ L+	µg/kg	2500	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
40. Methylene Chloride	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
42. MTBE	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
43. Naphthalene	U		µg/kg	330	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
44. n-Propylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
45. Styrene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
46. 1,1,1,2-Tetrachloroethane	U	V+ L+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
48. Tetrachloroethene	150		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
49. Toluene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
50. 1,2,4-Trichlorobenzene	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
53. Trichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
59. Vinyl Chloride	U		µg/kg	40	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
60. m&p-Xylene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
61. o-Xylene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC
‡ 62. Xylenes	U		µg/kg	150	1.0	06/17/22	VJ22F17A	06/17/22 16:51	VJ22F17A	BRC

Polynuclear Aromatic Hydrocarbons (PNAs)
Method: EPA 3546/EPA 8270E

Aliquot ID: A09128-004 **Matrix: Soil/Solid**
Description: SB4 (3-4)

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
2. Acenaphthylene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
3. Anthracene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD

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F: (517) 699-0388
F: (810) 220-3311
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Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB4 (3-4)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:00

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-004** Matrix: **Soil/Solid**
Method: **EPA 3546/EPA 8270E** Description: **SB4 (3-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
4. Benzo(a)anthracene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
5. Benzo(a)pyrene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
6. Benzo(b)fluoranthene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
7. Benzo(ghi)perylene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
8. Benzo(k)fluoranthene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
9. Chrysene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
11. Fluoranthene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
12. Fluorene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
15. Naphthalene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
16. Phenanthrene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD
17. Pyrene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 14:51	SN22F20A	SJD

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F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB5 (3-5)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:20

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C Aliquot ID: **A09128-005** Matrix: **Soil/Solid**
Method: ASTM D2216-10 Description: **SB5 (3-5)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	13		%	1	1.0	06/15/22	MC220615	06/16/22	MC220615	LJK

Michigan 10 Elements by ICP/MS Aliquot ID: **A09128-005** Matrix: **Soil/Solid**
Method: EPA 0200.2/EPA 6020A Description: **SB5 (3-5)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Arsenic	8900		µg/kg	100	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
2. Barium	58000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
3. Cadmium	330		µg/kg	50	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
4. Chromium	16000		µg/kg	500	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
5. Copper	17000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
6. Lead	34000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
7. Selenium	350		µg/kg	200	10	06/20/22	PT22F17A	06/20/22	T422F20A	CJA
8. Silver	U		µg/kg	100	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
9. Zinc	66000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA

Mercury by CVAAS Aliquot ID: **A09128-005** Matrix: **Soil/Solid**
Method: EPA 7471B Description: **SB5 (3-5)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Mercury	U		µg/kg	50	10	06/16/22	PM22F16B	06/16/22	M722F16A	JLH

Polychlorinated Biphenyls (PCBs) Aliquot ID: **A09128-005** Matrix: **Soil/Solid**
Method: EPA 3546/EPA 8082A Description: **SB5 (3-5)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Aroclor-1016	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:01	SO22F17A	TKT
2. Aroclor-1221	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:01	SO22F17A	TKT
3. Aroclor-1232	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:01	SO22F17A	TKT
4. Aroclor-1242	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:01	SO22F17A	TKT
5. Aroclor-1248	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:01	SO22F17A	TKT
6. Aroclor-1254	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:01	SO22F17A	TKT
7. Aroclor-1260	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:01	SO22F17A	TKT
‡ 8. Aroclor-1262	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:01	SO22F17A	TKT
‡ 9. Aroclor-1268	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:01	SO22F17A	TKT

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T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB5 (3-5)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:20

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 Aliquot ID: **A09128-005A** Matrix: **Soil/Solid**
Method: EPA 5035A/EPA 8260D Description: **SB5 (3-5)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
3. Benzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
4. Bromobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
5. Bromochloromethane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
6. Bromodichloromethane	U	V+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
7. Bromoform	U	V+ L+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
8. Bromomethane	U		µg/kg	200	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
9. 2-Butanone	U		µg/kg	750	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
10. n-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
13. Carbon Disulfide	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
15. Chlorobenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
16. Chloroethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
17. Chloroform	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
18. Chloromethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U	V+ L+	µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
21. Dibromochloromethane	U	V+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
22. Dibromomethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
35. Ethylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
36. Ethylene Dibromide	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC

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F: (517) 699-0388
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Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB5 (3-5)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:20

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035
Method: EPA 5035A/EPA 8260D

Aliquot ID: A09128-005A **Matrix: Soil/Solid**
Description: SB5 (3-5)

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
37. 2-Hexanone	U	V+ L+	µg/kg	2500	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
38. Isopropylbenzene	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
39. 4-Methyl-2-pentanone	U	V+ L+	µg/kg	2500	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
40. Methylene Chloride	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
42. MTBE	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
43. Naphthalene	U		µg/kg	330	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
44. n-Propylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
45. Styrene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
46. 1,1,1,2-Tetrachloroethane	U	V+ L+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
48. Tetrachloroethene	78		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
49. Toluene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
50. 1,2,4-Trichlorobenzene	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
53. Trichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
59. Vinyl Chloride	U		µg/kg	40	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
60. m&p-Xylene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
61. o-Xylene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC
‡ 62. Xylenes	U		µg/kg	150	1.0	06/17/22	VJ22F17A	06/17/22 17:15	VJ22F17A	BRC

Polynuclear Aromatic Hydrocarbons (PNAs)
Method: EPA 3546/EPA 8270E

Aliquot ID: A09128-005 **Matrix: Soil/Solid**
Description: SB5 (3-5)

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
2. Acenaphthylene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
3. Anthracene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD

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F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB5 (3-5)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:20

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-005** Matrix: **Soil/Solid**
Method: **EPA 3546/EPA 8270E** Description: **SB5 (3-5)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
4. Benzo(a)anthracene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
5. Benzo(a)pyrene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
6. Benzo(b)fluoranthene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
7. Benzo(ghi)perylene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
8. Benzo(k)fluoranthene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
9. Chrysene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
11. Fluoranthene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
12. Fluorene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
15. Naphthalene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
16. Phenanthrene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD
17. Pyrene (SIM)	U		µg/kg	330	1.0	06/17/22	PS22F17B	06/20/22 13:31	SN22F20A	SJD

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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB3 (5-7)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:45

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C Aliquot ID: **A09128-006** Matrix: **Soil/Solid**
Method: ASTM D2216-10 Description: **SB3 (5-7)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	17		%	1	1.0	06/15/22	MC220615	06/16/22	MC220615	LJK

Michigan 10 Elements by ICP/MS Aliquot ID: **A09128-006** Matrix: **Soil/Solid**
Method: EPA 0200.2/EPA 6020A Description: **SB3 (5-7)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Arsenic	7600		µg/kg	100	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
2. Barium	81000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
3. Cadmium	220		µg/kg	50	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
4. Chromium	19000		µg/kg	500	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
5. Copper	32000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
6. Lead	90000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
7. Selenium	300		µg/kg	200	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
8. Silver	U		µg/kg	100	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
9. Zinc	85000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA

Mercury by CVAAS Aliquot ID: **A09128-006** Matrix: **Soil/Solid**
Method: EPA 7471B Description: **SB3 (5-7)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Mercury	U		µg/kg	50	10	06/16/22	PM22F16B	06/16/22	M722F16A	JLH

Polychlorinated Biphenyls (PCBs) Aliquot ID: **A09128-006** Matrix: **Soil/Solid**
Method: EPA 3546/EPA 8082A Description: **SB3 (5-7)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Aroclor-1016	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:13	SO22F17A	TKT
2. Aroclor-1221	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:13	SO22F17A	TKT
3. Aroclor-1232	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:13	SO22F17A	TKT
4. Aroclor-1242	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:13	SO22F17A	TKT
5. Aroclor-1248	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:13	SO22F17A	TKT
6. Aroclor-1254	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:13	SO22F17A	TKT
7. Aroclor-1260	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:13	SO22F17A	TKT
‡ 8. Aroclor-1262	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:13	SO22F17A	TKT
‡ 9. Aroclor-1268	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:13	SO22F17A	TKT

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T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB3 (5-7)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:45

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 Aliquot ID: **A09128-006A** Matrix: **Soil/Solid**
Method: EPA 5035A/EPA 8260D Description: **SB3 (5-7)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
3. Benzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
4. Bromobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
5. Bromochloromethane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
6. Bromodichloromethane	U	V+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
7. Bromoform	U	V+ L+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
8. Bromomethane	U		µg/kg	200	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
9. 2-Butanone	U		µg/kg	750	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
10. n-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
13. Carbon Disulfide	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
15. Chlorobenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
16. Chloroethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
17. Chloroform	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
18. Chloromethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U	V+ L+	µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
21. Dibromochloromethane	U	V+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
22. Dibromomethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
35. Ethylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
36. Ethylene Dibromide	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC

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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB3 (5-7)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:45

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035 Aliquot ID: **A09128-006A** Matrix: **Soil/Solid**
Method: **EPA 5035A/EPA 8260D** Description: **SB3 (5-7)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
37. 2-Hexanone	U	V+ L+	µg/kg	2500	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
38. Isopropylbenzene	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
39. 4-Methyl-2-pentanone	U	V+ L+	µg/kg	2500	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
40. Methylene Chloride	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
42. MTBE	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
43. Naphthalene	U		µg/kg	330	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
44. n-Propylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
45. Styrene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
46. 1,1,1,2-Tetrachloroethane	U	V+ L+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
48. Tetrachloroethene	460		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
49. Toluene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
50. 1,2,4-Trichlorobenzene	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
53. Trichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
59. Vinyl Chloride	U		µg/kg	40	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
60. m&p-Xylene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
61. o-Xylene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC
‡ 62. Xylenes	U		µg/kg	150	1.0	06/17/22	VJ22F17A	06/17/22 17:40	VJ22F17A	BRC

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-006** Matrix: **Soil/Solid**
Method: **EPA 3546/EPA 8270E** Description: **SB3 (5-7)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 15:18	SN22F20A	SJD
2. Acenaphthylene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 15:18	SN22F20A	SJD
3. Anthracene (SIM)	500		µg/kg	330	20	06/17/22	PS22F17B	06/20/22 15:18	SN22F20A	SJD

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F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB3 (5-7)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:45

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-006** Matrix: **Soil/Solid**
Method: **EPA 3546/EPA 8270E** Description: **SB3 (5-7)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis			
						P. Date	P. Batch	A. Date	A. Batch	Init.	
4. Benzo(a)anthracene (SIM)	1100		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
5. Benzo(a)pyrene (SIM)	950		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
6. Benzo(b)fluoranthene (SIM)	1400		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
7. Benzo(ghi)perylene (SIM)	430		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
8. Benzo(k)fluoranthene (SIM)	580		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
9. Chrysene (SIM)	1100		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
11. Fluoranthene (SIM)	2500		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
12. Fluorene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
13. Indeno(1,2,3-cd)pyrene (SIM)	540		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
15. Naphthalene (SIM)	U		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
16. Phenanthrene (SIM)	2500		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD
17. Pyrene (SIM)	2300		µg/kg	330	20	06/17/22	PS22F17B	06/20/22	15:18	SN22F20A	SJD

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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584



Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-007

Order: A09128
 Date: 06/30/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB3 (5-10)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 12:00

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Michigan 10 Elements by ICP/MS, Total Recoverable Aliquot ID: **A09128-007A** Matrix: **Ground Water**
 Method: **EPA 3005A (Total Recoverable)/EPA 6020A** Description: **SB3 (5-10)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Arsenic	15		µg/L	5.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
2. Barium	350		µg/L	100	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
3. Cadmium	2.6		µg/L	1.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
4. Chromium	25		µg/L	10	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
5. Copper	94		µg/L	4.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
6. Lead	3700		µg/L	10	50	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
7. Selenium	8.2		µg/L	5.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
8. Silver	U		µg/L	0.20	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
9. Zinc	950	*	µg/L	50	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA

Mercury by CVAAS, Total Aliquot ID: **A09128-007A** Matrix: **Ground Water**
 Method: **EPA 7470A** Description: **SB3 (5-10)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Mercury	U	L+ F+	µg/L	0.20	1.0	06/20/22	PM22F20A	06/20/22	M722F20A	JLH

Polychlorinated Biphenyls (PCBs) Aliquot ID: **A09128-007** Matrix: **Ground Water**
 Method: **EPA 3510C/EPA 8082A** Description: **SB3 (5-10)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Aroclor-1016	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:15	SO22F20A	TKT
2. Aroclor-1221	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:15	SO22F20A	TKT
3. Aroclor-1232	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:15	SO22F20A	TKT
4. Aroclor-1242	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:15	SO22F20A	TKT
5. Aroclor-1248	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:15	SO22F20A	TKT
6. Aroclor-1254	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:15	SO22F20A	TKT
7. Aroclor-1260	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:15	SO22F20A	TKT
‡ 8. Aroclor-1262	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:15	SO22F20A	TKT
‡ 9. Aroclor-1268	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:15	SO22F20A	TKT

Volatile Organic Compounds (VOCs) by GC/MS Aliquot ID: **A09128-007B** Matrix: **Ground Water**
 Method: **EPA 5030C/EPA 8260D** Description: **SB3 (5-10)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.

1914 Holloway Drive	Holt, MI 48842	T: (517) 699-0345	F: (517) 699-0388
11766 E. Grand River	Brighton, MI 48116	T: (810) 220-3300	F: (810) 220-3311
8660 S. Mackinaw Trail	Cadillac, MI 49601	T: (231) 775-8368	F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB3 (5-10)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 12:00

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS
Method: EPA 5030C/EPA 8260D

Aliquot ID: A09128-007B **Matrix: Ground Water**
Description: SB3 (5-10)

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U	L-F-	µg/L	50	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
‡ 2. Acrylonitrile	U		µg/L	2.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
3. Benzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
4. Bromobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
5. Bromochloromethane	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
6. Bromodichloromethane	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
7. Bromoform	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
8. Bromomethane	U		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
9. 2-Butanone	U		µg/L	25	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
10. n-Butylbenzene	U	V+	µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
11. sec-Butylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
12. tert-Butylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
13. Carbon Disulfide	U		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
14. Carbon Tetrachloride	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
15. Chlorobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
16. Chloroethane	U		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
17. Chloroform	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
18. Chloromethane	U		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
19. 2-Chlorotoluene	U		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
21. Dibromochloromethane	U		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
22. Dibromomethane	U		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
23. 1,2-Dichlorobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
24. 1,3-Dichlorobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
25. 1,4-Dichlorobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
26. Dichlorodifluoromethane	U	V+	µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
27. 1,1-Dichloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
28. 1,2-Dichloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
29. 1,1-Dichloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
30. cis-1,2-Dichloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
31. trans-1,2-Dichloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
32. 1,2-Dichloropropane	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
33. cis-1,3-Dichloropropene	U		µg/L	0.50	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
34. trans-1,3-Dichloropropene	U		µg/L	0.50	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
35. Ethylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
36. Ethylene Dibromide	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC

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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584



Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-007

Order: A09128
 Date: 06/30/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB3 (5-10)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 12:00

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS
Method: EPA 5030C/EPA 8260D

Aliquot ID: A09128-007B **Matrix: Ground Water**
Description: SB3 (5-10)

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
37. 2-Hexanone	U		µg/L	50	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
38. Isopropylbenzene	U		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
39. 4-Methyl-2-pentanone	U		µg/L	50	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
40. Methylene Chloride	U		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
‡ 41. 2-Methylnaphthalene	U	F-	µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
42. MTBE	U		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
43. Naphthalene	U		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
44. n-Propylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
45. Styrene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
46. 1,1,1,2-Tetrachloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
47. 1,1,2,2-Tetrachloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
48. Tetrachloroethene	11		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
49. Toluene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
50. 1,2,4-Trichlorobenzene	U		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
51. 1,1,1-Trichloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
‡ 52. 1,1,2-Trichloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
53. Trichloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
54. Trichlorofluoromethane	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
55. 1,2,3-Trichloropropane	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
57. 1,2,4-Trimethylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
58. 1,3,5-Trimethylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
59. Vinyl Chloride	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
60. m&p-Xylene	U		µg/L	2.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
61. o-Xylene	U		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC
‡ 62. Xylenes	U		µg/L	3.0	1.0	06/17/22	VI22F17B	06/18/22 07:58	VI22F17B	BRC

Polynuclear Aromatic Hydrocarbons (PNAs)
Method: EPA 3535A/EPA 8270E

Aliquot ID: A09128-007 **Matrix: Ground Water**
Description: SB3 (5-10)

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
2. Acenaphthylene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
3. Anthracene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
4. Benzo(a)anthracene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
5. Benzo(a)pyrene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD

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F: (517) 699-0388
 F: (810) 220-3311
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Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-007

Order: A09128
 Date: 06/30/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB3 (5-10)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 12:00

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-007** Matrix: **Ground Water**
 Method: **EPA 3535A/EPA 8270E** Description: **SB3 (5-10)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
6. Benzo(b)fluoranthene (SIM)	U	F+	µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
7. Benzo(ghi)perylene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
8. Benzo(k)fluoranthene (SIM)	U	F+	µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
9. Chrysene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
10. Dibenzo(a,h)anthracene (SIM)	U		µg/L	2.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
11. Fluoranthene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
12. Fluorene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/L	2.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
14. 2-Methylnaphthalene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
15. Naphthalene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
16. Phenanthrene (SIM)	U		µg/L	2.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD
17. Pyrene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 02:36	S622F17D	SJD

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 T: (810) 220-3300
 T: (231) 775-8368

F: (517) 699-0388
 F: (810) 220-3311
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Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: MS (SB3 (5-10))	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 12:00

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Michigan 10 Elements by ICP/MS, Total Recoverable Aliquot ID: **A09128-008A** Matrix: **Ground Water**
Method: **EPA 3005A (Total Recoverable)/EPA 6020A** Description: **MS (SB3 (5-10))**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Arsenic	120		µg/L	5.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
2. Barium	910		µg/L	100	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
3. Cadmium	100		µg/L	1.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
4. Chromium	230		µg/L	10	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
5. Copper	300		µg/L	4.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
6. Lead	4200		µg/L	10	50	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
7. Selenium	100		µg/L	5.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
8. Silver	94		µg/L	0.20	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
9. Zinc	1600		µg/L	50	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA

Mercury by CVAAS, Total Aliquot ID: **A09128-008A** Matrix: **Ground Water**
Method: **EPA 7470A** Description: **MS (SB3 (5-10))**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Mercury	0.35	L+	µg/L	0.20	1.0	06/20/22	PM22F20A	06/20/22	M722F20A	JLH

