



**Tesoro Refining &
Marketing Company LLC**

P.O. Box 700
Anacortes, WA 98221

March 27, 2025

Sarah Penfield
Environmental Engineer
Solid Waste Management, Industrial Section
PO Box 47600
Olympia, WA 98504-7600

Subject: Oily Water Sewer Annual Progress Report - 2024

Dear Ms. Penfield,

Enclosed is the 2024 Annual Progress Report for SWMU-12 Oily Water Sewer, prepared in accordance with Section VII.C of Agreed Order No DE 16299 (AO). This report details the 2024 inspection findings, ongoing site characterization efforts, and sewer repairs.

Section 2 outlines deviations from the Investigation and Response Plan (IRP). Video inspections were completed for some piping sections along F and G streets; however, due to high water levels, obstructions, and poor video quality, these segments will be re-inspected at a later date.

Section 4.1 discusses Area of Concern 1 (AOC-1), identified during the 2022 inspections and repaired in 2023. Initial site characterization began in 2023 and continued through 2024.

Section 4.2 covers the second Area of Concern (AOC-2), discovered in 2023. Repairs and an initial investigation for AOC-2 were conducted in 2024.

The Sampling and Analysis Plan (SAP) for both areas of concern is included in **Appendix E**, with soil and groundwater sampling results provided in **Appendix B**.

The 2024 inspections identified three sewer pipe locations with defects rated Environmental Rating 4. Initial investigations for these ER 4 locations are scheduled for 2025.

If you have any questions regarding this information, please contact me at (360) 293-9122 or my ES&S Manager, Amber Larsen, at (360) 293-1664.

Sincerely,

A handwritten signature in black ink, appearing to read 'C. Hunt' with a large, stylized flourish.

Cameron Hunt.
General Manager
Tesoro Refining & Marketing Company LLC

Enclosure
2024 Annual Progress Report, SWMU-12 Oily Water Sewer

2024 ANNUAL PROGRESS REPORT

SWMU-12 OILY WATER SEWER

TESORO REFINING & MARKETING COMPANY LLC

MARATHON ANACORTES REFINERY

MARCH 26, 2025

SUBMITTED BY:



Tesoro Refining & Marketing Company LLC

Marathon Anacortes Refinery
10200 March's Point Road
Anacortes, WA 98221

SUBMITTED TO:

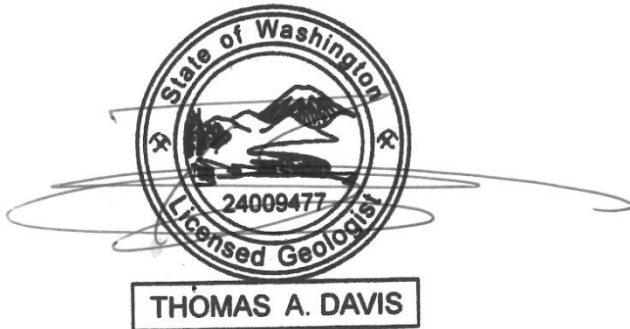


Washington State Department of Ecology

Industrial Section
PO Box 47600
Olympia, WA 98504-7600

CERTIFICATION STATEMENT

All geologic and hydrogeologic work performed pursuant to this report was conducted under the supervision of and direction of the geologist listed below:

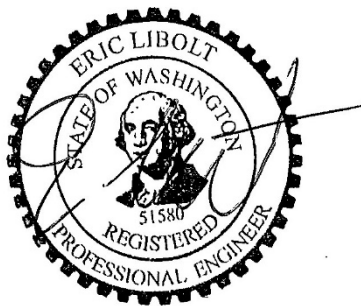


3/26/2025

Thomas Davis P.G.

Date

All engineering work performed pursuant to this report was conducted under the supervision and direction of the engineer listed below:



3/26/2025

Eric Libolt P.E.

Date

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1. INTRODUCTION

This annual progress report has been prepared in accordance with the requirements in Section VII.C. of Agreed Order No. DE 16299 (AO). The AO was entered into by the Washington State Department of Ecology (Ecology) and the Tesoro Refining & Marketing Company LLC Marathon Anacortes Refinery (Marathon Anacortes Refinery) on November 1st, 2021. The objective of the AO is to investigate and conduct remedial actions to the Marathon Anacortes Refinery Oily Water Sewer (OWS) system, also referred to as Solid Waste Management Unit 12 (SWMU-12).

Per Section VII.A of 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 releases or threatened releases from the OWS that are discovered during the investigation. The AO requires the Marathon Anacortes Refinery to submit an annual progress report to Ecology by April 1st of each year following the implementation of the IRP.

The IRP outlined ten phases of OWS inspections to be completed by November 1, 2031. Per the IRP, sewer inspections were completed in 2024. This report describes the 2024 sewer inspection findings, and the associated site characterization, corrective actions, and sewer repairs. This report was written in accordance with the revised OWS IRP Annual Progress Report Elements provided to the Marathon Anacortes Refinery by Ecology on December 11, 2024.

All figures referenced in this report are included in Appendix A. All tables referenced in this report are included in Appendix B.

1.1 GENERAL SITE INFORMATION

The Marathon Anacortes Refinery is situated two miles east of the city of Anacortes on the northern portion of March Point, a north-south oriented peninsula approximately 1.3 miles wide and 2.6 miles long. The site address is 10200 March's Point Road, Anacortes, Washington 98221. The property location is shown on Figure A-1.



The OWS system was constructed in the mid 1950's and is primarily made of vitrified clay. The main trunk line is 24 inches in diameter. The sewer system was installed in a trench that was backfilled with fine sand, silt, and clay (a mix of native soils). Inputs to the OWS are transported by a gravity drainage system to the waste water treatment plant located at the northern end of the refinery (PGG 1995, PGG 2016).

1.2 CONTACT INFORMATION

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

- Ecology Site Manager: Sarah Penfield
 - Address: P.O. Box 47600 Olympia, WA 98504-7600
 - Phone: (360) 280-2325
 - Email: sarah.penfield@ecy.wa.gov
- Project Consultant: ALL4, LLC.
 - Address: 228 E Champion St #101, Bellingham, WA 98225
 - Contact: Olana Costa
 - Phone: (360) 685-8343
 - Email: ocosta@all4inc.com
- Property Owner/Facility Operator: Marathon Anacortes Refinery
 - Address: 10200 March's Point Road, Anacortes, WA 98221
 - Contact: Monica Bohnert
 - Phone: (360) 293-1680
 - Email: mmbohnert@marathonpetroleum.com



2. DEVIATIONS FROM THE INVESTIGATION AND RESPONSE PLAN

In accordance with VII.C.1 of Agreed Order No. DE 16299 Marathon Anacortes Refinery is required to report any deviations from the Investigation and Response Plan.

Video inspections scheduled for 2023 include the main trunk line from manholes F-7 to F-14 along “F” Street. The following segments from the 2023 video inspections will be reattempted during a future inspection due to high water levels/obstructions leading to survey abandonment:

- F-8 to F-9
- F-9 to F-10
- F-12 to F-12A

Video inspections scheduled for 2024 include the main trunk line from manholes G-1B to G-8 along “G” Street. The following segments from the 2024 video inspections will be reattempted during a future inspection due to poor video quality:

- G-1 to G-2
- G-4 to G-5
- G-5 to G-6



3. OILY WATER SEWER ASSESSMENT

In accordance with VII.C.2 of Agreed Order No. DE 16299 Marathon Anacortes Refinery is required to report the findings of the sewer assessment, including the general condition of the OWS system components, the location and description of any problems identified and their cause, and a description of actions taken or planned to repair or maintain system components based on the results of the testing.

The 2024 OWS video inspections were completed by BAI Environmental Services (BAI) from June 12, 2024 to June 24, 2024. Video inspections were completed in general accordance with the National Association of Sewer Service Compliance (NASSCO) Pipeline Assessment Certification Program (PACP) and Manhole Assessment Certification Program (MACP). The original NASSCO reports provided by BAI are provided in Appendix C. Photographs of all NASSCO rated defects are provided in Appendix D.

The OWS segment inspections include the main trunk line from manholes G-1B to G-8 along “G” Street. A map showing the inspected sewer segments is provided as Figure A-2.

The sewer inspection videos were reviewed by BAI for the assessment of observed sewer defects (e.g., cracking, fractures, offset joints, etc.) using the NASSCO structural rating system, which were then provided to ALL4, LLC (ALL4) for an environmental rating (ER) evaluation.

3.1 2024 VIDEO INSPECTION FINDINGS

Following the NASSCO structural rating assessment, ALL4 assigned each defect a separate ER based on the potential for a release. The ER system is based on a scale of 1-5. The scale indicates the level of prioritization for follow-up actions. For example, an ER rating of 4 (ER 4) would indicate a significant structural defect with the potential for release to soil and groundwater, whereas an ER 1 would be a small structural defect (i.e. hairline crack or minor corrosion). The definition of each ER value can be found in Table B-1. The definition of each NASSCO code can be found in Table B-2. All sewer line defects and ERs are listed in Table B-3.



The 2024 OWS ER evaluation identified the following:

- Fifty ER 1s
- Forty-eight ER 2s
- Twelve ER 3s
- Three ER 4s
- Zero ER 5s

Per the rating system, the required action for an ER 1 and ER 2 is to document the defect in the refinery record. The required action for an ER 3 is to schedule a low priority mitigation effort and to document the defect in the refinery record.

The required action for an ER 4 is to conduct an initial release investigation and to schedule a moderate priority mitigation effort. The location and a description of each ER 4 identified in the 2024 video inspections are listed below and are shown on Figure A-3:

- Manhole G-1A: Medium offset joint; Broken joint with soil visible beyond defect
- 78.6 feet north of G-2: Broken joint
- 63.5 feet north of G-3: Circumferential fracture

Each section of pipe listed above is scheduled for repair in 2025. A camera inspection of each section will be conducted following the completion of repairs to confirm the repair was successful.

The initial investigation at each ER 4 is currently under review and will be scheduled in accordance with the facility planning and scheduling policy. In addition, a selection of cracks observed along the top of the OWS in 2023/2024 video inspections, and assigned an ER 3, will be investigated through the collection of soil samples. The investigation of these ER 3s will be carried out in an effort to evaluate the fate of benzene vapors or other volatile organic compounds through the cracks on the top of the sewer, per the concerns outlined in Ecology's Corrective Action Compliance Evaluation Final Report dated January 28, 2025 (Penfield, 2025).



4. RELEASES

In accordance with VII.C.3 of Agreed Order No. DE 16299 Marathon Anacortes Refinery is required to report information on the nature and extent of releases identified including the characteristics of the release, sampling results, how soil and groundwater quality was evaluated, and information on the extent of soil and groundwater impacts.

Two releases from the Marathon Anacortes Refinery OWS were confirmed in 2023: Area of Concern-1 (AOC-1) and Area of Concern-2 (AOC-2). The 2024 repair and investigation activities carried out in response to these releases are described below.

4.1 AREA OF CONCERN-1 RELEASE

Following the identification of AOC-1, an initial soil investigation was completed in September 2023 to investigate the subsurface conditions at the site. A release was confirmed following the review of laboratory analytical results for eight soil samples and one groundwater sample collected from AOC-1. A 90-day release report was submitted to Ecology on January 19, 2024. The findings from this initial investigation were discussed in the 2023 OWS Annual Progress Report that was submitted to Ecology on March 28, 2024 (ALL4, 2024).

AOC-1 site characterization field activities were continued from October 3, 2024 to October 8, 2024, per the IRP. A sampling and analysis plan (SAP) was prepared for the 2024 field activities and is included in Appendix E. Three soil borings were drilled by Cascade Environmental using a hollow stem auger near the confirmed release identified from the initial 2023 investigation. The boring locations are shown on Figure A-4. Soil borelogs are included in Appendix F. Monitoring wells were installed in each soil boring. The monitoring wells (24-1S, 24-2S, and 24-3S) were installed to a depth of 15 feet. The wells were installed with a ten-foot well screen from 4.5 to 14.5 feet, constructed of machine-slotted, 2-inch diameter PVC pipe. Well-construction diagrams are provided in Appendix G.



4.1.1 SOIL SAMPLE COLLECTION

Four soil samples were collected from AOC-1 on October 8, 2024, and sent to ALS Laboratory Group in Everett, WA. ALS Laboratory Group is an Ecology accredited laboratory. Soil samples were collected in accordance with the SAP. The soil sample locations are shown on Figures A-4, A-5, A-6, and A-7. The soil sample descriptions, depths of collection, and field screening results are included in Table B-4.

The following laboratory methods were used to analyze the soil samples:

- NWTPH-Gx: Gasoline range total petroleum hydrocarbons (TPH)
- NWTPH-Dx: Diesel and oil range TPH
- EPA Method 8260: Benzene, toluene, ethylbenzene, total xylenes (BTEX)
- EPA Method 8270: Polycyclic aromatic hydrocarbons (PAHs)
- EPA Method 7471: Mercury
- EPA Method 6020: Arsenic, barium, cadmium, lead, selenium, and silver

No additional contaminants of concern were identified at the location of AOC-1. The contaminants of concern listed in the IRP were approved based on site history, previous sampling, and the contaminants associated with material conveyed in the OWS. The Marathon Anacortes Refinery operates three additional sewer systems throughout the refinery. These include the refinery chemical sewer, storm sewer, and sanitary sewer. There were no known discharges to the OWS in 2024 that justified the addition of contaminants of concern.

4.1.2 SOIL SAMPLE RESULTS

The AOC-1 laboratory analytical results are summarized in Tables B-5 through B-8. The original laboratory analytical data reports are provided in Appendix H.

All soil samples collected from AOC-1 in 2024 were below the MTCA Method A cleanup levels for industrial soil.



All soil analytical data were submitted to the Ecology Environmental Information Management (EIM) database within 60 days of receipt. A table summarizing the EIM Study ID, dates of data validation, and dates of data submitted is provided in Appendix I.

4.1.3 GROUNDWATER SAMPLE COLLECTION

One groundwater sample was collected from each monitoring well installed in AOC-1 and sent to ALS Laboratory Group in Everett, WA in October 2024. Wells 24-2S and 24-3S were sampled on October 14, 2024, and well 24-1S was sampled on October 17, 2024. Groundwater samples were collected in accordance with the SAP. Groundwater elevation contours and the approximate hydraulic gradient within AOC-1 are shown on Figure A-8.

The following laboratory methods were used to analyze the groundwater samples:

- NWTPH-Gx: Gasoline range TPH
- NWTPH-Dx: Diesel and oil range TPH
- EPA Method 8260: BTEX
- EPA Method 8270: PAHs
- EPA Method 245.1: Mercury
- EPA Method 200.8: Arsenic, barium, cadmium, lead, selenium, and silver

No additional contaminants of concern were identified at the location of AOC-1. The contaminants of concern listed in the IRP were approved based on site history, previous sampling, and the contaminants associated with material conveyed in the OWS. The Marathon Anacortes Refinery operates three additional sewer systems throughout the refinery. These include the refinery chemical sewer, storm sewer, and sanitary sewer. There were no known discharges to the OWS in 2024 that justified the addition of contaminants of concern.



4.1.4 GROUNDWATER SAMPLE RESULTS

The AOC-1 groundwater laboratory analytical results are summarized in Table B-9. The original laboratory analytical data reports are provided in Appendix H.

Sample 24-1S exceeded the following target cleanup levels (Table B-9):

- Arsenic concentration was 8.0 µg/L, exceeding the MTCA Method C cleanup level for human health protection (noncarcinogens: 2.1 µg/L; carcinogens: 0.027 µg/L) and the MTCA Method C cleanup level for surface water (carcinogens: 0.12 µg/L). The natural background arsenic concentration for groundwater in the Puget Sound Basin is 8.0 µg/L (San Juan, 2022). Per WAC 173-340-720(7)(c), the target cleanup level should not be set at levels below the natural background concentration and therefore sample 24-1S should not be considered to exceed the target cleanup level.

Sample 24-2S exceeded the following cleanup levels (Table B-9):

- Arsenic concentration was 1.9 µg/L, exceeding the MTCA Method C cleanup level for human health protection (carcinogens: 0.027 µg/L) and the MTCA Method C cleanup level for surface water (carcinogens: 0.12 µg/L). The natural background arsenic concentration for groundwater in the Puget Sound Basin is 8.0 µg/L (San Juan, 2022). Per WAC 173-340-720(7)(c), the target cleanup level should not be set at levels below the natural background concentration and therefore sample 24-2S should not be considered to exceed the target cleanup level.

Sample 24-3S exceeded the following cleanup levels (Table B-9):

- Arsenic concentration was 5.9 µg/L, exceeding the MTCA Method C cleanup level for human health protection (noncarcinogens: 2.1 µg/L; carcinogens: 0.027 µg/L) and the MTCA Method C cleanup level for surface water (carcinogens: 0.12 µg/L). The natural background arsenic concentration for groundwater in the Puget Sound Basin is 8.0 µg/L (San Juan, 2022). Per WAC 173-340-720(7)(c), the target cleanup level should not be set at levels below the natural background concentration and therefore sample 24-3S should not be considered to exceed the target cleanup level.



All groundwater analytical data were submitted to the Ecology EIM database within 60 days of receipt. A table summarizing the EIM Study ID, dates of data validation, and dates of data submitted is provided in Appendix I.

4.1.5 REPAIRS

Repairs at AOC-1 were completed by Motivo Group in 2023 prior to the collection of soil and groundwater samples in September 2023. The section of pipe located where the ER 4 was identified (277 to 321 feet between manholes F-3 and F-4) was repaired using the CIPP method. A camera inspection of the pipe was conducted following repair completion to confirm the repair was successful.

4.2 AREA OF CONCERN-2 RELEASE

The confirmation of a release and the designation of an ER 5 at AOC-2 was discussed in the 2023 Annual Progress Report submitted to Ecology on March 28, 2024 (ALL4, 2024). Following the identification of AOC-2, a 90-day release report was submitted to Ecology on January 29, 2024, and an initial soil and groundwater investigation was conducted.

The site characterization of AOC-2 was initiated from October 3 to October 10, 2024. An SAP was prepared for the 2024 field activities and is included in Appendix E. Six soil borings were drilled by Cascade Environmental using a hollow stem auger near the confirmed release. The boring locations are shown on Figure A-9. The soil borelogs are included in Appendix F. Monitoring wells were installed in the northern most and southern most soil borings. The monitoring wells (24-4 and 24-5) were installed to a depth of 20 feet. The wells were installed with a fifteen-foot screened interval from 4.5 to 19.5 feet, constructed of machine-slotted, 2-inch diameter PVC pipe. Well-construction diagrams are provided in Appendix G.

A detailed site map of AOC-2 is provided as Figure A-9.



4.2.1 SOIL SAMPLE COLLECTION

Sixteen soil samples were collected from AOC-2 on October 3, 7, 9, and 10, 2024 and sent to ALS Laboratory Group in Everett, WA. Soil samples were collected in accordance with the SAP. Soil sample locations are shown on Figures A-9 and A-10. The soil sample descriptions, depths of collection and field screening results are included in Table B-10.

The following laboratory methods were used to analyze the soil samples:

- NWEPH: Extractable petroleum hydrocarbons (EPH)
- NWVPH: Volatile petroleum hydrocarbons (VPH)
- NWTPH-Gx: Gasoline range TPH
- NWTPH-Dx: Diesel and oil range TPH
- EPA Method 8260: BTEX
- EPA Method 8270: PAHs
- EPA Method 7471: Mercury
- EPA Method 6020: Arsenic, barium, cadmium, lead, selenium, and silver

No additional contaminants of concern were identified at the location of AOC-2. The contaminants of concern listed in the IRP were approved based on site history, previous sampling, and the contaminants associated with material conveyed in the OWS. The Marathon Anacortes Refinery operates three additional sewer systems throughout the refinery. These include the refinery chemical sewer, storm sewer, and sanitary sewer. There were no known discharges to the OWS in 2024 that justified the addition of contaminants of concern.

4.2.2 SOIL SAMPLE RESULTS

The AOC-2 laboratory analytical results are summarized in Tables B-11 through B-15. The original laboratory analytical data reports are provided in Appendix H. MTCA Method C petroleum constituent cleanup levels were calculated using the Model Toxics Control Act Total Petroleum Hydrocarbon



(MTCATPH) excel workbook tools for calculating soil and groundwater cleanup levels. The MTCATPH excel workbooks are provided in Appendix J.

Sample AOC2-24-4-4ft exceeded the following target cleanup levels (Table B-12):

- Benzene concentration was 0.12 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (0.03 mg/kg).

Sample AOC2-24-4-6.5-7ft exceeded the following target cleanup levels (Table B-12):

- Benzene concentration was 0.031 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (0.03 mg/kg).

Sample AOC2-SB4-5ft exceeded the following target cleanup levels (Table B-12):

- Gasoline range TPH concentration was 510 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (30 mg/kg).
- Benzene concentration was 0.34 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (0.03 mg/kg).
- Toluene concentration was 13 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (7.0 mg/kg).
- Total xylene concentration was 31.2 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (9.0 mg/kg).

Sample AOC2-SB4-10-10.5ft exceeded the following target cleanup levels (Tables B-11 and B-12):

- Gasoline range TPH concentration was 160 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (30 mg/kg).
- Benzene concentration was 0.66 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (0.03 mg/kg).
- Toluene concentration was 9.8 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (7.0 mg/kg).
- Total xylene concentration was 11.3 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (9.0 mg/kg).



- Protection of groundwater quality through soil leaching calculated through the MTCATPH excel workbook tools for calculating soil and groundwater cleanup levels failed. The measured TPH sample concentration was 189.06 mg/kg, which exceeded the calculated protective TPH concentration (22 mg/kg).

Sample AOC2-SB1-8.5-9ft exceeded the following target cleanup levels (Tables B-11 and B-12):

- Gasoline range TPH concentration was 62 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (30 mg/kg).
- Benzene concentration was 0.35 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (0.03 mg/kg).
- Protection of groundwater quality through soil. The measured TPH sample concentration was 51.64 mg/kg, which exceeded the calculated protective TPH concentration (21 mg/kg).

Sample AOC2-SB2-5ft exceeded the following target cleanup levels (Table B-12):

- Gasoline range TPH concentration was 540 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (30 mg/kg).
- Benzene concentration was 0.63 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (0.03 mg/kg).
- Toluene concentration was 17 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (7.0 mg/kg).
- Ethylbenzene concentration was 6.6 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (6.0 mg/kg).

Sample AOC2-SB2-6.5-7ft exceeded the following target cleanup levels (Tables B-11 and B-12):

- Gasoline range TPH concentration was 470 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (30 mg/kg).
- Benzene concentration was 0.73 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (0.03 mg/kg).
- Toluene concentration was 14 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (7.0 mg/kg).



- Total xylene concentration was 22.4 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (9.0 mg/kg).
- Protection of groundwater quality through soil leaching. The measured TPH sample concentration was 524.83 mg/kg, which exceeded the calculated protective TPH concentration (28 mg/kg).

Sample AOC2-SB3-3ft exceeded the following target cleanup levels (Tables B-12 and B-15):

- Gasoline range TPH concentration was 1300 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (30 mg/kg).
- Benzene concentration was 1.1 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (0.03 mg/kg).
- Toluene concentration was 31 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (7.0 mg/kg).
- Ethylbenzene concentration was 15 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (6.0 mg/kg).
- Total naphthalene concentration was 9.0 mg/kg, exceeding the MTCA Method A cleanup value for industrial soil (5.0 mg/kg).

All soil analytical data were submitted to the Ecology EIM database within 60 days of receipt. A table summarizing the EIM Study ID, dates of data validation, and dates of data submitted is provided in Appendix I.

4.2.3 GROUNDWATER SAMPLE COLLECTION

One groundwater sample was collected from each monitoring well installed in AOC-2 and from the pre-existing monitoring wells 14-3 and 92-P6 located to the east and west of AOC-2, respectively. Wells 92-P6 and 14-3 were sampled on October 14, 2024. Well 24-4 was sampled on October 17, 2024. Well 24-5 was sampled on November 11, 2024. The groundwater samples were sent to ALS Laboratory Group in Everett, WA. Groundwater samples were collected in accordance with the SAP. Groundwater elevation contours and the approximate hydraulic gradient within AOC-2 are shown on Figure A-11.



Groundwater samples collected from 24-4, 24-5, and 92-P6 were collected using a low-flow sampling technique, per the SAP. The depth-to-water in well 14-3 was 37.25 feet below the top of the well casing. The maximum depth that allows for suction via a peristaltic pump is approximately 30 feet below ground surface, thus the groundwater sample from 14-3 was collected using a disposable bailer. Prior to collecting the sample, three well volumes were purged from the well.

The following laboratory methods were used to analyze the groundwater samples:

- NWTPH-Gx: Gasoline range TPH
- NWTPH-Dx: Diesel and oil range TPH
- EPA Method 8260: BTEX
- EPA Method 8270: PAHs
- EPA Method 245.1: Mercury
- EPA Method 200.8: Arsenic, barium, cadmium, lead, selenium, and silver

No additional contaminants of concern were identified at the location of AOC-2. The contaminants of concern listed in the IRP were approved based on site history, previous sampling, and the contaminants associated with material conveyed in the OWS. The Marathon Anacortes Refinery operates three additional sewer systems throughout the refinery. These include the refinery chemical sewer, storm sewer, and sanitary sewer. There were no known discharges to the OWS in 2024 that justified the addition of contaminants of concern.

4.2.4 GROUNDWATER SAMPLE RESULTS

The AOC-2 groundwater laboratory analytical results are summarized in Table B-16. The original laboratory analytical data reports are provided in Appendix H.

Sample 24-4 exceeded the following cleanup levels (Table B-16):



- Arsenic concentration was 3.4 µg/L, exceeding the MTCA Method C cleanup level for human health protection (noncarcinogens: 2.1 µg/L; carcinogens: 0.027 µg/L) and the MTCA Method C cleanup level for surface water (carcinogens: 0.12 µg/L). The natural background arsenic concentration for groundwater in the Puget Sound Basin is 8.0 µg/L (San Juan, 2022). Per WAC 173-340-720(7)(c), the target cleanup level should not be set at levels below the natural background concentration and therefore sample 24-4 should not be considered to exceed the target cleanup level.

Sample 24-5 exceeded the following cleanup levels (Table B-16):

- Arsenic concentration was 3.0 µg/L, exceeding the MTCA Method C cleanup level for human health protection (noncarcinogens: 2.1 µg/L; carcinogens: 0.027 µg/L) and the MTCA Method C cleanup level for surface water (carcinogens: 0.12 µg/L). The natural background arsenic concentration for groundwater in the Puget Sound Basin is 8.0 µg/L (San Juan, 2022). Per WAC 173-340-720(7)(c), the target cleanup level should not be set at levels below the natural background concentration and therefore sample 24-5 should not be considered to exceed the target cleanup level.

Sample 92-P6 exceeded the following cleanup levels (Table B-16):

- Arsenic concentration was 1.7 µg/L, exceeding the MTCA Method C cleanup level for human health protection (carcinogens: 0.027 µg/L) and the MTCA Method C cleanup level for surface water (carcinogens: 0.12 µg/L). The natural background arsenic concentration for groundwater in the Puget Sound Basin is 8.0 µg/L (San Juan, 2022). Per WAC 173-340-720(7)(c), the target cleanup level should not be set at levels below the natural background concentration and therefore sample 92-P6 should not be considered to exceed the target cleanup level.

All groundwater analytical data were submitted to the Ecology EIM database within 60 days of receipt. A table summarizing the EIM Study ID, dates of data validation, and dates of data submitted is provided in Appendix I.



4.2.5 REPAIRS

Repairs to the OWS at AOC-2 were completed by Motivo Group in 2024 prior to the collection of soil and groundwater samples in October 2024. The section of pipe located where the ER 5 was identified (237.7 feet between manholes F-11 and F-12) was repaired using the CIPP method. A camera inspection of the pipe was conducted following repair completion to confirm the repair was successful.



5. CORRECTIVE ACTIONS AND INTERIM MEASURES

In accordance with VII.C.4 of Agreed Order No. DE 16299 Marathon Anacortes Refinery is required to report a description of the corrective actions or interim measures taken or planned to remediate soil or groundwater, including the volume and disposition of contaminated soil removed, and measures taken to monitor or remediate groundwater.

Further corrective actions and interim measures for AOC-1 and AOC-2 are currently under evaluation and will be finalized following the completion of site characterization. Site characterization is expected to be completed in 2025. Upon the determination of an interim action, a workplan will be submitted to Ecology within 60 days of completing the site characterization and before initiating the interim action.



6. RISK OF CONTAMINATION MIGRATION

In accordance with VII.C.7 of Agreed Order No. DE 16299 Marathon Anacortes Refinery is required to report measures to assess and prevent the risk of migration of contamination until a final remedy is implemented, including the elements of a groundwater monitoring program (number and location of wells, parameters monitored, frequency of monitoring).

The risk of contamination migration is being assessed at AOC-1 and AOC-2 through the implementation of a groundwater monitoring program. The groundwater monitoring network installed in each area of concern is discussed below.

6.1 AREA OF CONCERN-1

A network of three groundwater monitoring wells was installed at AOC-1 in 2024 (Figure A-4). Monitoring well 24-1S was installed approximately 60 feet north and ten feet west of the AOC-1 confirmed release location (soil sample 2023-13-09-B8-8ft). Monitoring well 24-2S was installed approximately 50 feet west and 25 feet north of the confirmed release. Monitoring well 24-3S was installed approximately 45 feet south and ten feet west of the confirmed release. All monitoring wells were installed to a depth of 15 feet and screened in the uppermost sand aquifer underlying the site (Unit S1).

Depth-to-water measurements and groundwater surface elevations are provided in Table B-8. Depth-to-water measurements collected prior to groundwater sample collection indicate that the groundwater flow direction is to the north (Figure A-8). Monitoring wells 24-1S and 24-2S are located downgradient of the confirmed release and will allow for the assessment of any potential contamination migration.

One groundwater sample was collected from each well as part of the continued site characterization of AOC-1. All groundwater samples collected from AOC-1 meet the target cleanup levels except for arsenic. The arsenic concentration measured in samples 24-1S, 24-2S, and 24-3S was 8.0 µg/L, 1.9 µg/L, and 5.9 µg/L, respectively. The natural background arsenic concentration for groundwater in the Puget Sound Basin is 8.0 µg/L, compared to the MTCA Method A cleanup level of 5.0 µg/L (based on state-wide



background levels), which suggests the detected arsenic concentrations are unrelated to a release from the OWS (San Juan, 2022).

6.1.1 GEOLOGY AND HYDROGEOLOGY

The major geologic units that underlie AOC-1 are described below in stratigraphically descending order (PGG, 1995).

Unit S1 – Fine to coarse sand with minor gravel and cobbles. This unit is only present in the southern portion of AOC-1 and is generally less than 10 feet in thickness.

Unit T1 – Densely compacted glacial drift consisting of clayey silt and silty clay with occasional gravelly zones and lenses of silty fine sand. This unit is generally less than 10 feet in thickness below AOC-1. Unit T1 is present at the surface for most of AOC-1. The hydraulic conductivity is estimated to be 4×10^{-7} centimeters per second (cm/sec).

Unit S2 – Interbedded fine- to medium-grained sand and silt, and/or silty sand. This unit ranges from 12 to 26 feet in thickness below AOC-1. The hydraulic conductivity is estimated to be 1×10^{-4} cm/sec.

Unit T1 acts as an aquitard and impedes the migration of residual hydrocarbons.

Unit S2 is the principal aquifer beneath AOC-1. Historic groundwater depth measurements suggest that saturation does not commonly occur above Unit S2 and that the general groundwater flow direction is to the north and east (PGG, 1995).

The geology underlying AOC-1 observed during the 2024 site characterization consisted of silty sand to approximately 13 feet below ground surface which then began to increase in clay content from 13 to 14 feet below ground surface.



The soil sample exceeding target cleanup levels (2023-13-09-B8-8ft) was collected at eight feet below the surface, suggesting the release documented at AOC-1 occurred in Unit S1. The vertical movement of hydrocarbons would be impeded by Unit T1 due to its dense and compact nature.

In addition to the native soils underlying AOC-1, the OWS is surrounded by an unconsolidated backfill material that may serve as a semi-contained conduit of releases depending on the adsorption capacity of native soil, volatilization, and degradation (PGG, 2016).

6.2 AREA OF CONCERN-2

A network of four groundwater monitoring wells is installed in AOC-2 (Figure A-9). Monitoring wells 24-4 and 24-5 were installed in 2024 as part of AOC-2 site characterization. Monitoring wells 92-P6 and 14-3 were installed in 1992 and 2014, respectively. Monitoring well 24-4 was installed approximately 325 feet north and ten feet west of the confirmed release within AOC-2 (manhole F-11; see 2023 OWS Annual Progress Report). Monitoring well 24-5 was installed approximately 65 feet south and ten feet west of the confirmed release. Monitoring well 92-P6 is located approximately ten feet south and 45 feet west of the confirmed release. Monitoring well 14-3 is located approximately 130 feet north and 125 feet east of the confirmed release. Monitoring wells 24-4, 24-5, and 92-P6 were installed to depths of 20 feet, 20 feet, and 25 feet, respectively and screened in silty clay (Unit T2). Monitoring well 14-3 was installed to a depth of 45 feet and screened in the uppermost sand aquifer underlying the site (Unit S3).

Depth-to-water measurements and groundwater surface elevations are provided in Table B-16. Depth-to-water measurements collected prior to groundwater sample collection indicate that the groundwater flow direction is to the north and east (Figure A-11). Monitoring wells 24-4 and 14-3 are located downgradient of the confirmed release and will allow for the assessment of any potential contamination migration from the release.

One groundwater sample was collected from each well as part of the AOC-2 site characterization. All groundwater samples collected from AOC-2 meet the target cleanup levels except for arsenic concentrations detected in 24-4, 24-5, and 92-P6. The arsenic concentration measured in samples 24-4, 24-5, and 92-P6 was 3.4 µg/L, 3.0 µg/L, and 1.7 µg/L, respectively. The natural background arsenic



concentration for groundwater in the Puget Sound Basin is 8.0 µg/L, compared to the MTCA Method A cleanup level of 5.0 µg/L (based on state-wide background levels), which suggests the detected arsenic concentrations are unrelated to a release from the OWS (San Juan, 2022).

6.2.1 Geology and Hydrogeology

The major geologic units that underlie AOC-2 are described below in stratigraphically descending order (PGG, 2016).

Unit T2 – Glacio-marine sediments consisting of finely laminated clay with occasional gravel and cobbles, sand lenses, and shell fragments and organic matter. This unit ranges from 11 to 63 feet in thickness below AOC-2. The hydraulic conductivity is estimated to be 4×10^{-7} cm/sec.

Unit S3 – Fine to medium-grained sand with minor lenses of coarse-grained sand, slightly silty sand, and silt interbeds. This unit has an approximate thickness of 29 feet below AOC-2. The hydraulic conductivity is estimated to be 5×10^{-3} cm/sec (Hart-Crowser & Associates, 1986).

Unit T2 acts as an aquitard and impedes the migration of residual hydrocarbons.

Migration of the release at AOC-2 would be downward and slow due to the dense and compact nature of Unit T2. Horizontal movement is unlikely but may occur in lenses of sand or gravel.

In addition to the native soils underlying AOC-2, the OWS is surrounded by unconsolidated backfill material that may serve as a semi-contained conduit of releases depending on the adsorption capacity of native soil, volatilization, and degradation (PGG, 2016).



7. INACCESSIBLE AREAS

In accordance with VII.C.5 of Agreed Order No. DE 16299 Marathon Anacortes Refinery is required to report areas that were determined to be inaccessible and where contaminated soil or groundwater was left in place.

The accessibility of further investigation and remediation at AOC-1 and AOC-2 will be evaluated in 2025.



8. CONCLUSIONS

The 2024 OWS inspections identified three sewer pipe locations that have defects of ER 4. An initial investigation of each ER 4 location will be scheduled to determine if a release from the OWS has occurred.

The initial site characterization of AOC-1 was initiated in 2023 and continued in 2024. Four soil samples and three groundwater samples were collected. All soil samples meet the target cleanup levels. All groundwater samples exceeded the arsenic MTCA target cleanup levels but meet MTCA cleanup levels for all other contaminants of concern. The Puget Sound natural arsenic background in groundwater may indicate that the groundwater within AOC-1 has not been impacted by the confirmed release. Further site characterization at AOC-1 is under evaluation.

An initial investigation of AOC-2 was conducted in 2024. Sixteen soil samples and four groundwater samples were collected. Soil samples *AOC2-24-4-4ft*, *AOC2-24-4-6.5-7ft*, *AOC2-SB4-5ft*, *AOC2-SB4-10-10.5ft*, *AOC2-SB1-8.5-9ft*, *AOC2-SB2-5ft*, *AOC2-SB2-6.5-7ft*, *AOC2-SB3-3ft* had petroleum constituents detected at concentrations above the MTCA target cleanup levels. Groundwater samples *24-4*, *24-5*, and *92-P6* exceeded the arsenic MTCA target cleanup levels but meet MTCA cleanup levels for all other contaminants of concern. The natural arsenic background in groundwater at AOC-2 may indicate that the groundwater within AOC-2 has not been impacted by the confirmed release. Further site characterization is under evaluation.



