2021 ANNUAL PROGRESS REPORT
SWMU 14 – OILY WATER SEWER
PHILLIPS 66 – FERNDALE REFINERY
FERNDALE, WASHINGTON 98248

prepared for:

Phillips 66 Company
3901 Unick Road
Ferndale, Washington 98248

March 28, 2022

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SWMU 14 – OILY WATER SEWER
PHILLIPS 66 FERNDALE REFINERY

Prepared for:

Phillips 66 Ferndale Refinery
3901 Unick Rd
Ferndale, Washington 98248

Prepared by:

Whatcom Environmental Services
228 East Champion Street #101
Bellingham, Washington 98225

March 28, 2022

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APPENDICES

ACRONYMS AND ABBREVIATIONS

AO	-	Agreed Order
AOC	-	Area of Concern
bgs	-	below ground surface
BTEX	-	Benzene, Toluene, Ethylbenzene, and Xylenes
COC	-	Contaminant/Chemical of Concern
CUL	-	Clean-up levels
Ecology	-	Washington State Department of Ecology
EPH	-	Extractable Petroleum Hydrocarbons
FOC	-	Fraction of Organic Carbon
IRP	-	Investigation and Response Plan
LEL	-	Lower Explosive Limits
MTCA	-	Model Toxics Control Act
NASSCO	-	National Association of Sewer Service Companies
OWS	-	Oily Water Sewer
PAH	-	Polycyclic Aromatic Hydrocarbons
PID	-	Photoionization Detector
PCS	-	Petroleum Contaminated Soil
QA/QC	-	Quality Assurance/Quality Control
RCW	-	Revised Code of Washington
SAP	-	Sampling and Analysis Plan
TPH	-	Total Petroleum Hydrocarbons
VOC	-	Volatile Organic Compounds
VPH	-	Volatile Petroleum Hydrocarbons
WAC	-	Washington State Administrative Code
WWTP	-	Waste Water Treatment Plant

1.0 INTRODUCTION

This annual progress report has been prepared in accordance with the requirements in Section VII.C. of Agreed Order No DE 16297 (AO). The AO was entered into by the Washington State Department of Ecology (Ecology) and Phillips 66 Ferndale Refinery. The objective of the AO is to investigate and conduct remedial actions to the Phillips 66 Ferndale Refinery's oily water sewer (OWS) system, also referred to as Solid Waste Management Unit 14 (SWMU-14).

Per the AO, an Investigation and Response Plan (IRP) was prepared to provide a framework to investigate the integrity of the OWS and respond to any potential releases of contamination to soil and/or groundwater. The IRP outlined four Phases of major OWS trunk line inspections to be completed by December 31, 2029. The inspections required for Phase I of the IRP investigation schedule were completed in 2021.

Per the IRP, if a potential release is discovered during the sewer inspections, the first step is to initiate site characterization at the potential release location(s). A potential release includes a sewer defect which indicates that the sewer has failed and there is the potential for contaminants from the oily sewer to impact soil or groundwater.

Site characterization has been initiated at all potential release locations identified during Phase I of the OWS inspections. Two release locations have been confirmed as a result of the Phase I site characterization. Further site characterization is needed at the confirmed release locations to delineate the horizontal and vertical extent of soil contamination and investigate the potential impacts to groundwater.

This annual progress report has been prepared in accordance with the requirements in the AO. This report describes the Phase I sewer inspection findings and ongoing site characterization efforts and sewer repair.

1.1 GENERAL SITE INFORMATION

The Phillips 66 Ferndale Refinery is located at 3901 Unick Road in Ferndale, Washington (parcel 390133197340). The refinery is in Section 32 in township 39 North, Range 1 East. The refinery is situated on the Strait of Georgia, and approximately 6.03

miles west of I-5. The refinery has a median elevation of approximately 200 feet above mean sea level and the site topography generally slopes from the east/northeast to the west/southwest. A site location map is provided as Figure 1.

Contact information for the Ecology site manager, project consultant and property owner/facility operator are included below.

- Ecology Site Manager: Liem Nguyen
  - Address: 300 Desmond Drive SE, Lacey, WA 98503
  - Phone: (360) 407-6955
  - Email: lngu461@ecy.wa.gov
- Project Consultant: Whatcom Environmental Services, Inc.
  - Address: 228 E Champion St #101, Bellingham, WA 98225
  - Contact: Eric Libolt
  - Phone: (360) 752-9571
  - Email: elibolt@whatcom-es.com
- Property Owner/Facility Operator: Phillips 66
  - Address: 3901 Unick Road, Ferndale, WA 98248
  - Contact: Megan Everson
  - Phone: (360) 384-8377
  - Email: megan.everson@p66.com

2.0 OILY WATER SEWER INSPECTIONS

Phase I OWS inspections were completed in the spring and summer of 2021. The sewer inspections were conducted to assess the general conditions of all sewer components and identify potential release locations where the sewer has failed and there is the potential for contaminants from the oily sewer to impact soil or groundwater.

2.1 OWS PHASE I INSPECTION FINDINGS

A map of the OWS segments inspected during Phase I is provided as Figure 2. Table 1 lists manholes that were inspected and Table 2 lists the sewer line segments that were inspected during Phase I.

OWS inspections were completed by Industrial Inspection Analysis (formerly Atlas Inspections) using CCTV equipment. All inspection videos were provided to TRC Environmental Corporation (TRC) for assessment using the National Association of Sewer Service Companies (NASSCO) rating system. The videos were reviewed for quality and completeness. TRC identified defects (e.g., cracking, fractures, offset joints, etc.) using NASSCO's Pipeline Assessment Certification Program (PACP) and Manhole Assessment Certification Program (MACP) structural rating system.

TRC presented Phase I OWS inspection findings in a report titled "*Phase I Oily Water Sewer Inspections and Repair Recommendations"* dated February 11, 2022. The report includes the assessment of all OWS system components, the location and description of any problems identified and repair recommendations. The TRC Phase I OWS Inspection report is included in Appendix A.

Following NASSCO rating, TRC assigned each defect an environmental rating (ER) based on the potential for a release. The ER system is based on a 1-5 scale. The scale indicates the level of prioritization for follow-up actions. For example, an ER=5 would indicate a significant structural defect with a confirmed release, whereas an ER=1 would be a minor structural defect with no potential for a release. The definition of each ER category can be found in the TRC report in Appendix A.

Per the rating system used by TRC, defects rated ER=4 were considered significant structural defects with potential for release. Locations rated ER=4 included:

- Segment 1-1, 190 ft south of MH 4C-1
- Segment 1-2, 39.1 ft south of MH 4C-FS (X-3)
- Segment 1-3, approximately 5 ft west of MH 2-4-1
- Segment 1-3, approximately 10 ft east of MH 3-4-1
- Segment 1-4, approximately 10 ft west of MH 3-4-1
- Segment 1-5, approximately 5 ft east of MH 7-4-1

3.0 PHASE I SITE CHARACTERIZATION

Per the IRP, Phase I site characterization of potential release locations was initiated in 2021 and followed all procedures stated in the Phase I sampling and analysis plan (SAP). Potential release locations occur where an ER=4 sewer defect was observed and there is the potential for contaminants to impact soil or groundwater.

3.1 SOIL SAMPLE COLLECTION

Soil samples were collected from all reported ER=4 rated locations to evaluate potential leaks from the OWS. The soil boring locations are shown on Figure 3. The soil sample descriptions, depths of collection and field screening results are included in Table 3.

One soil sample was collected from each soil boring location via EPA Method 5035A in sample containers provided by the lab. Soil samples were stored on ice in a cooler immediately after collection. Standard industry protocols regarding sample collection, preservation, chain-of-custody, and shipping were followed. The samples were identified by both the boring number from which they originated, the year the sample was collected, and the depth from which they were collected (i.e. B-1-21 5ft, B-2-21 3ft).

Soil samples were sent to Pace Analytical Laboratory in Minneapolis, Minnesota, Pace National Analytical Laboratory in Mount Juliet, Tennessee, and Fremont Analytical in Seattle, Washington in order to analyze all requested analyses. All laboratories are accredited by the Washington State Department of Ecology. Strict chain-of custody and QA/QC protocols were followed for each sample. The following laboratory methods were used to analyze the soil samples:

EPA Method 8260: Benzene, toluene, ethylbenzene, and total xylenes (BTEX)
EPA Method 8270 SIM: Naphthalenes and Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAH)
EPA Method 7471: Arsenic, Cadmium, Chromium VI, Chromium III, Lead, Nickel, and Mercury

EPA Method 9045: pH
NWTPH-EPH: Extractable Petroleum Hydrocarbons
NWTPH-VPH: Volatile Petroleum Hydrocarbons

It should be noted that fuel additives, methyl tert-butyl ether (MTBE), polychlorinated biphenyl (PCB), and PFAS were not analyzed per Table 7.2 of Ecology's Guidance for Remediation of Petroleum Contaminated Sites because the contaminants are not suspected to be in the Phase I ER=4 sewer segments.

3.2 SOIL SAMPLE RESULTS

Six soil samples were collected in September and October 2021 (B-1-21 through B-6-21 at various depths). The hazard index, risk, and TPH results are shown on Table 4. The BTEX results are provided on Table 5. The soil metal results are provided in Table 6. The cPAH results are provided in Table 7. The original laboratory analytical data reports are provided in Appendix B.

Two soil samples exceeded the target cleanup level for the protection of groundwater (vadose zone). Soil sample B-4-21 exceeded the cleanup level for naphthalene with a concentration of 5.52 mg/kg. Soil sample B-5-21 exceeded the cleanup level for benzene with a concentration of 0.03 mg/kg. Ecology was notified on February 9, 2022, concerning the two confirmed release locations.

Soil samples B-4-21 and B-5-21 were collected on either side of Manhole MH-3-4-1 (Figure 3). The release location associated with MH 3-4-1 will be identified as Area of Concern-1 (AOC-1).

3.2.1 Quality Assurance Review

A quality assurance review has been performed on all soil data generated during this investigation. The data set is 100% complete. The data review included an evaluation of:

- Field collection and handling
- Completeness
- Reporting limits
- Acceptability of test results for:

- Method blanks
- Analytical replicates
- Laboratory control samples (blank spikes)
- Surrogate recoveries
- Matrix spikes and matrix spike duplicates

The quality assurance review has established confidence that accepted project data are of known and appropriate quality and sufficient to support their intended use. Data qualifiers were added where appropriate. No data were rejected. A summary of the quality assurance review is provided in Appendix C.

3.3 SOIL GAS

A preliminary vapor intrusion assessment was conducted to assess if the site contamination could pose or is posing, a threat to indoor air quality. Volatile compounds in the soil have the potential to volatilize into the soil pore space beneath the nearby buildings. Buildings of concern for vapor intrusion from contamination at the site include the two small sheds approximately 15 feet north of B-2-21 and the Puget Sound Energy, Cogeneration facility warehouse located approximately 70 feet southwest of AOC-1.

The two small sheds are unoccupied and the B-2-21 concentrations for volatile contaminants of concern are below the MTCA method A soil cleanup levels, vapor intrusion is unlikely to occur. Further site characterization is needed to fully delineate AOC-1 before the preliminary vapor intrusion assessment can be completed for the Cogeneration warehouse.

3.4 ADDITIONAL SITE CHARACTERIZATION

Further site characterization is needed to fully delineate the AOC-1 site before remedial actions can be completed. Next steps in site characterization are to adequately characterize the horizontal and vertical extent of soil contamination and assess potential impacts to groundwater at the confirmed release locations.

3.5 OWS REPAIRS

TRC provided Phillips 66 with repair recommendations for all ER=3 and ER=4 sewer segment and manhole defects found during the Phase I sewer investigation. The repair recommendations can be found in the TRC report in Appendix A. OWS repair activities are scheduled to begin in spring or summer of 2022.

4.0 CLEANUP STANDARDS

Per the IRP, the soil cleanup standards were set using the MTCA Method C methodology as specified in WAC 173-340-745. MTCA Method C cleanup levels are based on the reasonable maximum exposure expected to occur at the site and were developed to evaluate direct contact, leaching, and vapor pathways using equations provided in WAC 173-340.

Direct contact cleanup levels for individual compounds are listed in CLARC and shown on Tables 4-7. The MTCATPH Workbook for Calculating Cleanup Levels for a Petroleum Mixture (available at https://ecology.wa.gov/) was used to calculate the site risk (under current conditions) and to calculate the Method C direct contact TPH cleanup level for the site. The MTCATPH workbook uses pre-established chemical and toxicity data, risk-based exposure assumptions, and user-defined site-specific information to calculate the site risk under current conditions. The risk and hazard index calculated by MTCATPH are shown for each sample (B-1-21 through B-6-21) in Table 4. The MTCATPH output worksheets for all samples are included in Appendix D.

The soil cleanup levels used for groundwater protection were obtained from the CLARC tables. The values in CLARC were calculated using the fixed parameter three-phase partitioning model for the vadose (unsaturated) zone as described in WAC 173-340-747(4) and based on Equation 747-1. However, the following analytes use the MTCA Method A Soil Cleanup Levels for protection of groundwater because they are applicable and relevant and appropriate requirements (ARARs) and are already adjusted for leaching and natural background concentrations:

- Benzene
- Arsenic
- Chromium IV
- Naphthalenes

5.0 PHASE I AOC-1 SITE GEOLOGY

5.1 SITE GEOLOGY

The Phillips 66 Ferndale Refinery is in the northern portion of the Puget Sound Basin. The region is characterized by thick sequences of Pleistocene glacial advance outwash and melt-water deposits that settled on a basement of tectonically deformed sedimentary and ancient metamorphic bedrock. The glacial deposits have been reworked by more recent fluvial, lacustrine, and aeolian actions into the landforms present today.

The stratigraphic sequence of major geologic units at the Ferndale Refinery has been described in reports previously submitted to Washington Department of Ecology (Ecology). The geologic units mapped beneath the Ferndale Refinery were summarized in Appendix B of the approved IRP.

5.1.1 AOC-1 Geology

Geologic cross sections were prepared to show the geologic units in the 2021 ER=4 study area. The cross section locations are shown on Figure 4.

The geologic units of importance at AOC-1 are described below in stratigraphically descending order and are shown in cross section A-A' (Figure 5) and cross section B-B' (Figure 6). The cross sections show the sewer profile, geologic units, and soil sample locations. Geologic units of importance at AOC-1 include:

Unit I Fill material consisting of silty clays with varying amounts of sand and gravel, resembling Unit III-type material.

Unit II Consists of native soils and thin surficial deposits which overlie the regional stratigraphic units. The unit is divided into two lithologic subunits:

- IIA (Native soil) Silty/sandy clay, silty clay, and clayey silt; dark brown; some gravel; firm; decomposed roots locally; slightly moist to wet; locally very wet. (thickness: 5 - <1 foot)
- IIB (Surficial deposits) Clayey/silty sand and clayey silt; light gray to greenish gray; some gravel; slightly firm; slightly wet to wet. (thickness: 5 - <1 foot)

Typically, the subunits are distinguishable based on color and textural differences; however, disturbances made during refinery construction often make this distinction difficult.

Unit III Glaciomarine drift (diamicton) represents the uppermost regionally continuous stratigraphic unit. The diamicton consists of brown silty clay, clayey silt, and clayey sand with minor to moderate amounts of sand, gravel, and matrix-supported pebbles, cobbles, and boulders. Occasionally the angular to rounded clasts are striated. The unit is consistently firm to very hard, depending on moisture content. Some orange and gray mottles are seen locally, as are thin (< 1 mm) vertical fractures in the uppermost portions. The unit is predominantly dry to slightly moist (thickness: 16 - <1 foot). As discussed below, this unit is the uppermost weathered portion of Unit IV.

Unit IV The deeper unweathered drift consists of light to dark gray silty clay with traces of sand, gravel, and matrix-supported pebbles, cobbles, and boulders. Occasionally the angular to rounded clasts are striated. The upper portions are firm to slightly plastic, and generally wet. With depth, the unit shows an increase in sand and often a significant increase in moisture content and plasticity (i.e., the material becomes very plastic, sticky, and very wet). Shells and shell fragments are common, confirming a marine origin (thickness: >40 - <1 foot).

Unit V The Mountain View sand and gravel underlies the younger Bellingham drift and overlies the Cherry Point silt. The deposit consists of well sorted silt, silty sand, and fine to medium grained sand, interlayered with poorly sorted sand and sand-gravel mixtures. The sands and gravels vary from light brown to gray, with their color influenced by the lithology of the mineral grains. The sands and gravels are loose and dry to slightly wet. The sediments are well stratified, with rounded pebbles, cross-bedding, and other features typical of fluvial deposition. The upper surface of the unit is irregular. Bodies of silt, representing low energy areas within the fluvial outwash environment during Mountain View time, are fairly widespread over most of the refinery site. The fine grained interbeds consist of tan clayey silt and lean clay. The silt bodies vary in thickness and stratigraphic position over short distances and are absent in places, indicating that the silt deposits are lensaic in nature. The silt lenses consist of thinly-bedded, micaceous silt, sandy silt, and silty very fine sand which is well sorted. They exhibit a floury texture and low shear strength when dry. The silts are dark gray where fresh, but are oxidized to orange and brown near the contact with adjacent materials (thickness: 25-100 feet).

Unit VI The top of the Cherry Point Silt lies at approximately 60 feet above mean sea level (approximately 130 feet below grade). The Cherry Point Silt consists of brown to gray interbedded clay, silt, silty sand, and fine to medium grained well-sorted sand. The regional water table occurs within the unit at approximately 160 feet below ground surface. The regional water table aquifer in the Cherry Point Silt is not used as a water supply downgradient of the facility. The direction of flow in the Cherry Point Silt is toward the west, where flowing groundwater discharges to the Strait of Georgia. The maximum thickness of the Cherry Point Silt is unknown and is estimated at approximately 300 feet thick.

The diamicton (Units III and IV) acts as an aquitard impeding the vertical migration of residual hydrocarbons.

5.2 SITE HYDROGEOLOGY

The hydrogeology of the Ferndale Refinery site has been characterized through the installation of numerous soil borings and monitoring wells, as well as the completion of bail tests, laboratory permeability tests, and grain size distribution tests.

The Ferndale Refinery area is underlain by a regionally continuous stratigraphic unit known as glaciomarine drift, or diamicton. The diamicton unit consists of moderately sorted to unsorted diamicton with lenses and discontinuous beds of moderately to well-sorted gravel, sand, silt, and clay. Bedding is massive to poorly stratified. Color is blue-gray to olive-gray depending on oxidation state. Thickness ranges to as much as 90 meters. Permeability is low and infiltration of precipitation is very poor.

Geotechnical samples have been collected in the diamicton. The data revealed that a fining-downward sequence is evident in the stratigraphic column. The average percentage of sand decreases with depth and the average percentage of silt and clay increases with depth. The bulk density of the samples increases with depth. The average vertical hydraulic conductivity decreases with depth from 1.26x10-07 cm/s in the upper weathered portion of the diamicton to 7.86x10-08 cm/s in the deeper portion of the unit. The average horizontal saturated hydraulic conductivity in the deeper portion of the unit is 1.70x10-06 cm/s. The fining-downward grain-size distribution, the increasing bulk density with depth, and the decreasing vertical conductivity with depth all support the conclusion that the diamicton acts as a sufficient aquitard to inhibit the downward migration of precipitation and accidentally spilled petroleum products.

The uppermost zone of saturation consists of saturated portions of native deposits and fill material located above the diamicton. The diamicton at the site is known to be firm and dry and consists of brown silty clay with minor gravel. The unit acts as an aquitard impeding the vertical migration of contaminants and occurs at approximately 6-10 feet below grade at the site.

Groundwater contained in the shallow surficial deposits is perched atop the relatively impermeable silt and clay of the diamicton (Units III and IV). The unconfined perched water is contained in the fill material, Unit IIA soil layer, and Unit IIB sand layer.

Water percolates downward and becomes perched above Unit III as a result of the textural disconformity between the diamicton and the overlying surficial units. The flow direction of the perched water atop the diamicton follows the structural contours of the upper surface of the diamicton.

The perched water above the diamicton would not be classified as potable per the definition in WAC 173-340-720 (2). The perched water at the site does not serve as a current source of drinking water and is not a potential future source of drinking water because the groundwater is likely present in insufficient quantity to yield greater than 0.5 gallons per minute on a sustainable basis.

The regional water table occurs within the Cherry Point Silt (Unit VI) at approximately 160 feet below ground surface. The direction of flow in the Cherry Point Silt is toward the west-northwest, where flowing groundwater discharges to the Strait of Georgia. The Cherry Point aquifer is not believed to be used as a water supply downgradient of the Ferndale Refinery as the flow direction is to the west-northwest toward the Strait of Georgia.

Based on the Phase I site characterization findings, the release documented at AOC-1 has occurred in the surficial deposits located above the diamicton.

6.0 INACESSIBLE CONTAMINATION

Inaccessible contamination will be determined after completion of the site characterization before initiating remedial actions and sewer repairs at AOC-1.

7.0 DEVIATIONS FROM THE IRP

The following are Phase I deviations from the proposed inspection schedule and methods presented in the IRP:

- The Phase I OWS inspections occurred prior to approval of the IRP. However, the inspections were conducted in accordance with the IRP requirements.
- Segment 1-28 was originally scheduled to be inspected as part of the Phase I inspection schedule. Due to high lower explosive limits (LELs) that created unsafe conditions for the inspection, segment 1-28 was not inspected and will be moved to the Phase IV inspection schedule.
- Manhole 4-6-1 was originally scheduled to be inspected during Phase IV, however, manhole 4-6-1 was inspected during Phase I.

The Phase I site characterization was initiated prior to approval of the IRP. Zinc and chlorinated VOCs were not analyzed in the soil samples during the initial sampling event. All future site characterization soil analyses will include zinc and chlorinated VOCs.

8.0 CONCLUSIONS

As part of the Phase I OWS investigation, sewer inspections have been completed and site characterization is ongoing at the Phillips 66 Ferndale Refinery. The OWS inspections revealed six sewer defects that could potentially result in a release to soil and groundwater. Site characterization has been initiated at all six potential release locations. Soil samples were collected in close proximity (as allowed by site conditions) to the identified potential release locations. Two releases have been confirmed as a result of ongoing Phase I characterization efforts. B-4-21 exceeded the protection of groundwater for naphthalenes at a concentration of 5.52 mg/kg. B-5-21 exceeded the protection of groundwater for benzene at a concentration of 0.03 mg/kg. Soil samples B-4-21 and B-5-21 were collected on either side of Manhole MH-3-4-1 (Figure 3). The release location associated with MH 3-4-1 will be identified as Area of Concern-1 (AOC-1).

Further site characterization is needed at AOC-1 before initiating remedial actions and sewer repairs. Further site characterization will attempt to determine the horizontal and vertical extent of soil contamination and assess potential impacts to groundwater. Site characterization activities will be conducted in accordance with WAC 173-340 and Ecology's Guidance for Remediation of Petroleum Contaminated Sites (Publication 10-09-057) (Guidance).

9.0 REFERENCES

EPA, 2020a. *National Functional Guidelines for Inorganic Superfund Methods Data Review*. EPA-540-R-20-006. U.S. Environmental Protection Agency Office of Superfund Remediation and Technology Innovation. Washington, D.C. November.

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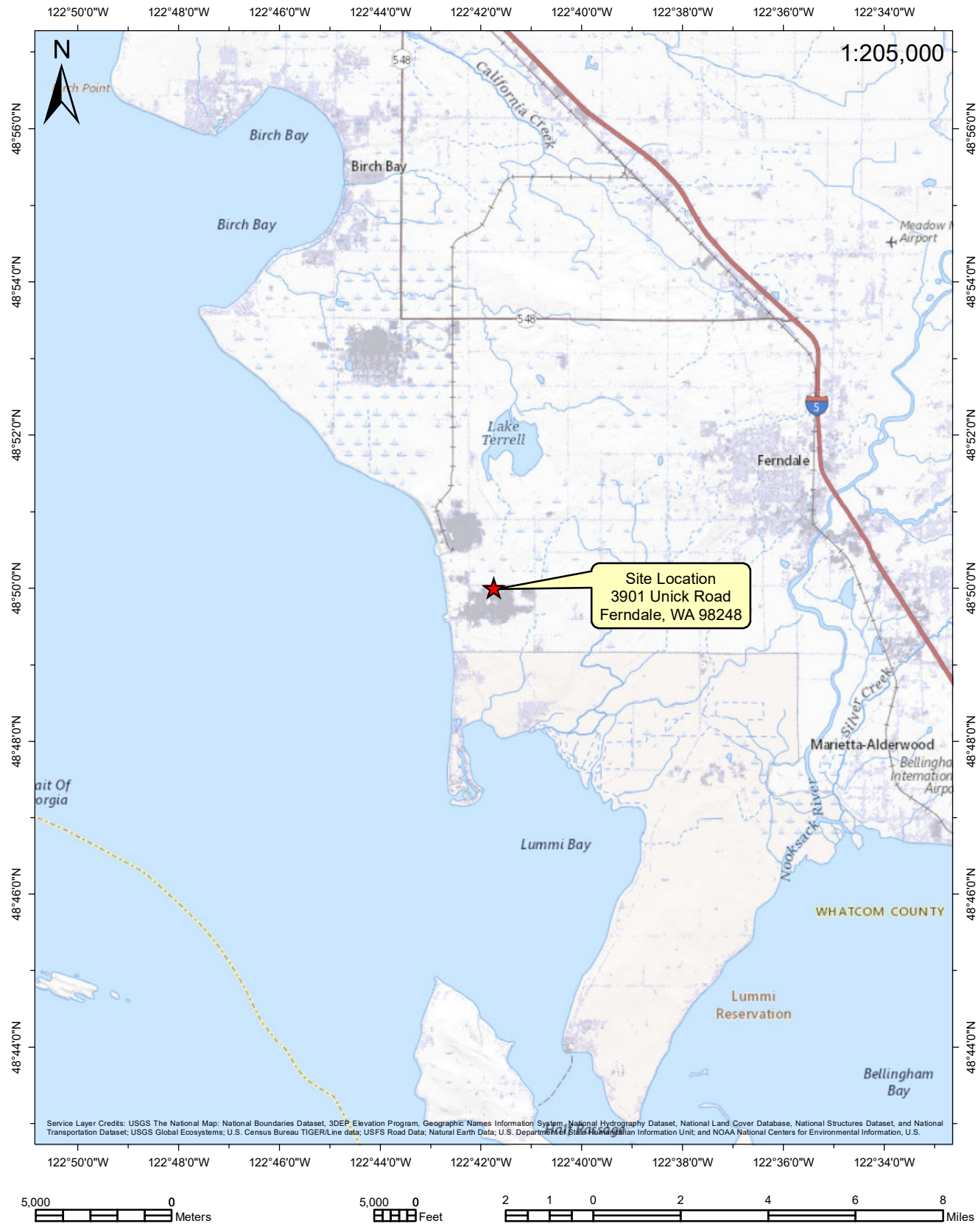

Prepared for:

Phillips 66 Company

Ferndale Refinery

Prepared by:

nwhatcom ENVIRONMENTAL

Site Location Map

Oily Sewer Investigation

12/02/21

Figure 1

N

2nd STREET

'M' STREET

'L' STREET

'K' STREET

'J' STREET

'H' STREET

'G' STREET

3rd STREET

3rd STREET

4th STREET

5th STREET

6th STREET

'F' STREET

'E' STREET

'D' STREET

MH 12-4

MH 9-4 FS

MH 7-4-1

MH STA. 24 + 97 / MH X-11

MH STA. 27 + 90 / MH X-10

MH 6-4-1

MH 4C-1

MH X-1

MH X-2

MH 4C-FS/MH X-3

MH 2-4-1

MH STA. 36 + 62 / MH X-7

MH STA. 33 + 68 / MH X-8

MH 3-4-1

MH STA. 30 + 74 / MH X-9

MH STA. 21 + 55 / MH X-12

MH X-12.2

MH STA. 18 + 15 / MH X-13

MH STA. 14 + 83 / MH X-14

MH STA. 11 + 45 / MH X-15

MH STA. 8 + 08 / MH X-16

MH STA. 3 + 08 / MH X-17

MH 4-6-1

MH 9 FS

MH 10-FS

MH 8 FS (Buried)

MH 11-FS

MH 12-FS

MH 13-FS

MH G / MH X-22

MH F / MH X-23

MH E/MH X-24

MH CC/MH X-25

1-1 1-2 1-3 1-4 1-5 1-6 1-7 1-8 1-9 1-10 1-11 1-12 1-13 1-14 1-15 1-16 1-17 1-18 1-19 1-20 1-21 1-22 1-23 1-24 1-25 1-26 1-27

LAKE TERRELL ROAD

Oily and Phenolic Sewer Manholes

Phase I (Completed in 2021)

Environmental Rating 3

Environmental Rating 4

Oily Water Sewer Major Trunk Lines

1-# Sewer Segment ID

0 150 300 450 600 750 900 Feet

1 inch equals 350 feet

All data are approximate and should be used for relative location reference only.

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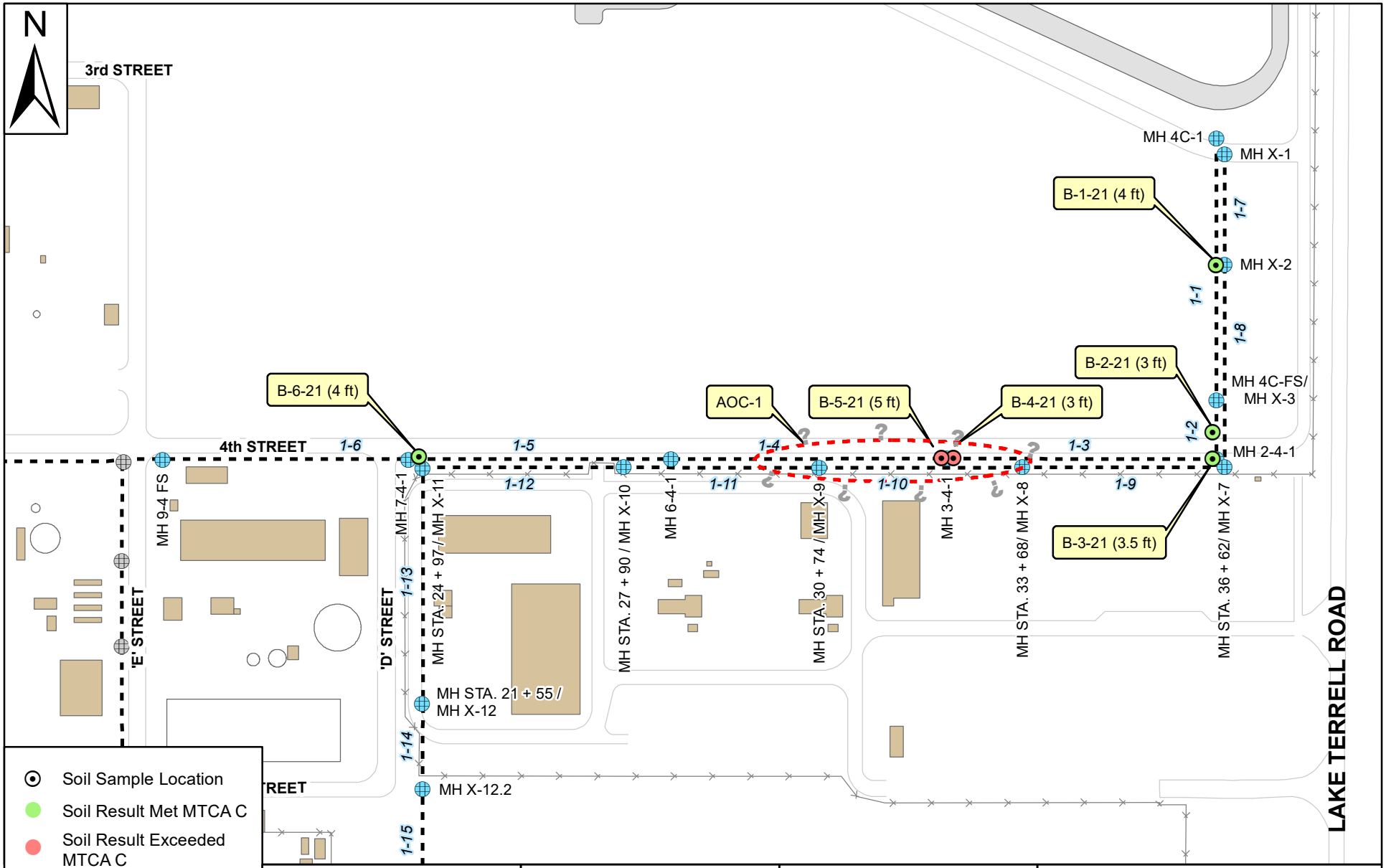
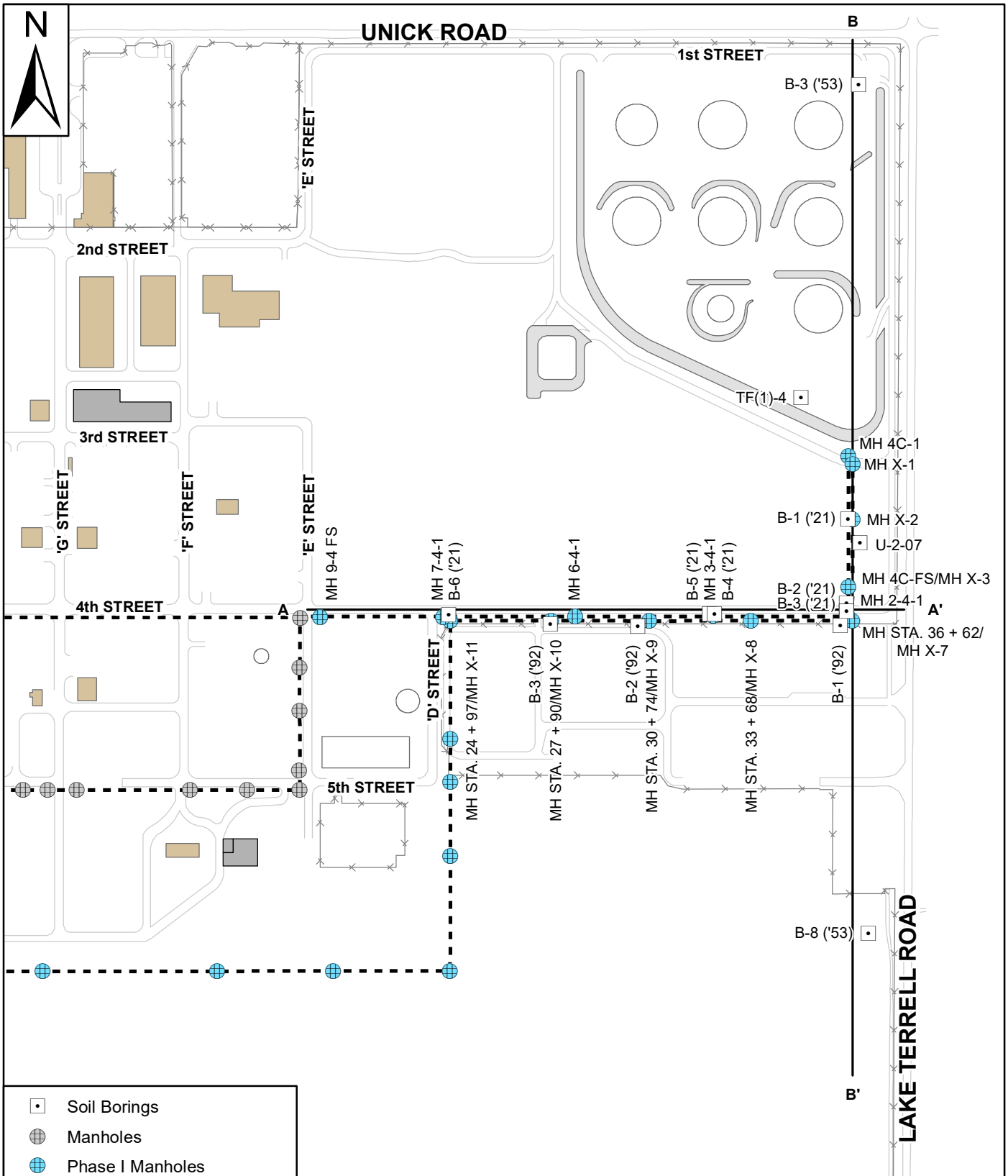
Phase I OWS Inspection Segments and Environmental Rated Defects 3 & 4 Locations