Polychlorinated Biphenyls (PCBs) Aliquot ID: **A09128-008** Matrix: **Ground Water**
Method: **EPA 3510C/EPA 8082A** Description: **MS (SB3 (5-10))**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Aroclor-1016	2.1		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:40	SO22F20A	TKT
2. Aroclor-1221	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:40	SO22F20A	TKT
3. Aroclor-1232	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:40	SO22F20A	TKT
4. Aroclor-1242	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:40	SO22F20A	TKT
5. Aroclor-1248	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:40	SO22F20A	TKT
6. Aroclor-1254	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:40	SO22F20A	TKT
7. Aroclor-1260	2.1		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:40	SO22F20A	TKT
‡ 8. Aroclor-1262	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:40	SO22F20A	TKT
‡ 9. Aroclor-1268	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:40	SO22F20A	TKT

Volatile Organic Compounds (VOCs) by GC/MS Aliquot ID: **A09128-008B** Matrix: **Ground Water**
Method: **EPA 5030C/EPA 8260D** Description: **MS (SB3 (5-10))**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U	L-	µg/L	50	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC

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8660 S. Mackinaw Trail	Cadillac, MI 49601	T: (231) 775-8368	F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: MS (SB3 (5-10))	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 12:00

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS Aliquot ID: **A09128-008B** Matrix: **Ground Water**
Method: **EPA 5030C/EPA 8260D** Description: **MS (SB3 (5-10))**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 2. Acrylonitrile	43		µg/L	2.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
3. Benzene	52		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
4. Bromobenzene	45		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
5. Bromochloromethane	45		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
6. Bromodichloromethane	54		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
7. Bromoform	51		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
8. Bromomethane	51		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
9. 2-Butanone	38		µg/L	25	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
10. n-Butylbenzene	51	V+	µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
11. sec-Butylbenzene	52		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
12. tert-Butylbenzene	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
13. Carbon Disulfide	47		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
14. Carbon Tetrachloride	52		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
15. Chlorobenzene	52		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
16. Chloroethane	54		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
17. Chloroform	51		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
18. Chloromethane	49		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
19. 2-Chlorotoluene	54		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	48		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
21. Dibromochloromethane	50		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
22. Dibromomethane	45		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
23. 1,2-Dichlorobenzene	48		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
24. 1,3-Dichlorobenzene	47		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
25. 1,4-Dichlorobenzene	45		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
26. Dichlorodifluoromethane	58	V+	µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
27. 1,1-Dichloroethane	49		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
28. 1,2-Dichloroethane	43		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
29. 1,1-Dichloroethene	47		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
30. cis-1,2-Dichloroethene	49		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
31. trans-1,2-Dichloroethene	47		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
32. 1,2-Dichloropropane	54		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
33. cis-1,3-Dichloropropene	48		µg/L	0.50	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
34. trans-1,3-Dichloropropene	48		µg/L	0.50	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
35. Ethylbenzene	52		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
36. Ethylene Dibromide	47		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
37. 2-Hexanone	U		µg/L	50	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
38. Isopropylbenzene	53		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC

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Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: MS (SB3 (5-10))	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 12:00

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS
Method: EPA 5030C/EPA 8260D

Aliquot ID: A09128-008B **Matrix: Ground Water**
Description: MS (SB3 (5-10))

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
39. 4-Methyl-2-pentanone	54		µg/L	50	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
40. Methylene Chloride	44		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
‡ 41. 2-Methylnaphthalene	32		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
42. MTBE	50		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
43. Naphthalene	39		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
44. n-Propylbenzene	54		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
45. Styrene	43		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
46. 1,1,1,2-Tetrachloroethane	55		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
47. 1,1,2,2-Tetrachloroethane	59		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
48. Tetrachloroethene	63		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
49. Toluene	55		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
50. 1,2,4-Trichlorobenzene	37		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
51. 1,1,1-Trichloroethane	55		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
‡ 52. 1,1,2-Trichloroethane	51		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
53. Trichloroethene	47		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
54. Trichlorofluoromethane	52		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
55. 1,2,3-Trichloropropane	52		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
‡ 56. 1,2,3-Trimethylbenzene	51		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
57. 1,2,4-Trimethylbenzene	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
58. 1,3,5-Trimethylbenzene	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
59. Vinyl Chloride	54		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
60. m&p-Xylene	110		µg/L	2.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
61. o-Xylene	54		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC
‡ 62. Xylenes	160		µg/L	3.0	1.0	06/17/22	VI22F17B	06/18/22 08:24	VI22F17B	BRC

Polynuclear Aromatic Hydrocarbons (PNAs)
Method: EPA 3535A/EPA 8270E

Aliquot ID: A09128-008 **Matrix: Ground Water**
Description: MS (SB3 (5-10))

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acenaphthene (SIM)	220		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
2. Acenaphthylene (SIM)	230		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
3. Anthracene (SIM)	280		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
4. Benzo(a)anthracene (SIM)	290		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
5. Benzo(a)pyrene (SIM)	310		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
6. Benzo(b)fluoranthene (SIM)	350		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
7. Benzo(ghi)perylene (SIM)	300		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD

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Holt, MI 48842
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Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584



Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-008

Order: A09128
 Date: 06/30/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: MS (SB3 (5-10))	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 12:00

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-008** Matrix: **Ground Water**
 Method: **EPA 3535A/EPA 8270E** Description: **MS (SB3 (5-10))**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
8. Benzo(k)fluoranthene (SIM)	360		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
9. Chrysene (SIM)	290		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
10. Dibenzo(a,h)anthracene (SIM)	320		µg/L	2.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
11. Fluoranthene (SIM)	290		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
12. Fluorene (SIM)	300		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
13. Indeno(1,2,3-cd)pyrene (SIM)	360		µg/L	2.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
14. 2-Methylnaphthalene (SIM)	200		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
15. Naphthalene (SIM)	200		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
16. Phenanthrene (SIM)	280		µg/L	2.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD
17. Pyrene (SIM)	320		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 21:59	S622F17D	SJD

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Holt, MI 48842
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T: (517) 699-0345
 T: (810) 220-3300
 T: (231) 775-8368

F: (517) 699-0388
 F: (810) 220-3311
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Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: MSD (SB3 (5-10))	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 12:00

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Michigan 10 Elements by ICP/MS, Total Recoverable Aliquot ID: **A09128-009A** Matrix: **Ground Water**
Method: **EPA 3005A (Total Recoverable)/EPA 6020A** Description: **MSD (SB3 (5-10))**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Arsenic	120		µg/L	5.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
2. Barium	890		µg/L	100	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
3. Cadmium	110		µg/L	1.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
4. Chromium	230		µg/L	10	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
5. Copper	310		µg/L	4.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
6. Lead	3100		µg/L	10	50	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
7. Selenium	120		µg/L	5.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
8. Silver	100		µg/L	0.20	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
9. Zinc	1400		µg/L	50	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA

Mercury by CVAAS, Total Aliquot ID: **A09128-009A** Matrix: **Ground Water**
Method: **EPA 7470A** Description: **MSD (SB3 (5-10))**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Mercury	0.38	L+	µg/L	0.20	1.0	06/20/22	PM22F20A	06/20/22	M722F20A	JLH

Polychlorinated Biphenyls (PCBs) Aliquot ID: **A09128-009** Matrix: **Ground Water**
Method: **EPA 3510C/EPA 8082A** Description: **MSD (SB3 (5-10))**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Aroclor-1016	2.1		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:52	SO22F20A	TKT
2. Aroclor-1221	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:52	SO22F20A	TKT
3. Aroclor-1232	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:52	SO22F20A	TKT
4. Aroclor-1242	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:52	SO22F20A	TKT
5. Aroclor-1248	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:52	SO22F20A	TKT
6. Aroclor-1254	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:52	SO22F20A	TKT
7. Aroclor-1260	2.3		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:52	SO22F20A	TKT
‡ 8. Aroclor-1262	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:52	SO22F20A	TKT
‡ 9. Aroclor-1268	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 15:52	SO22F20A	TKT

Volatile Organic Compounds (VOCs) by GC/MS Aliquot ID: **A09128-009B** Matrix: **Ground Water**
Method: **EPA 5030C/EPA 8260D** Description: **MSD (SB3 (5-10))**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U	L-	µg/L	50	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC

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8660 S. Mackinaw Trail	Cadillac, MI 49601	T: (231) 775-8368	F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: MSD (SB3 (5-10))	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 12:00

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS
Method: EPA 5030C/EPA 8260D

Aliquot ID: A09128-009B Matrix: Ground Water
Description: MSD (SB3 (5-10))

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 2. Acrylonitrile	44		µg/L	2.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
3. Benzene	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
4. Bromobenzene	47		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
5. Bromochloromethane	47		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
6. Bromodichloromethane	55		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
7. Bromoform	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
8. Bromomethane	53		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
9. 2-Butanone	39		µg/L	25	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
10. n-Butylbenzene	50	V+	µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
11. sec-Butylbenzene	51		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
12. tert-Butylbenzene	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
13. Carbon Disulfide	48		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
14. Carbon Tetrachloride	52		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
15. Chlorobenzene	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
16. Chloroethane	55		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
17. Chloroform	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
18. Chloromethane	51		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
19. 2-Chlorotoluene	55		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	49		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
21. Dibromochloromethane	52		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
22. Dibromomethane	48		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
23. 1,2-Dichlorobenzene	49		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
24. 1,3-Dichlorobenzene	48		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
25. 1,4-Dichlorobenzene	46		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
26. Dichlorodifluoromethane	58	V+	µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
27. 1,1-Dichloroethane	54		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
28. 1,2-Dichloroethane	45		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
29. 1,1-Dichloroethene	47		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
30. cis-1,2-Dichloroethene	51		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
31. trans-1,2-Dichloroethene	48		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
32. 1,2-Dichloropropane	56		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
33. cis-1,3-Dichloropropene	50		µg/L	0.50	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
34. trans-1,3-Dichloropropene	50		µg/L	0.50	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
35. Ethylbenzene	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
36. Ethylene Dibromide	49		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
37. 2-Hexanone	U		µg/L	50	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
38. Isopropylbenzene	53		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC

1914 Holloway Drive
11766 E. Grand River
8660 S. Mackinaw Trail

Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: MSD (SB3 (5-10))	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 12:00

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS
Method: EPA 5030C/EPA 8260D

Aliquot ID: A09128-009B **Matrix: Ground Water**
Description: MSD (SB3 (5-10))

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
39. 4-Methyl-2-pentanone	55		µg/L	50	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
40. Methylene Chloride	47		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
‡ 41. 2-Methylnaphthalene	33		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
42. MTBE	52		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
43. Naphthalene	40		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
44. n-Propylbenzene	54		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
45. Styrene	45		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
46. 1,1,1,2-Tetrachloroethane	57		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
47. 1,1,2,2-Tetrachloroethane	60		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
48. Tetrachloroethene	64		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
49. Toluene	56		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
50. 1,2,4-Trichlorobenzene	38		µg/L	5.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
51. 1,1,1-Trichloroethane	56		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
‡ 52. 1,1,2-Trichloroethane	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
53. Trichloroethene	47		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
54. Trichlorofluoromethane	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
55. 1,2,3-Trichloropropane	52		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
‡ 56. 1,2,3-Trimethylbenzene	52		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
57. 1,2,4-Trimethylbenzene	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
58. 1,3,5-Trimethylbenzene	53		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
59. Vinyl Chloride	54		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
60. m&p-Xylene	110		µg/L	2.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
61. o-Xylene	55		µg/L	1.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC
‡ 62. Xylenes	160		µg/L	3.0	1.0	06/17/22	VI22F17B	06/18/22 08:50	VI22F17B	BRC

Polynuclear Aromatic Hydrocarbons (PNAs)
Method: EPA 3535A/EPA 8270E

Aliquot ID: A09128-009 **Matrix: Ground Water**
Description: MSD (SB3 (5-10))

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acenaphthene (SIM)	260		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
2. Acenaphthylene (SIM)	280		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
3. Anthracene (SIM)	330		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
4. Benzo(a)anthracene (SIM)	350		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
5. Benzo(a)pyrene (SIM)	380		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
6. Benzo(b)fluoranthene (SIM)	430		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
7. Benzo(ghi)perylene (SIM)	360		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD

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Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: MSD (SB3 (5-10))	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: 12:00

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-009** Matrix: **Ground Water**
Method: **EPA 3535A/EPA 8270E** Description: **MSD (SB3 (5-10))**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
8. Benzo(k)fluoranthene (SIM)	430		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
9. Chrysene (SIM)	350		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
10. Dibenzo(a,h)anthracene (SIM)	390		µg/L	2.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
11. Fluoranthene (SIM)	360		µg/L	1.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
12. Fluorene (SIM)	360		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
13. Indeno(1,2,3-cd)pyrene (SIM)	420		µg/L	2.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
14. 2-Methylnaphthalene (SIM)	220		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
15. Naphthalene (SIM)	220		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
16. Phenanthrene (SIM)	330		µg/L	2.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD
17. Pyrene (SIM)	380		µg/L	5.0	1.0	06/17/22	PS22F17E	06/17/22 22:27	S622F17D	SJD

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: DUP Soil	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C Aliquot ID: **A09128-010** Matrix: **Soil/Solid**
Method: ASTM D2216-10 Description: **DUP Soil**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	25		%	1	1.0	06/15/22	MC220615	06/16/22	MC220615	LJK

Michigan 10 Elements by ICP/MS Aliquot ID: **A09128-010** Matrix: **Soil/Solid**
Method: EPA 0200.2/EPA 6020A Description: **DUP Soil**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Arsenic	4400		µg/kg	100	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
2. Barium	83000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
3. Cadmium	330		µg/kg	50	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
4. Chromium	12000		µg/kg	500	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
5. Copper	11000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
6. Lead	200000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
7. Selenium	520		µg/kg	200	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
8. Silver	U		µg/kg	100	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA
9. Zinc	160000		µg/kg	1000	20	06/17/22	PT22F17A	06/20/22	T422F20A	CJA

Mercury by CVAAS Aliquot ID: **A09128-010** Matrix: **Soil/Solid**
Method: EPA 7471B Description: **DUP Soil**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Mercury	73		µg/kg	50	10	06/16/22	PM22F16B	06/16/22	M722F16A	JLH

Polychlorinated Biphenyls (PCBs) Aliquot ID: **A09128-010** Matrix: **Soil/Solid**
Method: EPA 3546/EPA 8082A Description: **DUP Soil**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Aroclor-1016	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:24	SO22F17A	TKT
2. Aroclor-1221	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:24	SO22F17A	TKT
3. Aroclor-1232	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:24	SO22F17A	TKT
4. Aroclor-1242	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:24	SO22F17A	TKT
5. Aroclor-1248	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:24	SO22F17A	TKT
6. Aroclor-1254	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:24	SO22F17A	TKT
7. Aroclor-1260	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:24	SO22F17A	TKT
‡ 8. Aroclor-1262	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:24	SO22F17A	TKT
‡ 9. Aroclor-1268	U		µg/kg	100	5.0	06/17/22	PS22F17B	06/17/22 19:24	SO22F17A	TKT

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Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification:	Soil and Materials Engineers, Inc. - Plymouth	Sample Description:	DUP Soil	Chain of Custody:	203128
Client Project Name:	086124.00.03B.006	Sample No.:		Collect Date:	06/13/22
Client Project No.:	086124.00.03B.006	Sample Matrix:	Soil/Solid	Collect Time:	NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035
Method: EPA 5035A/EPA 8260D

Aliquot ID: A09128-010A **Matrix: Soil/Solid**
Description: DUP Soil

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U		µg/kg	1000	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
‡ 2. Acrylonitrile	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
3. Benzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
4. Bromobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
5. Bromochloromethane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
6. Bromodichloromethane	U	V+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
7. Bromoform	U	V+ L+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
8. Bromomethane	U		µg/kg	200	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
9. 2-Butanone	U		µg/kg	750	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
10. n-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
11. sec-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
12. tert-Butylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
13. Carbon Disulfide	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
14. Carbon Tetrachloride	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
15. Chlorobenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
16. Chloroethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
17. Chloroform	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
18. Chloromethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
19. 2-Chlorotoluene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U	V+ L+	µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
21. Dibromochloromethane	U	V+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
22. Dibromomethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
23. 1,2-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
24. 1,3-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
25. 1,4-Dichlorobenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
26. Dichlorodifluoromethane	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
27. 1,1-Dichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
28. 1,2-Dichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
29. 1,1-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
30. cis-1,2-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
31. trans-1,2-Dichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
32. 1,2-Dichloropropane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
33. cis-1,3-Dichloropropene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
34. trans-1,3-Dichloropropene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
35. Ethylbenzene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
36. Ethylene Dibromide	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC

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8660 S. Mackinaw Trail

Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: DUP Soil	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS, 5035
Method: EPA 5035A/EPA 8260D

Aliquot ID: A09128-010A **Matrix: Soil/Solid**
Description: DUP Soil

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
37. 2-Hexanone	U	V+ L+	µg/kg	2500	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
38. Isopropylbenzene	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
39. 4-Methyl-2-pentanone	U	V+ L+	µg/kg	2500	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
40. Methylene Chloride	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
‡ 41. 2-Methylnaphthalene	U		µg/kg	330	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
42. MTBE	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
43. Naphthalene	U		µg/kg	330	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
44. n-Propylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
45. Styrene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
46. 1,1,1,2-Tetrachloroethane	U	V+ L+	µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
47. 1,1,2,2-Tetrachloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
48. Tetrachloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
49. Toluene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
50. 1,2,4-Trichlorobenzene	U		µg/kg	250	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
51. 1,1,1-Trichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
52. 1,1,2-Trichloroethane	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
53. Trichloroethene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
54. Trichlorofluoromethane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
55. 1,2,3-Trichloropropane	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
57. 1,2,4-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
58. 1,3,5-Trimethylbenzene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
59. Vinyl Chloride	U		µg/kg	41	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
60. m&p-Xylene	U		µg/kg	100	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
61. o-Xylene	U		µg/kg	50	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC
‡ 62. Xylenes	U		µg/kg	150	1.0	06/17/22	VJ22F17A	06/17/22 18:04	VJ22F17A	BRC

Polynuclear Aromatic Hydrocarbons (PNAs)
Method: EPA 3546/EPA 8270E

Aliquot ID: A09128-010 **Matrix: Soil/Solid**
Description: DUP Soil

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
2. Acenaphthylene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
3. Anthracene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD

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T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: DUP Soil	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: NA