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APPENDIX A

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Figure A-9 Area of Concern-2 Site Detail Map

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Figure A-11 Area of Concern-2 Groundwater Contour Map



Prepared for:



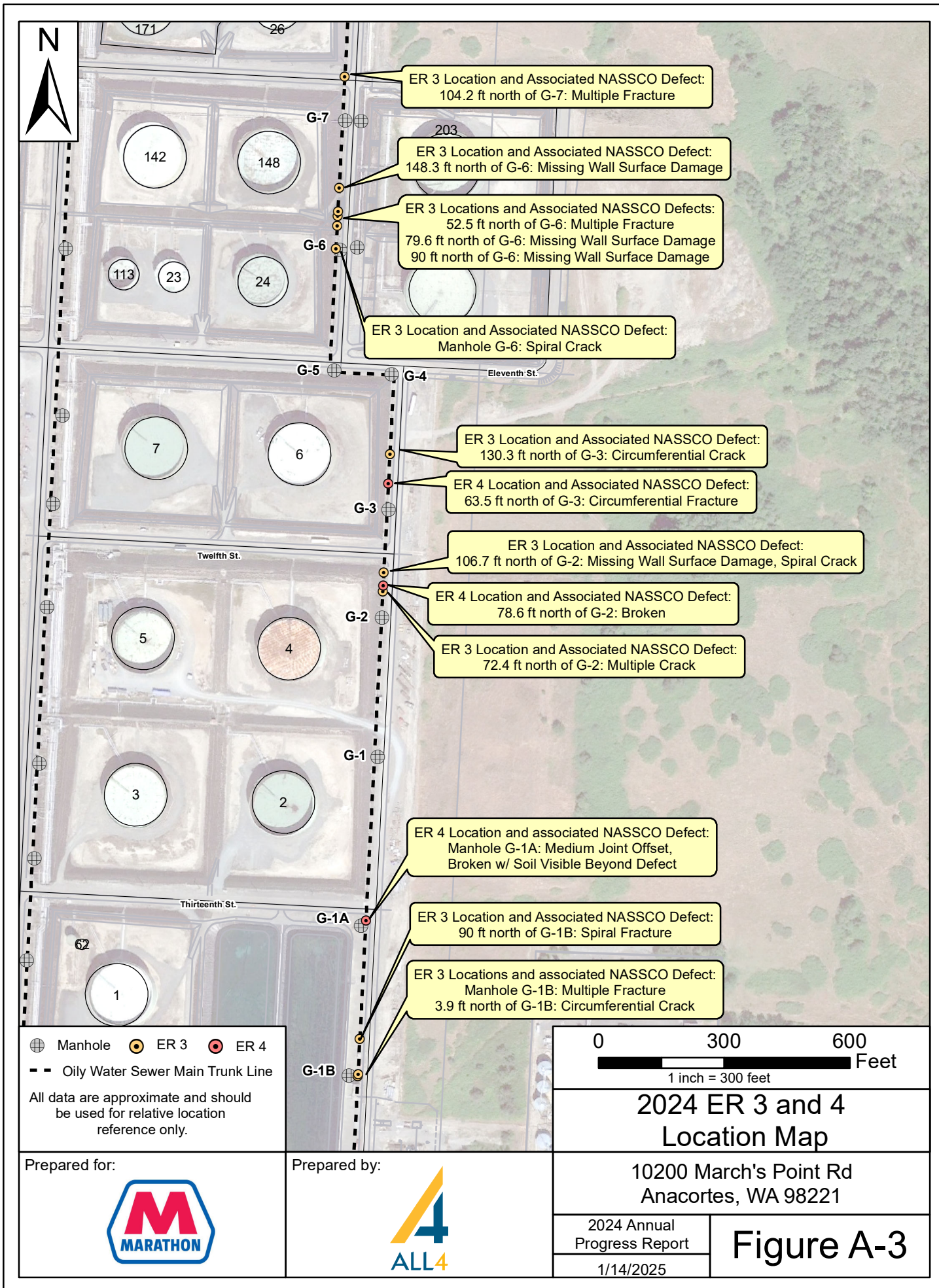
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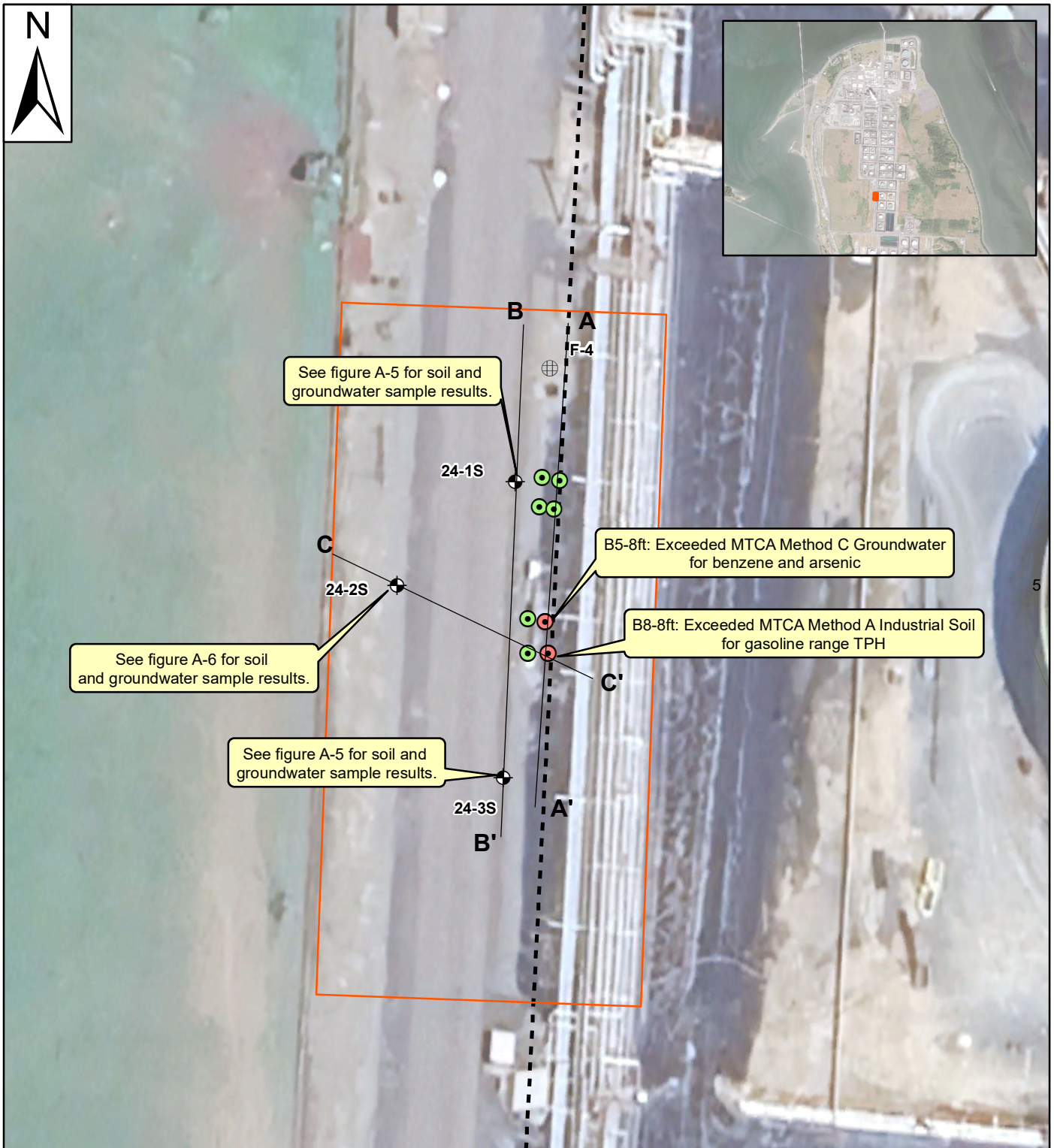


Site Location Map

2024 Annual
Progress Report
1/14/2025

Figure A-1





Monitoring Well



Manhole



2023 Sample Exceeding MTCA Cleanup Levels



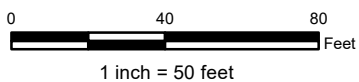
2023 Sample Meeting MTCA Cleanup Levels



Area of Concern-1



Oily Water Sewer



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

Area of Concern-1 Site Detail Map

Prepared for:



Prepared by:

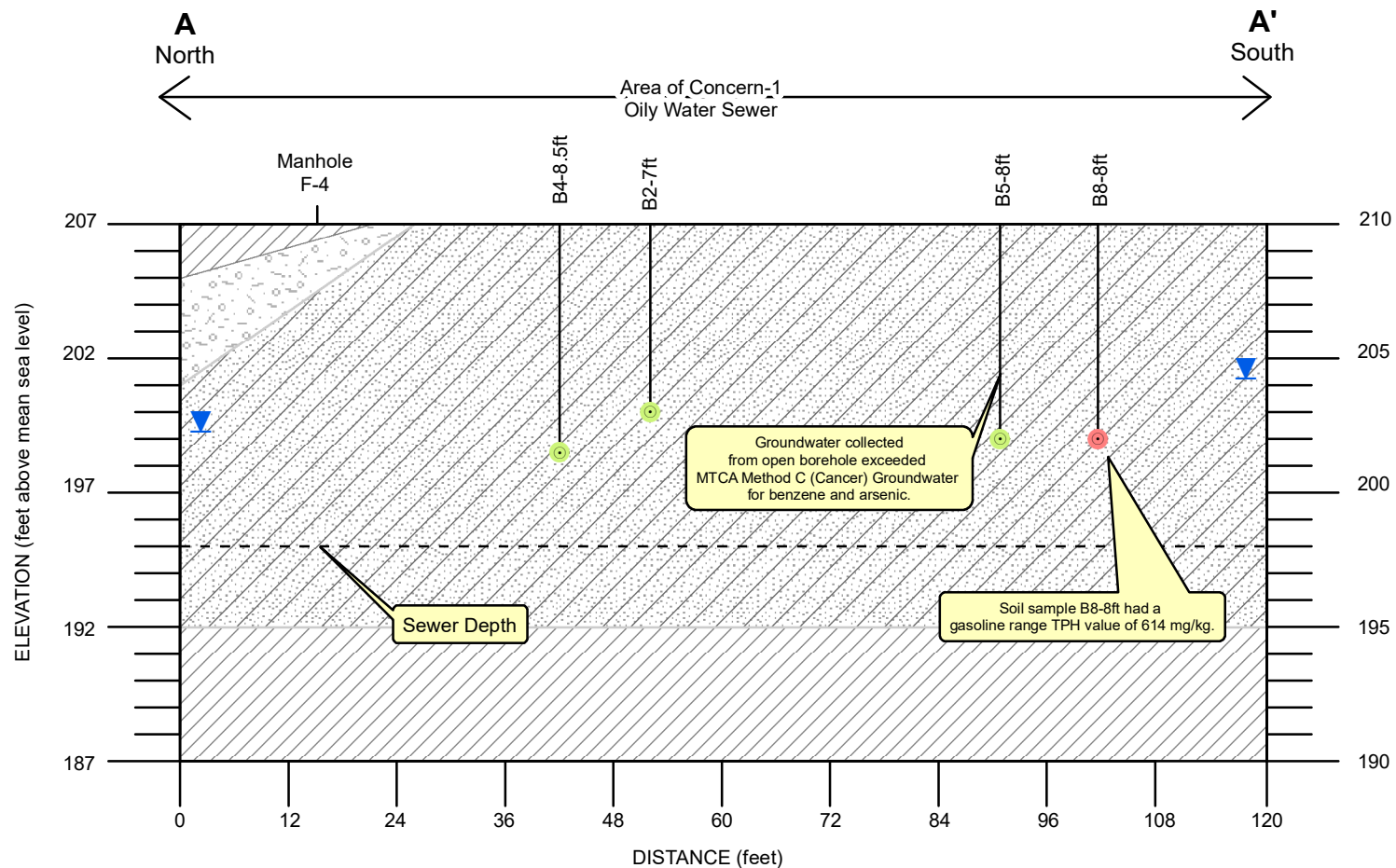


10200 March's Point Rd
Anacortes, WA 988221

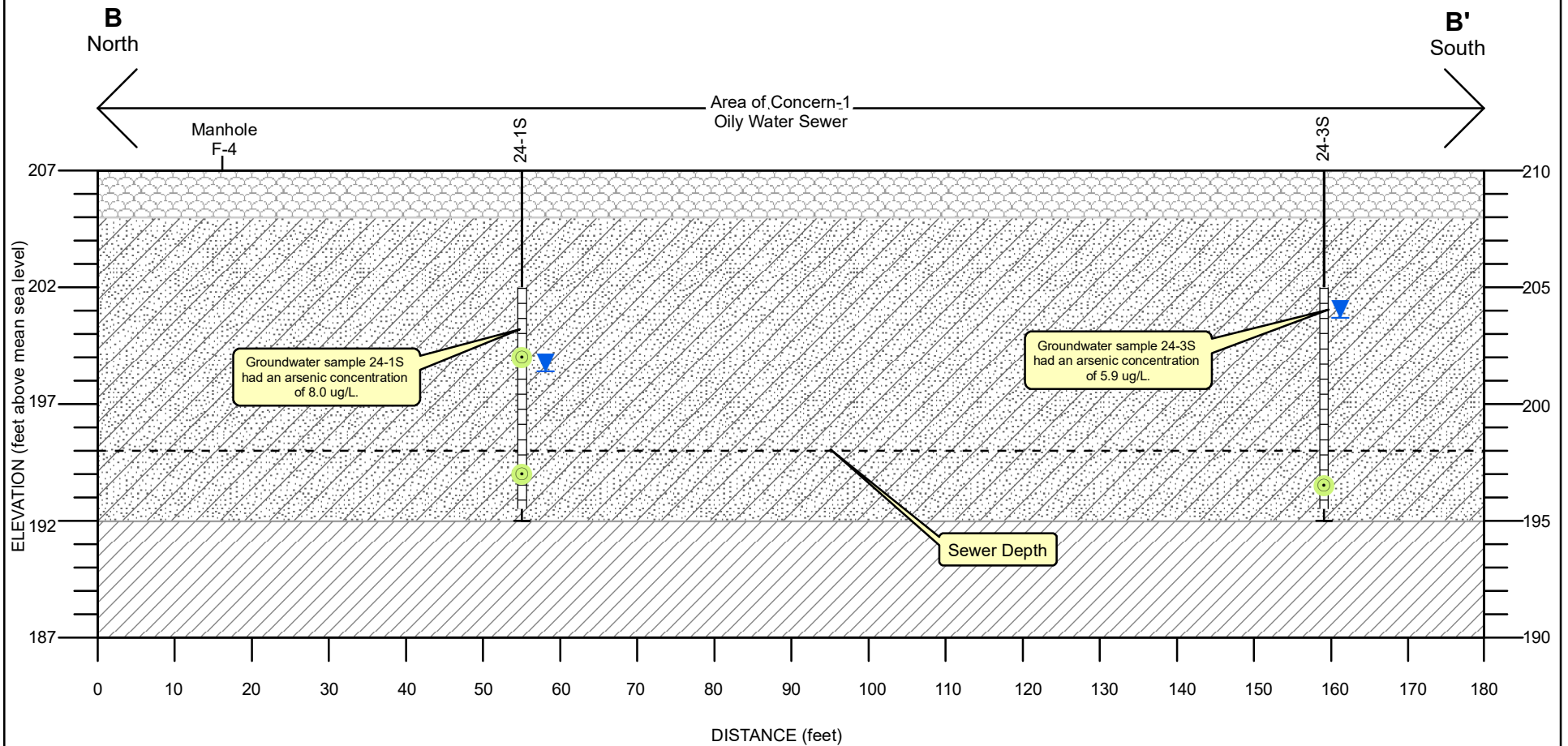
2024 Annual
Progress Report

1/23/2025

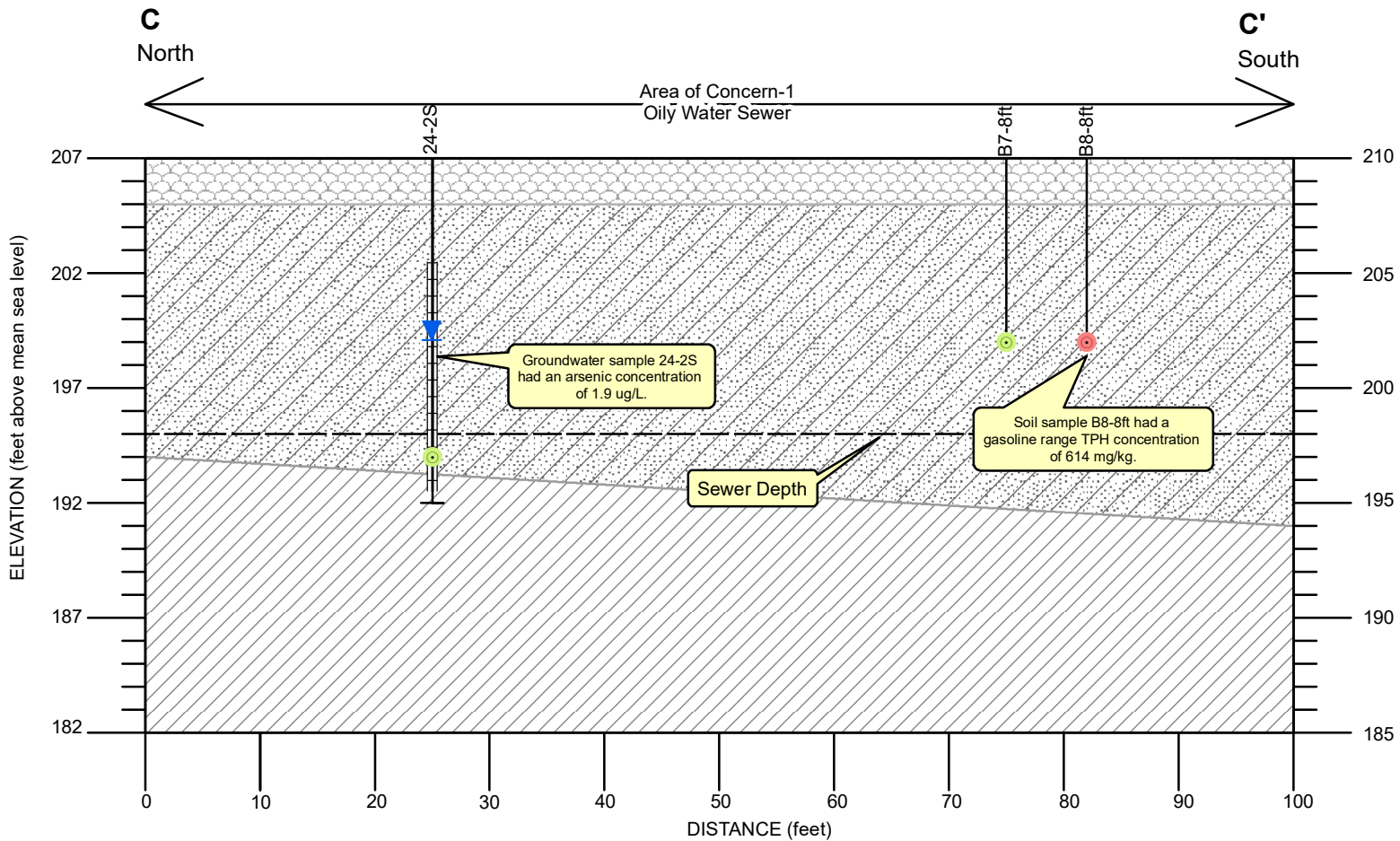
Figure A-4



B8-8ft — Boring Designation — Ground Surface — Boring — Bottom of Boring ▼ Groundwater Depth (10/14/2024) ○ Soil Sample Location ● Result Exceeded MTCA A ● Result Met MTCA A ▨ Silty Clay ▨ Till ▨ Silty Sand	All data are approximate and should be used for relative location reference only. Prepared for: 	SCALE: HORZ. 1" = 20' VERT. 1" = 6.67' (3x Vertical Exaggeration) Prepared by: 	Area of Concern-1 Geologic Cross Section A-A' 10200 March's Point Road Anacortes, WA 98225 2024 Annual Progress Report 1/23/2025 Figure A-5
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24-1S </



24-2S

- | | |
|----------------------------------|-------------------------|
| — Boring Designation | ● Soil Sample Location |
| — Ground Surface | ● Result Exceeded MTCAA |
| — Boring | ● Result Met MTCAA |
| — Screened Interval | Quarry Spalls |
| — Bottom of Boring | Silty Sand |
| ▼ Groundwater Depth (10/14/2024) | Silty Clay |

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

Prepared for:



SCALE: HORZ. 1" = 15'
VERT. 1" = 7.5'
(2x Vertical Exaggeration)

Prepared by:



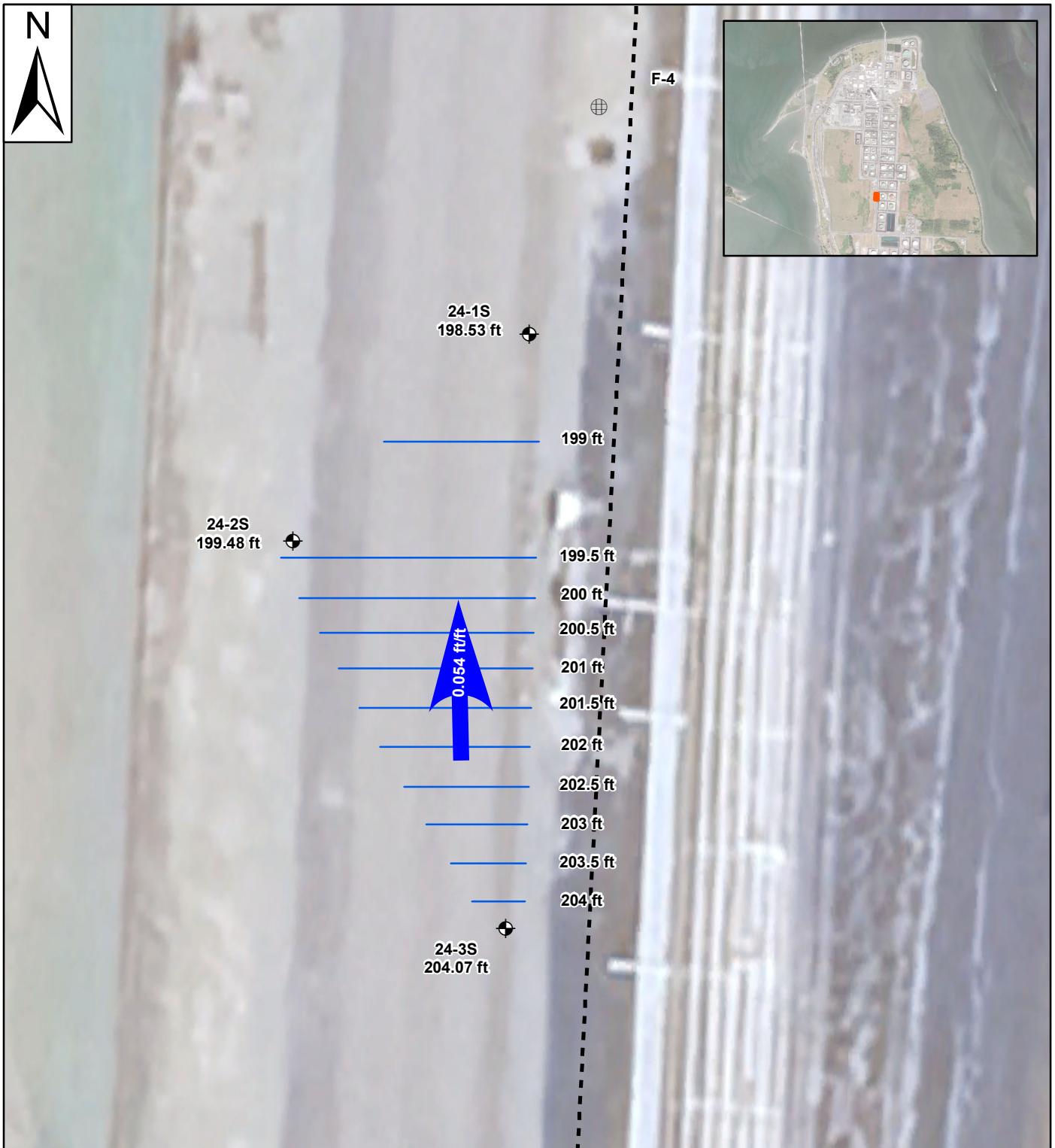
**Area of Concern-1
Geologic Cross Section C-C'**

10200 March's Point Road
Anacortes, WA 98225

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Progress Report

1/23/2025

Figure A-7



Monitoring Well



Groundwater Surface Elevation (ft msl)

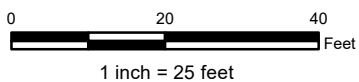
204.07 ft Groundwater Elevation at Well (ft msl)
November 11, 2024



Manhole



Oily Water Sewer



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

Area of Concern-1 Groundwater Contour Map

Prepared for:



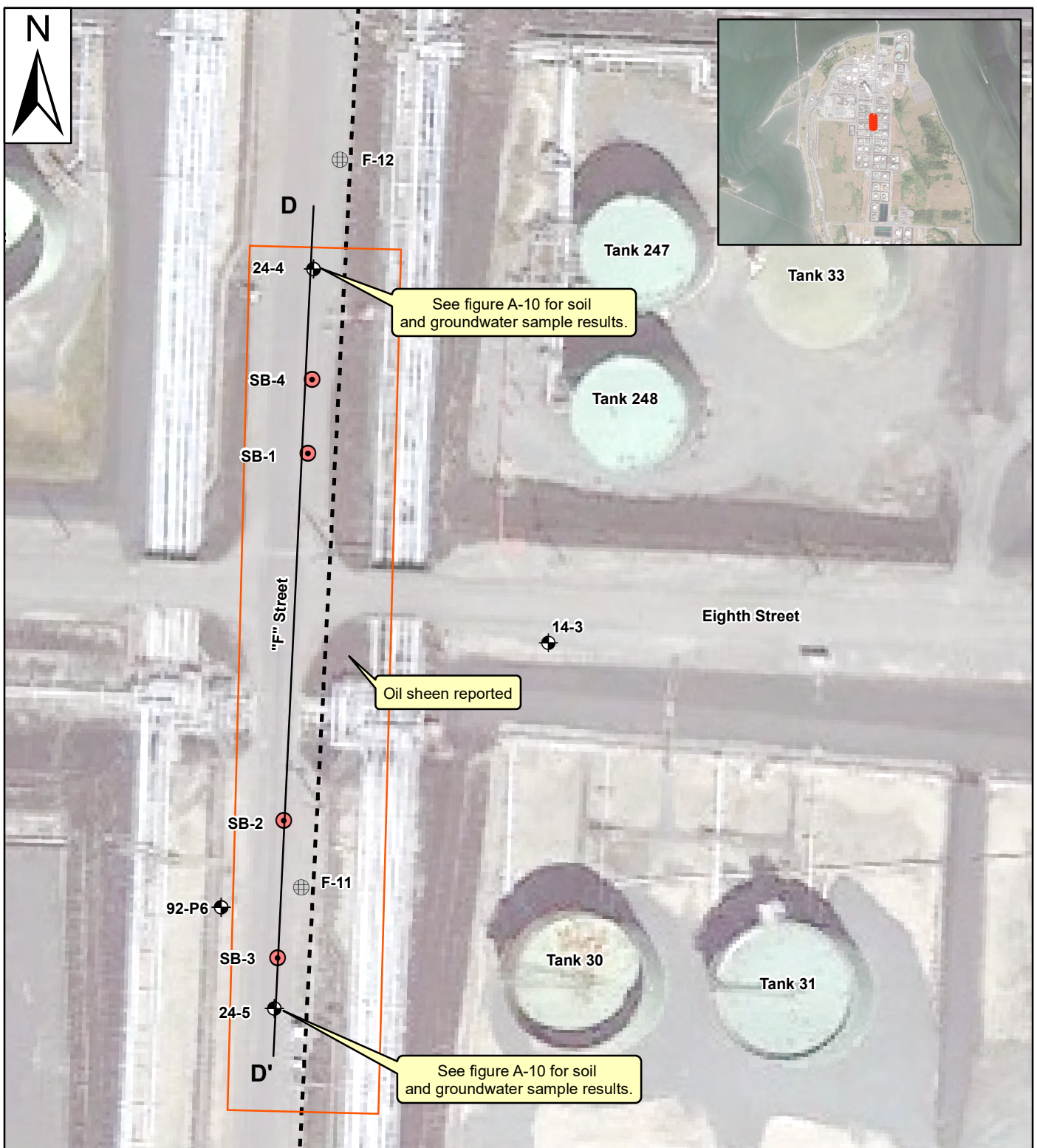
Prepared by:



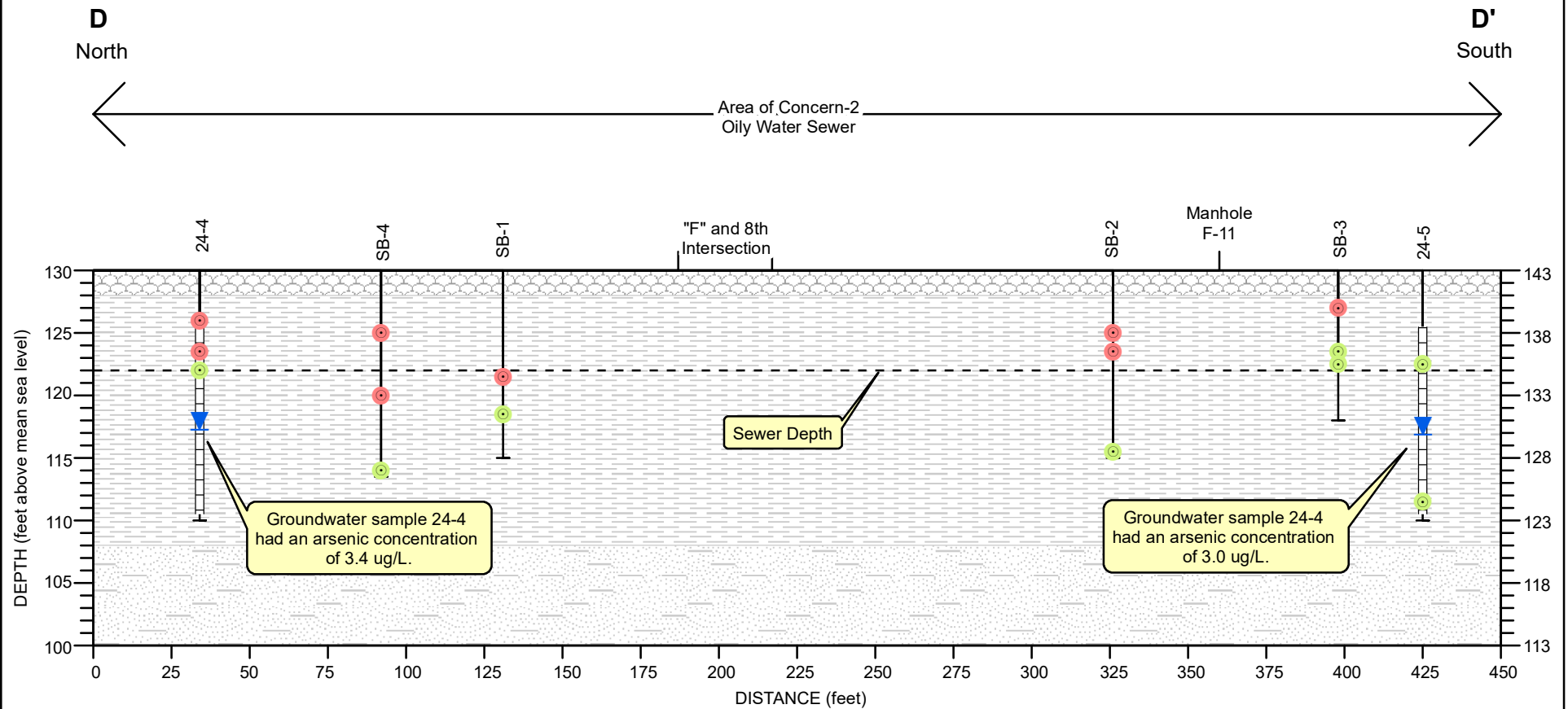
2024 Annual
Progress Report

2/18/2025

Figure A-8



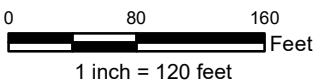
0 50 100 Feet 1 inch = 75 feet		All data are approximate and should be used for relative location reference only.		Area of Concern-2 Site Detail Map	
Prepared for: 		Prepared by: 		10200 March's Point Rd Anacortes, WA 98221	
				2024 Annual Progress Report	Figure A-9
				1/23/2025	



B-4 — Boring Designation — Ground Surface — Boring — Screened Interval — Bottom of Boring ▼ Groundwater Depth (10/14/2024 and 11/1/2024) ○ Soil Sample Location ● Result Exceeded MTCAA ● Result Met MTCAA [Pattern] Quarry Spalls [Pattern] Silty Clay [Pattern] Clayey Silt	All data are approximate and should be used for relative location reference only. Prepared for: 	SCALE: HORZ. 1" = 50' VERT. 1" = 12.5' (4x Vertical Exaggeration) Prepared by: 	Area of Concern-2 Geologic Cross Section D-D' 10200 March's Point Road Anacortes, WA 98225 2024 Annual Progress Report 1/23/2025 Figure A-10
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Monitoring Well	Groundwater Surface Elevation (ft msl)	204.07 ft Groundwater Elevation at Well (ft msl) November 11, 2024
Manhole	Oily Water Sewer	



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

Area of Concern-2 Groundwater Contour Map

Prepared for:



Prepared by:



10200 March's Point Rd
Anacortes, WA 98221

2024 Annual
Progress Report
2/18/2025

Figure A-11

APPENDIX B

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Table B-1
Oily Water Sewer Environmental Rating Scale
Marathon Anacortes Refinery

Environmental Rating (ER)	Characteristic / Example	Action 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 2.1 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 action 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 2.1 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 pose a 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 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 Refinery Record.

Table B-2
NASSCO Code Key
Marathon Anacortes Refinery

Code	Description
AMH	Access Point Manhole
B	Broken
BSV	Broken Soil Visible Beyond Defect
CC	Circumferential Crack
CH	Hinge Crack
CL	Longitudinal Crack
CM	Multiple Crack
CS	Spiral Crack
DAZ	Deposits Attached Other
DSC	Hard/Compacted Deposits
DSF	Fine Settled Deposits
DSZ	Other Settled Deposits
FC	Circumferential Fracture
FL	Longitudinal Fracture
FM	Multiple Fracture
FS	Spiral Fracture
HSV	Hole Soil Visible Beyond Defect
IDB	Infiltration Dripper Barrel
IDJ	Infiltration Dripper Joint
IGJ	Infiltration Gusher Joint
IRJ	Infiltration Runner Joint
ISJ	Infiltration Stain Joint
JOL	Large Joint Offset
JOM	Medium Joint Offset
LD	Down Line of Sewer
MCU	Miscellaneous Camera Underwater
MGO	Miscellaneous General Observation
MSA	Miscellaneous Survey Abandoned
MSC	Miscellaneous Shape/Size Change
MWL	Miscellaneous Water Level
MWLS	Miscellaneous Water Level Sag
MWM	Miscellaneous Water Mark
OBJ	Object Wedged in Joint
OBZ	Obstruction Other
RFB	Roots Fine Barrel
RFJ	Roots Fine Joint
RPL	Localized Pipeline Point Repair
RPR	Pipe Replaced Point Repair
RPZ	Point Repair Other
SMW	Missing Wall Surface Damage
SSS	Surface Damage Surface Spalling
TBI	Tap Break-In Intruding
TF	Tap Factory

Table B-3
Sewer Line Defects and Environmental Ratings
Marathon Anacortes Refinery

Manhole ID (Start:Finish)	Distance (ft)	Orientation on Pipe (ClockStart:ClockEnd)	Environmental Rating (1-5)	Defect	Cause of Defect	Actions Taken	Action Completion Date or Defect Life Expectancy
2022 Inspections							
F-1B-F-1	201	07	2	B, JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-1B-F-1	20	08:03	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-1-F-2	219-221	12:12	1	JOLD	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-1-F-2	128	12	2	TBD, RFC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-1-F-2	207	12:12	2	RFJ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-3-F-4	77-80	09:06	2	Not Applicable	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-3-F-4	110	06	3	IGJ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-3-F-4	279-321	12:12	4	BSV, B, FL, FS, BVV	Natural Degradation of Pipe Over Lifetime	CIPP Replacement and AOC-1 Site Characterization: Soil and Groundwater Sampling	Initial Investigation: 9/11/2023-9/13/2023 Further Characterization: 10/3/2024 - 10/11/2024
F-4-F-4A	144	12	3	TBI, OBC, IDL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-4-F-4A	1	04:08	3	CS, IDJ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-4-F-4A	113-117	12:12	2	Not Applicable	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-4A-F-5	211	10:02	3	JOLD	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-4A-F-5	62	11:01	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	1	12:10	2	FS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
2023 Inspections							
F-7-F-8	1.1	12:10	1	AMH, CL, FS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	6.6	02:03	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	13.3	05:09	2	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	20.4	05	2	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	23.8	10:02	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	30.4	09:11	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	37.6	04:07	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	44.7	09:03	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	55.3	05	3	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	78.9	NA	3	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	90.4	04:05	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	104.1	03	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	108	10	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	111.4	08:10	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	121.7	03	3	FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	132.2	10:02	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	139	02	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	149.4	10:04	2	FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	152.7	02:10	3	CH, IDJ, B	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	159.7	07	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	163.5	01:07	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	164.6	12:02	2	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	167.1	03:05	2	OBI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	177.3	02:11	3	FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	188.3	03:09	3	IRJ, CH	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	191.2	04	3	IDJ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	194.8	11:01	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	198.3	10:02	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	202.2	04:08	3	IDJ, CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	205.5	04:08	3	IDJ, CL, FL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	212.1	02:03	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	212.4	07	3	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	215.5	12	2	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	219.5	09	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	222.9	02:05	3	B	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	230.0	10:04	1	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	236.8	11	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	243.9	03:04	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	258.0	03	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	264.9	01	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	272.0	03:04	2	SSS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	279.1	02	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	282.1	12:09	2	CM, FS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	292.9	10	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	306.9	03:08	1	CL, FL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	310.6	09:10	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	325.8	12:12	3	CM, B	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	339.5	04:08	3	FS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	339.8	NA	3	MWL, ADP	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-7-F-8	340.6	NA	NA	AEP	NA	NA	NA
F-9-F-10	0.0	03:09	3	AMH, MWL, IDB, DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	5.9	NA	2	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	22.3	NA	2	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	23.8	06	1	OBI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	30.2	NA	2	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	47.3	12:12	3	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	50.6	02:10	2	CL, CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	54.2	NA	2	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	67.8	01:09	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	78.3	09:10	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	79.7	09	3	TBI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	82.2	02:08	3	MWL, CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	88.8	03	2	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	95.3	09	3	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	95.9	02:04	3	B	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	100.3	09	3	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	106.6	09	2	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis

Table B-3
Sewer Line Defects and Environmental Ratings
Marathon Anacortes Refinery