Oily Sewer Investigation

3/28/22

Figure 2


N
3rd STREET
4th STREET
'E' STREET
'D' STREET
LAKE TERRELL ROAD
MH 4C-1
MH X-1
B-1-21 (4 ft)
MH X-2
B-2-21 (3 ft)
MH 4C-FS/
MH X-3
MH 2-4-1
B-3-21 (3.5 ft)
B-6-21 (4 ft)
AOC-1
B-5-21 (5 ft)
B-4-21 (3 ft)
MH 9-4 FS
MH 7-4-1
MH STA. 24 + 97 / MH X-11
MH STA. 27 + 90 / MH X-10
MH 6-4-1
MH STA. 30 + 74 / MH X-9
MH 3-4-1
MH STA. 33 + 68/ MH X-8
MH STA. 36 + 62/ MH X-7
MH STA. 21 + 55 /
MH X-12
MH X-12.2
1-1
1-2
1-3
1-4
1-5
1-6
1-7
1-8
1-9
1-10
1-11
1-12
1-13
1-14
1-15
Soil Sample Location
Soil Result Met MTCA C
Soil Result Exceeded MTCA C
Manholes
Phase I Manholes
Sewer Major Trunk Lines
Area of Concern
0 50 100 200 300
Feet
1 inch = 200 feet
All data are approximate and should be used for relative location reference only.
Prepared for:
Phillips 66 Company
Ferndale Refinery
Prepared by:
whatcom ENVIRONMENTAL
Soil Sample Location Map
Oily Sewer Investigation
3/28/22
Figure 3



Prepared for:

Phillips 66 Company

Ferndale Refinery

Prepared by:

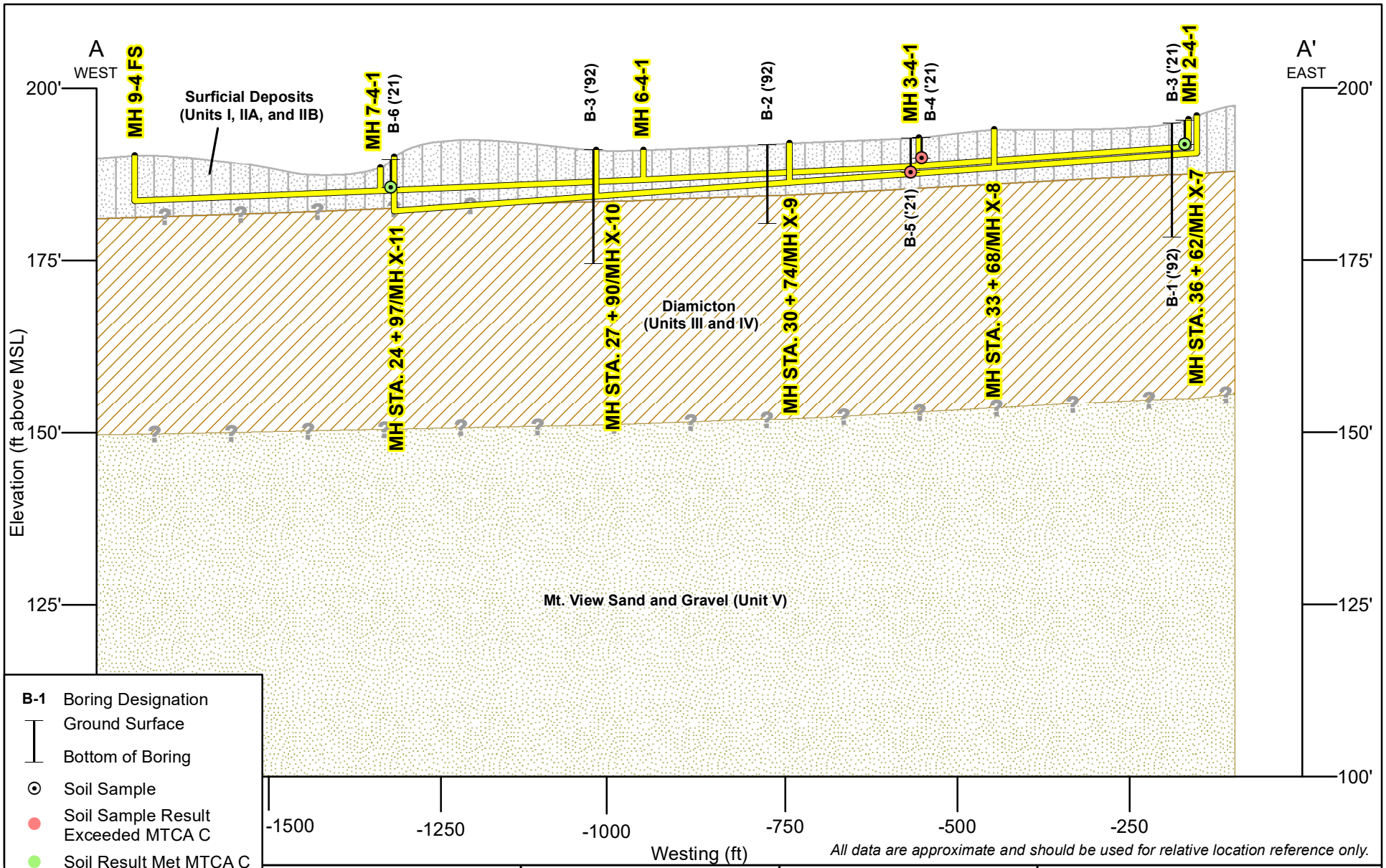
whatcom ENVIRONMENTAL

Cross Section Location Map

Oily Sewer Investigation

03/29/22

Figure 4



All data are approximate and should be used for relative location reference only.

HORIZONTAL SCALE:
1 in = 200 ft

VERTICAL SCALE: 1in = 20ft
(10x vertical exaggeration)

Prepared for:
Phillips 66 Company
Ferndale Refinery

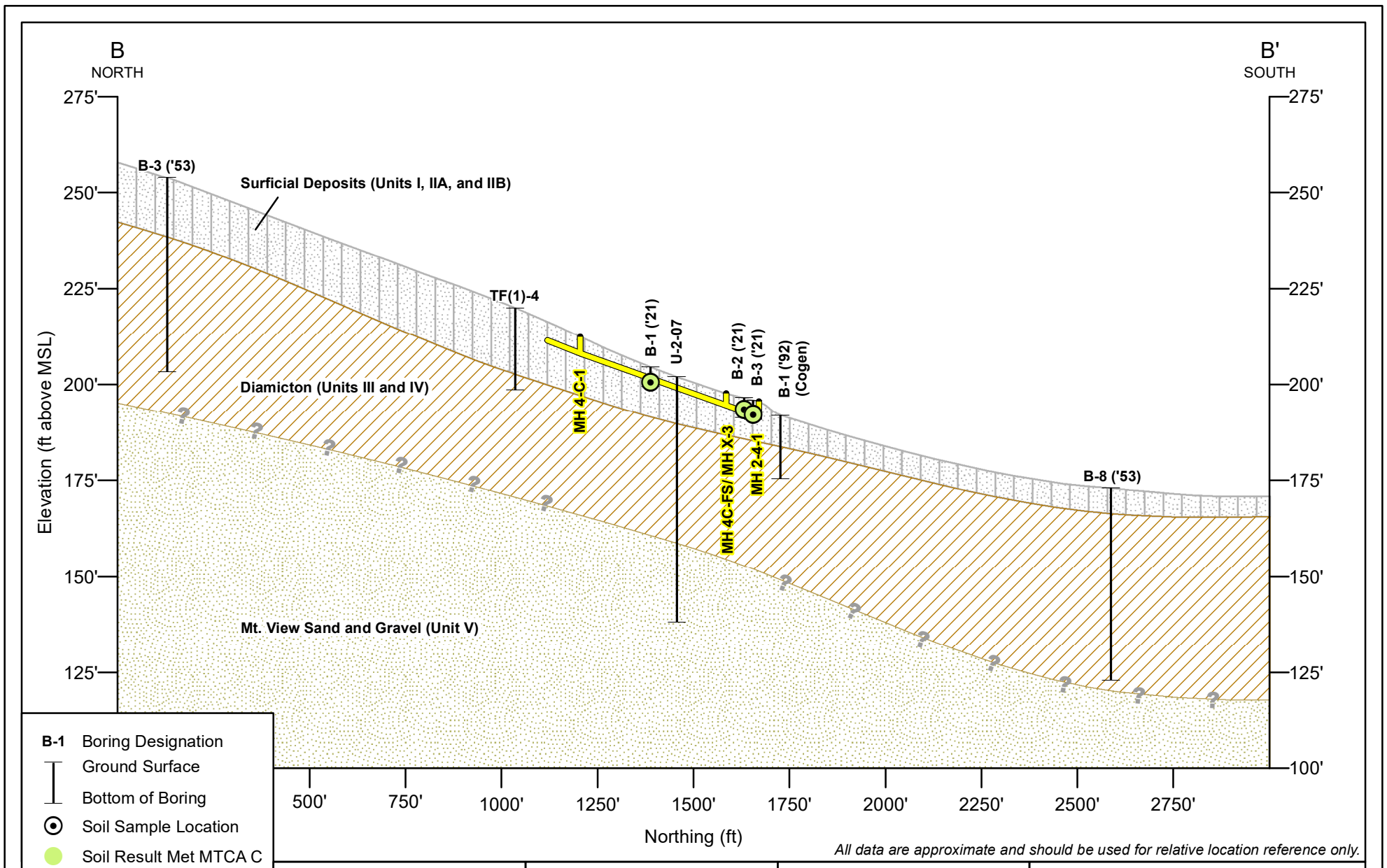
Prepared by:
nwhatcom ENVIRONMENTAL

Geologic Cross Section A-A'

Oily Sewer Investigation

03/28/22

Figure 5



All data are approximate and should be used for relative location reference only.

HORIZONTAL SCALE:
1 in = 350 ft

VERTICAL SCALE: 1in = 35ft
(10x vertical exaggeration)

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Ferndale Refinery

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Geologic Cross Section B-B'

Oily Sewer Investigation

3/28/22

Figure 6

Table 1. P66 Oily Water Sewer - Phase I Manhole Inspection Schedule

Manhole ID	Associated Sewer	Location Description	Plant Coordinates (x)	Plant Coordinates (y)	Reference Map	Rim Elevation	Invert Elevation (in)	Invert Elevation (out)
Phase I - Completed in 2021								
MH 4C-1	OWS	In field south of Crude Hill	165	1205	27-AS-167	NS	208.17	208.17
MH 4C-FS/MH X-3	OWS	In field south of Crude Hill	165	1585	27-AS-167	197.67	193.57	193.52
MH 2-4-1	OWS	East of 4th and A St.	165	1670	27-AS-168	195.50	191.58	191.48
MH 3-4-1	OWS	4th St., N of PSE Cogen	556	1670	27-AS-169	192.81	188.72	188.72
MH 6-4-1	OWS	4th St., N of PSE Cogen	956	1670	27-AS-169	191.00	186.81	186.71
MH 7-4-1	OWS	4th and D St intersection	1338	1670	27-AS-170	188.50	185.20	185.10
MH 9-4 FS	OWS	4th and E St. intersection	1695	1670	27-AS-170	190.25	183.88	183.78
MH X-1	OWS	In field south of Crude Hill	152.5	1248	27-AS-167	NS	NS	NS
MH X-2	OWS	In field south of Crude Hill	152.5	1400	27-AS-167	NS	NS	NS
MH STA. 36+62/MH X-7	OWS	East of 4th and A St.	152.5	1682	27-AS-168	196.00	190.77	190.55
MH STA. 33+68/MH X-8	OWS	4th St., N of PSE Cogen	447	1682	27-AS-168	194.00	188.43	188.43
MH STA. 30+74/MH X-9	OWS	4th St., N of PSE Cogen	744	1682	27-AS-169	192.00	186.32	186.32
MH STA. 27+90/MH X-10	OWS	4th St., N of PSE Cogen	1025	1682	27-AS-169	191.00	184.27	184.27
MH STA. 24+97/MH X-11	OWS	4th and D St intersection	1318	1682	27-AS-170	190.00	182.16	182.16
MH STA. 21+55/MH X-12	OWS	N. of 5th and D St. intersection	1318	2024	27-AS-170	187.00	179.91	179.91
New MH X-12.2	OWS	East of 5th and D	1318	2149.5	27-AS-170	NS	179.19	179.19
MH STA. 18+15/MH X-13	OWS	South of Switchhouse #1	1318	2364	27-AS-192	182.00	177.87	177.87
MH STA. 14+83/MH X-14	OWS	In field south of Switchhouse #1	1318	2696	27-AS-197	181.00	175.45	175.43
MH STA. 11+45/MH X-15	OWS	In field south of Bunkers	1658	2696	27-AS-197	180.00	175.02	175.02
MH STA. 8+08/MH X-16	OWS	In field south of SFOC	1993	2696	27-AS-198	183.00	174.62	174.62
MH STA. 3+08/MH X-17	OWS	South of 6th and G St.	2493	2696	27-AS-199	186.00	174.02	174.02
MH 4-6-1	OWS	6th and H St. intersection, S side	2779	2696	27-AS-199	177.45	172.25	172.25
MH 9 FS	OWS	6th St., between J and H Streets	3070	2696	27-AS-199	175.98	170.98	170.98
MH 10-FS	OWS	6th and J St. intersection, SE side	3345	2696	27-AS-200	177.87	169.71	169.71
MH 11-FS	OWS	6th St., between J and K Streets	3630	2696	27-AS-200	179.82	168.98	168.98
MH 12-FS	OWS	6th and K St. intersection, SE side	3950	2696	27-AS-201	183.00	168.19	168.19
MH 13-FS	OWS	6th St., between L and K Streets	4246	2696	27-AS-201	181.45	167.45	167.45
MH G/MH X-22	OWS	South of 6th St., east of OPL	4311	2880	27-AS-201	185.34	166.96	166.96
MH F/MH X-23	OWS	South of 6th St., SW corner of OPL	4750	2880	27-AS-202	NS	160.50	163.00

Table 1. P66 Oily Water Sewer - Phase I Manhole Inspection Schedule

Manhole ID	Associated Sewer	Location Description	Plant Coordinates (x)	Plant Coordinates (y)	Reference Map	Rim Elevation	Invert Elevation (in)	Invert Elevation (out)
Phase I - Completed in 2021								
MH E/MH X-24	OWS	South of 6th St., west of OPL	4828	2740	27-AS-202	NS	162.50	159.00

NS - Not Shown on Phillips 66 Facility Drawings OWS - Oily Water Sewer

Table 2. P66 Oily Water Sewer - Phase I Sewer Line Segment Inspection Schedule

Segment ID	Sewer Trunk Segment (MH to MH)	Associated Sewer	Location Description	Plant Coordinates ((x) MH to MH)	Plant Coordinates ((y) MH to MH)	Sewer Segment Type	Sewer Diameter (in)
Phase I - Completed in 2021							
1-1	MH 4C-1 to MH 4C-FS/MH X-3	OWS	In field south of Crude Hill	165	1205 to 1585	Vitrified Clay	8
1-2	MH 4C-FS/MH X-3 to MH 2-4-1	OWS	In field south of Crude Hill	165	1585 to 1670	Vitrified Clay	8
1-3	MH 2-4-1 to MH 3-4-1	OWS	East of 4th and A St.	165 to 556	1670	Vitrified Clay	8
1-4	MH 3-4-1 to MH 6-4-1	OWS	4th St., N of PSE Cogen	556 to 956	1670	Vitrified Clay	8
1-5	MH 6-4-1 to MH 7-4-1	OWS	4th St., N of PSE Cogen	956 to 1338	1670	Vitrified Clay	8
1-6	MH 7-4-1 to MH 9-4 FS	OWS	4th and D St. intersection	1338 to 1695	1670	Vitrified Clay	8
1-7	MH X-1 to MH X-2	OWS	North of 4th St, near A St.	152.5	1248 to1400	Vitrified Clay	12
1-8	MH X-2 to MH STA. 36+62/MH X-7	OWS	North of 4th St, near A St.	152.5	1400 to 1682	Vitrified Clay	15
1-9	MH STA. 36+62/MH X-7 to MH STA. 33+68/MH X-8	OWS	East of 4th and A St.	153 to 447	1682	Vitrified Clay	18
1-10	MH STA. 33+68/MH X-8 to MH STA. 30+74/MH X-9	OWS	4th St., N of PSE Cogen	447 to 744	1682	Vitrified Clay	18
1-11	MH STA. 30+74/MH X-9 to MH STA. 27+90/MH X-10	OWS	4th St., N of PSE Cogen	744 to 1025	1682	Vitrified Clay	18
1-12	MH STA. 27+90/ MH X-10 to MH STA. 24+97/MH X-11	OWS	4th St., N of PSE Cogen	1025 to 1318	1682	Vitrified Clay	18
1-13	MH STA. 24+97/MF X-11 to MH STA. 21+55/MH X-12	OWS	4th and D St intersection	1318	1682 to 2024	Vitrified Clay	18
1-14	MH STA. 21+5/MH X-125 to NEW MH X-12.2	OWS	N. of 5th and D St. intersection	1318	2024 to 2149.5	Vitrified Clay	18
1-15	NEW MH X 12.2 to MH STA. 18+15/MH X-13	OWS	N. of 5th and D St. intersection	1318	2149.5 to 2364	Vitrified Clay	18
1-16	MH STA. 18+15/MH X-13 to MH STA. 14+83/MH X-14	OWS	South of Switchhouse #1	1318	2364 to 2696	Vitrified Clay	24
1-17	MH STA. 14+83/MH X-14 to MH STA. 11+45/MH X-15	OWS	In field south of Switchhouse #1	1318 to 1658	2696	Vitrified Clay	24
1-18	MH STA. 11+45 /MH X-15 to MH STA. 8+08/MH X-16	OWS	In field south of Bunkers	1658 to 1993	2696	Vitrified Clay	24
1-19	MH STA. 8+08/MH X-16 to MH STA. 3+08/MH X-17	OWS	In field south of SFOC	1993 to 2493	2696	Vitrified Clay	24
1-20	MH STA 3+08/MH X-17 to MH 4-6-1	OWS	South of 6th St., between H and G St.	2493 to 2779	2696	Vitrified Clay	24
1-21	MH 9 FS to MH 10-FS	OWS	6th St., between J and H Streets	3070 to 3345	2696	Vitrified Clay	24
1-22	MH 10-FS to MH 11-FS	OWS	6th and J St. intersection	3345 to 3630	2696	Vitrified Clay	24
1-23	MH 11-FS to MH 12-FS	OWS	6th St., between J and K Streets	3630 to 3950	2696	Vitrified Clay	24
1-24	MH 12-FS to MH 13-FS	OWS	West of 6th and K St. intersection	3950 to 4246	2696	Vitrified Clay	24
1-25	MH 13-FS to MH G/MH X-22	OWS	South of 6th St., east of OPL	4246 to 4311	2696 to 2880	Vitrified Clay	24
1-26	MH G/MH X-22 to MH F/MH X-23	OWS	South of 6th St., SW corner of OPL	4311 to 4750	2880	Ductile Iron	24
1-27	MH F/MH X-23 to MH E/MH X-24	OWS	South of 6th St., west of OPL	4750 to 4828	2880 to 2740	Ductile Iron	24

Table 3. Soil Sample Descriptions

Sample ID	Date	Depth (feet)	Soil Sample Description	PID (ppm)	Sheen Test[a]
B-1-21	10/14/2021	4	Silt with trace sand and gravel, brown, loose, moist.	0.0	NS
B-2-21	9/30/2021	3	Sandy silt with gravel, gray, loose, moist.	257.2	MS
B-3-21	9/30/2021	3.5	Sandy silt with gravel, gray, loose, wet.	106.7	HS
B-4-21	9/30/2021	3	Sandy silt with gravel, gray, loose, wet.	140.4	HS
B-5-21	9/30/2021	5	Sandy silt with gravel, gray, loose, wet.	40.8	HS
B-6-21	9/30/2021	4	Sandy silt with gravel, brown, loose, wet.	20.2	SS

a - NS = No Sheen; VSS = Very Slight Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Table 4. Soil Sample MTCA TPH Hazard Index and Risk Results

Sample ID	Date	Depth (feet)	Measured Soil TPH Concentration (mg/kg)	Hazard Index Soil Direct Contact	Hazard Index Groundwater Protection	Risk Protection of Soil Direct Contact	Risk Potable GW Human Health Protection
MTCA Method C Protection of Soil Direct Contact:			53,062[a]	1	-	1.00E-05	-
Potable GW Human Health Protection:			-	-	1	-	1.00E-05
B-1-21	10/14/2021	4	51	1.15E-03	4.82E-01	6.96E-09	7.76E-07
B-2-21	9/30/2021	3	507	8.13E-03	2.04E-01	2.10E-09	2.46E-06
B-3-21	9/30/2021	3.5	3,958	7.33E-02	1.64E-01	8.57E-09	1.28E-06
B-4-21	9/30/2021	3	3,964	7.63E-02	2.86E-01	1.09E-08	8.45E-07
B-5-21	9/30/2021	5	598	1.09E-02	3.93E-01	8.36E-09	6.92E-06
B-6-21	9/30/2021	4	48	9.39E-04	4.82E-01	4.48E-10	3.67E-06

BOLD & shaded - indicates that the concentration in the sample exceeds the most stringent cleanup level.

a - All Method C cleanup levels for all samples (B-1-21 through B-6-21) were averaged to be used as the cleanup level for the site.

Table 5. Soil Sample BTEX Analytical Results

Sample ID	Date	Depth (feet)	EPA-8260 Benzene (mg/kg)	EPA-8260 Toluene (mg/kg)	EPA-8260 Ethylbenzene (mg/kg)	EPA-8260 Xylenes (mg/kg)	EPA-8260 n-Hexane (mg/kg)
MTCA Method C Direct Contant Cleanup Level[a]:			2,400	280,000	350,000	700,000	210,000
Protection of Groundwater (Vadose)[b]:			0.03[c]	4.5	5.9	14	72
B-1-21	10/14/2021	4	0.003	(ND<0.007)	(ND<0.001)	(ND<0.004)	(ND<0.001)
B-2-21	9/30/2021	3	(ND<0.01)	(ND<0.04)	(ND<0.01)	(ND<0.02)	(ND<0.03)
B-3-21	9/30/2021	3.5	(ND<0.02)	(ND<0.1)	0.0371 J	0.27	(ND<0.05)
B-4-21	9/30/2021	3	(ND<0.01)	(ND<0.04)	(ND<0.01)	(ND<0.02)	(ND<0.04)
B-5-21	9/30/2021	5	**0.033 J**	0.103 J	0.0534 J	0.57	(ND<0.08)
B-6-21	9/30/2021	4	(ND<0.016)	(ND<0.054)	(ND<0.013)	(ND<0.022)	(ND<0.046) C3

a - Method C cleanup levels obtained from CLARC tables calculated from WAC 173-370-745, Equation 745-2 (carcinogens) based on soil direct contact. If no carcinogenic value was listed then the non-carcinogenic value was applied.

b - Protection of groundwater values obtained from CLARC tables unless otherwise noted.

c - MTCA A cleanup level for industrial properties was chosen because it is an ARAR. MTCA A cleanup levels are already adjusted for leaching and natural background concentrations.

BOLD & shaded - indicates that the concentration in the sample exceeds the most stringent cleanup level.

C3 - The reported concentration is an estimate. The continuing calibration standard associated with the data responded low. Method sensitivity check is acceptable.

J - Analyte detected below the reporting limit, therefore result is an estimate.

ND - indicates analyte was not detected at level above reporting limit (shown in parentheses)

Table 6. Soil Sample Metal Analytical Results

Sample ID	Date	Depth (feet)	EPA-7471B Arsenic (mg/kg)	EPA-7471B Cadmium (mg/kg)	EPA-7199 Chromium (VI) (mg/kg)	- Chromium (III) (mg/kg)	EPA-7471B Lead (mg/kg)	EPA-7471B Nickel (mg/kg)	EPA-7471B Mercury (mg/kg)
MTCA Method C Direct Contant Cleanup Level[a]:			88	3,500	260	5,300,000	1000[c]	70,000	2[c]
Protection of Groundwater (Vadose)[b]:			20[c]	0.69	19[c]	480,000	3,000	130	2.1
B-1-21	10/14/2021	4	4.79	(ND<0.1)	(ND<1.5)	38	14.8	38.5	0.07
B-2-21	9/30/2021	3	4.63	(ND<0.1)	0.66 J	36.7	2.8	33.7	0.03
B-3-21	9/30/2021	3.5	5.95	(ND<0.1)	ND(<0.4)	37.4	4.9	34.3	0.01
B-4-21	9/30/2021	3	3.76	0.115 J	0.997 J	33.5	2.8	34.4	0.02
B-5-21	9/30/2021	5	8.36	(ND<0.2)	ND(<0.5)	44.5	5.8	45.6	0.03
B-6-21	9/30/2021	4	3.54	(ND<0.1)	0.62 J	25.7	2.24 J	25.8	0.02

a - Method C cleanup levels obtained from CLARC tables calculated from WAC 173-370-745, Equation 745-2 (carcinogens) based on soil direct contact. If no carcinogenic value was listed then the non-carcinogenic value was applied.

b - Protection of groundwater values obtained from CLARC tables unless otherwise noted.

c - MTCA A cleanup level for industrial properties was chosen because it is an ARAR. MTCA A cleanup levels are already adjusted for leaching and natural background concentrations.

BOLD & shaded - indicates that the concentration in the sample exceeds the most stringent cleanup level.

J - Analyte detected below the reporting limit, therefore result is an estimate.

ND - indicates analyte was not detected at level above reporting limit (shown in parentheses)

Table 7. Soil Sample cPAH Analytical Results

Sample ID		MTCA Method C Direct Contant Cleanup Level[a]:	Protection of Groundwater (Vadose)[b]:	Toxicity Equivalency Factor (TEF):	B-1-21	B-2-21	B-3-21	B-4-21	B-5-21	B-6-21
Depth					4	3	3.5	3	5	4
Date					10/14/2021	9/30/2021	9/30/2021	9/30/2021	9/30/2021	9/30/2021
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) (EPA-8270 SIM)										
Benzo[A]Anthracene	mg/kg	-	0.72[c]	0.1	(ND<0.015)	0.0051	0.0254	0.194	0.0063	(ND<0.00051)
Benzo[A]Pyrene	mg/kg	130	3.9	1	(ND<0.015)	(ND<0.00064)	(ND<0.0035)	(ND<0.0069)	(ND<0.0036)	(ND<0.0007)
Benzo[B]Fluoranthene	mg/kg	-	2.46[c]	0.1	(ND<0.015)	0.0044	0.0208	0.0394 J	0.0052	(ND<0.00058)
Benzo[K]fluoranthene	mg/kg	-	2.46[c]	0.1	(ND<0.015)	(ND<0.00055)	(ND<0.003)	(ND<0.0059)	(ND<0.0031)	(ND<0.0006)
Chrysene	mg/kg	-	0.8[c]	0.01	(ND<0.015)	0.0457	0.218	0.208	0.042	0.00073
Dibenz[A,H]Anthracene	mg/kg	-	3.57[c]	0.1	(ND<0.015)	0.0016	(ND<0.004)	0.0166 J	(ND<0.0042)	(ND<0.00081)
Indeno[1,2,3-Cd]Pyrene	mg/kg	-	6.94[c]	0.1	(ND<0.015)	(ND<0.00061)	(ND<0.0033)	(ND<0.0066)	(ND<0.0034)	(ND<0.00066)
Total cPAH Equivalent (TEq)[d]	mg/kg	130	-	-	0.011	0.002	0.009	0.026	0.004	0.001
Polycyclic Aromatic Hydrocarbons (PAHs) (EPA-8270 SIM)										
Acenaphthene	mg/kg	210,000	49	-	(ND<0.015)	0.016	(ND<0.0027)	0.177	0.101	(ND<0.00055)
Anthracene	mg/kg	1,100,000	1,100	-	(ND<0.015)	(ND<0.00036)	(ND<0.0019)	(ND<0.0039)	(ND<0.002)	(ND<0.00039)
Biphenyl	mg/kg	16,000	0.58	-	(ND<0.49)	(ND<0.012)	(ND<0.015)	(ND<0.013)	(ND<0.021)	(ND<0.015)
Dibenzofuran	mg/kg	3,500	1.5	-	(ND<0.015)	0.018	(ND<0.0026)	0.222	0.0391	(ND<0.00052)
Fluoranthene	mg/kg	140,000	630	-	(ND<0.015)	0.0025	(ND<0.0037)	(ND<0.0074)	0.0097	(ND<0.00075)
Fluorene	mg/kg	140,000	51	-	(ND<0.015)	0.087	0.319	0.999	0.116	(ND<0.00075)
Naphthalenes[e]	mg/kg	70,000	5[f]	-	(ND<0.015)	0.16	0.60	**5.52 E**	1.61	0.0035 J
Pyrene	mg/kg	110,000	330	-	(ND<0.015)	0.02	0.0841	0.183	0.0513	0.00085

a - Method C cleanup levels obtained from CLARC tables calculated from WAC 173-370-745, Equation 745-2 (carcinogens) based on soil direct contact. If no carcinogenic value was listed then the non-carcinogenic value was applied.

b - Protection of groundwater values obtained from CLARC tables unless otherwise noted.

c - Values calculated from WAC 173-340-747, Equation 747-1. cPAHs were calculated using the MTCA Method A groundwater cleanup level for benzo[a]pyrene.

d - cPAH level calculated using Toxicity equivalency methodology provided in WAC 173-340-708(8)

e - Sum of naphthalene, 1-methylnaphthalene and 2-methylnaphthalene.

f - MTCA A cleanup level for industrial properties was chosen because it is an ARAR. MTCA A cleanup levels are already adjusted for leaching and natural background concentrations.

BOLD & shaded - indicates that the concentration in the sample exceeds the most stringent cleanup level.

E - Analyte concentration exceeded the calibration range. The reported result is estimated.

J - Analyte detected below the reporting limit, therefore result is an estimate.

ND - indicates analyte was not detected at level above reporting limit (shown in parentheses)

For ND values, the TEF was multiplied by one half the reporting limit

TEF - Toxicity Equivalency Factor (WAC 173-340-900 table 708.2)

TEq - Toxicity Equivalency to benzo(a)pyrene, calculated by multiplying result by appropriate TEF.

APPENDIX A

TRC Report - Phase I Oily Water Sewer Inspections and Repair Recommendations

Phase I Oily Water Sewer Inspections and Repair Recommendations

Date: February 11, 2022

Prepared For: Phillips 66 Ferndale Refinery

Prepared By: TRC

Contents

Figures

Tables

Attachments

1. Phase I Field Inspections

1.1. Background

The Phillips 66 (P66) Ferndale Refinery's ("Refinery") Oily Water Sewer (OWS), also referred to as Solid Waste Management Unit (SWMU) 14, has been in operation since constructed in 1953. The OWS is the underground piping system that consists of drain hubs, manholes, hatches, and other access points, which conveys process wastewater, stormwater runoff from process areas, and fire water to the Refinery's wastewater treatment system.

An Investigation and Response Plan (Plan), dated January 26, 2021, was prepared for the Refinery in accordance with the requirements in the Agreed Order No. DE 16297 (AO). The specific requirements for Plan are listed in Section VII.A of the AO. The Plan describes measures that will be taken to investigate the OWS and respond to releases or threatened releases, if any, that are discovered during the investigation. This report describes sections of the OWS that were inspected during Phase I, in accordance with the Plan, and findings from those inspections.

1.2. Oily Water Sewer Field Inspections

The OWS inspection process was divided into four (4) phases covering a 10-year cycle. During Phase I, approximately 7,474 linear feet of sewer line segments and 30 manholes were inspected. Field inspections were completed by Atlas Inspection (a subsidiary or Industrial Inspection & Analysis, Inc.) ("Atlas"). Data was processed and segment IDs and locations confirmed in the field by Whatcom Environmental Services Inc ("Whatcom"). Visual overview of Phase I inspections can be found in **Figure 1**. The following **Table 1** and **Table 2** present segments and manholes inspected during Phase I.