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-010** Matrix: **Soil/Solid**
Method: **EPA 3546/EPA 8270E** Description: **DUP Soil**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
4. Benzo(a)anthracene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
5. Benzo(a)pyrene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
6. Benzo(b)fluoranthene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
7. Benzo(ghi)perylene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
8. Benzo(k)fluoranthene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
9. Chrysene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
10. Dibenzo(a,h)anthracene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
11. Fluoranthene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
12. Fluorene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
14. 2-Methylnaphthalene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
15. Naphthalene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
16. Phenanthrene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD
17. Pyrene (SIM)	U		µg/kg	330	10	06/17/22	PS22F17B	06/20/22 14:24	SN22F20A	SJD

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Holt, MI 48842
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Cadillac, MI 49601

T: (517) 699-0345
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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584



Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-011

Order: A09128
 Date: 06/30/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: DUP GW	Chain of Custody: 203130
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: NA

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Michigan 10 Elements by ICP/MS, Total Recoverable Aliquot ID: **A09128-011A** Matrix: **Ground Water**
 Method: **EPA 3005A (Total Recoverable)/EPA 6020A** Description: **DUP GW**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Arsenic	9.1		µg/L	5.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
2. Barium	220		µg/L	100	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
3. Cadmium	U		µg/L	1.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
4. Chromium	16		µg/L	10	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
5. Copper	40		µg/L	4.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
6. Lead	440		µg/L	3.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
7. Selenium	U		µg/L	5.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
8. Silver	U		µg/L	0.20	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
9. Zinc	280		µg/L	50	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA

Mercury by CVAAS, Total Aliquot ID: **A09128-011A** Matrix: **Ground Water**
 Method: **EPA 7470A** Description: **DUP GW**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Mercury	U	L+	µg/L	0.20	1.0	06/20/22	PM22F20A	06/20/22	M722F20A	JLH

Polychlorinated Biphenyls (PCBs) Aliquot ID: **A09128-011** Matrix: **Ground Water**
 Method: **EPA 3510C/EPA 8082A** Description: **DUP GW**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Aroclor-1016	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:27	SO22F20A	TKT
2. Aroclor-1221	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:27	SO22F20A	TKT
3. Aroclor-1232	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:27	SO22F20A	TKT
4. Aroclor-1242	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:27	SO22F20A	TKT
5. Aroclor-1248	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:27	SO22F20A	TKT
6. Aroclor-1254	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:27	SO22F20A	TKT
7. Aroclor-1260	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:27	SO22F20A	TKT
‡ 8. Aroclor-1262	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:27	SO22F20A	TKT
‡ 9. Aroclor-1268	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:27	SO22F20A	TKT

Volatile Organic Compounds (VOCs) by GC/MS Aliquot ID: **A09128-011B** Matrix: **Ground Water**
 Method: **EPA 5030C/EPA 8260D** Description: **DUP GW**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U	L-	µg/L	50	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	KCM

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8660 S. Mackinaw Trail	Cadillac, MI 49601	T: (231) 775-8368	F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: DUP GW	Chain of Custody: 203130
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: NA

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS Aliquot ID: **A09128-011B** Matrix: **Ground Water**
Method: EPA 5030C/EPA 8260D Description: **DUP GW**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 2. Acrylonitrile	U		µg/L	2.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
3. Benzene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
4. Bromobenzene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
5. Bromochloromethane	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
6. Bromodichloromethane	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
7. Bromoform	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
8. Bromomethane	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
9. 2-Butanone	U	L-	µg/L	25	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	KCM
10. n-Butylbenzene	U	V+	µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
11. sec-Butylbenzene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
12. tert-Butylbenzene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
13. Carbon Disulfide	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
14. Carbon Tetrachloride	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
15. Chlorobenzene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
16. Chloroethane	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
17. Chloroform	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
18. Chloromethane	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
19. 2-Chlorotoluene	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
21. Dibromochloromethane	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
22. Dibromomethane	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
23. 1,2-Dichlorobenzene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
24. 1,3-Dichlorobenzene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
25. 1,4-Dichlorobenzene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
26. Dichlorodifluoromethane	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
27. 1,1-Dichloroethane	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
28. 1,2-Dichloroethane	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
29. 1,1-Dichloroethene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
30. cis-1,2-Dichloroethene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
31. trans-1,2-Dichloroethene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
32. 1,2-Dichloropropane	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
33. cis-1,3-Dichloropropene	U		µg/L	0.50	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
34. trans-1,3-Dichloropropene	U		µg/L	0.50	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
35. Ethylbenzene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
36. Ethylene Dibromide	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
37. 2-Hexanone	U	L-	µg/L	50	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	KCM
38. Isopropylbenzene	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC

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11766 E. Grand River
8660 S. Mackinaw Trail

Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: DUP GW	Chain of Custody: 203130
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: NA

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS Aliquot ID: **A09128-011B** Matrix: **Ground Water**
Method: **EPA 5030C/EPA 8260D** Description: **DUP GW**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
39. 4-Methyl-2-pentanone	U		µg/L	50	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
40. Methylene Chloride	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
‡ 41. 2-Methylnaphthalene	U	L- V-	µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	KCM
42. MTBE	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
43. Naphthalene	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
44. n-Propylbenzene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
45. Styrene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
46. 1,1,1,2-Tetrachloroethane	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
47. 1,1,2,2-Tetrachloroethane	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
48. Tetrachloroethene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
49. Toluene	1.7		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
50. 1,2,4-Trichlorobenzene	U		µg/L	5.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
51. 1,1,1-Trichloroethane	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
‡ 52. 1,1,2-Trichloroethane	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
53. Trichloroethene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
54. Trichlorofluoromethane	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
55. 1,2,3-Trichloropropane	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
57. 1,2,4-Trimethylbenzene	1.7		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
58. 1,3,5-Trimethylbenzene	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
59. Vinyl Chloride	U		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
60. m&p-Xylene	3.1		µg/L	2.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
61. o-Xylene	1.2		µg/L	1.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC
‡ 62. Xylenes	4.3		µg/L	3.0	1.0	06/20/22	VI22F20A	06/20/22 12:01	VI22F20A	SNC

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-011** Matrix: **Ground Water**
Method: **EPA 3535A/EPA 8270E** Description: **DUP GW**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
2. Acenaphthylene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
3. Anthracene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
4. Benzo(a)anthracene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
5. Benzo(a)pyrene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
6. Benzo(b)fluoranthene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD

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8660 S. Mackinaw Trail

Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: DUP GW	Chain of Custody: 203130
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Ground Water	Collect Time: NA

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-011** Matrix: **Ground Water**
Method: EPA 3535A/EPA 8270E Description: **DUP GW**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
7. Benzo(ghi)perylene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
8. Benzo(k)fluoranthene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
9. Chrysene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
10. Dibenzo(a,h)anthracene (SIM)	U		µg/L	2.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
11. Fluoranthene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
12. Fluorene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/L	2.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
14. 2-Methylnaphthalene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
15. Naphthalene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
16. Phenanthrene (SIM)	U		µg/L	2.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD
17. Pyrene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/18/22 03:04	S622F17D	SJD

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Cadillac, MI 49601

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T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: Trip Blank	Chain of Custody: 203130
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Blank: Trip	Collect Time: 12:50

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS
Method: EPA 5030C/EPA 8260D

Aliquot ID: A09128-012 **Matrix: Blank: Trip**
Description: Trip Blank

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U	L-	µg/L	50	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
‡ 2. Acrylonitrile	U		µg/L	2.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
3. Benzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
4. Bromobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
5. Bromochloromethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
6. Bromodichloromethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
7. Bromoform	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
8. Bromomethane	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
9. 2-Butanone	U		µg/L	25	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
10. n-Butylbenzene	U	V+	µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
11. sec-Butylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
12. tert-Butylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
13. Carbon Disulfide	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
14. Carbon Tetrachloride	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
15. Chlorobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
16. Chloroethane	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
17. Chloroform	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
18. Chloromethane	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
19. 2-Chlorotoluene	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
21. Dibromochloromethane	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
22. Dibromomethane	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
23. 1,2-Dichlorobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
24. 1,3-Dichlorobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
25. 1,4-Dichlorobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
26. Dichlorodifluoromethane	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
27. 1,1-Dichloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
28. 1,2-Dichloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
29. 1,1-Dichloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
30. cis-1,2-Dichloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
31. trans-1,2-Dichloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
32. 1,2-Dichloropropane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
33. cis-1,3-Dichloropropene	U		µg/L	0.50	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
34. trans-1,3-Dichloropropene	U		µg/L	0.50	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
35. Ethylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
36. Ethylene Dibromide	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
37. 2-Hexanone	U		µg/L	50	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC

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Cadillac, MI 49601

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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
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Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-012

Order: A09128
 Date: 06/30/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: Trip Blank	Chain of Custody: 203130
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Blank: Trip	Collect Time: 12:50

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS
Method: EPA 5030C/EPA 8260D

Aliquot ID: A09128-012 **Matrix: Blank: Trip**
Description: Trip Blank

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
38. Isopropylbenzene	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
39. 4-Methyl-2-pentanone	U		µg/L	50	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
40. Methylene Chloride	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
‡ 41. 2-Methylnaphthalene	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
42. MTBE	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
43. Naphthalene	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
44. n-Propylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
45. Styrene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
46. 1,1,1,2-Tetrachloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
47. 1,1,2,2-Tetrachloroethane	U	V+	µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
48. Tetrachloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
49. Toluene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
50. 1,2,4-Trichlorobenzene	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
51. 1,1,1-Trichloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
‡ 52. 1,1,2-Trichloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
53. Trichloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
54. Trichlorofluoromethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
55. 1,2,3-Trichloropropane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
57. 1,2,4-Trimethylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
58. 1,3,5-Trimethylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
59. Vinyl Chloride	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
60. m&p-Xylene	U		µg/L	2.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
61. o-Xylene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC
‡ 62. Xylenes	U		µg/L	3.0	1.0	06/17/22	VI22F17A	06/17/22 11:30	VI22F17A	BRC

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 T: (231) 775-8368

F: (517) 699-0388
 F: (810) 220-3311
 F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: EQUIPMENT BLANK	Chain of Custody: 203130
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Blank: Equipment	Collect Time: 14:45

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Michigan 10 Elements by ICP/MS, Total Recoverable Aliquot ID: **A09128-013A** Matrix: **Blank: Equipment**
Method: **EPA 3005A (Total Recoverable)/EPA 6020A** Description: **EQUIPMENT BLANK**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Arsenic	U		µg/L	5.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
2. Barium	U		µg/L	100	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
3. Cadmium	U		µg/L	1.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
4. Chromium	U		µg/L	10	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
5. Copper	U		µg/L	4.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
6. Lead	U		µg/L	3.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
7. Selenium	U		µg/L	5.0	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
8. Silver	U		µg/L	0.20	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA
9. Zinc	U		µg/L	50	10	06/17/22	PT22F17B	06/17/22	T422F17E	CJA

Mercury by CVAAS, Total Aliquot ID: **A09128-013A** Matrix: **Blank: Equipment**
Method: **EPA 7470A** Description: **EQUIPMENT BLANK**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Mercury	U	L+	µg/L	0.20	1.0	06/20/22	PM22F20A	06/20/22	M722F20A	JLH

Polychlorinated Biphenyls (PCBs) Aliquot ID: **A09128-013** Matrix: **Blank: Equipment**
Method: **EPA 3510C/EPA 8082A** Description: **EQUIPMENT BLANK**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Aroclor-1016	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:38	SO22F20A	TKT
2. Aroclor-1221	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:38	SO22F20A	TKT
3. Aroclor-1232	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:38	SO22F20A	TKT
4. Aroclor-1242	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:38	SO22F20A	TKT
5. Aroclor-1248	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:38	SO22F20A	TKT
6. Aroclor-1254	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:38	SO22F20A	TKT
7. Aroclor-1260	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:38	SO22F20A	TKT
‡ 8. Aroclor-1262	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:38	SO22F20A	TKT
‡ 9. Aroclor-1268	U		µg/L	0.20	1.0	06/20/22	PS22F20C	06/20/22 16:38	SO22F20A	TKT

Volatile Organic Compounds (VOCs) by GC/MS Aliquot ID: **A09128-013B** Matrix: **Blank: Equipment**
Method: **EPA 5030C/EPA 8260D** Description: **EQUIPMENT BLANK**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acetone	U	L-	µg/L	50	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC

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8660 S. Mackinaw Trail	Cadillac, MI 49601	T: (231) 775-8368	F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: EQUIPMENT BLANK	Chain of Custody: 203130
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Blank: Equipment	Collect Time: 14:45

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS
Method: EPA 5030C/EPA 8260D

Aliquot ID: A09128-013B Matrix: Blank: Equipment
Description: EQUIPMENT BLANK

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 2. Acrylonitrile	U		µg/L	2.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
3. Benzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
4. Bromobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
5. Bromochloromethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
6. Bromodichloromethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
7. Bromoform	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
8. Bromomethane	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
9. 2-Butanone	U		µg/L	25	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
10. n-Butylbenzene	U	V+	µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
11. sec-Butylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
12. tert-Butylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
13. Carbon Disulfide	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
14. Carbon Tetrachloride	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
15. Chlorobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
16. Chloroethane	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
17. Chloroform	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
18. Chloromethane	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
19. 2-Chlorotoluene	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
‡ 20. 1,2-Dibromo-3-chloropropane (SIM)	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
21. Dibromochloromethane	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
22. Dibromomethane	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
23. 1,2-Dichlorobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
24. 1,3-Dichlorobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
25. 1,4-Dichlorobenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
26. Dichlorodifluoromethane	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
27. 1,1-Dichloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
28. 1,2-Dichloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
29. 1,1-Dichloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
30. cis-1,2-Dichloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
31. trans-1,2-Dichloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
32. 1,2-Dichloropropane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
33. cis-1,3-Dichloropropene	U		µg/L	0.50	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
34. trans-1,3-Dichloropropene	U		µg/L	0.50	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
35. Ethylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
36. Ethylene Dibromide	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
37. 2-Hexanone	U		µg/L	50	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
38. Isopropylbenzene	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC

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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: EQUIPMENT BLANK	Chain of Custody: 203130
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Blank: Equipment	Collect Time: 14:45

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Volatile Organic Compounds (VOCs) by GC/MS
Method: EPA 5030C/EPA 8260D

Aliquot ID: A09128-013B **Matrix: Blank: Equipment**
Description: EQUIPMENT BLANK

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
39. 4-Methyl-2-pentanone	U		µg/L	50	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
40. Methylene Chloride	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
‡ 41. 2-Methylnaphthalene	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
42. MTBE	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
43. Naphthalene	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
44. n-Propylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
45. Styrene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
46. 1,1,1,2-Tetrachloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
47. 1,1,2,2-Tetrachloroethane	U	V+	µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
48. Tetrachloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
49. Toluene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
50. 1,2,4-Trichlorobenzene	U		µg/L	5.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
51. 1,1,1-Trichloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
‡ 52. 1,1,2-Trichloroethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
53. Trichloroethene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
54. Trichlorofluoromethane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
55. 1,2,3-Trichloropropane	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
‡ 56. 1,2,3-Trimethylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
57. 1,2,4-Trimethylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
58. 1,3,5-Trimethylbenzene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
59. Vinyl Chloride	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
60. m&p-Xylene	U		µg/L	2.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
61. o-Xylene	U		µg/L	1.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC
‡ 62. Xylenes	U		µg/L	3.0	1.0	06/17/22	VI22F17A	06/17/22 11:57	VI22F17A	BRC

Polynuclear Aromatic Hydrocarbons (PNAs)
Method: EPA 3535A/EPA 8270E

Aliquot ID: A09128-013 **Matrix: Blank: Equipment**
Description: EQUIPMENT BLANK

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Acenaphthene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
2. Acenaphthylene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
3. Anthracene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
4. Benzo(a)anthracene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
5. Benzo(a)pyrene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
6. Benzo(b)fluoranthene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
7. Benzo(ghi)perylene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS

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Cadillac, MI 49601

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T: (231) 775-8368

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Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-013

Order: A09128
 Date: 06/30/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: EQUIPMENT BLANK	Chain of Custody: 203130
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Blank: Equipment	Collect Time: 14:45

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Polynuclear Aromatic Hydrocarbons (PNAs) Aliquot ID: **A09128-013** Matrix: **Blank: Equipment**
 Method: **EPA 3535A/EPA 8270E** Description: **EQUIPMENT BLANK**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
8. Benzo(k)fluoranthene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
9. Chrysene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
10. Dibenzo(a,h)anthracene (SIM)	U		µg/L	2.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
11. Fluoranthene (SIM)	U		µg/L	1.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
12. Fluorene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
13. Indeno(1,2,3-cd)pyrene (SIM)	U		µg/L	2.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
14. 2-Methylnaphthalene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
15. Phenanthrene (SIM)	U		µg/L	2.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS
16. Pyrene (SIM)	U		µg/L	5.0	1.0	06/17/22	PS22F17E	06/21/22 05:01	SN22F20B	ALS

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Definitions/ Qualifiers:

- A:** Spike recovery or precision unusable due to dilution.
- B:** The analyte was detected in the associated method blank.
- E:** The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated.
- J:** The concentration is an estimated value.
- M:** Modified Method
- U:** The analyte was not detected at or above the reporting limit.
- X:** Matrix Interference has resulted in a raised reporting limit or distorted result.
- W:** Results reported on a wet-weight basis.
- ***: Value reported is outside QC limits

Exception Summary:

- *** : Duplicate analysis not within control limits.
- F-** : Recovery from the spiked aliquot exceeds the lower control limit (matrix spike or matrix spike duplicate).
- F+** : Recovery from the spiked aliquot exceeds the upper control limit (matrix spike or matrix spike duplicate).
- L-** : Recovery in the associated laboratory sample (LCS) exceeds the lower control limit. Results may be biased low.
- L+** : Recovery in the associated laboratory sample (LCS) exceeds the upper control limit. Results may be biased high.
- V-** : Recovery in the associated continuing calibration verification sample (CCV) exceeds the lower control limit. Results may be biased low.
- V+** : Recovery in the associated continuing calibration verification sample (CCV) exceeds the upper control limit. Results may be biased high.

Analysis Locations:

All analyses performed in Holt.