Manhole ID (Start:Finish)	Distance (ft)	Orientation on Pipe (ClockStart:ClockEnd)	Environmental Rating (1-5)	Defect	Cause of Defect	Actions Taken	Action Completion Date or Defect Life Expectancy
2023 Inspections (cont.)							
F-9-F-10	151.1	09:11	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	154.2	04	3	CM, IDI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	161.8	02	3	TF	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	164.4	03:11	3	FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	171.8	01:03	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	176.1	NA	2	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	188.4	08:10	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	192.0	06:03	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	195.9	09	2	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	202.8	08:10	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	214.5	NA	3	JOL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	257.3	12:03	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	270.9	02:09	3	FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	316.9	05	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	323.1	08:09	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-9-F-10	365.9	NA	NA	MSA, MCU, MWM	NA	NA	NA
F-10-F-11	0.0	12:12	2	AMH, MWL, DAZ, JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	12.0	NA	2	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	68.1	02:05	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	128.4	NA	2	DAZ, JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	150.6	05:07	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	195.5	08:10	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	210.2	07	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	221.6	05:07	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	227.3	NA	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	231.3	05	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	238.2	07	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	242.9	07	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	248.5	05	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	252.8	NA	2	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-10-F-11	261.8	12:12	3	AMH, DAZ, JOL, B	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	0.0	08:09	3	AMH, MWL, FC, IDI, MWM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	0.1	NA	2	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	1.9	NA	NA	MWL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	6.0	09	3	IDI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	9.6	07	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	53.8	07	3	IDI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	64.1	05	3	IDI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	75.3	05:07	3	IGJ, IDI, CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	83.1	NA	3	MWLS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	96.5	05:07	3	IDI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	108.4	06	1	OBZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	138.7	03	3	IDI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	141.4	05:08	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	148.5	04	3	IDI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	206.0	03	3	IDI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	209.8	09	3	IDI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	226.8	NA	3	MWLS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	232.7	08:11	3	CM, IDI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-11-F-12	237.7	03:08	5	MSA, JOM, CM, IDI	Natural Degradation of Pipe Over Lifetime	CIPP Replacement and AOC-2 Site Characterization: Soil and Groundwater Sampling	Initial Investigation: 10/3/2024 - 10/11/2024
F-12-F-12A	0.0	NA	NA	AMH, MWL	NA	NA	NA
F-12-F-12A	35.9	07:08	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12-F-12A	42.7	NA	2	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12-F-12A	67.8	05:08	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12-F-12A	82.7	04:05	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12-F-12A	112.7	03:05	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12-F-12A	127.0	04:08	3	IDI	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12-F-12A	133.5	06:07	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12-F-12A	162.1	01:04	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12-F-12A	179.8	08	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12-F-12A	196.5	11:01	2	RFB, CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12-F-12A	199.0	11:01	2	RFB, CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12-F-12A	200.9	NA	3	MSA, JOL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	0.0	NA	NA	AMH, MWL, MWM	NA	NA	NA
F-12A-F-14	28.1	11	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	45.1	08:09	1	SSS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	69.8	05	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	94.3	02	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	98.2	05:07	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	100.4		2	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	103.0	10:06	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	130.2	05	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	133.8	05:08	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	138.3	11:01	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	147.2	03:05	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	151.7	05	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	157.9	02:09	3	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	160.9	05:08	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	169.4	10:12	1	RFJ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	176.7	12	1	RFJ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	179.2	10:06	2	SSS, RFJ, CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
F-12A-F-14	184.2	12	1	RFJ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis

Table B-3
Sewer Line Defects and Environmental Ratings
Marathon Anacortes Refinery

Manhole ID (Start:Finish)	Distance (ft)	Orientation on Pipe (ClockStart:ClockEnd)	Environmental Rating (1-5)	Defect	Cause of Defect	Actions Taken	Action Completion Date or Defect Life Expectancy
2023 Inspections (cont.)							
F-12A-F-14	198.5	NA	NA	MWL	NA	NA	NA
F-12A-F-14	204.7	04:08	3	AMH, FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
2024 Inspections							
G-18-G-1A	0	12:02	3	AMH, MWL, FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	3.9	04:11	3	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	12.9	NA	1	DSZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	14.6	02:05	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	27.8	06	1	DSF	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	37.8	12:08	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	42.3	08:09	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	52.1	07:09	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	61.7	03:09	1	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	90	03:04	3	FS, MWL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	118	07:10	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	120.5	06	1	DSF	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	126.3	01:03	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	137.1	06	1	DSF	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	138.2	06	2	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	155.9	07:09	2	FS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	163.8	10	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	173.4	06:12	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	219.3	03:06	2	FS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	323.0	NA	2	DSF	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	328.9	12	1	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	330.0	02:03	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-18-G-1A	335.4	NA	NA	AMH	NA	NA	NA
G-1A-G-1	0	12	4	AMH, MWL, JOM, BSV	Natural Degradation of Pipe Over Lifetime	Scheduled for CIPP Replacement	Repair scheduled for 2025
G-1A-G-1	6.3	06:12	2	FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	7.5	02	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	87.9	07:09	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	110	06:11	2	FS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	128	07	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	163.3	NA	2	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	174.2	NA	1	JOM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	177.7	06:10	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	184.5	07:10	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	220.3	12:06	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	233.8	12	1	DSZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	290.4	07:09	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	341.0	06:09	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-1A-G-1	367.7	NA	NA	AMH	NA	NA	NA
G-2-G-3	0	NA	NA	AMH, MWL	NA	NA	NA
G-2-G-3	0.4	03	2	FL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	30.5	01:04	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	68.9	03:06	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	72.4	03:11	3	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	78.6	05:07	4	B	Natural Degradation of Pipe Over Lifetime	Scheduled for CIPP Replacement	Repair scheduled for 2025
G-2-G-3	89.8	09:10	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	99.4	03:07	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	106.7	11:05	3	SMW, CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	116.3	09:10	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	123.6	05	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	144.2	03:07	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	182.9	07	1	OBJ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	196	05	2	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	229.4	03:06	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	253.9	03:06	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	273.5	08	1	DSF	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	286.2	07:09	1	OBJ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-2-G-3	287.5	NA	NA	AMH, DSF	NA	NA	NA
G-3-G-4	0	NA	NA	AMH, MWL	NA	NA	NA
G-3-G-4	4.7	08:03	2	JOM, CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-3-G-4	13.2	09:12	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-3-G-4	21.5	03:06	1	SSS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-3-G-4	51.1	12:12	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-3-G-4	63.5	04:08	4	FC	Natural Degradation of Pipe Over Lifetime	Scheduled for CIPP Replacement	Repair scheduled for 2025
G-3-G-4	70.6	01:03	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-3-G-4	79.2	09	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-3-G-4	120.1	12:12	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-3-G-4	130.3	12:12	3	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-3-G-4	185.3	12:12	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-3-G-4	209.9	08:10	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-3-G-4	227	12:03	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-3-G-4	230.5	12:12	1	DAZ, MSC, MWL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-3-G-4	235	06	2	DSC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis

Table B-3
Sewer Line Defects and Environmental Ratings
Marathon Anacortes Refinery

Manhole ID (Start:Finish)	Distance (ft)	Orientation on Pipe (ClockStart:ClockEnd)	Environmental Rating (1-5)	Defect	Cause of Defect	Actions Taken	Action Completion Date or Defect Life Expectancy
2024 Inspections (cont.)							
G-3-G-4	242.2	NA	NA	MSA, DSC, DAZ	NA	NA	NA
G-4-G-3	6.3	NA	NA	AMH, MWL	NA	NA	NA
G-4-G-3	25.0	12:12	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-4-G-3	40.5	12:12	1	MSC, DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	0	12:03	3	AMH, MWL, CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	0.9	06:10	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	30.7	04:08	2	FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	48.4	10:05	1	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	52.5	04:07	3	FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	61.8	06:09	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	68.1	12:12	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	74.6	02	1	SSS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	79.6	05	3	SMW	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	90	02	3	SMW	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	97.6	09	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	125.5	03:09	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	146.8	03:09	1	CH	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	148.3	08:11	3	SMW	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	156.7	03:06	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	162.6	02:09	2	SSS, CH	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	171.2	05	2	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	177.7	12:12	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	181.7	05:06	2	FL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	194.1	02:03	2	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	189.4	07:09	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	191.6	05:07	2	FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	219.6	09:03	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	263.8	09:05	2	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-6-G-7	268.6	07:05	NA	AMH, DAZ	NA	NA	NA
G-7-G-8	0	05:10	2	AMH, MWL, CL, CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	3.9	04:08	2	CH	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	14.6	04:08	1	CH	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	31.6	05:08	1	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	46.4	09:10	1	SSS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	52.8	03:05	1	SSS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	68.3	12	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	74.3	07	2	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	87.5	05	2	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	99.2	08	2	CL, IDJ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	104.2	11:01	3	FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	107.9	03:10	2	FM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	136.5	02:06	1	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	141.9	07:11	1	CS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	180.7	10:02	2	CC	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	220.5	08:11	1	SSS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	230.3	09:02	2	CM	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	271.7	12	1	SSS	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	344.6	09:03	1	DAZ	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	359.4	11	1	CL	Natural Degradation of Pipe Over Lifetime	No Action Taken	Condition Remains Satisfactory Based on CCTV Analysis
G-7-G-8	361.7	NA	NA	AMH	Natural Degradation of Pipe Over Lifetime	NA	NA

Table B-4
AOC-1 Soil Sample Descriptions
Marathon Anacortes Refinery

Sample ID	Date	Soil Sample Description	Depth of Collection (ft)	PID (ppm)	Sheen ^(a)
2023-11-09-B1-7ft	9/11/2023	Silty fine sand, gray.	7	0.0	NS
2023-11-09-B2-7ft	9/11/2023	Silty fine sand, gray.	7	0.2	NS
2023-11-09-B3-7.7ft	9/11/2023	Silty fine sand, dark gray.	7.7	0.0	NS
2023-12-09-B4-8.5ft	9/12/2023	Silty fine sand, dark gray.	8.5	0.0	NS
2023-12-09-B5-8ft	9/12/2023	Fine sand, dark brown.	8	5.4	HS
2023-13-09-B6-8ft	9/13/2023	Silty fine sand, dark brown.	8	0.0	NS
2023-13-09-B7-8ft	9/13/2023	Silty fine sand, dark gray.	8	0.1	NS
2023-13-09-B8-8ft	9/13/2023	Silty fine sand, dark gray.	8	0.2	MS
AOC1-24-1S-8-8.5ft	10/8/2024	Silty fine sand, gray, firm, moist.	8	1.5	VSS
AOC1-24-1S-13-13.5ft	10/8/2024	Silty fine to medium sand, brown, hard, moist.	13-13.5	0.0	NS
AOC1-24-2S-12.5-13ft	10/8/2024	Silty fine to medium sand, dark brown, firm, moist.	12.5-13	0.0	NS
AOC1-24-3S-13.5-14ft	10/8/2024	Fine to medium sand with silt, brown with orange mottling, firm, moist.	13.5-14	0.0	VSS

^(a) NS = No Sheen; VSS = Very Slight Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Table B-5
AOC-1 Soil TPH and BTEX Analytical Results
Marathon Anacortes Refinery

Constituent (Method)	Gasoline Range TPH (NWTPH-Gx)	Diesel Range TPH (NWTPH-Dx)	Motor Oil Range TPH (NWTPH-Dx)	Benzene (EPA-8260)	Toluene (EPA-8260)	Ethylbenzene (EPA-8260)	Total Xylenes (EPA-8260)
MTCA Method A Cleanup Levels for Industrial Soil ^(a) (mg/kg)	30/100 ^(b) (mg/kg)	2,000 (mg/kg)	2,000 (mg/kg)	0.03 (mg/kg)	7.0 (mg/kg)	6.0 (mg/kg)	9.0 (mg/kg)
2023-11-09-B1-7ft (9/11/2023)	ND(<6.2)	ND(<6.2)	ND(<12.4)	0.00017	0.0003	0.00023	0.0007
2023-11-09-B2-7ft (9/11/2023)	22.10	20.00	32.00	0.00029	ND(<0.00088)	ND(<0.00088)	ND(<0.00175)
2023-11-09-B3-7.7ft (9/11/2023)	ND(<7.07)	ND(<6.48)	54.3	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00173)
2023-12-09-B4-8.5ft (9/12/2023)	ND(<6.35)	ND(<6.61)	13.5	ND(<0.00089)	ND(<0.00089)	ND(<0.00089)	ND(<0.00177)
2023-12-09-B5-8ft (9/12/2023)	ND(<5.92)	39.8	33.3	0.00775	0.0135	0.00265	0.0191
2023-13-09-B6-8ft (9/13/2023)	ND(<6.66)	ND(<6.84)	ND(<13.7)	ND(<0.00101)	ND(<0.00101)	ND(<0.00101)	ND(<0.00203)
2023-13-09-B7-8ft (9/13/2023)	ND(<4.82)	ND(<5.83)	ND(<11.7)	ND(<0.00075)	ND(<0.00075)	ND(<0.00075)	ND(<0.00149)
2023-13-09-B8-8ft (9/13/2023)	614	201	181	0.00057	0.00054	ND(<0.00077)	0.00080
AOC-1-24-1S-8-8.5ft (10/8/2024)	ND(<3.0)	ND(<25)	ND(<50)	ND(<0.005)	ND(<0.01)	ND(<0.01)	ND(<0.02)
AOC-1-24-1S-13-13.5ft (10/8/2024)	ND(<3.0)	ND(<25)	ND(<50)	ND(<0.005)	ND(<0.01)	ND(<0.01)	ND(<0.02)
AOC-1-24-2S-12.5-13ft (10/8/2024)	ND(<3.0)	ND(<25)	ND(<50)	ND(<0.005)	ND(<0.01)	ND(<0.01)	ND(<0.02)
AOC-1-24-3S-13.5-14ft (10/8/2024)	ND(<3.0)	ND(<25)	ND(<50)	ND(<0.005)	ND(<0.01)	ND(<0.01)	ND(<0.02)

^(a) Method A cleanup levels for industrial soil obtained from WAC 173-340-900, Table 745-1.

^(b) To use the cleanup level of 30 mg/kg the soil must meet the benzene soil cleanup level. To use the cleanup level of 100 mg/kg the soil must be found to contain no benzene and the total of ethylbenzene, toluene and xylene must be less than 1% of the gasoline mixture.

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

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

Table B-6
AOC-1 Soil Sample Metal Analytical Results
Marathon Anacortes Refinery

Constituent (Method)	Mercury (EPA-7471)	Arsenic (EPA-6020)	Barium (EPA-6020)	Cadmium (EPA-6020)	Lead (EPA-6020)	Selenium (EPA-6020)	Silver (EPA-6020)
MTCA Method A Cleanup Levels for Industrial Soil ^(a) (mg/kg)	2.0 (mg/kg)	20 (mg/kg)	-	2.0 (mg/kg)	1,000 (mg/kg)	-	-
2023-11-09-B1-7ft (9/11/2023)	0.0164	5.26	47.4	0.06	2.72	0.95	0.07
2023-11-09-B2-7ft (9/11/2023)	0.00716	2.08	60.5	0.08	3.08	1.21	0.07
2023-11-09-B3-7.7ft (9/11/2023)	0.0204	3.06	49	0.06	2.23	0.57	0.07
2023-12-09-B4-8.5ft (9/12/2023)	0.0134	3.64	48.3	0.07	3.65	0.61	0.07
2023-12-09-B5-8ft (9/12/2023)	0.0102	3.92	63.7	0.05	1.93	1.12	0.07
2023-13-09-B6-8ft (9/13/2023)	0.0132	3.78	70.1	0.08	2.02	0.73	0.07
2023-13-09-B7-8ft (9/13/2023)	0.0117	4.13	63.9	0.1	2.30	0.62	0.05
2023-13-09-B8-8ft (9/13/2023)	0.0165	10.1	80.6	0.14	3.19	1.15	0.08
AOC-1-24-1S-8-8.5ft (10/8/2024)	0.027	4.9	54	ND(<0.10)	3.10	ND(<1.0)	ND(<0.10)
AOC-1-24-1S-13-13.5ft (10/8/2024)	ND(<0.02)	5.7	42	ND(<0.10)	2.50	ND(<1.0)	ND(<0.10)
AOC-1-24-2S-12.5-13ft (10/8/2024)	0.042	6.4	67	0.1	4.00	ND(<1.0)	ND(<0.10)
AOC-1-24-3S-13.5-14ft (10/8/2024)	0.024	3.3	47	ND(<0.10)	2.90	ND(<1.0)	ND(<0.10)

^(a) Method A cleanup levels for industrial soil obtained from WAC 173-340-900, Table 745-1.

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

Table B-7
 ADC-1 Soil cPAH Analytical Results
 Marathon Anacortes Refinery

Constituent (Method)	Benzo(a)pyrene (EPA-8270)	Benzo(a)anthracene (EPA-8270)	Benzo(b)fluoranthene (EPA-8270)	Benzo(k)fluoranthene (EPA-8270)	Chrysene (EPA-8270)	Dibenzo(a,h)anthracene (EPA-8270)	Indeno(1,2,3-cd)pyrene (EPA-8270)	Total cPAH Equivalent (TEQ) ^(b)	Total TMIEQ ^(c)
Toxicity Equivalency Factor (TEF) ^(a)	1	0.1	0.1	0.1	0.01	0.1	0.1	-	-
Relative Mobility Factor (RMF) _J ^(d)	2.71	1	0.79	0.79	2.43	0.54	0.28	-	-
MTCA Method A Cleanup Levels for Industrial Soil ^(f) (mg/kg)	2.0 (mg/kg)	-	-	-	-	-	-	2.0 ^(e) (mg/kg)	2.0 ^(e) (mg/kg)
2023-11-09-B1-7ft (9/11/2023)	0.00071	0.00058	0.00228	0.00047	0.00334	0.00064	0.0004	0.0011804	0.002
2023-11-09-B2-7ft (9/11/2023)	0.00466	0.00553	0.00346	0.00095	0.0209	0.00103	0.00088	0.006054	0.014
2023-11-09-B3-7.7ft (9/11/2023)	0.00079	0.00046	0.0013	0.00024	0.00283	0.00043	0.00039	0.0020543	0.003
2023-12-09-B4-8.5ft (9/12/2023)	0.00139	0.0016	0.00114	0.00060	0.00229	0.00029	0.00063	0.0026789	0.005
2023-12-09-B5-8ft (9/12/2023)	0.00079	0.00107	0.00091	0.00039	0.00375	0.00023	0.00049	0.0011365	0.002
2023-13-09-B6-8ft (9/13/2023)	0.00025	0.00038	0.00027	0.00019	0.00042	ND(<0.0005)	0.00018	0.0013432	0.002
2023-13-09-B7-8ft (9/13/2023)	0.00016	0.00024	0.0002	ND(<0.0005)	0.0004	ND(<0.0005)	0.00011	0.001245	0.001
2023-13-09-B8-8ft (9/13/2023)	0.00065	0.00171	0.00205	0.00029	0.00971	0.0003	0.00034	0.0012161	0.002
ADC1-24-15-8-8.5ft (10/8/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0151	0.031
ADC1-24-15-13-13.5ft (10/8/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0151	0.031
ADC1-24-25-12.5-13ft (10/8/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0151	0.031
ADC1-24-35-13.5-14ft (10/8/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0151	0.031

^(a) TEF - Toxicity Equivalency Factor (WAC 173-340-800 table 708.2).
^(b) RME - Relative Mobility Factor (Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) Using Toxicity Equivalency Factors (TEFs) - Implementation Memorandum #20)
^(c) Method A Cleanup levels for soil obtained from WAC 173-340-800, Table 745-1.
^(d) TEF - Toxicity Equivalency to benzo(a)pyrene, calculated by multiplying result by appropriate TEF. cPAH level calculated using toxicity equivalency methodology provided in WAC 173-340-708(b).
^(e) TMIEQ - Toxic Mobility Equivalent Concentration, calculated by multiplying result by appropriate TEF and RMF.
^(f) Method A cleanup level of benzo(a)pyrene.

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

Table B-8
AOC-1 Soil PAH Analytical Results
Marathon Anacortes Refinery

Constituent (Method)	Naphthalene (EPA-8270)	1-Methylnaphthalene (EPA-8270)	2-Methylnaphthalene (EPA-8270)	Total Naphthalenes (EPA-8270)	Acenaphthylene (EPA-8270)	Acenaphthene (EPA-8270)	Dibenzofuran (EPA-8270)	Fluorene (EPA-8270)	Phenanthrene (EPA-8270)	Anthracene (EPA-8270)	Fluoranthene (EPA-8270)	Pyrene (EPA-8270)	Benzo(a,h)perylene (EPA-8270)
MTCAL Method A Cleanup Levels for Industrial Soil ^(a) (mg/kg)	5.0 (mg/kg)	-	-	5.0 (mg/kg)	-	-	-	-	-	-	-	-	-
2023-11-09-81-7H (9/11/2023)	0.00076	0.00033	0.00095	0.00204	ND(<0.0005)	0.00021	0.00018	0.00024	0.00121 ^(b)	0.00021	0.00098	0.00121	0.00236
2023-11-09-82-7H (9/11/2023)	0.00146	0.00125	0.00192	0.00463	ND(<0.0005)	0.00103	0.00081	0.00241	0.012 ^(b)	0.00223	0.00773	0.0287	0.00328
2023-11-09-83-7H (9/11/2023)	0.00118	0.00114	0.00054	0.00286	0.00007	0.00064	0.00014	0.00031	0.00146 ^(b)	0.00024	0.00096	0.00126	0.00238
2023-12-09-84-8.5H (9/12/2023)	0.06110	0.00634	0.0117	0.07904	0.00072	0.00585	0.00174	0.00412	0.0112 ^(b)	0.0022	0.00491	0.0062	0.00120
2023-12-09-85-8H (9/12/2023)	0.00224	0.00798	0.00895	0.01917	ND(<0.0005)	0.00218	0.00378	0.019	0.0266 ^(b)	0.00226	0.00222	0.00404	0.00085
2023-13-09-86-8H (9/13/2023)	0.00173	0.0004	0.00083	0.00296	0.0003	0.00034	0.00068	0.00094	0.00213 ^(b)	0.00081	0.00138	0.00132	0.00027
2023-13-09-87-8H (9/13/2023)	ND(<0.0006)	0.00014	0.00027	0.00041	ND(<0.0005)	ND(<0.0005)	0.00014	0.00013	0.00056 ^(b)	0.0002	0.00041	0.0005	0.00039
2023-13-09-88-8H (9/13/2023)	0.00101	0.00715	0.00323	0.01139	ND(<0.0005)	0.0061	0.00449	0.022	0.0182 ^(b)	0.00507	0.00531	0.00985	0.00094
AOC-1-24-15-8-8.5H (10/8/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
AOC-1-24-15-13-13.5H (10/8/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
AOC-1-24-25-12.5-13H (10/8/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
AOC-1-24-35-13.5-14H (10/8/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)

^(a) Method A cleanup levels for industrial soil obtained from MAC 173-340-800, Table 745-1.
BOLD & shaded indicates that the concentration in the sample exceeds the most stringent cleanup level.
 ND indicates analyte was not detected at level above reporting limit (shown in parenthesis)

Table B-9
AOC-1 Groundwater Analytical Results
Marathon Anacortes Refinery

Constituent	Unit	Method	Toxicity Equivalency Factor ^(d) (TEF)	MTCA Method A Cleanup Levels for Groundwater ^(b)	MTCA Method C Cleanup Levels for Groundwater ^(b) (Noncancer)	MTCA Method C Cleanup Levels for Groundwater ^(b) (Cancer)	MTCA Method C Cleanup Levels for Surface Water ^(b) (Noncancer)	MTCA Method C Cleanup Levels for Surface Water ^(b) (Cancer)	2023-12-09-B5-8ft ^(f) (9/12/2023)	24-15 (10/17/2024)	24-25 (10/14/2024)	24-35 (10/14/2024)
Field Parameters												
Depth to Water	ft	-	-	-	-	-	-	-	NA	7.62	6.98	6.17
Groundwater Surface Elevation	ft	-	-	-	-	-	-	-	NA	199.42	200.38	204.2
Turbidity	NTU	-	-	-	-	-	-	-	7.41	10.5	10.5	2.86
Temperature	°C	-	-	-	-	-	-	-	NA	15.3	15.9	17.7
Conductivity	mS/cm	-	-	-	-	-	-	-	NA	0.3071	0.351	0.4074
Total Dissolved Solids	g/L	-	-	-	-	-	-	-	NA	0.1996	0.2281	0.2648
Salinity	ppt	-	-	-	-	-	-	-	NA	0.15	0.17	0.2
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	NA	0.23	1.75	0.22
pH	pH Units	-	-	-	-	-	-	-	NA	7.35	7.04	7.13
Oxidation/Reduction Potential	mV	-	-	-	-	-	-	-	NA	-17.4	75.1	43.0
TPH/BTEX												
Gasoline Range Organics	µg/L	NWTPH-Gx	-	800/1,000 ^(d)	-	-	-	-	793	ND(<50)	ND(<50)	ND(<50)
Diesel Range Organics	µg/L	NWTPH-Dx	-	500	-	-	-	-	5,720	ND(<130)	ND(<130)	ND(<130)
Motor Oil Range Organics	µg/L	NWTPH-Ox	-	500	-	-	-	-	3,210	ND(<250)	ND(<250)	ND(<250)
Benzene	µg/L	EPA-8260	-	5.0	70	8.0	5,000	570	15.8	ND(<2.0)	ND(<2.0)	ND(<2.0)
Toluene	µg/L	EPA-8260	-	1,000	1,400	-	48,000	-	26.2	ND(<2.0)	ND(<2.0)	ND(<2.0)
Ethylbenzene	µg/L	EPA-8260	-	700	1,800	-	17,000	-	5.01	ND(<2.0)	ND(<2.0)	ND(<2.0)
Total Xylenes	µg/L	EPA-8260	-	1,000	3,500	-	-	-	33.01	ND(<4.0)	ND(<4.0)	ND(<4.0)
cPAHs												
Benzo(a)pyrene	µg/L	EPA-8270	1	0.1	11	0.88	65	5.4	0.007	ND(<0.020)	ND(<0.020)	ND(<0.020)
Benzo(a)anthracene	µg/L	EPA-8270	0.1	-	-	-	-	-	0.016	ND(<0.020)	ND(<0.020)	ND(<0.020)
Benzo(b)fluoranthene	µg/L	EPA-8270	0.1	-	-	-	-	-	0.012	ND(<0.020)	ND(<0.020)	ND(<0.020)
Benzo(k)fluoranthene	µg/L	EPA-8270	0.1	-	-	-	-	-	ND(<0.010)	ND(<0.020)	ND(<0.020)	ND(<0.020)
Chrysene	µg/L	EPA-8270	0.01	-	-	-	-	-	0.134	ND(<0.020)	ND(<0.020)	ND(<0.020)
Dibenzo(a,h)anthracene	µg/L	EPA-8270	0.1	-	-	-	-	-	ND(<0.0010)	ND(<0.020)	ND(<0.020)	ND(<0.020)
Indeno(1,2,3-cd)pyrene	µg/L	EPA-8270	0.1	-	-	-	-	-	ND(<0.0010)	ND(<0.020)	ND(<0.020)	ND(<0.020)
Total cPAH Equivalent (TEq) ^(c)	µg/L	EPA-8270	-	0.1 ^(c)	-	-	-	-	0.013	0.015	0.015	0.015
Metals												
Arsenic ^(d)	µg/L	EPA 200.8	-	8.0	8.0	8.0	8.0	8.0	23.3	8.0	1.9	5.9
Cadmium	µg/L	EPA 200.8	-	5.0	18	-	-	-	1.51	ND(<1.0)	ND(<1.0)	ND(<1.0)
Selenium	µg/L	EPA 200.8	-	-	180	-	6,800	-	8.08	ND(<4.0)	ND(<4.0)	ND(<4.0)
Silver	µg/L	EPA 200.8	-	-	180	-	65,000	-	ND(<0.2)	ND(<1.0)	ND(<1.0)	ND(<1.0)
Barium	µg/L	EPA 200.8	-	-	7,000	-	-	-	1,950	24	17	20
Lead	µg/L	EPA 200.8	-	15	-	-	-	-	100	ND(<1.0)	ND(<1.0)	ND(<1.0)
Mercury	µg/L	EPA 245.1	-	2.0	-	-	-	-	0.807	ND(<2.0)	ND(<0.20)	ND(<0.20)

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

^(b) MTCA cleanup levels obtained from WA. Ecology CLARC Master Tables.

^(c) TEq - Toxicity Equivalency to benzo(a)pyrene, calculated by multiplying result by appropriate TEF. cPAH level calculated using Toxicity equivalency methodology provided in WAC 173-340-708(B). Method A cleanup level of benzo(a)pyrene.

^(d) Sum of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.

^(e) To use the cleanup level of 800 ug/L the groundwater must meet the benzene soil cleanup level. To use the cleanup level of 1,000 ug/L the groundwater must be found to contain no benzene and the total of ethylbenzene, toluene and xylene must be less than 1% of the gasoline mixture.

^(f) Groundwater sample was collected from open boring (B5) and may contain particulates and is not considered a representative groundwater sample.

^(g) Per WAC 173-340-720(7)(c), arsenic cleanup levels are being set at the natural background.

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

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

Table B-10
AOC-2 Soil Sample Descriptions
Marathon Anacortes Refinery

Sample ID	Date	Soil Sample Description	Depth of Collection (ft)	PID (ppm)	Sheen ^(a)
AOC2-24-4-4ft	10/7/2024	Gravelly sandy silt with clay, brown, firm, moist.	4	167.2	SS
AOC2-24-4-6.5-7ft	10/10/2024	Silty clay with minor gravel, brown, hard, moist.	6.5-7	43.4	NS
AOC2-24-4-8-8.5ft	10/10/2024	Silty clay with minor gravel, brown, firm, moist.	8-8.5	5.0	NS
AOC2-SB4-5ft	10/7/2024	Gravelly sandy silt with clay, brown, hard, dry.	5	38.4	NS
AOC2-SB4-10-10.5ft	10/9/2024	Silty clay, brown, hard, dry.	10-10.5	375.0	MS
AOC2-SB4-16-16.5ft	10/9/2024	Silty clay with gravel, gray, firm, moist.	16-16.5	1.2	VSS
AOC2-SB1-8.5ft	10/9/2024	Silty clay with gravel, brown, hard, moist.	8.5	197.0	SS
AOC2-SB1-11.5-12ft	10/9/2024	Silty clay, brown, firm, moist.	11.5-12	8.6	SS
AOC2-SB2-5ft	10/3/2024	Silty clay with minor sand and gravel, gray with minor orange mottling, soft, wet.	5	1510	MS
AOC2-SB2-6.5-7ft	10/9/2024	Silty clay with minor gravel, gray, firm, moist.	6.5-7	513.0	MS
AOC2-SB2-14.5-15ft	10/9/2024	Silty clay with gravel, brown, firm, moist.	14.5-15	1.5	SS
AOC2-SB3-3ft	10/3/2024	Clayey silt with brown sand lens, gray, firm, moist.	3	888.8	HS
AOC2-SB3-6.5-7ft	10/10/2024	Silty clay with minor gravel, brown and gray, firm, moist.	6.5-7	11.3	SS
AOC2-SB3-7.5-8ft	10/10/2024	Silty clay, brown, hard, moist.	7.5-8	0.6	NS
AOC2-24-5-7.5-8ft	10/10/2024	Silty clay, brown, firm, moist.	7.5-8	0.1	VSS
AOC2-24-5-18.5-19ft	10/10/2024	Silty clay, brown, firm, moist.	18.5-19	0.1	NS

^(a) NS = No Sheen; VSS = Very Slight Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Table B-11
AOC-2 Soil Method C and Protection of Groundwater Quality MTCATPH Workbook Results
Marathon Anacortes Refinery

Sample ID	Measured TPH Soil Concentration ^{(a)(b)} (mg/kg)	Method C (For Industrial Land Use) Soil Direct Contact Pathway: Exposure via Combined Incidental Ingestion and Dermal Contact			Soil Protection of Potable Groundwater Quality: Leaching Pathway
		TPH Cleanup Level ^(c) (mg/kg)	Noncancer Hazard Index (Must not exceed 1)	Cancer Hazard Index (Must not exceed 1×10^{-5})	Modeled Protective TPH Soil Concentration ^(d) (mg/kg)
AOC2-24-4-6.5-7ft	52.09	25,000	2.0×10^{-3}	6.9×10^{-9}	86
AOC2-SB1-8.5-9ft	51.64	25,000	2.0×10^{-3}	9.1×10^{-9}	21
AOC2-SB2-6.5-7ft	524.83	19,000	2.8×10^{-2}	1.7×10^{-8}	28
AOC2-SB4-10-10.5ft	189.06	23,000	8.2×10^{-3}	1.3×10^{-8}	22

^(a) The measured total petroleum hydrocarbon (TPH) soil concentration is automatically calculated based on inserted soil analytical data into the MTCATPH Version 12.0 Workbook for Calculating Cleanup Levels for Petroleum Mixtures.

^(b) The measured TPH sample concentration fails compliance if it exceeds the modeled TPH soil concentration that is protective of the target TPH groundwater concentration.

^(c) The overall TPH cleanup levels are automatically calculated based on a noncancer Hazard Index (HI) of 1 via the MTCATPH Version 12.0 Workbook for Calculating Cleanup Levels for Petroleum Mixtures.

^(d) The modeled TPH soil concentration is protective of the Method A TPH potable groundwater cleanup level from WAC 173-340-890 Table 720-1 (the target TPH groundwater concentration).

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

Table B-12
AOC-2 Soil TPH and BTEX Analytical Results
Marathon Anacortes Refinery

Constituent (Method)	Gasoline Range TPH (NWTPH-Gx)	Diesel Range TPH (NWTPH-Dx)	Diesel Range TPH w/ SGA (NWTPH-Dx)	Motor Oil Range TPH (NWTPH-Dx)	Motor Oil Range TPH w/ SGA (NWTPH-Dx)	Benzene (EPA-8260)	Toluene (EPA-8260)	Ethylbenzene (EPA-8260)	Total Xylenes (EPA-8260)
MTCA Method A Cleanup Levels for Industrial Soil ^(a) (mg/kg)	30/100 ^(b) (mg/kg)	2,000 (mg/kg)	2,000 (mg/kg)	2,000 (mg/kg)	2,000 (mg/kg)	0.03 (mg/kg)	7.0 (mg/kg)	6.0 (mg/kg)	9.0 (mg/kg)
AOC2-24-4-4ft (10/7/2024)	17	ND(<25)	NA	ND(<50)	NA	0.12	1.50	0.20	1.20
AOC2-24-4-6.5-7ft (10/10/2024)	ND(<3.0)	ND(<25)	ND(<25)	ND(<50)	ND(<50)	0.031	0.06	0.03	0.10
AOC2-24-4-8-8.5ft (10/10/2024)	ND(<3.0)	ND(<25)	NA	ND(<50)	NA	ND(<0.018)	0.017	ND(<0.015)	ND(<0.03)
AOC2-SB4-5ft (10/7/2024)	510	670	NA	230	NA	0.34	13	5.0	31.2
AOC2-SB4-10-10.5ft (10/9/2024)	160	ND(<25)	ND(<25)	ND(<50)	ND(<50)	0.66	9.8	2.6	11.3
AOC2-SB4-16-16.5ft (10/9/2024)	ND(<3.0)	ND(<25)	NA	ND(<50)	NA	ND(<0.017)	0.034	ND(<0.014)	ND(<0.28)
AOC2-SB1-8.5-9ft (10/9/2024)	62	ND(<25)	ND(<25)	ND(<50)	ND(<50)	0.35	3.5	0.91	4.21
AOC2-SB1-11.5-12ft (10/9/2024)	ND(<3.0)	ND(<25)	NA	ND(<50)	NA	ND(<0.018)	0.14	ND(<0.015)	0.131
AOC2-SB2-5ft (10/3/2024)	540	97	100	ND(<50)	ND(<50)	0.63	17	6.6	3.8
AOC2-SB2-6.5-7ft (10/9/2024)	470	61	65	ND(<50)	ND(<50)	0.73	14	4.3	22.4
AOC2-SB2-14.5-15ft (10/9/2024)	ND(<3.0)	ND(<25)	NA	ND(<50)	NA	ND(<0.016)	0.02	ND(<0.014)	ND(<0.027)
AOC2-SB3-3ft (10/3/2024)	1300	1300	1300	ND(<250)	ND(<250)	1.1	31	15	8.1
AOC2-SB3-6.5-7ft (10/10/2024)	5.30	ND(<25)	NA	ND(<50)	NA	ND(<0.018)	0.095	ND(<0.015)	ND(<0.091)
AOC2-SB3-7.5-8ft (10/10/2024)	ND(<3.0)	ND(<25)	NA	ND(<50)	NA	ND(<0.017)	ND(<0.01)	ND(<0.014)	ND(<0.028)
AOC2-24-5-7.5-8ft (10/10/2024)	ND(<3.0)	ND(<25)	NA	ND(<50)	NA	ND(<0.019)	0.033	ND(<0.016)	ND(<0.032)
AOC2-24-5-18.5-19ft (10/10/2024)	ND(<3.0)	ND(<25)	NA	ND(<50)	NA	ND(<0.016)	0.012	ND(<0.014)	ND(<0.027)

^(a) Method A cleanup levels for industrial soil obtained from: WAC 173-340-900, Table 745-1.

^(b) To use the cleanup level of 30 mg/kg the soil must meet the benzene soil cleanup level. To use the cleanup level of 100 mg/kg the soil must be found to contain no benzene and the total of ethylbenzene, toluene and xylene must be less than 1% of the gasoline mixture.

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

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

Table B-13
AOC-2 Soil Metal Analytical Results
Marathon Anacortes Refinery

Constituent (Method)	Mercury (EPA-7471)	Arsenic (EPA-6020)	Barium (EPA-6020)	Cadmium (EPA-6020)	Lead (EPA-6020)	Selenium (EPA-6020)	Silver (EPA-6020)
MTCA Method A Cleanup Levels for Industrial Soil ^(a) (mg/kg)	2.0 (mg/kg)	20 (mg/kg)	-	2.0 (mg/kg)	1,000 (mg/kg)	-	-
AOC2-24-4-4ft (10/7/2024)	0.036	4.9	81	0.12	4.2	ND(<1.0)	ND(<0.10)
AOC2-24-4-6.5-7ft (10/10/2024)	0.041	5.2	88	0.1	4.5	ND(<1.0)	ND(<0.10)
AOC2-24-4-8-8.5ft (10/10/2024)	0.049	6	110	0.13	6	ND(<1.0)	ND(<0.10)
AOC2-SB4-5ft (10/7/2024)	0.045	5.8	100	0.16	4.9	ND(<1.0)	ND(<0.10)
AOC2-SB4-10-10.5ft (10/9/2024)	0.048	6.9	110	0.17	5.6	ND(<1.0)	ND(<0.10)
AOC2-SB4-16-16.5ft (10/9/2024)	0.04	3.7	85	0.13	4.9	ND(<1.0)	ND(<0.10)
AOC2-SB1-8.5-9ft (10/9/2024)	0.034	4.3	73	ND(<0.10)	4	ND(<1.0)	ND(<0.10)
AOC2-SB1-11.5-12ft (10/9/2024)	0.047	9	100	0.13	5.3	ND(<1.0)	ND(<0.10)
AOC2-SB2-5ft (10/3/2024)	0.050	6.4	98	0.14	5.1	ND(<1.0)	ND(<0.10)
AOC2-SB2-6.5-7ft (10/9/2024)	0.051	6.4	98	0.12	5.2	ND(<1.0)	ND(<0.10)
AOC2-SB2-14.5-15ft (10/9/2024)	0.041	3.9	78	0.13	4.6	ND(<1.0)	ND(<0.10)
AOC2-SB3-3ft (10/3/2024)	0.030	4.9	220	0.11	3.8	ND(<1.0)	ND(<0.10)
AOC2-SB3-6.5-7ft (10/10/2024)	0.05	6	110	0.15	6.9	ND(<1.0)	0.12
AOC2-SB3-7.5-8ft (10/10/2024)	0.05	6.3	97	0.10	5.7	ND(<1.0)	ND(<0.10)
AOC2-24-5-7.5-8ft (10/10/2024)	0.051	6.5	110	0.11	5.9	ND(<1.0)	ND(<0.10)
AOC2-24-5-18.5-19ft (10/10/2024)	0.046	4	81	0.11	4.9	ND(<1.0)	ND(<0.10)

^(a) Method A cleanup levels for industrial soil obtained from WAC 173-340-900, Table 745-1.