Table 1. Phase I Inspected Segments

Setup ID	Segment ID	Pipe Dia. (in.)	Inspected Footage (LF)	Comments
1-1	4C-1:X-3	8	338.4	
1-2	2-4-1:X-3	8	40.1	Survey abandoned due to impassable patch repair and fractured pipe.
1-2R	X-3:2-4-1	8	39.1	Reverse inspection segment complete. Survey abandoned due to impassable patch repair and fractured pipe.
1-3	2-4-1:3-4-1	8	383.4	Survey abandoned due to impassable water level and offset joint.
1-3R	3-4-1:2-4-1	8	5.6	Reverse inspection segment complete. Survey abandoned due to impassable water level and offset joint.
1-4	6-4-1:3-4-1	8	351.1	Survey abandoned due to impassable water level and offset joint. Segment inspection considered complete since survey abandoned directly adjacent to manhole.

Setup ID	Segment ID	Pipe Dia. (in.)	Inspected Footage (LF)	Comments
1-5	7-4-1:6-4-1	8	346.9	Survey abandoned due to impassable water level.
1-5R	6-4-1:7-4-1	8	44	Reverse inspection segment complete.
1-6	7-4-1:9-4FS	8	320.8	Survey abandoned due to impassable pipe with material change. Reverse inspection not completed during Phase I due to presence of fire stop.
1-7	X-1:X-2	12	131.5	
1-8	X-2:X-7	15	278.2	
1-9	X-7:X-8	15	254	Survey abandoned due to poor traction. Segment inspection considered complete since survey abandoned directly adjacent to manhole.
1-10	X-8:X-9	18	283.5	
1-11	X-9:X-10	18	280.7	
1-12	X-10:X-11	18	284.3	
1-13	X-11:X-12	18	334.5	
1-14	X-12.2:X-12	18	119.6	
1-15	X-12.2:X-13	18	184	
1-16	X-13:X-14	18	321.6	
1-17	X-14:X-15	18	305.7	
1-18	X-15:X-16	18	303	
1-19	X-16:X-17	18	493	
1-20	X-17:4-6-1	18	228	
1-21	9-FS:10-FS	24	244.2	
1-22	10-FS:11-FS	24	251.7	
1-23	11-FS:12-FS	24	266.1	
1-24	12-FS:13-FS	24	286	
1-25	13-FS:X-22	24	170.6	
1-26	X-23:X-22	24	431	
1-27	X-23:X-24	24	153.7	

Table 2. Phase I Inspected Manholes

Setup ID	Manhole ID
1-ST-1	X-1
1-ST-2	4C-1
1-ST-3	X-2
1-ST-4	X-3
1-ST-5	2-4-1
1-ST-6	3-4-1
1-ST-7	6-4-1
1-ST-8	X-7
1-ST-9	X-8
1-ST-10	X-9
1-ST-11	X-10
1-ST-12	7-4-1
1-ST-13	9-4FS
1-ST-14	X-11
1-ST-15	9-FS
1-ST-16	10-FS
1-ST-17	11-FS
1-ST-18	12-FS
1-ST-19	13-FS
1-ST-20	X-22
1-ST-21	X-12.2
1-ST-22	X-23
1-ST-23	X-24
1-ST-24	4-6-1
1-ST-25	X-16
1-ST-26	X-17
1-ST-27	X-12
1-ST-28	X-15
1-ST-29	X-13

Setup ID	Manhole ID
1-ST-30	X-14

2. Phase I Field Data Review

2.1. Video Review

Sewer line segment and manhole inspection videos for the listed segments and manholes in **Table 1** and **Table 2** were provided to TRC by Atlas and Whatcom between May 12, 2021 and July 22, 2021. Following receipt of sewer inspection videos, TRC's team of certified National Association of Sewer Service Companies (NASSCO) staff reviewed each video for completeness and quality and then provided initial identification of each defect using NASSCO certified software. Sewer line segments and manholes were reviewed using NASSCO's Pipeline Assessment Certification Program (PACP) and Manhole Assessment Certification Program (MACP) structural rating (SR) system to identify sewer defects (e.g., cracking, deformities, etc.).

Following structural rating, TRC assigned each defect a separate environmental rating (ER) primarily considering the potential for a release. This rating system was made specific for the Refinery and can be found in **Attachment 1**. Each ER category is based on defect characteristics and the prioritization for follow-up actions and documentation.

Summary inspection reports, including ER identifiers and photos of defects, for segments and manholes, can be found in **Attachment 2** and **Attachment 3**, respectively.

2.2. Repair Recommendations

Defects rated with an ER of 3 or 4 are grouped together in numbered "Repair Areas" and are shown on **Figure 2A through Figure 2C.**

Repair Area 1 (1-1, 1-2)

- 1-1
  - Dig and replace sewer segments for ER=3 fractures and ER=4 broken pipe between approximately 160 ft and 190 ft south of MH 4C-1.
  - Continue monitoring, or scope for future repair, sewer segments for ER=3 fractures between approximately 240 ft and 335 ft south of MH 4C-1.
- 1-2
  - Dig and replace patch repair and adjacent ER=4 fractures at 39.1 ft south of X-3.

Alternatively

- 1-1 and 1-2
  - Line entire 1-1 segment with cured in place pipe (CIPP).
  - Line entire 1-2 segment with CIPP.

Repair Area 2 (1-3, 1-4)

- 1-3

    - Dig and replace sewer segments for ER=4 broken pipe between approximately 0 ft and 5 ft west of MH 2-4-1.
    - Continue monitoring, or scope for future repair, ER=3 fractures approximately 47.5 ft west of MH 2-4-1.
    - Dig and replace sewer segments for ER=4 large offset joint and ER=4 hole between approximately 0 ft and 10 ft east of MH 3-4-1.
- 1-4
    - Dig and replace sewer segments for ER=4 large offset joint between approximately 0 ft and 10 ft west of MH 3-4-1.

Recommended

- MH 3-4-1
    - Assess condition surrounding MH 3-4-1. Large offset joints on either side of manhole could be sign of sinkhole formation or unsettling in area.

Repair Area 3 (1-5)

- 1-5
    - Dig and replace sewer segments for ER=4 fractured pipe between approximately 0 ft and 5 ft east of MH 7-4-1.
    - Continue monitoring, or scope for future repair, ER=3 fractures approximately 0.2 ft west of MH 6-4-1.

Repair Area 4 (1-15)

- 1-15
    - Continue monitoring, or scope for future repair, ER=3 angular joint approximately 1.4 feet south of MH X-12.2.

Repair Area 5 (MH X-16)

- MH X-16
    - Patch the interior section of manhole X-16 that appears to have groundwater infiltration ER=3. Not considered high potential for release but should be mitigated to keep defect from expanding.

Repair Area 6 (1-23)

- 1-23
    - Continue monitoring, or scope for future repair, ER=3 fractures approximately 112.8 feet west of MH 11-FS.

Figures

Sewer Inspection Route

Phenolic Sewer Major Trunk Lines

Oily Water Sewer Major Trunk Lines

1-A-X Phenolic Manholes

Oily and Phenolic Sewer Manholes

- Phase I
- Phase II
- Phase III
- Phase IV

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC

1:6,000
1" = 500'

0 250 500 FEET

PROJECT:
PHILLIPS 66
PHASE I OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE:
PHASE I OILY WATER SEWER INSPECTIONS OVERVIEW

DRAWN BY:	B. LEE	PROJ. NO.:	423514.0000.0000
CHECKED BY:	M. HORN		**FIGURE 1**
APPROVED BY:	J. ALLEN		
DATE:	FEBRUARY 2022		

TRC
505 EAST HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE: 423514_Ferndale.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet; Map Rotation: 0
Saved By MHORN on 2/4/2022 - 7:46:38 PM; File Path: T:\PROJECTS\Phillips66_Co\423514_Ferndale\2-APRX\423514_Ferndale.aprx; Layout Name: Figure1

Sewer Line Defects

- Environmental Rating = 4
- Environmental Rating = 3

Oily and Phenolic Sewer Manholes

Inspection

- Phase I

Oily Water Sewer Major Trunk Lines

Sewer Inspection Route

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC

N

1:900
1" = 75'
0 37.5 75 FEET

PROJECT:
PHILLIPS 66
PHASE I OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE: **PHASE I SEWER INSPECTION REPAIR AREAS AND ENVIRONMENTAL RATED DEFECTS 3 & 4**

DRAWN BY:	B. LEE	PROJ. NO.:	423514.0000.0000
CHECKED BY:	C. PLANA		**FIGURE 2A**
APPROVED BY:	J. ALLEN		
DATE:	FEBRUARY 2022		

TRC
505 EAST HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE: 423514_Ferndale.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet. Map Rotation: 0
Stored By: AMORA on 2/4/2022 - 7:45:38 PM. File Path: T:\PROJECTS\Phillips66_Cp\423514_Ferndale\2-APRX\423514_Ferndale.aprx. Layout Name: Figure2A_Defects

Sewer Line Defects

- Environmental Rating = 4
- Environmental Rating = 3

Oily and Phenolic Sewer Manholes

Inspection

- Phase I

Oily Water Sewer Major Trunk Lines

Sewer Inspection Route

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC

1:1,000
1" = 83'

0 41.5 83 FEET

PROJECT:
PHILLIPS 66
PHASE I OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE: **PHASE I SEWER INSPECTION REPAIR AREAS AND ENVIRONMENTAL RATED DEFECTS 3 & 4**

DRAWN BY:	B. LEE	PROJ. NO.:	423514.0000.0000
CHECKED BY:	C. PLANA		**FIGURE 2B**
APPROVED BY:	J. ALLEN		
DATE:	FEBRUARY 2022		

TRC
505 EAST HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE: 423514_Ferndale.aprx

Sewer Line Defects

- Environmental Rating = 3

Manhole Defects

- Max Environmental Rating = 3

Oily and Phenolic Sewer Manholes Inspection

- Phase I
- Phase II
- Phase III
- Phase IV
- Phenolic Sewer Major Trunk Lines
- Oily Water Sewer Major Trunk Lines
- Sewer Inspection Route

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC

N

1:2,500
1" = 208'

0 104 208 FEET

PROJECT: PHILLIPS 66
PHASE I OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE: PHASE I SEWER INSPECTION REPAIR AREAS AND ENVIRONMENTAL RATED DEFECTS 3 & 4

DRAWN BY:	B. LEE	PROJ. NO.:	423514.0000.0000
CHECKED BY:	C. PLANA		FIGURE 2C
APPROVED BY:	J. ALLEN		
DATE:	FEBRUARY 2022		

TRC
505 EAST HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE: 423514_Ferndale.aprx

Attachment 1: Phillips 66 Ferndale OWS Environmental Rating System

Phillips 66 - Ferndale Refinery
Sewer Environmental Ratings

Environmental Rating (ER)	Characteristic / Examples	Actions and Documentation
5	Significant structural defect with confirmed release. Examples: Large holes at or below the segment/manhole flow line and above groundwater table; completely separated joints with exposed surrounding soil above groundwater table; collapsed pipe sections.	Initial investigation confirmed soil or groundwater exceedance of cleanup levels specified in Section 3.1 of IRP. Confirmed release from OWS will be reported to Ecology 90 days after discovery. Conduct site characterization and schedule for high priority mitigation effort (repair, ongoing monitoring for inaccessible sewers, etc.) If soil surrounding significant defect appears impacted due to a potential release from the OWS, then immediate response actions will be initiated to stop the source of the potential release and begin clean-up activities.
4	Significant structural defect with potential for release. Examples: Same as ER = 5.	Conduct initial release investigation involving the collection of soil and/or shallow groundwater sample(s). Groundwater samples will be collected only if the potential release occurred at or below the shallow groundwater table elevation. Increase to ER=5 if soil or groundwater concentrations exceed cleanup levels specified in Section 3.1 of IRP. Schedule for moderate priority mitigation effort (primarily repair based on Refinery operational needs and accessibility or reinspection to monitor defect condition).
3	Moderate structural defect. Examples: Significant fractures/cracks at or below the pipe/manhole flow line; groundwater infiltration at defect; significant corrosion. Defects that both higher risk for future potential release or structural failure.	Document in the Refinery record. Schedule for low priority mitigation effort (primarily repair based on Refinery operational needs and accessibility or reinspection to monitor defect condition).
2	Small to moderate structural defect. Examples: Moderate fractures/cracks above the pipe/manhole flow line; joint improperly seated; pipe reinforcement visible, moderate corrosion in pipe.	Document in the Refinery record.
1	Small structural defect. Examples: Hairline cracks; minor corrosion/deterioration of pipe/manhole material; visible aggregate; small offset joint; missing sealing rings.	Document in the Refinery record.

Notes:

1. ER = Environmental Rating.
2. IRP = Investigation and Response Plan dated January 26, 2021.
3. OWS = Oily Water Sewer

Attachment 2: OWS Segment Inspection Summary Reports

Available Upon Request

Attachment 3: OWS Structure Inspection Summary Reports

Available Upon Request

APPENDIX B

Soil Laboratory Analytical Data Reports

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

December 10, 2021

Amie Blystone
Phillips 66
P.O. Box 8
Ferndale, WA 98248

RE: Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Dear Amie Blystone:

Enclosed are the analytical results for sample(s) received by the laboratory on October 02, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses were subcontracted outside of the Pace Network. The test report from the external subcontractor is attached to this report in its entirety.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace National - Mt. Juliet
- Pace Analytical Services - Minneapolis

This report was revised on December 10, 2021 to include a project narrative for method 8270E PAH by SIM.
To report 1-Methylnaphthalene by method 8270E PAH by SIM on Pace sample 10581546003.
Additionally per client request, Pace sample 10581546005 was re-analyzed using the methanol vials provided for method 8260D and both sets of data have been reported.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jennifer Gross
jennifer.gross@pacelabs.com
(612)607-1700
Project Manager

Enclosures

cc: Ashley Yamaura, Whatcom Environmental Services

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Pace Analytical Services, LLC - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414
1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab
A2LA Certification #: 2926.01*
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009*
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014*
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Tribal Water Systems+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605*
Georgia Certification #: 959
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086*
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064*
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137*
Minnesota Dept of Ag Approval: via MN 027-053-137
Minnesota Petrofund Registration #: 1240*
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081*
New Jersey Certification #: MN002
New York Certification #: 11647*
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification (1700) #: CL101
Ohio VAP Certification (1800) #: CL110*
Oklahoma Certification #: 9507*
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001*
Pennsylvania Certification #: 68-00563*
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192*
Utah Certification #: MN00064*
Vermont Certification #: VT-027053137
Virginia Certification #: 460163*
Washington Certification #: C486*
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01
USDA Permit #: P330-19-00208
*Please Note: Applicable air certifications are denoted with an asterisk (*).

Pace Analytical Services National

12065 Lebanon Road, Mt. Juliet, TN 37122
Alabama Certification #: 40660
Alaska Certification 17-026
Arizona Certification #: AZ0612
Arkansas Certification #: 88-0469
California Certification #: 2932
Canada Certification #: 1461.01
Colorado Certification #: TN00003
Connecticut Certification #: PH-0197
DOD Certification: #1461.01
EPA# TN00003
Florida Certification #: E87487
Georgia DW Certification #: 923
Georgia Certification: NELAP
Idaho Certification #: TN00003
Illinois Certification #: 200008
Indiana Certification #: C-TN-01
Iowa Certification #: 364
Kansas Certification #: E-10277
Kentucky UST Certification #: 16
Kentucky Certification #: 90010
Louisiana Certification #: AI30792
Louisiana DW Certification #: LA180010
Maine Certification #: TN0002
Maryland Certification #: 324
Massachusetts Certification #: M-TN003
Michigan Certification #: 9958
Minnesota Certification #: 047-999-395
Mississippi Certification #: TN00003
Missouri Certification #: 340
Montana Certification #: CERT0086
Nebraska Certification #: NE-OS-15-05

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Pace Analytical Services National

Nevada Certification #: TN-03-2002-34
New Hampshire Certification #: 2975
New Jersey Certification #: TN002
New Mexico DW Certification
New York Certification #: 11742
North Carolina Aquatic Toxicity Certification #: 41
North Carolina Drinking Water Certification #: 21704
North Carolina Environmental Certificate #: 375
North Dakota Certification #: R-140
Ohio VAP Certification #: CL0069
Oklahoma Certification #: 9915
Oregon Certification #: TN200002
Pennsylvania Certification #: 68-02979
Rhode Island Certification #: LAO00356
South Carolina Certification #: 84004
South Dakota Certification
Tennessee DW/Chem/Micro Certification #: 2006
Texas Certification #: T 104704245-17-14
Texas Mold Certification #: LAB0152
USDA Soil Permit #: P330-15-00234
Utah Certification #: TN00003
Vermont Dept. of Health: ID# VT-2006
Virginia Certification #: VT2006
Virginia Certification #: 460132
Washington Certification #: C847
West Virginia Certification #: 233
Wisconsin Certification #: 998093910
Wyoming UST Certification #: via A2LA 2926.01
A2LA-ISO 17025 Certification #: 1461.01
A2LA-ISO 17025 Certification #: 1461.02
AIHA-LAP/LLC EMLAP Certification #:100789

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10581546001	**B-2-21 (3 FT)**	Solid	09/30/21 10:15	10/02/21 09:00
10581546002	**B-3-21 (3.5 FT)**	Solid	09/30/21 11:15	10/02/21 09:00
10581546003	**B-4-21 (3 FT)**	Solid	09/30/21 11:45	10/02/21 09:00
10581546004	**B-5-21 (5 FT)**	Solid	09/30/21 01:15	10/02/21 09:00
10581546005	**B-6-21 (4 FT)**	Solid	09/30/21 02:15	10/02/21 09:00

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10581546001	**B-2-21 (3 FT)**	EPA 6020B	JPD	5	PAN
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E	JNJ	7	PAN
		EPA 8270E by SIM	JLR	21	PASI-M
		EPA 8260D	DWR	10	PAN
		SM 2540G	KDW	1	PAN
		EPA 7199	MCG	1	PAN
		Calculated	MCG	1	PAN
		EPA 9045D	AR3	1	PASI-M
10581546002	**B-3-21 (3.5 FT)**	EPA 6020B	JPD	5	PAN
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E	JNJ	7	PAN
		EPA 8270E by SIM	JLR	21	PASI-M
		EPA 8260D	DWR	10	PAN
		SM 2540G	KDW	1	PAN
		EPA 7199	MCG	1	PAN
		Calculated	MCG	1	PAN
		EPA 9045D	AR3	1	PASI-M
10581546003	**B-4-21 (3 FT)**	EPA 6020B	JPD	5	PAN
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E	JNJ	7	PAN
		EPA 8270E by SIM	JLR	21	PASI-M
		EPA 8260D	DWR	10	PAN
		SM 2540G	KDW	1	PAN
		EPA 7199	MCG	1	PAN
		Calculated	MCG	1	PAN
		EPA 9045D	AR3	1	PASI-M
10581546004	**B-5-21 (5 FT)**	EPA 6020B	JPD	5	PAN
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E	JNJ	7	PAN
		EPA 8270E by SIM	KJ3	21	PASI-M
		EPA 8260D	DWR	10	PAN
		SM 2540G	KDW	1	PAN

Pace Analytical Services, LLC
1700 Elm Street
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SAMPLE ANALYTE COUNT

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 7199	MCG	1	PAN
		Calculated	MCG	1	PAN
		EPA 9045D	AR3	1	PASI-M
10581546005	**B-6-21 (4 FT)**	EPA 6020B	JPD	5	PAN
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E	JNJ	7	PAN
		EPA 8270E by SIM	JLR	21	PASI-M
		EPA 8260D	ACG, JHH	10	PAN
		SM 2540G	KDW	1	PAN
		EPA 7199	MCG	1	PAN
		Calculated	MCG	1	PAN
		EPA 9045D	AR3	1	PASI-M

PAN = Pace National - Mt. Juliet
PASI-M = Pace Analytical Services - Minneapolis

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Date: December 10, 2021

The original analysis for method 8270E PAH by SIM on Pace sample 10581546003 and associated MS/MSD were performed at a 10x dilution due to the physical (dark) appearance of the sample. Subsequently, due to the amount of matrix present in the chromatogram greater than 5 times the internal standards, re-analysis at a lower dilution was not performed.

Upon client request, associated samples were re-analyzed and reviewed by the Department Manager. After review, it was found that some analytes were missed being integrated by the instrument software due to sample matrix and subsequent retention time shifts of both the internal standards and associated analytes. As a result of the re-analysis, results for samples -001 and -004 have changed to include previously missing j-flag detections.

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Date: December 10, 2021

B-3-21 (3.5 FT) (Lab ID: 10581546002)

- Volatile Organic Compounds (GC/MS) by Method 8260D - Surrogate failure due to matrix interference

B-4-21 (3 FT) (Lab ID: 10581546003)

- Volatile Organic Compounds (GC/MS) by Method 8260D - Surrogate failure due to matrix interference

B-6-21 (4 FT) (Lab ID: 10581546005)

- Volatile Organic Compounds (GC/MS) by Method 8260D - No stir bars remain for further analysis.

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Method: **EPA 6020B**
Description: Metals (ICPMS) 6020B
Client: Phillips66_Whatcom Environmental
Date: December 10, 2021

General Information:
5 samples were analyzed for EPA 6020B by Pace National Mt. Juliet. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Method: **EPA 7471B**
Description: 7471B Mercury
Client: Phillips66_Whatcom Environmental
Date: December 10, 2021

General Information:
5 samples were analyzed for EPA 7471B by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 7471B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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1700 Elm Street
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PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Method: **EPA 8270E**
Description: SVOA (GC/MS) 8270E
Client: Phillips66_Whatcom Environmental
Date: December 10, 2021

General Information:
5 samples were analyzed for EPA 8270E by Pace National Mt. Juliet. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
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PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Method: **EPA 8270E by SIM**
Description: 8270E MSSV PAH by SIM
Client: Phillips66_Whatcom Environmental
Date: December 10, 2021

General Information:
5 samples were analyzed for EPA 8270E by SIM by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 3550C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 775548

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10581546003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 4131157)
  - 2-Methylnaphthalene
  - Acenaphthene
  - Acenaphthylene
  - Anthracene
  - Benzo(a)anthracene
  - Benzo(a)pyrene
  - Benzo(g,h,i)perylene
  - Fluoranthene

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PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Method: **EPA 8270E by SIM**
Description: 8270E MSSV PAH by SIM
Client: Phillips66_Whatcom Environmental
Date: December 10, 2021

QC Batch: 775548

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10581546003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Indeno(1,2,3-cd)pyrene
- Naphthalene
- MSD (Lab ID: 4131158)
  - 2-Methylnaphthalene
  - Acenaphthene
  - Anthracene
  - Benzo(a)pyrene
  - Benzo(g,h,i)perylene
  - Chrysene
  - Dibenzofuran
  - Fluoranthene
  - Naphthalene

P6: Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.

- MS (Lab ID: 4131157)
  - 1-Methylnaphthalene
  - Fluorene
  - Phenanthrene
- MSD (Lab ID: 4131158)
  - 1-Methylnaphthalene
  - Fluorene
  - Phenanthrene

R1: RPD value was outside control limits.

- MSD (Lab ID: 4131158)
  - Acenaphthylene
  - Naphthalene

Additional Comments:

Analyte Comments:

QC Batch: 775548

D4: Sample was diluted due to the presence of high levels of target analytes.

- B-3-21 (3.5 FT) (Lab ID: 10581546002)
  - 2-Fluorobiphenyl (S)
- B-4-21 (3 FT) (Lab ID: 10581546003)
  - 2-Fluorobiphenyl (S)
- B-5-21 (5 FT) (Lab ID: 10581546004)
  - 2-Fluorobiphenyl (S)
- MS (Lab ID: 4131157)
  - 2-Fluorobiphenyl (S)
- MSD (Lab ID: 4131158)
  - 2-Fluorobiphenyl (S)

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PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Method: **EPA 8270E by SIM**
Description: 8270E MSSV PAH by SIM
Client: Phillips66_Whatcom Environmental
Date: December 10, 2021

Analyte Comments:

QC Batch: 775548

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- B-4-21 (3 FT) (Lab ID: 10581546003)
  - 1-Methylnaphthalene
- MS (Lab ID: 4131157)
  - 1-Methylnaphthalene
- MSD (Lab ID: 4131158)
  - 1-Methylnaphthalene

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PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Method: **EPA 8260D**
Description: VOA (GC/MS) 8260D
Client: Phillips66_Whatcom Environmental
Date: December 10, 2021

General Information:
5 samples were analyzed for EPA 8260D by Pace National Mt. Juliet. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 1756421

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): L1414955-03

R1: RPD value was outside control limits.

- MSD (Lab ID: R3716450-5)
  - Ethylbenzene
  - Xylene (Total)
  - m&p-Xylene

Additional Comments:

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PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Method: **EPA 8260D**
Description: VOA (GC/MS) 8260D
Client: Phillips66_Whatcom Environmental
Date: December 10, 2021

Analyte Comments:

QC Batch: 1763708

C3: The reported concentration is an estimate. The continuing calibration standard associated with this data responded low. Method sensitivity check is acceptable.

- B-6-21 (4 FT) (Lab ID: 10581546005)
  - n-Hexane

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PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Method: **SM 2540G**
Description: Total Solids 2540 G-2011
Client: Phillips66_Whatcom Environmental
Date: December 10, 2021

General Information:
5 samples were analyzed for SM 2540G by Pace National Mt. Juliet. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Method: **EPA 7199**
Description: Wet Chemistry 7199
Client: Phillips66_Whatcom Environmental
Date: December 10, 2021

General Information:
5 samples were analyzed for EPA 7199 by Pace National Mt. Juliet. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: 1754567

D8: The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.

- DUP (Lab ID: R3717096-3)
  - Chromium, Hexavalent

Additional Comments:

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PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Method: **Calculated**
Description: Calculated Results
Client: Phillips66_Whatcom Environmental
Date: December 10, 2021

General Information:
5 samples were analyzed for Calculated by Pace National Mt. Juliet. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Method: **EPA 9045D**
Description: 9045D pH
Client: Phillips66_Whatcom Environmental
Date: December 10, 2021