Accreditation Number(s):

T104704518-19-8 (TX)

1914 Holloway Drive
11766 E. Grand River
8660 S. Mackinaw Trail

Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

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A09128-007: Original Sample (OS)/Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

EPA 8082A

Run Time: A09128-007 (OS): 06/20/22 16:15 [SO22F20A] A09128-008 (MS): 06/20/22 15:40 [SO22F20A] A09128-009 (MSD): 06/20/22 15:52 [SO22F20A]

Analyte	Original Result	MS Spike Amount	MS Result	MS Rec.	Rec. Limits	MS Qualifier	MSD Spike Amount	MSD Result	MSD Rec.	MSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/L	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
Aroclor-1016	U	2.67	2.08	78	60 - 120		2.67	2.08	78		0	20	
Aroclor-1260	U	2.67	2.08	78	60 - 120		2.67	2.27	85		9	20	

A09128-007: Original Sample (OS)/Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

EPA 8270E

Run Time: A09128-007 (OS): 06/18/22 02:36 [S622F17D] A09128-008 (MS): 06/17/22 21:59 [S622F17D] A09128-009 (MSD): 06/17/22 22:27 [S622F17D]

Analyte	Original Result	MS Spike Amount	MS Result	MS Rec.	Rec. Limits	MS Qualifier	MSD Spike Amount	MSD Result	MSD Rec.	MSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/L	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
Acenaphthene (SIM)	U	356	224	63	60 - 107		356	264	74		16	30	
Acenaphthylene (SIM)	U	356	233	66	54 - 107		356	277	78		17	30	
Anthracene (SIM)	U	356	281	79	55 - 112		356	335	94		18	30	
Benzo(a)anthracene (SIM)	U	356	289	81	59 - 116		356	346	97		18	30	
Benzo(a)pyrene (SIM)	U	356	313	88	60 - 118		356	382	107		20	30	
Benzo(b)fluoranthene (SIM)	U	356	353	99	58 - 118		356	426	120	*	19	30	
Benzo(ghi)perylene (SIM)	U	356	302	85	47 - 122		356	363	102		18	30	
Benzo(k)fluoranthene (SIM)	U	356	355	100	56 - 120		356	432	122	*	20	30	
Chrysene (SIM)	U	356	294	83	56 - 117		356	352	99		18	30	
Dibenzo(a,h)anthracene (SIM)	U	356	315	89	48 - 128		356	389	109		21	30	
Fluoranthene (SIM)	U	356	294	83	57 - 119		356	360	101		20	30	
Fluorene (SIM)	U	356	304	85	70 - 112		356	359	101		17	30	
Indeno(1,2,3-cd)pyrene (SIM)	U	356	356	100	54 - 130		356	423	119		17	30	
2-Methylnaphthalene (SIM)	U	356	195	55	31 - 113		356	218	61		11	30	
Naphthalene (SIM)	U	356	201	56	39 - 100		356	220	62		9	30	
Phenanthrene (SIM)	U	356	278	78	65 - 112		356	334	94		18	30	
Pyrene (SIM)	U	356	316	89	70 - 115		356	380	107		18	30	

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A09128-007A: Original Sample (OS)/Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

EPA 7470A

Run Time: A09128-007A (OS): 06/20/22 11:14 [M722F20A] A09128-008A (MS): 06/20/22 11:10 [M722F20A] A09128-009A (MSD): 06/20/22 11:11 [M722F20A]

Analyte	Original Result	MS Spike Amount	MS Result	MS Rec.	Rec. Limits	MS Qualifier	MSD Spike Amount	MSD Result	MSD Rec.	MSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/L	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
Mercury	U	0.250	0.346	122	70 - 130		0.250	0.378	134	*	10	20	

A09128-007A: Original Sample (OS)/Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

EPA 6020A

Run Time: A09128-007A (OS): 06/17/22 15:40 [T422F17E] A09128-008A (MS): 06/17/22 15:34 [T422F17E] A09128-009A (MSD): 06/17/22 15:38 [T422F17E]

Analyte	Original Result	MS Spike Amount	MS Result	MS Rec.	Rec. Limits	MS Qualifier	MSD Spike Amount	MSD Result	MSD Rec.	MSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/L	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
Arsenic	14.6	100	118	103	70 - 130		100	122	107		4	20	
Barium	352	500	912	112	70 - 130		500	886	107		5	20	
Cadmium	2.62	100	100	97	70 - 130		100	109	106		9	20	
Chromium	25.3	200	226	100	70 - 130		200	232	103		3	20	
Copper	94.5	200	300	103	70 - 130		200	305	105		2	20	
Selenium	8.19	100	103	95	70 - 130		100	115	107		12	20	
Silver	U	100	93.8	94	70 - 130		100	103	103		9	20	
Zinc	949	500	1560	122	70 - 130		500	1420	94		26	20	*

A09128-007A: Original Sample (OS)/Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

EPA 6020A

Run Time: A09128-007A (OS): 06/17/22 16:18 [T422F17E] A09128-008A (MS): 06/17/22 16:19 [T422F17E] A09128-009A (MSD): 06/17/22 16:20 [T422F17E]

Analyte	Original Result	MS Spike Amount	MS Result	MS Rec.	Rec. Limits	MS Qualifier	MSD Spike Amount	MSD Result	MSD Rec.	MSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/L	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
Lead	3680	200	4230	274	70 - 130	*	200	3150	-266	*	12124	20	*

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F: (810) 220-3311
F: (231) 775-8584

A09128-007B: Original Sample (OS)/Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

EPA 8260D

Run Time: A09128-007B (OS): 06/18/22 07:58 [VI22F17B] A09128-008B (MS): 06/18/22 08:24 [VI22F17B] A09128-009B (MSD): 06/18/22 08:50 [VI22F17B]

Analyte	Original Result	MS Spike Amount	MS Result	MS Rec.	Rec. Limits	MS Qualifier	MSD Spike Amount	MSD Result	MSD Rec.	MSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/L	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
Acetone	U	50.0	21.4	43	54 - 140	*	50.0	22.5	45	*	5	20	
Acrylonitrile	U	50.0	42.7	85	70 - 130		50.0	43.9	88		3	20	
Benzene	U	50.0	52.2	104	80 - 120		50.0	53.2	106		2	20	
Bromobenzene	U	50.0	45.5	91	75 - 125		50.0	46.8	94		3	20	
Bromochloromethane	U	50.0	44.9	90	70 - 130		50.0	47.3	95		5	20	
Bromodichloromethane	U	50.0	53.6	107	75 - 120		50.0	55.4	111		3	20	
Bromoform	U	50.0	50.6	101	70 - 130		50.0	52.5	105		4	20	
Bromomethane	U	50.0	51.1	102	68 - 135		50.0	52.6	105		3	20	
2-Butanone	U	50.0	37.5	75	70 - 148		50.0	38.5	77		3	20	
n-Butylbenzene	U	50.0	50.5	101	70 - 133		50.0	50.4	101		0	20	
sec-Butylbenzene	U	50.0	51.7	103	70 - 125		50.0	51.2	102		1	20	
tert-Butylbenzene	U	50.0	53.5	107	70 - 130		50.0	53.0	106		1	20	
Carbon Disulfide	U	50.0	47.0	94	70 - 130		50.0	47.9	96		2	20	
Carbon Tetrachloride	U	50.0	51.7	103	70 - 130		50.0	52.1	104		1	20	
Chlorobenzene	U	50.0	51.9	104	80 - 120		50.0	53.3	107		3	20	
Chloroethane	U	50.0	53.5	107	61 - 130		50.0	54.7	109		2	20	
Chloroform	U	50.0	51.0	102	80 - 120		50.0	52.6	105		3	20	
Chloromethane	U	50.0	49.4	99	67 - 125		50.0	51.2	102		4	20	
2-Chlorotoluene	U	50.0	54.0	108	75 - 125		50.0	54.6	109		1	20	
1,2-Dibromo-3-chloropropane (SIM)	U	50.0	48.0	96	70 - 130		50.0	48.6	97		1	20	
Dibromochloromethane	U	50.0	50.3	101	70 - 130		50.0	52.4	105		4	20	
Dibromomethane	U	50.0	45.4	91	75 - 125		50.0	47.9	96		5	20	
1,2-Dichlorobenzene	U	50.0	48.1	96	70 - 120		50.0	48.8	98		1	20	
1,3-Dichlorobenzene	U	50.0	47.4	95	75 - 125		50.0	47.6	95		0	20	
1,4-Dichlorobenzene	U	50.0	45.1	90	75 - 125		50.0	45.6	91		1	20	
Dichlorodifluoromethane	U	50.0	58.4	117	70 - 136		50.0	58.2	116		0	20	
1,1-Dichloroethane	U	50.0	48.8	98	70 - 130		50.0	53.8	108		10	20	
1,2-Dichloroethane	U	50.0	42.8	86	70 - 130		50.0	44.5	89		4	20	
1,1-Dichloroethene	U	50.0	46.8	94	78 - 120		50.0	47.2	94		1	20	
cis-1,2-Dichloroethene	U	50.0	49.5	99	70 - 125		50.0	50.7	101		2	20	
trans-1,2-Dichloroethene	U	50.0	46.9	94	70 - 130		50.0	47.9	96		2	20	
1,2-Dichloropropane	U	50.0	54.3	109	80 - 121		50.0	56.0	112		3	20	
cis-1,3-Dichloropropene	U	50.0	48.2	96	70 - 130		50.0	50.3	101		4	20	

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A09128-007B: Original Sample (OS)/Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

EPA 8260D

Run Time: A09128-007B (OS): 06/18/22 07:58 [VI22F17B] A09128-008B (MS): 06/18/22 08:24 [VI22F17B] A09128-009B (MSD): 06/18/22 08:50 [VI22F17B]

Analyte	Original Result	MS Spike Amount	MS Result	MS Rec.	Rec. Limits	MS Qualifier	MSD Spike Amount	MSD Result	MSD Rec.	MSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/L	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
trans-1,3-Dichloropropene	U	50.0	47.9	96	70 - 132		50.0	50.1	100		4	20	
Ethylbenzene	U	50.0	52.3	105	80 - 120		50.0	53.0	106		1	20	
Ethylene Dibromide	U	50.0	47.2	94	80 - 120		50.0	49.2	98		4	20	
2-Hexanone	U	50.0	39.6	79	70 - 130		50.0	39.7	79		0	20	
Isopropylbenzene	U	50.0	53.1	106	75 - 125		50.0	53.1	106		0	20	
4-Methyl-2-pentanone	U	50.0	53.9	108	70 - 130		50.0	54.6	109		1	20	
Methylene Chloride	U	50.0	44.4	89	70 - 130		50.0	46.7	93		5	20	
2-Methylnaphthalene	U	50.0	31.7	63	70 - 130	*	50.0	32.9	66	*	4	20	
MTBE	U	50.0	50.2	100	70 - 125		50.0	52.0	104		4	20	
Naphthalene	U	50.0	38.7	77	70 - 130		50.0	39.9	80		3	20	
n-Propylbenzene	U	50.0	53.7	107	70 - 130		50.0	53.5	107		0	20	
Styrene	U	50.0	43.1	86	70 - 130		50.0	45.2	90		5	20	
1,1,1,2-Tetrachloroethane	U	50.0	54.6	109	80 - 130		50.0	56.6	113		4	20	
1,1,2,2-Tetrachloroethane	U	50.0	59.0	118	70 - 130		50.0	60.0	120		2	20	
Tetrachloroethene	10.9	50.0	63.2	105	70 - 130		50.0	63.9	106		1	20	
Toluene	U	50.0	55.3	109	80 - 120		50.0	56.0	111		1	20	
1,2,4-Trichlorobenzene	U	50.0	36.6	73	70 - 130		50.0	38.1	76		4	20	
1,1,1-Trichloroethane	U	50.0	54.8	110	70 - 130		50.0	55.6	111		1	20	
1,1,2-Trichloroethane	U	50.0	51.0	102	75 - 125		50.0	52.8	106		3	20	
Trichloroethene	U	50.0	46.9	94	71 - 125		50.0	47.2	94		1	20	
Trichlorofluoromethane	U	50.0	51.6	103	70 - 133		50.0	53.0	106		3	20	
1,2,3-Trichloropropane	U	50.0	51.7	103	75 - 125		50.0	52.2	104		1	20	
1,2,3-Trimethylbenzene	U	50.0	50.7	101	70 - 130		50.0	51.7	103		2	20	
1,2,4-Trimethylbenzene	U	50.0	52.6	105	75 - 130		50.0	52.9	106		1	20	
1,3,5-Trimethylbenzene	U	50.0	52.6	105	75 - 130		50.0	52.7	105		0	20	
Vinyl Chloride	U	50.0	53.5	107	74 - 125		50.0	54.2	108		1	20	
m&p-Xylene	U	100	108	108	75 - 130		100	109	109		1	20	
o-Xylene	U	50.0	53.8	108	80 - 120		50.0	54.8	110		2	20	

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Definitions/ Qualifiers:

U: The analyte was not detected at or above the Reporting Limit (RL).
*****: Value reported is outside QC limits

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:



By Jacob Sutherland at 4:22 PM, Jun 30, 2022

PM22F16B: Method Blank (MB)

EPA 7471B

Run Time: PM22F16B.MB 06/16/2022 12:15 [M722F16A]

Analyte	MB Result	MB Qualifier	MB RDL
Mercury	µg/kg U		µg/kg 50

PM22F16B: Laboratory Control Sample (LCS)

EPA 7471B

Run Time: PM22F16B.LCS: 06/16/2022 12:16 [M722F16A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Mercury	µg/kg 200	µg/kg 199	% 100	% 85-115	

PM22F20A: Method Blank (MB)

EPA 7470A

Run Time: PM22F20A.MB 06/20/2022 11:07 [M722F20A]

Analyte	MB Result	MB Qualifier	MB RDL
Mercury	U		0.20

PM22F20A: Laboratory Control Sample (LCS)

EPA 7470A

Run Time: PM22F20A.LCS: 06/20/2022 11:08 [M722F20A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Mercury	0.250	0.309	124	85-115	*

PS22F17B: Method Blank (MB)

EPA 8082A

Run Time: PS22F17B.MB 06/17/2022 16:53 [SO22F17A]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/kg		µg/kg
Aroclor-1016	U		100
Aroclor-1260	U		100
Decachlorobiphenyl-PCB(S)	60		40-143
2,4,5,6-Tetrachloro-m-xylene-PCB(S)	48		42-133

PS22F17B: Method Blank (MB)

EPA 8270E

Run Time: PS22F17B.MB 06/20/2022 09:06 [SN22F20A]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/kg		µg/kg
Acenaphthene (SIM)	U		330
Acenaphthylene (SIM)	U		330
Anthracene (SIM)	U		330
Benzo(a)anthracene (SIM)	U		330
Benzo(a)pyrene (SIM)	U		330
Benzo(b)fluoranthene (SIM)	U		330
Benzo(ghi)perylene (SIM)	U		330
Benzo(k)fluoranthene (SIM)	U		330
Chrysene (SIM)	U		330
Dibenzo(a,h)anthracene (SIM)	U		330
Fluoranthene (SIM)	U		330
Fluorene (SIM)	U		330
Indeno(1,2,3-cd)pyrene (SIM)	U		330
2-Methylnaphthalene (SIM)	U		330
Naphthalene (SIM)	U		330
Phenanthrene (SIM)	U		330
Pyrene (SIM)	U		330
2-Fluorobiphenyl(S)	48	*	49-115
1-Fluoronaphthalene(S)	53		46-114
4-Terphenyl-d14(S)	57		48-117

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PS22F17B: Laboratory Control Sample (LCS)

EPA 8082A

Run Time: PS22F17B.LCS: 06/17/2022 17:04 [SO22F17A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	µg/kg	µg/kg	%	%	
Aroclor-1016	667	431	65	60-120	
Aroclor-1260	667	481	72	60-120	
<i>Decachlorobiphenyl-PCB(S)</i>			58	40-143	
<i>2,4,5,6-Tetrachloro-m-xylene-PCB(S)</i>			45	42-133	

PS22F17B: Laboratory Control Sample (LCS)

EPA 8270E

Run Time: PS22F17B.LCS: 06/20/2022 09:32 [SN22F20A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	µg/kg	µg/kg	%	%	
Acenaphthene (SIM)	5330	2380	45	35-93	
Acenaphthylene (SIM)	5330	2730	51	33-100	
Anthracene (SIM)	5330	2930	55	43-91	
Benzo(a)anthracene (SIM)	5330	2980	56	47-102	
Benzo(a)pyrene (SIM)	5330	3280	62	45-117	
Benzo(b)fluoranthene (SIM)	5330	3840	72	48-121	
Benzo(ghi)perylene (SIM)	5330	3180	60	48-111	
Benzo(k)fluoranthene (SIM)	5330	3270	61	52-117	
Chrysene (SIM)	5330	3020	57	51-108	
Dibenzo(a,h)anthracene (SIM)	5330	3310	62	51-113	
Fluoranthene (SIM)	5330	2830	53	50-101	
Fluorene (SIM)	5330	2660	50	40-97	
Indeno(1,2,3-cd)pyrene (SIM)	5330	3800	71	54-122	
2-Methylnaphthalene (SIM)	5330	2480	47	30-95	
Naphthalene (SIM)	5330	2600	49	27-87	
Phenanthrene (SIM)	5330	2900	54	41-92	
Pyrene (SIM)	5330	3040	57	46-109	
<i>2-Fluorobiphenyl(S)</i>			47	49-115	*
<i>1-Fluoronaphthalene(S)</i>			51	46-114	
<i>4-Terphenyl-d14(S)</i>			57	48-117	

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PS22F17E: Method Blank (MB)

EPA 8270E

Run Time: PS22F17E.MB 06/17/2022 15:59 [S622F17D]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
Acenaphthene (SIM)	U		5.0
Acenaphthylene (SIM)	U		5.0
Anthracene (SIM)	U		5.0
Benzo(a)anthracene (SIM)	U		1.0
Benzo(a)pyrene (SIM)	U		1.0
Benzo(b)fluoranthene (SIM)	U		1.0
Benzo(ghi)perylene (SIM)	U		1.0
Benzo(k)fluoranthene (SIM)	U		1.0
Chrysene (SIM)	U		1.0
Dibenzo(a,h)anthracene (SIM)	U		2.0
Fluoranthene (SIM)	U		1.0
Fluorene (SIM)	U		5.0
Indeno(1,2,3-cd)pyrene (SIM)	U		2.0
2-Methylnaphthalene (SIM)	U		5.0
Naphthalene (SIM)	U		5.0
Phenanthrene (SIM)	U		2.0
Pyrene (SIM)	U		5.0
2-Fluorobiphenyl(S)	83		44-109
1-Fluoronaphthalene(S)	81		44-103
4-Terphenyl-d14(S)	73		44-124

PS22F17E: Laboratory Control Sample (LCS)

EPA 8270E

Run Time: PS22F17E.LCS: 06/20/2022 11:18 [SN22F20A]