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

Table B-14
AOC 2 Soil cPAH Analytical Results
Marathon Anacortes Refinery

Constituent (Method)	Benzo[a]pyrene (EPA-8270)	Benzo[a]anthracene (EPA-8270)	Benzo[b]fluoranthene (EPA-8270)	Benzo[k]fluoranthene (EPA-8270)	Chrysene (EPA-8270)	Dibenz[a,h]anthracene (EPA-8270)	Indeno[1,2,3-cd]pyrene (EPA-8270)	Total cPAH Equivalent (TEq) ⁽⁶⁾	Total TMEQ ⁽⁶⁾
Toxicity Equivalency Factor (TEF) ⁽⁴⁾	1	0.1	0.1	0.1	0.01	0.1	0.1	-	-
Relative Mobility Factor (RMF) ⁽⁵⁾	2.71	1	0.79	0.79	2.43	0.54	0.28	-	-
MTCA Method A Cleanup Levels for Industrial Soil ⁽¹⁾ (mg/kg)	2.0	-	-	-	-	-	-	2.0 ⁽⁶⁾	2.0 ⁽⁶⁾
AOC2-24-4-4R (10/7/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-24-4-6.5-7R (10/10/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-24-4-8.8-5R (10/10/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-584-5R (10/7/2024)	0.06000	0.04600	0.03200	ND(<0.02)	0.023	ND(<0.02)	ND(<0.02)	0.07103	0.172
AOC2-584-10-10.5R (10/9/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-584-10-16.5R (10/9/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-581-8-5-9R (10/9/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-581-11.5-12R (10/9/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-582-3R (10/3/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-582-6.5-7R (10/9/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-582-14.5-15R (10/9/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-583-3R (10/3/2024)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.0795	0.031
AOC2-583-6.5-7R (10/10/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-583-7.5-8R (10/10/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-24-5-7.5-8R (10/10/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031
AOC2-24-5-18.5-19R (10/10/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.0351	0.031

⁽¹⁾ TEF - Toxicity Equivalency Factor (WAC 173-340-020 table 708.2)

⁽²⁾ RMF - Relative Mobility Factor (Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) Using Toxicity Equivalency Factors (TEFs) - Implementation Memorandum #10)

⁽³⁾ Method A cleanup levels for soil obtained from WAC 173-340-020, Table 740-1.

⁽⁴⁾ TEF - Toxicity Equivalency to benzo[a]pyrene, calculated by multiplying result by appropriate TEF. cPAH level calculated using toxicity equivalency methodology provided in WAC 173-340-708B(4).

⁽⁵⁾ RMF - Toxic Mobility Equivalent Concentration, calculated by multiplying result by appropriate TEF and RMF.

⁽⁶⁾ Method A cleanup level of benzo[a]pyrene.

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

Table B-15
AOC-2 Soil Sample Other PAH Analytical Results
Marathon Anacortes Refinery

Constituent (Method)	Naphthalene (EPA-8270)	1-Methylnaphthalene (EPA-8270)	2-Methylnaphthalene (EPA-8270)	Total Naphthalenes (EPA-8270)	Acenaphthylene (EPA-8270)	Acenaphthene (EPA-8270)	Dibenzofuran (EPA-8270)	Fluorene (EPA-8270)	Phenanthrene (EPA-8270)	Anthracene (EPA-8270)	Fluoranthene (EPA-8270)	Pyrene (EPA-8270)	Benzo[<i>a,h,i</i>]perylene (EPA-8270)
MTCA Method A Cleanup Levels for Industrial Soil ^(d) (mg/kg)	5.0 (mg/kg)	-	-	5.0 (mg/kg)	-	-	-	-	-	-	-	-	-
AOC2-24-4-4ft (10/7/2024)	0.042	0.024	0.037	0.103	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
AOC2-24-4-6.5-7ft (10/10/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	NA	NA	NA	NA	NA	NA	NA	NA
AOC2-24-4-8-8.5ft (10/10/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
AOC2-584-5ft (10/7/2024)	0.900	0.830	1.400	3.13	0.021	0.085	NA	0.180	0.340	ND(<0.02)	0.130	0.130	ND(<0.02)
AOC2-584-10-10.5ft (10/9/2024)	0.11	0.069	0.11	0.289	NA	NA	NA	NA	NA	NA	NA	NA	NA
AOC2-584-16-16.5ft (10/9/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
AOC2-581-8.5-9ft (10/9/2024)	ND(<0.02)	ND(<0.02)	0.028	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA
AOC2-581-11.5-12ft (10/9/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
AOC2-582-5ft (10/9/2024)	0.23	0.28	0.42	0.93	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	71	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
AOC2-582-6.5-7ft (10/9/2024)	0.22	0.3	0.46	0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA
AOC2-582-14.5-15ft (10/9/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
AOC2-583-3ft (10/9/2024)	2.2	2.8	4.0	9.0	ND(<0.1)	0.17	NA	ND(<0.1)	0.49	ND(<0.1)	ND(<0.1)	0.13	ND(<0.1)
AOC2-583-6.5-7ft (10/10/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
AOC2-583-7-8ft (10/10/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
AOC2-24-5-7-5-8ft (10/10/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
AOC2-24-5-18.5-19ft (10/10/2024)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	NA	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)

^(d) Method A cleanup levels for industrial soil obtained from WAC 173-340-900, Table 745-1.

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

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

Table B-16
AOC-2 Groundwater Analytical Results
Marathon Anacortes Refinery

Constituent	Unit	Method	Toxicity Equivalency Factor ⁽¹⁾ (TEF):	MTCA Method A Cleanup Levels for Groundwater ^(b)	MTCA Method C Cleanup Levels for Groundwater ^(b) (Noncancer)	MTCA Method C Cleanup Levels for Groundwater ^(b) (Cancer)	MTCA Method C Cleanup Levels for Surface Water ^(b) (Noncancer)	MTCA Method C Cleanup Levels for Surface Water ^(b) (Cancer)	24-4 (10/17/2024)	24-5 (11/11/2024)	92-P6 (10/14/2024)	14-3 (10/14/2024)
Field Parameters												
Depth to Water	ft	-	-	-	-	-	-	-	11.3	12.7	14.1	37.25
Groundwater Surface Elevation	ft	-	-	-	-	-	-	-	119.39	130.2	100.4	71.4
Turbidity	NTU	-	-	-	-	-	-	-	106	2.64	1.34	NA
Temperature	°c	-	-	-	-	-	-	-	15.2	14.5	16.9	NA
Conductivity	mS/cm	-	-	-	-	-	-	-	0.578	0.767	0.4718	NA
Total Dissolved Solids	g/L	-	-	-	-	-	-	-	0.2167	0.499	0.3067	NA
Salinity	ppt	-	-	-	-	-	-	-	0.16	0.38	0.23	NA
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	5.78	1.84	0.01	NA
pH	pH Units	-	-	-	-	-	-	-	7.56	7.47	8.06	NA
Oxidation/ Reduction Potential	mV	-	-	-	-	-	-	-	73.3	-2.1	-122.9	NA
TPH/BTEX												
Gasoline Range Organics	µg/L	NWTPH-Gx	-	800/1,000 ^(d)	-	-	-	-	ND(<50)	ND(<50)	ND(<50)	ND(<50)
Diesel Range Organics	µg/L	NWTPH-Dx	-	500	-	-	-	-	270	ND(<130)	270	190
Motor Oil Range Organics	µg/L	NWTPH-Dx	-	500	-	-	-	-	ND(<250)	ND(<250)	ND(<250)	280
Benzene	µg/L	EPA-8260	-	5.0	70	8.0	5,000	570	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)
Toluene	µg/L	EPA-8260	-	1,000	1,400	-	48,000	-	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)
Ethylbenzene	µg/L	EPA-8260	-	700	1,800	-	17,000	-	ND(<2.0)	ND(<2.0)	ND(<2.0)	ND(<2.0)
Total Xylenes	µg/L	EPA-8260	-	1,000	3,500	-	-	-	ND(<4.0)	ND(<4.0)	ND(<4.0)	ND(<4.0)
cPAHs												
Benzo(a)pyrene	µg/L	EPA-8270	1	-	11	0.88	65	5.4	ND(<0.020)	ND(<0.020)	ND(<0.020)	ND(<0.020)
Benzo(a)anthracene	µg/L	EPA-8270	0.1	-	-	-	-	-	ND(<0.020)	ND(<0.020)	ND(<0.020)	ND(<0.020)
Benzo(b)fluoranthene	µg/L	EPA-8270	0.1	-	-	-	-	-	ND(<0.020)	ND(<0.020)	ND(<0.020)	ND(<0.020)
Benzo(k)fluoranthene	µg/L	EPA-8270	0.1	-	-	-	-	-	ND(<0.020)	ND(<0.021)	ND(<0.020)	ND(<0.020)
Chrysene	µg/L	EPA-8270	0.01	-	-	-	-	-	ND(<0.020)	ND(<0.020)	ND(<0.020)	ND(<0.020)
Dibenzo(a,h)anthracene	µg/L	EPA-8270	0.1	-	-	-	-	-	ND(<0.020)	ND(<0.020)	ND(<0.020)	ND(<0.020)
Indeno(1,2,3-cd)pyrene	µg/L	EPA-8270	0.1	-	-	-	-	-	ND(<0.020)	ND(<0.020)	ND(<0.020)	ND(<0.020)
Total cPAH Equivalent (TEq) ^(e)	µg/L	EPA-8270	-	0.1 ^(f)	-	-	-	-	0.015	0.015	0.015	0.015
Metals												
Arsenic ^(b)	µg/L	EPA 200.8	-	8.0	8.0	8.0	8.0	8.0	3.4	3.0	1.7	ND(<1.0)
Cadmium	µg/L	EPA 200.8	-	5.0	18	-	-	-	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<1.0)
Selenium	µg/L	EPA 200.8	-	-	180	-	6,800	-	ND(<4.0)	5.0	ND(<4.0)	ND(<4.0)
Silver	µg/L	EPA 200.8	-	-	180	-	65,000	-	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<1.0)
Barium	µg/L	EPA 200.8	-	-	7,000	-	-	-	33	41	18	30
Lead	µg/L	EPA 200.8	-	15	-	-	-	-	2.6	ND(<1.0)	ND(<1.0)	ND(<1.0)
Mercury	µg/L	EPA 245.1	-	2.0	-	-	-	-	ND(<0.20)	ND(<0.20)	ND(<0.20)	ND(<0.20)

⁽¹⁾ TEF - Toxicity Equivalency Factor (WAC 173-340-900 table 708.2).

^(b) MTCA cleanup levels obtained from WA Ecology CLARC Master Tables.

^(c) TEQ - Toxicity Equivalency to benzo(a)pyrene, calculated by multiplying result by appropriate TEF. cPAH level calculated using Toxicity equivalency methodology provided in WAC 173-340-708(8e). Method A cleanup level of benzo(a)pyrene.

^(d) Sum of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.

^(e) To use the cleanup level of 800 ug/L the groundwater must meet the benzene soil cleanup level. To use the cleanup level of 1,000 ug/L the groundwater must be found to contain no benzene and the total of ethylbenzene, toluene and xylene must be less than 1% of the gasoline mixture.

^(f) Per WAC 173-340-720(7)(c), arsenic cleanup levels are being set at the natural background.

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

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

APPENDIX C
BAI NASSCO REPORTS



PACP Inspection Form

Header Section

Red font fields = Mandatory, Black font fields = Optional



General Information

1. Surveyed by Brian Garries	2. Certificate No. P0035046-122021	3. Reviewed by	4. Reviewer Certificate No.
5. Owner Marathon	6. Customer	7. P/O Number	8. Work Order Number
9. Media Label	10. Project 2024 OWS	11. Date 20240624	12. Time 10:04
13. Sheet Number 1	14. Weather 1	15. Pre-Cleaning L	16. Date Cleaned
17. Flow Control	18. Purpose of Survey	19. Direction of Survey D	20. Inspection Technology Used CC
21. Inspection Status CI	22. Consequence of Failure	23. Pressure Value	

Location

24. Drainage Area	25. Pipe Segment Reference	26. Street (Name & Number) TANK FARM
27. City Anacortes, WA	28. Location Code	29. Location Details

Pipe

30. Pipe Use PR	31. Height (Diameter) 8	32. Width 8	33. Shape C
34. Material VCP	35. Lining Method	36. Coating Method	37. Pipe Joint Length 3.5
38. Total Length 355	39. Length Surveyed 335.4	40. Year Constructed	41. Year Renewed

Measurements

42. Upstream MH No. G-1B	43. Upstrm MH Rim to Invert	44. Upstrm MH Rim to Grade	45. Upstrm MH Grade to Invert
46. Upstream MH Northing*	47. Upstream MH Easting*	48. Upstream MH Elevation**	
49. Downstream MH No. G-1A	50. Downstream MH Rim to Invert	51. Downstream MH Rim to Grade	
52. Downstream MH Grade to Invert	53. Downstream MH Northing*	54. Downstream MH Easting*	
55. Downstream MH Elevation**	56. MH Coordinate System*	57. MH Vertical Datum**	58. GPS Accuracy
59. Additional Information			

*Entry required if Northing, Easting or Coordinate System data is recorded.

**Entry required if Elevation or Vertical Datum data is recorded.

Sketch

USMH	DSMH

Details Section

Details

Red font fields = Mandatory, Black font fields = Optional



PACP Inspection Form

Header Section

Red font fields = Mandatory, Black font fields = Optional



General Information

1. Surveyed by Brian Garries	2. Certificate No. P0035046-122021	3. Reviewed by	4. Reviewer Certificate No.
5. Owner Marathon	6. Customer	7. P/O Number	8. Work Order Number
9. Media Label	10. Project 2024 OWS	11. Date 20240624 YYYYMMDD	12. Time 13:27 HH:MM
13. Sheet Number 1	14. Weather 1	15. Pre-Cleaning L	16. Date Cleaned 20240624 YYYYMMDD
17. Flow Control N	18. Purpose of Survey F	19. Direction of Survey D	20. Inspection Technology Used CC
21. Inspection Status CI	22. Consequence of Failure	23. Pressure Value	

Location

24. Drainage Area	25. Pipe Segment Reference	26. Street (Name & Number) TANK FARM
27. City Anacortes, WA	28. Location Code	29. Location Details

Pipe

30. Pipe Use PR	31. Height (Diameter) 8	32. Width 8	33. Shape C
34. Material VCP	35. Lining Method	36. Coating Method	37. Pipe Joint Length 3.5
38. Total Length 375	39. Length Surveyed 367.7	40. Year Constructed YYYY	41. Year Renewed YYYY

Measurements

42. Upstream MH No. G-1A	43. Upstrm MH Rim to Invert	44. Upstrm MH Rim to Grade	45. Upstrm MH Grade to Invert
46. Upstream MH Northing*	47. Upstream MH Easting*	48. Upstream MH Elevation**	
49. Downstream MH No. G-1	50. Downstream MH Rim to Invert	51. Downstream MH Rim to Grade	
52. Downstream MH Grade to Invert	53. Downstream MH Northing*	54. Downstream MH Easting*	
55. Downstream MH Elevation**	56. MH Coordinate System*	57. MH Vertical Datum**	58. GPS Accuracy
59. Additional Information			

*Entry required if Northing, Easting or Coordinate System data is recorded.

**Entry required if Elevation or Vertical Datum data is recorded.

Sketch

USMH	DSMH
------	------

Details Section

Details

Red font fields = Mandatory, Black font fields = Optional



PACP Inspection Form

Header Section

Red font fields = Mandatory, Black font fields = Optional



General Information

1. Surveyed by Brian Garries	2. Certificate No. P0035046-122021	3. Reviewed by	4. Reviewer Certificate No.
5. Owner Marathon	6. Customer	7. P/O Number	8. Work Order Number
9. Media Label	10. Project 2024 OWS	11. Date 20240613 YYYYMMDD	12. Time 14:01 HH:MM
13. Sheet Number 1	14. Weather 1	15. Pre-Cleaning L	16. Date Cleaned 20240613 YYYYMMDD
17. Flow Control	18. Purpose of Survey F	19. Direction of Survey D	20. Inspection Technology Used CC
21. Inspection Status CI	22. Consequence of Failure	23. Pressure Value	

Location

24. Drainage Area	25. Pipe Segment Reference	26. Street (Name & Number) TANK FARM
27. City Anacortes, WA	28. Location Code	29. Location Details

Pipe

30. Pipe Use PR	31. Height (Diameter) 8	32. Width 8	33. Shape C
34. Material VCP	35. Lining Method	36. Coating Method	37. Pipe Joint Length 3.5
38. Total Length 300	39. Length Surveyed 287.5	40. Year Constructed YYYY	41. Year Renewed YYYY

Measurements

42. Upstream MH No. G-2	43. Upstrm MH Rim to Invert	44. Upstrm MH Rim to Grade	45. Upstrm MH Grade to Invert
46. Upstream MH Northing*	47. Upstream MH Easting*	48. Upstream MH Elevation**	
49. Downstream MH No. G-3	50. Downstream MH Rim to Invert	51. Downstream MH Rim to Grade	
52. Downstream MH Grade to Invert	53. Downstream MH Northing*	54. Downstream MH Easting*	
55. Downstream MH Elevation**	56. MH Coordinate System*	57. MH Vertical Datum**	58. GPS Accuracy
59. Additional Information			

*Entry required if Northing, Easting or Coordinate System data is recorded.

**Entry required if Elevation or Vertical Datum data is recorded.

Sketch

USMH	DSMH

PACP Inspection Form

Details Section

1. Surveyed by Brian Garries	5. Owner Marathon	11. Date 20240730	13. Sheet No. 2	42. Upstream MH No. G-2	49. Downstream MH No. G-3
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Details

[illegible]

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MACP Inspection Form

Header Section

General Information

1. Surveyed By (1,2) Brian Garries	2. Certificate Number (1,2) P0035046-122021	3. Reviewed By	4. Reviewer Certificate No.
5. Owner Marathon	6. Customer	7. P/O Number	8. Work Order
9. Media Label	10. Project 2024 OWS	11. Date (1,2) YYYYMMDD 20240613	12. Time 14:24
13. Sheet Number (1,2) 3	14. Weather 1	15. Pre-Cleaning (2) L	16. Date Cleaned YYYYMMDD 20240613
17. Purpose of Survey (1,2) F	18. Inspection Level (1,2) 2	19. Inspection Status (1,2) CI	20. Consequence of Failure

Location

21. Drainage Area TANK FARM	22. MH/Access Point No. (1,2) G-2	23. Street (1,2) TANK FARM	24. City (1,2) Anacortes, WA
25. Location Code (2) Z	26. Surface Type (2) ASPHALT	27. Inflow Potential from Runoff	28. Location Details

Manhole

29. MH Use (2) PR	30. Access Type (1,2) AMH	31. Year Constructed YYYY	32. Year Renewed YYYY	33. Evidence of Surcharge (2) N
-----------------------------	-------------------------------------	------------------------------	--------------------------	---

Measurements

34. Rim to Invert (2) N	35. Rim to Grade (2) N	36. Grade to Invert (2) N	37. Rim to Grade Exposed
38. Northing*	39. Easting*	40. Elevation**	41. Coordinate System*
42. Vertical Datum**		43. GPS Accuracy	
44. Additional Information			

Red font fields = Mandatory, Black font fields = Optional

*Entry required if Northing, Easting or Coordinate System data is recorded.

**Entry required if Elevation or Vertical Datum data is recorded.

Sketch

MACP Inspection Form

Manhole Component Observation Section

Cover

45. Type (2) SOLID	46. Shape (2) C	47. Size (2) N	48. Center Cover Size
49. Size Width (2) N	50. Cover Material (2) CAS	51. Hole Diameter (Vent) (2) N	52. Hole Number (2) 0
53. Bearing Surface Diameter (2) N	54. Bearing Surface Width (2) N	55. Cover/Frame Fit (2) G	56. Cover Condition (1,2) SOUND

Cover Insert

57. Insert Type (2) N	58. Cover Insert Condition (2)
--------------------------	--------------------------------

Cover Adjustment Ring

59. Ring Type (1, 2) N	60. Ring Material (2)	61. Ring Condition (1,2)	62. Ring Height
---------------------------	-----------------------	--------------------------	-----------------

Frame

63. Frame Material (2) CAS	64. Bearing Surface Width (2) N	65. Bearing Surface Depth (2) N	66. Clear Opening Diam (2) N
67. Clear Opening Width (2) N	68. Frame Condition (1,2) SOUND	69. Seal Condition (2) SOUND	70. Offset Distance (2) 0
71. Seal Inflow (2) N	72. Frame Depth		

Chimney

73. Chimney Present (2) Y	74. First Material (2) CR	75. Second Material	76. Chimney I/I
77. Clear Opening	78. Chimney Depth (2) N	79. Lining Interior	80. Lining Exterior
			81. Chimney Condition (1) SOUND

Cone

82. Type (2) FT	83. Material (2) CR	84. Depth (2) N
85. Lining Interior	86. Lining Exterior	87. Cone Condition (1) SOUND

Wall

88. Wall Diameter (Length)	89. Wall by Size (Width)	90. Material (2) CR	91. Depth (2) N
92. Wall Lining Interior	93. Wall Lining Exterior	94. Wall Condition (1) SOUND	

Bench

95. Bench Present (2) Y	96. Bench Material (2) CR	97. Bench Lining	98. Bench Condition (1) SOUND
----------------------------	------------------------------	------------------	----------------------------------

Channel

99. Channel Installed (2) N	100. Channel Material (2)	101. Type (2)	102. Exposure (2)	103. Channel Condition(1)
--------------------------------	---------------------------	---------------	-------------------	---------------------------

Steps

104. Number (2) 4	105. Material (2) M
----------------------	------------------------

Additional Component Information

106. Additional Component Information

Pipe Connections

107. Pipe No. (2)	108. Clock Pos (2)	109. Rim to Invert (2)	110. Direction (2)	111. Material (2)	112. Shape (2)	113. Height (Diam) (2)	114. Width (2)	115. Cond (2)	116. Seal Cond (2)	117. Pipe Type (2)	118. Struct ID	119. Comment
1	06	N	OUT	CP	C	8	8	S	S	GR		
2	12	N	IN	CP	C	8	8	S	S	OU		
3	12	N	IN	CP	C	8	8	S	S	OL		
4	03	N	IN	CP	C	8	8	S	S	IU		

1= Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required

Manhole Component Defect Section

1. Surveyed By (1,2) Brian Garries	5. Owner Marathon	11. Date (1,2) 20240730 YYYYMMDD	13. Sheet Number (1,2) 4	22. MH/Access Point No. (1,2) G-2
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[illegible]

1= Mandatory Level 1 Inspection Required, 2 = Mandatory Level 2 Inspection Required



PACP Inspection Form

Header Section

Red font fields = Mandatory, Black font fields = Optional



General Information

1. Surveyed by Brian Garries	2. Certificate No. P0035046-122021	3. Reviewed by	4. Reviewer Certificate No.
5. Owner Marathon	6. Customer	7. P/O Number	8. Work Order Number
9. Media Label	10. Project 2024 OWS	11. Date 20240617 YYYYMMDD	12. Time 13:28 HH:MM
13. Sheet Number 1	14. Weather 1	15. Pre-Cleaning L	16. Date Cleaned 20240617 YYYYMMDD
17. Flow Control	18. Purpose of Survey F	19. Direction of Survey D	20. Inspection Technology Used CC
21. Inspection Status CI	22. Consequence of Failure	23. Pressure Value	

Location

24. Drainage Area	25. Pipe Segment Reference	26. Street (Name & Number) TANK FARM
27. City Anacortes, WA	28. Location Code	29. Location Details

Pipe

30. Pipe Use PR	31. Height (Diameter) 8	32. Width 8	33. Shape C
34. Material VCP	35. Lining Method	36. Coating Method	37. Pipe Joint Length 3.5
38. Total Length 295	39. Length Surveyed 242.2	40. Year Constructed YYYY	41. Year Renewed YYYY

Measurements

42. Upstream MH No. G-3	43. Upstrm MH Rim to Invert	44. Upstrm MH Rim to Grade	45. Upstrm MH Grade to Invert
46. Upstream MH Northing*	47. Upstream MH Easting*	48. Upstream MH Elevation**	
49. Downstream MH No. G-4	50. Downstream MH Rim to Invert	51. Downstream MH Rim to Grade	
52. Downstream MH Grade to Invert	53. Downstream MH Northing*	54. Downstream MH Easting*	
55. Downstream MH Elevation**	56. MH Coordinate System*	57. MH Vertical Datum**	58. GPS Accuracy
59. Additional Information			

*Entry required if Northing, Easting or Coordinate System data is recorded.

**Entry required if Elevation or Vertical Datum data is recorded.

Sketch

USMH	DSMH

Details Section

Details

Red font fields = Mandatory, Black font fields = Optional



PACP Inspection Form

Header Section

Red font fields = Mandatory, Black font fields = Optional



General Information

1. Surveyed by Brian Garries	2. Certificate No. P0035046-122021	3. Reviewed by	4. Reviewer Certificate No.
5. Owner Marathon	6. Customer	7. P/O Number	8. Work Order Number
9. Media Label	10. Project 2024 OWS	11. Date YYYYMMDD 20240619	12. Time HH:MM
14. Weather	15. Pre-Cleaning	16. Date Cleaned YYYYMMDD 20240619	17. Flow Control
19. Direction of Survey U	20. Inspection Technology Used CC	21. Inspection Status CI	
22. Consequence of Failure		23. Pressure Value	

Location

24. Drainage Area	25. Pipe Segment Reference	26. Street (Name & Number) TANK FARM
27. City Anacortes, WA	28. Location Code	29. Location Details

Pipe

30. Pipe Use PR	31. Height (Diameter) 10	32. Width 10	33. Shape C
34. Material VCP	35. Lining Method	36. Coating Method	37. Pipe Joint Length 3.5
38. Total Length	39. Length Surveyed 45.9	40. Year Constructed YYYY	41. Year Renewed YYYY

Measurements

42. Upstream MH No. G-3	43. Upstrm MH Rim to Invert	44. Upstrm MH Rim to Grade	45. Upstrm MH Grade to Invert
46. Upstream MH Northing*	47. Upstream MH Easting*	48. Upstream MH Elevation**	
49. Downstream MH No. G-4	50. Downstream MH Rim to Invert	51. Downstream MH Rim to Grade	
52. Downstream MH Grade to Invert	53. Downstream MH Northing*	54. Downstream MH Easting*	
55. Downstream MH Elevation**	56. MH Coordinate System*	57. MH Vertical Datum**	58. GPS Accuracy
59. Additional Information			

*Entry required if Northing, Easting or Coordinate System data is recorded.

**Entry required if Elevation or Vertical Datum data is recorded.

Sketch

USMH 	DSMH
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PACP Inspection Form

Details Section

1. Surveyed by Brian Garries	5. Owner Marathon	11. Date 20240730	13. Sheet No. 2	42. Upstream MH No. G-3	49. Downstream MH No. G-4
---------------------------------	----------------------	----------------------	-----------------------	----------------------------	------------------------------

Details

[illegible]

Red font fields = Mandatory, Black font fields = Optional



PACP Inspection Form

Header Section

Red font fields = Mandatory, Black font fields = Optional



General Information

1. Surveyed by Brian Garries	2. Certificate No. P0035046-122021	3. Reviewed by	4. Reviewer Certificate No.
5. Owner Marathon	6. Customer	7. P/O Number	8. Work Order Number
9. Media Label	10. Project 2024 OWS	11. Date 20240620 YYYYMMDD	12. Time 11:22 HH:MM
13. Sheet Number 1	14. Weather 1	15. Pre-Cleaning L	16. Date Cleaned 20240620 YYYYMMDD
17. Flow Control	18. Purpose of Survey F	19. Direction of Survey D	20. Inspection Technology Used CC
21. Inspection Status CI	22. Consequence of Failure	23. Pressure Value	

Location

24. Drainage Area	25. Pipe Segment Reference	26. Street (Name & Number) TANK FARM
27. City Anacortes, WA	28. Location Code	29. Location Details

Pipe

30. Pipe Use PR	31. Height (Diameter) 10	32. Width 10	33. Shape C
34. Material VCP	35. Lining Method	36. Coating Method	37. Pipe Joint Length 3.5
38. Total Length 290	39. Length Surveyed 268.6	40. Year Constructed YYYY	41. Year Renewed YYYY

Measurements

42. Upstream MH No. G-6	43. Upstrm MH Rim to Invert	44. Upstrm MH Rim to Grade	45. Upstrm MH Grade to Invert
46. Upstream MH Northing*	47. Upstream MH Easting*	48. Upstream MH Elevation**	
49. Downstream MH No. G-7	50. Downstream MH Rim to Invert	51. Downstream MH Rim to Grade	
52. Downstream MH Grade to Invert	53. Downstream MH Northing*	54. Downstream MH Easting*	
55. Downstream MH Elevation**	56. MH Coordinate System*	57. MH Vertical Datum**	58. GPS Accuracy
59. Additional Information			

*Entry required if Northing, Easting or Coordinate System data is recorded.

**Entry required if Elevation or Vertical Datum data is recorded.

Sketch

USMH	DSMH

PACP Inspection Form

Details Section

1. Surveyed by Brian Garries	5. Owner Marathon	11. Date 20240731	13. Sheet No. 2	42. Upstream MH No. G-6	49. Downstream MH No. G-7
---------------------------------	----------------------	----------------------	-----------------------	----------------------------	------------------------------

Details

[illegible]

Red font fields = Mandatory, Black font fields = Optional



PACP Inspection Form

Header Section

Red font fields = Mandatory, Black font fields = Optional



General Information

1. Surveyed by Brian Garries	2. Certificate No. P0035046-122021	3. Reviewed by	4. Reviewer Certificate No.
5. Owner Marathon	6. Customer	7. P/O Number	8. Work Order Number
9. Media Label	10. Project 2024 OWS	11. Date 20240625 YYYYMMDD	12. Time 09:53 HH:MM
13. Sheet Number 1	14. Weather 1	15. Pre-Cleaning L	16. Date Cleaned 20240625 YYYYMMDD
17. Flow Control	18. Purpose of Survey F	19. Direction of Survey D	20. Inspection Technology Used CC
21. Inspection Status CI	22. Consequence of Failure	23. Pressure Value	

Location

24. Drainage Area	25. Pipe Segment Reference	26. Street (Name & Number) TANK FARM
27. City Anacortes, WA	28. Location Code	29. Location Details

Pipe

30. Pipe Use PR	31. Height (Diameter) 10	32. Width 10	33. Shape C
34. Material VCP	35. Lining Method	36. Coating Method	37. Pipe Joint Length 3.5
38. Total Length 380	39. Length Surveyed 361.7	40. Year Constructed YYYY	41. Year Renewed YYYY

Measurements

42. Upstream MH No. G-7	43. Upstrm MH Rim to Invert	44. Upstrm MH Rim to Grade	45. Upstrm MH Grade to Invert
46. Upstream MH Northing*	47. Upstream MH Easting*	48. Upstream MH Elevation**	
49. Downstream MH No. G-8	50. Downstream MH Rim to Invert	51. Downstream MH Rim to Grade	
52. Downstream MH Grade to Invert	53. Downstream MH Northing*	54. Downstream MH Easting*	
55. Downstream MH Elevation**	56. MH Coordinate System*	57. MH Vertical Datum**	58. GPS Accuracy
59. Additional Information			

*Entry required if Northing, Easting or Coordinate System data is recorded.

**Entry required if Elevation or Vertical Datum data is recorded.

Sketch

USMH	DSMH

Details Section

Details

Red font fields = Mandatory, Black font fields = Optional

APPENDIX D
NASSCO RATED SEWER DEFECT PHOTOGRAPHS

G-1B to G-1A

0.0 FT.

10:04 AM
06/24/24

G-1B to G-1A

5.4 FT.

10:05 AM
06/24/24

G-1B to G-1A

12.2 FT.

10:06 AM
06/24/24

01:20



G-1B to G-1A

15.7 FT.

10:06 AM

06/21/21

G-1B to G-1A

40.8 FT.

10:07 AM

06/24/24

G-1B to G-1A

43.6 FT.

10:07 AM
06/24/24

G-1B to G-1A

53.5 FT.

10:08 AM
06/24/24

G-1B to G-1A

63.5 FT.

10:08 AM

06/24/24

G-1B to G-1A

91.7 FT.

10:09 AM

06/24/24

G-1B to G-1A

120.5 FT.

10:10 AM

06/24/24

G-1B to G-1A

126.3 FT.

10:10 AM

06/24/24

G-1B to G-1A

138.1 FT.

10:11 AM
06/24/24

G-1B to G-1A

159.2 FT.

10:11 AM
06/24/24

G-1B to G-1A

163.8 FT.

10:11 AM

06/24/24

G-1B to G-1A

178.9 FT.

10:12 AM

06/24/24

G-1B to G-1A

222.0 FT.

10:13 AM

06/24/24

E-1B to G-1A

328.9 FT.

10:16 AM

06/24/24

G-1B to G-1A

333.0 FT.

10:16 AM

06/24/24

G-1A to G-1

0.0 FT.

01:27 PM

06/24/24

G-1A to G-1

6.3 FT.

01:29 PM

06/24/24

G-1A to G-1

7.5 FT.

01:29 PM

06/01/04

G-1A to G-1

89.0 FT.

01:32 PM

06/24/24

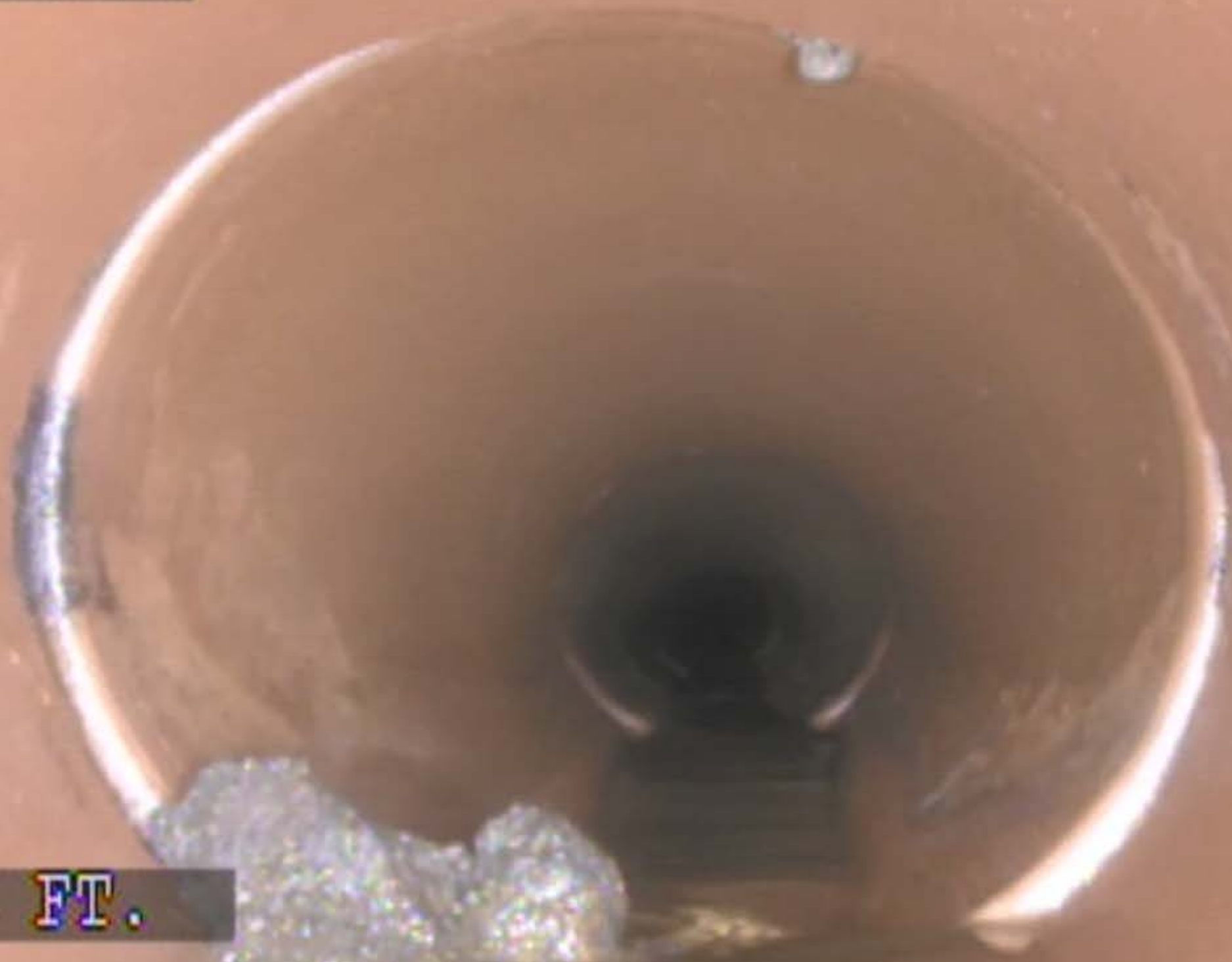
G-1A to G-1

112.0 FT.

01:33 PM

06/24/24

G-1A to G-1



127.9 FT.

01:34 PM

06/24/24

G-1A to G-1

163.7 FT.

01:35 PM

06/24/24

G-1A to G-1

174.0 FT.

01:36 PM

06/24/24

G-1A to G-1

179.3 FT.

01:36 PM

06/24/24

G-1A to G-1

186.3 FT.

01:36 PM

06/24/24

G-1A to G-1

224.1 FT.

01:37 PM

06/24/24

G-1A to G-1

233.9 FT.

01:38 PM

06/24/24

G-1A to G-1

290.4 FT.

01:39 PM

06/24/24

G-1A to G-1

343.4 FT.

01:41 PM

06/24/24

G-2 to G-3

0.4 FT.

02:01 PM
06/13/24

G-2 to G-3

30.5 FT.

02:03 PM
06/13/24

G-2 to G-3

70.7 FT.

02:04 PM

06/13/24

G-2 to G-3

74.3 FT.

02:04 PM

06/13/24

G-2 to G-3

78.7 FT.

02:04 PM
06/13/24

G-2 to G-3

89.8 FT.

02:05 PM
06/13/24

G-2 to G-3

99.2 FT.

02:05 PM
06/13/24

G-2 to G-3

107.2 FT.

02:06 PM
06/13/24

G-2 to G-3

113.3 FT.

02:06 PM
06/13/24

G-2 to G-3

123.5 FT.

02:06 PM
06/13/24

G-2 to G-3

144.9 FT.

02:07 PM

06/13/24

G-2 to G-3

196.0 FT.

02:08 PM

06/13/24

G-2 to G-3

232.0 FT.

02:09 PM

06/13/24

G-2 to G-3

255.8 FT.

02:10 PM
06/13/24

G-3 to G-4

4.5 FT.

01:28 PM

06/17/24

G-3 to G-4

14.3 FT.

01:29 PM

06/17/24

G-3 to G-4

21.1 FT.

01:29 PM
06/17/24



24.7 FT.

03:30 PM
06/19/24



38.4 FT.

03:34 PM

06/19/24

G-3 to G-4

51.1 FT.

01:30 PM
06/17/24

G-3 to G-4

64.9 FT.

01:31 PM
06/17/24

G-3 to G-4

70.4 FT.

01:32 PM
06/17/24

G-3 to G-4

78.8 FT.

01:32 PM

06/17/24

G-3 to G-4

121.0 FT.

01:33 PM
06/17/24

G-3 to G-4

131.7 FT.

01:35 PM

06/17/24

G-3 to G-4

186.4 FT.

01:38 PM
06/17/24

G-3 to G-4

210.0 FT.

01:39 PM
06/17/24

G-3 to G-4

227.2 FT.

01:40 PM
06/17/24

G-3 to G-4



230.4 FT.

01:41 PM
06/17/24



24.5 FT.

03:30 PM

06/19/24

A close-up photograph of a circular opening in a concrete wall. The opening is dark and appears to be a tunnel or a large pipe. Inside this opening, there is a smaller, concentric circular hole. The concrete surrounding the opening is rough and textured. The lighting is somewhat dim, with some highlights on the edges of the opening.