General Information:
5 samples were analyzed for EPA 9045D by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Sample: B-2-21 (3 FT) **Lab ID: 10581546001** Collected: 09/30/21 10:15 Received: 10/02/21 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Metals (ICPMS) 6020B	Analytical Method: EPA 6020B Preparation Method: 3050B Pace National - Mt. Juliet								
Arsenic	**4.63**	mg/kg	1.14	0.114	5	10/13/21 03:21	10/13/21 20:37	7440-38-2	
Cadmium	**<0.0979**	mg/kg	1.14	0.0979	5	10/13/21 03:21	10/13/21 20:37	7440-43-9	
Chromium	**37.4**	mg/kg	5.72	0.339	5	10/13/21 03:21	10/13/21 20:37	7440-47-3	
Lead	**2.83**	mg/kg	2.29	0.113	5	10/13/21 03:21	10/13/21 20:37	7439-92-1	
Nickel	**33.7**	mg/kg	2.86	0.226	5	10/13/21 03:21	10/13/21 20:37	7440-02-0	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.026**	mg/kg	0.020	0.0087	1	10/06/21 08:41	10/08/21 11:27	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis								
Percent Moisture	**12.4**	%	0.10	0.10	1		10/05/21 12:05		N2
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3546 Pace National - Mt. Juliet								
Biphenyl (Diphenyl)	**<0.0121**	mg/kg	0.381	0.0121	1	10/13/21 21:58	10/14/21 15:19	92-52-4	
Surrogates									
2-Fluorophenol (S)	52.9	%	12.0-120		1	10/13/21 21:58	10/14/21 15:19	367-12-4	
Phenol-d5 (S)	46.1	%	10.0-120		1	10/13/21 21:58	10/14/21 15:19	4165-62-2	
Nitrobenzene-d5 (S)	39.8	%	10.0-122		1	10/13/21 21:58	10/14/21 15:19	4165-60-0	
2-Fluorobiphenyl (S)	54.6	%	15.0-120		1	10/13/21 21:58	10/14/21 15:19	321-60-8	
2,4,6-Tribromophenol (S)	95.1	%	10.0-127		1	10/13/21 21:58	10/14/21 15:19	118-79-6	
p-Terphenyl-d14 (S)	57.1	%	10.0-120		1	10/13/21 21:58	10/14/21 15:19	1718-51-0	
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
1-Methylnaphthalene	**146**	ug/kg	11.4	0.62	1	10/08/21 16:16	10/11/21 14:34	90-12-0	
2-Methylnaphthalene	**<0.62**	ug/kg	11.4	0.62	1	10/08/21 16:16	10/11/21 14:34	91-57-6	
Acenaphthene	**15.9**	ug/kg	11.4	0.51	1	10/08/21 16:16	10/11/21 14:34	83-32-9	
Acenaphthylene	**9.0J**	ug/kg	11.4	0.78	1	10/08/21 16:16	10/11/21 14:34	208-96-8	
Anthracene	**<0.36**	ug/kg	11.4	0.36	1	10/08/21 16:16	10/11/21 14:34	120-12-7	
Benzo(a)anthracene	**5.1J**	ug/kg	11.4	0.47	1	10/08/21 16:16	10/11/21 14:34	56-55-3	
Benzo(a)pyrene	**<0.64**	ug/kg	11.4	0.64	1	10/08/21 16:16	10/11/21 14:34	50-32-8	
Benzo(b)fluoranthene	**4.4J**	ug/kg	11.4	0.53	1	10/08/21 16:16	10/11/21 14:34	205-99-2	
Benzo(g,h,i)perylene	**2.9J**	ug/kg	11.4	0.53	1	10/08/21 16:16	10/11/21 14:34	191-24-2	
Benzo(k)fluoranthene	**<0.55**	ug/kg	11.4	0.55	1	10/08/21 16:16	10/11/21 14:34	207-08-9	
Chrysene	**45.7**	ug/kg	11.4	0.46	1	10/08/21 16:16	10/11/21 14:34	218-01-9	
Dibenz(a,h)anthracene	**1.6J**	ug/kg	11.4	0.75	1	10/08/21 16:16	10/11/21 14:34	53-70-3	
Dibenzofuran	**18.4**	ug/kg	11.4	0.48	1	10/08/21 16:16	10/11/21 14:34	132-64-9	
Fluoranthene	**2.5J**	ug/kg	11.4	0.69	1	10/08/21 16:16	10/11/21 14:34	206-44-0	
Fluorene	**87.0**	ug/kg	11.4	0.69	1	10/08/21 16:16	10/11/21 14:34	86-73-7	
Indeno(1,2,3-cd)pyrene	**<0.61**	ug/kg	11.4	0.61	1	10/08/21 16:16	10/11/21 14:34	193-39-5	
Naphthalene	**10.7J**	ug/kg	11.4	0.51	1	10/08/21 16:16	10/11/21 14:34	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Sample: B-2-21 (3 FT) **Lab ID: 10581546001** Collected: 09/30/21 10:15 Received: 10/02/21 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
Phenanthrene	**177**	ug/kg	11.4	0.80	1	10/08/21 16:16	10/11/21 14:34	85-01-8	
Pyrene	**20.0**	ug/kg	11.4	0.74	1	10/08/21 16:16	10/11/21 14:34	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	72	%.	50-125		1	10/08/21 16:16	10/11/21 14:34	321-60-8	
p-Terphenyl-d14 (S)	77	%.	51-125		1	10/08/21 16:16	10/11/21 14:34	1718-51-0	
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet								
Benzene	**<0.0121**	mg/kg	0.0322	0.0121	25	10/12/21 11:04	10/14/21 20:00	71-43-2	
Ethylbenzene	**<0.00967**	mg/kg	0.0322	0.00967	25	10/12/21 11:04	10/14/21 20:00	100-41-4	
n-Hexane	**<0.0339**	mg/kg	0.322	0.0339	25	10/12/21 11:04	10/14/21 20:00	110-54-3	
Toluene	**<0.0397**	mg/kg	0.161	0.0397	25	10/12/21 11:04	10/14/21 20:00	108-88-3	
o-Xylene	**<0.0161**	mg/kg	0.0322	0.0161	25	10/12/21 11:04	10/14/21 20:00	95-47-6	
m&p-Xylene	**<0.0107**	mg/kg	0.0645	0.0107	25	10/12/21 11:04	10/14/21 20:00	179601-23-1	
Xylene (Total)	**<0.0161**	mg/kg	0.0967	0.0161	25	10/12/21 11:04	10/14/21 20:00	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	99.3	%	70.0-130		25	10/12/21 11:04	10/14/21 20:00	17060-07-0	
Toluene-d8 (S)	105	%	75.0-131		25	10/12/21 11:04	10/14/21 20:00	2037-26-5	
4-Bromofluorobenzene (S)	148	%	67.0-138		25	10/12/21 11:04	10/14/21 20:00	460-00-4	ST
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet								
Total Solids	**87.4**	%			1	10/08/21 10:17	10/08/21 10:25		
Wet Chemistry 7199	Analytical Method: EPA 7199 Preparation Method: 3060A Pace National - Mt. Juliet								
Chromium, Hexavalent	**0.660J**	mg/kg	1.14	0.292	1	10/10/21 18:00	10/15/21 10:57		J
Calculated Results	Analytical Method: Calculated Preparation Method: Calc. Pace National - Mt. Juliet								
Chromium, Trivalent	**36.7**	mg/kg	1.14	0.292	1	10/13/21 03:21	10/15/21 10:57		
9045D pH	Analytical Method: EPA 9045D Pace Analytical Services - Minneapolis								
pH at 25 Degrees C	**7.5**	Std. Units	0.10	0.10	1		10/15/21 19:41		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Sample: B-3-21 (3.5 FT) **Lab ID: 10581546002** Collected: 09/30/21 11:15 Received: 10/02/21 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Metals (ICPMS) 6020B	Analytical Method: EPA 6020B Preparation Method: 3050B Pace National - Mt. Juliet								
Arsenic	**5.95**	mg/kg	1.40	0.140	5	10/13/21 03:21	10/13/21 20:40	7440-38-2	
Cadmium	**<0.120**	mg/kg	1.40	0.120	5	10/13/21 03:21	10/13/21 20:40	7440-43-9	
Chromium	**37.4**	mg/kg	7.01	0.415	5	10/13/21 03:21	10/13/21 20:40	7440-47-3	
Lead	**4.91**	mg/kg	2.81	0.139	5	10/13/21 03:21	10/13/21 20:40	7439-92-1	
Nickel	**34.3**	mg/kg	3.51	0.276	5	10/13/21 03:21	10/13/21 20:40	7440-02-0	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.014J**	mg/kg	0.024	0.010	1	10/06/21 08:41	10/08/21 11:29	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis								
Percent Moisture	**18.7**	%	0.10	0.10	1		10/05/21 12:05		N2
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3546 Pace National - Mt. Juliet								
Biphenyl (Diphenyl)	**<0.0149**	mg/kg	0.467	0.0149	1	10/13/21 21:58	10/14/21 16:20	92-52-4	
Surrogates									
2-Fluorophenol (S)	34.0	%	12.0-120		1	10/13/21 21:58	10/14/21 16:20	367-12-4	
Phenol-d5 (S)	33.2	%	10.0-120		1	10/13/21 21:58	10/14/21 16:20	4165-62-2	
Nitrobenzene-d5 (S)	28.3	%	10.0-122		1	10/13/21 21:58	10/14/21 16:20	4165-60-0	
2-Fluorobiphenyl (S)	47.2	%	15.0-120		1	10/13/21 21:58	10/14/21 16:20	321-60-8	
2,4,6-Tribromophenol (S)	96.4	%	10.0-127		1	10/13/21 21:58	10/14/21 16:20	118-79-6	
p-Terphenyl-d14 (S)	51.6	%	10.0-120		1	10/13/21 21:58	10/14/21 16:20	1718-51-0	
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
1-Methylnaphthalene	**559**	ug/kg	61.4	3.4	5	10/08/21 16:16	10/11/21 12:53	90-12-0	
2-Methylnaphthalene	**<3.3**	ug/kg	61.4	3.3	5	10/08/21 16:16	10/11/21 12:53	91-57-6	
Acenaphthene	**<2.7**	ug/kg	61.4	2.7	5	10/08/21 16:16	10/11/21 12:53	83-32-9	
Acenaphthylene	**39.3J**	ug/kg	61.4	4.2	5	10/08/21 16:16	10/11/21 12:53	208-96-8	
Anthracene	**<1.9**	ug/kg	61.4	1.9	5	10/08/21 16:16	10/11/21 12:53	120-12-7	
Benzo(a)anthracene	**25.4J**	ug/kg	61.4	2.5	5	10/08/21 16:16	10/11/21 12:53	56-55-3	
Benzo(a)pyrene	**<3.5**	ug/kg	61.4	3.5	5	10/08/21 16:16	10/11/21 12:53	50-32-8	
Benzo(b)fluoranthene	**20.8J**	ug/kg	61.4	2.9	5	10/08/21 16:16	10/11/21 12:53	205-99-2	
Benzo(g,h,i)perylene	**16.0J**	ug/kg	61.4	2.9	5	10/08/21 16:16	10/11/21 12:53	191-24-2	
Benzo(k)fluoranthene	**<3.0**	ug/kg	61.4	3.0	5	10/08/21 16:16	10/11/21 12:53	207-08-9	
Chrysene	**218**	ug/kg	61.4	2.5	5	10/08/21 16:16	10/11/21 12:53	218-01-9	
Dibenz(a,h)anthracene	**<4.0**	ug/kg	61.4	4.0	5	10/08/21 16:16	10/11/21 12:53	53-70-3	
Dibenzofuran	**<2.6**	ug/kg	61.4	2.6	5	10/08/21 16:16	10/11/21 12:53	132-64-9	
Fluoranthene	**<3.7**	ug/kg	61.4	3.7	5	10/08/21 16:16	10/11/21 12:53	206-44-0	
Fluorene	**319**	ug/kg	61.4	3.7	5	10/08/21 16:16	10/11/21 12:53	86-73-7	
Indeno(1,2,3-cd)pyrene	**<3.3**	ug/kg	61.4	3.3	5	10/08/21 16:16	10/11/21 12:53	193-39-5	
Naphthalene	**45.2J**	ug/kg	61.4	2.8	5	10/08/21 16:16	10/11/21 12:53	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Sample: B-3-21 (3.5 FT) **Lab ID: 10581546002** Collected: 09/30/21 11:15 Received: 10/02/21 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
Phenanthrene	**425**	ug/kg	61.4	4.3	5	10/08/21 16:16	10/11/21 12:53	85-01-8	
Pyrene	**84.1**	ug/kg	61.4	4.0	5	10/08/21 16:16	10/11/21 12:53	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	77	%.	50-125		5	10/08/21 16:16	10/11/21 12:53	321-60-8	D4
p-Terphenyl-d14 (S)	78	%.	51-125		5	10/08/21 16:16	10/11/21 12:53	1718-51-0	
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet								
Benzene	**<0.0170**	mg/kg	0.0452	0.0170	25	10/12/21 11:04	10/14/21 20:20	71-43-2	
Ethylbenzene	**0.0371J**	mg/kg	0.0452	0.0136	25	10/12/21 11:04	10/14/21 20:20	100-41-4	J
n-Hexane	**<0.0475**	mg/kg	0.452	0.0475	25	10/12/21 11:04	10/14/21 20:20	110-54-3	
Toluene	**<0.0557**	mg/kg	0.226	0.0557	25	10/12/21 11:04	10/14/21 20:20	108-88-3	
o-Xylene	**0.110**	mg/kg	0.0452	0.0226	25	10/12/21 11:04	10/14/21 20:20	95-47-6	
m&p-Xylene	**0.158**	mg/kg	0.0904	0.0150	25	10/12/21 11:04	10/14/21 20:20	179601-23-1	
Xylene (Total)	**0.268**	mg/kg	0.136	0.0226	25	10/12/21 11:04	10/14/21 20:20	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	101	%	70.0-130		25	10/12/21 11:04	10/14/21 20:20	17060-07-0	
Toluene-d8 (S)	143	%	75.0-131		25	10/12/21 11:04	10/14/21 20:20	2037-26-5	ST
4-Bromofluorobenzene (S)	450	%	67.0-138		25	10/12/21 11:04	10/14/21 20:20	460-00-4	ST
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet								
Total Solids	**71.3**	%			1	10/09/21 19:03	10/09/21 19:23		
Wet Chemistry 7199	Analytical Method: EPA 7199 Preparation Method: 3060A Pace National - Mt. Juliet								
Chromium, Hexavalent	**<0.358**	mg/kg	1.40	0.358	1	10/10/21 18:00	10/15/21 11:02		
Calculated Results	Analytical Method: Calculated Preparation Method: Calc. Pace National - Mt. Juliet								
Chromium, Trivalent	**37.4**	mg/kg	1.40	0.358	1	10/13/21 03:21	10/15/21 11:02		
9045D pH	Analytical Method: EPA 9045D Pace Analytical Services - Minneapolis								
pH at 25 Degrees C	**7.4**	Std. Units	0.10	0.10	1		10/15/21 19:47		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Sample: B-4-21 (3 FT) **Lab ID: 10581546003** Collected: 09/30/21 11:45 Received: 10/02/21 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Metals (ICPMS) 6020B	Analytical Method: EPA 6020B Preparation Method: 3050B Pace National - Mt. Juliet								
Arsenic	**3.76**	mg/kg	1.22	0.122	5	10/13/21 03:21	10/13/21 20:44	7440-38-2	
Cadmium	**0.115J**	mg/kg	1.22	0.105	5	10/13/21 03:21	10/13/21 20:44	7440-43-9	J
Chromium	**34.5**	mg/kg	6.12	0.362	5	10/13/21 03:21	10/13/21 20:44	7440-47-3	
Lead	**2.82**	mg/kg	2.45	0.121	5	10/13/21 03:21	10/13/21 20:44	7439-92-1	
Nickel	**34.4**	mg/kg	3.06	0.241	5	10/13/21 03:21	10/13/21 20:44	7440-02-0	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.022**	mg/kg	0.022	0.0094	1	10/06/21 08:41	10/08/21 11:30	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis								
Percent Moisture	**18.6**	%	0.10	0.10	1		10/05/21 12:05		N2
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3546 Pace National - Mt. Juliet								
Biphenyl (Diphenyl)	**<0.0130**	mg/kg	0.407	0.0130	1	10/13/21 21:58	10/14/21 16:41	92-52-4	
Surrogates									
2-Fluorophenol (S)	39.9	%	12.0-120		1	10/13/21 21:58	10/14/21 16:41	367-12-4	
Phenol-d5 (S)	38.7	%	10.0-120		1	10/13/21 21:58	10/14/21 16:41	4165-62-2	
Nitrobenzene-d5 (S)	32.1	%	10.0-122		1	10/13/21 21:58	10/14/21 16:41	4165-60-0	
2-Fluorobiphenyl (S)	50.5	%	15.0-120		1	10/13/21 21:58	10/14/21 16:41	321-60-8	
2,4,6-Tribromophenol (S)	98.8	%	10.0-127		1	10/13/21 21:58	10/14/21 16:41	118-79-6	
p-Terphenyl-d14 (S)	53.8	%	10.0-120		1	10/13/21 21:58	10/14/21 16:41	1718-51-0	
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
1-Methylnaphthalene	**5250**	ug/kg	122	6.7	10	10/08/21 16:16	10/11/21 11:37	90-12-0	E,P6
2-Methylnaphthalene	**<6.6**	ug/kg	122	6.6	10	10/08/21 16:16	10/11/21 11:37	91-57-6	M1
Acenaphthene	**177**	ug/kg	122	5.5	10	10/08/21 16:16	10/11/21 11:37	83-32-9	M1
Acenaphthylene	**84.7J**	ug/kg	122	8.4	10	10/08/21 16:16	10/11/21 11:37	208-96-8	M1,R1
Anthracene	**<3.9**	ug/kg	122	3.9	10	10/08/21 16:16	10/11/21 11:37	120-12-7	M1
Benzo(a)anthracene	**194**	ug/kg	122	5.0	10	10/08/21 16:16	10/11/21 11:37	56-55-3	M1
Benzo(a)pyrene	**<6.9**	ug/kg	122	6.9	10	10/08/21 16:16	10/11/21 11:37	50-32-8	M1
Benzo(b)fluoranthene	**39.4J**	ug/kg	122	5.7	10	10/08/21 16:16	10/11/21 11:37	205-99-2	
Benzo(g,h,i)perylene	**<5.7**	ug/kg	122	5.7	10	10/08/21 16:16	10/11/21 11:37	191-24-2	M1
Benzo(k)fluoranthene	**<5.9**	ug/kg	122	5.9	10	10/08/21 16:16	10/11/21 11:37	207-08-9	
Chrysene	**208**	ug/kg	122	4.9	10	10/08/21 16:16	10/11/21 11:37	218-01-9	M1
Dibenz(a,h)anthracene	**16.6J**	ug/kg	122	8.0	10	10/08/21 16:16	10/11/21 11:37	53-70-3	
Dibenzofuran	**222**	ug/kg	122	5.1	10	10/08/21 16:16	10/11/21 11:37	132-64-9	M1
Fluoranthene	**<7.4**	ug/kg	122	7.4	10	10/08/21 16:16	10/11/21 11:37	206-44-0	M1
Fluorene	**999**	ug/kg	122	7.4	10	10/08/21 16:16	10/11/21 11:37	86-73-7	P6
Indeno(1,2,3-cd)pyrene	**<6.6**	ug/kg	122	6.6	10	10/08/21 16:16	10/11/21 11:37	193-39-5	M1
Naphthalene	**273**	ug/kg	122	5.5	10	10/08/21 16:16	10/11/21 11:37	91-20-3	M1,R1

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Sample: B-4-21 (3 FT) **Lab ID: 10581546003** Collected: 09/30/21 11:45 Received: 10/02/21 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
Phenanthrene	**2030**	ug/kg	122	8.6	10	10/08/21 16:16	10/11/21 11:37	85-01-8	P6
Pyrene	**183**	ug/kg	122	7.9	10	10/08/21 16:16	10/11/21 11:37	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	80	%.	50-125		10	10/08/21 16:16	10/11/21 11:37	321-60-8	D4
p-Terphenyl-d14 (S)	78	%.	51-125		10	10/08/21 16:16	10/11/21 11:37	1718-51-0	
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet								
Benzene	**<0.0136**	mg/kg	0.0362	0.0136	25	10/12/21 11:04	10/14/21 20:40	71-43-2	
Ethylbenzene	**<0.0108**	mg/kg	0.0362	0.0108	25	10/12/21 11:04	10/14/21 20:40	100-41-4	
n-Hexane	**<0.0380**	mg/kg	0.362	0.0380	25	10/12/21 11:04	10/14/21 20:40	110-54-3	
Toluene	**<0.0445**	mg/kg	0.181	0.0445	25	10/12/21 11:04	10/14/21 20:40	108-88-3	
o-Xylene	**<0.0181**	mg/kg	0.0362	0.0181	25	10/12/21 11:04	10/14/21 20:40	95-47-6	
m&p-Xylene	**0.0166J**	mg/kg	0.0723	0.0120	25	10/12/21 11:04	10/14/21 20:40	179601-23-1	J
Xylene (Total)	**<0.0181**	mg/kg	0.108	0.0181	25	10/12/21 11:04	10/14/21 20:40	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	110	%	70.0-130		25	10/12/21 11:04	10/14/21 20:40	17060-07-0	
Toluene-d8 (S)	84.7	%	75.0-131		25	10/12/21 11:04	10/14/21 20:40	2037-26-5	
4-Bromofluorobenzene (S)	278	%	67.0-138		25	10/12/21 11:04	10/14/21 20:40	460-00-4	ST
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet								
Total Solids	**81.8**	%			1	10/09/21 19:03	10/09/21 19:23		
Wet Chemistry 7199	Analytical Method: EPA 7199 Preparation Method: 3060A Pace National - Mt. Juliet								
Chromium, Hexavalent	**0.997J**	mg/kg	1.22	0.312	1	10/10/21 18:00	10/15/21 11:08		J
Calculated Results	Analytical Method: Calculated Preparation Method: Calc. Pace National - Mt. Juliet								
Chromium, Trivalent	**33.5**	mg/kg	1.22	0.312	1	10/13/21 03:21	10/15/21 11:08		
9045D pH	Analytical Method: EPA 9045D Pace Analytical Services - Minneapolis								
pH at 25 Degrees C	**6.2**	Std. Units	0.10	0.10	1		10/15/21 19:49		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Sample: B-5-21 (5 FT) **Lab ID: 10581546004** Collected: 09/30/21 01:15 Received: 10/02/21 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Metals (ICPMS) 6020B	Analytical Method: EPA 6020B Preparation Method: 3050B Pace National - Mt. Juliet								
Arsenic	**8.36**	mg/kg	2.02	0.202	5	10/13/21 03:21	10/13/21 20:47	7440-38-2	
Cadmium	**<0.172**	mg/kg	2.02	0.172	5	10/13/21 03:21	10/13/21 20:47	7440-43-9	
Chromium	**44.5**	mg/kg	10.1	0.597	5	10/13/21 03:21	10/13/21 20:47	7440-47-3	
Lead	**5.78**	mg/kg	4.03	0.200	5	10/13/21 03:21	10/13/21 20:47	7439-92-1	
Nickel	**45.6**	mg/kg	5.04	0.397	5	10/13/21 03:21	10/13/21 20:47	7440-02-0	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.027**	mg/kg	0.023	0.010	1	10/06/21 08:41	10/08/21 11:32	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis								
Percent Moisture	**22.4**	%	0.10	0.10	1		10/05/21 12:05		N2
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3546 Pace National - Mt. Juliet								
Biphenyl (Diphenyl)	**<0.0214**	mg/kg	0.671	0.0214	1	10/13/21 21:58	10/14/21 17:01	92-52-4	
Surrogates									
2-Fluorophenol (S)	48.3	%	12.0-120		1	10/13/21 21:58	10/14/21 17:01	367-12-4	
Phenol-d5 (S)	43.9	%	10.0-120		1	10/13/21 21:58	10/14/21 17:01	4165-62-2	
Nitrobenzene-d5 (S)	39.6	%	10.0-122		1	10/13/21 21:58	10/14/21 17:01	4165-60-0	
2-Fluorobiphenyl (S)	54.4	%	15.0-120		1	10/13/21 21:58	10/14/21 17:01	321-60-8	
2,4,6-Tribromophenol (S)	112	%	10.0-127		1	10/13/21 21:58	10/14/21 17:01	118-79-6	
p-Terphenyl-d14 (S)	63.8	%	10.0-120		1	10/13/21 21:58	10/14/21 17:01	1718-51-0	
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
1-Methylnaphthalene	**698**	ug/kg	64.4	3.5	5	10/08/21 16:16	10/14/21 16:37	90-12-0	
2-Methylnaphthalene	**892**	ug/kg	64.4	3.5	5	10/08/21 16:16	10/14/21 16:37	91-57-6	
Acenaphthene	**101**	ug/kg	64.4	2.9	5	10/08/21 16:16	10/14/21 16:37	83-32-9	
Acenaphthylene	**24.5J**	ug/kg	64.4	4.4	5	10/08/21 16:16	10/14/21 16:37	208-96-8	
Anthracene	**<2.0**	ug/kg	64.4	2.0	5	10/08/21 16:16	10/14/21 16:37	120-12-7	
Benzo(a)anthracene	**6.3J**	ug/kg	64.4	2.7	5	10/08/21 16:16	10/14/21 16:37	56-55-3	
Benzo(a)pyrene	**<3.6**	ug/kg	64.4	3.6	5	10/08/21 16:16	10/14/21 16:37	50-32-8	
Benzo(b)fluoranthene	**5.2J**	ug/kg	64.4	3.0	5	10/08/21 16:16	10/14/21 16:37	205-99-2	
Benzo(g,h,i)perylene	**4.3J**	ug/kg	64.4	3.0	5	10/08/21 16:16	10/14/21 16:37	191-24-2	
Benzo(k)fluoranthene	**<3.1**	ug/kg	64.4	3.1	5	10/08/21 16:16	10/14/21 16:37	207-08-9	
Chrysene	**42.0J**	ug/kg	64.4	2.6	5	10/08/21 16:16	10/14/21 16:37	218-01-9	
Dibenz(a,h)anthracene	**<4.2**	ug/kg	64.4	4.2	5	10/08/21 16:16	10/14/21 16:37	53-70-3	
Dibenzofuran	**39.1J**	ug/kg	64.4	2.7	5	10/08/21 16:16	10/14/21 16:37	132-64-9	
Fluoranthene	**9.7J**	ug/kg	64.4	3.9	5	10/08/21 16:16	10/14/21 16:37	206-44-0	
Fluorene	**116**	ug/kg	64.4	3.9	5	10/08/21 16:16	10/14/21 16:37	86-73-7	
Indeno(1,2,3-cd)pyrene	**<3.4**	ug/kg	64.4	3.4	5	10/08/21 16:16	10/14/21 16:37	193-39-5	
Naphthalene	**21.7J**	ug/kg	64.4	2.9	5	10/08/21 16:16	10/14/21 16:37	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Sample: B-5-21 (5 FT) **Lab ID: 10581546004** Collected: 09/30/21 01:15 Received: 10/02/21 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
Phenanthrene	**338**	ug/kg	64.4	4.5	5	10/08/21 16:16	10/14/21 16:37	85-01-8	
Pyrene	**51.3J**	ug/kg	64.4	4.2	5	10/08/21 16:16	10/14/21 16:37	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	72	%.	50-125		5	10/08/21 16:16	10/14/21 16:37	321-60-8	D4
p-Terphenyl-d14 (S)	69	%.	51-125		5	10/08/21 16:16	10/14/21 16:37	1718-51-0	
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet								
Benzene	**0.0331J**	mg/kg	0.0758	0.0284	25	10/12/21 11:04	10/14/21 20:59	71-43-2	J
Ethylbenzene	**0.0534J**	mg/kg	0.0758	0.0227	25	10/12/21 11:04	10/14/21 20:59	100-41-4	J
n-Hexane	**<0.0798**	mg/kg	0.758	0.0798	25	10/12/21 11:04	10/14/21 20:59	110-54-3	
Toluene	**0.103J**	mg/kg	0.379	0.0934	25	10/12/21 11:04	10/14/21 20:59	108-88-3	J
o-Xylene	**0.182**	mg/kg	0.0758	0.0379	25	10/12/21 11:04	10/14/21 20:59	95-47-6	
m&p-Xylene	**0.391**	mg/kg	0.152	0.0252	25	10/12/21 11:04	10/14/21 20:59	179601-23-1	
Xylene (Total)	**0.573**	mg/kg	0.227	0.0379	25	10/12/21 11:04	10/14/21 20:59	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	101	%	70.0-130		25	10/12/21 11:04	10/14/21 20:59	17060-07-0	
Toluene-d8 (S)	114	%	75.0-131		25	10/12/21 11:04	10/14/21 20:59	2037-26-5	
4-Bromofluorobenzene (S)	167	%	67.0-138		25	10/12/21 11:04	10/14/21 20:59	460-00-4	ST
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet								
Total Solids	**49.6**	%			1	10/09/21 19:03	10/09/21 19:23		
Wet Chemistry 7199	Analytical Method: EPA 7199 Preparation Method: 3060A Pace National - Mt. Juliet								
Chromium, Hexavalent	**<0.514**	mg/kg	2.02	0.514	1	10/10/21 18:00	10/15/21 11:35		
Calculated Results	Analytical Method: Calculated Preparation Method: Calc. Pace National - Mt. Juliet								
Chromium, Trivalent	**44.5**	mg/kg	2.02	0.514	1	10/13/21 03:21	10/15/21 11:35		
9045D pH	Analytical Method: EPA 9045D Pace Analytical Services - Minneapolis								
pH at 25 Degrees C	**6.9**	Std. Units	0.10	0.10	1		10/15/21 19:20		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Sample: B-6-21 (4 FT) **Lab ID: 10581546005** Collected: 09/30/21 02:15 Received: 10/02/21 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Metals (ICPMS) 6020B	Analytical Method: EPA 6020B Preparation Method: 3050B Pace National - Mt. Juliet								
Arsenic	**3.54**	mg/kg	1.37	0.137	5	10/13/21 03:21	10/13/21 20:50	7440-38-2	
Cadmium	**<0.117**	mg/kg	1.37	0.117	5	10/13/21 03:21	10/13/21 20:50	7440-43-9	
Chromium	**26.3**	mg/kg	6.85	0.406	5	10/13/21 03:21	10/13/21 20:50	7440-47-3	
Lead	**2.24J**	mg/kg	2.74	0.136	5	10/13/21 03:21	10/13/21 20:50	7439-92-1	J
Nickel	**25.8**	mg/kg	3.43	0.270	5	10/13/21 03:21	10/13/21 20:50	7440-02-0	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis								
Mercury	**0.019J**	mg/kg	0.023	0.010	1	10/06/21 08:41	10/08/21 11:33	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis								
Percent Moisture	**19.5**	%	0.10	0.10	1		10/05/21 12:06		N2
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3546 Pace National - Mt. Juliet								
Biphenyl (Diphenyl)	**<0.0145**	mg/kg	0.456	0.0145	1	10/13/21 21:58	10/14/21 15:39	92-52-4	
Surrogates									
2-Fluorophenol (S)	58.7	%	12.0-120		1	10/13/21 21:58	10/14/21 15:39	367-12-4	
Phenol-d5 (S)	51.4	%	10.0-120		1	10/13/21 21:58	10/14/21 15:39	4165-62-2	
Nitrobenzene-d5 (S)	41.8	%	10.0-122		1	10/13/21 21:58	10/14/21 15:39	4165-60-0	
2-Fluorobiphenyl (S)	58.2	%	15.0-120		1	10/13/21 21:58	10/14/21 15:39	321-60-8	
2,4,6-Tribromophenol (S)	101	%	10.0-127		1	10/13/21 21:58	10/14/21 15:39	118-79-6	
p-Terphenyl-d14 (S)	65.5	%	10.0-120		1	10/13/21 21:58	10/14/21 15:39	1718-51-0	
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
1-Methylnaphthalene	**1.7J**	ug/kg	12.4	0.68	1	10/08/21 16:16	10/11/21 15:24	90-12-0	
2-Methylnaphthalene	**1.8J**	ug/kg	12.4	0.67	1	10/08/21 16:16	10/11/21 15:24	91-57-6	
Acenaphthene	**<0.55**	ug/kg	12.4	0.55	1	10/08/21 16:16	10/11/21 15:24	83-32-9	
Acenaphthylene	**<0.85**	ug/kg	12.4	0.85	1	10/08/21 16:16	10/11/21 15:24	208-96-8	
Anthracene	**<0.39**	ug/kg	12.4	0.39	1	10/08/21 16:16	10/11/21 15:24	120-12-7	
Benzo(a)anthracene	**<0.51**	ug/kg	12.4	0.51	1	10/08/21 16:16	10/11/21 15:24	56-55-3	
Benzo(a)pyrene	**<0.70**	ug/kg	12.4	0.70	1	10/08/21 16:16	10/11/21 15:24	50-32-8	
Benzo(b)fluoranthene	**<0.58**	ug/kg	12.4	0.58	1	10/08/21 16:16	10/11/21 15:24	205-99-2	
Benzo(g,h,i)perylene	**0.70J**	ug/kg	12.4	0.58	1	10/08/21 16:16	10/11/21 15:24	191-24-2	
Benzo(k)fluoranthene	**<0.60**	ug/kg	12.4	0.60	1	10/08/21 16:16	10/11/21 15:24	207-08-9	
Chrysene	**0.73J**	ug/kg	12.4	0.50	1	10/08/21 16:16	10/11/21 15:24	218-01-9	
Dibenz(a,h)anthracene	**<0.81**	ug/kg	12.4	0.81	1	10/08/21 16:16	10/11/21 15:24	53-70-3	
Dibenzofuran	**<0.52**	ug/kg	12.4	0.52	1	10/08/21 16:16	10/11/21 15:24	132-64-9	
Fluoranthene	**<0.75**	ug/kg	12.4	0.75	1	10/08/21 16:16	10/11/21 15:24	206-44-0	
Fluorene	**<0.75**	ug/kg	12.4	0.75	1	10/08/21 16:16	10/11/21 15:24	86-73-7	
Indeno(1,2,3-cd)pyrene	**<0.66**	ug/kg	12.4	0.66	1	10/08/21 16:16	10/11/21 15:24	193-39-5	
Naphthalene	**<0.56**	ug/kg	12.4	0.56	1	10/08/21 16:16	10/11/21 15:24	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Sample: B-6-21 (4 FT) **Lab ID: 10581546005** Collected: 09/30/21 02:15 Received: 10/02/21 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis								
Phenanthrene	**2.2J**	ug/kg	12.4	0.87	1	10/08/21 16:16	10/11/21 15:24	85-01-8	
Pyrene	**0.85J**	ug/kg	12.4	0.80	1	10/08/21 16:16	10/11/21 15:24	129-00-0	
Surrogates									
2-Fluorobiphenyl (S)	72	%.	50-125		1	10/08/21 16:16	10/11/21 15:24	321-60-8	
p-Terphenyl-d14 (S)	83	%.	51-125		1	10/08/21 16:16	10/11/21 15:24	1718-51-0	
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet								
Benzene	**<0.000514**	mg/kg	0.00137	0.000514	1	09/30/21 02:15	10/13/21 17:48	71-43-2	
Benzene	**<0.0163**	mg/kg	0.0436	0.0163	25	10/12/21 11:04	10/26/21 16:44	71-43-2	
Ethylbenzene	**0.00141**	mg/kg	0.00137	0.000411	1	09/30/21 02:15	10/13/21 17:48	100-41-4	
Ethylbenzene	**<0.0131**	mg/kg	0.0436	0.0131	25	10/12/21 11:04	10/26/21 16:44	100-41-4	
n-Hexane	**0.00648J**	mg/kg	0.0137	0.00144	1	09/30/21 02:15	10/13/21 17:48	110-54-3	J
n-Hexane	**<0.0458**	mg/kg	0.436	0.0458	25	10/12/21 11:04	10/26/21 16:44	110-54-3	C3
Toluene	**<0.00169**	mg/kg	0.00685	0.00169	1	09/30/21 02:15	10/13/21 17:48	108-88-3	
Toluene	**<0.0537**	mg/kg	0.218	0.0537	25	10/12/21 11:04	10/26/21 16:44	108-88-3	
o-Xylene	**0.00571**	mg/kg	0.00137	0.000685	1	09/30/21 02:15	10/13/21 17:48	95-47-6	
o-Xylene	**0.0368J**	mg/kg	0.0436	0.0218	25	10/12/21 11:04	10/26/21 16:44	95-47-6	J
m&p-Xylene	**0.00332**	mg/kg	0.00274	0.000455	1	09/30/21 02:15	10/13/21 17:48	179601-23-1	
m&p-Xylene	**0.0385J**	mg/kg	0.0871	0.0145	25	10/12/21 11:04	10/26/21 16:44	179601-23-1	J
Xylene (Total)	**<0.000685**	mg/kg	0.00411	0.000685	1	09/30/21 02:15	10/13/21 17:48	1330-20-7	
Xylene (Total)	**<0.0218**	mg/kg	0.131	0.0218	25	10/12/21 11:04	10/26/21 16:44	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	109	%	70.0-130		1	09/30/21 02:15	10/13/21 17:48	17060-07-0	
1,2-Dichloroethane-d4 (S)	92.4	%	70.0-130		25	10/12/21 11:04	10/26/21 16:44	17060-07-0	
Toluene-d8 (S)	133	%	75.0-131		1	09/30/21 02:15	10/13/21 17:48	2037-26-5	ST
Toluene-d8 (S)	108	%	75.0-131		25	10/12/21 11:04	10/26/21 16:44	2037-26-5	
4-Bromofluorobenzene (S)	122	%	67.0-138		1	09/30/21 02:15	10/13/21 17:48	460-00-4	
4-Bromofluorobenzene (S)	95.8	%	67.0-138		25	10/12/21 11:04	10/26/21 16:44	460-00-4	
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet								
Total Solids	**73.0**	%			1	10/09/21 19:03	10/09/21 19:23		
Wet Chemistry 7199	Analytical Method: EPA 7199 Preparation Method: 3060A Pace National - Mt. Juliet								
Chromium, Hexavalent	**0.620J**	mg/kg	1.37	0.349	1	10/14/21 18:00	10/15/21 12:24		D8,J
Calculated Results	Analytical Method: Calculated Preparation Method: Calc. Pace National - Mt. Juliet								
Chromium, Trivalent	**25.7**	mg/kg	1.37	0.349	1	10/13/21 03:21	10/15/21 12:24		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Sample: B-6-21 (4 FT) **Lab ID: 10581546005** Collected: 09/30/21 02:15 Received: 10/02/21 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
9045D pH	Analytical Method: EPA 9045D Pace Analytical Services - Minneapolis								
pH at 25 Degrees C	**7.4**	Std. Units	0.10	0.10	1		10/15/21 19:39		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 1755398
QC Batch Method: 3050B
Analysis Method: EPA 6020B
Analysis Description: Metals (ICPMS) 6020B
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004, 10581546005

METHOD BLANK: R3716093-1 Matrix: Solid
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004, 10581546005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Arsenic	mg/kg	<0.100	1.00	0.100	10/13/21 19:49	
Cadmium	mg/kg	<0.0855	1.00	0.0855	10/13/21 19:49	
Chromium	mg/kg	<0.297	5.00	0.297	10/13/21 19:49	
Lead	mg/kg	<0.0990	2.00	0.0990	10/13/21 19:49	
Nickel	mg/kg	<0.197	2.50	0.197	10/13/21 19:49	

LABORATORY CONTROL SAMPLE: R3716093-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	100	96.6	96.6	80.0-120	
Cadmium	mg/kg	100	105	105	80.0-120	
Chromium	mg/kg	100	101	101	80.0-120	
Lead	mg/kg	100	98.3	98.3	80.0-120	
Nickel	mg/kg	100	104	104	80.0-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R3716093-5 R3716093-6

Parameter	Units	L1409499-03 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	1.12	100	100	102	111	101	110	75.0-125	7.80	20	
Cadmium	mg/kg	ND	100	100	101	106	101	106	75.0-125	5.01	20	
Chromium	mg/kg	3.85	100	100	108	116	104	112	75.0-125	6.99	20	
Lead	mg/kg	6.75	100	100	1300	1420	1290	1410	75.0-125	8.87	20	MH
Nickel	mg/kg	0.917	100	100	126	140	126	139	75.0-125	9.93	20	MH

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 774492
QC Batch Method: EPA 7471B
Analysis Method: EPA 7471B
Analysis Description: 7471B Mercury Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004, 10581546005

METHOD BLANK: 4125289 Matrix: Solid
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004, 10581546005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Mercury	mg/kg	<0.0077	0.018	0.0077	10/08/21 11:11	

LABORATORY CONTROL SAMPLE: 4125290

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.45	0.46	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4125291 4125292

Parameter	Units	10581540001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	ND	0.46	0.49	0.46	0.48	99	98	80-120	5	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 774477
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004, 10581546005

SAMPLE DUPLICATE: 4125574

Parameter	Units	10581507001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	5.4	5.3	1	30	N2

SAMPLE DUPLICATE: 4125650

Parameter	Units	10581482007 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	18.1	18.5	2	30	N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 1756427
QC Batch Method: 3546
Analysis Method: EPA 8270E
Analysis Description: SVOA (GC/MS) 8270E
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004, 10581546005

METHOD BLANK: R3716963-2 Matrix: Solid
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004, 10581546005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Biphenyl (Diphenyl)	mg/kg	<0.0106	0.333	0.0106	10/14/21 08:30	
Nitrobenzene-d5 (S)	%	46.8	10.0-122		10/14/21 08:30	
2-Fluorobiphenyl (S)	%	59.5	15.0-120		10/14/21 08:30	
p-Terphenyl-d14 (S)	%	73.3	10.0-120		10/14/21 08:30	
Phenol-d5 (S)	%	55	10.0-120		10/14/21 08:30	
2-Fluorophenol (S)	%	65	12.0-120		10/14/21 08:30	
2,4,6-Tribromophenol (S)	%	95.2	10.0-127		10/14/21 08:30	

LABORATORY CONTROL SAMPLE: R3716963-1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Biphenyl (Diphenyl)	mg/kg	0.666	0.382	57.4	39.0-120	
Nitrobenzene-d5 (S)	%			36.9	10.0-122	
2-Fluorobiphenyl (S)	%			60.1	15.0-120	
p-Terphenyl-d14 (S)	%			70.9	10.0-120	
Phenol-d5 (S)	%			55.0	10.0-120	
2-Fluorophenol (S)	%			62.6	12.0-120	
2,4,6-Tribromophenol (S)	%			102	10.0-127	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R3716963-3 R3716963-4