Analyte	LCS Spike Amount µg/L	LCS Result µg/L	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene (SIM)	80.0	61.9	77	60-107	
Acenaphthylene (SIM)	80.0	67.8	85	54-107	
Anthracene (SIM)	80.0	63.4	79	55-112	
Benzo(a)anthracene (SIM)	80.0	58.0	72	56-112	
Benzo(a)pyrene (SIM)	80.0	64.4	80	59-113	
Benzo(b)fluoranthene (SIM)	80.0	72.1	90	59-113	
Benzo(ghi)perylene (SIM)	80.0	71.7	90	46-124	
Benzo(k)fluoranthene (SIM)	80.0	65.8	82	59-111	
Chrysene (SIM)	80.0	58.9	74	53-112	
Dibenzo(a,h)anthracene (SIM)	80.0	70.5	88	48-131	
Fluoranthene (SIM)	80.0	59.5	74	69-112	
Fluorene (SIM)	80.0	66.0	82	70-112	
Indeno(1,2,3-cd)pyrene (SIM)	80.0	76.2	95	54-128	
2-Methylnaphthalene (SIM)	80.0	61.6	77	31-113	
Naphthalene (SIM)	80.0	69.5	87	37-107	
Phenanthrene (SIM)	80.0	62.3	78	65-112	
Pyrene (SIM)	80.0	66.7	83	70-115	
2-Fluorobiphenyl(S)			75	44-109	
1-Fluoronaphthalene(S)			81	44-103	
4-Terphenyl-d14(S)			77	44-124	

PS22F20C: Method Blank (MB)

EPA 8082A

Run Time: PS22F20C.MB 06/20/2022 15:17 [SO22F20A]

Analyte	MB Result	MB Qualifier	MB RDL
Aroclor-1016	U		0.20
Aroclor-1260	U		0.20
<i>Decachlorobiphenyl-PCB(S)</i>	90		14-124
<i>2,4,5,6-Tetrachloro-m-xylene-PCB(S)</i>	41		26-136

PS22F20C: Laboratory Control Sample (LCS)

EPA 8082A

Run Time: PS22F20C.LCS: 06/22/2022 20:21 [SO22F22A]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Aroclor-1016	2.00	1.77	88	60-120	
Aroclor-1260	2.00	2.31	115	60-120	
<i>Decachlorobiphenyl-PCB(S)</i>			102	14-124	
<i>2,4,5,6-Tetrachloro-m-xylene-PCB(S)</i>			61	26-136	

PT22F17A: Method Blank (MB)

EPA 6020A

Run Time: PT22F17A.MB 06/17/2022 15:25 [T422F17E]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/kg		µg/kg
Arsenic	U		100
Barium	U		1000
Cadmium	U		50
Chromium	U		500
Copper	U		1000
Lead	U		1000
Selenium	U		200
Silver	U		100
Zinc	1030	*	1000

PT22F17A: Laboratory Control Sample (LCS)

EPA 6020A

Run Time: PT22F17A.LCS: 06/17/2022 15:26 [T422F17E]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	µg/kg	µg/kg	%	%	
Arsenic	10000	9990	100	85-115	
Barium	50000	48000	96	85-115	
Cadmium	10000	9590	96	85-115	
Chromium	20000	19800	99	85-115	
Copper	20000	21700	108	85-115	
Lead	20000	17800	89	85-115	
Selenium	10000	9900	99	85-115	
Silver	10000	9560	96	85-115	
Zinc	50000	51400	103	85-115	

1914 Holloway Drive
11766 E. Grand River
8660 S. Mackinaw Trail

Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

PT22F17B: Method Blank (MB)

EPA 6020A

Run Time: PT22F17B.MB 06/17/2022 15:46 [T422F17E]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
Arsenic	U		5.0
Barium	U		100
Cadmium	U		1.0
Chromium	U		10
Copper	U		4.0
Lead	U		3.0
Selenium	U		5.0
Silver	U		0.20
Zinc	U		50

PT22F17B: Laboratory Control Sample (LCS)

EPA 6020A

Run Time: PT22F17B.LCS: 06/17/2022 15:31 [T422F17E]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	µg/L	µg/L	%	%	
Arsenic	100	99.5	99	85-115	
Barium	500	497	99	85-115	
Cadmium	100	96.7	97	85-115	
Chromium	200	197	99	85-115	
Copper	200	214	107	85-115	
Lead	200	180	90	85-115	
Selenium	100	98.5	99	85-115	
Silver	100	96.4	96	85-115	
Zinc	500	506	101	85-115	

VI22F17A: Method Blank (MB)

EPA 8260D

Run Time: VI22F17A.MB 06/17/2022 10:39 [VI22F17A]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
Acetone	U		50
Acrylonitrile	U		2.0
Benzene	U		1.0
Bromobenzene	U		1.0
Bromochloromethane	U		1.0
Bromodichloromethane	U		1.0
Bromoform	U		1.0
Bromomethane	U		5.0
2-Butanone	U		25
n-Butylbenzene	U		1.0
sec-Butylbenzene	U		1.0
tert-Butylbenzene	U		1.0
Carbon Disulfide	U		5.0
Carbon Tetrachloride	U		1.0
Chlorobenzene	U		1.0
Chloroethane	U		5.0
Chloroform	U		1.0
Chloromethane	U		5.0
2-Chlorotoluene	U		5.0
1,2-Dibromo-3-chloropropane (SIM)	U		1.0
Dibromochloromethane	U		5.0
Dibromomethane	U		5.0
1,2-Dichlorobenzene	U		1.0
1,3-Dichlorobenzene	U		1.0
1,4-Dichlorobenzene	U		1.0
Dichlorodifluoromethane	U		5.0
1,1-Dichloroethane	U		1.0
1,2-Dichloroethane	U		1.0
1,1-Dichloroethene	U		1.0
cis-1,2-Dichloroethene	U		1.0
trans-1,2-Dichloroethene	U		1.0
1,2-Dichloropropane	U		1.0
cis-1,3-Dichloropropene	U		0.50

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11766 E. Grand River
8660 S. Mackinaw Trail

Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

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T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

VI22F17A: Method Blank (MB)

EPA 8260D

Run Time: VI22F17A.MB 06/17/2022 10:39 [VI22F17A]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
trans-1,3-Dichloropropene	U		0.50
Ethylbenzene	U		1.0
Ethylene Dibromide	U		1.0
2-Hexanone	U		50
Isopropylbenzene	U		5.0
4-Methyl-2-pentanone	U		50
Methylene Chloride	U		5.0
2-Methylnaphthalene	U		5.0
MTBE	U		5.0
Naphthalene	U		5.0
n-Propylbenzene	U		1.0
Styrene	U		1.0
1,1,1,2-Tetrachloroethane	U		1.0
1,1,2,2-Tetrachloroethane	U		1.0
Tetrachloroethene	U		1.0
Toluene	U		1.0
1,2,4-Trichlorobenzene	U		5.0
1,1,1-Trichloroethane	U		1.0
1,1,2-Trichloroethane	U		1.0
Trichloroethene	U		1.0
Trichlorofluoromethane	U		1.0
1,2,3-Trichloropropane	U		1.0
1,2,3-Trimethylbenzene	U		1.0
1,2,4-Trimethylbenzene	U		1.0
1,3,5-Trimethylbenzene	U		1.0
Vinyl Chloride	U		1.0
m&p-Xylene	U		2.0
o-Xylene	U		1.0
4-Bromofluorobenzene(S)	100		80-120
Dibromofluoromethane(S)	103		80-120
1,2-Dichloroethane-d4(S)	97		80-120
Toluene-d8(S)	101		80-120

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Cadillac, MI 49601

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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

VI22F17A: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

EPA 8260D

Run Time: VI22F17A.LCS: 06/17/2022 09:21 [VI22F17A] VI22F17A.LCSD: 06/17/2022 09:47 [VI22F17A]

Analyte	LCS	LCS Result	LCS Rec.	Rec. Limits	LCS	LCSD	LCSD	LCSD	LCSD	RPD	RPD Limits	RPD
	Spike Amount	µg/L	%	%	Qualifier	Spike Amount	Result	Rec.	Qualifier	%	%	Qualifier
Acetone	50.0	22.2	44	54-140	*	50.0	21.0	42	*	5	20	
Acrylonitrile	50.0	45.8	92	70-130		50.0	43.3	87		6	20	
Benzene	50.0	52.4	105	80-120		50.0	51.2	102		3	20	
Bromobenzene	50.0	48.6	97	75-125		50.0	48.0	96		1	20	
Bromochloromethane	50.0	47.1	94	70-130		50.0	46.1	92		2	20	
Bromodichloromethane	50.0	54.3	109	75-120		50.0	54.3	109		0	20	
Bromoform	50.0	53.7	107	70-130		50.0	53.3	107		0	20	
Bromomethane	50.0	53.9	108	68-135		50.0	50.1	100		8	20	
2-Butanone	50.0	39.6	79	70-148		50.0	37.7	75		5	20	
n-Butylbenzene	50.0	62.3	125	70-133		50.0	60.1	120		4	20	
sec-Butylbenzene	50.0	57.3	115	70-125		50.0	55.0	110		4	20	
tert-Butylbenzene	50.0	56.4	113	70-130		50.0	54.7	109		4	20	
Carbon Disulfide	50.0	49.1	98	70-130		50.0	46.5	93		5	20	
Carbon Tetrachloride	50.0	49.9	100	70-130		50.0	48.2	96		4	20	
Chlorobenzene	50.0	54.5	109	80-120		50.0	53.5	107		2	20	
Chloroethane	50.0	52.5	105	61-130		50.0	49.6	99		6	20	
Chloroform	50.0	51.1	102	80-120		50.0	49.6	99		3	20	
Chloromethane	50.0	50.8	102	67-125		50.0	48.5	97		5	20	
2-Chlorotoluene	50.0	58.0	116	75-125		50.0	56.7	113		3	20	
1,2-Dibromo-3-chloropropane (SIM)	50.0	52.8	106	70-130		50.0	51.2	102		4	20	
Dibromochloromethane	50.0	52.7	105	70-130		50.0	52.3	105		0	20	
Dibromomethane	50.0	48.7	97	75-125		50.0	48.6	97		0	20	
1,2-Dichlorobenzene	50.0	53.4	107	70-120		50.0	53.3	107		0	20	
1,3-Dichlorobenzene	50.0	53.6	107	75-125		50.0	52.6	105		2	20	
1,4-Dichlorobenzene	50.0	51.2	102	75-125		50.0	50.6	101		1	20	
Dichlorodifluoromethane	50.0	55.5	111	70-136		50.0	52.1	104		7	20	
1,1-Dichloroethane	50.0	52.8	106	70-130		50.0	50.7	101		5	20	
1,2-Dichloroethane	50.0	44.2	88	70-130		50.0	43.8	88		0	20	
1,1-Dichloroethene	50.0	45.3	91	78-120		50.0	43.2	86		6	20	
cis-1,2-Dichloroethene	50.0	49.2	98	70-125		50.0	47.4	95		3	20	
trans-1,2-Dichloroethene	50.0	47.4	95	70-130		50.0	45.9	92		3	20	
1,2-Dichloropropane	50.0	55.4	111	80-121		50.0	54.6	109		2	20	
cis-1,3-Dichloropropene	50.0	52.5	105	70-130		50.0	52.0	104		1	20	

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Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

VI22F17A: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

EPA 8260D

Run Time: VI22F17A.LCS: 06/17/2022 09:21 [VI22F17A] VI22F17A.LCSD: 06/17/2022 09:47 [VI22F17A]

Analyte	LCS	LCS Result	LCS Rec.	Rec. Limits	LCS	LCSD	LCSD	LCSD	LCSD	RPD	RPD Limits	RPD
	Spike Amount				Qualifier	Spike Amount	Result	Rec.	Qualifier	%	%	Qualifier
	µg/L	µg/L	%	%		µg/L	µg/L	%		%		
trans-1,3-Dichloropropene	50.0	52.9	106	70-132		50.0	52.3	105		1	20	
Ethylbenzene	50.0	54.2	108	80-120		50.0	52.4	105		3	20	
Ethylene Dibromide	50.0	50.6	101	80-120		50.0	50.1	100		1	20	
2-Hexanone	50.0	43.0	86	70-130		50.0	40.5	81		6	20	
Isopropylbenzene	50.0	55.2	110	75-125		50.0	53.5	107		3	20	
4-Methyl-2-pentanone	50.0	56.8	114	70-130		50.0	54.4	109		4	20	
Methylene Chloride	50.0	45.9	92	70-130		50.0	44.9	90		2	20	
2-Methylnaphthalene	50.0	42.3	85	70-130		50.0	38.3	77		10	20	
MTBE	50.0	52.3	105	70-125		50.0	51.0	102		3	20	
Naphthalene	50.0	45.7	91	70-130		50.0	44.8	90		1	20	
n-Propylbenzene	50.0	57.9	116	70-130		50.0	56.1	112		4	20	
Styrene	50.0	47.6	95	70-130		50.0	46.3	93		2	20	
1,1,1,2-Tetrachloroethane	50.0	56.3	113	80-130		50.0	56.1	112		1	20	
1,1,2,2-Tetrachloroethane	50.0	62.6	125	70-130		50.0	61.7	123		2	20	
Tetrachloroethene	50.0	54.0	108	70-130		50.0	52.9	106		2	20	
Toluene	50.0	55.5	111	80-120		50.0	54.1	108		3	20	
1,2,4-Trichlorobenzene	50.0	47.8	96	70-130		50.0	47.8	96		0	20	
1,1,1-Trichloroethane	50.0	53.2	106	70-130		50.0	50.9	102		4	20	
1,1,2-Trichloroethane	50.0	53.3	107	75-125		50.0	52.7	105		2	20	
Trichloroethene	50.0	47.2	94	71-125		50.0	46.0	92		2	20	
Trichlorofluoromethane	50.0	49.4	99	70-133		50.0	47.2	94		5	20	
1,2,3-Trichloropropane	50.0	55.5	111	75-125		50.0	53.6	107		4	20	
1,2,3-Trimethylbenzene	50.0	54.5	109	70-130		50.0	53.9	108		1	20	
1,2,4-Trimethylbenzene	50.0	56.9	114	75-130		50.0	55.9	112		2	20	
1,3,5-Trimethylbenzene	50.0	56.9	114	75-130		50.0	55.6	111		3	20	
Vinyl Chloride	50.0	51.5	103	74-125		50.0	49.1	98		5	20	
m&p-Xylene	100	112	112	75-130		100	109	109		3	20	
o-Xylene	50.0	56.2	112	80-120		50.0	55.2	110		2	20	
4-Bromofluorobenzene(S)			101	80-120				102				
Dibromofluoromethane(S)			100	80-120				100				
1,2-Dichloroethane-d4(S)			93	80-120				91				
Toluene-d8(S)			101	80-120				102				

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VI22F17B: Method Blank (MB)

EPA 8260D

Run Time: VI22F17B.MB 06/17/2022 23:16 [VI22F17B]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
Acetone	U		50
Acrylonitrile	U		2.0
Benzene	U		1.0
Bromobenzene	U		1.0
Bromochloromethane	U		1.0
Bromodichloromethane	U		1.0
Bromoform	U		1.0
Bromomethane	U		5.0
2-Butanone	U		25
n-Butylbenzene	U		1.0
sec-Butylbenzene	U		1.0
tert-Butylbenzene	U		1.0
Carbon Disulfide	U		5.0
Carbon Tetrachloride	U		1.0
Chlorobenzene	U		1.0
Chloroethane	U		5.0
Chloroform	U		1.0
Chloromethane	U		5.0
2-Chlorotoluene	U		5.0
1,2-Dibromo-3-chloropropane (SIM)	U		1.0
Dibromochloromethane	U		5.0
Dibromomethane	U		5.0
1,2-Dichlorobenzene	U		1.0
1,3-Dichlorobenzene	U		1.0
1,4-Dichlorobenzene	U		1.0
Dichlorodifluoromethane	U		5.0
1,1-Dichloroethane	U		1.0
1,2-Dichloroethane	U		1.0
1,1-Dichloroethene	U		1.0
cis-1,2-Dichloroethene	U		1.0
trans-1,2-Dichloroethene	U		1.0
1,2-Dichloropropane	U		1.0
cis-1,3-Dichloropropene	U		0.50

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VI22F17B: Method Blank (MB)

EPA 8260D

Run Time: VI22F17B.MB 06/17/2022 23:16 [VI22F17B]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
trans-1,3-Dichloropropene	U		0.50
Ethylbenzene	U		1.0
Ethylene Dibromide	U		1.0
2-Hexanone	U		50
Isopropylbenzene	U		5.0
4-Methyl-2-pentanone	U		50
Methylene Chloride	U		5.0
2-Methylnaphthalene	U		5.0
MTBE	U		5.0
Naphthalene	U		5.0
n-Propylbenzene	U		1.0
Styrene	U		1.0
1,1,1,2-Tetrachloroethane	U		1.0
1,1,2,2-Tetrachloroethane	U		1.0
Tetrachloroethene	U		1.0
Toluene	U		1.0
1,2,4-Trichlorobenzene	U		5.0
1,1,1-Trichloroethane	U		1.0
1,1,2-Trichloroethane	U		1.0
Trichloroethene	U		1.0
Trichlorofluoromethane	U		1.0
1,2,3-Trichloropropane	U		1.0
1,2,3-Trimethylbenzene	U		1.0
1,2,4-Trimethylbenzene	U		1.0
1,3,5-Trimethylbenzene	U		1.0
Vinyl Chloride	U		1.0
m&p-Xylene	U		2.0
o-Xylene	U		1.0
4-Bromofluorobenzene(S)	101		80-120
Dibromofluoromethane(S)	104		80-120
1,2-Dichloroethane-d4(S)	98		80-120
Toluene-d8(S)	101		80-120

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Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

VI22F17B: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

EPA 8260D

Run Time: VI22F17B.LCS: 06/17/2022 21:57 [VI22F17B] VI22F17B.LCSD: 06/17/2022 22:23 [VI22F17B]