38.8 FT.

03:34 PM

06/19/24

G-6 to G-7

0.0 FT.

11:22 AM

06/30/24

G-6 to G-7

0.9 FT.

11:23 AM
06/20/24

G-6 to G-7

33.3 FT.

11:24 AM

06/20/24

G-6 to G-7

49.5 FT.

11:25 AM

06/20/24

G-6 to G-7

56.5 FT.

11:25 AM

06/20/24

G-6 to G-7

61.8 FT.

11:26 AM
06/20/24

G-6 to G-7

71.9 FT.

11:26 AM
06/20/24

G-6 to G-7

75.7 FT.

11:27 AM

06/20/24

G-6 to G-7

78.9 FT.

11:27 AM
06/20/24

G-6 to G-7

91.3 FT.

11:28 AM

06/20/24

G-6 to G-7

97.6 FT.

11:29 AM

06/20/24

G-6 to G-7

126.6 FT.

11:30 AM
06/20/24

G-6 to G-7

146.8 FT.

11:31 AM
06/20/24

G-6 to G-7

147.8 FT.

11:31 AM

06/20/24

G-6 to G-7

157.1 FT.

11:32 AM
06/20/24

G-6 to G-7

165.8 FT.

11:32 AM

06/20/24

G-6 to G-7

171.0 FT.

11:32 AM
06/20/24

G-6 to G-7

180.7 FT.

11:33 AM

06/20/24

G-6 to G-7

182.2 FT.

11:33 AM
06/20/24

G-6 to G-7

184.2 FT.

11:34 AM

06/20/24

G-6 to G-7

189.6 FT.

11:34 AM

06/20/24

G-6 to G-7

191.6 FT.

11:34 AM
06/20/24

G-6 to G-7

219.0 FT.

11:35 AM

06/20/24

G-6 to G-7

262.6 FT.

11:36 AM
06/20/24

G-7 to G-8

Double-click to go to fullscreen, ctrl+click to snap to video size

0.0 FT.

09:53 AM

06/25/24

G-7 to G-8

5.1 FT.

09:53 AM

06/25/24

G-7 to G-8

14.4 FT.

09:54 AM

06/25/24

G-7 to G-8

31.6 FT.

09:54 AM

06/25/24

G-7 to G-8



45.9 FT.

09:55 AM
06/25/24

G-7 to G-8

52.6 FT.

09:55 AM

06/25/24

G-7 to G-8

68.3 FT.

09:55 AM

06/25/24

G-7 to G-8

73.7 FT.

09:56 AM

06/25/24

G-7 to G-8

87.6 FT.

09:56 AM

06/25/24

G-7 to G-8

99.2 FT.

09:56 AM

06/25/24

G-7 to G-8

105.9 FT.

09:57 AM

06/25/24

G-7 to G-8

110.4 FT.

09:58 AM

06/25/24

G-7 to G-8

138.7 FT.

09:59 AM

06/25/24

G-7 to G-8

143.7 FT.

09:59 AM

06/25/24

G-7 to G-8

183.6 FT.

10:00 AM

06/25/24

G-7 to G-8

219.6 FT.

10:01 AM

06/25/24

G-7 to G-8

233.0 FT.

10:01 AM

06/25/24

G-7 to G-8

271.2 FT.

10:02 AM

06/25/24

G-7 to G-8

344.9 FT.

10:04 AM

06/25/24

G-7 to G-8

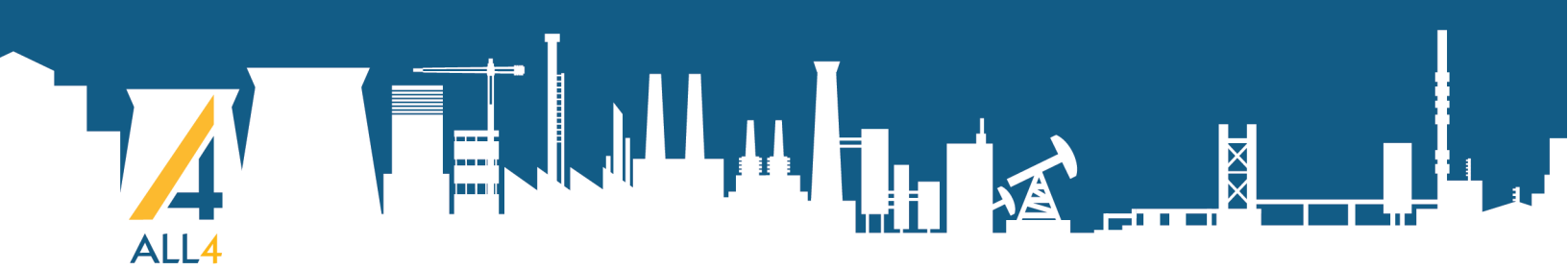


358.3 FT.

10:05 AM

06/25/24

APPENDIX E
2024 SAMPLING AND ANALYSIS PLANS



ALL4

SAMPLING AND ANALYSIS PLAN

SWMU-12 OILY WATER SEWER

AREA OF CONCERN-1

MARATHON ANACORTES REFINERY

SUBMITTED BY:

SEPTEMBER 30, 2024

SUBMITTED TO:



ALL4 LLC

228 East Champion Street Suite 101
Bellingham, WA 98225



Marathon Anacortes Refinery

Environmental Department
10200 March's Point Road
Anacortes, Washington

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<u>Section Name</u>	<u>Page Number</u>
1. INTRODUCTION AND BACKGROUND INFORMATION	1-1
2. SAMPLING AND ANALYSIS PLAN.....	2-1
2.1 PROJECT SCHEDULE.....	2-1
2.2 HEALTH AND SAFETY	2-1
2.3 SITE CHARACTERIZATION PROCEDURES.....	2-1
2.3.1 Preliminary Activities.....	2-1
2.3.2 Proposed Monitoring Well Locations.....	2-1
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2.3.6 Waste Materials Handling Procedures.....	2-4
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2.5 SITE CHARACTERIZATION REPORT.....	2-5
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Appendix A - Figures



1. INTRODUCTION AND BACKGROUND INFORMATION

This sampling and analysis plan (SAP) has been created to guide the continued site characterization of Area of Concern-1 (AOC-1) identified in the 2022 Oily Water Sewer Annual Progress Report (Mott MacDonald, 2023). This SAP has been prepared in accordance with Agreed Order No. DE 16299 (AO), the Marathon Anacortes Refinery Oily Water Sewer Investigation and Response Plan (IRP; Mott MacDonald, 2022), and Table 6.4 of the Washington State Department of Ecology's Guidance for Remediation of Petroleum Sites (Guidance). All figures referenced in this report are located in Appendix A.

The Marathon Anacortes Refinery is located at 10200 March's Point Road in Anacortes, Washington (Figure A-1). AOC-1 is located along "F" Street between manholes F-4 and F-3 (Figure A-2).

The site characterization of AOC-1 was initiated in September 2023 to determine if a release had occurred from the oily water sewer. Eight soil samples and one groundwater sample were collected, and a release was confirmed following the review of laboratory analytical results. Soil sample *2023-13-09-B8-8ft* and groundwater sample *2023-12-09-B5-8ft* contained petroleum constituents at concentrations that exceeded the Model Toxics Control Act (MTCA) target cleanup levels. A map showing the location of samples collected during the 2023 site characterization is provided as Figure A-2.

Further site characterization of AOC-1 will occur in 2024 to determine the horizontal and vertical extent of soil contamination and the potential impact to groundwater.



2. SAMPLING AND ANALYSIS PLAN

2.1 PROJECT SCHEDULE

The site characterization sampling outlined in this SAP will occur in October of 2024.

2.2 HEALTH AND SAFETY

ALL4 personnel will adhere to both the Marathon Anacortes Refinery safe-work practices as well as company safety policies. All work will be properly permitted, and all site characterization, sampling, and screening will be conducted by competent and trained personnel.

2.3 SITE CHARACTERIZATION PROCEDURES

The following sections describe the soil and groundwater sampling procedures to be applied in the field.

2.3.1 Preliminary Activities

Prior to the onset of field activities, an underground utility locate will be completed at the site. All appropriate permit(s) will be obtained from Marathon Anacortes Refinery Operations. All soil boring locations will be marked with white paint prior to the start of work.

2.3.2 Proposed Monitoring Well Locations

Four groundwater monitoring wells will be installed near the sample locations that exceeded MTCA cleanup levels in 2023 (Figure A-3). Historic potentiometric contours for the upper most aquifer underlying the site (Unit S2) suggest groundwater flow is to the north and east (PGG, 1995).



The following groundwater monitoring wells and well locations will be installed to evaluate soil and groundwater conditions:

24-1S: 50 ft north of groundwater sample *2023-12-09-B5-8ft*

24-2S: 50 ft west of groundwater sample *2023-12-09-B5-8ft*

24-3S: At the location of groundwater sample *2023-12-09-B5-8ft*

24-4S: 50 ft south* of groundwater sample *2023-12-09-B5-8ft*

A map showing the monitoring well locations is provided as Figure A-3.

Further site characterization to the immediate east of AOC-1 is inaccessible due to critical infrastructure. All monitoring wells will be installed to a depth of 15 ft bgs. Depth to groundwater in the vicinity of AOC-1 is generally 3.5 ft bgs (PGG, 1995).

2.3.3 Monitoring Well Installation and Soil Sample Collection

A licensed driller will be contracted to advance borings at the proposed locations to 15 ft bgs using a hollow-stem auger drill rig. The wells will be constructed with machine slotted, 2-inch diameter PVC pipe. The well screen lengths will be 10 ft and the top of the PVC well casing will be protected with either bollards surrounding the well stick-up or a flush mounted well monument. Soil cuttings will be temporarily stored on-site in 55-gallon drums for proper disposal following the conclusion of well installation activities. ALL4 personnel will be on-site to describe the soil cores during the drilling work. Soil descriptions will generally follow ASTM D 2487 Unified Soil Classification System procedures for description and identification of soils. Visual oil staining or odoriferous indications of contamination will be recorded.

Soil samples will be field screened for evidence of petroleum impacts. Soil will be placed in a plastic re-sealable bag and the tip of a photo-ionization detector (PID) will be inserted into the plastic bag to measure organic vapor concentrations in the headspace. The PID measurement will be recorded in the field notebook. The organic vapor headspace analyses will be conducted using a MiniRAE Model 3000 PID

* Upon the indication of contamination during soil field screening, 24-4S will be moved 50 ft further south to encompass all potential contamination within the system of monitoring wells. Soil indicative of contamination generally has a photoionization detector (PID) reading above 50 ppm and may exhibit a sheen.



equipped with a 10.6 eV lamp (or equivalent). At a minimum, the PID will be calibrated prior to the start of sample collection in accordance with manufacturer's specifications using a hexane or isobutylene standard. The calibration gas and concentration will be recorded in the field notebook.

Sheen tests will be conducted using a portion of the soil core and distilled water. Sheen tests will be recorded as: NS – no sheen, SS – slight sheen, MS – moderate sheen, and HS – heavy sheen.

A minimum of one soil sample will be collected from each soil boring where field screening indicates the presence of petroleum compounds, or as the geology dictates (i.e., sand lenses, top of water table, etc.). Soil samples will be collected as discrete samples and placed in containers provided by the laboratory. Soil samples for volatile constituents will be collected using Environmental Protection Agency Method 5035A procedures. One duplicate soil sample will be collected and analyzed during this sampling event.

Each soil sample will be identified with a unique sample designation included on the sample label. Samples will be identified by both the monitoring well from which they originated and the depth from which they were collected (i.e. *24-1S 8ft* for a sample collected from Monitoring Well 24-1S at a depth of 8 ft). The duplicate sample will be identified as *AOC1-Dup-1*.

Standard industry protocol regarding sample collection, preservation, chain-of-custody, and shipping will be followed.

2.3.4 Groundwater Monitoring

The groundwater monitoring wells will be purged and developed using disposable bailers prior to sampling. The purged water will be temporarily stored and discharged to the nearest drain connected to the oily-water sewer system.

The monitoring well system will be sampled on a quarterly basis. The depth of groundwater will be measured in each well prior to sampling. Sampling will be conducted using a low-flow sampling technique. A YSI Model 556 multi probe meter will be used in conjunction with a flow-through cell to monitor



groundwater chemistry during the low-flow purging process. Purging is considered adequate and groundwater samples will be collected once the water chemistry parameters have stabilized.

Following the review of laboratory analytical results of the first sampling event, the extent of further groundwater monitoring will be reassessed.

2.3.5 Decontamination Procedures

All sampling equipment will be decontaminated prior to and between each sampling event to reduce the potential for cross contamination. Decontamination will be conducted using Alconox detergent followed by a distilled water rinse.

2.3.6 Waste Materials Handling Procedures

Soil cuttings generated from the drilling or sampling will be stored on-site in properly labeled 55-gallon drums. The soil will be removed from the site and transported under manifest to a client- and regulatory-approved facility for recycling or disposal. Decontamination fluids and purge water from well development and sampling activities will be treated in the Marathon Anacortes Refinery wastewater treatment plant (WWTP).

Any waste materials other than soil cuttings/fluids generated by sampling activities will be disposed of appropriately.

2.4 LABORATORY ANALYSIS AND PROCEDURES

Samples will be analyzed for known or suspected contaminants of concern in the wastewater conveyed by the oily water sewer piping per the IRP.

Soil samples will be analyzed for the following:

- NWEPH and NWVPH: Extractable and volatile petroleum hydrocarbons (EPH and VPH)



- NWTPH-Gx: Volatile range total petroleum hydrocarbons (TPH)
- NWTPH-Dx: Diesel range TPH, motor oil range TPH
- EPA Method 8260: Benzene, toluene, ethylbenzene, and xylenes (BTEX), hexane, ethylene dibromide (EDB), ethylene dichloride (EDC), methyl tert-butyl ether (MTBE)
- EPA Method 8270 SIM: Carcinogenic polycyclic aromatic hydrocarbons (cPAHs)
- EPA Method 6020: Arsenic, barium, cadmium, lead, mercury, selenium, and silver
- EPA Method 7471: Mercury

Groundwater samples will be analyzed for the following:

- NWTPH-Gx: Volatile range TPH
- NWTPH-Dx: Diesel range TPH, motor oil range TPH
- EPA Method 8021: Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- EPA Method 8270 SIM: cPAHs
- EPA Method 200.8: Arsenic, barium, cadmium, lead, mercury, selenium, and silver
- EPA Method 245.1: Mercury

Laboratory analysis will be performed by ALS Laboratory Group (ALS) in Everett, Washington. ALS is an Ecology accredited laboratory. The laboratories are expected to meet all relevant quality assurance/quality control (QA/QC) requirements presented in Ecology and EPA protocols. All reports from the laboratory will be accompanied by QC results and any other necessary analytical information to enable the project manager to determine the quality of the data.

2.5 SITE CHARACTERIZATION REPORT

Following the completion of the site characterization, a report will be prepared documenting the investigation results. The report will include summary data tables, site maps showing the site location and sample locations, and original laboratory analytical reports. The information will be included in the 2024 Oily Water Sewer Annual Progress Report.



3. REFERENCES

Mott MacDonald. May 2022. Marathon Anacortes Refinery Oily Water Sewer Investigation and Response Plan, Anacortes, Washington.

Mott MacDonald. March 31, 2023. 2022 Annual Progress Report Oily Water Sewer Investigation, Marathon Anacortes Refinery.

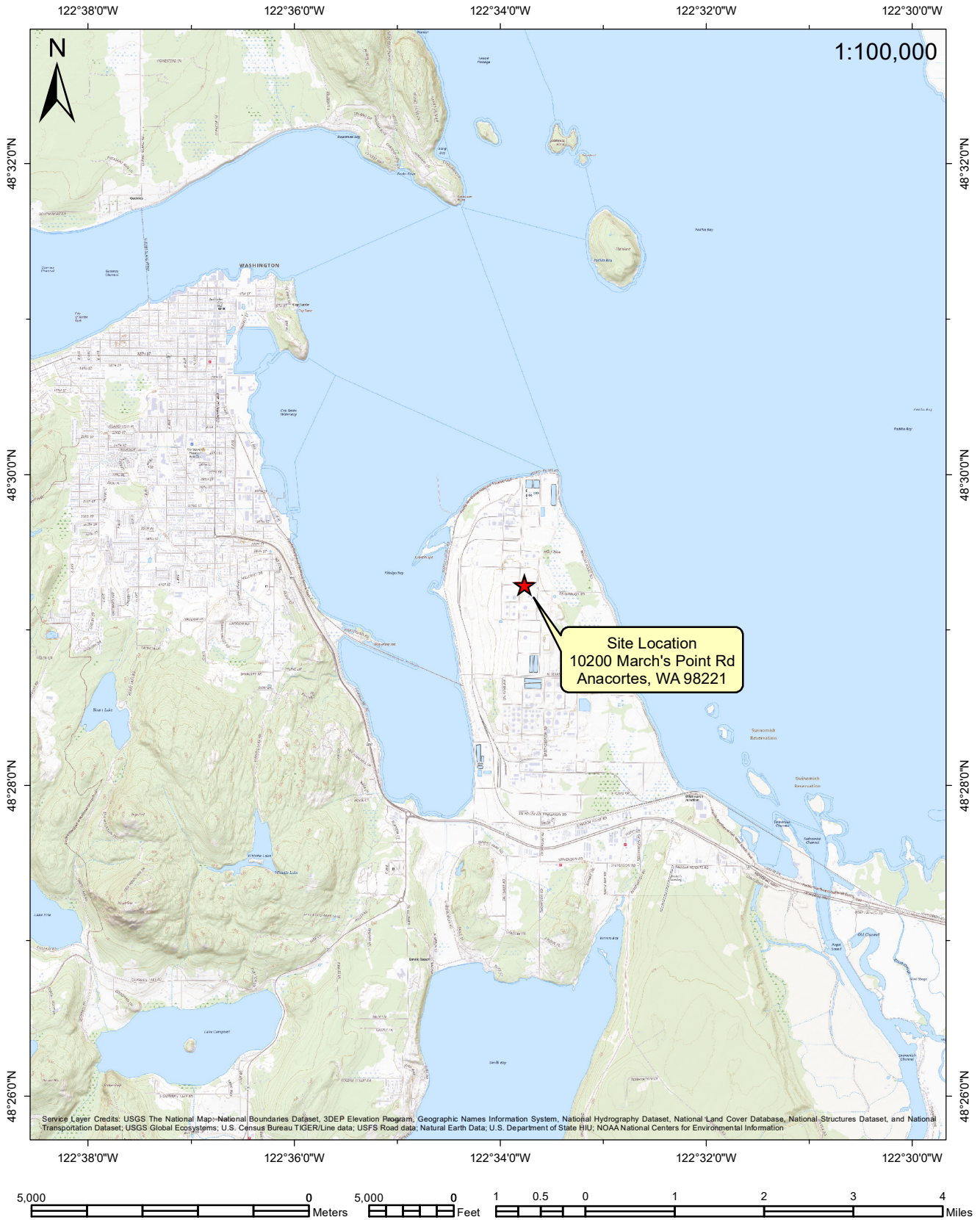
Pacific Groundwater Group. 1995. RCRA Facility Investigation Shell Anacortes Refinery Final Reports: SWMU 10, 17, 18, 20, 40. Phase II Report SWMU 12. Phase I Report SWMU 21. Volume 1.

Washington State Department of Ecology. 2023. Model Toxics Control Act Chapter 173-340 WAC. Publication No. 94-06.

Washington State Department of Ecology. 2021. Agreed Order for Interim Action – Oily Water Sewer (SWMU-12). No. DE 16299.

Washington State Department of Ecology. June 2016. Guidance for Remediation of Petroleum Contaminated Sites. Publication No. 10-09-057.

APPENDIX A - FIGURES



Prepared for:



Prepared by:

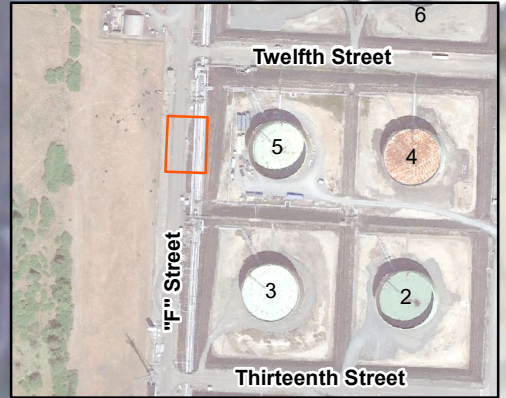


Site Location Map

Area of Concern-1
Sampling and Analysis Plan

6/14/2024

Figure A-1

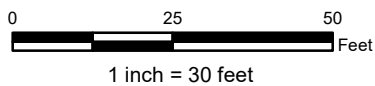


B5-8ft: Exceeded MTCA Method C Groundwater for benzene and arsenic

B8-8ft: Exceeded MTCA Method A Industrial Soil for volatile range TPH

- Exceeded MTCA Cleanup Levels
- Met MTCA Cleanup Levels

- Manhole
- Area of Concern-1
- Oily Water Sewer



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

2023 Site Characterization Sample Results

Prepared for:



Prepared by:

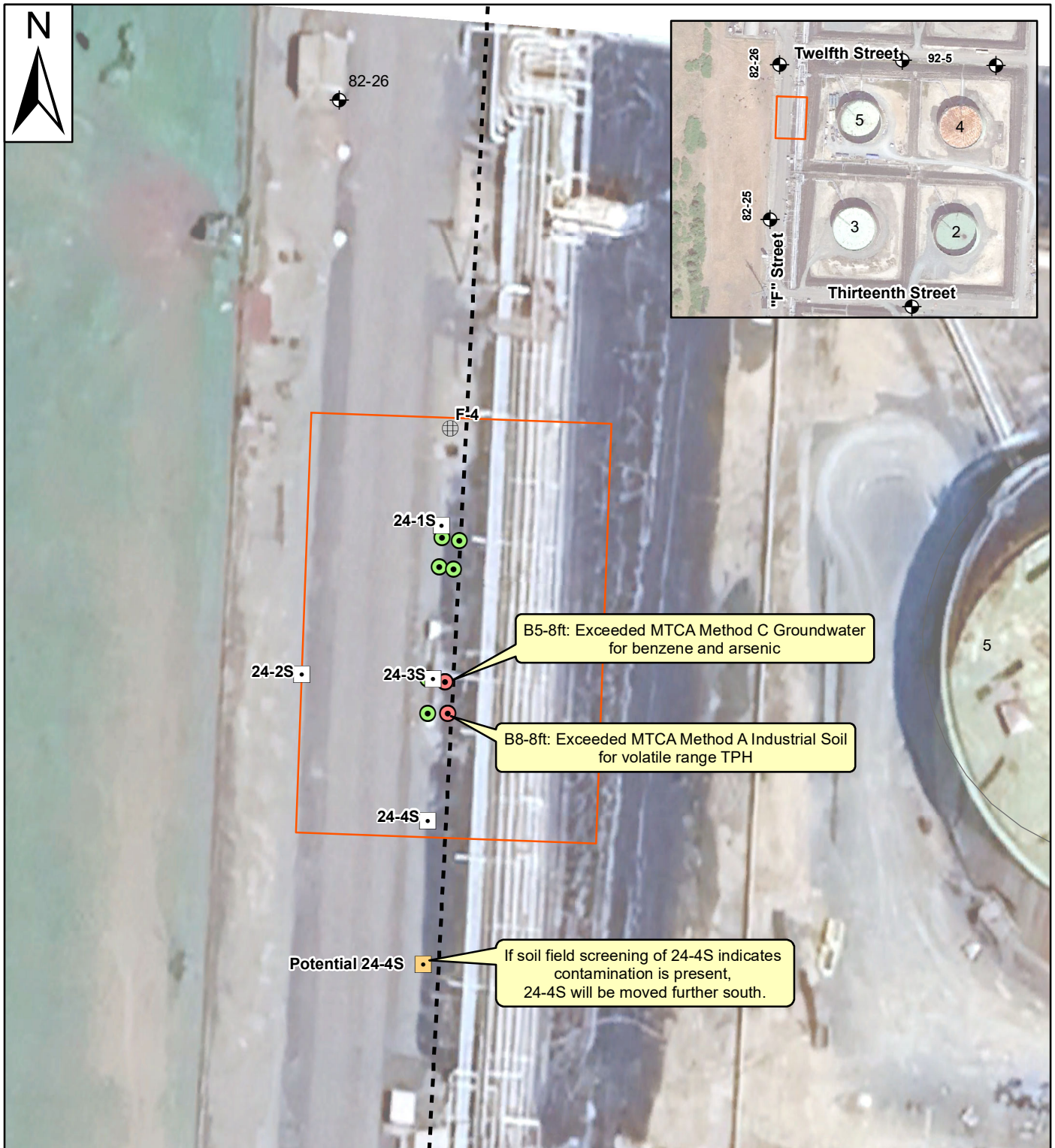


10200 March's Point Rd
Anacortes, WA 988221

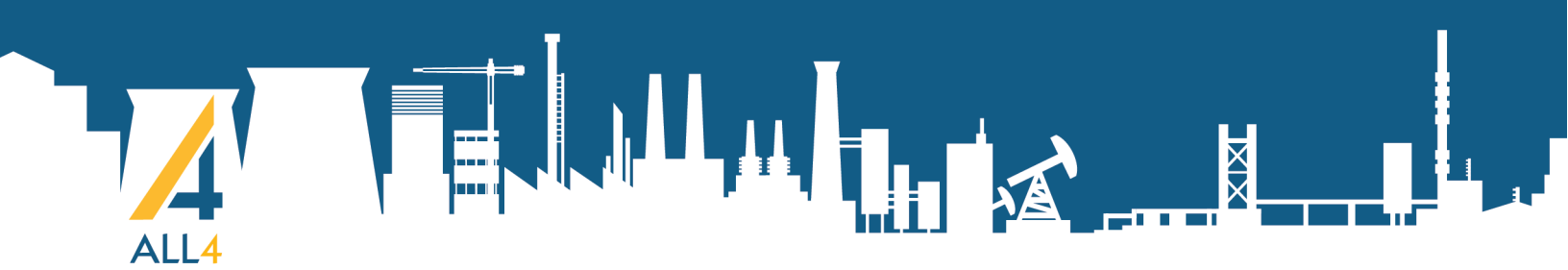
Area of Concern-1
Sampling and Analysis Plan

6/14/2024

Figure A-2



Monitoring Well Potential Monitoring Well	Exceeded MTCA Cleanup Levels Met MTCA Cleanup Levels	Manhole Area of Concern-1 Oily Water Sewer
0 40 80 Feet 1 inch = 50 feet	All data are approximate and should be used for relative location reference only.	Area of Concern-1 Monitoring Well Locations
Prepared for:	Prepared by:	10200 March's Point Rd Anacortes, WA 988221 Area of Concern-1 Sampling and Analysis Plan 6/14/2024 Figure A-3



ALL4

SAMPLING AND ANALYSIS PLAN

SWMU-12 OILY WATER SEWER

AREA OF CONCERN-2

MARATHON ANACORTES REFINERY

SUBMITTED BY:

SEPTEMBER 30, 2024

SUBMITTED TO:



ALL4 LLC

228 East Champion Street Suite 101
Bellingham, WA 98225



Marathon Anacortes Refinery

Environmental Department
10200 March's Point Road
Anacortes, Washington

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Appendix A - Figures



1. INTRODUCTION AND BACKGROUND INFORMATION

This sampling and analysis plan (SAP) has been created to guide the site characterization of Area of Concern-2 (AOC-2). This SAP has been prepared in accordance with Agreed Order No. DE 16299 (AO), the Marathon Anacortes Refinery Oily Water Sewer Investigation and Response Plan (IRP; Mott MacDonald, 2022), and Table 6.4 of the Washington State Department of Ecology's Guidance for Remediation of Petroleum Sites (Guidance). All figures referenced in this report are located in Appendix A.

The Marathon Anacortes Refinery is located at 10200 March's Point Road in Anacortes, Washington (Figure A-1). AOC-2 is located along "F" Street between manholes F-11 and F-12 (Figure A-2). The oily water sewer is approximately 8 ft below ground surface (bgs) at AOC-2.

AOC-2 was identified on November 1, 2023, when an oil sheen was observed in a stormwater ditch located approximately 130 ft north of manhole F-11. The location of the oil sheen was compared with oily water sewer video inspections recorded in 2023 (ALL4, 2024). It was concluded that the oil sheen was likely produced by a blockage within the sewer located approximately 237 ft north of manhole F-11 (Figure A-2).

Per the IRP, the site characterization of AOC-2 will occur in 2024 to determine the horizontal and vertical extent of soil contamination and the potential impact to groundwater.



2. SAMPLING AND ANALYSIS PLAN

2.1 PROJECT SCHEDULE

The site characterization sampling outlined in this SAP will occur in October of 2024.

2.2 HEALTH AND SAFETY

ALL4 personnel will adhere to both the Marathon Anacortes Refinery safe-work practices as well as company safety policies. All work will be properly permitted, and all site characterization, sampling, and screening will be conducted by competent and trained personnel.

2.3 SITE CHARACTERIZATION PROCEDURES

The following sections describe the soil and groundwater sampling procedures to be applied in the field.

2.3.1 Preliminary Activities

Prior to the onset of field activities, an underground utility locate will be completed at the site. All appropriate permit(s) will be obtained from Marathon Anacortes Refinery Operations. All boring locations will be marked with white paint prior to the start of work.

2.3.2 Proposed Soil Boring and Monitoring Well Locations

Six soil borings will be advanced within AOC-2 (Figure A-2). Monitoring wells will be installed in the northern most and southern most soil borings. Historic potentiometric contours for the underlying aquifer (Unit S3) suggest groundwater flow is to the north and east (PGG, 2015).



The following soil boring and monitoring well locations will be used to evaluate soil and groundwater conditions at AOC-2:

SB-1: 50 ft north of manhole F-11

SB-2: 125 ft north of manhole F-11

SB-3: 175 ft north of manhole F-11

SB-4: 225 ft north of manhole F-11

24-5: 275 ft north* of manhole F-11

24-6: 30 ft south* of manhole F-11

A map showing the borehole and monitoring well locations is provided as Figure A-2.

The depth to which monitoring wells 24-5 and 24-6 will be installed will be determined during soil field screening. The uppermost appearance of water within the 24-5 and 24-6 soil borings will be used as guidance in determining the proper depth of well installation.

The uppermost aquifer that underlies AOC-2 is Unit S3 (fine to medium grained sand; PGG, 2015). It is expected that the monitoring wells will be installed within this unit.

Unit T2 (clay with occasional sand or gravel lenses) lies above Unit S3 and contains areas of perched and/or discontinuous groundwater (PGG, 2015). If water is encountered in the soil borings before reaching Unit S3 and is present in an amount that suggests well recharge is viable, the monitoring wells will be installed within Unit T2.

Existing monitoring wells 14-3 and 92-P6 (Figure A-2) will be used to evaluate groundwater to the east and west of AOC-2. Monitoring well 14-3 is installed within Unit S3 to a depth of 45 ft bgs. Depth to groundwater is generally 37.5 ft bgs. Monitoring well 92-P6 is installed within Unit T2 to a depth of 26 ft bgs. Depth to groundwater is generally 14 ft bgs.

* Upon the indication of contamination during soil field screening, 24-5 and 24-6 will be moved further north and south of manhole F-11 to encompass all potential contamination within the system of monitoring wells. Soil indicative of contamination generally has a photoionization detector (PID) reading above 50 ppm and may exhibit a sheen.



2.3.3 Soil Boring and Soil Sampling Procedures

A licensed driller will be contracted to advance borings at the proposed locations using a hollow-stem auger drill rig. The wells will be constructed with machine slotted, 2-inch diameter PVC pipe. The well screen lengths will be 10 ft and the top of the PVC well casing will be protected with either a flush mounted well monument or a stick-up well monument protected by bollards. Soil cuttings will be temporarily stored on-site in 55-gallon drums for proper disposal following the conclusion of well installation activities.

ALL4 personnel will be on-site to describe the soil cores during the drilling work. Soil descriptions will generally follow ASTM D 2487 Unified Soil Classification System procedures for description and identification of soils. Visual oil staining or odoriferous indications of contamination will be recorded.

Soil samples will be field screened for evidence of petroleum impacts. Soil will be placed in a plastic re-sealable bag and the tip of a photo-ionization detector (PID) will be inserted into the plastic bag to measure organic vapor concentrations in the headspace. The PID measurement will be recorded in the field notebook. The organic vapor headspace analyses will be conducted using a MiniRAE Model 3000 PID equipped with a 10.6 eV lamp (or equivalent). At a minimum, the PID will be calibrated prior to the start of sample collection in accordance with manufacturer's specifications using a hexane or isobutylene standard. The calibration gas and concentration will be recorded in the field notebook.

Sheen tests will be conducted using a portion of the soil core and distilled water. Sheen tests will be recorded as: NS – no sheen, SS – slight sheen, MS – moderate sheen, and HS – heavy sheen.

A minimum of one soil sample will be collected from each soil boring where field screening indicates the presence of petroleum compounds, or as the geology dictates (i.e., sand lenses, top of water table, etc.). Soil samples will be collected as discrete samples and placed in containers provided by the laboratory. Soil samples for volatile constituents will be collected using Environmental Protection Agency Method 5035A procedures. One duplicate soil sample will be collected and analyzed during this sampling event.

Each soil sample will be identified with a unique sample designation included on the sample label. Samples will be identified by both the soil boring or monitoring well from which they originated and the depth



from which they were collected (i.e. *SB-1 8ft* for a sample collected from Soil Boring 1 at a depth of 8 ft). The duplicate sample will be identified as *AOC2-Dup-1*.

Standard industry protocol regarding sample collection, preservation, chain-of-custody, and shipping will be followed.

2.3.4 Groundwater Monitoring

Groundwater monitoring will be conducted using the existing monitoring wells 14-3 and 92-P6 to the east and west of AOC-2, as well as 24-5 and 24-6 that will be installed as part of this site characterization.

The newly installed wells will be purged and developed using disposable bailers prior to sampling. The purged water will be temporarily stored and discharged to the nearest drain connected to the oily-water sewer system.

The monitoring well system will be sampled on a quarterly basis. The depth of groundwater will be measured in each well prior to sampling. Sampling will be conducted using a low-flow sampling technique. A YSI Model 556 multi probe meter will be used in conjunction with a flow-through cell to monitor groundwater chemistry during the low-flow purging process. Purging is considered adequate and groundwater samples will be collected once the water chemistry parameters have stabilized.

Following the review of laboratory analytical results of the first sampling event, the extent of further groundwater monitoring will be reassessed.

2.3.5 Decontamination Procedures

All sampling equipment will be decontaminated prior to and between each sampling event to reduce the potential for cross contamination. Decontamination will be conducted using Alconox detergent followed by a distilled water rinse.



2.3.6 Waste Materials Handling Procedures

Soil cuttings generated from the drilling or sampling will be stored on-site in properly labeled 55-gallon drums. The soil will be removed from the site and transported under manifest to a client- and regulatory-approved facility for recycling or disposal. Decontamination fluids and purge water from well development and sampling activities will be treated in the Marathon Anacortes Refinery wastewater treatment plant (WWTP).

Other waste materials generated by sampling activities will be disposed of appropriately.

2.4 LABORATORY ANALYSIS AND PROCEDURES

Samples will be analyzed for known or suspected contaminants of concern in the wastewater conveyed by the oily water sewer piping per the IRP.

Soil samples will be analyzed for the following:

- NWEPH and NWVPH: Extractable and volatile petroleum hydrocarbons (EPH and VPH)
- NWTPH-Gx: Volatile range total petroleum hydrocarbons (TPH)
- NWTPH-Dx: Diesel range TPH, motor oil range TPH
- EPA Method 8260: Benzene, toluene, ethylbenzene, and xylenes (BTEX) hexane, ethylene dibromide (EDB), ethylene dichloride (EDC), methyl tert-butyl ether (MTBE)
- EPA Method 8270 SIM: Carcinogenic polycyclic aromatic hydrocarbons (cPAHs)
- EPA Method 6020: Arsenic, barium, cadmium, lead, mercury, selenium, and silver
- EPA Method 7471: Mercury

Groundwater samples will be analyzed for the following:

- NWTPH-Gx: Volatile range TPH
- NWTPH-Dx: Diesel range TPH, motor oil range TPH
- EPA Method 8021: Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- EPA Method 8270 SIM: cPAHs
- EPA Method 200.8: Arsenic, barium, cadmium, lead, mercury, selenium, and silver



- EPA Method 245.1: Mercury

Laboratory analysis will be performed by ALS Laboratory Group (ALS) in Everett, Washington. ALS is an Ecology accredited laboratory. The laboratories are expected to meet all relevant quality assurance/quality control (QA/QC) requirements presented in Ecology and EPA protocols. All reports from the laboratory will be accompanied by QC results and any other necessary analytical information to enable the project manager to determine the quality of the data.