Parameter	Units	L1412415-01 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Biphenyl (Diphenyl)	mg/kg	ND	0.796	0.796	0.333	0.357	41.8	44.9	15.0-120	7.14	33	
Nitrobenzene-d5 (S)	%						28.3	28.4	10.0-122			
2-Fluorobiphenyl (S)	%						47.7	47.4	15.0-120			
p-Terphenyl-d14 (S)	%						54.8	55.4	10.0-120			
Phenol-d5 (S)	%						42.7	42.4	10.0-120			
2-Fluorophenol (S)	%						47.1	46.9	12.0-120			
2,4,6-Tribromophenol (S)	%						84.2	90.2	10.0-127			

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 1756421
QC Batch Method: 5035A
Analysis Method: EPA 8260D
Analysis Description: VOA (GC/MS) 8260D
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10581546005

METHOD BLANK: R3716450-3 Matrix: Solid
Associated Lab Samples: 10581546005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Benzene	mg/kg	<0.000375	0.00100	0.000375	10/13/21 15:42	
Ethylbenzene	mg/kg	<0.000300	0.00100	0.000300	10/13/21 15:42	
n-Hexane	mg/kg	<0.00105	0.0100	0.00105	10/13/21 15:42	
Toluene	mg/kg	<0.00123	0.00500	0.00123	10/13/21 15:42	
Xylene (Total)	mg/kg	<0.000500	0.00300	0.000500	10/13/21 15:42	
o-Xylene	mg/kg	<0.000500	0.00100	0.000500	10/13/21 15:42	
m&p-Xylene	mg/kg	<0.000332	0.00200	0.000332	10/13/21 15:42	
Toluene-d8 (S)	%	116	75.0-131		10/13/21 15:42	
4-Bromofluorobenzene (S)	%	97.2	67.0-138		10/13/21 15:42	
1,2-Dichloroethane-d4 (S)	%	109	70.0-130		10/13/21 15:42	

LABORATORY CONTROL SAMPLE: R3716450-1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	mg/kg	0.0250	0.0243	97.2	70.0-123	
Ethylbenzene	mg/kg	0.0250	0.0241	96.4	74.0-126	
n-Hexane	mg/kg	0.0250	0.0268	107	55.0-137	
Toluene	mg/kg	0.0250	0.0239	95.6	75.0-121	
Xylene (Total)	mg/kg	0.0750	0.0717	95.6	72.0-127	
o-Xylene	mg/kg	0.0250	0.0233	93.2	79.0-124	
m&p-Xylene	mg/kg	0.0500	0.0484	96.8	76.0-126	
Toluene-d8 (S)	%			110	75.0-131	
4-Bromofluorobenzene (S)	%			103	67.0-138	
1,2-Dichloroethane-d4 (S)	%			116	70.0-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R3716450-4 R3716450-5

Parameter	Units	L1414955-03 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	mg/kg	ND	0.0228	0.0222	0.0163	0.0163	71.6	73.5	10.0-149	0.00	37	
Ethylbenzene	mg/kg	ND	0.0228	0.0222	0.0142	0.00947	62.1	42.6	10.0-160	39.8	38	R1
n-Hexane	mg/kg	ND	0.0228	0.0222	0.0151	0.0162	66.3	73.0	10.0-157	6.90	37	
Toluene	mg/kg	ND	0.0228	0.0222	0.0155	0.0130	67.9	58.4	10.0-156	17.7	38	
o-Xylene	mg/kg	ND	0.0228	0.0222	0.0137	0.00937	60.0	42.2	10.0-156	37.5	40	
m&p-Xylene	mg/kg	ND	0.0457	0.0445	0.0268	0.0174	58.7	39.2	10.0-156	42.4	40	R1
Xylene (Total)	mg/kg	ND	0.0685	0.0667	0.0405	0.0268	59.1	40.2	10.0-160	40.7	38	R1
Toluene-d8 (S)	%						115	113	75.0-131			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R3716450-4 R3716450-5

Parameter	Units	L1414955-03 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
4-Bromofluorobenzene (S)	%						102	104	67.0-138			
1,2-Dichloroethane-d4 (S)	%						118	117	70.0-130			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 1757232
QC Batch Method: 5035A
Analysis Method: EPA 8260D
Analysis Description: VOA (GC/MS) 8260D
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004

METHOD BLANK: R3717122-4 Matrix: Solid
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Benzene	mg/kg	<0.000375	0.00100	0.000375	10/14/21 18:41	
Ethylbenzene	mg/kg	<0.000300	0.00100	0.000300	10/14/21 18:41	
n-Hexane	mg/kg	<0.00105	0.0100	0.00105	10/14/21 18:41	
Toluene	mg/kg	<0.00123	0.00500	0.00123	10/14/21 18:41	
Xylene (Total)	mg/kg	<0.000500	0.00300	0.000500	10/14/21 18:41	
o-Xylene	mg/kg	<0.000500	0.00100	0.000500	10/14/21 18:41	
m&p-Xylene	mg/kg	<0.000332	0.00200	0.000332	10/14/21 18:41	
Toluene-d8 (S)	%	110	75.0-131		10/14/21 18:41	
4-Bromofluorobenzene (S)	%	108	67.0-138		10/14/21 18:41	
1,2-Dichloroethane-d4 (S)	%	103	70.0-130		10/14/21 18:41	

LABORATORY CONTROL SAMPLE: R3717122-1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	mg/kg	0.00500	0.00499	99.8	70.0-123	
Ethylbenzene	mg/kg	0.00500	0.00512	102	74.0-126	
n-Hexane	mg/kg	0.00500	0.00557	111	55.0-137	
Toluene	mg/kg	0.00500	0.00472	94.4	75.0-121	
Xylene (Total)	mg/kg	0.0150	0.0141	94.0	72.0-127	
o-Xylene	mg/kg	0.00500	0.00459	91.8	79.0-124	
m&p-Xylene	mg/kg	0.0100	0.00946	94.6	76.0-126	
Toluene-d8 (S)	%			104	75.0-131	
4-Bromofluorobenzene (S)	%			91.1	67.0-138	
1,2-Dichloroethane-d4 (S)	%			97.0	70.0-130	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 1763708
QC Batch Method: 5035A
Analysis Method: EPA 8260D
Analysis Description: VOA (GC/MS) 8260D
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10581546005

METHOD BLANK: R3722326-3 Matrix: Solid
Associated Lab Samples: 10581546005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Benzene	mg/kg	<0.00938	0.0250	0.00938	10/26/21 15:04	
Ethylbenzene	mg/kg	<0.00750	0.0250	0.00750	10/26/21 15:04	
n-Hexane	mg/kg	<0.0263	0.250	0.0263	10/26/21 15:04	
Toluene	mg/kg	<0.0308	0.125	0.0308	10/26/21 15:04	
Xylene (Total)	mg/kg	<0.0125	0.0750	0.0125	10/26/21 15:04	
o-Xylene	mg/kg	<0.0125	0.0250	0.0125	10/26/21 15:04	
m&p-Xylene	mg/kg	<0.00830	0.0500	0.00830	10/26/21 15:04	
Toluene-d8 (S)	%	110	75.0-131		10/26/21 15:04	
4-Bromofluorobenzene (S)	%	97.8	67.0-138		10/26/21 15:04	
1,2-Dichloroethane-d4 (S)	%	93.6	70.0-130		10/26/21 15:04	

LABORATORY CONTROL SAMPLE & LCSD: R3722326-1 R3722326-2

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Benzene	mg/kg	0.00500	0.00490	0.00512	98.0	102	70.0-123	4.39	20	
Ethylbenzene	mg/kg	0.00500	0.00494	0.00548	98.8	110	74.0-126	10.4	20	
n-Hexane	mg/kg	0.00500	0.00397	0.00439	79.4	87.8	55.0-137	10.0	20	
Toluene	mg/kg	0.00500	0.00492	0.00505	98.4	101	75.0-121	2.61	20	
Xylene (Total)	mg/kg	0.0150	0.0149	0.0158	99.3	105	72.0-127	5.86	20	
o-Xylene	mg/kg	0.00500	0.00496	0.00506	99.2	101	79.0-124	2.00	20	
m&p-Xylene	mg/kg	0.0100	0.00996	0.0107	99.6	107	76.0-126	7.16	20	
Toluene-d8 (S)	%				108	107	75.0-131			
4-Bromofluorobenzene (S)	%				94.8	95.6	67.0-138			
1,2-Dichloroethane-d4 (S)	%				97.8	97.2	70.0-130			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 775548
QC Batch Method: EPA 3550C
Analysis Method: EPA 8270E by SIM
Analysis Description: 8270E Solid PAH by SIM MSSV
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004, 10581546005

METHOD BLANK: 4130776 Matrix: Solid
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004, 10581546005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1-Methylnaphthalene	ug/kg	<0.55	10.0	0.55	10/11/21 10:47	
2-Methylnaphthalene	ug/kg	<0.54	10.0	0.54	10/11/21 10:47	
Acenaphthene	ug/kg	<0.45	10.0	0.45	10/11/21 10:47	
Acenaphthylene	ug/kg	<0.68	10.0	0.68	10/11/21 10:47	
Anthracene	ug/kg	<0.32	10.0	0.32	10/11/21 10:47	
Benzo(a)anthracene	ug/kg	<0.41	10.0	0.41	10/11/21 10:47	
Benzo(a)pyrene	ug/kg	<0.56	10.0	0.56	10/11/21 10:47	
Benzo(b)fluoranthene	ug/kg	<0.47	10.0	0.47	10/11/21 10:47	
Benzo(g,h,i)perylene	ug/kg	<0.46	10.0	0.46	10/11/21 10:47	
Benzo(k)fluoranthene	ug/kg	<0.48	10.0	0.48	10/11/21 10:47	
Chrysene	ug/kg	<0.40	10.0	0.40	10/11/21 10:47	
Dibenz(a,h)anthracene	ug/kg	<0.66	10.0	0.66	10/11/21 10:47	
Dibenzofuran	ug/kg	<0.42	10.0	0.42	10/11/21 10:47	
Fluoranthene	ug/kg	0.66J	10.0	0.60	10/11/21 10:47	
Fluorene	ug/kg	<0.60	10.0	0.60	10/11/21 10:47	
Indeno(1,2,3-cd)pyrene	ug/kg	<0.54	10.0	0.54	10/11/21 10:47	
Naphthalene	ug/kg	<0.45	10.0	0.45	10/11/21 10:47	
Phenanthrene	ug/kg	<0.70	10.0	0.70	10/11/21 10:47	
Pyrene	ug/kg	<0.65	10.0	0.65	10/11/21 10:47	
2-Fluorobiphenyl (S)	%.	96	50-125		10/11/21 10:47	
p-Terphenyl-d14 (S)	%.	93	51-125		10/11/21 10:47	

LABORATORY CONTROL SAMPLE: 4130777

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1-Methylnaphthalene	ug/kg	33.3	24.7	74	47-125	
2-Methylnaphthalene	ug/kg	33.3	24.5	74	47-125	
Acenaphthene	ug/kg	33.3	26.2	79	56-125	
Acenaphthylene	ug/kg	33.3	25.0	75	47-125	
Anthracene	ug/kg	33.3	28.7	86	60-125	
Benzo(a)anthracene	ug/kg	33.3	29.1	87	69-125	
Benzo(a)pyrene	ug/kg	33.3	29.5	89	63-125	
Benzo(b)fluoranthene	ug/kg	33.3	32.0	96	67-125	
Benzo(g,h,i)perylene	ug/kg	33.3	34.4	103	67-125	
Benzo(k)fluoranthene	ug/kg	33.3	30.3	91	67-125	
Chrysene	ug/kg	33.3	29.2	88	71-125	
Dibenz(a,h)anthracene	ug/kg	33.3	35.6	107	65-125	
Dibenzofuran	ug/kg	33.3	28.6	86	52-125	
Fluoranthene	ug/kg	33.3	30.2	91	65-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
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(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

LABORATORY CONTROL SAMPLE: 4130777

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluorene	ug/kg	33.3	29.6	89	63-125	
Indeno(1,2,3-cd)pyrene	ug/kg	33.3	35.5	106	69-125	
Naphthalene	ug/kg	33.3	24.0	72	51-125	
Phenanthrene	ug/kg	33.3	29.7	89	66-125	
Pyrene	ug/kg	33.3	28.1	84	68-125	
2-Fluorobiphenyl (S)	%.			77	50-125	
p-Terphenyl-d14 (S)	%.			87	51-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4131157 4131158

Parameter	Units	10581546003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1-Methylnaphthalene	ug/kg	5250	40.9	40.8	5080	6410	-410	2840	37-125	23	30	E,P6
2-Methylnaphthalene	ug/kg	<6.6	40.9	40.8	<6.6	<6.6	0	0	30-135		30	M1
Acenaphthene	ug/kg	177	40.9	40.8	318	243	344	161	30-140	27	30	M1
Acenaphthylene	ug/kg	84.7J	40.9	40.8	192	137	262	129	30-136	33	30	M1,R1
Anthracene	ug/kg	<3.9	40.9	40.8	<3.9	<3.9	0	0	46-125		30	M1
Benzo(a)anthracene	ug/kg	194	40.9	40.8	185	243	-21	122	30-150	27	30	M1
Benzo(a)pyrene	ug/kg	<6.9	40.9	40.8	64.3J	64.9J	157	159	30-150		30	M1
Benzo(b)fluoranthene	ug/kg	39.4J	40.9	40.8	72.4J	80.2J	81	100	30-150		30	
Benzo(g,h,i)perylene	ug/kg	<5.7	40.9	40.8	65.1J	68.9J	159	169	30-150		30	M1
Benzo(k)fluoranthene	ug/kg	<5.9	40.9	40.8	35.9J	35.5J	88	87	30-150		30	
Chrysene	ug/kg	208	40.9	40.8	229	269	51	150	36-126	16	30	M1
Dibenz(a,h)anthracene	ug/kg	16.6J	40.9	40.8	50.9J	54.1J	84	92	30-147		30	
Dibenzofuran	ug/kg	222	40.9	40.8	252	286	72	157	30-150	13	30	M1
Fluoranthene	ug/kg	<7.4	40.9	40.8	77.9J	91.6J	190	224	30-150		30	M1
Fluorene	ug/kg	999	40.9	40.8	1010	1150	27	381	30-140	13	30	P6
Indeno(1,2,3-cd)pyrene	ug/kg	<6.6	40.9	40.8	<6.6	43.8J	0	107	30-150		30	M1
Naphthalene	ug/kg	273	40.9	40.8	254	362	-47	219	30-138	35	30	M1,R1
Phenanthrene	ug/kg	2030	40.9	40.8	2020	2360	-25	798	30-150	15	30	P6
Pyrene	ug/kg	183	40.9	40.8	210	245	66	150	30-150	15	30	
2-Fluorobiphenyl (S)	%.						81	102	50-125			D4
p-Terphenyl-d14 (S)	%.						80	80	51-125			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 1753338
QC Batch Method: SM 2540 G
Analysis Method: SM 2540G
Analysis Description: Total Solids 2540 G-2011
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10581546001

METHOD BLANK: R3714289-1 Matrix: Solid
Associated Lab Samples: 10581546001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Solids	%	0.00100			10/08/21 10:25	

LABORATORY CONTROL SAMPLE: R3714289-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Solids	%	50.0	50.0	100	85.0-115	

SAMPLE DUPLICATE: R3714289-3

Parameter	Units	L1412630-02 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Solids	%	82.4	83.6	1.49	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 1753344
QC Batch Method: SM 2540 G
Analysis Method: SM 2540G
Analysis Description: Total Solids 2540 G-2011
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10581546002, 10581546003, 10581546004, 10581546005

METHOD BLANK: R3714652-1 Matrix: Solid
Associated Lab Samples: 10581546002, 10581546003, 10581546004, 10581546005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Solids	%	0.00100			10/09/21 19:23	

LABORATORY CONTROL SAMPLE: R3714652-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Solids	%	50.0	50.0	100	85.0-115	

SAMPLE DUPLICATE: R3714652-3

Parameter	Units	L1414263-01 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Solids	%	98.5	99.8	1.29	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 1754566
QC Batch Method: 3060A
Analysis Method: EPA 7199
Analysis Description: Wet Chemistry 7199
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004

METHOD BLANK: R3717097-1 Matrix: Solid
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chromium, Hexavalent	mg/kg	<0.255	1.00	0.255	10/15/21 08:53	

LABORATORY CONTROL SAMPLE: R3717097-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	10.0	10.2	102	80.0-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R3717097-4 R3717097-5

Parameter	Units	L1413587-03 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	mg/kg	1.06	23.5	23.5	19.8	22.2	93.5	106	75.0-125	11.6	20	

MATRIX SPIKE SAMPLE: R3717097-6

Parameter	Units	L1413587-03 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	1.06	747	649	102	75.0-125	

SAMPLE DUPLICATE: R3717097-3

Parameter	Units	L1413483-01 Result	Dup Result	RPD	Max RPD	Qualifiers
Chromium, Hexavalent	mg/kg	ND	<0.327	0.00	20	

SAMPLE DUPLICATE: R3717097-8

Parameter	Units	L1414280-01 Result	Dup Result	RPD	Max RPD	Qualifiers
Chromium, Hexavalent	mg/kg	ND	<0.255	0.00	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 1754567
QC Batch Method: 3060A
Analysis Method: EPA 7199
Analysis Description: Wet Chemistry 7199
Laboratory: Pace National - Mt. Juliet

Associated Lab Samples: 10581546005

METHOD BLANK: R3717096-1 Matrix: Solid
Associated Lab Samples: 10581546005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chromium, Hexavalent	mg/kg	<0.255	1.00	0.255	10/15/21 12:03	

LABORATORY CONTROL SAMPLE: R3717096-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	10.0	8.92	89.2	80.0-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R3717096-4 R3717096-5

Parameter	Units	L1414808-01 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	mg/kg	ND	20.0	20.0	19.4	19.8	96.8	99.2	75.0-125	2.47	20	

MATRIX SPIKE SAMPLE: R3717096-9

Parameter	Units	L1414808-01 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	ND	644	627	97.3	75.0-125	

SAMPLE DUPLICATE: R3717096-3

Parameter	Units	10581546005 Result	Dup Result	RPD	Max RPD	Qualifiers
Chromium, Hexavalent	mg/kg	0.453	0.983J	73.9	20	D8,J

SAMPLE DUPLICATE: R3717096-8

Parameter	Units	L1415068-01 Result	Dup Result	RPD	Max RPD	Qualifiers
Chromium, Hexavalent	mg/kg	ND	<0.294	0.00	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

QC Batch: 777321
QC Batch Method: EPA 9045D
Analysis Method: EPA 9045D
Analysis Description: 9045D pH
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10581546001, 10581546002, 10581546003, 10581546004, 10581546005

LABORATORY CONTROL SAMPLE: 4140747

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.0	101	98-102	

SAMPLE DUPLICATE: 4140748

Parameter	Units	10582597001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	5.1	5.2	1	3	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

WORKORDER QUALIFIERS

WO: 10581546
[1]

SAMPLE QUALIFIERS

Sample: 10581546002
[1] Volatile Organic Compounds (GC/MS) by Method 8260D - Surrogate failure due to matrix interference

Sample: 10581546003
[1] Volatile Organic Compounds (GC/MS) by Method 8260D - Surrogate failure due to matrix interference

Sample: 10581546005
[1] Volatile Organic Compounds (GC/MS) by Method 8260D - No stir bars remain for further analysis.

ANALYTE QUALIFIERS

C3	The reported concentration is an estimate. The continuing calibration standard associated with this data responded low. Method sensitivity check is acceptable.
D4	Sample was diluted due to the presence of high levels of target analytes.
D8	The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
J	Analyte detected below the reporting limit, therefore result is an estimate. This qualifier is also used for all TICs.

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1700 Elm Street
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(612)607-1700

QUALIFIERS

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
MH	Matrix spike recovery and/or matrix spike duplicate recovery was above laboratory control limits. Result may be biased high.
N2	The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.
P6	Matrix spike recovery was outside laboratory control limits due to a parent sample concentration notably higher than the spike level.
R1	RPD value was outside control limits.
ST	Surrogate recovery was above laboratory control limits. Results may be biased high.

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

METHOD CROSS REFERENCE TABLE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Parameter	Matrix	Analytical Method	Preparation Method
9045D pH	Solid	SW-846 9045D	N/A

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10581546001	**B-2-21 (3 FT)**	3050B	1755398	EPA 6020B	1755398
10581546002	**B-3-21 (3.5 FT)**	3050B	1755398	EPA 6020B	1755398
10581546003	**B-4-21 (3 FT)**	3050B	1755398	EPA 6020B	1755398
10581546004	**B-5-21 (5 FT)**	3050B	1755398	EPA 6020B	1755398
10581546005	**B-6-21 (4 FT)**	3050B	1755398	EPA 6020B	1755398
10581546001	**B-2-21 (3 FT)**	EPA 7471B	774492	EPA 7471B	775057
10581546002	**B-3-21 (3.5 FT)**	EPA 7471B	774492	EPA 7471B	775057
10581546003	**B-4-21 (3 FT)**	EPA 7471B	774492	EPA 7471B	775057
10581546004	**B-5-21 (5 FT)**	EPA 7471B	774492	EPA 7471B	775057
10581546005	**B-6-21 (4 FT)**	EPA 7471B	774492	EPA 7471B	775057
10581546001	**B-2-21 (3 FT)**	ASTM D2974	774477		
10581546002	**B-3-21 (3.5 FT)**	ASTM D2974	774477		
10581546003	**B-4-21 (3 FT)**	ASTM D2974	774477		
10581546004	**B-5-21 (5 FT)**	ASTM D2974	774477		
10581546005	**B-6-21 (4 FT)**	ASTM D2974	774477		
10581546001	**B-2-21 (3 FT)**	3546	1756427	EPA 8270E	1756427
10581546002	**B-3-21 (3.5 FT)**	3546	1756427	EPA 8270E	1756427
10581546003	**B-4-21 (3 FT)**	3546	1756427	EPA 8270E	1756427
10581546004	**B-5-21 (5 FT)**	3546	1756427	EPA 8270E	1756427
10581546005	**B-6-21 (4 FT)**	3546	1756427	EPA 8270E	1756427
10581546001	**B-2-21 (3 FT)**	EPA 3550C	775548	EPA 8270E by SIM	775880
10581546002	**B-3-21 (3.5 FT)**	EPA 3550C	775548	EPA 8270E by SIM	775880
10581546003	**B-4-21 (3 FT)**	EPA 3550C	775548	EPA 8270E by SIM	775880
10581546004	**B-5-21 (5 FT)**	EPA 3550C	775548	EPA 8270E by SIM	775880
10581546005	**B-6-21 (4 FT)**	EPA 3550C	775548	EPA 8270E by SIM	775880
10581546001	**B-2-21 (3 FT)**	5035A	1757232	EPA 8260D	1757232
10581546002	**B-3-21 (3.5 FT)**	5035A	1757232	EPA 8260D	1757232
10581546003	**B-4-21 (3 FT)**	5035A	1757232	EPA 8260D	1757232
10581546004	**B-5-21 (5 FT)**	5035A	1757232	EPA 8260D	1757232
10581546005	**B-6-21 (4 FT)**	5035A	1756421	EPA 8260D	1756421
10581546005	**B-6-21 (4 FT)**	5035A	1763708	EPA 8260D	1763708
10581546001	**B-2-21 (3 FT)**	SM 2540 G	1753338	SM 2540G	1753338
10581546002	**B-3-21 (3.5 FT)**	SM 2540 G	1753344	SM 2540G	1753344
10581546003	**B-4-21 (3 FT)**	SM 2540 G	1753344	SM 2540G	1753344
10581546004	**B-5-21 (5 FT)**	SM 2540 G	1753344	SM 2540G	1753344
10581546005	**B-6-21 (4 FT)**	SM 2540 G	1753344	SM 2540G	1753344
10581546001	**B-2-21 (3 FT)**	3060A	1754566	EPA 7199	1754566
10581546002	**B-3-21 (3.5 FT)**	3060A	1754566	EPA 7199	1754566
10581546003	**B-4-21 (3 FT)**	3060A	1754566	EPA 7199	1754566
10581546004	**B-5-21 (5 FT)**	3060A	1754566	EPA 7199	1754566
10581546005	**B-6-21 (4 FT)**	3060A	1754567	EPA 7199	1754567
10581546001	**B-2-21 (3 FT)**	Calc.	1755398	Calculated	1755398
10581546002	**B-3-21 (3.5 FT)**	Calc.	1755398	Calculated	1755398

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: P66: Oily Water Sewer-Revised Report
Pace Project No.: 10581546

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10581546003	**B-4-21 (3 FT)**	Calc.	1755398	Calculated	1755398
10581546004	**B-5-21 (5 FT)**	Calc.	1755398	Calculated	1755398
10581546005	**B-6-21 (4 FT)**	Calc.	1755398	Calculated	1755398
10581546001	**B-2-21 (3 FT)**	EPA 9045D	777321		
10581546002	**B-3-21 (3.5 FT)**	EPA 9045D	777321		
10581546003	**B-4-21 (3 FT)**	EPA 9045D	777321		
10581546004	**B-5-21 (5 FT)**	EPA 9045D	777321		
10581546005	**B-6-21 (4 FT)**	EPA 9045D	777321		

Cooler 1 of 2

Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurat

WO# : 10581546

10581546

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Phillips 66 Ferndale Refinery	Report To:	Amie Blystone	Attention:	Amie Blystone
Address:	PO Box 8	Copy To:	Ashley Yamaura	Company Name:	Phillips 66
	Ferndale, WA 98248		ayamaura@whatcom-es.com / 360-752-9571	Address:	PO Box 8, Ferndale, WA 98248
Email To:	Amie.Blystone@p66.com	Purchase Order No.	PO # 4300035146	Pace Quote Reference:	
Phone:	(360) 384-8377 Fax: (360) 384-8422	Client Project ID:	P66: Oily Water Sewer	Pace Project Manager:	State / Location
Requested Due Date/TAT:	Standard TAT	Container Order Number:		Pace Profile #:	

ITEM#	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Y/N	Analyses Test: BTEX - EPA 8260	NWTPH - VPH, Hexane	NWTPH - EPH	PAHs/cPAHs - 8270 SIM (see attached list)	Naphthalenes 8270 SIM	As, Cd, Cr (III & VI), Pb, Ni - EPA 6020	Mercury - EPA 7471	pH	Residual Chlorine (Y/N)	
1	B-2-21 (3 FT)	SL	G	9/30/21	10:15	-	-		TerraCore 5035A kit w/: 2 extra Methanol VOAS, 2- 8oz. Jars, & 1- 4oz. Jar.									X	X	X	X	X	X	X	X		Please return cooler
2	B-3-21 (3.5 FT)	SL	G	9/30/21	11:15	-	-		TerraCore 5035A kit w/: 2 extra Methanol VOAS, 2- 8oz. Jars, & 1- 4oz. Jar.									X	X	X	X	X	X	X	X		and packing material to
3	B-4-21 (3 FT)	SL	G	9/30/21	11:45	-	-		TerraCore 5035A kit w/: 2 extra Methanol VOAS, 2- 8oz. Jars, & 1- 4oz. Jar.									X	X	X	X	X	X	X	X		Whatcom Environmental.
4	B-5-21 (5 FT)	SL	G	9/30/21	1:15	-	-		TerraCore 5035A kit w/: 2 extra Methanol VOAS, 2- 8oz. Jars, & 1- 4oz. Jar.									X	X	X	X	X	X	X	X		
5	B-6-21 (4 FT)	SL	G	9/30/21	2:15	-	-		TerraCore 5035A kit w/: 2 extra Methanol VOAS, 2- 8oz. Jars, & 1- 4oz. Jar.									X	X	X	X	X	X	X	X		
6																												
7																												
8																												
9																												
10																												
11																												
12																												

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Please email results to both Phillips 66, and Whatcom Environmental	/ Whatcom Environmental			/ PACE	10/2/21	900	3.5 / 2.8	Y	Y	Y
See attached page for requested reporting limits.										

SAMPLER NAME AND SIGNATURE			TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:	Ashley Yamaura					
SIGNATURE of SAMPLER:		DATE Signed: 10/1/2021				

001
002
003
004
005

Pace Analytical®	Document Name: **Sample Condition Upon Receipt (SCUR) - MN**	Document Revised: 14Apr2021 **Page 1 of 1**
	Document No.: **ENV-FRM-MIN4-0150 Rev.02**	Pace Analytical Services - **Minneapolis**

Sample Condition Upon Receipt

Client Name: P66

Project #:

WO#: 10581546

PM: JMG **Due Date: 10/18/21**

CLIENT: COP

Courier: ☒ Fed.Ex ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ SpeeDee ☐ Commercial

Tracking Number: _____ See Exceptions ☒ ENV-FRM-MIN4-0142

Custody Seal on Cooler/Box Present? ☒ Yes ☐ No **Seals Intact?** ☒ Yes ☐ No **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Packing Material: ☐ Bubble Wrap ☒ Bubble Bags ☐ None ☐ Other: _____ **Temp Blank?** ☒ Yes ☐ No

Thermometer: ☐ T1(0461) ☐ T2(1336) ☐ T3(0459) ☐ OS418-LS ☐ T4(0254) ☒ T5(0489) ☐ 160285052 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Dry ☐ Melted

Did Samples Originate in West Virginia? ☐ Yes ☒ No **Were All Container Temps Taken?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Cooler Temp Read w/temp blank:** 3.5, 2.8 °C

Correction Factor: True **Cooler Temp Corrected w/temp blank:** 3.5, 2.8 °C

Average Corrected Temp (no temp blank only): _____ °C ☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

USDA Regulated Soil: (☐ N/A, water sample/Other: _____)

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☒ No

Date/Initials of Person Examining Contents: HKB 10/9/21

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☒ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present and Filled Out?	☒ Yes	☐ No		1.
Chain of Custody Relinquished?	☒ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	3.
Samples Arrived within Hold Time?	☒ Yes	☐ No		4.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E coli ☐ BOD/cBOD ☐ Hex Chrome ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other _____
Rush Turn Around Time Requested?	☐ Yes	☒ No		6.
Sufficient Volume?	☒ Yes	☐ No		7.
Correct Containers Used?	☒ Yes	☐ No		8.
-Pace Containers Used?	☒ Yes	☐ No		
Containers Intact?	☒ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☒ Yes	☐ No		11. **If no, write ID/ Date/Time on Container Below:** **See Exception** ☐ ENV-FRM-MIN4-0142
Matrix: ☐ Water ☒ Soil ☐ Oil ☐ Other _____				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☒ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☒ N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☒ Yes	☐ No	☐ N/A	Positive for Res. Chlorine? ☐ Yes ☐ No **pH Paper Lot#** **See Exception** ☐ ENV-FRM-MIN4-0142
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☒ Yes	☐ No	☐ N/A	13. **See Exception** ☐ ENV-FRM-MIN4-0140
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☒ No	☐ N/A	
Trip Blank Present?	☐ Yes	☒ No	☐ N/A	14.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	Pace Trip Blank Lot # (if purchased): _____

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: JENNI GROSS **Date:** 10/04/21

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: HKB

SCUR Exceptions:

Workorder #:

Out of Temp Sample IDs	Container Type	# of Containers

PM Notified? ☐Yes ☐No

If yes, indicate who was contacted/date/time.
If no, indicate reason why.

Multiple Cooler Project? ☐Yes ☐No
If you answered yes, fill out information to the left.

No Temp Blank		
Read Temp	Corrected Temp	Average Temp

Tracking Number/Temperature	
7748 6338 N/A	3.5
7748 6338 8276	2.8

Issue Type: Sample ID	Container Type	# of Containers

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preserv.	pH Upon Receipt	Date Adjusted	Time Adjusted	Amount Added (mL)	Lot # Added	pH After	In Compliance after addition?	Initials
								☐Yes ☐No	
								☐Yes ☐No	
								☐Yes ☐No	
								☐Yes ☐No	

Comments:

Internal Transfer Chain of Custody

Pace Analytical®
www.pacelabs.com

☐ Samples Pre-Logged into eCOC.

State Of Origin: WA
Cert. Needed: ☒ Yes ☐ No

Workorder: 10581546 **Workorder Name:** P66: Oily Water Sewer

Owner Received Date: 10/2/2021 Results Requested By: 10/18/2021

Report To	Subcontract To
Jennifer Gross Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700	Pace National 12065 Lebanon Rd Mt. Juliet, TN 37122 Phone (615) 758-5858

E178

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: VG9B	DW	Unpreserved JGCU				6020 As,Cd,Cr,Pb,Ni - Pace National	7199 Hex Cr - Pace National	8260D AP9 BTEX, Hexane* - Pace	8270E Biphenyl - Pace National	Total Solids - Pace National	Trivalent Cr - Pace National							LAB USE ONLY 10414224
1	B-2-21 (3 FT)	PS	9/30/2021 10:15	10581546001	Solid	2	1	1				X	X	X	X	X	X							1
2	B-3-21 (3.5 FT)	PS	9/30/2021 11:15	10581546002	Solid	2	1	1				X	X	X	X	X	X							2
3	B-4-21 (3 FT)	PS	9/30/2021 11:45	10581546003	Solid	2	1	1				X	X	X	X	X	X							3
4	B-5-21 (5 FT)	PS	9/30/2021 01:15	10581546004	Solid	2	1	1				X	X	X	X	X	X							4
5	B-6-21 (4 FT)	PS	9/30/2021 02:15	10581546005	Solid	2	1	1				X	X	X	X	X	X							5

Transfers	Released By	Date/Time	Received By	Date/Time
1	[illegible] Pace	10/5/21 1635		
2				
3				10/6/21

Comments

*8260D BTEX, hexane - run stir bars first.

Cooler Temperature on Receipt _____ °C | **Custody Seal** Y or N | **Received on Ice** Y or N | **Samples Intact** Y or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.
This chain of custody is considered complete as is since this information is available in the owner laboratory.

0.4+.1=0.5 ATBL

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N		

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Pace Analytical Minnesota
Julie Bowser
1700 Elm Street, Ste. 200
Minneapolis, MN 55414

RE: P66: Oily Water Sewer
Work Order Number: 2110086

October 19, 2021

Attention Julie Bowser:

Fremont Analytical, Inc. received 5 sample(s) on 10/6/2021 for the analyses presented in the following report.