Analyte	LCS	LCS Result	LCS Rec.	Rec. Limits	LCS	LCSD	LCSD	LCSD	LCSD	RPD	RPD Limits	RPD
	Spike Amount	µg/L	%	%	Qualifier	Spike Amount	Result	Rec.	Qualifier	%	%	Qualifier
	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
Acetone	50.0	23.6	47	54-140	*	50.0	23.1	46	*	2	20	
Acrylonitrile	50.0	45.0	90	70-130		50.0	43.0	86		5	20	
Benzene	50.0	52.7	105	80-120		50.0	48.8	98		7	20	
Bromobenzene	50.0	48.2	96	75-125		50.0	45.6	91		5	20	
Bromochloromethane	50.0	46.9	94	70-130		50.0	44.0	88		7	20	
Bromodichloromethane	50.0	55.2	110	75-120		50.0	51.4	103		7	20	
Bromoform	50.0	52.6	105	70-130		50.0	50.4	101		4	20	
Bromomethane	50.0	54.2	108	68-135		50.0	49.0	98		10	20	
2-Butanone	50.0	39.2	78	70-148		50.0	37.0	74		5	20	
n-Butylbenzene	50.0	60.4	121	70-133		50.0	55.1	110		10	20	
sec-Butylbenzene	50.0	56.8	114	70-125		50.0	52.1	104		9	20	
tert-Butylbenzene	50.0	56.6	113	70-130		50.0	51.9	104		8	20	
Carbon Disulfide	50.0	48.6	97	70-130		50.0	43.9	88		10	20	
Carbon Tetrachloride	50.0	51.3	103	70-130		50.0	47.0	94		9	20	
Chlorobenzene	50.0	53.5	107	80-120		50.0	50.6	101		6	20	
Chloroethane	50.0	53.0	106	61-130		50.0	48.2	96		10	20	
Chloroform	50.0	53.0	106	80-120		50.0	48.9	98		8	20	
Chloromethane	50.0	51.4	103	67-125		50.0	47.0	94		9	20	
2-Chlorotoluene	50.0	57.4	115	75-125		50.0	53.4	107		7	20	
1,2-Dibromo-3-chloropropane (SIM)	50.0	51.4	103	70-130		50.0	49.2	98		5	20	
Dibromochloromethane	50.0	51.8	104	70-130		50.0	49.5	99		5	20	
Dibromomethane	50.0	46.9	94	75-125		50.0	45.6	91		3	20	
1,2-Dichlorobenzene	50.0	52.3	105	70-120		50.0	49.2	98		7	20	
1,3-Dichlorobenzene	50.0	52.2	104	75-125		50.0	48.8	98		6	20	
1,4-Dichlorobenzene	50.0	49.5	99	75-125		50.0	46.5	93		6	20	
Dichlorodifluoromethane	50.0	57.9	116	70-136		50.0	51.4	103		12	20	
1,1-Dichloroethane	50.0	53.5	107	70-130		50.0	49.6	99		8	20	
1,2-Dichloroethane	50.0	44.1	88	70-130		50.0	41.7	83		6	20	
1,1-Dichloroethene	50.0	46.4	93	78-120		50.0	42.5	85		9	20	
cis-1,2-Dichloroethene	50.0	50.4	101	70-125		50.0	46.9	94		7	20	
trans-1,2-Dichloroethene	50.0	47.8	96	70-130		50.0	43.7	87		10	20	
1,2-Dichloropropane	50.0	55.4	111	80-121		50.0	51.9	104		7	20	
cis-1,3-Dichloropropene	50.0	51.8	104	70-130		50.0	48.9	98		6	20	

1914 Holloway Drive
11766 E. Grand River
8660 S. Mackinaw Trail

Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

VI22F17B: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

EPA 8260D

Run Time: VI22F17B.LCS: 06/17/2022 21:57 [VI22F17B] VI22F17B.LCSD: 06/17/2022 22:23 [VI22F17B]

Analyte	LCS	LCS Result	LCS Rec.	Rec. Limits	LCS	LCSD	LCSD	LCSD	LCSD	RPD	RPD Limits	RPD
	Spike Amount				Qualifier	Spike Amount	Result	Rec.	Qualifier	%	%	Qualifier
	µg/L	µg/L	%	%		µg/L	µg/L	%		%		
trans-1,3-Dichloropropene	50.0	51.9	104	70-132		50.0	49.4	99		5	20	
Ethylbenzene	50.0	53.6	107	80-120		50.0	49.8	100		7	20	
Ethylene Dibromide	50.0	49.3	99	80-120		50.0	47.6	95		4	20	
2-Hexanone	50.0	40.8	82	70-130		50.0	38.9	78		5	20	
Isopropylbenzene	50.0	54.8	110	75-125		50.0	50.9	102		8	20	
4-Methyl-2-pentanone	50.0	54.4	109	70-130		50.0	52.6	105		4	20	
Methylene Chloride	50.0	46.3	93	70-130		50.0	43.2	86		8	20	
2-Methylnaphthalene	50.0	41.5	83	70-130		50.0	37.3	75		10	20	
MTBE	50.0	51.9	104	70-125		50.0	49.3	99		5	20	
Naphthalene	50.0	44.4	89	70-130		50.0	41.8	84		6	20	
n-Propylbenzene	50.0	57.7	115	70-130		50.0	53.0	106		8	20	
Styrene	50.0	46.7	93	70-130		50.0	43.9	88		6	20	
1,1,1,2-Tetrachloroethane	50.0	55.9	112	80-130		50.0	52.8	106		6	20	
1,1,2,2-Tetrachloroethane	50.0	61.8	124	70-130		50.0	58.8	118		5	20	
Tetrachloroethene	50.0	52.7	105	70-130		50.0	49.0	98		7	20	
Toluene	50.0	55.9	112	80-120		50.0	51.6	103		8	20	
1,2,4-Trichlorobenzene	50.0	46.3	93	70-130		50.0	43.1	86		8	20	
1,1,1-Trichloroethane	50.0	55.0	110	70-130		50.0	50.2	100		10	20	
1,1,2-Trichloroethane	50.0	52.2	104	75-125		50.0	50.0	100		4	20	
Trichloroethene	50.0	47.2	94	71-125		50.0	43.6	87		8	20	
Trichlorofluoromethane	50.0	51.3	103	70-133		50.0	46.2	92		11	20	
1,2,3-Trichloropropane	50.0	53.3	107	75-125		50.0	51.7	103		4	20	
1,2,3-Trimethylbenzene	50.0	54.0	108	70-130		50.0	50.4	101		7	20	
1,2,4-Trimethylbenzene	50.0	56.2	112	75-130		50.0	52.6	105		6	20	
1,3,5-Trimethylbenzene	50.0	56.5	113	75-130		50.0	52.5	105		7	20	
Vinyl Chloride	50.0	52.9	106	74-125		50.0	47.7	95		11	20	
m&p-Xylene	100	111	111	75-130		100	103	103		7	20	
o-Xylene	50.0	55.3	111	80-120		50.0	52.1	104		7	20	
4-Bromofluorobenzene(S)			102	80-120				102				
Dibromofluoromethane(S)			102	80-120				102				
1,2-Dichloroethane-d4(S)			91	80-120				92				
Toluene-d8(S)			103	80-120				101				

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11766 E. Grand River
8660 S. Mackinaw Trail

Holt, MI 48842
Brighton, MI 48116
Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

VI22F20A: Method Blank (MB)

EPA 8260D

Run Time: VI22F20A.MB 06/20/2022 11:34 [VI22F20A]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
Acetone	U		50
Acrylonitrile	U		2.0
Benzene	U		1.0
Bromobenzene	U		1.0
Bromochloromethane	U		1.0
Bromodichloromethane	U		1.0
Bromoform	U		1.0
Bromomethane	U		5.0
2-Butanone	U		25
n-Butylbenzene	U		1.0
sec-Butylbenzene	U		1.0
tert-Butylbenzene	U		1.0
Carbon Disulfide	U		5.0
Carbon Tetrachloride	U		1.0
Chlorobenzene	U		1.0
Chloroethane	U		5.0
Chloroform	U		1.0
Chloromethane	U		5.0
2-Chlorotoluene	U		5.0
1,2-Dibromo-3-chloropropane (SIM)	U		1.0
Dibromochloromethane	U		5.0
Dibromomethane	U		5.0
1,2-Dichlorobenzene	U		1.0
1,3-Dichlorobenzene	U		1.0
1,4-Dichlorobenzene	U		1.0
Dichlorodifluoromethane	U		5.0
1,1-Dichloroethane	U		1.0
1,2-Dichloroethane	U		1.0
1,1-Dichloroethene	U		1.0
cis-1,2-Dichloroethene	U		1.0
trans-1,2-Dichloroethene	U		1.0
1,2-Dichloropropane	U		1.0
cis-1,3-Dichloropropene	U		0.50

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8660 S. Mackinaw Trail

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Cadillac, MI 49601

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F: (810) 220-3311
F: (231) 775-8584

VI22F20A: Method Blank (MB)

EPA 8260D

Run Time: VI22F20A.MB 06/20/2022 11:34 [VI22F20A]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
trans-1,3-Dichloropropene	U		0.50
Ethylbenzene	U		1.0
Ethylene Dibromide	U		1.0
2-Hexanone	U		50
Isopropylbenzene	U		5.0
4-Methyl-2-pentanone	U		50
Methylene Chloride	U		5.0
2-Methylnaphthalene	U		5.0
MTBE	U		5.0
Naphthalene	U		5.0
n-Propylbenzene	U		1.0
Styrene	U		1.0
1,1,1,2-Tetrachloroethane	U		1.0
1,1,2,2-Tetrachloroethane	U		1.0
Tetrachloroethene	U		1.0
Toluene	U		1.0
1,2,4-Trichlorobenzene	U		5.0
1,1,1-Trichloroethane	U		1.0
1,1,2-Trichloroethane	U		1.0
Trichloroethene	U		1.0
Trichlorofluoromethane	U		1.0
1,2,3-Trichloropropane	U		1.0
1,2,3-Trimethylbenzene	U		1.0
1,2,4-Trimethylbenzene	U		1.0
1,3,5-Trimethylbenzene	U		1.0
Vinyl Chloride	U		1.0
m&p-Xylene	U		2.0
o-Xylene	U		1.0
4-Bromofluorobenzene(S)	101		80-120
Dibromofluoromethane(S)	100		80-120
1,2-Dichloroethane-d4(S)	95		80-120
Toluene-d8(S)	100		80-120

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VI22F20A: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

EPA 8260D

Run Time: VI22F20A.LCS: 06/20/2022 10:16 [VI22F20A] VI22F20A.LCSD: 06/20/2022 10:42 [VI22F20A]

Analyte	LCS	LCS Result	LCS Rec.	Rec. Limits	LCS	LCSD	LCSD	LCSD	LCSD	RPD	RPD Limits	RPD
	Spike Amount	µg/L	%	%	Qualifier	Spike Amount	Result	Rec.	Qualifier	%	%	Qualifier
Acetone	50.0	21.8	44	54-140	*	50.0	20.0	40	*	10	20	
Acrylonitrile	50.0	41.9	84	70-130		50.0	39.5	79		6	20	
Benzene	50.0	49.1	98	80-120		50.0	46.8	94		4	20	
Bromobenzene	50.0	45.3	91	75-125		50.0	43.9	88		3	20	
Bromochloromethane	50.0	43.9	88	70-130		50.0	42.5	85		3	20	
Bromodichloromethane	50.0	45.6	91	75-120		50.0	44.5	89		2	20	
Bromoform	50.0	47.1	94	70-130		50.0	45.2	90		4	20	
Bromomethane	50.0	53.3	107	68-135		50.0	50.7	101		6	20	
2-Butanone	50.0	36.9	74	70-148		50.0	34.5	69	*	7	20	
n-Butylbenzene	50.0	55.4	111	70-133		50.0	53.2	106		5	20	
sec-Butylbenzene	50.0	51.2	102	70-125		50.0	48.9	98		4	20	
tert-Butylbenzene	50.0	51.0	102	70-130		50.0	48.9	98		4	20	
Carbon Disulfide	50.0	44.7	89	70-130		50.0	44.8	90		1	20	
Carbon Tetrachloride	50.0	39.8	80	70-130		50.0	36.9	74		8	20	
Chlorobenzene	50.0	51.0	102	80-120		50.0	48.9	98		4	20	
Chloroethane	50.0	49.1	98	61-130		50.0	46.1	92		6	20	
Chloroform	50.0	47.3	95	80-120		50.0	46.6	93		2	20	
Chloromethane	50.0	48.0	96	67-125		50.0	46.4	93		3	20	
2-Chlorotoluene	50.0	53.2	106	75-125		50.0	51.0	102		4	20	
1,2-Dibromo-3-chloropropane (SIM)	50.0	46.1	92	70-130		50.0	43.1	86		7	20	
Dibromochloromethane	50.0	44.7	89	70-130		50.0	42.9	86		3	20	
Dibromomethane	50.0	46.7	93	75-125		50.0	44.5	89		4	20	
1,2-Dichlorobenzene	50.0	50.3	101	70-120		50.0	49.2	98		3	20	
1,3-Dichlorobenzene	50.0	49.7	99	75-125		50.0	48.6	97		2	20	
1,4-Dichlorobenzene	50.0	48.1	96	75-125		50.0	46.2	92		4	20	
Dichlorodifluoromethane	50.0	49.5	99	70-136		50.0	47.4	95		4	20	
1,1-Dichloroethane	50.0	49.0	98	70-130		50.0	43.6	87		12	20	
1,2-Dichloroethane	50.0	42.3	85	70-130		50.0	40.6	81		5	20	
1,1-Dichloroethene	50.0	41.5	83	78-120		50.0	39.5	79		5	20	
cis-1,2-Dichloroethene	50.0	46.1	92	70-125		50.0	44.3	89		3	20	
trans-1,2-Dichloroethene	50.0	43.5	87	70-130		50.0	45.2	90		3	20	
1,2-Dichloropropane	50.0	51.7	103	80-121		50.0	49.7	99		4	20	
cis-1,3-Dichloropropene	50.0	45.6	91	70-130		50.0	44.3	89		2	20	

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Cadillac, MI 49601

T: (517) 699-0345
T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
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F: (231) 775-8584

VI22F20A: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

EPA 8260D

Run Time: VI22F20A.LCS: 06/20/2022 10:16 [VI22F20A] VI22F20A.LCSD: 06/20/2022 10:42 [VI22F20A]

Analyte	LCS	LCS Result	LCS Rec.	Rec. Limits	LCS	LCSD	LCSD	LCSD	LCSD	RPD	RPD Limits	RPD
	Spike Amount				Qualifier	Spike Amount	Result	Rec.	Qualifier	%	%	Qualifier
	µg/L	µg/L	%	%		µg/L	µg/L	%		%		
trans-1,3-Dichloropropene	50.0	46.6	93	70-132		50.0	45.0	90		3	20	
Ethylbenzene	50.0	49.8	100	80-120		50.0	47.3	95		5	20	
Ethylene Dibromide	50.0	47.5	95	80-120		50.0	45.0	90		5	20	
2-Hexanone	50.0	38.6	77	70-130		50.0	34.6	69	*	11	20	
Isopropylbenzene	50.0	50.5	101	75-125		50.0	47.9	96		5	20	
4-Methyl-2-pentanone	50.0	51.2	102	70-130		50.0	46.4	93		9	20	
Methylene Chloride	50.0	43.2	86	70-130		50.0	41.7	83		4	20	
2-Methylnaphthalene	50.0	39.7	79	70-130		50.0	33.1	66	*	18	20	
MTBE	50.0	49.6	99	70-125		50.0	47.7	95		4	20	
Naphthalene	50.0	43.9	88	70-130		50.0	41.2	82		7	20	
n-Propylbenzene	50.0	52.3	105	70-130		50.0	49.8	100		5	20	
Styrene	50.0	44.3	89	70-130		50.0	42.5	85		5	20	
1,1,1,2-Tetrachloroethane	50.0	46.9	94	80-130		50.0	45.7	91		3	20	
1,1,2,2-Tetrachloroethane	50.0	58.1	116	70-130		50.0	55.2	110		5	20	
Tetrachloroethene	50.0	43.0	86	70-130		50.0	40.9	82		5	20	
Toluene	50.0	51.7	103	80-120		50.0	49.4	99		4	20	
1,2,4-Trichlorobenzene	50.0	45.1	90	70-130		50.0	43.9	88		2	20	
1,1,1-Trichloroethane	50.0	44.9	90	70-130		50.0	42.9	86		5	20	
1,1,2-Trichloroethane	50.0	51.4	103	75-125		50.0	49.1	98		5	20	
Trichloroethene	50.0	43.4	87	71-125		50.0	41.1	82		6	20	
Trichlorofluoromethane	50.0	45.2	90	70-133		50.0	43.1	86		5	20	
1,2,3-Trichloropropane	50.0	53.7	107	75-125		50.0	49.6	99		8	20	
1,2,3-Trimethylbenzene	50.0	50.8	102	70-130		50.0	49.3	99		3	20	
1,2,4-Trimethylbenzene	50.0	52.4	105	75-130		50.0	50.4	101		4	20	
1,3,5-Trimethylbenzene	50.0	52.2	104	75-130		50.0	50.0	100		4	20	
Vinyl Chloride	50.0	48.0	96	74-125		50.0	45.3	91		5	20	
m&p-Xylene	100	104	104	75-130		100	98.3	98		6	20	
o-Xylene	50.0	52.1	104	80-120		50.0	49.6	99		5	20	
4-Bromofluorobenzene(S)			100	80-120				101				
Dibromofluoromethane(S)			97	80-120				98				
1,2-Dichloroethane-d4(S)			91	80-120				90				
Toluene-d8(S)			100	80-120				100				

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T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
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VI22F23B: Method Blank (MB)

EPA 8260D

Run Time: VI22F23B.MB 06/23/2022 22:18 [VI22F23B]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
Bromomethane	U		5.0
4-Bromofluorobenzene(S)	100		80-120
Dibromofluoromethane(S)	102		80-120
1,2-Dichloroethane-d4(S)	95		80-120
Toluene-d8(S)	100		80-120

VI22F23B: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

EPA 8260D

Run Time: VI22F23B.LCS: 06/23/2022 20:59 [VI22F23B] VI22F23B.LCSD: 06/23/2022 21:26 [VI22F23B]

Analyte	LCS Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier	LCSD Spike Amount	LCSD Result	LCSD Rec.	LCSD Qualifier	RPD	RPD Limits	RPD Qualifier
	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
Bromomethane	50.0	52.6	105	68-135		50.0	52.1	104		1	20	
4-Bromofluorobenzene(S)			102	80-120				102				
Dibromofluoromethane(S)			100	80-120				100				
1,2-Dichloroethane-d4(S)			89	80-120				91				
Toluene-d8(S)			101	80-120				100				

VJ22F17A: Method Blank (MB)