2.5 SITE CHARACTERIZATION REPORT

Following the completion of the site characterization, a report will be prepared documenting the investigation results. The report will include summary data tables, site maps showing the site location and sample locations, and original laboratory analytical reports. The information will be included in the 2024 Oily Water Sewer Annual Progress Report.



3. REFERENCES

ALL4. February 2024. Environmental Rating of 2023 Oily Water Sewer Video Inspections.

Mott MacDonald. May 2022. Marathon Anacortes Refinery Oily Water Sewer Investigation and Response Plan, Anacortes, Washington.

Pacific Groundwater Group. January 2015. SWMU 21 Final Phase II Report, Tesoro Refining and Marketing Company, Anacortes Refinery.

Washington State Department of Ecology. 2023. Model Toxics Control Act Chapter 173-340 WAC. Publication No. 94-06.

Washington State Department of Ecology. 2021. Agreed Order for Interim Action – Oily Water Sewer (SWMU-12). No. DE 16299.

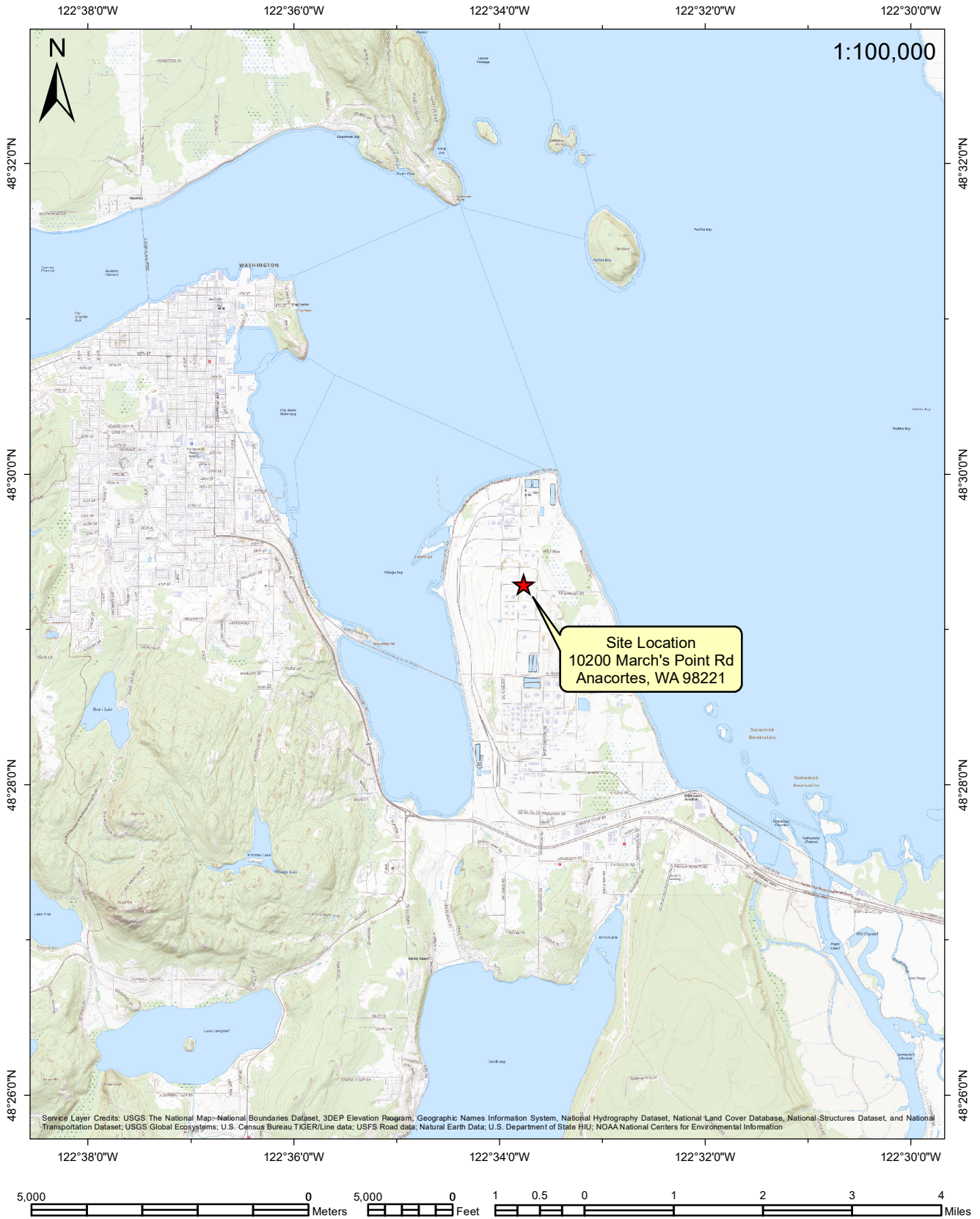
Washington State Department of Ecology. June 2016. Guidance for Remediation of Petroleum Contaminated Sites. Publication No. 10-09-057.

APPENDIX A - FIGURES

LIST OF FIGURES

Figure A-1 Site Location Map

Figure A-2 Area of Concern-2 Sample Locations



Prepared for:



Prepared by:

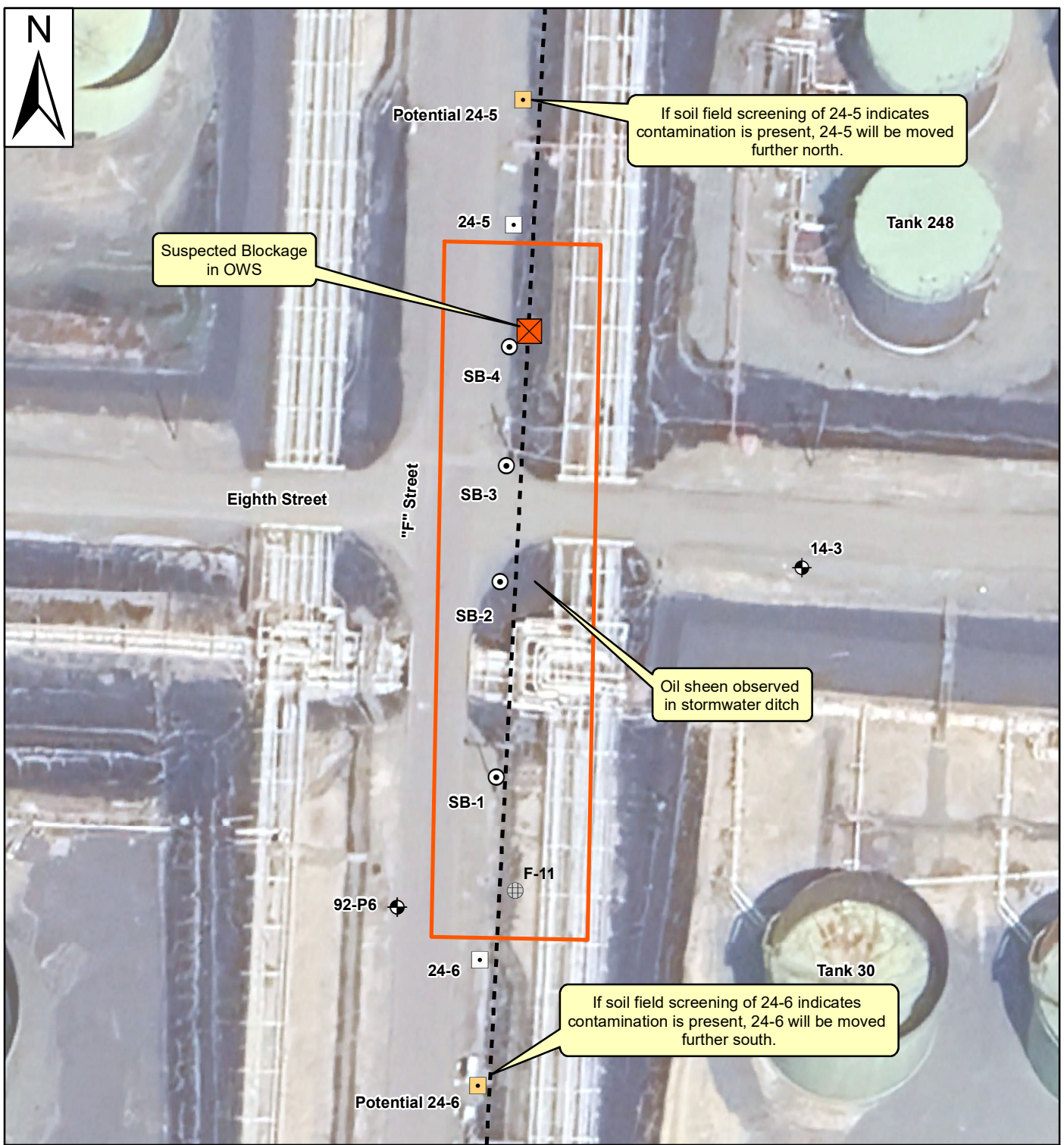


Site Location Map

Area of Concern-2
Sampling and Analysis Plan

6/14/2024

Figure A-1



Monitoring Well Potential Monitoring Well Soil Boring Active Well Manhole Suspected Blockage Area of Concern-2 Oily Water Sewer		0 30 60 Feet 1 inch = 60 feet		All data are approximate and should be used for relative location reference only. Area of Concern-2 Sample Locations	
Prepared for:		Prepared by:		10200 March's Point Rd Anacortes, WA 98221	
		Area of Concern-2 Sampling and Analysis Plan 6/14/2024		Figure A-2	

APPENDIX F
SOIL BORELOGS

Project: Oily Water Sewer Area of Concern-1	Sheet: 1 of 1
Client: Marathon	Drilled by: Brian S. - Cascade
Boring Number: 24-1S	Logged by: Thom D. - ALL4
Location: Northern most boring	First Encountered Water: 11 ft.
Date Completed: Preclearing completed 10/3/2024	Total Depth: 15 ft.
Hollow stem completed 10/8/2024	

Sheet: 1 of 1

Drilled by: Brian S. - Cascade

Logged by: Thom D. - ALL4

First Encountered Water: 11 ft.

Total Depth: 15 ft.

Hollow stem completed 10/8/2024

Depth	Description	Blow Count	Screening Results			Sample	
			Depth (ft)	PID (ppm)	Sheen		
	<i>(cleared top 5 ft with vac truck/hand auger)</i>	<i>Dames and Moore Split Spoon Sampler</i>					
Surface to 1.75 ft.	Quarry spall below road apron.						
1.75 to 3.0 ft.	Clayey silt with minor gravel, brown, hard, moist.		2'	1.0	NS		
			3'	3.0	VSS		
3.0 to 9.0 ft.	Silty fine sand, gray, firm, moist.		4'	2.0	VSS		
			5'	2.0	VSS		
			8'	1.5	VSS		
			<u>7.5-9 ft</u>				8-8.5 ft.
			20.20.22				
10.5 to 13.5 ft.	Silty fine to medium sand, brown, hard, moist.		<u>10.5-12 ft</u>	11'	0.0	VSS	13-13.5 ft.
			25.25.30	13'	0.0	NS	
13.5 to 14.0 ft.	Clayey fine sandy silt, gray, firm, moist.	<u>12.5-14 ft</u>	14'	0.0	NS		
		5.15.15					

www.all4inc.com

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

[illegible]

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

[illegible]

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

[illegible]

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

Hollow Stem Boring Log	
------------------------	--

Project: Oily Water Sewer Area of Concern-2 Sheet: 1 of 1

Client: Marathon	Drilled by: Brian S. - Cascade
Boring Number: SB-4	Logged by: Thom D. - ALL4

Location: East side of "F" Street, ~50 ft. north of SB-1.	First Encountered Water: NA
Date Completed: Preclearing completed 10/7/2024	Total Depth: 16.5 ft.

Hollow stem completed 10/9/2024				
			Screening Results	

Depth	Description	Blow Count	Depth	PID	Sheen	Sample
			(ft)	(ppm)		

			(%)	(ppm)	
	<u>(cleared top 5 ft with vac truck/hand auger)</u>	Dames and Moore Split			

[illegible]

ALL4 LLC

www.all4inc.com

NS = No Sheen: VSS = Very Slight Sheen: SS = Slight Sheen: MS = Moderate Sheen: HS = Heavy Sheen

NS = No sheen; VS = Very slight sheen; S = Slight sheen; MS = Moderate sheen; HS = Heavy sheen.

[illegible]

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

Hollow Stem Boring Log

Project: Oily Water Sewer Area of Concern-2 Sheet: 1 of 1

Client: Marathon Drilled by: Brian S. - Cascade

Boring Number: SB-2	Logged by: Olana C. - ALL4
---------------------	----------------------------

Location: South of dog leg on east side of "F" and south of 8th St.	First Encountered Water: Surface perched
---	--

Date Completed: Preclearing completed 10/3/2024	Total Depth: 15 ft.
---	---------------------

Hollow stem completed 10/9/2024

Sheet: 1 of 1

Drilled by: Brian S. - Cascade

Logged by: Olana C. - ALL4

First Encountered Water: Surface perched

Total Depth: 15 ft.

[illegible]

ALL4 LLC www.all4inc.com
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www.all4inc.com

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

[illegible]

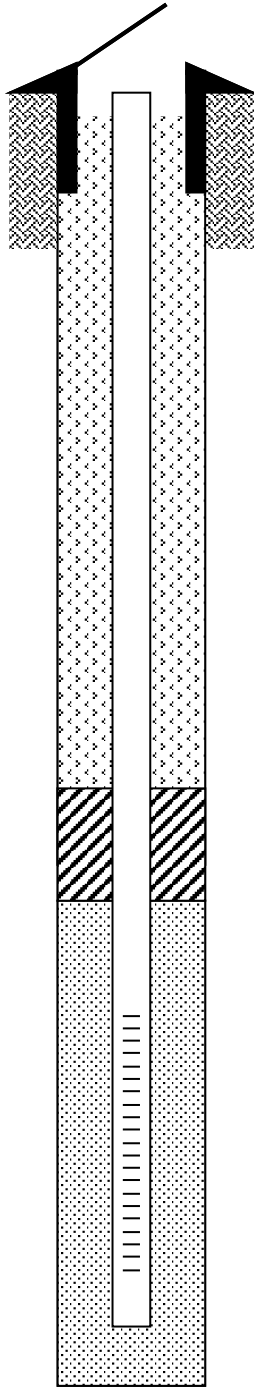
NS = No Sheen; VSS = Very Slight Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

[illegible]

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

APPENDIX G
WELL DIAGRAMS

Well Design Specifications



Not to Scale

Elevations (feet):	Top of Casing:	207.039 ft
Mean Sea Level (MSL)	Ground Elevation:	207.534 ft
Coordinates:	545589.781 E	1220775.624 N
Coordinate System:	HORIZ: NAD 83/11 & VERT: NAVD 88	
Type of Casing:	PVC	
Casing Diameter:	2.0 inch	
Screen Slot:	0.01 inch	
Screen Style:	Machine slotted	
Sand Pack:	10/20 Colorado Silica	
Bentonite Seal:	Medium Chip	
Grout Type:	NA	Weight: NA
Bore Hole Diameter:	8.0 inch	
Drill Rig:	Hollow Stem Auger	
Drilled by:	Brian S. - Cascade	
Logged by:	Thom D. - ALL4	
Completion Date:	10/8/2024	

Date of Measurement	D-T-W (ft. bgs)	Water Level (ft. MSL)	Field pH	Field EC (mS/cm)
10/17/2024	7.62	199.42	7.35	0.3071
11/11/2024	8.51	198.53	NA	NA

Comments:

Project: Marathon Oily Water Sewer AOC-1

Location: Northern most boring.

ALL4 LLC

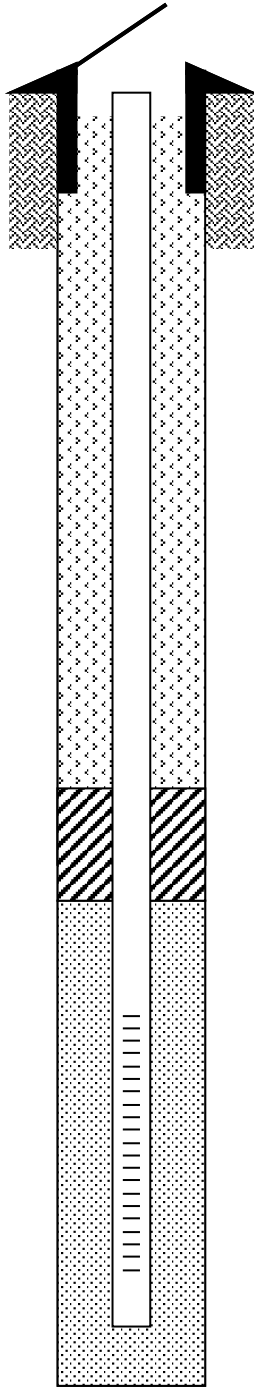
228 East Champion Street #101
Bellingham, WA 98225
(360) 752-9571

24-1S

Ecology Well ID:

BPW-760

Well Design Specifications



Not to Scale

Elevations (feet):	Top of Casing:	207.362 ft
Mean Sea Level (MSL)	Ground Elevation:	207.778 ft
Coordinates:	545556.158 E	1220740.658 N
Coordinate System:	HORIZ: NAD 83/11 & VERT: NAVD 88	
Type of Casing:	PVC	
Casing Diameter:	2.0 inch	
Screen Slot:	0.01 inch	
Screen Style:	Machine slotted	
Sand Pack:	10/20 Colorado Silica	
Bentonite Seal:	Medium Chip	
Grout Type:	NA	Weight: NA
Bore Hole Diameter:	8.0 inch	
Drill Rig:	Hollow Stem Auger	
Drilled by:	Brian S. - Cascade	
Logged by:	Thom D. - ALL4	
Completion Date:	10/8/2024	

Date of Measurement	D-T-W (ft. bgs)	Water Level (ft. MSL)	Field pH	Field EC (mS/cm)
10/14/2024	6.98	200.38	7.04	0.351
11/11/2024	7.88	199.48	NA	NA

Comments:

Project: Marathon Oily Water Sewer AOC-1

Location: West side of "F" Street.

ALL4 LLC

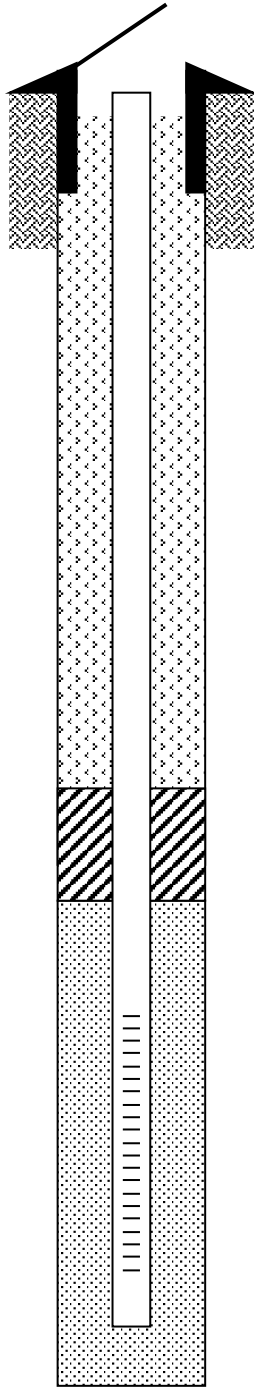
228 East Champion Street #101
Bellingham, WA 98225
(360) 752-9571

24-2S

Ecology Well ID:

BPW-758

Well Design Specifications



Not to Scale

Elevations (feet):	Top of Casing:	210.365 ft
Mean Sea Level (MSL)	Ground Elevation:	210.786 ft
Coordinates:	545498.886 E	1220770.893 N
Coordinate System:	HORIZ: NAD 83/11 & VERT: NAVD 88	
Type of Casing:	PVC	
Casing Diameter:	2.0 inch	
Screen Slot:	0.01 inch	
Screen Style:	Machine slotted	
Sand Pack:	10/20 Colorado Silica	
Bentonite Seal:	Medium Chip	
Grout Type:	NA	Weight: NA
Bore Hole Diameter:	8.0 inch	
Drill Rig:	Hollow Stem Auger	
Drilled by:	Brian S. - Cascade	
Logged by:	Thom D. - ALL4	
Completion Date:	10/8/2024	

Date of Measurement	D-T-W (ft. bgs)	Water Level (ft. MSL)	Field pH	Field EC (mS/cm)
10/14/2024	6.17	204.20	7.13	0.4074
11/11/2024	6.3	204.07	NA	NA

Comments:

Project: Marathon Oily Water Sewer AOC-1

Location: Southern most boring.

ALL4 LLC

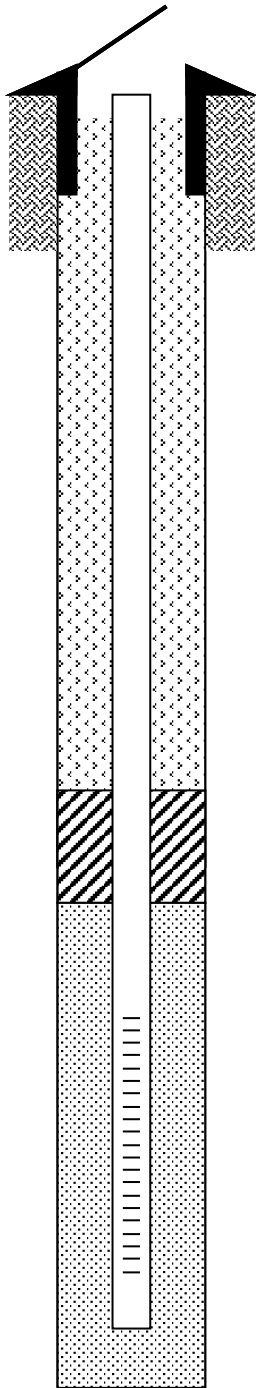
228 East Champion Street #101
Bellingham, WA 98225
(360) 752-9571

24-3S

Ecology Well ID:

BPW-759

Well Design Specifications



Not to Scale

Elevations (feet):
Mean Sea Level (MSL)

Top of Casing: 130.69 ft
Ground Elevation: 131.163 ft

Coordinates: 548415.416 E 1220920.873 N

Coordinate System: HORIZ: NAD 83/11 & VERT: NAVD 88

Type of Casing: PVC

Casing Diameter: 2.0 inch

Screen Slot: 0.01 inch

Screen Style: Machine slotted

Sand Pack: 10/20 Colorado Silica

Bentonite Seal: Medium Chip

Grout Type: NA **Weight:** NA

Bore Hole Diameter: 8.0 inch

Drill Rig: Hollow Stem Auger

Drilled by: Brian S. - Cascade

Logged by: Thom D. - ALL4

Completion Date: 10/10/2024

Date of Measurement	D-T-W (ft. bgs)	Water Level (ft. MSL)	Field pH	Field EC (mS/cm)
10/17/2024	11.3	119.39	7.56	0.578
11/11/2024	11.54	119.15	NA	NA

Comments:

Project: Marathon Oily Water Sewer AOC-2

Location: East side of "F" St., northern most boring.

ALL4 LLC

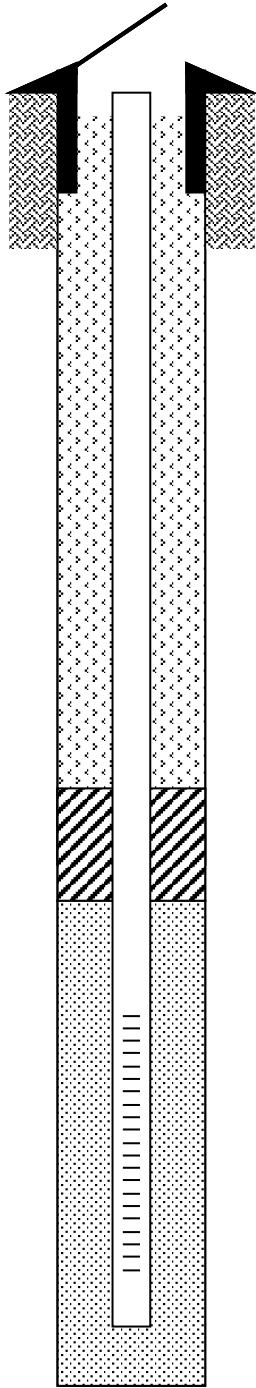
228 East Champion Street #101
Bellingham, WA 98225
(360) 752-9571

24-4

Ecology Well ID:

BPW-762

Well Design Specifications



Depths in
Feet Below
Ground
Surface

1.5 ft.

2.5 ft.

4.5 ft.

19.5 ft.

20 ft.

20 ft.

Not to Scale

Elevations (feet):
Mean Sea Level (MSL)

Top of Casing: 142.826 ft
Ground Elevation: 143.439 ft

Coordinates: 548013.613 E 1220900.369 N

Coordinate System: HORIZ: NAD 83/11 & VERT: NAVD 88

Type of Casing: PVC

Casing Diameter: 2.0 inch

Screen Slot: 0.01 inch

Screen Style: Machine slotted

Sand Pack: 10/20 Colorado Silica

Bentonite Seal: Medium Chip

Grout Type: NA Weight: NA

Bore Hole Diameter: 8.0 inch

Drill Rig: Hollow Stem Auger

Drilled by: Brian S. - Cascade

Logged by: Thom D. - ALL4

Completion Date: 10/10/2024

Date of Measurement	D-T-W (ft. bgs)	Water Level (ft. MSL)	Field pH	Field EC (mS/cm)
11/11/2024	12.66	130.17	7.47	0.767

Comments:

Project: Marathon Oily Water Sewer AOC-2

Location: East side of "F" St., southern most boring.

ALL4 LLC

228 East Champion Street #101
Bellingham, WA 98225
(360) 752-9571

24-5

Ecology Well ID:

BPW-761

APPENDIX H
ORIGINAL LABORATORY ANALYTICAL DATA REPORTS



November 6, 2024

Ms. Olana Costa
ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

Dear Ms. Costa,

On October 4th, 2 samples were received by our laboratory and assigned our laboratory project number EV24100061. The project was identified as your Marathon Oily Water Sewer. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Carl Nott
Laboratory Director



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

DATE: 11/6/2024

ALS JOB#: EV24100061

ALS SAMPLE#: EV24100061-01

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon Oily Water Sewer

DATE RECEIVED: 10/04/2024

COLLECTION DATE: 10/3/2024 3:10:00 PM

CLIENT SAMPLE ID AOC2-SB2-5ft

WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	540	30	10	MG/KG	10/12/2024	MNC
TPH-Diesel Range	NWTPH-DX	97	25	1	MG/KG	10/15/2024	DHM
TPH-Diesel Range	NWTPH-DX w/ SGA	100	25	1	MG/KG	10/16/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/15/2024	DHM
TPH-Oil Range	NWTPH-DX w/ SGA	U	50	1	MG/KG	10/16/2024	DHM
Benzene - Reanalysis1	EPA-8260	630	17	1	UG/KG	10/11/2024	DLC
Toluene	EPA-8260	17000	100	10	UG/KG	10/11/2024	DLC
Ethylbenzene	EPA-8260	6600	150	10	UG/KG	10/11/2024	DLC
m,p-Xylene	EPA-8260	27000	290	10	UG/KG	10/11/2024	DLC
o-Xylene	EPA-8260	11000	180	10	UG/KG	10/11/2024	DLC
Naphthalene	EPA-8270 SIM	230	20	1	UG/KG	10/15/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	420	20	1	UG/KG	10/15/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	280	20	1	UG/KG	10/15/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Phenanthrene	EPA-8270 SIM	71	20	1	UG/KG	10/15/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Mercury	EPA-7471	0.050	0.020	1	MG/KG	10/07/2024	RAL
Arsenic	EPA-6020	6.4	0.20	1	MG/KG	10/07/2024	EBS
Barium	EPA-6020	98	0.10	1	MG/KG	10/07/2024	EBS
Cadmium	EPA-6020	0.14	0.10	1	MG/KG	10/07/2024	EBS
Lead	EPA-6020	5.1	0.10	1	MG/KG	10/07/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/07/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/07/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	82.3	10/12/2024	MNC

Page 2 of 10

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626

ALS Group USA, Corp dba ALS Environmental

Environmental

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS JOB#: EV24100061
ALS SAMPLE#: EV24100061-01
CLIENT CONTACT: Olana Costa
DATE RECEIVED: 10/04/2024
CLIENT PROJECT: Marathon Oily Water Sewer
COLLECTION DATE: 10/3/2024 3:10:00 PM
CLIENT SAMPLE ID: AOC2-SB2-5ft
WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS	ANALYSIS
			DATE	BY
C25	NWTPH-DX	135 SUR08	10/15/2024	DHM
C25	NWTPH-DX w/ SGA	141 SUR08	10/16/2024	DHM
Toluene-d8	EPA-8260	115	10/11/2024	DLC
Toluene-d8 - Reanalysis1	EPA-8260	99.1	10/11/2024	DLC
Terphenyl-d14	EPA-8270 SIM	46.6	10/15/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

SUR08 -Surrogate recoveries were outside of the control limits due to matrix interference.

Chromatogram indicates that it is likely that sample contains weathered gasoline and weathered diesel.

Chromatogram indicates that it is likely that sample contains weathered gasoline and lightly weathered diesel.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS JOB#: EV24100061
ALS SAMPLE#: EV24100061-02
CLIENT CONTACT: Olana Costa
DATE RECEIVED: 10/04/2024
CLIENT PROJECT: Marathon Oily Water Sewer
COLLECTION DATE: 10/3/2024 3:30:00 PM
CLIENT SAMPLE ID: AOC2-SB3-3ft
WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	1300	300	100	MG/KG	10/16/2024	MNC
TPH-Diesel Range	NWTPH-DX w/ SGA	1300	120	5	MG/KG	10/16/2024	DHM
TPH-Oil Range	NWTPH-DX w/ SGA	U	250	5	MG/KG	10/16/2024	DHM
Benzene	EPA-8260	1100	15	1	UG/KG	10/11/2024	DLC
Toluene - 100X Dilution1	EPA-8260	31000	1000	100	UG/KG	10/11/2024	DLC
Ethylbenzene - 100X Dilution1	EPA-8260	15000	1300	100	UG/KG	10/11/2024	DLC
m,p-Xylene - 100X Dilution1	EPA-8260	58000	2500	100	UG/KG	10/11/2024	DLC
o-Xylene - 100X Dilution1	EPA-8260	23000	1600	100	UG/KG	10/11/2024	DLC
Naphthalene	EPA-8270 SIM	2200	100	5	UG/KG	10/16/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	4000	100	5	UG/KG	10/16/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	2800	100	5	UG/KG	10/16/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	100	5	UG/KG	10/16/2024	DBA
Acenaphthene	EPA-8270 SIM	170	100	5	UG/KG	10/16/2024	DBA
Fluorene	EPA-8270 SIM	U	100	5	UG/KG	10/16/2024	DBA
Phenanthrene	EPA-8270 SIM	490	100	5	UG/KG	10/16/2024	DBA
Anthracene	EPA-8270 SIM	U	100	5	UG/KG	10/16/2024	DBA
Fluoranthene	EPA-8270 SIM	U	100	5	UG/KG	10/16/2024	DBA
Pyrene	EPA-8270 SIM	130	100	5	UG/KG	10/16/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	100	5	UG/KG	10/16/2024	DBA
Chrysene	EPA-8270 SIM	U	100	5	UG/KG	10/16/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	100	5	UG/KG	10/16/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	100	5	UG/KG	10/16/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	100	5	UG/KG	10/16/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	100	5	UG/KG	10/16/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	100	5	UG/KG	10/16/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	100	5	UG/KG	10/16/2024	DBA
Mercury	EPA-7471	0.030	0.020	1	MG/KG	10/07/2024	RAL
Arsenic	EPA-6020	4.9	0.20	1	MG/KG	10/07/2024	EBS
Barium	EPA-6020	220	0.10	1	MG/KG	10/07/2024	EBS
Cadmium	EPA-6020	0.11	0.10	1	MG/KG	10/07/2024	EBS
Lead	EPA-6020	3.8	0.10	1	MG/KG	10/07/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/07/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/07/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	U, SUR07	10/16/2024	MNC
C25	NWTPH-DX w/ SGA	138 SUR08	10/16/2024	DHM
Toluene-d8	EPA-8260	130 GS1	10/11/2024	DLC



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100061
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100061-02
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/04/2024
CLIENT PROJECT:	Marathon Oily Water Sewer	COLLECTION DATE:	10/3/2024 3:30:00 PM
CLIENT SAMPLE ID	AOC2-SB3-3ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS	ANALYSIS
			DATE	BY
Toluene-d8 - 100X Dilution1	EPA-8260	120	10/11/2024	DLC
Terphenyl-d14	EPA-8270 SIM	88.6	10/16/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

SUR08 -Surrogate recoveries were outside of the control limits due to matrix interference.

SUR07 -The surrogate recovery could not be determined due to dilution below the calibration range.

GS1 - Surrogate outside of control limits due to matrix effect.

Chromatogram indicates that it is likely that sample contains lightly weathered gasoline and weathered diesel.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS SDG#: EV24100061
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon Oily Water Sewer

LABORATORY BLANK RESULTS

MBG-101124S - Batch 219085 - Soil by NWTPH-GX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	MG/KG	3.0	10/12/2024	MNC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-101524S - Batch 219075 - Soil by NWTPH-DX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range	NWTPH-DX	U	MG/KG	25	10/15/2024	DHM
TPH-Oil Range	NWTPH-DX	U	MG/KG	50	10/15/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.

MB-101024S - Batch 219074 - Soil by EPA-8260

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Benzene	EPA-8260	U	UG/KG	5.0	10/10/2024	DLC
Toluene	EPA-8260	U	UG/KG	10	10/10/2024	DLC
Ethylbenzene	EPA-8260	U	UG/KG	10	10/10/2024	DLC
m,p-Xylene	EPA-8260	U	UG/KG	20	10/10/2024	DLC
o-Xylene	EPA-8260	U	UG/KG	10	10/10/2024	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-101524S - Batch 219146 - Soil by EPA-8270 SIM

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Naphthalene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Acenaphthene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Fluorene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Phenanthrene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Anthracene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Fluoranthene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Pyrene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Chrysene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS SDG#: EV24100061
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon Oily Water Sewer

LABORATORY BLANK RESULTS

MB-101524S - Batch 219146 - Soil by EPA-8270 SIM

Indeno[1,2,3-cd]Pyrene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R479903 - Batch R479903 - Soil by EPA-7471

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Mercury	EPA-7471	U	MG/KG	0.020	10/07/2024	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MB-100724S - Batch 218652 - Soil by EPA-6020

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-6020	U	MG/KG	0.20	10/07/2024	EBS
Barium	EPA-6020	U	MG/KG	0.12	10/07/2024	EBS
Cadmium	EPA-6020	U	MG/KG	0.10	10/07/2024	EBS
Lead	EPA-6020	U	MG/KG	0.10	10/07/2024	EBS
Selenium	EPA-6020	U	MG/KG	1.0	10/07/2024	EBS
Silver	EPA-6020	U	MG/KG	0.10	10/07/2024	EBS

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS SDG#: EV24100061
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon Oily Water Sewer

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 219085 - Soil by NWTPH-GX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Volatile Range - BS	NWTPH-GX	87.5			66.5	122.7	10/12/2024	MNC
TPH-Volatile Range - BSD	NWTPH-GX	87.8	0		66.5	122.7	10/12/2024	MNC

ALS Test Batch ID: 219075 - Soil by NWTPH-DX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Diesel Range - BS	NWTPH-DX	97.7			75.5	122.1	10/15/2024	DHM
TPH-Diesel Range - BSD	NWTPH-DX	102	4		75.5	122.1	10/15/2024	DHM

ALS Test Batch ID: 219074 - Soil by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Benzene - BS	EPA-8260	102			75	138	10/10/2024	DLC
Benzene - BSD	EPA-8260	96.9	5		75	138	10/11/2024	DLC
Benzene - BSD	EPA-8260	93.4	9		75	138	10/10/2024	DLC
Toluene - BS	EPA-8260	95.8			71.6	122.1	10/10/2024	DLC
Toluene - BSD	EPA-8260	89.3	7		71.6	122.1	10/11/2024	DLC
Toluene - BSD	EPA-8260	87.0	10		71.6	122.1	10/10/2024	DLC
Ethylbenzene - BS	EPA-8260	107			50	150	10/10/2024	DLC
Ethylbenzene - BSD	EPA-8260	109	2		50	150	10/11/2024	DLC
Ethylbenzene - BSD	EPA-8260	97.2	10		50	150	10/10/2024	DLC
m,p-Xylene - BS	EPA-8260	104			50	150	10/10/2024	DLC
m,p-Xylene - BSD	EPA-8260	94.0	10		50	150	10/10/2024	DLC
m,p-Xylene - BSD	EPA-8260	106	2		50	150	10/11/2024	DLC
o-Xylene - BS	EPA-8260	107			50	150	10/10/2024	DLC
o-Xylene - BSD	EPA-8260	108	0		50	150	10/11/2024	DLC
o-Xylene - BSD	EPA-8260	96.0	11		50	150	10/10/2024	DLC

ALS Test Batch ID: 219146 - Soil by EPA-8270 SIM

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Naphthalene - BS	EPA-8270 SIM	94.1			20	150	10/16/2024	DBA
Naphthalene - BSD	EPA-8270 SIM	115	20		20	150	10/16/2024	DBA
2-Methylnaphthalene - BS	EPA-8270 SIM	99.3			20	150	10/16/2024	DBA
2-Methylnaphthalene - BSD	EPA-8270 SIM	121	20		20	150	10/16/2024	DBA
1-Methylnaphthalene - BS	EPA-8270 SIM	95.7			20	150	10/16/2024	DBA
1-Methylnaphthalene - BSD	EPA-8270 SIM	117	20		20	150	10/16/2024	DBA
Acenaphthylene - BS	EPA-8270 SIM	106			20	150	10/16/2024	DBA
Acenaphthylene - BSD	EPA-8270 SIM	132	21		20	150	10/16/2024	DBA

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ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626

ALS Group USA, Corp dba ALS Environmental

Environmental

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

DATE: 11/6/2024
ALS SDG#: EV24100061
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon Oily Water Sewer

LABORATORY CONTROL SAMPLE RESULTS

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Acenaphthene - BS	EPA-8270 SIM	99.4			41	107	10/16/2024	DBA
Acenaphthene - BSD	EPA-8270 SIM	123	21	SQ6	41	107	10/16/2024	DBA
Fluorene - BS	EPA-8270 SIM	106			20	150	10/16/2024	DBA
Fluorene - BSD	EPA-8270 SIM	131	21		20	150	10/16/2024	DBA
Phenanthrene - BS	EPA-8270 SIM	103			20	150	10/16/2024	DBA
Phenanthrene - BSD	EPA-8270 SIM	124	19		20	150	10/16/2024	DBA
Anthracene - BS	EPA-8270 SIM	101			20	150	10/16/2024	DBA
Anthracene - BSD	EPA-8270 SIM	124	21		20	150	10/16/2024	DBA
Fluoranthene - BS	EPA-8270 SIM	106			20	150	10/16/2024	DBA
Fluoranthene - BSD	EPA-8270 SIM	128	19		20	150	10/16/2024	DBA
Pyrene - BS	EPA-8270 SIM	101			18	136	10/16/2024	DBA
Pyrene - BSD	EPA-8270 SIM	124	20	SR1	18	136	10/16/2024	DBA
Benzo[A]Anthracene - BS	EPA-8270 SIM	109			20	150	10/16/2024	DBA
Benzo[A]Anthracene - BSD	EPA-8270 SIM	135	21		20	150	10/16/2024	DBA
Chrysene - BS	EPA-8270 SIM	97.1			20	150	10/16/2024	DBA
Chrysene - BSD	EPA-8270 SIM	121	22		20	150	10/16/2024	DBA
Benzo[B]Fluoranthene - BS	EPA-8270 SIM	103			20	150	10/16/2024	DBA
Benzo[B]Fluoranthene - BSD	EPA-8270 SIM	128	22		20	150	10/16/2024	DBA
Benzo[K]Fluoranthene - BS	EPA-8270 SIM	87.5			20	150	10/16/2024	DBA
Benzo[K]Fluoranthene - BSD	EPA-8270 SIM	106	19		20	150	10/16/2024	DBA
Benzo[A]Pyrene - BS	EPA-8270 SIM	93.1			20	150	10/16/2024	DBA
Benzo[A]Pyrene - BSD	EPA-8270 SIM	115	21		20	150	10/16/2024	DBA
Indeno[1,2,3-Cd]Pyrene - BS	EPA-8270 SIM	97.0			20	150	10/16/2024	DBA
Indeno[1,2,3-Cd]Pyrene - BSD	EPA-8270 SIM	121	22		20	150	10/16/2024	DBA
Dibenz[A,H]Anthracene - BS	EPA-8270 SIM	102			20	150	10/16/2024	DBA
Dibenz[A,H]Anthracene - BSD	EPA-8270 SIM	135	28		20	150	10/16/2024	DBA
Benzo[G,H,I]Perylene - BS	EPA-8270 SIM	91.0			20	150	10/16/2024	DBA
Benzo[G,H,I]Perylene - BSD	EPA-8270 SIM	122	29		20	150	10/16/2024	DBA

SQ6 - The LCS and/or LCSD recovery were outside of control limits. However, MS/MSD recovery was within control limits. No corrective action taken.
SR1 - RPD outside of control limits.