Extractable Petroleum Hydrocarbons by NWEPH
Sample Moisture (Percent Moisture)
Volatile Petroleum Hydrocarbons by NWVPH

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *10/19/2021*

CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer
Work Order: 2110086

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2110086-001	B-2-21 (3 FT)	09/30/2021 10:15 AM	10/06/2021 12:08 PM
2110086-002	B-3-21 (3.5 FT)	09/30/2021 11:15 AM	10/06/2021 12:08 PM
2110086-003	B-4-21 (3 FT)	09/30/2021 11:45 AM	10/06/2021 12:08 PM
2110086-004	B-5-21 (5 FT)	09/30/2021 1:15 AM	10/06/2021 12:08 PM
2110086-005	B-6-21 (4 FT)	09/30/2021 2:15 AM	10/06/2021 12:08 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

Case Narrative

WO#: **2110086**
Date: **10/19/2021**

CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2110086**
Date Reported: **10/19/2021**

CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

Lab ID: 2110086-001 **Collection Date:** 9/30/2021 10:15:00 AM
Client Sample ID: **B-2-21 (3 FT)** **Matrix:** Solid

Analyses	Result	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 33968		Analyst: MM
Aliphatic Hydrocarbon (C10-C12)	28.5	5.09		mg/Kg-dry	1	10/14/2021 10:14:26 PM
Aliphatic Hydrocarbon (C12-C16)	78.4	2.17		mg/Kg-dry	1	10/14/2021 10:14:26 PM
Aliphatic Hydrocarbon (C16-C21)	96.4	4.33		mg/Kg-dry	1	10/14/2021 10:14:26 PM
Aliphatic Hydrocarbon (C21-C34)	173	6.96		mg/Kg-dry	1	10/14/2021 10:14:26 PM
Aromatic Hydrocarbon (C10-C12)	4.84	3.61	J	mg/Kg-dry	1	10/15/2021 7:58:18 AM
Aromatic Hydrocarbon (C12-C16)	25.0	2.49		mg/Kg-dry	1	10/15/2021 7:58:18 AM
Aromatic Hydrocarbon (C16-C21)	ND	5.74		mg/Kg-dry	1	10/15/2021 7:58:18 AM
Aromatic Hydrocarbon (C21-C34)	88.7	8.49		mg/Kg-dry	1	10/15/2021 7:58:18 AM
Surr: 1-Chlorooctadecane	83.3	60 - 140		%Rec	1	10/14/2021 10:14:26 PM
Surr: o-Terphenyl	85.6	60 - 140		%Rec	1	10/15/2021 7:58:18 AM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 33976		Analyst: SLL
Aliphatic Hydrocarbon (C5-C6)	1.33	1.14	J	mg/Kg-dry	1	10/7/2021 4:11:03 PM
Aliphatic Hydrocarbon (C6-C8)	ND	0.384		mg/Kg-dry	1	10/7/2021 4:11:03 PM
Aliphatic Hydrocarbon (C8-C10)	2.93	1.12		mg/Kg-dry	1	10/7/2021 4:11:03 PM
Aromatic Hydrocarbon (C8-C10)	ND	1.45		mg/Kg-dry	1	10/7/2021 4:11:03 PM
Surr: 1,4-Difluorobenzene	75.1	65 - 140		%Rec	1	10/7/2021 4:11:03 PM
Surr: Bromofluorobenzene	98.4	65 - 140		%Rec	1	10/7/2021 4:11:03 PM
Sample Moisture (Percent Moisture)				Batch ID: R70427		Analyst: OK
Percent Moisture	14.6	0.100		wt%	1	10/8/2021 10:30:06 AM

Analytical Report

Work Order: **2110086**
Date Reported: **10/19/2021**

CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

Lab ID: 2110086-002 **Collection Date:** 9/30/2021 11:15:00 AM
Client Sample ID: **B-3-21 (3.5 FT)** **Matrix:** Solid

Analyses	Result	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 33968		Analyst: MM
Aliphatic Hydrocarbon (C10-C12)	186	5.03		mg/Kg-dry	1	10/14/2021 11:07:45 PM
Aliphatic Hydrocarbon (C12-C16)	652	2.14		mg/Kg-dry	1	10/14/2021 11:07:45 PM
Aliphatic Hydrocarbon (C16-C21)	658	4.28		mg/Kg-dry	1	10/14/2021 11:07:45 PM
Aliphatic Hydrocarbon (C21-C34)	1,200	6.87		mg/Kg-dry	1	10/14/2021 11:07:45 PM
Aromatic Hydrocarbon (C10-C12)	16.1	3.57		mg/Kg-dry	1	10/15/2021 8:51:44 AM
Aromatic Hydrocarbon (C12-C16)	129	2.46		mg/Kg-dry	1	10/15/2021 8:51:44 AM
Aromatic Hydrocarbon (C16-C21)	325	5.68		mg/Kg-dry	1	10/15/2021 8:51:44 AM
Aromatic Hydrocarbon (C21-C34)	735	8.39		mg/Kg-dry	1	10/15/2021 8:51:44 AM
Surr: 1-Chlorooctadecane	99.9	60 - 140		%Rec	1	10/14/2021 11:07:45 PM
Surr: o-Terphenyl	85.3	60 - 140		%Rec	1	10/15/2021 8:51:44 AM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 33976		Analyst: SLL
Aliphatic Hydrocarbon (C5-C6)	1.47	1.26	J	mg/Kg-dry	1	10/7/2021 5:29:44 PM
Aliphatic Hydrocarbon (C6-C8)	5.68	0.426		mg/Kg-dry	1	10/7/2021 5:29:44 PM
Aliphatic Hydrocarbon (C8-C10)	21.6	1.25		mg/Kg-dry	1	10/7/2021 5:29:44 PM
Aromatic Hydrocarbon (C8-C10)	28.4	1.60		mg/Kg-dry	1	10/7/2021 5:29:44 PM
Surr: 1,4-Difluorobenzene	75.4	65 - 140		%Rec	1	10/7/2021 5:29:44 PM
Surr: Bromofluorobenzene	132	65 - 140		%Rec	1	10/7/2021 5:29:44 PM
Sample Moisture (Percent Moisture)				Batch ID: R70427		Analyst: OK
Percent Moisture	21.7	0.100		wt%	1	10/8/2021 10:30:06 AM

Analytical Report

Work Order: **2110086**
Date Reported: **10/19/2021**

CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

Lab ID: 2110086-003 **Collection Date:** 9/30/2021 11:45:00 AM
Client Sample ID: **B-4-21 (3 FT)** **Matrix:** Solid

Analyses	Result	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 33968		Analyst: MM
Aliphatic Hydrocarbon (C10-C12)	206	5.63		mg/Kg-dry	1	10/15/2021 12:00:35 AM
Aliphatic Hydrocarbon (C12-C16)	618	2.40		mg/Kg-dry	1	10/15/2021 12:00:35 AM
Aliphatic Hydrocarbon (C16-C21)	594	4.79		mg/Kg-dry	1	10/15/2021 12:00:35 AM
Aliphatic Hydrocarbon (C21-C34)	1,140	7.69		mg/Kg-dry	1	10/15/2021 12:00:35 AM
Aromatic Hydrocarbon (C10-C12)	40.9	4.00		mg/Kg-dry	1	10/15/2021 10:39:09 AM
Aromatic Hydrocarbon (C12-C16)	155	2.75		mg/Kg-dry	1	10/15/2021 10:39:09 AM
Aromatic Hydrocarbon (C16-C21)	419	6.35		mg/Kg-dry	1	10/15/2021 10:39:09 AM
Aromatic Hydrocarbon (C21-C34)	705	9.39		mg/Kg-dry	1	10/15/2021 10:39:09 AM
Surr: 1-Chlorooctadecane	88.5	60 - 140		%Rec	1	10/15/2021 12:00:35 AM
Surr: o-Terphenyl	85.1	60 - 140		%Rec	1	10/15/2021 10:39:09 AM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 33976		Analyst: SLL
Aliphatic Hydrocarbon (C5-C6)	1.27	1.11	J	mg/Kg-dry	1	10/7/2021 8:44:27 PM
Aliphatic Hydrocarbon (C6-C8)	4.25	0.374		mg/Kg-dry	1	10/7/2021 8:44:27 PM
Aliphatic Hydrocarbon (C8-C10)	31.6	1.09		mg/Kg-dry	1	10/7/2021 8:44:27 PM
Aromatic Hydrocarbon (C8-C10)	49.3	1.41		mg/Kg-dry	1	10/7/2021 8:44:27 PM
Surr: 1,4-Difluorobenzene	78.5	65 - 140		%Rec	1	10/7/2021 8:44:27 PM
Surr: Bromofluorobenzene	176	65 - 140	S	%Rec	1	10/7/2021 8:44:27 PM
Sample Moisture (Percent Moisture)				Batch ID: R70427		Analyst: OK
Percent Moisture	22.8	0.100		wt%	1	10/8/2021 10:30:06 AM

NOTES:
S - Outlying surrogate recovery(ies) observed.

Analytical Report

Work Order: **2110086**
Date Reported: **10/19/2021**

CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

Lab ID: 2110086-004 **Collection Date:** 9/30/2021 1:15:00 AM
Client Sample ID: **B-5-21 (5 FT)** **Matrix:** Solid

Analyses	Result	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 33968		Analyst: MM
Aliphatic Hydrocarbon (C10-C12)	29.1	5.98		mg/Kg-dry	1	10/15/2021 12:53:50 AM
Aliphatic Hydrocarbon (C12-C16)	74.2	2.55		mg/Kg-dry	1	10/15/2021 12:53:50 AM
Aliphatic Hydrocarbon (C16-C21)	78.8	5.09		mg/Kg-dry	1	10/15/2021 12:53:50 AM
Aliphatic Hydrocarbon (C21-C34)	199	8.18		mg/Kg-dry	1	10/15/2021 12:53:50 AM
Aromatic Hydrocarbon (C10-C12)	ND	4.25		mg/Kg-dry	1	10/15/2021 12:26:50 PM
Aromatic Hydrocarbon (C12-C16)	25.6	2.92		mg/Kg-dry	1	10/15/2021 12:26:50 PM
Aromatic Hydrocarbon (C16-C21)	79.6	6.75		mg/Kg-dry	1	10/15/2021 12:26:50 PM
Aromatic Hydrocarbon (C21-C34)	98.0	9.98		mg/Kg-dry	1	10/15/2021 12:26:50 PM
Surr: 1-Chlorooctadecane	80.3	60 - 140		%Rec	1	10/15/2021 12:53:50 AM
Surr: o-Terphenyl	79.0	60 - 140		%Rec	1	10/15/2021 12:26:50 PM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 33976		Analyst: SLL
Aliphatic Hydrocarbon (C5-C6)	1.29	1.12	J	mg/Kg-dry	1	10/7/2021 6:47:41 PM
Aliphatic Hydrocarbon (C6-C8)	1.15	0.378	J	mg/Kg-dry	1	10/7/2021 6:47:41 PM
Aliphatic Hydrocarbon (C8-C10)	3.20	1.10		mg/Kg-dry	1	10/7/2021 6:47:41 PM
Aromatic Hydrocarbon (C8-C10)	3.85	1.42		mg/Kg-dry	1	10/7/2021 6:47:41 PM
Surr: 1,4-Difluorobenzene	75.9	65 - 140		%Rec	1	10/7/2021 6:47:41 PM
Surr: Bromofluorobenzene	102	65 - 140		%Rec	1	10/7/2021 6:47:41 PM
Sample Moisture (Percent Moisture)				Batch ID: R70427		Analyst: OK
Percent Moisture	24.1	0.100		wt%	1	10/8/2021 10:30:06 AM

Analytical Report

Work Order: **2110086**
Date Reported: **10/19/2021**

CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

Lab ID: 2110086-005 **Collection Date:** 9/30/2021 2:15:00 AM
Client Sample ID: **B-6-21 (4 FT)** **Matrix:** Solid

Analyses	Result	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 33968		Analyst: MM
Aliphatic Hydrocarbon (C10-C12)	ND	4.92		mg/Kg-dry	1	10/18/2021 9:51:57 AM
Aliphatic Hydrocarbon (C12-C16)	ND	2.10		mg/Kg-dry	1	10/18/2021 9:51:57 AM
Aliphatic Hydrocarbon (C16-C21)	ND	4.19		mg/Kg-dry	1	10/18/2021 9:51:57 AM
Aliphatic Hydrocarbon (C21-C34)	10.0	6.73	J	mg/Kg-dry	1	10/18/2021 9:51:57 AM
Aromatic Hydrocarbon (C10-C12)	ND	3.50		mg/Kg-dry	1	10/15/2021 1:20:34 PM
Aromatic Hydrocarbon (C12-C16)	ND	2.41		mg/Kg-dry	1	10/15/2021 1:20:34 PM
Aromatic Hydrocarbon (C16-C21)	5.66	5.56	J	mg/Kg-dry	1	10/15/2021 1:20:34 PM
Aromatic Hydrocarbon (C21-C34)	9.72	8.22	J	mg/Kg-dry	1	10/15/2021 1:20:34 PM
Surr: 1-Chlorooctadecane	140	60 - 140		%Rec	1	10/18/2021 9:51:57 AM
Surr: o-Terphenyl	91.9	60 - 140		%Rec	1	10/15/2021 1:20:34 PM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 33976		Analyst: SLL
Aliphatic Hydrocarbon (C5-C6)	1.20	0.990	J	mg/Kg-dry	1	10/7/2021 8:05:34 PM
Aliphatic Hydrocarbon (C6-C8)	1.67	0.335		mg/Kg-dry	1	10/7/2021 8:05:34 PM
Aliphatic Hydrocarbon (C8-C10)	ND	0.979		mg/Kg-dry	1	10/7/2021 8:05:34 PM
Aromatic Hydrocarbon (C8-C10)	ND	1.26		mg/Kg-dry	1	10/7/2021 8:05:34 PM
Surr: 1,4-Difluorobenzene	77.4	65 - 140		%Rec	1	10/7/2021 8:05:34 PM
Surr: Bromofluorobenzene	95.9	65 - 140		%Rec	1	10/7/2021 8:05:34 PM
Sample Moisture (Percent Moisture)				Batch ID: R70427		Analyst: OK
Percent Moisture	22.2	0.100		wt%	1	10/8/2021 10:30:06 AM

Work Order: 2110086
CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **MB-33968**	SampType: **MBLK**			Units: **mg/Kg**		Prep Date: **10/6/2021**			RunNo: **70601**		
Client ID: **MBLKS**	Batch ID: **33968**					Analysis Date: **10/14/2021**			SeqNo: **1435121**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	ND	10.0									
Aliphatic Hydrocarbon (C12-C16)	ND	10.0									
Aliphatic Hydrocarbon (C16-C21)	ND	10.0									
Aliphatic Hydrocarbon (C21-C34)	ND	10.0									
Surr: 1-Chlorooctadecane	84.0		100.0		84.0	60	140				

Sample ID: **LCS-33968**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **10/6/2021**			RunNo: **70601**		
Client ID: **LCSS**	Batch ID: **33968**					Analysis Date: **10/14/2021**			SeqNo: **1435122**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	89.2	10.0	125.0	0	71.4	70	130				
Aliphatic Hydrocarbon (C12-C16)	115	10.0	125.0	0	92.1	70	130				
Aliphatic Hydrocarbon (C16-C21)	116	10.0	125.0	0	93.0	70	130				
Aliphatic Hydrocarbon (C21-C34)	137	10.0	125.0	0	110	70	130				
Surr: 1-Chlorooctadecane	101		100.0		101	60	140				

Sample ID: **LCSD-33968**	SampType: **LCSD**			Units: **mg/Kg**		Prep Date: **10/6/2021**			RunNo: **70601**		
Client ID: **LCSS02**	Batch ID: **33968**					Analysis Date: **10/14/2021**			SeqNo: **1435130**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	79.7	10.0	125.0	0	63.7	70	130	0	200	20	S
Aliphatic Hydrocarbon (C12-C16)	101	10.0	125.0	0	81.2	70	130	0	200	20	
Aliphatic Hydrocarbon (C16-C21)	105	10.0	125.0	0	83.7	70	130	0	200	20	
Aliphatic Hydrocarbon (C21-C34)	136	10.0	125.0	0	109	70	130	0	200	20	
Surr: 1-Chlorooctadecane	91.5		100.0		91.5	60	140		0		

NOTES:
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range.

Work Order: 2110086
CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **MB-33968**	SampType: **MBLK**			Units: **mg/Kg**		Prep Date: **10/6/2021**		RunNo: **70600**			
Client ID: **MBLKS**	Batch ID: **33968**					Analysis Date: **10/15/2021**		SeqNo: **1434924**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	ND	10.0									
Aromatic Hydrocarbon (C12-C16)	ND	10.0									
Aromatic Hydrocarbon (C16-C21)	ND	10.0									
Aromatic Hydrocarbon (C21-C34)	8.76	10.0									J
Surr: o-Terphenyl	87.7		100.0		87.7	60	140				

Sample ID: **LCS-33968**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **10/6/2021**		RunNo: **70600**			
Client ID: **LCSS**	Batch ID: **33968**					Analysis Date: **10/15/2021**		SeqNo: **1434925**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	99.4	10.0	125.0	0	79.5	70	130				
Aromatic Hydrocarbon (C12-C16)	110	10.0	125.0	0	88.1	70	130				
Aromatic Hydrocarbon (C16-C21)	120	10.0	125.0	0	96.2	70	130				
Aromatic Hydrocarbon (C21-C34)	132	10.0	125.0	0	105	70	130				
Surr: o-Terphenyl	105		100.0		105	60	140				

Sample ID: **LCSD-33968**	SampType: **LCSD**			Units: **mg/Kg**		Prep Date: **10/6/2021**		RunNo: **70600**			
Client ID: **LCSS02**	Batch ID: **33968**					Analysis Date: **10/15/2021**		SeqNo: **1434937**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	87.6	10.0	125.0	0	70.1	70	130	99.38	12.5	20	
Aromatic Hydrocarbon (C12-C16)	93.5	10.0	125.0	0	74.8	70	130	110.1	16.3	20	
Aromatic Hydrocarbon (C16-C21)	99.3	10.0	125.0	0	79.5	70	130	120.3	19.1	20	
Aromatic Hydrocarbon (C21-C34)	116	10.0	125.0	0	92.9	70	130	131.8	12.6	20	
Surr: o-Terphenyl	85.8		100.0		85.8	60	140		0		

Work Order: 2110086
CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **LCS-33976**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **10/7/2021**		RunNo: **70527**			
Client ID: **LCSS**	Batch ID: **33976**					Analysis Date: **10/7/2021**		SeqNo: **1435042**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	28.2	2.50	30.00	0	93.9	70	130				
Aliphatic Hydrocarbon (C6-C8)	10.3	1.50	10.00	0	103	70	130				
Aliphatic Hydrocarbon (C8-C10)	10.1	2.50	10.00	0	101	70	130				
Aromatic Hydrocarbon (C8-C10)	35.0	3.00	40.00	0	87.6	70	130				
Surr: 1,4-Difluorobenzene	2.27		2.500		90.7	65	140				
Surr: Bromofluorobenzene	2.40		2.500		96.0	65	140				

Sample ID: **MB-33976**	SampType: **MBLK**			Units: **mg/Kg**		Prep Date: **10/7/2021**		RunNo: **70527**			
Client ID: **MBLKS**	Batch ID: **33976**					Analysis Date: **10/7/2021**		SeqNo: **1435043**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	1.28	2.50		0	0						J
Aliphatic Hydrocarbon (C6-C8)	ND	1.50		0	0						
Aliphatic Hydrocarbon (C8-C10)	ND	2.50		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	3.00		0	0						
Surr: 1,4-Difluorobenzene	1.92		2.500		76.8	65	140				
Surr: Bromofluorobenzene	2.43		2.500		97.1	65	140				

Sample ID: **2110086-001BMS**	SampType: **MS**			Units: **mg/Kg-dry**		Prep Date: **10/7/2021**		RunNo: **70527**			
Client ID: **B-2-21 (3 FT)**	Batch ID: **33976**					Analysis Date: **10/7/2021**		SeqNo: **1435029**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	29.4	2.35	28.23	1.333	99.3	70	130				
Aliphatic Hydrocarbon (C6-C8)	10.0	1.41	9.408	0	106	70	130				
Aliphatic Hydrocarbon (C8-C10)	10.7	2.35	9.408	2.928	82.8	70	130				
Aromatic Hydrocarbon (C8-C10)	42.4	2.82	37.63	0	113	70	130				
Surr: 1,4-Difluorobenzene	2.06		2.352		87.6	65	140				
Surr: Bromofluorobenzene	2.36		2.352		100	65	140				

Work Order: 2110086
CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **2110086-004BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **10/7/2021** RunNo: **70527**
Client ID: **B-5-21 (5 FT)** Batch ID: **33976** Analysis Date: **10/7/2021** SeqNo: **1435034**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	1.38	2.31		0	0			1.290	6.54	25	J
Aliphatic Hydrocarbon (C6-C8)	1.80	1.39		0	0			1.154	43.8	25	
Aliphatic Hydrocarbon (C8-C10)	2.95	2.31		0	0			3.198	7.93	25	
Aromatic Hydrocarbon (C8-C10)	4.02	2.77		0	0			3.854	4.26	25	
Surr: 1,4-Difluorobenzene	1.80		2.311		77.9	65	140		0		
Surr: Bromofluorobenzene	2.36		2.311		102	65	140		0		

Sample Log-In Check List

Client Name:	**PACEMI**	Work Order Number:	**2110086**
Logged by:	**Gabrielle Coeuille**	Date Received:	**10/6/2021 12:08:33 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	FedEx		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☑	No ☐	Not Present ☐
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample 1	0.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Original

Chain of Custody

PASI Minnesota Laboratory

Pace Analytical® www.pacelabs.com

2110086

Workorder: 10581546 Workorder Name: P66: Oily Water Sewer Results Requested By: 10/18/2021

Report / Invoice To	Subcontract To	
Jennifer Gross Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700 Email: jennifer.gross@pacelabs.com	Fremont Analytical 3600 Fremont Ave N. Seattle, WA 98103 206-352-3790	P.O. 10581546

State of Sample Origin: WA

Item	Sample ID	Collect Date/Time	Lab ID	Matrix	MeOH VG9M	Unpreserved JGCU	EPH - Fremont Analytical	VPH - Fremont Analytical	Dry Weight	LAB USE ONLY
1	B-2-21 (3 FT)	9/30/2021 10:15	10581546001	Solid	2	1	X	X	X	
2	B-3-21 (3.5 FT)	9/30/2021 11:15	10581546002	Solid	2	1	X	X	X	
3	B-4-21 (3 FT)	9/30/2021 11:45	10581546003	Solid	2	1	X	X	X	
4	B-5-21 (5 FT)	9/30/2021 01:15	10581546004	Solid	2	1	X	X	X	
5	B-6-21 (4 FT)	9/30/2021 02:15	10581546005	Solid	2	1	X	X	X	

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature] / Pace	10/5/21 1620	[signature]	10/6/21 1208
2				
3				

Comments: Report to MDL.

Cooler Temperature on Receipt ____ °C Custody Seal Y or N Received on Ice Y or N Samples Intact Y or N

C5-C6 Aliphatics	NWVPH	>C10-C12 Aliphatics	NWEPH
>C6-C8 Aliphatics	NWVPH	>C12-C16 Aliphatics	NWEPH
>C8-C10 Aliphatics	NWVPH	>C16-C21 Aliphatics	NWEPH
>C8-C10 Aromatics	NWVPH	>C21-C34 Aliphatics	NWEPH
		>C10-C12 Aromatics	NWEPH
		>C12-C16 Aromatics	NWEPH
		>C16-C21 Aromatics	NWEPH
		>C21-C34 Aromatics	NWEPH

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

November 09, 2021

Amie Blystone
Phillips 66
P.O. Box 8
Ferndale, WA 98248

RE: Project: P66: Oily Water Sewer
Pace Project No.: 10583611

Dear Amie Blystone:

Enclosed are the analytical results for sample(s) received by the laboratory on October 16, 2021. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses were subcontracted outside of the Pace Network. The test report from the external subcontractor is attached to this report in its entirety.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace National - Mt. Juliet
- Pace Analytical Services - Minneapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jennifer Gross
jennifer.gross@pacelabs.com
(612)607-1700
Project Manager

Enclosures

cc: Ashley Yamaura, Whatcom Environmental Services

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

Pace Analytical Services, LLC - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414
1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab
A2LA Certification #: 2926.01*
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009*
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014*
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Tribal Water Systems+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605*
Georgia Certification #: 959
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086*
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064*
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137*
Minnesota Dept of Ag Approval: via MN 027-053-137
Minnesota Petrofund Registration #: 1240*
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081*
New Jersey Certification #: MN002
New York Certification #: 11647*
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification (1700) #: CL101
Ohio VAP Certification (1800) #: CL110*
Oklahoma Certification #: 9507*
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001*
Pennsylvania Certification #: 68-00563*
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192*
Utah Certification #: MN00064*
Vermont Certification #: VT-027053137
Virginia Certification #: 460163*
Washington Certification #: C486*
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01
USDA Permit #: P330-19-00208
*Please Note: Applicable air certifications are denoted with an asterisk (*).

Pace Analytical Services National

12065 Lebanon Road, Mt. Juliet, TN 37122
Alabama Certification #: 40660
Alaska Certification 17-026
Arizona Certification #: AZ0612
Arkansas Certification #: 88-0469
California Certification #: 2932
Canada Certification #: 1461.01
Colorado Certification #: TN00003
Connecticut Certification #: PH-0197
DOD Certification: #1461.01
EPA# TN00003
Florida Certification #: E87487
Georgia DW Certification #: 923
Georgia Certification: NELAP
Idaho Certification #: TN00003
Illinois Certification #: 200008
Indiana Certification #: C-TN-01
Iowa Certification #: 364
Kansas Certification #: E-10277
Kentucky UST Certification #: 16
Kentucky Certification #: 90010
Louisiana Certification #: AI30792
Louisiana DW Certification #: LA180010
Maine Certification #: TN0002
Maryland Certification #: 324
Massachusetts Certification #: M-TN003
Michigan Certification #: 9958
Minnesota Certification #: 047-999-395
Mississippi Certification #: TN00003
Missouri Certification #: 340
Montana Certification #: CERT0086
Nebraska Certification #: NE-OS-15-05

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

Pace Analytical Services National

Nevada Certification #: TN-03-2002-34
New Hampshire Certification #: 2975
New Jersey Certification #: TN002
New Mexico DW Certification
New York Certification #: 11742
North Carolina Aquatic Toxicity Certification #: 41
North Carolina Drinking Water Certification #: 21704
North Carolina Environmental Certificate #: 375
North Dakota Certification #: R-140
Ohio VAP Certification #: CL0069
Oklahoma Certification #: 9915
Oregon Certification #: TN200002
Pennsylvania Certification #: 68-02979
Rhode Island Certification #: LAO00356
South Carolina Certification #: 84004
South Dakota Certification
Tennessee DW/Chem/Micro Certification #: 2006
Texas Mold Certification #: LAB0152
Texas Certification #: T 104704245-17-14
USDA Soil Permit #: P330-15-00234
Utah Certification #: TN00003
Vermont Dept. of Health: ID# VT-2006
Virginia Certification #: VT2006
Virginia Certification #: 460132
Washington Certification #: C847
West Virginia Certification #: 233
Wisconsin Certification #: 998093910
Wyoming UST Certification #: via A2LA 2926.01
A2LA-ISO 17025 Certification #: 1461.01
A2LA-ISO 17025 Certification #: 1461.02
AIHA-LAP/LLC EMLAP Certification #:100789

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10583611001	**B-1-21 (4 FT)**	Solid	10/14/21 03:00	10/16/21 09:50

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10583611001	**B-1-21 (4 FT)**	EPA 6020B	LD	5	PAN
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E	AMG	7	PAN
		EPA 8270E by SIM	KJ3	21	PASI-M
		EPA 8260D	DWR	10	PAN
		SM 2540G	JAV	1	PAN
		EPA 7199	JER	1	PAN
		Calculated	LD	1	PAN
		EPA 9045D	AR3	1	PASI-M

PAN = Pace National - Mt. Juliet
PASI-M = Pace Analytical Services - Minneapolis

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

Sample: B-1-21 (4 FT) **Lab ID: 10583611001** Collected: 10/14/21 03:00 Received: 10/16/21 09:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Metals (ICPMS) 6020B	Analytical Method: EPA 6020B Preparation Method: 3050B Pace National - Mt. Juliet							
Arsenic	**4.79**	mg/kg	1.48	5	10/26/21 17:34	10/27/21 19:07	7440-38-2	
Cadmium	ND	mg/kg	1.48	5	10/26/21 17:34	10/27/21 19:07	7440-43-9	
Chromium	**38.6**	mg/kg	7.42	5	10/26/21 17:34	10/27/21 19:07	7440-47-3	
Lead	**14.8**	mg/kg	2.97	5	10/26/21 17:34	10/27/21 19:07	7439-92-1	
Nickel	**38.5**	mg/kg	3.71	5	10/26/21 17:34	10/27/21 19:07	7440-02-0	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis							
Mercury	**0.070**	mg/kg	0.025	1	10/21/21 14:29	10/27/21 13:28	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**32.1**	%	0.10	1		10/25/21 17:24		N2
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3546 Pace National - Mt. Juliet							
Biphenyl (Diphenyl)	ND	mg/kg	0.494	1	10/25/21 18:51	10/26/21 14:20	92-52-4	
Surrogates								
2-Fluorophenol (S)	69.4	%	12.0-120	1	10/25/21 18:51	10/26/21 14:20	367-12-4	
Phenol-d5 (S)	67.4	%	10.0-120	1	10/25/21 18:51	10/26/21 14:20	4165-62-2	
Nitrobenzene-d5 (S)	58.3	%	10.0-122	1	10/25/21 18:51	10/26/21 14:20	4165-60-0	
2-Fluorobiphenyl (S)	69.4	%	15.0-120	1	10/25/21 18:51	10/26/21 14:20	321-60-8	
2,4,6-Tribromophenol (S)	81.1	%	10.0-127	1	10/25/21 18:51	10/26/21 14:20	118-79-6	
p-Terphenyl-d14 (S)	68.5	%	10.0-120	1	10/25/21 18:51	10/26/21 14:20	1718-51-0	
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	90-12-0	
2-Methylnaphthalene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	91-57-6	
Acenaphthene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	83-32-9	
Acenaphthylene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	208-96-8	
Anthracene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	120-12-7	
Benzo(a)anthracene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	56-55-3	
Benzo(a)pyrene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	50-32-8	
Benzo(b)fluoranthene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	205-99-2	
Benzo(g,h,i)perylene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	191-24-2	
Benzo(k)fluoranthene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	207-08-9	
Chrysene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	53-70-3	
Dibenzofuran	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	132-64-9	
Fluoranthene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	206-44-0	
Fluorene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	193-39-5	
Naphthalene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

Sample: B-1-21 (4 FT) **Lab ID: 10583611001** Collected: 10/14/21 03:00 Received: 10/16/21 09:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis							
Phenanthrene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	85-01-8	
Pyrene	ND	ug/kg	14.7	1	10/20/21 14:55	10/25/21 23:24	129-00-0	
Surrogates								
2-Fluorobiphenyl (S)	65	%.	50-125	1	10/20/21 14:55	10/25/21 23:24	321-60-8	
p-Terphenyl-d14 (S)	53	%.	51-125	1	10/20/21 14:55	10/25/21 23:24	1718-51-0	
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Benzene	**0.00288**	mg/kg	0.00148	1	10/14/21 03:00	10/25/21 22:00	71-43-2	
Ethylbenzene	ND	mg/kg	0.00148	1	10/14/21 03:00	10/25/21 22:00	100-41-4	
n-Hexane	ND	mg/kg	0.0148	1	10/14/21 03:00	10/25/21 22:00	110-54-3	
Toluene	ND	mg/kg	0.00742	1	10/14/21 03:00	10/25/21 22:00	108-88-3	
o-Xylene	ND	mg/kg	0.00148	1	10/14/21 03:00	10/25/21 22:00	95-47-6	
m&p-Xylene	ND	mg/kg	0.00297	1	10/14/21 03:00	10/25/21 22:00	179601-23-1	
Xylene (Total)	ND	mg/kg	0.00445	1	10/14/21 03:00	10/25/21 22:00	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	122	%	70.0-130	1	10/14/21 03:00	10/25/21 22:00	17060-07-0	
Toluene-d8 (S)	121	%	75.0-131	1	10/14/21 03:00	10/25/21 22:00	2037-26-5	
4-Bromofluorobenzene (S)	86.1	%	67.0-138	1	10/14/21 03:00	10/25/21 22:00	460-00-4	
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet							
Total Solids	**67.4**	%		1	10/23/21 17:21	10/23/21 17:29		
Wet Chemistry 7199	Analytical Method: EPA 7199 Preparation Method: 3060A Pace National - Mt. Juliet							
Chromium, Hexavalent	ND	mg/kg	1.48	1	10/25/21 18:00	10/26/21 14:13		D8
Calculated Results	Analytical Method: Calculated Preparation Method: Calc. Pace National - Mt. Juliet							
Chromium, Trivalent	**38.0**	mg/kg	1.48	1	10/26/21 17:34	10/27/21 19:07		
9045D pH	Analytical Method: EPA 9045D Pace Analytical Services - Minneapolis							
pH at 25 Degrees C	**6.9**	Std. Units	0.10	1		11/03/21 15:08		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

QC Batch: 1763566
QC Batch Method: 3050B
Analysis Method: EPA 6020B
Analysis Description: Metals (ICPMS) 6020B
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10583611001

METHOD BLANK: R3722219-1 Matrix: Solid
Associated Lab Samples: 10583611001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	1.00	10/27/21 18:18	
Cadmium	mg/kg	ND	1.00	10/27/21 18:18	
Chromium	mg/kg	ND	5.00	10/27/21 18:18	
Lead	mg/kg	ND	2.00	10/27/21 18:18	
Nickel	mg/kg	ND	2.50	10/27/21 18:18	

LABORATORY CONTROL SAMPLE: R3722219-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	100	94.6	94.6	80.0-120	
Cadmium	mg/kg	100	98.9	98.9	80.0-120	
Chromium	mg/kg	100	95.6	95.6	80.0-120	
Lead	mg/kg	100	99.0	99.0	80.0-120	
Nickel	mg/kg	100	101	101	80.0-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R3722219-5 R3722219-6

Parameter	Units	L1421071-10 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	3.30	128	128	117	116	89.0	88.0	75.0-125	1.12	20	
Cadmium	mg/kg	ND	128	128	128	126	99.6	98.0	75.0-125	1.68	20	
Chromium	mg/kg	21.9	128	128	139	140	91.2	92.0	75.0-125	0.757	20	
Lead	mg/kg	5.86	128	128	133	125	99.0	92.9	75.0-125	6.07	20	
Nickel	mg/kg	17.2	128	128	140	136	95.5	92.9	75.0-125	2.44	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