EPA 8260D

Run Time: VJ22F17A.MB 06/17/2022 11:32 [VJ22F17A]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/kg		µg/kg
Acetone	U		1000
Acrylonitrile	U		100
Benzene	U		50
Bromobenzene	U		100
Bromochloromethane	U		100
Bromodichloromethane	U		100
Bromoform	U		100
Bromomethane	U		200
2-Butanone	U		750
n-Butylbenzene	U		50
sec-Butylbenzene	U		50
tert-Butylbenzene	U		50
Carbon Disulfide	U		250
Carbon Tetrachloride	U		50
Chlorobenzene	U		50
Chloroethane	U		250
Chloroform	U		50
Chloromethane	U		250
2-Chlorotoluene	U		50
1,2-Dibromo-3-chloropropane (SIM)	U		250
Dibromochloromethane	U		100
Dibromomethane	U		250
1,2-Dichlorobenzene	U		100
1,3-Dichlorobenzene	U		100
1,4-Dichlorobenzene	U		100
Dichlorodifluoromethane	U		250
1,1-Dichloroethane	U		50
1,2-Dichloroethane	U		50
1,1-Dichloroethene	U		50
cis-1,2-Dichloroethene	U		50
trans-1,2-Dichloroethene	U		50
1,2-Dichloropropane	U		50
cis-1,3-Dichloropropene	U		50

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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

VJ22F17A: Method Blank (MB)

EPA 8260D

Run Time: VJ22F17A.MB 06/17/2022 11:32 [VJ22F17A]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/kg		µg/kg
trans-1,3-Dichloropropene	U		50
Ethylbenzene	U		50
Ethylene Dibromide	U		50
2-Hexanone	U		2500
Isopropylbenzene	U		250
4-Methyl-2-pentanone	U		2500
Methylene Chloride	U		100
2-Methylnaphthalene	U		330
MTBE	U		250
Naphthalene	U		330
n-Propylbenzene	U		100
Styrene	U		50
1,1,1,2-Tetrachloroethane	U		100
1,1,2,2-Tetrachloroethane	U		50
Tetrachloroethene	U		50
Toluene	U		50
1,2,4-Trichlorobenzene	U		250
1,1,1-Trichloroethane	U		50
1,1,2-Trichloroethane	U		50
Trichloroethene	U		50
Trichlorofluoromethane	U		100
1,2,3-Trichloropropane	U		100
1,2,3-Trimethylbenzene	U		100
1,2,4-Trimethylbenzene	U		100
1,3,5-Trimethylbenzene	U		100
Vinyl Chloride	U		40
m&p-Xylene	U		100
o-Xylene	U		50
4-Bromofluorobenzene(S)	105		76-127
Dibromofluoromethane(S)	99		76-126
1,2-Dichloroethane-d4(S)	108		75-120
Toluene-d8(S)	100		80-120

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VJ22F17A: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

EPA 8260D

Run Time: VJ22F17A.LCS: 06/17/2022 10:19 [VJ22F17A] VJ22F17A.LCSD: 06/17/2022 10:43 [VJ22F17A]

Analyte	LCS	LCS Result	LCS Rec.	Rec. Limits	LCS	LCSD	LCSD	LCSD	LCSD	RPD	RPD Limits	RPD
	Spike Amount				Qualifier	Spike Amount	Result	Rec.	Qualifier	%	%	Qualifier
	µg/kg	µg/kg	%	%		µg/kg	µg/kg	%		%	%	
Acetone	2500	2210	88	50-149		2500	2350	94		7	20	
Acrylonitrile	2500	2970	119	70-130		2500	2930	117		2	20	
Benzene	2500	2610	104	75-125		2500	2480	99		5	20	
Bromobenzene	2500	2700	108	70-120		2500	2640	106		2	20	
Bromochloromethane	2500	2670	107	70-125		2500	2640	106		1	20	
Bromodichloromethane	2500	3090	123	70-130		2500	3030	121		2	20	
Bromoform	2500	3280	131	70-130	*	2500	3280	131	*	0	20	
Bromomethane	2500	2640	106	66-134		2500	2590	104		2	20	
2-Butanone	2500	2650	106	67-131		2500	2870	115		8	20	
n-Butylbenzene	2500	2870	115	70-130		2500	2750	110		4	20	
sec-Butylbenzene	2500	2740	110	70-130		2500	2650	106		4	20	
tert-Butylbenzene	2500	2690	107	70-130		2500	2600	104		3	20	
Carbon Disulfide	2500	2760	110	70-130		2500	2710	108		2	20	
Carbon Tetrachloride	2500	2900	116	70-130		2500	2740	110		5	20	
Chlorobenzene	2500	2660	106	75-125		2500	2580	103		3	20	
Chloroethane	2500	2930	117	70-141		2500	2810	113		3	20	
Chloroform	2500	2540	101	80-120		2500	2470	99		2	20	
Chloromethane	2500	2460	98	63-130		2500	2350	94		4	20	
2-Chlorotoluene	2500	2710	109	70-130		2500	2630	105		4	20	
1,2-Dibromo-3-chloropropane (SIM)	2500	3250	130	70-130		2500	3340	134	*	3	20	
Dibromochloromethane	2500	3260	130	70-130		2500	3240	129		1	20	
Dibromomethane	2500	2440	97	70-130		2500	2450	98		1	20	
1,2-Dichlorobenzene	2500	2620	105	75-120		2500	2590	104		1	20	
1,3-Dichlorobenzene	2500	2650	106	70-125		2500	2560	102		4	20	
1,4-Dichlorobenzene	2500	2590	104	70-125		2500	2540	102		2	20	
Dichlorodifluoromethane	2500	2730	109	65-135		2500	2580	103		6	20	
1,1-Dichloroethane	2500	2530	101	75-125		2500	2490	99		2	20	
1,2-Dichloroethane	2500	2530	101	70-130		2500	2490	100		1	20	
1,1-Dichloroethene	2500	2450	98	75-120		2500	2440	97		1	20	
cis-1,2-Dichloroethene	2500	2590	103	70-125		2500	2490	100		3	20	
trans-1,2-Dichloroethene	2500	2500	100	70-130		2500	2420	97		3	20	
1,2-Dichloropropane	2500	2860	114	80-120		2500	2770	111		3	20	
cis-1,3-Dichloropropene	2500	2810	112	70-125		2500	2750	110		2	20	

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T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

VJ22F17A: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

EPA 8260D

Run Time: VJ22F17A.LCS: 06/17/2022 10:19 [VJ22F17A] VJ22F17A.LCSD: 06/17/2022 10:43 [VJ22F17A]

Analyte	LCS	LCS Result	LCS Rec.	Rec. Limits	LCS	LCSD	LCSD	LCSD	LCSD	RPD	RPD Limits	RPD
	Spike Amount				Qualifier	Spike Amount	Result	Rec.	Qualifier	%	%	Qualifier
	µg/kg	µg/kg	%	%		µg/kg	µg/kg	%		%		
trans-1,3-Dichloropropene	2500	3080	123	70-125		2500	3040	122		1	20	
Ethylbenzene	2500	2720	109	80-120		2500	2590	103		6	20	
Ethylene Dibromide	2500	2780	111	70-125		2500	2780	111		0	20	
2-Hexanone	2500	3320	133	70-130	*	2500	3540	141	*	6	20	
Isopropylbenzene	2500	2650	106	75-130		2500	2510	100		6	20	
4-Methyl-2-pentanone	2500	3160	127	70-130		2500	3330	133	*	5	20	
Methylene Chloride	2500	2370	95	70-130		2500	2320	93		2	20	
2-Methylnaphthalene	2500	2410	96	61-136		2500	2600	104		8	20	
MTBE	2500	2650	106	70-130		2500	2670	107		1	20	
Naphthalene	2500	2550	102	70-125		2500	2600	104		2	20	
n-Propylbenzene	2500	2770	111	70-130		2500	2660	106		5	20	
Styrene	2500	2240	90	75-125		2500	2200	88		2	20	
1,1,1,2-Tetrachloroethane	2500	3170	127	75-125	*	2500	3090	124		2	20	
1,1,2,2-Tetrachloroethane	2500	3090	124	70-130		2500	3070	123		1	20	
Tetrachloroethene	2500	2620	105	70-130		2500	2500	100		5	20	
Toluene	2500	2570	103	80-120		2500	2470	99		4	20	
1,2,4-Trichlorobenzene	2500	2510	100	70-130		2500	2500	100		0	20	
1,1,1-Trichloroethane	2500	2710	109	70-130		2500	2620	105		4	20	
1,1,2-Trichloroethane	2500	2740	110	70-125		2500	2750	110		0	20	
Trichloroethene	2500	2500	100	75-125		2500	2410	96		4	20	
Trichlorofluoromethane	2500	3020	121	50-150		2500	2890	116		4	20	
1,2,3-Trichloropropane	2500	2830	113	70-130		2500	2790	112		1	20	
1,2,3-Trimethylbenzene	2500	2640	106	70-130		2500	2590	104		2	20	
1,2,4-Trimethylbenzene	2500	2700	108	70-130		2500	2600	104		4	20	
1,3,5-Trimethylbenzene	2500	2670	107	70-130		2500	2580	103		4	20	
Vinyl Chloride	2500	2690	107	69-120		2500	2560	102		5	20	
m&p-Xylene	5000	5440	109	80-125		5000	5210	104		5	20	
o-Xylene	2500	2590	104	75-125		2500	2500	100		4	20	
4-Bromofluorobenzene(S)			104	76-127				104				
Dibromofluoromethane(S)			99	76-126				99				
1,2-Dichloroethane-d4(S)			102	75-120				103				
Toluene-d8(S)			101	80-120				100				

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F: (517) 699-0388
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VM22F21B: Method Blank (MB)

EPA 8260D

Run Time: VM22F21B.MB 06/21/2022 12:46 [VM22F21B]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
Acetone	U		50
Acrylonitrile	U		2.0
Benzene	U		1.0
Bromobenzene	U		1.0
Bromochloromethane	U		1.0
Bromodichloromethane	U		1.0
Bromoform	U		1.0
2-Butanone	U		25
n-Butylbenzene	U		1.0
sec-Butylbenzene	U		1.0
tert-Butylbenzene	U		1.0
Carbon Disulfide	U		5.0
Carbon Tetrachloride	U		1.0
Chlorobenzene	U		1.0
Chloroethane	U		5.0
Chloroform	U		1.0
Chloromethane	U		5.0
2-Chlorotoluene	U		5.0
1,2-Dibromo-3-chloropropane (SIM)	U		1.0
Dibromochloromethane	U		5.0
Dibromomethane	U		5.0
1,2-Dichlorobenzene	U		1.0
1,3-Dichlorobenzene	U		1.0
1,4-Dichlorobenzene	U		1.0
Dichlorodifluoromethane	U		5.0
1,1-Dichloroethane	U		1.0
1,2-Dichloroethane	U		1.0
1,1-Dichloroethene	U		1.0
cis-1,2-Dichloroethene	U		1.0
trans-1,2-Dichloroethene	U		1.0
1,2-Dichloropropane	U		1.0
cis-1,3-Dichloropropene	U		0.50
trans-1,3-Dichloropropene	U		0.50

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T: (231) 775-8368

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VM22F21B: Method Blank (MB)

EPA 8260D

Run Time: VM22F21B.MB 06/21/2022 12:46 [VM22F21B]

Analyte	MB Result	MB Qualifier	MB RDL
	µg/L		µg/L
Ethylbenzene	U		1.0
Ethylene Dibromide	U		1.0
2-Hexanone	U		50
Isopropylbenzene	U		5.0
4-Methyl-2-pentanone	U		50
Methylene Chloride	U		5.0
2-Methylnaphthalene	U		5.0
MTBE	U		5.0
Naphthalene	U		5.0
n-Propylbenzene	U		1.0
Styrene	U		1.0
1,1,1,2-Tetrachloroethane	U		1.0
1,1,2,2-Tetrachloroethane	U		1.0
Tetrachloroethene	U		1.0
Toluene	U		1.0
1,2,4-Trichlorobenzene	U		5.0
1,1,1-Trichloroethane	U		1.0
1,1,2-Trichloroethane	U		1.0
Trichloroethene	U		1.0
Trichlorofluoromethane	U		1.0
1,2,3-Trichloropropane	U		1.0
1,2,3-Trimethylbenzene	U		1.0
1,2,4-Trimethylbenzene	U		1.0
1,3,5-Trimethylbenzene	U		1.0
Vinyl Chloride	U		1.0
m&p-Xylene	U		2.0
o-Xylene	U		1.0
4-Bromofluorobenzene(S)	90		80-120
Dibromofluoromethane(S)	112		80-120
1,2-Dichloroethane-d4(S)	82		80-120
Toluene-d8(S)	97		80-120

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VM22F21B: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

EPA 8260D

Run Time: VM22F21B.LCS: 06/21/2022 11:21 [VM22F21B] VM22F21B.LCSD: 06/21/2022 11:50 [VM22F21B]

Analyte	LCS	LCS Result	LCS Rec.	Rec. Limits	LCS	LCSD	LCSD	LCSD	LCSD	RPD	RPD Limits	RPD
	Spike Amount				Qualifier	Spike Amount	Result	Rec.	Qualifier	%	%	Qualifier
	µg/L	µg/L	%	%		µg/L	µg/L	%		%		
Acetone	50.0	28.1	56	54-140		50.0	29.2	58		4	20	
Acrylonitrile	50.0	57.3	115	70-130		50.0	56.7	113		2	20	
Benzene	50.0	48.2	96	80-120		50.0	47.7	95		1	20	
Bromobenzene	50.0	46.3	93	75-125		50.0	45.5	91		2	20	
Bromochloromethane	50.0	51.2	102	70-130		50.0	50.0	100		2	20	
Bromodichloromethane	50.0	62.4	125	75-120	*	50.0	61.3	123	*	2	20	
Bromoform	50.0	89.7	179	70-130	*	50.0	90.7	181	*	1	20	
2-Butanone	50.0	42.5	85	70-148		50.0	42.7	85		0	20	
n-Butylbenzene	50.0	50.5	101	70-133		50.0	48.3	97		4	20	
sec-Butylbenzene	50.0	52.2	104	70-125		50.0	50.4	101		3	20	
tert-Butylbenzene	50.0	51.0	102	70-130		50.0	49.5	99		3	20	
Carbon Disulfide	50.0	64.7	129	70-130		50.0	69.3	139	*	7	20	
Carbon Tetrachloride	50.0	55.8	112	70-130		50.0	53.2	106		6	20	
Chlorobenzene	50.0	51.8	104	80-120		50.0	50.9	102		2	20	
Chloroethane	50.0	60.9	122	61-130		50.0	53.9	108		12	20	
Chloroform	50.0	52.9	106	80-120		50.0	52.5	105		1	20	
Chloromethane	50.0	58.4	117	67-125		50.0	54.9	110		6	20	
2-Chlorotoluene	50.0	49.5	99	75-125		50.0	47.6	95		4	20	
1,2-Dibromo-3-chloropropane (SIM)	50.0	94.2	188	70-130	*	50.0	95.6	191	*	2	20	
Dibromochloromethane	50.0	67.8	136	70-130	*	50.0	70.6	141	*	4	20	
Dibromomethane	50.0	56.3	113	75-125		50.0	55.6	111		2	20	
1,2-Dichlorobenzene	50.0	52.0	104	70-120		50.0	51.4	103		1	20	
1,3-Dichlorobenzene	50.0	53.8	108	75-125		50.0	52.5	105		3	20	
1,4-Dichlorobenzene	50.0	51.1	102	75-125		50.0	50.1	100		2	20	
Dichlorodifluoromethane	50.0	49.1	98	70-136		50.0	47.9	96		2	20	
1,1-Dichloroethane	50.0	51.8	104	70-130		50.0	50.7	101		3	20	
1,2-Dichloroethane	50.0	39.1	78	70-130		50.0	38.6	77		1	20	
1,1-Dichloroethene	50.0	44.8	90	78-120		50.0	46.9	94		4	20	
cis-1,2-Dichloroethene	50.0	49.8	100	70-125		50.0	48.3	97		3	20	
trans-1,2-Dichloroethene	50.0	48.6	97	70-130		50.0	47.0	94		3	20	
1,2-Dichloropropane	50.0	50.4	101	80-121		50.0	50.2	100		1	20	
cis-1,3-Dichloropropene	50.0	62.6	125	70-130		50.0	62.5	125		0	20	
trans-1,3-Dichloropropene	50.0	68.3	137	70-132	*	50.0	67.5	135	*	1	20	

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T: (810) 220-3300
T: (231) 775-8368

F: (517) 699-0388
F: (810) 220-3311
F: (231) 775-8584

VM22F21B: Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

EPA 8260D

Run Time: VM22F21B.LCS: 06/21/2022 11:21 [VM22F21B] VM22F21B.LCSD: 06/21/2022 11:50 [VM22F21B]

Analyte	LCS	LCS Result	LCS Rec.	Rec. Limits	LCS	LCSD	LCSD	LCSD	LCSD	RPD	RPD Limits	RPD
	Spike Amount				Qualifier	Spike Amount	Result	Rec.	Qualifier	%	%	Qualifier
	µg/L	µg/L	%	%		µg/L	µg/L	%		%	%	
Ethylbenzene	50.0	50.8	102	80-120		50.0	49.1	98		4	20	
Ethylene Dibromide	50.0	54.2	108	80-120		50.0	56.2	112		4	20	
2-Hexanone	50.0	48.6	97	70-130		50.0	49.5	99		2	20	
Isopropylbenzene	50.0	52.1	104	75-125		50.0	50.1	100		4	20	
4-Methyl-2-pentanone	50.0	72.5	145	70-130	*	50.0	71.5	143	*	1	20	
Methylene Chloride	50.0	47.4	95	70-130		50.0	45.9	92		3	20	
2-Methylnaphthalene	50.0	53.4	107	70-130		50.0	50.8	102		5	20	
MTBE	50.0	48.9	98	70-125		50.0	49.9	100		2	20	
Naphthalene	50.0	48.2	96	70-130		50.0	46.8	94		2	20	
n-Propylbenzene	50.0	51.5	103	70-130		50.0	49.7	99		4	20	
Styrene	50.0	48.1	96	70-130		50.0	47.1	94		2	20	
1,1,1,2-Tetrachloroethane	50.0	67.6	135	80-130	*	50.0	69.8	140	*	4	20	
1,1,2,2-Tetrachloroethane	50.0	64.6	129	70-130		50.0	64.8	130		1	20	
Tetrachloroethene	50.0	49.4	99	70-130		50.0	49.7	99		0	20	
Toluene	50.0	53.6	107	80-120		50.0	51.2	102		5	20	
1,2,4-Trichlorobenzene	50.0	48.9	98	70-130		50.0	46.7	93		5	20	
1,1,1-Trichloroethane	50.0	54.8	110	70-130		50.0	53.6	107		3	20	
1,1,2-Trichloroethane	50.0	50.6	101	75-125		50.0	52.7	105		4	20	
Trichloroethene	50.0	47.3	95	71-125		50.0	46.5	93		2	20	
Trichlorofluoromethane	50.0	54.7	109	70-133		50.0	50.4	101		8	20	
1,2,3-Trichloropropane	50.0	51.9	104	75-125		50.0	51.4	103		1	20	
1,2,3-Trimethylbenzene	50.0	50.3	101	70-130		50.0	49.0	98		3	20	
1,2,4-Trimethylbenzene	50.0	51.2	102	75-130		50.0	49.9	100		2	20	
1,3,5-Trimethylbenzene	50.0	50.6	101	75-130		50.0	49.6	99		2	20	
Vinyl Chloride	50.0	59.5	119	74-125		50.0	55.1	110		8	20	
m&p-Xylene	100	100	100	75-130		100	96.5	97		3	20	
o-Xylene	50.0	50.5	101	80-120		50.0	49.3	99		2	20	
4-Bromofluorobenzene(S)			96	80-120				95				
Dibromofluoromethane(S)			112	80-120				113				
1,2-Dichloroethane-d4(S)			80	80-120				80				
Toluene-d8(S)			103	80-120				100				

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Definitions/Qualifiers:

- U: The analyte was not detected at or above the Reporting Limit (RL).
*: Value reported is outside QC limits

Exception Summary:

Exceptions have been properly noted on reported results or affected samples have been scheduled for reanalysis when appropriate.