ALS Test Batch ID: R479903 - Soil by EPA-7471

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Mercury - BS	EPA-7471	104			81.8	117	10/07/2024	RAL
Mercury - BSD	EPA-7471	104	0		81.8	117	10/07/2024	RAL



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS SDG#: EV24100061
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon Oily Water Sewer

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 218652 - Soil by EPA-6020

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Arsenic - BS	EPA-6020	98.2			80	120	10/07/2024	EBS
Arsenic - BSD	EPA-6020	100	2		80	120	10/07/2024	EBS
Barium - BS	EPA-6020	94.1			80	120	10/07/2024	EBS
Barium - BSD	EPA-6020	97.8	4		80	120	10/07/2024	EBS
Cadmium - BS	EPA-6020	100			80	120	10/07/2024	EBS
Cadmium - BSD	EPA-6020	103	3		80	120	10/07/2024	EBS
Lead - BS	EPA-6020	94.2			80	120	10/07/2024	EBS
Lead - BSD	EPA-6020	98.1	4		80	120	10/07/2024	EBS
Selenium - BS	EPA-6020	98.0			80	120	10/07/2024	EBS
Selenium - BSD	EPA-6020	100	2		80	120	10/07/2024	EBS
Silver - BS	EPA-6020	96.4			80	120	10/07/2024	EBS
Silver - BSD	EPA-6020	99.6	3		80	120	10/07/2024	EBS

APPROVED BY

Carl Nott
Laboratory Director



Chain Of Custody/ Laboratory Analysis Request

Date 10/4/21 Page 1 Of 1

EV24100061

[illegible]

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Olivia Costa, Atty, 10/4/24, 12:00 Olivia Costa

Received By: AFRESE, ALI 10/04/24 (0120)

2. Relinquished By: _____

Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis

Standard
 Fuels & Hydrocarbon Analysis

5

31

SAME DAY

SAME DAY

Specificity:

OTHER:

100

// abstratum / I use Only

*Turnaround request less than standard may incur Rush Charges



SAMPLE RECEIVING CHECKLIST

Client: Alt 4

ALS Job #: E/24100061

Project: Marathon Dily Water
Sewer

Login Date: 10/4/24

Login Time: 1201

Login By: AV

Type of Shipping Container:

☒ Cooler

☐ Box

☐ Other: _____

Shipped Via:

☐ FedEx Ground

☐ FedEx Express

☐ UPS

☐ External Courier

☒ ALS Courier

☐ Hand Delivered

Were custody seals on the outside of the shipping container?

How Many? _____ Where? _____ Date: _____ Name: _____

Was CoC filled out properly? (in ink, signed, dated, etc.)

Did all bottles have labels?

Did all bottle labels and tags agree with CoC?

Were samples received within hold time?

Did all bottles arrive in good condition?

Was sufficient amount of sample sent for tests requested?

Was correct preservation added to samples?

Subcontract test containers added to subcontract bin?

Wetchem test containers marked with applicable tests?

Short hold time test containers delivered to analysts?

VOA vials checked for bubbles?

Bubbles in sample number(s): _____

5035A kits received?

Low kits: 2 High kits: _____

5035A kits returned?

Low kits: _____ High kits: _____

Temperature upon receipt: 7.1 °C

On ice? ☒

Thermometer ID: 189

Other discrepancies:

Was client contacted? _____ Who was called? _____ By whom? _____ Date: _____

Outcome of call:



November 6, 2024

Ms. Olana Costa
ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

Dear Ms. Costa,

On October 9th, 6 samples were received by our laboratory and assigned our laboratory project number EV24100096. The project was identified as your Marathon OWS. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Carl Nott
Laboratory Director



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

DATE: 11/6/2024

ALS JOB#: EV24100096

ALS SAMPLE#: EV24100096-01

CLIENT CONTACT: Olana Costa

DATE RECEIVED: 10/09/2024

CLIENT PROJECT: Marathon OWS

COLLECTION DATE: 10/7/2024 9:55:00 AM

CLIENT SAMPLE ID: AOC2-SB-4-5ft

WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	510	30	10	MG/KG	10/22/2024	MNC
TPH-Diesel Range	NWTPH-DX	670	25	1	MG/KG	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX	230	50	1	MG/KG	10/18/2024	DHM
Benzene	EPA-8260	340	160	10	UG/KG	10/17/2024	DLC
Toluene	EPA-8260	13000	100	10	UG/KG	10/17/2024	DLC
Ethylbenzene	EPA-8260	5000	140	10	UG/KG	10/17/2024	DLC
m,p-Xylene	EPA-8260	22000	270	10	UG/KG	10/17/2024	DLC
o-Xylene	EPA-8260	9200	170	10	UG/KG	10/17/2024	DLC
Naphthalene	EPA-8270 SIM	900	20	1	UG/KG	10/15/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	1400	20	1	UG/KG	10/15/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	830	20	1	UG/KG	10/15/2024	DBA
Acenaphthylene	EPA-8270 SIM	21	20	1	UG/KG	10/15/2024	DBA
Acenaphthene	EPA-8270 SIM	85	20	1	UG/KG	10/15/2024	DBA
Fluorene	EPA-8270 SIM	180	20	1	UG/KG	10/15/2024	DBA
Phenanthrene	EPA-8270 SIM	340	20	1	UG/KG	10/15/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Fluoranthene	EPA-8270 SIM	130	20	1	UG/KG	10/15/2024	DBA
Pyrene	EPA-8270 SIM	130	20	1	UG/KG	10/15/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	60	20	1	UG/KG	10/15/2024	DBA
Chrysene	EPA-8270 SIM	46	20	1	UG/KG	10/15/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	32	20	1	UG/KG	10/15/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	23	20	1	UG/KG	10/15/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Mercury	EPA-7471	0.045	0.020	1	MG/KG	10/11/2024	RAL
Arsenic	EPA-6020	5.8	0.25	1	MG/KG	10/10/2024	RAL
Barium	EPA-6020	100	0.10	1	MG/KG	10/10/2024	RAL
Cadmium	EPA-6020	0.16	0.10	1	MG/KG	10/10/2024	RAL
Lead	EPA-6020	4.9	0.10	1	MG/KG	10/10/2024	RAL
Selenium	EPA-6020	U	1.0	1	MG/KG	10/10/2024	RAL
Silver	EPA-6020	U	0.10	1	MG/KG	10/10/2024	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	97.0	10/22/2024	MNC
C25	NWTPH-DX	142 SUR08	10/18/2024	DHM
Toluene-d8	EPA-8260	96.1	10/17/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC 228 E. Champion St, Suite 101 Bellingham, WA 98225	DATE:	11/6/2024
		ALS JOB#:	EV24100096
		ALS SAMPLE#:	EV24100096-01
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/09/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/7/2024 9:55:00 AM
CLIENT SAMPLE ID	AOC2-SB-4-5ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	69.0	10/15/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

SUR08 -Surrogate recoveries were outside of the control limits due to matrix interference.

Chromatogram indicates that it is likely that sample contains lightly weathered gasoline, weathered diesel and an unidentified oil range product.

Oil range product results biased high due to diesel range product overlap.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100096
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100096-02
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/09/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/7/2024 1:45:00 PM
CLIENT SAMPLE ID	AOC2-24-4-4ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	17	3.0	1	MG/KG	10/22/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/17/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/17/2024	DHM
Benzene	EPA-8260	120	18	1	UG/KG	10/17/2024	DLC
Toluene	EPA-8260	1500	10	1	UG/KG	10/17/2024	DLC
Ethylbenzene	EPA-8260	200	15	1	UG/KG	10/17/2024	DLC
m,p-Xylene	EPA-8260	860	29	1	UG/KG	10/17/2024	DLC
o-Xylene	EPA-8260	340	18	1	UG/KG	10/17/2024	DLC
Naphthalene	EPA-8270 SIM	42	20	1	UG/KG	10/15/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	37	20	1	UG/KG	10/15/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	24	20	1	UG/KG	10/15/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/15/2024	DBA
Mercury	EPA-7471	0.036	0.020	1	MG/KG	10/11/2024	RAL
Arsenic	EPA-6020	4.9	0.25	1	MG/KG	10/10/2024	RAL
Barium	EPA-6020	81	0.10	1	MG/KG	10/10/2024	RAL
Cadmium	EPA-6020	0.12	0.10	1	MG/KG	10/10/2024	RAL
Lead	EPA-6020	4.2	0.10	1	MG/KG	10/10/2024	RAL
Selenium	EPA-6020	U	1.0	1	MG/KG	10/10/2024	RAL
Silver	EPA-6020	U	0.10	1	MG/KG	10/10/2024	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	78.4	10/22/2024	MNC
C25	NWTPH-DX	110	10/17/2024	DHM
Toluene-d8	EPA-8260	103	10/17/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC 228 E. Champion St, Suite 101 Bellingham, WA 98225	DATE:	11/6/2024
		ALS JOB#:	EV24100096
		ALS SAMPLE#:	EV24100096-02
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/09/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/7/2024 1:45:00 PM
CLIENT SAMPLE ID	AOC2-24-4-4ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	51.5	10/15/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains weathered gasoline.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS JOB#: EV24100096
ALS SAMPLE#: EV24100096-03
CLIENT CONTACT: Olana Costa
DATE RECEIVED: 10/09/2024
CLIENT PROJECT: Marathon OWS
COLLECTION DATE: 10/8/2024 9:05:00 AM
CLIENT SAMPLE ID: AOC1-24-2S-12.5-13ft
WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/21/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/17/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/17/2024	DHM
Benzene	EPA-8260	U	5.0	1	UG/KG	10/16/2024	DLC
Toluene	EPA-8260	U	10	1	UG/KG	10/16/2024	DLC
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/16/2024	DLC
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/16/2024	DLC
o-Xylene	EPA-8260	U	10	1	UG/KG	10/16/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Mercury	EPA-7471	0.042	0.020	1	MG/KG	10/11/2024	RAL
Arsenic	EPA-6020	6.4	0.25	1	MG/KG	10/10/2024	RAL
Barium	EPA-6020	67	0.10	1	MG/KG	10/10/2024	RAL
Cadmium	EPA-6020	0.10	0.10	1	MG/KG	10/10/2024	RAL
Lead	EPA-6020	4.0	0.10	1	MG/KG	10/10/2024	RAL
Selenium	EPA-6020	U	1.0	1	MG/KG	10/10/2024	RAL
Silver	EPA-6020	U	0.10	1	MG/KG	10/10/2024	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	90.3	10/21/2024	MNC
C25	NWTPH-DX	111	10/17/2024	DHM
Toluene-d8	EPA-8260	104	10/16/2024	DLC



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100096
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100096-03
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/09/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/8/2024 9:05:00 AM
CLIENT SAMPLE ID	AOC1-24-2S-12.5-13ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	75.2	10/16/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC DATE: 11/6/2024
228 E. Champion St, Suite 101 ALS JOB#: EV24100096
Bellingham, WA 98225 ALS SAMPLE#: EV24100096-04
CLIENT CONTACT: Olana Costa DATE RECEIVED: 10/09/2024
CLIENT PROJECT: Marathon OWS COLLECTION DATE: 10/8/2024 11:40:00 AM
CLIENT SAMPLE ID AOC1-24-3S-13.5-14ft WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/21/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/18/2024	DHM
Benzene	EPA-8260	U	5.0	1	UG/KG	10/16/2024	DLC
Toluene	EPA-8260	U	10	1	UG/KG	10/16/2024	DLC
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/16/2024	DLC
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/16/2024	DLC
o-Xylene	EPA-8260	U	10	1	UG/KG	10/16/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Mercury	EPA-7471	0.024	0.020	1	MG/KG	10/11/2024	RAL
Arsenic	EPA-6020	3.3	0.25	1	MG/KG	10/10/2024	RAL
Barium	EPA-6020	47	0.10	1	MG/KG	10/10/2024	RAL
Cadmium	EPA-6020	U	0.10	1	MG/KG	10/10/2024	RAL
Lead	EPA-6020	2.9	0.10	1	MG/KG	10/10/2024	RAL
Selenium	EPA-6020	U	1.0	1	MG/KG	10/10/2024	RAL
Silver	EPA-6020	U	0.10	1	MG/KG	10/10/2024	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	76.7	10/21/2024	MNC
C25	NWTPH-DX	123	10/18/2024	DHM
Toluene-d8	EPA-8260	102	10/16/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100096
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100096-04
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/09/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/8/2024 11:40:00 AM
CLIENT SAMPLE ID	AOC1-24-3S-13.5-14ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	67.7	10/16/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS JOB#: EV24100096
ALS SAMPLE#: EV24100096-05
CLIENT CONTACT: Olana Costa
DATE RECEIVED: 10/09/2024
CLIENT PROJECT: Marathon OWS
COLLECTION DATE: 10/8/2024 2:45:00 PM
CLIENT SAMPLE ID: AOC1-24-1S-8-8.5ft
WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/22/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/19/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/19/2024	DHM
Benzene	EPA-8260	U	5.0	1	UG/KG	10/16/2024	DLC
Toluene	EPA-8260	U	10	1	UG/KG	10/16/2024	DLC
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/16/2024	DLC
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/16/2024	DLC
o-Xylene	EPA-8260	U	10	1	UG/KG	10/16/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Mercury	EPA-7471	0.027	0.020	1	MG/KG	10/11/2024	RAL
Arsenic	EPA-6020	4.9	0.25	1	MG/KG	10/10/2024	RAL
Barium	EPA-6020	54	0.10	1	MG/KG	10/10/2024	RAL
Cadmium	EPA-6020	U	0.10	1	MG/KG	10/10/2024	RAL
Lead	EPA-6020	3.1	0.10	1	MG/KG	10/10/2024	RAL
Selenium	EPA-6020	U	1.0	1	MG/KG	10/10/2024	RAL
Silver	EPA-6020	U	0.10	1	MG/KG	10/10/2024	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	78.1	10/22/2024	MNC
C25	NWTPH-DX	131	10/19/2024	DHM
Toluene-d8	EPA-8260	101	10/16/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100096
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100096-05
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/09/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/8/2024 2:45:00 PM
CLIENT SAMPLE ID	AOC1-24-1S-8-8.5ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	100	10/16/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC DATE: 11/6/2024
228 E. Champion St, Suite 101 ALS JOB#: EV24100096
Bellingham, WA 98225 ALS SAMPLE#: EV24100096-06
CLIENT CONTACT: Olana Costa DATE RECEIVED: 10/09/2024
CLIENT PROJECT: Marathon OWS COLLECTION DATE: 10/8/2024 2:55:00 PM
CLIENT SAMPLE ID AOC1-24-1S-13-13.5ft WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/22/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/17/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/17/2024	DHM
Benzene	EPA-8260	U	5.0	1	UG/KG	10/16/2024	DLC
Toluene	EPA-8260	U	10	1	UG/KG	10/16/2024	DLC
Ethylbenzene	EPA-8260	U	10	1	UG/KG	10/16/2024	DLC
m,p-Xylene	EPA-8260	U	20	1	UG/KG	10/16/2024	DLC
o-Xylene	EPA-8260	U	10	1	UG/KG	10/16/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/16/2024	DBA
Mercury	EPA-7471	U	0.020	1	MG/KG	10/11/2024	RAL
Arsenic	EPA-6020	5.7	0.25	1	MG/KG	10/10/2024	RAL
Barium	EPA-6020	42	0.10	1	MG/KG	10/10/2024	RAL
Cadmium	EPA-6020	U	0.10	1	MG/KG	10/10/2024	RAL
Lead	EPA-6020	2.5	0.10	1	MG/KG	10/10/2024	RAL
Selenium	EPA-6020	U	1.0	1	MG/KG	10/10/2024	RAL
Silver	EPA-6020	U	0.10	1	MG/KG	10/10/2024	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	81.6	10/22/2024	MNC
C25	NWTPH-DX	168 SUR09	10/17/2024	DHM
Toluene-d8	EPA-8260	98.8	10/16/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100096
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100096-06
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/09/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/8/2024 2:55:00 PM
CLIENT SAMPLE ID	AOC1-24-1S-13-13.5ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	122	10/16/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

SUR09 - Surrogate outside of control limits with a high bias. Associated compounds non-detect. No corrective action taken.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS SDG#: EV24100096
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY BLANK RESULTS

MBG-102124S - Batch 219362 - Soil by NWTPH-GX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	MG/KG	3.0	10/21/2024	MNC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-101724S - Batch 219213 - Soil by NWTPH-DX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range	NWTPH-DX	U	MG/KG	25	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX	U	MG/KG	50	10/18/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.

MB-101624S - Batch 219138 - Soil by EPA-8260

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Benzene	EPA-8260	U	UG/KG	5.0	10/16/2024	DLC
Toluene	EPA-8260	U	UG/KG	10	10/16/2024	DLC
Ethylbenzene	EPA-8260	U	UG/KG	10	10/16/2024	DLC
m,p-Xylene	EPA-8260	U	UG/KG	20	10/16/2024	DLC
o-Xylene	EPA-8260	U	UG/KG	10	10/16/2024	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-101724S - Batch 219281 - Soil by EPA-8260

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Benzene	EPA-8260	U	UG/KG	5.0	10/17/2024	DLC
Toluene	EPA-8260	U	UG/KG	10	10/17/2024	DLC
Ethylbenzene	EPA-8260	U	UG/KG	10	10/17/2024	DLC
m,p-Xylene	EPA-8260	U	UG/KG	20	10/17/2024	DLC
o-Xylene	EPA-8260	U	UG/KG	10	10/17/2024	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-101524S - Batch 219146 - Soil by EPA-8270 SIM

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Naphthalene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Acenaphthene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

DATE: 11/6/2024
ALS SDG#: EV24100096
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY BLANK RESULTS

MB-101524S - Batch 219146 - Soil by EPA-8270 SIM

Fluorene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Phenanthrene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Anthracene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Fluoranthene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Pyrene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Chrysene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	UG/KG	20	10/16/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R480183 - Batch R480183 - Soil by EPA-7471

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Mercury	EPA-7471	U	MG/KG	0.020	10/11/2024	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MB-101024S2 - Batch 218857 - Soil by EPA-6020

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-6020	U	MG/KG	0.25	10/10/2024	RAL
Barium	EPA-6020	U	MG/KG	0.12	10/10/2024	RAL
Cadmium	EPA-6020	U	MG/KG	0.10	10/10/2024	RAL
Lead	EPA-6020	U	MG/KG	0.10	10/10/2024	RAL
Selenium	EPA-6020	U	MG/KG	1.0	10/10/2024	RAL
Silver	EPA-6020	U	MG/KG	0.10	10/10/2024	RAL

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS SDG#: EV24100096
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 219362 - Soil by NWTPH-GX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Volatile Range - BS	NWTPH-GX	94.2			66.5	122.7	10/21/2024	MNC
TPH-Volatile Range - BSD	NWTPH-GX	98.7	5		66.5	122.7	10/21/2024	MNC

ALS Test Batch ID: 219213 - Soil by NWTPH-DX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Diesel Range - BS	NWTPH-DX	119			75.5	122.1	10/18/2024	DHM
TPH-Diesel Range - BSD	NWTPH-DX	82.9	36	SR1	75.5	122.1	10/18/2024	DHM

SR1 - RPD outside of control limits.

ALS Test Batch ID: 219138 - Soil by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Benzene - BS	EPA-8260	101			75	138	10/16/2024	DLC
Benzene - BSD	EPA-8260	92.5	9		75	138	10/16/2024	DLC
Toluene - BS	EPA-8260	109			71.6	122.1	10/16/2024	DLC
Toluene - BSD	EPA-8260	98.6	10		71.6	122.1	10/16/2024	DLC
Ethylbenzene - BS	EPA-8260	112			50	150	10/16/2024	DLC
Ethylbenzene - BSD	EPA-8260	101	10		50	150	10/16/2024	DLC
m,p-Xylene - BS	EPA-8260	108			50	150	10/16/2024	DLC
m,p-Xylene - BSD	EPA-8260	97.7	10		50	150	10/16/2024	DLC
o-Xylene - BS	EPA-8260	111			50	150	10/16/2024	DLC
o-Xylene - BSD	EPA-8260	99.8	10		50	150	10/16/2024	DLC

ALS Test Batch ID: 219281 - Soil by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Benzene - BS	EPA-8260	86.3			75	138	10/17/2024	DLC
Benzene - BSD	EPA-8260	85.7	1		75	138	10/17/2024	DLC
Toluene - BS	EPA-8260	88.2			71.6	122.1	10/17/2024	DLC
Toluene - BSD	EPA-8260	89.8	2		71.6	122.1	10/17/2024	DLC
Ethylbenzene - BS	EPA-8260	93.1			50	150	10/17/2024	DLC
Ethylbenzene - BSD	EPA-8260	91.6	2		50	150	10/17/2024	DLC
m,p-Xylene - BS	EPA-8260	88.8			50	150	10/17/2024	DLC
m,p-Xylene - BSD	EPA-8260	88.9	0		50	150	10/17/2024	DLC
o-Xylene - BS	EPA-8260	89.9			50	150	10/17/2024	DLC
o-Xylene - BSD	EPA-8260	90.2	0		50	150	10/17/2024	DLC



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC 228 E. Champion St, Suite 101 Bellingham, WA 98225	DATE:	11/6/2024
		ALS SDG#:	EV24100096
CLIENT CONTACT:	Olana Costa	WDOE ACCREDITATION:	C601
CLIENT PROJECT:	Marathon OWS		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 219146 - Soil by EPA-8270 SIM

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Naphthalene - BS	EPA-8270 SIM	94.1			20	150	10/16/2024	DBA
Naphthalene - BSD	EPA-8270 SIM	115	20		20	150	10/16/2024	DBA
2-Methylnaphthalene - BS	EPA-8270 SIM	99.3			20	150	10/16/2024	DBA
2-Methylnaphthalene - BSD	EPA-8270 SIM	121	20		20	150	10/16/2024	DBA
1-Methylnaphthalene - BS	EPA-8270 SIM	95.7			20	150	10/16/2024	DBA
1-Methylnaphthalene - BSD	EPA-8270 SIM	117	20		20	150	10/16/2024	DBA
Acenaphthylene - BS	EPA-8270 SIM	106			20	150	10/16/2024	DBA
Acenaphthylene - BSD	EPA-8270 SIM	132	21		20	150	10/16/2024	DBA
Acenaphthene - BS	EPA-8270 SIM	99.4			41	107	10/16/2024	DBA
Acenaphthene - BSD	EPA-8270 SIM	123	21	SQ6	41	107	10/16/2024	DBA
Fluorene - BS	EPA-8270 SIM	106			20	150	10/16/2024	DBA
Fluorene - BSD	EPA-8270 SIM	131	21		20	150	10/16/2024	DBA
Phenanthrene - BS	EPA-8270 SIM	103			20	150	10/16/2024	DBA
Phenanthrene - BSD	EPA-8270 SIM	124	19		20	150	10/16/2024	DBA
Anthracene - BS	EPA-8270 SIM	101			20	150	10/16/2024	DBA
Anthracene - BSD	EPA-8270 SIM	124	21		20	150	10/16/2024	DBA
Fluoranthene - BS	EPA-8270 SIM	106			20	150	10/16/2024	DBA
Fluoranthene - BSD	EPA-8270 SIM	128	19		20	150	10/16/2024	DBA
Pyrene - BS	EPA-8270 SIM	101			18	136	10/16/2024	DBA
Pyrene - BSD	EPA-8270 SIM	124	20	SR1	18	136	10/16/2024	DBA
Benzo[A]Anthracene - BS	EPA-8270 SIM	109			20	150	10/16/2024	DBA
Benzo[A]Anthracene - BSD	EPA-8270 SIM	135	21		20	150	10/16/2024	DBA
Chrysene - BS	EPA-8270 SIM	97.1			20	150	10/16/2024	DBA
Chrysene - BSD	EPA-8270 SIM	121	22		20	150	10/16/2024	DBA
Benzo[B]Fluoranthene - BS	EPA-8270 SIM	103			20	150	10/16/2024	DBA
Benzo[B]Fluoranthene - BSD	EPA-8270 SIM	128	22		20	150	10/16/2024	DBA
Benzo[K]Fluoranthene - BS	EPA-8270 SIM	87.5			20	150	10/16/2024	DBA
Benzo[K]Fluoranthene - BSD	EPA-8270 SIM	106	19		20	150	10/16/2024	DBA
Benzo[A]Pyrene - BS	EPA-8270 SIM	93.1			20	150	10/16/2024	DBA
Benzo[A]Pyrene - BSD	EPA-8270 SIM	115	21		20	150	10/16/2024	DBA
Indeno[1,2,3-Cd]Pyrene - BS	EPA-8270 SIM	97.0			20	150	10/16/2024	DBA
Indeno[1,2,3-Cd]Pyrene - BSD	EPA-8270 SIM	121	22		20	150	10/16/2024	DBA
Dibenz[A,H]Anthracene - BS	EPA-8270 SIM	102			20	150	10/16/2024	DBA
Dibenz[A,H]Anthracene - BSD	EPA-8270 SIM	135	28		20	150	10/16/2024	DBA
Benzo[G,H,I]Perylene - BS	EPA-8270 SIM	91.0			20	150	10/16/2024	DBA
Benzo[G,H,I]Perylene - BSD	EPA-8270 SIM	122	29		20	150	10/16/2024	DBA

SQ6 - The LCS and/or LCSD recovery were outside of control limits. However, MS/MSD recovery was within control limits. No corrective action taken.
 SR1 - RPD outside of control limits.

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS SDG#:	EV24100096
	Bellingham, WA 98225	WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Olana Costa		
CLIENT PROJECT:	Marathon OWS		

LABORATORY CONTROL SAMPLE RESULTS
ALS Test Batch ID: R480183 - Soil by EPA-7471

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Mercury - BS	EPA-7471	104			81.8	117	10/11/2024	RAL
Mercury - BSD	EPA-7471	103	1		81.8	117	10/11/2024	RAL

ALS Test Batch ID: 218857 - Soil by EPA-6020

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Arsenic - BS	EPA-6020	99.5			80	120	10/10/2024	RAL
Arsenic - BSD	EPA-6020	106	6		80	120	10/10/2024	RAL
Barium - BS	EPA-6020	101			80	120	10/10/2024	RAL
Barium - BSD	EPA-6020	107	6		80	120	10/10/2024	RAL
Cadmium - BS	EPA-6020	105			80	120	10/10/2024	RAL
Cadmium - BSD	EPA-6020	110	5		80	120	10/10/2024	RAL
Lead - BS	EPA-6020	99.0			80	120	10/10/2024	RAL
Lead - BSD	EPA-6020	105	5		80	120	10/10/2024	RAL
Selenium - BS	EPA-6020	97.8			80	120	10/10/2024	RAL
Selenium - BSD	EPA-6020	104	6		80	120	10/10/2024	RAL
Silver - BS	EPA-6020	102			80	120	10/10/2024	RAL
Silver - BSD	EPA-6020	107	5		80	120	10/10/2024	RAL



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

DATE: 11/6/2024
ALS SDG#: EV24100096
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

MATRIX SPIKE RESULTS

ALS Test Batch ID: 219146 - Soil

Parent Sample: AOC1-24-2S-12.5-13ft

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	PARENT SAMPLE RESULT	CALC RESULT*	LIMITS		RPD	ANALYSIS DATE	ANALYSIS BY
								MIN	MAX			
Naphthalene - MS	EPA-8270 SIM	53.0			862	0	456	20	150		10/16/2024	DBA
Naphthalene - MSD	EPA-8270 SIM	58.4	10		862	0	503	20	150	30	10/16/2024	DBA
2-Methylnaphthalene - MS	EPA-8270 SIM	57.9			862	0	499	20	150		10/16/2024	DBA
2-Methylnaphthalene - MSD	EPA-8270 SIM	60.6	4		862	0	522	20	150	30	10/16/2024	DBA
1-Methylnaphthalene - MS	EPA-8270 SIM	56.4			862	0	486	20	150		10/16/2024	DBA
1-Methylnaphthalene - MSD	EPA-8270 SIM	61.0	8		862	0	526	20	150	30	10/16/2024	DBA
Acenaphthylene - MS	EPA-8270 SIM	61.1			862	0	526	20	150		10/16/2024	DBA
Acenaphthylene - MSD	EPA-8270 SIM	67.6	10		862	0	583	20	150	30	10/16/2024	DBA
Acenaphthene - MS	EPA-8270 SIM	57.6			862	0	497	41	107		10/16/2024	DBA
Acenaphthene - MSD	EPA-8270 SIM	63.7	10		862	0	549	41	107	13	10/16/2024	DBA
Fluorene - MS	EPA-8270 SIM	62.3			862	0	537	20	150		10/16/2024	DBA
Fluorene - MSD	EPA-8270 SIM	69.7	11		862	0	600	20	150	30	10/16/2024	DBA
Phenanthrene - MS	EPA-8270 SIM	58.1			862	7.9	500	20	150		10/16/2024	DBA
Phenanthrene - MSD	EPA-8270 SIM	64.6	10		862	7.9	557	20	150	30	10/16/2024	DBA
Anthracene - MS	EPA-8270 SIM	59.5			862	0	513	20	150		10/16/2024	DBA
Anthracene - MSD	EPA-8270 SIM	67.1	12		862	0	578	20	150	30	10/16/2024	DBA
Fluoranthene - MS	EPA-8270 SIM	72.8			862	8.7	627	20	150		10/16/2024	DBA
Fluoranthene - MSD	EPA-8270 SIM	71.0	2		862	8.7	612	20	150	30	10/16/2024	DBA
Pyrene - MS	EPA-8270 SIM	58.3			862	11	502	18	136		10/16/2024	DBA
Pyrene - MSD	EPA-8270 SIM	51.2	13		862	11	441	18	136	18	10/16/2024	DBA
Benzo[A]Anthracene - MS	EPA-8270 SIM	63.2			862	7.2	544	20	150		10/16/2024	DBA
Benzo[A]Anthracene - MSD	EPA-8270 SIM	72.8	14		862	7.2	627	20	150	30	10/16/2024	DBA
Chrysene - MS	EPA-8270 SIM	55.1			862	6.4	475	20	150		10/16/2024	DBA
Chrysene - MSD	EPA-8270 SIM	61.5	11		862	6.4	530	20	150	30	10/16/2024	DBA
Benzo[B]Fluoranthene - MS	EPA-8270 SIM	59.6			862	5.1	514	20	150		10/16/2024	DBA
Benzo[B]Fluoranthene - MSD	EPA-8270 SIM	67.6	13		862	5.1	583	20	150	30	10/16/2024	DBA
Benzo[K]Fluoranthene - MS	EPA-8270 SIM	46.5			862	2.3	400	20	150		10/16/2024	DBA
Benzo[K]Fluoranthene - MSD	EPA-8270 SIM	53.7	14		862	2.3	463	20	150	30	10/16/2024	DBA
Benzo[A]Pyrene - MS	EPA-8270 SIM	52.5			862	4.7	452	20	150		10/16/2024	DBA
Benzo[A]Pyrene - MSD	EPA-8270 SIM	59.8	13		862	4.7	515	20	150	30	10/16/2024	DBA
Indeno[1,2,3-Cd]Pyrene - MS	EPA-8270 SIM	53.5			862	2.7	461	20	150		10/16/2024	DBA
Indeno[1,2,3-Cd]Pyrene - MSD	EPA-8270 SIM	66.0	21		862	2.7	569	20	150	30	10/16/2024	DBA
Dibenz[A,H]Anthracene - MS	EPA-8270 SIM	53.0			862	0	457	20	150		10/16/2024	DBA
Dibenz[A,H]Anthracene - MSD	EPA-8270 SIM	66.1	22		862	0	570	20	150	30	10/16/2024	DBA
Benzo[G,H,I]Perylene - MS	EPA-8270 SIM	53.9			862	0	465	20	150		10/16/2024	DBA
Benzo[G,H,I]Perylene - MSD	EPA-8270 SIM	66.7	21		862	0	575	20	150	30	10/16/2024	DBA

*Calc Result = (Sample Result - Parent Sample Result)

CERTIFICATE OF ANALYSIS

APPROVED BY

Carl Nott
Laboratory Director

Chain Of Custody/ Laboratory Analysis Request

2000

FV/24100096

Date 10/2/24 Page 7 Of _____

[illegible]

SPECIAL INSTRUCTIONS

Answered by CN for free call

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Olena Costa Olena Costa 10/9/21 @ 1:35 PM

Received By: **AFRESE** AIS, 10/09/24 @1355

2. Relinquished By:

Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis

Standard	10	5	3	2	1	0
Fuels & Hydrocarbon Analysis						

OTHER: 1100

Specify: _____

0240



SAMPLE RECEIVING CHECKLIST

Client: ALL4

ALS Job #: EV24100096

Project: MARATHON OWS

Login Date: 10/09/24

Login Time: 1720

Login By: MTT

Type of Shipping Container:

☒ Cooler

☐ Box

☐ Other: _____

Shipped Via:

☐ FedEx Ground

☐ FedEx Express

☐ UPS

☐ External Courier

☒ ALS Courier

☐ Hand Delivered

Were custody seals on the outside of the shipping container?

Yes

No

N/A

How Many? _____ Where? _____ Date: _____ Name: _____

Was CoC filled out properly? (in ink, signed, dated, etc.)

Did all bottles have labels?

Did all bottle labels and tags agree with CoC?

Were samples received within hold time?

Did all bottles arrive in good condition?

Was sufficient amount of sample sent for tests requested?

Was correct preservation added to samples?

Subcontract test containers added to subcontract bin?

Wetchem test containers marked with applicable tests?

Short hold time test containers delivered to analysts?

VOA vials checked for bubbles?

Bubbles in sample number(s): _____

5035A kits received?

Low kits: 6 High kits: _____ + 4 extra MeOH vials

5035A kits returned?

Low kits: _____ High kits: _____

Temperature upon receipt: 1.1 °C

On ice? Yes

Thermometer ID: 189

Other discrepancies:

Was client contacted? _____ Who was called? _____ By whom? _____ Date: _____

Outcome of call:



SAMPLE RECEIVING CHECKLIST

Client: ALL4

ALS Job #: EV24100096

Project: MARATHON OWS

Login Date: 10/09/24

Login Time: 1720

Login By: MTT

Type of Shipping Container:

☒ Cooler

☐ Box

☐ Other: _____

Shipped Via:

☐ FedEx Ground

☐ FedEx Express

☐ UPS

☐ External Courier

☒ ALS Courier

☐ Hand Delivered

Were custody seals on the outside of the shipping container?

Yes

No

N/A

How Many? _____ Where? _____ Date: _____ Name: _____

Was CoC filled out properly? (in ink, signed, dated, etc.)

Did all bottles have labels?

Did all bottle labels and tags agree with CoC?

Were samples received within hold time?

Did all bottles arrive in good condition?

Was sufficient amount of sample sent for tests requested?

Was correct preservation added to samples?

Subcontract test containers added to subcontract bin?

Wetchem test containers marked with applicable tests?

Short hold time test containers delivered to analysts?

VOA vials checked for bubbles?

Bubbles in sample number(s): _____

5035A kits received?

Low kits: 6 High kits: _____ + 4 extra MeOH vials

5035A kits returned?