QC Batch: 778449
QC Batch Method: EPA 7471B
Analysis Method: EPA 7471B
Analysis Description: 7471B Mercury Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10583611001

METHOD BLANK: 4145921 Matrix: Solid
Associated Lab Samples: 10583611001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.017	10/27/21 13:13	

LABORATORY CONTROL SAMPLE: 4145922

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.44	0.41	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4145923 4145924

Parameter	Units	10584043001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.096	0.49	0.54	0.51	0.61	85	96	80-120	18	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

QC Batch: 779012
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10583611001

SAMPLE DUPLICATE: 4149125

Parameter	Units	30445726013 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	25.9	30.1	15	30	N2

SAMPLE DUPLICATE: 4149126

Parameter	Units	10584506003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	34.7	35.0	1	30	N2

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

QC Batch: 1762922
QC Batch Method: 3546
Analysis Method: EPA 8270E
Analysis Description: SVOA (GC/MS) 8270E
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10583611001

METHOD BLANK: R3721400-2 Matrix: Solid
Associated Lab Samples: 10583611001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Biphenyl (Diphenyl)	mg/kg	ND	0.333	10/26/21 10:50	
Nitrobenzene-d5 (S)	%	65.2	10.0-122	10/26/21 10:50	
2-Fluorobiphenyl (S)	%	75.1	15.0-120	10/26/21 10:50	
p-Terphenyl-d14 (S)	%	78.4	10.0-120	10/26/21 10:50	
Phenol-d5 (S)	%	72.8	10.0-120	10/26/21 10:50	
2-Fluorophenol (S)	%	76.3	12.0-120	10/26/21 10:50	
2,4,6-Tribromophenol (S)	%	76.9	10.0-127	10/26/21 10:50	

LABORATORY CONTROL SAMPLE: R3721400-1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Biphenyl (Diphenyl)	mg/kg	0.666	0.446	67.0	39.0-120	
Nitrobenzene-d5 (S)	%			48.6	10.0-122	
2-Fluorobiphenyl (S)	%			68.8	15.0-120	
p-Terphenyl-d14 (S)	%			67.9	10.0-120	
Phenol-d5 (S)	%			66.5	10.0-120	
2-Fluorophenol (S)	%			72.1	12.0-120	
2,4,6-Tribromophenol (S)	%			83.2	10.0-127	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R3722643-1 R3722643-2

Parameter	Units	L1420708-01 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Biphenyl (Diphenyl)	mg/kg	ND	0.648	0.652	0.473	0.548	73.0	84.0	15.0-120	14.7	33	
Nitrobenzene-d5 (S)	%						67.0	57.4	10.0-122			
2-Fluorobiphenyl (S)	%						78.7	85.3	15.0-120			
p-Terphenyl-d14 (S)	%						80.2	71.2	10.0-120			
Phenol-d5 (S)	%						85.8	71.9	10.0-120			
2-Fluorophenol (S)	%						97.7	86.8	12.0-120			
2,4,6-Tribromophenol (S)	%						95.7	103	10.0-127			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

QC Batch: 1763045
QC Batch Method: 5035A
Analysis Method: EPA 8260D
Analysis Description: VOA (GC/MS) 8260D
Laboratory: Pace National - Mt. Juliet

Associated Lab Samples: 10583611001

METHOD BLANK: R3723687-4 Matrix: Solid
Associated Lab Samples: 10583611001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	mg/kg	ND	0.00100	10/25/21 13:01	
Ethylbenzene	mg/kg	ND	0.00100	10/25/21 13:01	
n-Hexane	mg/kg	ND	0.0100	10/25/21 13:01	
Toluene	mg/kg	ND	0.00500	10/25/21 13:01	
Xylene (Total)	mg/kg	ND	0.00300	10/25/21 13:01	
o-Xylene	mg/kg	ND	0.00100	10/25/21 13:01	
m&p-Xylene	mg/kg	ND	0.00200	10/25/21 13:01	
Toluene-d8 (S)	%	118	75.0-131	10/25/21 13:01	
4-Bromofluorobenzene (S)	%	105	67.0-138	10/25/21 13:01	
1,2-Dichloroethane-d4 (S)	%	117	70.0-130	10/25/21 13:01	

LABORATORY CONTROL SAMPLE: R3723687-1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	mg/kg	0.0250	0.0239	95.6	70.0-123	
Ethylbenzene	mg/kg	0.0250	0.0252	101	74.0-126	
n-Hexane	mg/kg	0.0250	0.0240	96.0	55.0-137	
Toluene	mg/kg	0.0250	0.0254	102	75.0-121	
Xylene (Total)	mg/kg	0.0750	0.0740	98.7	72.0-127	
o-Xylene	mg/kg	0.0250	0.0243	97.2	79.0-124	
m&p-Xylene	mg/kg	0.0500	0.0497	99.4	76.0-126	
Toluene-d8 (S)	%			114	75.0-131	
4-Bromofluorobenzene (S)	%			106	67.0-138	
1,2-Dichloroethane-d4 (S)	%			118	70.0-130	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

QC Batch: 778000
QC Batch Method: EPA 3550C
Analysis Method: EPA 8270E by SIM
Analysis Description: 8270E Solid PAH by SIM MSSV
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10583611001

METHOD BLANK: 4144101 Matrix: Solid
Associated Lab Samples: 10583611001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1-Methylnaphthalene	ug/kg	ND	10.0	10/25/21 12:29	
2-Methylnaphthalene	ug/kg	ND	10.0	10/25/21 12:29	
Acenaphthene	ug/kg	ND	10.0	10/25/21 12:29	
Acenaphthylene	ug/kg	ND	10.0	10/25/21 12:29	
Anthracene	ug/kg	ND	10.0	10/25/21 12:29	
Benzo(a)anthracene	ug/kg	ND	10.0	10/25/21 12:29	
Benzo(a)pyrene	ug/kg	ND	10.0	10/25/21 12:29	
Benzo(b)fluoranthene	ug/kg	ND	10.0	10/25/21 12:29	
Benzo(g,h,i)perylene	ug/kg	ND	10.0	10/25/21 12:29	
Benzo(k)fluoranthene	ug/kg	ND	10.0	10/25/21 12:29	
Chrysene	ug/kg	ND	10.0	10/25/21 12:29	
Dibenz(a,h)anthracene	ug/kg	ND	10.0	10/25/21 12:29	
Dibenzofuran	ug/kg	ND	10.0	10/25/21 12:29	
Fluoranthene	ug/kg	ND	10.0	10/25/21 12:29	
Fluorene	ug/kg	ND	10.0	10/25/21 12:29	
Indeno(1,2,3-cd)pyrene	ug/kg	ND	10.0	10/25/21 12:29	
Naphthalene	ug/kg	ND	10.0	10/25/21 12:29	
Phenanthrene	ug/kg	ND	10.0	10/25/21 12:29	
Pyrene	ug/kg	ND	10.0	10/25/21 12:29	
2-Fluorobiphenyl (S)	%.	79	50-125	10/25/21 12:29	
p-Terphenyl-d14 (S)	%.	83	51-125	10/25/21 12:29	

LABORATORY CONTROL SAMPLE: 4144102

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1-Methylnaphthalene	ug/kg	33.3	26.2	79	47-125	
2-Methylnaphthalene	ug/kg	33.3	26.5	80	47-125	
Acenaphthene	ug/kg	33.3	26.6	80	56-125	
Acenaphthylene	ug/kg	33.3	27.8	83	47-125	
Anthracene	ug/kg	33.3	27.4	82	60-125	
Benzo(a)anthracene	ug/kg	33.3	27.1	81	69-125	
Benzo(a)pyrene	ug/kg	33.3	29.1	87	63-125	
Benzo(b)fluoranthene	ug/kg	33.3	29.4	88	67-125	
Benzo(g,h,i)perylene	ug/kg	33.3	27.9	84	67-125	
Benzo(k)fluoranthene	ug/kg	33.3	29.1	87	67-125	
Chrysene	ug/kg	33.3	28.7	86	71-125	
Dibenz(a,h)anthracene	ug/kg	33.3	26.0	78	65-125	
Dibenzofuran	ug/kg	33.3	29.0	87	52-125	
Fluoranthene	ug/kg	33.3	28.3	85	65-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

LABORATORY CONTROL SAMPLE: 4144102

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluorene	ug/kg	33.3	28.0	84	63-125	
Indeno(1,2,3-cd)pyrene	ug/kg	33.3	26.6	80	69-125	
Naphthalene	ug/kg	33.3	26.5	80	51-125	
Phenanthrene	ug/kg	33.3	27.2	82	66-125	
Pyrene	ug/kg	33.3	28.2	84	68-125	
2-Fluorobiphenyl (S)	%.			81	50-125	
p-Terphenyl-d14 (S)	%.			82	51-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4144103 4144104

Parameter	Units	10583339014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1-Methylnaphthalene	ug/kg	ND	36.6	36.6	26.6	31.1	73	85	37-125	16	30	
2-Methylnaphthalene	ug/kg	ND	36.6	36.6	26.6	31.1	73	85	30-135	16	30	
Acenaphthene	ug/kg	ND	36.6	36.6	29.8	35.4	81	97	30-140	17	30	
Acenaphthylene	ug/kg	ND	36.6	36.6	29.6	32.1	81	88	30-136	8	30	
Anthracene	ug/kg	ND	36.6	36.6	30.8	52.8	84	144	46-125	53	30	M1,R1
Benzo(a)anthracene	ug/kg	0.014 mg/kg	36.6	36.6	44.8	76.0	86	171	30-150	52	30	M1,R1
Benzo(a)pyrene	ug/kg	0.018 mg/kg	36.6	36.6	46.2	69.1	78	140	30-150	40	30	R1
Benzo(b)fluoranthene	ug/kg	0.025 mg/kg	36.6	36.6	54.1	86.5	80	169	30-150	46	30	M1,R1
Benzo(g,h,i)perylene	ug/kg	0.014 mg/kg	36.6	36.6	39.4	51.3	69	101	30-150	26	30	
Benzo(k)fluoranthene	ug/kg	ND	36.6	36.6	37.7	49.3	103	135	30-150	27	30	
Chrysene	ug/kg	0.016 mg/kg	36.6	36.6	46.5	76.6	84	166	36-126	49	30	M1,R1
Dibenz(a,h)anthracene	ug/kg	ND	36.6	36.6	30.0	35.5	82	97	30-147	17	30	
Dibenzofuran	ug/kg	ND	36.6	36.6	30.4	38.8	83	106	30-150	24	30	
Fluoranthene	ug/kg	0.024 mg/kg	36.6	36.6	58.8	132	96	296	30-150	77	30	M1,R1
Fluorene	ug/kg	ND	36.6	36.6	30.2	39.7	83	108	30-140	27	30	
Indeno(1,2,3-cd)pyrene	ug/kg	0.014 mg/kg	36.6	36.6	39.8	53.6	69	107	30-150	30	30	
Naphthalene	ug/kg	ND	36.6	36.6	27.6	37.8	75	103	30-138	31	30	R1
Phenanthrene	ug/kg	ND	36.6	36.6	43.2	116	118	317	30-150	92	30	M1,R1
Pyrene	ug/kg	0.024 mg/kg	36.6	36.6	57.1	110	91	235	30-150	63	30	M1,R1
2-Fluorobiphenyl (S)	%.						79	85	50-125			
p-Terphenyl-d14 (S)	%.						76	82	51-125			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

QC Batch: 1762066
QC Batch Method: SM 2540 G
Analysis Method: SM 2540G
Analysis Description: Total Solids 2540 G-2011
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10583611001

METHOD BLANK: R3720713-1 Matrix: Solid
Associated Lab Samples: 10583611001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Solids	%	0.00100		10/23/21 17:29	

LABORATORY CONTROL SAMPLE: R3720713-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Solids	%	50.0	50.0	100	85.0-115	

SAMPLE DUPLICATE: R3720713-3

Parameter	Units	L1420657-42 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Solids	%	88.4	88.2	0.244	10	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

QC Batch: 1762656
QC Batch Method: 3060A
Analysis Method: EPA 7199
Analysis Description: Wet Chemistry 7199
Laboratory: Pace National - Mt. Juliet

Associated Lab Samples: 10583611001

METHOD BLANK: R3721492-1 Matrix: Solid
Associated Lab Samples: 10583611001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chromium, Hexavalent	mg/kg	ND	1.00	10/26/21 12:27	

LABORATORY CONTROL SAMPLE: R3721492-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	10.0	11.5	115	80.0-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R3721492-4 R3721492-5

Parameter	Units	L1418643-02 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	mg/kg	ND	20.0	20.0	14.7	20.5	73.7	102	75.0-125	32.5	20	ML,R1

MATRIX SPIKE SAMPLE: R3721492-6

Parameter	Units	L1418643-02 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	ND	659	693	105	75.0-125	

SAMPLE DUPLICATE: R3721492-3

Parameter	Units	L1418643-01 Result	Dup Result	RPD	Max RPD	Qualifiers
Chromium, Hexavalent	mg/kg	ND	ND	0.00	20	

SAMPLE DUPLICATE: R3721492-8

Parameter	Units	10583611001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chromium, Hexavalent	mg/kg	0.442	ND	52.0	20	D8

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

QC Batch: 781128
QC Batch Method: EPA 9045D
Analysis Method: EPA 9045D
Analysis Description: 9045D pH
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10583611001

LABORATORY CONTROL SAMPLE: 4160121

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
pH at 25 Degrees C	Std. Units	5	5.1	101	98-102	

SAMPLE DUPLICATE: 4160122

Parameter	Units	10584667001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	11.8	11.8	0	3	

SAMPLE DUPLICATE: 4160123

Parameter	Units	10584506001 Result	Dup Result	RPD	Max RPD	Qualifiers
pH at 25 Degrees C	Std. Units	11.6	11.6	1	3	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(612)607-1700

QUALIFIERS

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

D8	The sample and duplicate results for this parameter are less than 5 times the reporting limit, the RPD may not be statistically valid.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
ML	Matrix spike recovery and/or matrix spike duplicate recovery was below laboratory control limits. Result may be biased low.
N2	The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.
R1	RPD value was outside control limits.

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METHOD CROSS REFERENCE TABLE

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

Parameter	Matrix	Analytical Method	Preparation Method
9045D pH	Solid	SW-846 9045D	N/A

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: P66: Oily Water Sewer
Pace Project No.: 10583611

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10583611001	**B-1-21 (4 FT)**	3050B	1763566	EPA 6020B	1763566
10583611001	**B-1-21 (4 FT)**	EPA 7471B	778449	EPA 7471B	778753
10583611001	**B-1-21 (4 FT)**	ASTM D2974	779012		
10583611001	**B-1-21 (4 FT)**	3546	1762922	EPA 8270E	1762922
10583611001	**B-1-21 (4 FT)**	EPA 3550C	778000	EPA 8270E by SIM	779147
10583611001	**B-1-21 (4 FT)**	5035A	1763045	EPA 8260D	1763045
10583611001	**B-1-21 (4 FT)**	SM 2540 G	1762066	SM 2540G	1762066
10583611001	**B-1-21 (4 FT)**	3060A	1762656	EPA 7199	1762656
10583611001	**B-1-21 (4 FT)**	Calc.	1763566	Calculated	1763566
10583611001	**B-1-21 (4 FT)**	EPA 9045D	781128		

Pace Analytical
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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Phillips 66 Ferndale Refinery	Report To:	Amie Blystone	Attention:	Amie Blystone
Address:	PO Box 8	Copy To:	Ashley Yamaura	Company Name:	Phillips 66
	Ferndale, WA 98248		ayamaura@whatcom-es.com / 360-752-9571	Address:	PO Box 8, Ferndale, WA 98248
Email To:	Amie.Blystone@p66.com	Purchase Order No.	PO # 4300035146	Pace Quote Reference:	
Phone:	(360) 384-8377 Fax (360) 384-8422	Client Project ID:	P66: Oily Water Sewer	Pace Project Manager:	
Requested Due Date/TAT:	Standard TAT	Container Order Number:		Pace Profile #:	

Regulatory Agency

State / Location

SAMPLE ID
One Character per box.
(A-Z, 0-9 / , -)
Sample Ids must be unique

MATRIX	CODE
Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Other	OT
Tissue	TS

ITEM#	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	BTEX - EPA 8260	NWTPH - VPH, Hexane	NWTPH - EPH	PAHs/cPAHs - 8270 SIM (see attached list)	Naphthalenes 8270 SIM	As, Cd, Cr (III & VI), Pb, Ni - EPA 6020	Mercury - EPA 7471	pH	Residual Chlorine (Y/N)	Requested Analysis Filtered (Y/N)
1	B-1-21 (4 FT)	SL	G	10/14/21	3:00	-	-		TerraCore 5035A kit w/: 2 extra Methanol VOAS, 2- 8oz. Jars, & 1- 4oz. Jar.									X	X	X	X	X	X	X	X			
2																												
3																												
4																												
5																												
6																												
7																												
8																												
9																												

WO# : 10583611

10583611

Please return cooler and packing material to Whatcom Environmental.

001

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Please email results to both Phillips 66, and Whatcom Environmental	Whatcom Environmental	10/15/21	12:30	IJ-PACE	10/16/21	9:50	2.1	Y	Y	Y
See attached page for requested reporting limits.										

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ashley Yamaura

SIGNATURE of SAMPLER: Ashley Yamaura

DATE Signed: 10/15/2021

Pace Analytical®	Document Name: **Sample Condition Upon Receipt (SCUR) - MN**	Document Revised: 14Apr2021 **Page 1 of 1**
	Document No.: **ENV-FRM-MIN4-0150 Rev.02**	Pace Analytical Services - **Minneapolis**

Sample Condition Upon Receipt

Client Name: Phillips 66 **Project #:** **WO#: 10583611**

PM: JMG **Due Date: 11/01/21**

CLIENT: COP

Courier: ☒Fed Ex ☐UPS ☐USPS ☐Client ☐Pace ☐SpeeDee ☐Commercial

Tracking Number: 2849 6232 6466 **See Exceptions** ☐ **ENV-FRM-MIN4-0142**

Custody Seal on Cooler/Box Present? ☒Yes ☐No **Seals Intact?** ☒Yes ☐No **Biological Tissue Frozen?** ☐Yes ☐No ☒N/A

Packing Material: ☒Bubble Wrap ☒Bubble Bags ☐None ☐Other:_____ **Temp Blank?** ☒Yes ☐No

Thermometer: ☒T1(0461) ☐T2(1336) ☐T3(0459) ☐OS418-LS ☐T4(0254) ☐T5(0489) ☐160285052 **Type of Ice:** ☒Wet ☐Blue ☐None ☐Dry ☐Melted

Did Samples Originate in West Virginia? ☐Yes ☒No **Were All Container Temps Taken?** ☐Yes ☐No ☒N/A

Temp should be above freezing to 6°C **Cooler Temp Read w/temp blank:** 2.1 °C **Average Corrected Temp (no temp blank only):** _____ °C ☐See Exceptions ENV-FRM-MIN4-0142 ☐1 Container

Correction Factor: 0.0 **Cooler Temp Corrected w/temp blank:** 2.1 °C

USDA Regulated Soil: (☐ N/A, water sample/Other:_____)
Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐Yes ☒No

Date/Initials of Person Examining Contents: 10/18/21 TJ
Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐Yes ☒No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present and Filled Out?	☒Yes	☐No		1.
Chain of Custody Relinquished?	☒Yes	☐No		2.
Sampler Name and/or Signature on COC?	☒Yes	☐No	☐N/A	3.
Samples Arrived within Hold Time?	☒Yes	☐No		4.
Short Hold Time Analysis (<72 hr)?	☐Yes	☒No		5. ☐Fecal Coliform ☐HPC ☐Total Coliform/E coli ☐BOD/cBOD ☐Hex Chrome ☐Turbidity ☐Nitrate ☐Nitrite ☐Orthophos ☐Other_____
Rush Turn Around Time Requested?	☐Yes	☒No		6.
Sufficient Volume?	☒Yes	☐No		7.
Correct Containers Used? -Pace Containers Used?	☒Yes ☒Yes	☐No ☐No		8.
Containers Intact?	☒Yes	☐No		9.
Field Filtered Volume Received for Dissolved Tests?	☐Yes	☐No	☒N/A	10. Is sediment visible in the dissolved container? ☐Yes ☐No
Is sufficient information available to reconcile the samples to the COC? Matrix: ☐Water ☒Soil ☐Oil ☐Other_____	☒Yes	☐No		11. **If no, write ID/ Date/Time on Container Below:** **See Exception** ☐ **ENV-FRM-MIN4-0142**
All containers needing acid/base preservation have been checked?	☐Yes	☐No	☒N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐Yes	☐No	☒N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☐Yes	☐No	☒N/A	Positive for Res. Chlorine? ☐Yes ☐No **pH Paper Lot#** **See Exception** ☐ **ENV-FRM-MIN4-0142**
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☐Yes	☐No	☒N/A	13. **See Exception** ☐ **ENV-FRM-MIN4-0140**
Headspace in VOA Vials (greater than 6mm)?	☐Yes	☐No	☒N/A	
Trip Blank Present?	☐Yes	☐No	☒N/A	14.
Trip Blank Custody Seals Present?	☐Yes	☐No	☒N/A	Pace Trip Blank Lot # (if purchased):_____

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐Yes ☐No

Person Contacted:_____ Date/Time:_____

Comments/Resolution:_____

Project Manager Review: Jenni Gross **Date:** 10/20/21

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled by: TJ (1)

Internal Transfer Chain of Custody

Pace Analytical®
www.pacelabs.com

☐ Samples Pre-Logged into eCOC.

State Of Origin: WA
Cert. Needed: [X] Yes ☐ No

Workorder: 10583611 **Workorder Name:** P66: Oily Water Sewer
Owner Received Date: 10/16/2021 **Results Requested By:** 11/4/2021

Report To	Subcontract To
Jennifer Gross Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700	Pace National 12065 Lebanon Rd Mt. Juliet, TN 37122 Phone (615) 758-5858

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: NaOH VG9B	Unpreserved JGCO	Other DWC				6020 As,Cd,Cr,Pb,Ni - Pace National	7199 Hex Cr - Pace National	8260D AP9 BTEX, Hexane* - Pace	8270E Biphenyl - Pace National	Total Solids - Pace National	Trivalent Cr - Pace National							LAB USE ONLY
1	B-1-21 (4 FT)	PS	10/14/2021 03:00	10583611001	Solid	2	1	1				X	X	X	X	X	X							L4208169-01
2																								
3																								
4																								
5																								

Transfers	Released By	Date/Time	Received By	Date/Time
1	[illegible] Pace	10/20/21 1435	[illegible]	10-21-21 0900
2				
3				

Comments
*8260D BTEX, hexane - run stir bars first.

Cooler Temperature on Receipt _____ °C | **Custody Seal** Y or N | **Received on Ice** Y or N | **Samples Intact** Y or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.
This chain of custody is considered complete as is since this information is available in the owner laboratory.

3.9 +0 = 3.9
A3K

K064

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N		

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Pace Analytical Minnesota
Julie Bowser
1700 Elm Street, Ste. 200
Minneapolis, MN 55414

RE: P66: Oily Water Sewer
Work Order Number: 2110319

November 09, 2021

Attention Julie Bowser:

Fremont Analytical, Inc. received 1 sample(s) on 10/22/2021 for the analyses presented in the following report.

Extractable Petroleum Hydrocarbons by NWEPH
Sample Moisture (Percent Moisture)
Volatile Petroleum Hydrocarbons by NWVPH

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *11/09/2021*

CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer
Work Order: 2110319

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2110319-001	B-1-21 (4 FT)	10/14/2021 3:00 AM	10/22/2021 10:24 AM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

Case Narrative

WO#: **2110319**
Date: **11/9/2021**

CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Associated LCS is outside of control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Method Detection Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2110319**
Date Reported: **11/9/2021**

Client: Pace Analytical Minnesota
Project: P66: Oily Water Sewer
Lab ID: 2110319-001
Client Sample ID: B-1-21 (4 FT)

Collection Date: 10/14/2021 3:00:00 AM
Matrix: Solid

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 34217			Analyst: MM
Aliphatic Hydrocarbon (C10-C12)	ND	13.0	5.90	*	mg/Kg-dry	1	11/05/21 15:40:37
Aliphatic Hydrocarbon (C12-C16)	ND	13.0	2.51		mg/Kg-dry	1	11/05/21 15:40:37
Aliphatic Hydrocarbon (C16-C21)	ND	13.0	5.02		mg/Kg-dry	1	11/05/21 15:40:37
Aliphatic Hydrocarbon (C21-C34)	ND	13.0	8.07		mg/Kg-dry	1	11/05/21 15:40:37
Aromatic Hydrocarbon (C10-C12)	ND	13.0	4.19		mg/Kg-dry	1	11/06/21 11:16:41
Aromatic Hydrocarbon (C12-C16)	ND	13.0	2.89		mg/Kg-dry	1	11/06/21 11:16:41
Aromatic Hydrocarbon (C16-C21)	ND	13.0	6.66		mg/Kg-dry	1	11/06/21 11:16:41
Aromatic Hydrocarbon (C21-C34)	ND	13.0	9.85		mg/Kg-dry	1	11/06/21 11:16:41
Surr: 1-Chlorooctadecane	80.3	60 - 140	0		%Rec	1	11/05/21 15:40:37
Surr: o-Terphenyl	73.4	60 - 140	0		%Rec	1	11/06/21 11:16:41

NOTES:
* - Associated LCS does not meet acceptance criteria; refer to QC summary.

Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 34218			Analyst: SLL
Aliphatic Hydrocarbon (C5-C6)	1.89	3.33	1.61	J	mg/Kg-dry	1	10/28/21 20:59:23
Aliphatic Hydrocarbon (C6-C8)	ND	2.00	0.544		mg/Kg-dry	1	10/28/21 20:59:23
Aliphatic Hydrocarbon (C8-C10)	ND	3.33	1.59		mg/Kg-dry	1	10/28/21 20:59:23
Aromatic Hydrocarbon (C8-C10)	ND	4.00	2.05		mg/Kg-dry	1	10/28/21 20:59:23
Surr: 1,4-Difluorobenzene	73.2	65 - 140	0		%Rec	1	10/28/21 20:59:23
Surr: Bromofluorobenzene	91.5	65 - 140	0		%Rec	1	10/28/21 20:59:23
Sample Moisture (Percent Moisture)				Batch ID: R70839			Analyst: ALB
Percent Moisture	27.8	0.500	0.100		wt%	1	10/28/21 9:39:47

Work Order: 2110319
CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **MB-34217**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **10/28/2021**	RunNo: **71095**
Client ID: **MBLKS**	Batch ID: **34217**		Analysis Date: **11/5/2021**	SeqNo: **1446944**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	ND	10.0									*
Aliphatic Hydrocarbon (C12-C16)	ND	10.0									
Aliphatic Hydrocarbon (C16-C21)	ND	10.0									
Aliphatic Hydrocarbon (C21-C34)	ND	10.0									
Surr: 1-Chlorooctadecane	89.6		100.0		89.6	60	140				

NOTES:
* - Associated LCS does not meet acceptance criteria; refer to QC summary.

Sample ID: **LCS-34217**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **10/28/2021**	RunNo: **71095**
Client ID: **LCSS**	Batch ID: **34217**		Analysis Date: **11/5/2021**	SeqNo: **1446945**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	78.6	10.0	125.0	0	62.9	70	130				S
Aliphatic Hydrocarbon (C12-C16)	103	10.0	125.0	0	82.0	70	130				
Aliphatic Hydrocarbon (C16-C21)	104	10.0	125.0	0	83.6	70	130				
Aliphatic Hydrocarbon (C21-C34)	89.5	10.0	125.0	0	71.6	70	130				
Surr: 1-Chlorooctadecane	101		100.0		101	60	140				

NOTES:
S - Outlying spike recovery observed (low bias). Samples will be qualified with a *.

Sample ID: **2110444-001AMS**	SampType: **MS**	Units: **mg/Kg-dry**	Prep Date: **10/28/2021**	RunNo: **71095**
Client ID: **BATCH**	Batch ID: **34217**		Analysis Date: **11/5/2021**	SeqNo: **1446952**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	212	11.8	147.0	93.87	80.5	70	130				
Aliphatic Hydrocarbon (C12-C16)	295	11.8	147.0	178.2	79.2	70	130				
Aliphatic Hydrocarbon (C16-C21)	1,240	11.8	147.0	1,149	59.1	70	130				S
Aliphatic Hydrocarbon (C21-C34)	10,400	11.8	147.0	10,790	-267	70	130				S
Surr: 1-Chlorooctadecane	110		117.6		93.9	60	140				

NOTES:
S - Analyte concentration was too high for accurate spike recovery(ies).

Work Order: 2110319
CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **2110444-001AMSD**	SampType: **MSD**	Units: **mg/Kg-dry**	Prep Date: **10/28/2021**	RunNo: **71095**
Client ID: **BATCH**	Batch ID: **34217**		Analysis Date: **11/5/2021**	SeqNo: **1446953**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C10-C12)	197	10.4	129.7	93.87	79.2	70	130	212.2	7.63	30	
Aliphatic Hydrocarbon (C12-C16)	271	10.4	129.7	178.2	71.2	70	130	294.7	8.54	30	
Aliphatic Hydrocarbon (C16-C21)	1,100	10.4	129.7	1,149	-37.5	70	130	1,236	11.6	30	S
Aliphatic Hydrocarbon (C21-C34)	10,400	10.4	129.7	10,790	-311	70	130	10,400	0.100	30	S
Surr: 1-Chlorooctadecane	102		103.7		98.4	60	140		0		

NOTES:
S - Analyte concentration was too high for accurate spike recovery(ies).

Sample ID: **MB-34217**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **10/28/2021**	RunNo: **71096**
Client ID: **MBLKS**	Batch ID: **34217**		Analysis Date: **11/6/2021**	SeqNo: **1446963**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	ND	10.0									
Aromatic Hydrocarbon (C12-C16)	ND	10.0									
Aromatic Hydrocarbon (C16-C21)	ND	10.0									
Aromatic Hydrocarbon (C21-C34)	ND	10.0									
Surr: o-Terphenyl	76.9		100.0		76.9	60	140				

Sample ID: **LCS-34217**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **10/28/2021**	RunNo: **71096**
Client ID: **LCSS**	Batch ID: **34217**		Analysis Date: **11/6/2021**	SeqNo: **1447572**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	88.2	10.0	125.0	0	70.5	70	130				
Aromatic Hydrocarbon (C12-C16)	88.7	10.0	125.0	0	71.0	70	130				
Aromatic Hydrocarbon (C16-C21)	94.9	10.0	125.0	0	75.9	70	130				
Aromatic Hydrocarbon (C21-C34)	120	10.0	125.0	0	96.2	70	130				
Surr: o-Terphenyl	92.8		100.0		92.8	60	140				

Work Order: 2110319
CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **2110444-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **10/28/2021** RunNo: **71096**
Client ID: **BATCH** Batch ID: **34217** Analysis Date: **11/8/2021** SeqNo: **1447585**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	428	11.8	147.0	307.1	82.1	70	130				
Aromatic Hydrocarbon (C12-C16)	252	11.8	147.0	122.0	88.6	70	130				
Aromatic Hydrocarbon (C16-C21)	319	11.8	147.0	159.7	109	70	130				
Aromatic Hydrocarbon (C21-C34)	1,010	11.8	147.0	906.1	73.8	70	130				
Surr: o-Terphenyl	128		117.6		109	60	140				

Sample ID: **2110444-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **10/28/2021** RunNo: **71096**
Client ID: **BATCH** Batch ID: **34217** Analysis Date: **11/8/2021** SeqNo: **1447586**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	434	10.4	129.7	307.1	98.1	70	130	434.2	0	30	
Aromatic Hydrocarbon (C12-C16)	245	10.4	129.7	122.0	95.1	70	130	245.3	0	30	
Aromatic Hydrocarbon (C16-C21)	320	10.4	129.7	159.7	124	70	130	320.1	0	30	
Aromatic Hydrocarbon (C21-C34)	1,070	10.4	129.7	906.1	126	70	130	1,070	0	30	
Surr: o-Terphenyl	118		103.7		113	60	140		0		

Work Order: 2110319
CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **LCS-34218**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **10/28/2021**		RunNo: **70935**			
Client ID: **LCSS**	Batch ID: **34218**					Analysis Date: **10/28/2021**		SeqNo: **1443180**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	32.6	2.50	30.00	0	109	70	130				
Aliphatic Hydrocarbon (C6-C8)	10.9	1.50	10.00	0	109	70	130				
Aliphatic Hydrocarbon (C8-C10)	10.3	2.50	10.00	0	103	70	130				
Aromatic Hydrocarbon (C8-C10)	47.7	3.00	40.00	0	119	70	130				
Surr: 1,4-Difluorobenzene	2.33		2.500		93.2	65	140				
Surr: Bromofluorobenzene	2.39		2.500		95.5	65	140				

Sample ID: **LCS-34218**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **10/28/2021**		RunNo: **71018**			
Client ID: **LCSS**	Batch ID: **34218**					Analysis Date: **10/28/2021**		SeqNo: **1445003**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	32.6	2.50	30.00	0	109	70	130				
Aliphatic Hydrocarbon (C6-C8)	10.9	1.50	10.00	0	109	70	130				
Aliphatic Hydrocarbon (C8-C10)	10.3	2.50	10.00	0	103	70	130				
Aromatic Hydrocarbon (C8-C10)	47.7	3.00	40.00	0	119	70	130				
Surr: 1,4-Difluorobenzene	2.33		2.500		93.2	65	140				
Surr: Bromofluorobenzene	2.39		2.500		95.5	65	140				

Sample ID: **MB-34218**	SampType: **MBLK**			Units: **mg/Kg**		Prep Date: **10/28/2021**		RunNo: **70935**			
Client ID: **MBLKS**	Batch ID: **34218**					Analysis Date: **10/28/2021**		SeqNo: **1443181**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	1.41	2.50		0	0						J
Aliphatic Hydrocarbon (C6-C8)	ND	1.50		0	0						
Aliphatic Hydrocarbon (C8-C10)	ND	2.50		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	3.00		0	0						
Surr: 1,4-Difluorobenzene	1.84		2.500		73.6	65	140				
Surr: Bromofluorobenzene	2.27		2.500		91.0	65	140				

Work Order: 2110319
CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **MB-34218** SampType: **MBLK** Units: **mg/Kg** Prep Date: **10/28/2021** RunNo: **71018**
Client ID: **MBLKS** Batch ID: **34218** Analysis Date: **10/28/2021** SeqNo: **1445004**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	1.41	2.50		0	0						J
Aliphatic Hydrocarbon (C6-C8)	ND	1.50		0	0						
Aliphatic Hydrocarbon (C8-C10)	ND	2.50		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	3.00		0	0						
Surr: 1,4-Difluorobenzene	1.84		2.500		73.6	65	140				
Surr: Bromofluorobenzene	2.27		2.500		91.0	65	140				

Sample ID: **2110294-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **10/28/2021** RunNo: **70935**
Client ID: **BATCH** Batch ID: **34218** Analysis Date: **10/28/2021** SeqNo: **1443173**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	1.76	3.00		0	0			1.704	3.05	25	JH
Aliphatic Hydrocarbon (C6-C8)	0.837	1.80		0	0			0	200	25	JH
Aliphatic Hydrocarbon (C8-C10)	ND	3.00		0	0			0	0	25	H
Aromatic Hydrocarbon (C8-C10)	ND	3.60		0	0			0	0	25	H
Surr: 1,4-Difluorobenzene	2.29		3.003		76.4	65	140		0		H
Surr: Bromofluorobenzene	2.81		3.003		93.4	65	140		0		H

Sample ID: **2110294-001BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **10/28/2021** RunNo: **71018**
Client ID: **BATCH** Batch ID: **34218** Analysis Date: **10/28/2021** SeqNo: **1444988**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	1.76	3.00		0	0			1.704	3.05	25	JH
Aliphatic Hydrocarbon (C6-C8)	0.837	1.80		0	0			0	200	25	JH
Aliphatic Hydrocarbon (C8-C10)	ND	3.00		0	0			0	0	25	H
Aromatic Hydrocarbon (C8-C10)	ND	3.60		0	0			0	0	25	H
Surr: 1,4-Difluorobenzene	2.29		3.003		76.4	65	140		0		H
Surr: Bromofluorobenzene	2.81		3.003		93.4	65	140		0		H

Work Order: 2110319
CLIENT: Pace Analytical Minnesota
Project: P66: Oily Water Sewer

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **2110294-003BMS**	SampType: **MS**	Units: **mg/Kg-dry**	Prep Date: **10/28/2021**	RunNo: **70935**
Client ID: **BATCH**	Batch ID: **34218**		Analysis Date: **10/29/2021**	SeqNo: **1443175**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	51.1	4.20	50.38	2.393	96.7	70	130				H
Aliphatic Hydrocarbon (C6-C8)	16.1	2.52	16.79	4.298	70.5	70	130				H
Aliphatic Hydrocarbon (C8-C10)	17.8	4.20	16.79	6.606	66.8	70	130				SH
Aromatic Hydrocarbon (C8-C10)	82.3	5.04	67.17	0	123	70	130				H
Surr: 1,4-Difluorobenzene	3.84		4.198		91.6	65	140				H
Surr: Bromofluorobenzene	4.02		4.198		95.7	65	140				H

NOTES:
S - Analyte concentration was too high for accurate spike recovery(ies).