Report Generated By:



By Jacob Sutherland at 3:29 PM, Jun 30, 2022



Case Narrative

Client: Soil and Materials Engineers, Inc.
 Project Name: 086124.00.03B.006

Six soil and seven water samples, including blanks, were collected on June 13, 2022 and received by Fibertec, Inc. on June 14, 2022. The shipping cooler temperature was within specifications (0 – 6 °C), and the sample containers arrived without any visible signs of tampering or breakage. Containers were checked for correct pH, where appropriate.

Exceptions are noted below.

Cross reference

Lab ID #	Client ID #	Matrix	Requested Tests
A09128-001	SB1 (2-4)	Soil	%Moisture, Trace Metals, PCBs, VOCs, SVOCs
A09128-002	SB2 (4-6)	Soil	%Moisture, Trace Metals, PCBs, VOCs, SVOCs
A09128-003	SB2 (6-11)	Water	Trace Metals, PCBs, VOCs, SVOCs
A09128-004	SB4 (3-4)	Soil	%Moisture, Trace Metals, PCBs, VOCs, SVOCs
A09128-005	SB5 (3-5)	Soil	%Moisture, Trace Metals, PCBs, VOCs, SVOCs
A09128-006	SB3 (5-7)	Soil	%Moisture, Trace Metals, PCBs, VOCs, SVOCs
A09128-007	SB3 (5-10)	Water	Trace Metals, PCBs, VOCs, SVOCs
A09128-008	MS (SB3 (5-10))	Water	Trace Metals, PCBs, VOCs, SVOCs
A09128-009	MSD (SB3 (5-10))	Water	Trace Metals, PCBs, VOCs, SVOCs
A09128-010	DUP Soil	Soil	%Moisture, Trace Metals, PCBs, VOCs, SVOCs
A09128-011	DUP GW	Water	Trace Metals, PCBs, VOCs, SVOCs
A09128-012	Trip Blank	Water	VOCs
A09128-013	EQUIPMENT BLANK	Water	Trace Metals, PCBs, VOCs, SVOCs

Exceptions

Volatile Organic Compounds Method: EPA 5035A/EPA 8260D

Multiple compounds on various samples were qualified as estimated due to high Continuing Calibration Verification, Laboratory Control Sample (LCS) and/or Laboratory Control Sample Duplicate (LCSD). Results may be biased high, but were non-detect.

Total Mercury Method: EPA 7470A

Samples -003, -007, -008, -009, -011 and -013 were qualified for Mercury due to high Laboratory Control Sample. Results may be biased high, but were non-detect, except for MS/MSD.

Sample -007 was qualified for Mercury as the spiked sample recovery was high. Results may be biased high, but were non-detect.



Case Narrative

Michigan 10 Elements Method: EPA 3005A/EPA 6020A

The Matrix Spike/Matrix Spike Duplicate (MS/MSD) pair exhibited an RPD for Zinc (26%) exceeding criteria (RPD \leq 20%) associated with sample -007. This indicates increased variability with the results.

Volatile Organic Compounds Method EPA: 5030C/EPA 8260D

Multiple compounds on various samples were qualified as estimated due to high Continuing Calibration Verification, Laboratory Control Sample (LCS) and/or Laboratory Control Sample Duplicate (LCSD). Results may be biased high, but were non-detect, except for MS/MSD.

The following samples were qualified for the listed compounds due to low Laboratory Control Sample (LCS) and/or Laboratory Control Sample Duplicate (LCSD). Results may be biased low.

Samples -007, -008 and -009: Acetone: LCS 47% recovery / LCSD 46% recovery, with criteria being 54-140%.

Sample -011: Acetone: LCS 44% recovery / LCSD 40% recovery, with criteria being 54-140%.

Samples -012 and -013: Acetone: LCS 44% recovery / LCSD 42% recovery, with criteria being 54-140%.

Sample -011: 2-Butanone: LCSD 69% recovery with criteria being 70-148%.

Sample -011: 2-Hexanone: LCSD 69% recovery with criteria being 70-130%.

Sample -011: 2-Methylnaphthalene: LCSD 66% recovery with criteria being 70-130%.

Sample -007 was qualified for the listed compounds as the spiked sample recovery was low for the Matrix Spike (MS) and/or Matrix Spike Duplicate (MSD). The Laboratory Control Sample (LCS) was acceptable for 2-Methylnaphthalene only. Results may be biased low.

Acetone: MS 43% recovery / MSD 45% recovery, with criteria being 54-140%, LCS 47% recovery

2-Methylnaphthalene: MS 63% recovery / MSD 66% recovery, with criteria being 70-130%, LCS 83% recovery

Sample -011 was qualified as estimated for 2-Methylnaphthalene due to low Continuing Calibration Verification (78% recovery with criteria being 80-120%). Results may be biased low.



Case Narrative

Polynuclear Aromatic Hydrocarbons Method: EPA 3535A/EPA 8270E

Sample -007 was qualified for the listed compounds as the spiked sample recovery was high for the Matrix Spike Duplicate (MSD). The Laboratory Control Sample (LCS) was acceptable. Results may be biased high, but were non-detect.

Benzo(b)fluoranthene (SIM): MSD 120% recovery with criteria being 58-118%, LCS 90% recovery

Benzo(k)fluoranthene: MSD 122% recovery with criteria being 56-120%, LCS 82% recovery

No further exceptions were observed.

Client Name: SME				MATRIX (SEE RIGHT CORNER FOR CODE)	# OF CONTAINERS	PARAMETERS										Matrix Code			Deliverables										
Contact Person: Anita Ketola						VOC's	PAH's	PCB's	MI 10 Metals	S	W	X	X	X	X	S	GW	Ground Water	Level 2										
Project Name/ Number: 086124.00.03B.006																				A	Air	SW	Surface Water	Level 3					
Email distribution list: Anita.Ketola@sme-usa.com																									O	Oil	WW	Waste Water	Level 4
Quote#																													
Purchase Order#				HOLD SAMPLE	Remarks:	S	Soil	GW	Ground Water																				
Date										Time	Sample #	Client Sample Descriptor	S	W	X	X	X	X	S	GW	Ground Water	Level 2							
6/13/22				0915		SB1 (2-4)	S	W	X														X	X	X	S	GW	Ground Water	Level 2
										0945		SB2 (4-6)	S	W	X	X	X	X	S	GW	Ground Water	Level 2							
				1015		SB2 (6-11)	S	W	X														X	X	X	S	GW	Ground Water	Level 2
										1100		SB4 (3-4)	S	W	X	X	X	X	S	GW	Ground Water	Level 2							
				1120		SB5 (3-5)	S	W	X														X	X	X	S	GW	Ground Water	Level 2
										1145		SB3 (5-7)	S	W	X	X	X	X	S	GW	Ground Water	Level 2							
				1200		SB3 (5-10)	S	W	X														X	X	X	S	GW	Ground Water	Level 2
										1200		MS (SB3 (5-10))	S	W	X	X	X	X	S	GW	Ground Water	Level 2							
				1200		MSD (SB3 (5-10))	S	W	X														X	X	X	S	GW	Ground Water	Level 2
										↓		DUP Soil	S	W	X	X	X	X	S	GW	Ground Water	Level 2							
Comments:				S	W	X	X	X	X														X	X	X	S	GW	Ground Water	Level 2
										S	W	X	X	X	X	X	X	X	S	GW	Ground Water	Level 2							

Received By Lab
JUN 14 2022
Initials: SM

Sampled/Relinquished By: Jacob Lindsay Jacob Lindsay		Date/Time: 6/13/22 1500	Received By: SME Cold Storage
Relinquished By: SME C.I.S Storage/Paul John		Date/Time: 6/14/22 235	Received By: Paul John 6/14/22 2:35
Relinquished By: Paul John		Date/Time: 6/14/22 1635	Received By Laboratory: Paul John

Turnaround Time ALL RESULTS WILL BE SENT BY THE END OF THE BUSINESS DAY

1 bus. day
 2 bus. days
 3 bus. days
 4 bus. days
 5-7 bus. days (standard)
 Other (specify time/date requirement): _____

LAB USE ONLY

Fibertec project number: **A09128**

Temperature upon receipt at Lab: **4.70**

Received On Ice

Please see back for terms and conditions

Client Name: SME		MATRIX (SEE RIGHT CORNER FOR CODE) # OF CONTAINERS VOCS PAHs PCBS MI 10 Metals		PARAMETERS										Matrix Code			Deliverables				
Contact Person: Anita Ketola				HOLD SAMPLE	S	Soil	GW	Ground Water										Level 2			
Project Name/ Number: D86124.DD, D3B.D06					A	Air	SW	Surface Water										Level 3			
Email distribution list: Anita.Ketola@sme-usa.com				O	Oil	WW	Waste Water										Level 4				
Quote#				P	Wipe	X	Other: Specify										EDD				
Purchase Order#				Remarks:																	
Date	Time	Sample #	Client Sample Descriptor																		
6/13/22			DUP GW										GW	5	X	X	X	X			
↓	1250		Trip Blank										S	1	X						
↓	1445		Equipment Blank										GW	5	X	X	X	X			
Received By Lab																					
JUN 14 2022																					
Initials: JK																					
Comments:																					
Sampled/Relinquished By:			Date/Time				Received By:														
Jacob Lindsay Gubert			6/13/22 1500				SME Cold Storage														
Relinquished By:			Date/Time				Received By:														
SME Cold Storage Paul			6/14/22 235				Paul														
Relinquished By:			Date/Time				Received By Laboratory:														
Paul			6/14/22 1635				Paul														
Turnaround time ALL RESULTS WILL BE SENT BY THE END OF THE BUSINESS DAY																					
LAB USE ONLY																					
<input type="checkbox"/> 1 bus. day <input type="checkbox"/> 2 bus. days <input type="checkbox"/> 3 bus. days <input type="checkbox"/> 4 bus. days <input checked="" type="checkbox"/> 5-7 bus. days (standard) Other (specify time/date requirement): _____																					
Fibertec project number: A09128 Temperature upon receipt at Lab: 4.7°C																					
Please see back for terms and conditions																					



Tuesday, July 19, 2022

Fibertec Project Number: A09128 Supplemental
Project Identification: 086124.00.03B.006 /086124.00.03B.006
Submittal Date: 06/14/2022

Ms. Anita Ketola
Soil and Materials Engineers, Inc. - Plymouth
43980 Plymouth Oaks Blvd
Plymouth, MI 48170

Dear Ms. Ketola,

Thank you for selecting Fibertec Environmental Services as your analytical laboratory. The samples you submitted have been analyzed in accordance with NELAC standards and the results compiled in the attached report. Any exceptions to NELAC compliance are noted in the report. These results apply only to those samples submitted. Please note TO-15 samples will be disposed of 7 calendar days after the reporting date. All other samples will be disposed of 30 days after the reporting date.

If you have any questions regarding these results or if we may be of further assistance to you, please contact me at (517) 699-0345.

Sincerely,

By Bailey Welch at 8:45 AM, Jul 19, 2022

For Daryl P. Strandbergh
Laboratory Director

Enclosures

1914 Holloway Drive
11766 E Grand River
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Hbt, MI 48842
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Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-001

Order: A09128
 Date: 07/19/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB1 (2-4)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 09:15

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C Aliquot ID: **A09128-001** Matrix: **Soil/Solid**
 Method: **ASTM D2216-10** Description: **SB1 (2-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	14		%	1	1.0	06/15/22	MC220615	06/16/22	MC220615	LJK

Lead, MDEQ Criteria Aliquot ID: **A09128-001B** Matrix: **Soil/Solid**
 Method: **EPA 0200.2/EPA 6020A** Description: **SB1 (2-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead, Coarse Fraction	354000		µg/kg	1000	100	07/15/22	PT22G15A	07/15/22	T422G15A	CJA
2. Lead, Fine Fraction	494000		µg/kg	2000	100	07/15/22	PT22G15A	07/15/22	T422G15A	CJA
3. Lead, Total (Calculated)	359000		µg/kg	1000	1.0	NA	NA	07/15/22	NA	CJA
‡ 4. Percent Total Solids	85.1		%	0.1	1.0	NA	NA	07/15/22	NA	CJA

Chromium, Hexavalent Aliquot ID: **A09128-001** Matrix: **Soil/Solid**
 Method: **EPA 3060A/EPA 7196A** Description: **SB1 (2-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Chromium VI	U	H	µg/kg	460	1.0	07/14/22	W322G14B	07/15/22	W322G14B	MJS

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Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-002

Order: A09128
 Date: 07/19/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB2 (4-6)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 09:45

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C Aliquot ID: **A09128-002** Matrix: **Soil/Solid**
 Method: **ASTM D2216-10** Description: **SB2 (4-6)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	31		%	1	1.0	06/15/22	MC220615	06/16/22	MC220615	LJK

Lead, MDEQ Criteria Aliquot ID: **A09128-002B** Matrix: **Soil/Solid**
 Method: **EPA 0200.2/EPA 6020A** Description: **SB2 (4-6)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead, Coarse Fraction	120000		µg/kg	1000	100	07/15/22	PT22G15A	07/15/22	T422G15A	CJA
2. Lead, Fine Fraction	136000		µg/kg	2000	100	07/15/22	PT22G15A	07/15/22	T422G15A	CJA
3. Lead, Total (Calculated)	120000		µg/kg	1000	1.0	NA	NA	07/15/22	NA	CJA
‡ 4. Percent Total Solids	74.7		%	0.1	1.0	NA	NA	07/15/22	NA	CJA

Chromium, Hexavalent Aliquot ID: **A09128-002** Matrix: **Soil/Solid**
 Method: **EPA 3060A/EPA 7196A** Description: **SB2 (4-6)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Chromium VI	U	H	µg/kg	580	1.0	07/14/22	W322G14B	07/15/22	W322G14B	MJS

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Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-004

Order: A09128
 Date: 07/19/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB4 (3-4)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:00

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Lead, MDEQ Criteria Aliquot ID: **A09128-004B** Matrix: **Soil/Solid**
 Method: **EPA 0200.2/EPA 6020A** Description: **SB4 (3-4)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Lead, Coarse Fraction	53600		µg/kg	1000	100	07/15/22	PT22G15A	07/15/22	T422G15A	CJA
2. Lead, Fine Fraction	109000		µg/kg	2000	100	07/15/22	PT22G15A	07/15/22	T422G15A	CJA
3. Lead, Total (Calculated)	56100		µg/kg	1000	1.0	NA	NA	07/15/22	NA	CJA
‡ 4. Percent Total Solids	88.1		%	0.1	1.0	NA	NA	07/15/22	NA	CJA

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Analytical Laboratory Report
Laboratory Project Number: A09128
Laboratory Sample Number: A09128-006

Order: A09128
 Date: 07/19/22

Client Identification: Soil and Materials Engineers, Inc. - Plymouth	Sample Description: SB3 (5-7)	Chain of Custody: 203128
Client Project Name: 086124.00.03B.006	Sample No:	Collect Date: 06/13/22
Client Project No: 086124.00.03B.006	Sample Matrix: Soil/Solid	Collect Time: 11:45

Sample Comments: **Soil results have been calculated and reported on a dry weight basis unless otherwise noted.**

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Water (Moisture) Content Dried at 105 ± 5°C Aliquot ID: **A09128-006** Matrix: **Soil/Solid**
Method: ASTM D2216-10 Description: **SB3 (5-7)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
‡ 1. Percent Moisture (Water Content)	17		%	1	1.0	06/15/22	MC220615	06/16/22	MC220615	LJK

Chromium, Hexavalent Aliquot ID: **A09128-006** Matrix: **Soil/Solid**
Method: EPA 3060A/EPA 7196A Description: **SB3 (5-7)**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation		Analysis		
						P. Date	P. Batch	A. Date	A. Batch	Init.
1. Chromium VI	U	H	µg/kg	480	1.0	07/14/22	W322G14B	07/15/22	W322G14B	MJS

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Definitions/ Qualifiers:

- A:** Spike recovery or precision unusable due to dilution.
- B:** The analyte was detected in the associated method blank.
- E:** The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated.
- J:** The concentration is an estimated value.
- M:** Modified Method
- U:** The analyte was not detected at or above the reporting limit.
- X:** Matrix Interference has resulted in a raised reporting limit or distorted result.
- W:** Results reported on a wet-weight basis.
- *:** Value reported is outside QC limits

Exception Summary:

H : Hold time exceeded.

Analysis Locations:

All analyses performed in Holt.



Accreditation Number(s):

T104704518-19-8 (TX)

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Case Narrative

Client: Soil and Materials Engineers, Inc.
Project Name: 086124.00.03B.006

On July 13, 2022 a request for additional analysis was received, as listed below. The samples were prepared and analyzed within the required holding times.

Exceptions are noted below.

Cross reference

Lab ID #	Client ID #	Matrix	Requested Tests
A09128-001	SB1 (2-4)	Soil	%Moisture, F/C Lead, Hexavalent Chromium
A09128-002	SB2 (4-6)	Soil	%Moisture, F/C Lead, Hexavalent Chromium
A09128-004	SB4 (3-4)	Soil	F/C Lead
A09128-006	SB3 (5-7)	Soil	%Moisture, Hexavalent Chromium

Exceptions

Hexavalent Chromium Method: EPA 3060A/EPA 7196A

Samples -001, -002, and -006 were qualified as having estimated results for Hexavalent Chromium due to exceeding the hold time (time from sampling to analysis should be within 28 days and was 31 days).

No further exceptions were observed.



*Passionate People Building
and Revitalizing our World*