Sample ID: **2110294-003BMS**	SampType: **MS**	Units: **mg/Kg-dry**	Prep Date: **10/28/2021**	RunNo: **71018**
Client ID: **BATCH**	Batch ID: **34218**		Analysis Date: **10/29/2021**	SeqNo: **1444990**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	51.1	4.20	50.38	2.393	96.7	70	130				H
Aliphatic Hydrocarbon (C6-C8)	16.1	2.52	16.79	4.298	70.5	70	130				H
Aliphatic Hydrocarbon (C8-C10)	17.8	4.20	16.79	6.606	66.8	70	130				SH
Aromatic Hydrocarbon (C8-C10)	82.3	5.04	67.17	0	123	70	130				H
Surr: 1,4-Difluorobenzene	3.84		4.198		91.6	65	140				H
Surr: Bromofluorobenzene	4.02		4.198		95.7	65	140				H

NOTES:
S - Outlying spike recoveries were associated with this sample.

Sample Log-In Check List

Client Name:	**PACEMI**	Work Order Number:	**2110319**
Logged by:	**Gabrielle Coeuille**	Date Received:	**10/22/2021 10:24:00 AM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes	☑	No ☐	Not Present	☐
2.	How was the sample delivered?	Client				

Log In

3.	Coolers are present?	Yes	☑	No ☐	NA	☐
4.	Shipping container/cooler in good condition?	Yes	☑	No ☐		
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes	☑	No ☐	Not Present	☐
6.	Was an attempt made to cool the samples?	Yes	☑	No ☐	NA	☐
7.	Were all items received at a temperature of >2°C to 6°C *	Yes	☑	No ☐	NA	☐
8.	Sample(s) in proper container(s)?	Yes	☑	No ☐		
9.	Sufficient sample volume for indicated test(s)?	Yes	☑	No ☐		
10.	Are samples properly preserved?	Yes	☑	No ☐		
11.	Was preservative added to bottles?	Yes	☐	No ☑	NA	☐
12.	Is there headspace in the VOA vials?	Yes	☐	No ☐	NA	☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes	☑	No ☐		
14.	Does paperwork match bottle labels?	Yes	☑	No ☐		
15.	Are matrices correctly identified on Chain of Custody?	Yes	☑	No ☐		
16.	Is it clear what analyses were requested?	Yes	☑	No ☐		
17.	Were all holding times able to be met?	Yes	☑	No ☐		

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes	☐	No ☐	NA	☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample 1	4.3
Temp Blank 1	1.8

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Chain of Custody

2110319

PASI Minnesota Laboratory

Pace Analytical
www.pacelabs.com

Workorder: 10583611 **Workorder Name:** P66: Oily Water Sewer **Results Requested By:** 11/4/2021

Report / Invoice To	Subcontract To
Jennifer Gross Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700 Email: jennifer.gross@pacelabs.com	Fremont Analytical 3600 Fremont Ave. N Seattle, WA 98103 206-352-3790 P.O. 10583611

State of Sample Origin: WA

Item	Sample ID	Collect Date/Time	Lab ID	Matrix	Preserved Containers: VG9M	Preserved Containers: Unpreserved JGCU					Requested Analysis: EPH - Fremont Analytical	Requested Analysis: VPH - Fremont Analytical	Requested Analysis: Dry Weight									LAB USE ONLY
1	B-1-21 (4 FT)	10/14/2021 03:00	10583611001	Solid	2	1					X	X	X									
2																						
3																						
4																						
5																						

Transfers	Released By	Date/Time	Received By	Date/Time
1	[illegible] Pace	10/20/21 1500	Justine Mertz	10/22 10:24
2				
3				

Comments

Report to MDL

Cooler Temperature on Receipt _____ °C | **Custody Seal** Y or N | **Received on Ice** Y or N | **Samples Intact** Y or N

C5-C6 Aliphatics	NWVPH	>C10-C12 Aliphatics	NWEPH
>C6-C8 Aliphatics	NWVPH	>C12-C16 Aliphatics	NWEPH
>C8-C10 Aliphatics	NWVPH	>C16-C21 Aliphatics	NWEPH
>C8-C10 Aromatics	NWVPH	>C21-C34 Aliphatics	NWEPH
		>C10-C12 Aromatics	NWEPH
		>C12-C16 Aromatics	NWEPH
		>C16-C21 Aromatics	NWEPH
		>C21-C34 Aromatics	NWEPH

APPENDIX C

Data Quality Assurance Review

This evaluation provides the results of verification and validation checks of analytical data for six soil samples collected during the sampling events which occurred on September 30, 2021, and October 14, 2021, at the Phillips 66 Ferndale Refinery. The samples were collected and analyzed as part of the Oily Water Sewer site investigation. All sample analyses were conducted at Pace Analytical Services, Pace National, and Fremont Analytical. This data quality evaluation covers Pace Project No: 10581546 & 10583611.

Laboratory quality control procedures have been verified using the applicable National Functional Guidelines (EPA, 2020a; EPA, 2020b). The verification and validation check for each laboratory data package included the following:

- Verification that the laboratory data package contained all necessary documentation (including chain-of-custody records; identification of samples received by the laboratory; date and time of receipt of the samples at the laboratory; sample conditions upon receipt at the laboratory; date and time of sample analysis; explanation of any significant corrective actions taken by the laboratory during the analytical process; and, if applicable, date of extraction, definition of laboratory data qualifiers, all sample-related quality control data, and quality control acceptance criteria).
- Verification that all requested analyses, special cleanups, and special handling methods were performed.
- Evaluation of sample holding times.
- Evaluation of quality control data compared to acceptance criteria, including method blanks, surrogate recoveries, matrix spike results, laboratory duplicate and/or replicate results, and laboratory control sample results.
- Evaluation of overall data quality and completeness of analytical data.

Based on the verification and validation check, data qualifiers have been added to the sample results tables provided in the Report as needed. Data qualifier definitions are provided in the table footnotes. The absence of a data qualifier indicates that the reported result is acceptable without qualification. The data quality evaluation is summarized below.

Laboratory Data Package Completeness

The Pace Analytical laboratory data reports (10581546 & 10583611) contained a signed chain-of-custody, a cooler receipt form documenting the condition and temperature of the

samples upon receipt at the laboratory, sample analytical results, and quality control results (method blanks, surrogate recoveries, laboratory control sample results, and replicate sample results). Definitions of laboratory qualifiers and quality control acceptance criteria were provided, as appropriate.

Sample Conditions and Analysis

The laboratories received the samples in good condition and all analyses were performed as requested. Preservation of samples, as specified by the analytical method, was verified by the laboratory.

Holding Times

For all analyses and all samples, the time between sample collection, extraction (if applicable), and analysis was determined to be within analytical method and project-specified holding times.

Initial and Continuing Calibrations

Appropriate calibration standard methods were followed as required. All initial and continuing calibration results were within acceptable range with the following exceptions:

- n-Hexane continuing calibration did not meet established acceptance criteria during low level volatile organic compounds analysis (8260D). The continuing calibration standard associated with the data responded low. Method sensitivity check is acceptable. Associated data have been qualified as estimated concentration (C3) as indicated in Table 5.
- 1-Methylnapthalene initial or continuing calibration did not meet established acceptance criteria during low level semivolatile organic compounds analysis (8270E). The concentration exceeded the calibration range. Associated data have been qualified as estimated concentration (E) as indicated in Table 7.

Lab Method Blanks

Several method blanks were analyzed with each batch of samples. No contamination of the selected analytes was detected in any of the method blanks, with the following exceptions:

- Aliphatic Hydrocarbon (C5-C6) was detected in the method blank associated with volatile petroleum hydrocarbons analysis (NWVPH). The detected concentration was below the required reporting limit. Associated data have been qualified as estimated concentrations (J) as indicated in Table 4.
- Aromatic Hydrocarbon (C21-C34) was detected in the method blank associated with extractable petroleum hydrocarbons analysis (NWEPH). The detected concentration was below the required reporting limit. Associated data have been qualified as estimated concentrations (J) as indicated in Table 5.

Surrogate Recoveries

Appropriate compounds were used as surrogate spikes for low level semivolatile (8270E) and volatile (8260D) organic compound analyses. Surrogate spikes were added to all samples including Matrix Spikes, Matrix Spike Duplicates, Laboratory Control Samples, and blanks. Recovery values for the surrogate spikes were within the required control limits for all samples with the following exceptions:

- 4-Bromofluorobenzene surrogate recovery results for samples B-2-21 through B-5-21 for low level volatile organic compounds analysis (8260D) were above laboratory control limits. Results may be biased high under qualifier (ST).
- Toluene surrogate recovery results for sample B-3-21 for low level volatile organic compounds analysis (8260D) was above laboratory control limits. Results may be biased high under qualifier (ST).
- 2-Fluorobiphenyl surrogate recovery results for samples B-3-21 through B-5-21 and Matrix Spike/Matrix Spike Duplicate for method (8270E) were diluted due to the presence of high levels of target analytes under qualifier (D4). All recovery values for 2-Fluorobiphenyl were within the required control limits.

Laboratory Control Sample Results

At least one laboratory control sample (LCS) and/or laboratory control sample duplicate (LCSD) was analyzed with each batch of samples. Recoveries for each LCS and/or LCSD were within the laboratory-specified control limits with the following exceptions:

- Aliphatic C10-C12 LCSD results associated with Extractable Petroleum Hydrocarbon analysis (NWEPH) were below the laboratory reported RPD limit. Associated data have been qualified as estimated concentrations (J) as indicated in Table 4.

Sample Duplicate and Matrix Spike/Matrix Spike Duplicate Results and Laboratory Duplicate Results

A sample duplicate and/or Matrix Spike/Matrix Spike Duplicate (MS/MSD) was analyzed with each batch of samples. The recovery values and relative percent difference (RPD) values for associated analyses were within the laboratory-specified control limits for all samples with the following exceptions:

- Lead MS/MSD recovery is ten times above the laboratory specified recommended limits. The laboratory confirmed that the results are accurate and the high recovery did not occur from a mis-spike. All other laboratory quality control data associated with Lead and analysis meets specified requirements. No data qualifier is deemed necessary.
- Nickel MS/MSD recovery was above the laboratory specified recommended limits. All other laboratory quality control data associated with Nickel analysis meets specified requirements. No data qualifier is deemed necessary.
- Acenaphthylene and Naphthalene associated with low level semivolatile organic compounds analysis (8270DE) were outside of the laboratory specified recommended RPD limits. Batch accepted based on laboratory control sample (LCS) recovery. No data qualifier is deemed necessary.
- Ethylbenzene and Xylenes associated with low level volatile organic compounds analysis (8260D) were slightly above the recommended RPD limits. All other laboratory quality control data associated with Ethylbenzene and Xylenes analysis meets specified requirements. No data qualifier deemed necessary.
- 1-Methylnaphthalene MS/MSD results associated with low level volatile semivolatile organic compounds analysis (8270E) exceeded the calibration range. The reported result is estimated. No data qualifier deemed necessary.
- Several parameters associated with low level semivolatile organic compound analysis
- (8270E) exceeded QC limits for MS/MSD recovery. Batch accepted based on LCS recovery. No data qualifier deemed necessary.
- Several parameters associated with low level semivolatile organic compound analysis (8270E) was outside laboratory control limits for MS/MSD recovery due to a parent sample concentration notably higher than the spike level. All other laboratory quality control data associated with the various parameters meets specified requirements. No data qualifier deemed necessary.

Sample Collection Methods

All sample collection and handling methods were followed as described in the approved Sampling and Analysis Plan (SAP) and laboratory methods.

Overall Assessment of the Data

This data set is 100% complete. Data precision was evaluated through sample duplicates, laboratory surrogate duplicates, and matrix spike duplicates. Data accuracy was evaluated through laboratory method blanks, surrogate spikes, and matrix spikes. Based on this data quality verification and validation, all of the data presented were determined to be acceptable.

APPENDIX D

MTCA TPH Worksheets

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 10/14/21
Site Name: Phillips 66 Ferndale Refinery
Sample Name: B-1-21 (4 FT)

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	1.88	3.67%
AL_EC >6-8	0.544	1.06%
AL_EC >8-10	1.59	3.11%
AL_EC >10-12	5.9	11.53%
AL_EC >12-16	2.51	4.90%
AL_EC >16-21	5.02	9.81%
AL_EC >21-34	8.07	15.77%
AR_EC >8-10	2.045	4.00%
AR_EC >10-12	4.1753	8.16%
AR_EC >12-16	2.8606	5.59%
AR_EC >16-21	6.66	13.01%
AR_EC >21-34	9.7471	19.05%
Benzene	0.00288	0.01%
Toluene	0.007	0.01%
Ethylbenzene	0.001	0.00%
Total Xylenes	0.004	0.01%
Naphthalene	0.0147	0.03%
1-Methyl Naphthalene	0.0147	0.03%
2-Methyl Naphthalene	0.0147	0.03%
n-Hexane	0.01	0.02%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.0147	0.03%
Benzo(b)fluoranthene	0.0147	0.03%
Benzo(k)fluoranthene	0.0147	0.03%
Benzo(a)pyrene	0.0147	0.03%
Chrysene	0.0147	0.03%
Dibenz(a,h)anthracene	0.0147	0.03%
Indeno(1,2,3-cd)pyrene	0.0147	0.03%
Sum	51.17388	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	500	ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 10/14/2021
Site Name: Phillips 66 Ferndale Refinery
Sample Name: B-1-21 (4 FT)
Measured Soil TPH Concentration, mg/kg: **51.174**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	1,793	2.93E-08	2.35E-02	Pass
	Method C	44,485	6.96E-09	1.15E-03	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protectior	229	7.76E-07	4.82E-01	Pass
	Target TPH GW Conc. @ 500 ug/L	1,365	NA	NA	Pass

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**1,792.72**	**44,485.37**
Most Stringent Criterion	**Risk of cPAHs mixture= 1E-6**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	*NO*	2.18E+03	1.25E-06	1.00E+00	YES	4.45E+04	6.05E-06	1.00E+00
Total Risk=1E-5	*NO*	1.75E+04	1.00E-05	8.03E+00	*NO*	7.35E+04	1.00E-05	1.65E+00
Risk of Benzene= 1E-6	*NO*	3.23E+05	1.85E-04	1.48E+02	NA			
Risk of cPAHs mixture= 1E-6	YES	1.79E+03	1.02E-06	8.23E-01				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**HI=1**
Protective Ground Water Concentration, ug/L	**344.59**
Protective Soil Concentration, mg/kg	**229.31**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	3.45E+02	2.80E-06	1.00E+00	2.29E+02
Total Risk = 1E-5	*NO*	5.17E+02	1.00E-05	1.44E+00	2.05E+03
Total Risk = 1E-6	YES	1.85E+02	1.00E-06	5.76E-01	6.77E+01
Risk of cPAHs mixture= 1E-5	*NO*	5.53E+02	1.49E-05	1.60E+00	100% NAPL
Benzene MCL = 5 ug/L	*NO*	4.70E+02	6.59E-06	1.30E+00	8.07E+02
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 78000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	5.00E+02	8.55E-06	1.39E+00	**1.37E+03**

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 09/30/21
Site Name: Phillips 66 Ferndale Refinery
Sample Name: B-2-21 (3 FT)

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	1.2961	0.26%
AL_EC >6-8	0.384	0.08%
AL_EC >8-10	2.93	0.58%
AL_EC >10-12	28.5	5.62%
AL_EC >12-16	78.4	15.47%
AL_EC >16-21	96.4	19.02%
AL_EC >21-34	173	34.14%
AR_EC >8-10	1.42423	0.28%
AR_EC >10-12	4.83949	0.96%
AR_EC >12-16	24.85338	4.90%
AR_EC >16-21	5.74	1.13%
AR_EC >21-34	88.6414	17.49%
Benzene	0.0121	0.00%
Toluene	0.0397	0.01%
Ethylbenzene	0.00967	0.00%
Total Xylenes	0.0161	0.00%
Naphthalene	0.0107	0.00%
1-Methyl Naphthalene	0.146	0.03%
2-Methyl Naphthalene	0.00062	0.00%
n-Hexane	0.0339	0.01%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.0051	0.00%
Benzo(b)fluoranthene	0.0044	0.00%
Benzo(k)fluoranthene	0.00055	0.00%
Benzo(a)pyrene	0.00064	0.00%
Chrysene	0.0457	0.01%
Dibenz(a,h)anthracene	0.0016	0.00%
Indeno(1,2,3-cd)pyrene	0.00061	0.00%
Sum	506.73599	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	500	ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 9/30/2021
Site Name: Phillips 66 Ferndale Refinery
Sample Name: B-2-21 (3 FT)
Measured Soil TPH Concentration, mg/kg: **506.736**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	2,828	9.10E-09	1.79E-01	Pass
	Method C	62,337	2.10E-09	8.13E-03	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	4,413	2.46E-06	2.04E-01	Pass
	Target TPH GW Conc. @ 500 ug/L	100% NAPL	NA	NA	Pass

Warning! Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (Refer to WAC 173-340-7490 through ~7494).

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**2,827.60**	**62,337.29**
Most Stringent Criterion	**HI =1**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	2.83E+03	5.08E-08	1.00E+00	YES	6.23E+04	2.58E-07	1.00E+00
Total Risk=1E-5	*NO*	5.57E+05	1.00E-05	1.97E+02	*NO*	2.41E+06	1.00E-05	3.87E+01
Risk of Benzene= 1E-6	*NO*	7.61E+05	1.37E-05	2.69E+02	NA			
Risk of cPAHs mixture= 1E-6	*NO*	1.70E+05	3.05E-06	6.00E+01				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**Benzene MCL = 5 ug/L**
Protective Ground Water Concentration, ug/L	**90.51**
Protective Soil Concentration, mg/kg	**4412.57**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	*NO*	9.54E+01	8.72E-06	3.98E-01	100% NAPL
Total Risk = 1E-5	*NO*	9.54E+01	8.72E-06	3.98E-01	100% NAPL
Total Risk = 1E-6	YES	4.67E+01	1.00E-06	1.22E-01	1.49E+02
Risk of cPAHs mixture= 1E-5	*NO*	9.54E+01	8.72E-06	3.98E-01	100% NAPL
Benzene MCL = 5 ug/L	YES	9.05E+01	6.71E-06	3.42E-01	4.41E+03
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 73000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	9.54E+01	8.72E-06	3.98E-01	**100% NAPL**

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 09/30/21
Site Name: Phillips 66 Ferndale Refinery
Sample Name: B-3-21 (3.5 FT)

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	1.4225	0.04%
AL_EC >6-8	5.68	0.14%
AL_EC >8-10	21.6	0.55%
AL_EC >10-12	186	4.70%
AL_EC >12-16	652	16.47%
AL_EC >16-21	658	16.62%
AL_EC >21-34	1200	30.32%
AR_EC >8-10	28.0949	0.71%
AR_EC >10-12	16.0972	0.41%
AR_EC >12-16	128.4377	3.24%
AR_EC >16-21	325	8.21%
AR_EC >21-34	734.722	18.56%
Benzene	0.017	0.00%
Toluene	0.0557	0.00%
Ethylbenzene	0.0371	0.00%
Total Xylenes	0.268	0.01%
Naphthalene	0.0452	0.00%
1-Methyl Naphthalene	0.559	0.01%
2-Methyl Naphthalene	0.0033	0.00%
n-Hexane	0.0475	0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.0254	0.00%
Benzo(b)fluoranthene	0.0208	0.00%
Benzo(k)fluoranthene	0.003	0.00%
Benzo(a)pyrene	0.0035	0.00%
Chrysene	0.218	0.01%
Dibenz(a,h)anthracene	0.004	0.00%
Indeno(1,2,3-cd)pyrene	0.0033	0.00%
Sum	3958.3651	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	500	ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 9/30/2021
Site Name: Phillips 66 Ferndale Refinery
Sample Name: B-3-21 (3.5 FT)
Measured Soil TPH Concentration, mg/kg: **3,958.365**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	2,561	3.64E-08	1.55E+00	Fail
	Method C	53,988	8.57E-09	7.33E-02	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	100% NAPL	1.28E-06	1.64E-01	Pass
	Target TPH GW Conc. @ 500 ug/L	100% NAPL	NA	NA	Pass

Warning! Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (Refer to WAC 173-340-7490 through ~7494).

Warning! Check Residual Saturation (WAC340-747(10)).

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**2,561.23**	**53,988.22**
Most Stringent Criterion	**HI =1**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	2.56E+03	2.35E-08	1.00E+00	YES	5.40E+04	1.17E-07	1.00E+00
Total Risk=1E-5	*NO*	1.09E+06	1.00E-05	4.25E+02	*NO*	4.62E+06	1.00E-05	8.55E+01
Risk of Benzene= 1E-6	*NO*	4.23E+06	3.89E-05	1.65E+03	NA			
Risk of cPAHs mixture= 1E-6	*NO*	2.72E+05	2.49E-06	1.06E+02				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**NA**
Protective Ground Water Concentration, ug/L	**NA**
Protective Soil Concentration, mg/kg	**Soil-to-Ground Water is not a critical pathway!**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	8.22E+01	1.67E-06	1.78E-01	100% NAPL
Total Risk = 1E-5	YES	8.22E+01	1.67E-06	1.78E-01	100% NAPL
Total Risk = 1E-6	YES	7.47E+01	1.00E-06	1.51E-01	1.75E+03
Risk of cPAHs mixture= 1E-5	YES	8.22E+01	1.67E-06	1.78E-01	100% NAPL
Benzene MCL = 5 ug/L	YES	8.22E+01	1.67E-06	1.78E-01	100% NAPL
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 75000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	8.22E+01	1.67E-06	1.78E-01	**100% NAPL**

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 09/30/21
Site Name: Phillips 66 Ferndale Refinery
Sample Name: B-4-21 (3 FT)

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	1.232	0.03%
AL_EC >6-8	4.25	0.11%
AL_EC >8-10	31.6	0.80%
AL_EC >10-12	206	5.20%
AL_EC >12-16	618	15.59%
AL_EC >16-21	594	14.98%
AL_EC >21-34	1140	28.76%
AR_EC >8-10	49.2711	1.24%
AR_EC >10-12	40.627	1.02%
AR_EC >12-16	154.9934	3.91%
AR_EC >16-21	419	10.57%
AR_EC >21-34	704.5226	17.77%
Benzene	0.0136	0.00%
Toluene	0.0445	0.00%
Ethylbenzene	0.0108	0.00%
Total Xylenes	0.0181	0.00%
Naphthalene	0.273	0.01%
1-Methyl Naphthalene		0.00%
2-Methyl Naphthalene	0.0066	0.00%
n-Hexane	0.038	0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.194	0.00%
Benzo(b)fluoranthene	0.0394	0.00%
Benzo(k)fluoranthene	0.0059	0.00%
Benzo(a)pyrene	0.0069	0.00%
Chrysene	0.208	0.01%
Dibenz(a,h)anthracene	0.0166	0.00%
Indeno(1,2,3-cd)pyrene	0.0066	0.00%
Sum	3964.3781	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	500	ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 9/30/2021
Site Name: Phillips 66 Ferndale Refinery
Sample Name: B-4-21 (3 FT)
Measured Soil TPH Concentration, mg/kg: **3,964.378**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	2,485	4.61E-08	1.60E+00	Fail
	Method C	51,980	1.09E-08	7.63E-02	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	100% NAPL	8.45E-07	2.86E-01	Pass
	Target TPH GW Conc. @ 500 ug/L	100% NAPL	NA	NA	Pass

Warning! Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (Refer to WAC 173-340-7490 through ~7494).

Warning! Check Residual Saturation (WAC340-747(10)).

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**2,485.08**	**51,980.13**
Most Stringent Criterion	**HI =1**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	2.49E+03	2.89E-08	1.00E+00	YES	5.20E+04	1.43E-07	1.00E+00
Total Risk=1E-5	*NO*	8.61E+05	1.00E-05	3.46E+02	*NO*	3.64E+06	1.00E-05	6.99E+01
Risk of Benzene= 1E-6	*NO*	5.30E+06	6.16E-05	2.13E+03	NA			
Risk of cPAHs mixture= 1E-6	*NO*	8.75E+04	1.02E-06	3.52E+01				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**NA**
Protective Ground Water Concentration, ug/L	**NA**
Protective Soil Concentration, mg/kg	**Soil-to-Ground Water is not a critical pathway!**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	1.30E+02	1.13E-06	3.02E-01	100% NAPL
Total Risk = 1E-5	YES	1.30E+02	1.13E-06	3.02E-01	100% NAPL
Total Risk = 1E-6	YES	1.28E+02	1.00E-06	2.95E-01	9.39E+03
Risk of cPAHs mixture= 1E-5	YES	1.30E+02	1.13E-06	3.02E-01	100% NAPL
Benzene MCL = 5 ug/L	YES	1.30E+02	1.13E-06	3.02E-01	100% NAPL
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 76000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	1.30E+02	1.13E-06	3.02E-01	**100% NAPL**

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 09/30/21
Site Name: Phillips 66 Ferndale Refinery
Sample Name: B-5-21 (5 FT)

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	1.2102	0.20%
AL_EC >6-8	1.15	0.19%
AL_EC >8-10	3.2	0.53%
AL_EC >10-12	29.1	4.86%
AL_EC >12-16	74.2	12.40%
AL_EC >16-21	78.8	13.17%
AL_EC >21-34	199	33.27%
AR_EC >8-10	3.2236	0.54%
AR_EC >10-12	4.2471	0.71%
AR_EC >12-16	24.01	4.01%
AR_EC >16-21	79.6	13.31%
AR_EC >21-34	97.9322	16.37%
Benzene	0.0331	0.01%
Toluene	0.103	0.02%
Ethylbenzene	0.0534	0.01%
Total Xylenes	0.573	0.10%
Naphthalene	0.0217	0.00%
1-Methyl Naphthalene	0.698	0.12%
2-Methyl Naphthalene	0.892	0.15%
n-Hexane	0.0798	0.01%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.0063	0.00%
Benzo(b)fluoranthene	0.0052	0.00%
Benzo(k)fluoranthene	0.0031	0.00%
Benzo(a)pyrene	0.0036	0.00%
Chrysene	0.042	0.01%
Dibenz(a,h)anthracene	0.0042	0.00%
Indeno(1,2,3-cd)pyrene	0.0034	0.00%
Sum	598.1949	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	500	ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 9/30/2021
Site Name: Phillips 66 Ferndale Refinery
Sample Name: B-5-21 (5 FT)
Measured Soil TPH Concentration, mg/kg: **598.195**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	2,719	3.59E-08	2.20E-01	Pass
	Method C	54,716	8.36E-09	1.09E-02	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	732	6.92E-06	3.93E-01	Pass
	Target TPH GW Conc. @ 500 ug/L	100% NAPL	NA	NA	Pass

Warning! Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (Refer to WAC 173-340-7490 through ~7494).

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**2,719.09**	**54,716.48**
Most Stringent Criterion	**HI =1**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	2.72E+03	1.63E-07	1.00E+00	YES	5.47E+04	7.65E-07	1.00E+00
Total Risk=1E-5	*NO*	1.67E+05	1.00E-05	6.13E+01	*NO*	7.15E+05	1.00E-05	1.31E+01
Risk of Benzene= 1E-6	*NO*	3.29E+05	1.97E-05	1.21E+02	NA			
Risk of cPAHs mixture= 1E-6	*NO*	7.45E+04	4.47E-06	2.74E+01				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**Benzene MCL = 5 ug/L**
Protective Ground Water Concentration, ug/L	**106.90**
Protective Soil Concentration, mg/kg	**731.72**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	*NO*	1.41E+02	2.03E-05	7.74E-01	100% NAPL
Total Risk = 1E-5	*NO*	1.16E+02	1.00E-05	4.90E-01	1.18E+03
Total Risk = 1E-6	YES	3.27E+01	1.00E-06	1.05E-01	4.27E+01
Risk of cPAHs mixture= 1E-5	*NO*	1.41E+02	2.03E-05	7.74E-01	100% NAPL
Benzene MCL = 5 ug/L	YES	1.07E+02	7.78E-06	4.21E-01	7.32E+02
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 76000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	1.41E+02	2.03E-05	7.74E-01	**100% NAPL**

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 09/30/21
Site Name: Phillips 66 Ferndale Refinery
Sample Name: B-6-21 (4 FT)

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	1.19352	2.50%
AL_EC >6-8	1.67	3.50%
AL_EC >8-10	0.979	2.05%
AL_EC >10-12	4.92	10.30%
AL_EC >12-16	2.1	4.40%
AL_EC >16-21	4.19	8.78%
AL_EC >21-34	10	20.94%
AR_EC >8-10	1.24956	2.62%
AR_EC >10-12	3.49944	7.33%
AR_EC >12-16	2.4065	5.04%
AR_EC >16-21	5.66	11.85%
AR_EC >21-34	9.72	20.36%
Benzene	0.0163	0.03%
Toluene	0.0537	0.11%
Ethylbenzene	0.0131	0.03%
Total Xylenes	0.0218	0.05%
Naphthalene	0.00056	0.00%
1-Methyl Naphthalene	0.0017	0.00%
2-Methyl Naphthalene	0.0018	0.00%
n-Hexane	0.0458	0.10%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.00051	0.00%
Benzo(b)fluoranthene	0.00058	0.00%
Benzo(k)fluoranthene	0.0006	0.00%
Benzo(a)pyrene	0.0007	0.00%
Chrysene	0.00073	0.00%
Dibenz(a,h)anthracene	0.00081	0.00%
Indeno(1,2,3-cd)pyrene	0.00066	0.00%
Sum	47.74737	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.001	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	500	ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 9/30/2021
Site Name: Phillips 66 Ferndale Refinery
Sample Name: B-6-21 (4 FT)
Measured Soil TPH Concentration, mg/kg: **47.747**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	2,490	2.28E-09	1.92E-02	Pass
	Method C	50,867	4.48E-10	9.39E-04	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	84	3.67E-06	4.82E-01	Pass
	Target TPH GW Conc. @ 500 ug/L	1,654	NA	NA	Pass

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**2,490.09**	**50,867.36**
Most Stringent Criterion	**HI =1**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	2.49E+03	1.19E-07	1.00E+00	YES	5.09E+04	4.78E-07	1.00E+00
Total Risk=1E-5	*NO*	2.10E+05	1.00E-05	8.43E+01	*NO*	1.06E+06	1.00E-05	2.09E+01
Risk of Benzene= 1E-6	*NO*	5.33E+04	2.54E-06	2.14E+01	NA			
Risk of cPAHs mixture= 1E-6	*NO*	3.63E+04	1.73E-06	1.46E+01				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**Benzene MCL = 5 ug/L**
Protective Ground Water Concentration, ug/L	**192.78**
Protective Soil Concentration, mg/kg	**84.26**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	*NO*	2.65E+02	1.08E-05	1.00E+00	1.52E+02
Total Risk = 1E-5	*NO*	2.54E+02	1.00E-05	9.54E-01	1.39E+02
Total Risk = 1E-6	YES	4.46E+01	1.00E-06	1.62E-01	1.27E+01
Risk of cPAHs mixture= 1E-5	*NO*	5.71E+02	9.21E-05	3.45E+00	100% NAPL
Benzene MCL = 5 ug/L	YES	1.93E+02	6.31E-06	7.12E-01	8.43E+01
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 77000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	5.00E+02	5.53E-05	2.48E+00	**1.65E+03**