Low kits: _____ High kits: _____

Temperature upon receipt: 1.1 °C

On ice? Yes

Thermometer ID: 189

Other discrepancies:

Was client contacted? _____ Who was called? _____ By whom? _____ Date: _____

Outcome of call:



November 6, 2024

Ms. Olana Costa
ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

Dear Ms. Costa,

On October 11th, 13 samples were received by our laboratory and assigned our laboratory project number EV24100114. The project was identified as your Marathon OWS. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Carl Nott
Laboratory Director



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-01
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/9/2024 9:20:00 AM
CLIENT SAMPLE ID	AOC2-SB4-10-10.5ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	160	30	10	MG/KG	10/24/2024	MNC
C5-C6 Aliphatics	NWVPH	5.5	5.0	1	MG/KG	10/16/2024	OSE
>C6-C8 Aliphatics	NWVPH	19	5.0	1	MG/KG	10/16/2024	OSE
>C8-C10 Aliphatics	NWVPH	18	5.0	1	MG/KG	10/16/2024	OSE
>C10-C12 Aliphatics	NWVPH	23	5.0	1	MG/KG	10/16/2024	OSE
>C8-C10 Aromatics	NWVPH	43	5.0	1	MG/KG	10/16/2024	OSE
>C10-C12 Aromatics	NWVPH	21	5.0	1	MG/KG	10/16/2024	OSE
>C12-C13 Aromatics	NWVPH	19	5.0	1	MG/KG	10/16/2024	OSE
TPH-Diesel Range	NWTPH-DX w/ SGA	U	25	1	MG/KG	10/19/2024	DHM
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/25/2024	DHM
TPH-Oil Range	NWTPH-DX w/ SGA	U	50	1	MG/KG	10/19/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/25/2024	DHM
>C8-C10 Aliphatics	NWEPH	U	24	1	MG/KG	10/23/2024	FAL
>C10-C12 Aliphatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
>C12-C16 Aliphatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
>C16-C21 Aliphatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
>C21-C34 Aliphatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
>C8-C10 Aromatics	NWEPH	U	24	1	MG/KG	10/23/2024	FAL
>C10-C12 Aromatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
>C12-C16 Aromatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
>C16-C21 Aromatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
>C21-C34 Aromatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
Methyl T-Butyl Ether	EPA-8260	U	38	1	UG/KG	10/23/2024	DLC
Hexane	EPA-8260	1300	200	1	UG/KG	10/23/2024	DLC
1,2-Dichloroethane	EPA-8260	U	11	1	UG/KG	10/23/2024	DLC
Benzene	EPA-8260	660	18	1	UG/KG	10/23/2024	DLC
Toluene - 10X Dilution1	EPA-8260	9800	110	10	UG/KG	10/24/2024	DLC
1,2-Dibromoethane	EPA-8260	U	8.7	1	UG/KG	10/23/2024	DLC
Ethylbenzene	EPA-8260	2600	15	1	UG/KG	10/23/2024	DLC
m,p-Xylene - 10X Dilution1	EPA-8260	8300	300	10	UG/KG	10/24/2024	DLC
o-Xylene	EPA-8260	3000	19	1	UG/KG	10/23/2024	DLC
Naphthalene	EPA-8270 SIM	110	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	110	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	69	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-01
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/9/2024 9:20:00 AM
CLIENT SAMPLE ID	AOC2-SB4-10-10.5ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.048	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	6.9	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	110	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	0.17	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	5.6	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	61.7	10/24/2024	MNC
C25	NWTPH-DX w/ SGA	103	10/19/2024	DHM
C25	NWTPH-DX	90.0	10/25/2024	DHM
C25	NWEPH	72.4	10/23/2024	FAL
p-Terphenyl	NWEPH	66.5	10/23/2024	FAL
Toluene-d8	EPA-8260	91.0	10/23/2024	DLC
Toluene-d8 - 10X Dilution1	EPA-8260	95.6	10/24/2024	DLC
Terphenyl-d14	EPA-8270 SIM	112	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains weathered gasoline.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-02
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/9/2024 9:30:00 AM
CLIENT SAMPLE ID	AOC2-SB4-16-16.5ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/25/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/25/2024	DHM
Benzene	EPA-8260	U	17	1	UG/KG	10/23/2024	DLC
Toluene	EPA-8260	34	10	1	UG/KG	10/23/2024	DLC
Ethylbenzene	EPA-8260	U	14	1	UG/KG	10/23/2024	DLC
m,p-Xylene	EPA-8260	U	28	1	UG/KG	10/23/2024	DLC
o-Xylene	EPA-8260	U	18	1	UG/KG	10/23/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.040	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	3.7	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	85	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	0.13	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	4.9	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	72.0	10/23/2024	MNC
C25	NWTPH-DX	92.9	10/25/2024	DHM
Toluene-d8	EPA-8260	97.0	10/23/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-02
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/9/2024 9:30:00 AM
CLIENT SAMPLE ID	AOC2-SB4-16-16.5ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	96.0	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-03
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/9/2024 11:00:00 AM
CLIENT SAMPLE ID	AOC2-SB1-8.5-9ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	62	3.0	1	MG/KG	10/23/2024	MNC
C5-C6 Aliphatics	NWVPH	U	5.0	1	MG/KG	10/16/2024	OSE
>C6-C8 Aliphatics	NWVPH	U	5.0	1	MG/KG	10/16/2024	OSE
>C8-C10 Aliphatics	NWVPH	U	5.0	1	MG/KG	10/16/2024	OSE
>C10-C12 Aliphatics	NWVPH	U	5.0	1	MG/KG	10/16/2024	OSE
>C8-C10 Aromatics	NWVPH	5.2	5.0	1	MG/KG	10/16/2024	OSE
>C10-C12 Aromatics	NWVPH	U	5.0	1	MG/KG	10/16/2024	OSE
>C12-C13 Aromatics	NWVPH	U	5.0	1	MG/KG	10/16/2024	OSE
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/18/2024	DHM
TPH-Diesel Range	NWTPH-DX w/ SGA	U	25	1	MG/KG	10/19/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX w/ SGA	U	50	1	MG/KG	10/19/2024	DHM
>C8-C10 Aliphatics	NWEPH	U	21	1	MG/KG	10/23/2024	FAL
>C10-C12 Aliphatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C12-C16 Aliphatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C16-C21 Aliphatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C21-C34 Aliphatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C8-C10 Aromatics	NWEPH	U	21	1	MG/KG	10/23/2024	FAL
>C10-C12 Aromatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C12-C16 Aromatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C16-C21 Aromatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C21-C34 Aromatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
Methyl T-Butyl Ether	EPA-8260	U	30	1	UG/KG	10/21/2024	DLC
Hexane	EPA-8260	460	160	1	UG/KG	10/21/2024	DLC
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/21/2024	DLC
Benzene	EPA-8260	350	15	1	UG/KG	10/21/2024	DLC
Toluene - 10X Dilution1	EPA-8260	3500	100	10	UG/KG	10/22/2024	DLC
1,2-Dibromoethane	EPA-8260	U	7.0	1	UG/KG	10/21/2024	DLC
Ethylbenzene	EPA-8260	910	12	1	UG/KG	10/21/2024	DLC
m,p-Xylene	EPA-8260	3300	24	1	UG/KG	10/21/2024	DLC
o-Xylene	EPA-8260	910	15	1	UG/KG	10/21/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	28	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-03
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/9/2024 11:00:00 AM
CLIENT SAMPLE ID	AOC2-SB1-8.5-9ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.034	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	4.3	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	73	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	4.0	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	111	10/23/2024	MNC
C25	NWTPH-DX	107	10/18/2024	DHM
C25	NWTPH-DX w/ SGA	115	10/19/2024	DHM
C25	NWEPH	71.1	10/23/2024	FAL
p-Terphenyl	NWEPH	67.2	10/23/2024	FAL
Toluene-d8	EPA-8260	96.0	10/21/2024	DLC
Toluene-d8 - 10X Dilution1	EPA-8260	94.6	10/22/2024	DLC
Terphenyl-d14	EPA-8270 SIM	114	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains weathered gasoline.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC DATE: 11/6/2024
228 E. Champion St, Suite 101 ALS JOB#: EV24100114
Bellingham, WA 98225 ALS SAMPLE#: EV24100114-04
CLIENT CONTACT: Olana Costa DATE RECEIVED: 10/11/2024
CLIENT PROJECT: Marathon OWS COLLECTION DATE: 10/9/2024 11:15:00 AM
CLIENT SAMPLE ID AOC2-SB1-11.5-12ft WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/18/2024	DHM
Benzene	EPA-8260	U	18	1	UG/KG	10/21/2024	DLC
Toluene	EPA-8260	140	10	1	UG/KG	10/21/2024	DLC
Ethylbenzene	EPA-8260	U	15	1	UG/KG	10/21/2024	DLC
m,p-Xylene	EPA-8260	83	29	1	UG/KG	10/21/2024	DLC
o-Xylene	EPA-8260	48	18	1	UG/KG	10/21/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.047	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	9.0	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	100	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	0.13	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	5.3	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	90.0	10/23/2024	MNC
C25	NWTPH-DX	109	10/18/2024	DHM
Toluene-d8	EPA-8260	96.4	10/21/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-04
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/9/2024 11:15:00 AM
CLIENT SAMPLE ID	AOC2-SB1-11.5-12ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	98.2	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-05
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/9/2024 1:50:00 PM
CLIENT SAMPLE ID	AOC2-SB2-14.5-15ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/18/2024	DHM
Benzene	EPA-8260	U	16	1	UG/KG	10/21/2024	DLC
Toluene	EPA-8260	20	10	1	UG/KG	10/21/2024	DLC
Ethylbenzene	EPA-8260	U	14	1	UG/KG	10/21/2024	DLC
m,p-Xylene	EPA-8260	U	27	1	UG/KG	10/21/2024	DLC
o-Xylene	EPA-8260	U	17	1	UG/KG	10/21/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.041	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	3.9	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	78	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	0.13	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	4.6	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	100	10/23/2024	MNC
C25	NWTPH-DX	97.6	10/18/2024	DHM
Toluene-d8	EPA-8260	95.9	10/21/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-05
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/9/2024 1:50:00 PM
CLIENT SAMPLE ID	AOC2-SB2-14.5-15ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	96.1	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC DATE: 11/6/2024
228 E. Champion St, Suite 101 ALS JOB#: EV24100114
Bellingham, WA 98225 ALS SAMPLE#: EV24100114-06
CLIENT CONTACT: Olana Costa DATE RECEIVED: 10/11/2024
CLIENT PROJECT: Marathon OWS COLLECTION DATE: 10/9/2024 1:55:00 PM
CLIENT SAMPLE ID AOC2-SB2-6.5-7ft WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	470	300	100	MG/KG	10/24/2024	MNC
C5-C6 Aliphatics	NWVPH	24	5.7	1	MG/KG	10/16/2024	OSE
>C6-C8 Aliphatics	NWVPH	88	5.7	1	MG/KG	10/16/2024	OSE
>C8-C10 Aliphatics	NWVPH	60	7.6	1	MG/KG	10/16/2024	OSE
>C10-C12 Aliphatics	NWVPH	60	5.0	1	MG/KG	10/16/2024	OSE
>C8-C10 Aromatics	NWVPH	100	9.5	1	MG/KG	10/16/2024	OSE
>C10-C12 Aromatics	NWVPH	59	5.0	1	MG/KG	10/16/2024	OSE
>C12-C13 Aromatics	NWVPH	58	5.0	1	MG/KG	10/16/2024	OSE
TPH-Diesel Range	NWTPH-DX	61	25	1	MG/KG	10/18/2024	DHM
TPH-Diesel Range	NWTPH-DX w/ SGA	65	25	1	MG/KG	10/19/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX w/ SGA	U	50	1	MG/KG	10/19/2024	DHM
>C8-C10 Aliphatics	NWEPH	U	23	1	MG/KG	10/23/2024	FAL
>C10-C12 Aliphatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
>C12-C16 Aliphatics	NWEPH	21	1.6	1	MG/KG	10/23/2024	FAL
>C16-C21 Aliphatics	NWEPH	15	12	1	MG/KG	10/23/2024	FAL
>C21-C34 Aliphatics	NWEPH	13	12	1	MG/KG	10/23/2024	FAL
>C8-C10 Aromatics	NWEPH	U	23	1	MG/KG	10/23/2024	FAL
>C10-C12 Aromatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
>C12-C16 Aromatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
>C16-C21 Aromatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
>C21-C34 Aromatics	NWEPH	U	12	1	MG/KG	10/23/2024	FAL
Methyl T-Butyl Ether	EPA-8260	U	37	1	UG/KG	10/21/2024	DLC
Hexane	EPA-8260	5200	190	1	UG/KG	10/21/2024	DLC
1,2-Dichloroethane	EPA-8260	U	11	1	UG/KG	10/21/2024	DLC
Benzene	EPA-8260	730	18	1	UG/KG	10/21/2024	DLC
Toluene - 10X Dilution1	EPA-8260	14000	110	10	UG/KG	10/22/2024	DLC
1,2-Dibromoethane	EPA-8260	U	8.6	1	UG/KG	10/21/2024	DLC
Ethylbenzene - 10X Dilution1	EPA-8260	4300	150	10	UG/KG	10/22/2024	DLC
m,p-Xylene - 10X Dilution1	EPA-8260	17000	300	10	UG/KG	10/22/2024	DLC
o-Xylene - 10X Dilution1	EPA-8260	5400	190	10	UG/KG	10/22/2024	DLC
Naphthalene	EPA-8270 SIM	220	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	460	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	300	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA

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ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626

ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-06
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/9/2024 1:55:00 PM
CLIENT SAMPLE ID	AOC2-SB2-6.5-7ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.051	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	6.4	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	98	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	0.12	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	5.2	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	U, SUR07	10/24/2024	MNC
C25	NWTPH-DX	113	10/18/2024	DHM
C25	NWTPH-DX w/ SGA	121	10/19/2024	DHM
C25	NWEPH	76.9	10/23/2024	FAL
p-Terphenyl	NWEPH	67.8	10/23/2024	FAL
Toluene-d8	EPA-8260	101	10/21/2024	DLC
Toluene-d8 - 10X Dilution1	EPA-8260	92.5	10/22/2024	DLC
Terphenyl-d14	EPA-8270 SIM	88.8	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

SUR07 -The surrogate recovery could not be determined due to dilution below the calibration range.

Chromatogram indicates that it is likely that sample contains lightly weathered gasoline and weathered diesel.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-07
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/10/2024 8:45:00 AM
CLIENT SAMPLE ID	AOC2-24-5-7.5-8ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/18/2024	DHM
Benzene	EPA-8260	U	19	1	UG/KG	10/21/2024	DLC
Toluene	EPA-8260	33	11	1	UG/KG	10/21/2024	DLC
Ethylbenzene	EPA-8260	U	16	1	UG/KG	10/21/2024	DLC
m,p-Xylene	EPA-8260	U	32	1	UG/KG	10/21/2024	DLC
o-Xylene	EPA-8260	U	20	1	UG/KG	10/21/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.051	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	6.5	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	110	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	0.11	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	5.9	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	94.4	10/23/2024	MNC
C25	NWTPH-DX	104	10/18/2024	DHM
Toluene-d8	EPA-8260	97.4	10/21/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC 228 E. Champion St, Suite 101 Bellingham, WA 98225	DATE:	11/6/2024
		ALS JOB#:	EV24100114
		ALS SAMPLE#:	EV24100114-07
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/10/2024 8:45:00 AM
CLIENT SAMPLE ID	AOC2-24-5-7.5-8ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	93.5	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC DATE: 11/6/2024
228 E. Champion St, Suite 101 ALS JOB#: EV24100114
Bellingham, WA 98225 ALS SAMPLE#: EV24100114-08
CLIENT CONTACT: Olana Costa DATE RECEIVED: 10/11/2024
CLIENT PROJECT: Marathon OWS COLLECTION DATE: 10/10/2024 9:00:00 AM
CLIENT SAMPLE ID AOC2-24-5-18.5-19ft WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/18/2024	DHM
Benzene	EPA-8260	U	16	1	UG/KG	10/21/2024	DLC
Toluene	EPA-8260	12	10	1	UG/KG	10/21/2024	DLC
Ethylbenzene	EPA-8260	U	14	1	UG/KG	10/21/2024	DLC
m,p-Xylene	EPA-8260	U	27	1	UG/KG	10/21/2024	DLC
o-Xylene	EPA-8260	U	17	1	UG/KG	10/21/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.046	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	4.0	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	81	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	0.11	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	4.9	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	95.2	10/23/2024	MNC
C25	NWTPH-DX	96.4	10/18/2024	DHM
Toluene-d8	EPA-8260	96.0	10/21/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-08
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/10/2024 9:00:00 AM
CLIENT SAMPLE ID	AOC2-24-5-18.5-19ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	86.8	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC DATE: 11/6/2024
228 E. Champion St, Suite 101 ALS JOB#: EV24100114
Bellingham, WA 98225 ALS SAMPLE#: EV24100114-09
CLIENT CONTACT: Olana Costa DATE RECEIVED: 10/11/2024
CLIENT PROJECT: Marathon OWS COLLECTION DATE: 10/10/2024 11:10:00 AM
CLIENT SAMPLE ID AOC2-SB3-6.5-7ft WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	5.3	3.0	1	MG/KG	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/18/2024	DHM
Benzene	EPA-8260	U	18	1	UG/KG	10/21/2024	DLC
Toluene	EPA-8260	95	11	1	UG/KG	10/21/2024	DLC
Ethylbenzene	EPA-8260	U	15	1	UG/KG	10/21/2024	DLC
m,p-Xylene	EPA-8260	44	30	1	UG/KG	10/21/2024	DLC
o-Xylene	EPA-8260	47	19	1	UG/KG	10/21/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.050	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	6.0	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	110	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	0.15	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	6.9	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	0.12	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	82.2	10/23/2024	MNC
C25	NWTPH-DX	105	10/18/2024	DHM
Toluene-d8	EPA-8260	97.4	10/21/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-09
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/10/2024 11:10:00 AM
CLIENT SAMPLE ID	AOC2-SB3-6.5-7ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	103	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.
Chromatogram indicates that it is likely that sample contains highly weathered gasoline.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC DATE: 11/6/2024
228 E. Champion St, Suite 101 ALS JOB#: EV24100114
Bellingham, WA 98225 ALS SAMPLE#: EV24100114-10
CLIENT CONTACT: Olana Costa DATE RECEIVED: 10/11/2024
CLIENT PROJECT: Marathon OWS COLLECTION DATE: 10/10/2024 11:20:00 AM
CLIENT SAMPLE ID AOC2-SB3-7.5-8ft WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/18/2024	DHM
Benzene	EPA-8260	U	17	1	UG/KG	10/21/2024	DLC
Toluene	EPA-8260	U	10	1	UG/KG	10/21/2024	DLC
Ethylbenzene	EPA-8260	U	14	1	UG/KG	10/21/2024	DLC
m,p-Xylene	EPA-8260	U	28	1	UG/KG	10/21/2024	DLC
o-Xylene	EPA-8260	U	18	1	UG/KG	10/21/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.050	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	6.3	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	97	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	0.10	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	5.7	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	91.8	10/23/2024	MNC
C25	NWTPH-DX	99.7	10/18/2024	DHM
Toluene-d8	EPA-8260	93.9	10/21/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-10
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/10/2024 11:20:00 AM
CLIENT SAMPLE ID	AOC2-SB3-7.5-8ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	91.4	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-11
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/10/2024 1:40:00 PM
CLIENT SAMPLE ID	AOC2-24-4-6.5-7ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/23/2024	MNC
C5-C6 Aliphatics	NWVPH	U	5.0	1	MG/KG	10/16/2024	OSE
>C6-C8 Aliphatics	NWVPH	U	5.0	1	MG/KG	10/16/2024	OSE
>C8-C10 Aliphatics	NWVPH	U	5.0	1	MG/KG	10/16/2024	OSE
>C10-C12 Aliphatics	NWVPH	U	5.0	1	MG/KG	10/16/2024	OSE
>C8-C10 Aromatics	NWVPH	9.4	5.0	1	MG/KG	10/16/2024	OSE
>C10-C12 Aromatics	NWVPH	U	5.0	1	MG/KG	10/16/2024	OSE
>C12-C13 Aromatics	NWVPH	U	5.0	1	MG/KG	10/16/2024	OSE
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/18/2024	DHM
TPH-Diesel Range	NWTPH-DX w/ SGA	U	25	1	MG/KG	10/19/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX w/ SGA	U	50	1	MG/KG	10/19/2024	DHM
>C8-C10 Aliphatics	NWEPH	U	23	1	MG/KG	10/23/2024	FAL
>C10-C12 Aliphatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C12-C16 Aliphatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C16-C21 Aliphatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C21-C34 Aliphatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C8-C10 Aromatics	NWEPH	U	23	1	MG/KG	10/23/2024	FAL
>C10-C12 Aromatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C12-C16 Aromatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C16-C21 Aromatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
>C21-C34 Aromatics	NWEPH	U	11	1	MG/KG	10/23/2024	FAL
Methyl T-Butyl Ether	EPA-8260	U	34	1	UG/KG	10/21/2024	DLC
Hexane	EPA-8260	U	170	1	UG/KG	10/21/2024	DLC
1,2-Dichloroethane	EPA-8260	U	10	1	UG/KG	10/21/2024	DLC
Benzene	EPA-8260	31	16	1	UG/KG	10/21/2024	DLC
Toluene	EPA-8260	59	10	1	UG/KG	10/21/2024	DLC
1,2-Dibromoethane	EPA-8260	U	7.8	1	UG/KG	10/21/2024	DLC
Ethylbenzene	EPA-8260	31	14	1	UG/KG	10/21/2024	DLC
m,p-Xylene	EPA-8260	39	27	1	UG/KG	10/21/2024	DLC
o-Xylene	EPA-8260	57	17	1	UG/KG	10/21/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-11
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/10/2024 1:40:00 PM
CLIENT SAMPLE ID	AOC2-24-4-6.5-7ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.041	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	5.2	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	88	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	0.10	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	4.5	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	101	10/23/2024	MNC
C25	NWTPH-DX	120	10/18/2024	DHM
C25	NWTPH-DX w/ SGA	110	10/19/2024	DHM
C25	NWEPH	73.6	10/23/2024	FAL
p-Terphenyl	NWEPH	65.9	10/23/2024	FAL
Toluene-d8	EPA-8260	97.0	10/21/2024	DLC
Terphenyl-d14	EPA-8270 SIM	97.1	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-12
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/10/2024 2:00:00 PM
CLIENT SAMPLE ID	AOC2-24-4-8-8.5ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/18/2024	DHM
Benzene	EPA-8260	U	18	1	UG/KG	10/21/2024	DLC
Toluene	EPA-8260	17	11	1	UG/KG	10/21/2024	DLC
Ethylbenzene	EPA-8260	U	15	1	UG/KG	10/21/2024	DLC
m,p-Xylene	EPA-8260	U	30	1	UG/KG	10/21/2024	DLC
o-Xylene	EPA-8260	U	19	1	UG/KG	10/21/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.049	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	6.0	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	110	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	0.13	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	6.0	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	83.4	10/23/2024	MNC
C25	NWTPH-DX	109	10/18/2024	DHM
Toluene-d8	EPA-8260	96.4	10/21/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-12
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/10/2024 2:00:00 PM
CLIENT SAMPLE ID	AOC2-24-4-8-8.5ft	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	93.2	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC DATE: 11/6/2024
228 E. Champion St, Suite 101 ALS JOB#: EV24100114
Bellingham, WA 98225 ALS SAMPLE#: EV24100114-13
CLIENT CONTACT: Olana Costa DATE RECEIVED: 10/11/2024
CLIENT PROJECT: Marathon OWS COLLECTION DATE: 10/10/2024 8:00:00 AM
CLIENT SAMPLE ID: ALL4-DUP-1 WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	3.0	1	MG/KG	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	25	1	MG/KG	10/19/2024	DHM
TPH-Oil Range	NWTPH-DX	U	50	1	MG/KG	10/19/2024	DHM
Benzene	EPA-8260	U	19	1	UG/KG	10/21/2024	DLC
Toluene	EPA-8260	33	11	1	UG/KG	10/21/2024	DLC
Ethylbenzene	EPA-8260	U	16	1	UG/KG	10/21/2024	DLC
m,p-Xylene	EPA-8260	U	31	1	UG/KG	10/21/2024	DLC
o-Xylene	EPA-8260	U	20	1	UG/KG	10/21/2024	DLC
Naphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Acenaphthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluorene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Phenanthrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	20	1	UG/KG	10/24/2024	DBA
Mercury	EPA-7471	0.052	0.020	1	MG/KG	10/16/2024	RAL
Arsenic	EPA-6020	5.9	0.50	1	MG/KG	10/16/2024	EBS
Barium	EPA-6020	100	0.10	1	MG/KG	10/16/2024	EBS
Cadmium	EPA-6020	0.11	0.10	1	MG/KG	10/16/2024	EBS
Lead	EPA-6020	5.6	0.50	1	MG/KG	10/16/2024	EBS
Selenium	EPA-6020	U	1.0	1	MG/KG	10/16/2024	EBS
Silver	EPA-6020	U	0.10	1	MG/KG	10/16/2024	EBS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	82.6	10/23/2024	MNC
C25	NWTPH-DX	113	10/19/2024	DHM
Toluene-d8	EPA-8260	98.5	10/21/2024	DLC

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100114
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100114-13
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/11/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/10/2024 8:00:00 AM
CLIENT SAMPLE ID	ALL4-DUP-1	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Terphenyl-d14	EPA-8270 SIM	106	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

Soil results reported on a dry-weight basis.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS SDG#: EV24100114
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY BLANK RESULTS

MBG2-102224S - Batch 219618 - Soil by NWTPH-GX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	MG/KG	3.0	10/23/2024	MNC

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R498679 - Batch R498679 - Soil by NWVPH

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
C5-C6 Aliphatics	NWVPH	U	MG/KG	5.0	10/16/2024	OSE
>C6-C8 Aliphatics	NWVPH	U	MG/KG	5.0	10/16/2024	OSE
>C8-C10 Aliphatics	NWVPH	U	MG/KG	5.0	10/16/2024	OSE
>C10-C12 Aliphatics	NWVPH	U	MG/KG	5.0	10/16/2024	OSE
>C8-C10 Aromatics	NWVPH	U	MG/KG	5.0	10/16/2024	OSE
>C10-C12 Aromatics	NWVPH	U	MG/KG	5.0	10/16/2024	OSE
>C12-C13 Aromatics	NWVPH	U	MG/KG	5.0	10/16/2024	OSE

U - Analyte analyzed for but not detected at level above reporting limit.

MB-101824S - Batch 219627 - Soil by NWTPH-DX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range	NWTPH-DX	U	MG/KG	25	10/18/2024	DHM
TPH-Oil Range	NWTPH-DX	U	MG/KG	50	10/18/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R498176 - Batch R498176 - Soil by NWEPH

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
>C8-C10 Aliphatics	NWEPH	U	MG/KG	21	10/23/2024	FAL
>C10-C12 Aliphatics	NWEPH	U	MG/KG	11	10/23/2024	FAL
>C12-C16 Aliphatics	NWEPH	U	MG/KG	1.6	10/23/2024	FAL
>C16-C21 Aliphatics	NWEPH	U	MG/KG	11	10/23/2024	FAL
>C21-C34 Aliphatics	NWEPH	U	MG/KG	11	10/23/2024	FAL
>C8-C10 Aromatics	NWEPH	U	MG/KG	21	10/23/2024	FAL
>C10-C12 Aromatics	NWEPH	U	MG/KG	11	10/23/2024	FAL
>C12-C16 Aromatics	NWEPH	U	MG/KG	11	10/23/2024	FAL
>C16-C21 Aromatics	NWEPH	U	MG/KG	11	10/23/2024	FAL
>C21-C34 Aromatics	NWEPH	U	MG/KG	11	10/23/2024	FAL

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS SDG#: EV24100114
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY BLANK RESULTS

MB-102124S - Batch 219494 - Soil by EPA-8260

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Methyl T-Butyl Ether	EPA-8260	U	UG/KG	10	10/21/2024	DLC
Hexane	EPA-8260	U	UG/KG	10	10/21/2024	DLC
1,2-Dichloroethane	EPA-8260	U	UG/KG	10	10/21/2024	DLC
Benzene	EPA-8260	U	UG/KG	5.0	10/21/2024	DLC
Toluene	EPA-8260	U	UG/KG	10	10/21/2024	DLC
1,2-Dibromoethane	EPA-8260	U	UG/KG	5.0	10/21/2024	DLC
Ethylbenzene	EPA-8260	U	UG/KG	10	10/21/2024	DLC
m,p-Xylene	EPA-8260	U	UG/KG	20	10/21/2024	DLC
o-Xylene	EPA-8260	U	UG/KG	10	10/21/2024	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-102324S - Batch 219567 - Soil by EPA-8260

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Methyl T-Butyl Ether	EPA-8260	U	UG/KG	10	10/23/2024	DLC
Hexane	EPA-8260	U	UG/KG	10	10/23/2024	DLC
1,2-Dichloroethane	EPA-8260	U	UG/KG	10	10/23/2024	DLC
Benzene	EPA-8260	U	UG/KG	5.0	10/23/2024	DLC
Toluene	EPA-8260	U	UG/KG	10	10/23/2024	DLC
1,2-Dibromoethane	EPA-8260	U	UG/KG	5.0	10/23/2024	DLC
Ethylbenzene	EPA-8260	U	UG/KG	10	10/23/2024	DLC
m,p-Xylene	EPA-8260	U	UG/KG	20	10/23/2024	DLC
o-Xylene	EPA-8260	U	UG/KG	10	10/23/2024	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-102224S - Batch 219490 - Soil by EPA-8270 SIM

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Naphthalene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Acenaphthene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Fluorene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Phenanthrene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Anthracene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Fluoranthene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Pyrene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 11/6/2024
ALS SDG#: EV24100114
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY BLANK RESULTS

MB-102224S - Batch 219490 - Soil by EPA-8270 SIM

Benzo[A]Anthracene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Chrysene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	UG/KG	20	10/24/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R480291 - Batch R480291 - Soil by EPA-7471

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Mercury	EPA-7471	U	MG/KG	0.020	10/16/2024	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MB-101524S - Batch 219144 - Soil by EPA-6020

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-6020	U	MG/KG	0.50	10/16/2024	EBS
Barium	EPA-6020	U	MG/KG	0.12	10/16/2024	EBS
Cadmium	EPA-6020	U	MG/KG	0.10	10/16/2024	EBS
Lead	EPA-6020	U	MG/KG	0.50	10/16/2024	EBS
Selenium	EPA-6020	U	MG/KG	1.0	10/16/2024	EBS
Silver	EPA-6020	U	MG/KG	0.10	10/16/2024	EBS

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
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CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 219618 - Soil by NWTPH-GX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Volatile Range - BS	NWTPH-GX	92.1			66.5	122.7	10/23/2024	MNC
TPH-Volatile Range - BSD	NWTPH-GX	92.5	0		66.5	122.7	10/23/2024	MNC

ALS Test Batch ID: 219627 - Soil by NWTPH-DX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Diesel Range - BS	NWTPH-DX	110			75.5	122.1	10/18/2024	DHM
TPH-Diesel Range - BSD	NWTPH-DX	109	1		75.5	122.1	10/18/2024	DHM

ALS Test Batch ID: R498176 - Soil by NWEPH

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
>C8-C10 Aliphatics - BS	NWEPH	31.5			16.2	56.2	10/23/2024	FAL
>C10-C12 Aliphatics - BS	NWEPH	49.2			11.9	100	10/23/2024	FAL
>C12-C16 Aliphatics - BS	NWEPH	70.8			33.1	96.5	10/23/2024	FAL
>C16-C21 Aliphatics - BS	NWEPH	80.2			30.2	109	10/23/2024	FAL
>C21-C34 Aliphatics - BS	NWEPH	39.2			27.5	135	10/23/2024	FAL
>C8-C10 Aromatics - BS	NWEPH	42.8			9.07	92	10/23/2024	FAL
>C10-C12 Aromatics - BS	NWEPH	65.6			11.6	139	10/23/2024	FAL
>C12-C16 Aromatics - BS	NWEPH	76.2			34.3	135	10/23/2024	FAL
>C16-C21 Aromatics - BS	NWEPH	78.2			47.5	130	10/23/2024	FAL
>C21-C34 Aromatics - BS	NWEPH	79.8			36.6	126	10/23/2024	FAL

ALS Test Batch ID: 219494 - Soil by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Methyl T-Butyl Ether - BS	EPA-8260	105			50	150	10/21/2024	DLC
Methyl T-Butyl Ether - BSD	EPA-8260	98.4	7		50	150	10/21/2024	DLC
Hexane - BS	EPA-8260	98.0			50	150	10/21/2024	DLC
Hexane - BSD	EPA-8260	84.7	14		50	150	10/21/2024	DLC
1,2-Dichloroethane - BS	EPA-8260	116			50	150	10/21/2024	DLC
1,2-Dichloroethane - BSD	EPA-8260	107	8		50	150	10/21/2024	DLC
Benzene - BS	EPA-8260	103			75	138	10/21/2024	DLC
Benzene - BSD	EPA-8260	91.3	12		75	138	10/21/2024	DLC
Toluene - BS	EPA-8260	93.6			71.6	122.1	10/21/2024	DLC
Toluene - BSD	EPA-8260	83.1	12		71.6	122.1	10/21/2024	DLC
1,2-Dibromoethane - BS	EPA-8260	104			50	150	10/21/2024	DLC
1,2-Dibromoethane - BSD	EPA-8260	99.4	4		50	150	10/21/2024	DLC
Ethylbenzene - BS	EPA-8260	100			50	150	10/21/2024	DLC



CERTIFICATE OF ANALYSIS

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WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY CONTROL SAMPLE RESULTS

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Ethylbenzene - BSD	EPA-8260	90.9	10		50	150	10/21/2024	DLC
m,p-Xylene - BS	EPA-8260	96.6			50	150	10/21/2024	DLC
m,p-Xylene - BSD	EPA-8260	87.8	10		50	150	10/21/2024	DLC
o-Xylene - BS	EPA-8260	87.4			50	150	10/21/2024	DLC
o-Xylene - BSD	EPA-8260	80.3	8		50	150	10/21/2024	DLC

ALS Test Batch ID: 219567 - Soil by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Methyl T-Butyl Ether - BS	EPA-8260	93.2			50	150	10/23/2024	DLC
Methyl T-Butyl Ether - BSD	EPA-8260	95.7	3		50	150	10/23/2024	DLC
Hexane - BS	EPA-8260	110			50	150	10/23/2024	DLC
Hexane - BSD	EPA-8260	106	3		50	150	10/23/2024	DLC
1,2-Dichloroethane - BS	EPA-8260	120			50	150	10/23/2024	DLC
1,2-Dichloroethane - BSD	EPA-8260	121	0		50	150	10/23/2024	DLC
Benzene - BS	EPA-8260	113			75	138	10/23/2024	DLC
Benzene - BSD	EPA-8260	110	3		75	138	10/23/2024	DLC
Toluene - BS	EPA-8260	96.3			71.6	122.1	10/23/2024	DLC
Toluene - BSD	EPA-8260	94.3	2		71.6	122.1	10/23/2024	DLC
1,2-Dibromoethane - BS	EPA-8260	101			50	150	10/23/2024	DLC
1,2-Dibromoethane - BSD	EPA-8260	98.7	2		50	150	10/23/2024	DLC
Ethylbenzene - BS	EPA-8260	110			50	150	10/23/2024	DLC
Ethylbenzene - BSD	EPA-8260	104	6		50	150	10/23/2024	DLC
m,p-Xylene - BS	EPA-8260	104			50	150	10/23/2024	DLC
m,p-Xylene - BSD	EPA-8260	98.1	6		50	150	10/23/2024	DLC
o-Xylene - BS	EPA-8260	92.1			50	150	10/23/2024	DLC
o-Xylene - BSD	EPA-8260	87.6	5		50	150	10/23/2024	DLC

ALS Test Batch ID: 219490 - Soil by EPA-8270 SIM

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Naphthalene - BS	EPA-8270 SIM	99.3			20	150	10/24/2024	DBA
Naphthalene - BSD	EPA-8270 SIM	91.1	9		20	150	10/24/2024	DBA
2-Methylnaphthalene - BS	EPA-8270 SIM	103			20	150	10/24/2024	DBA
2-Methylnaphthalene - BSD	EPA-8270 SIM	95.0	8		20	150	10/24/2024	DBA
1-Methylnaphthalene - BS	EPA-8270 SIM	100			20	150	10/24/2024	DBA
1-Methylnaphthalene - BSD	EPA-8270 SIM	92.7	8		20	150	10/24/2024	DBA
Acenaphthylene - BS	EPA-8270 SIM	110			20	150	10/24/2024	DBA
Acenaphthylene - BSD	EPA-8270 SIM	102	8		20	150	10/24/2024	DBA
Acenaphthene - BS	EPA-8270 SIM	102			41	107	10/24/2024	DBA

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ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626

ALS Group USA, Corp dba ALS Environmental



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

DATE: 11/6/2024
ALS SDG#: EV24100114
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY CONTROL SAMPLE RESULTS

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Acenaphthene - BSD	EPA-8270 SIM	92.7	9		41	107	10/24/2024	DBA
Fluorene - BS	EPA-8270 SIM	107			20	150	10/24/2024	DBA
Fluorene - BSD	EPA-8270 SIM	97.8	9		20	150	10/24/2024	DBA
Phenanthrene - BS	EPA-8270 SIM	101			20	150	10/24/2024	DBA
Phenanthrene - BSD	EPA-8270 SIM	93.3	8		20	150	10/24/2024	DBA
Anthracene - BS	EPA-8270 SIM	106			20	150	10/24/2024	DBA
Anthracene - BSD	EPA-8270 SIM	98.3	8		20	150	10/24/2024	DBA
Fluoranthene - BS	EPA-8270 SIM	95.4			20	150	10/24/2024	DBA
Fluoranthene - BSD	EPA-8270 SIM	88.2	8		20	150	10/24/2024	DBA
Pyrene - BS	EPA-8270 SIM	101			18	136	10/24/2024	DBA
Pyrene - BSD	EPA-8270 SIM	91.8	9		18	136	10/24/2024	DBA
Benzo[A]Anthracene - BS	EPA-8270 SIM	114			20	150	10/24/2024	DBA
Benzo[A]Anthracene - BSD	EPA-8270 SIM	103	11		20	150	10/24/2024	DBA
Chrysene - BS	EPA-8270 SIM	109			20	150	10/24/2024	DBA
Chrysene - BSD	EPA-8270 SIM	99.4	9		20	150	10/24/2024	DBA
Benzo[B]Fluoranthene - BS	EPA-8270 SIM	101			20	150	10/24/2024	DBA
Benzo[B]Fluoranthene - BSD	EPA-8270 SIM	93.3	8		20	150	10/24/2024	DBA
Benzo[K]Fluoranthene - BS	EPA-8270 SIM	95.2			20	150	10/24/2024	DBA
Benzo[K]Fluoranthene - BSD	EPA-8270 SIM	90.3	5		20	150	10/24/2024	DBA
Benzo[A]Pyrene - BS	EPA-8270 SIM	97.1			20	150	10/24/2024	DBA
Benzo[A]Pyrene - BSD	EPA-8270 SIM	90.3	7		20	150	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene - BS	EPA-8270 SIM	118			20	150	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene - BSD	EPA-8270 SIM	110	7		20	150	10/24/2024	DBA
Dibenz[A,H]Anthracene - BS	EPA-8270 SIM	118			20	150	10/24/2024	DBA
Dibenz[A,H]Anthracene - BSD	EPA-8270 SIM	111	6		20	150	10/24/2024	DBA
Benzo[G,H,I]Perylene - BS	EPA-8270 SIM	81.5			20	150	10/24/2024	DBA
Benzo[G,H,I]Perylene - BSD	EPA-8270 SIM	85.2	5		20	150	10/24/2024	DBA

ALS Test Batch ID: R480291 - Soil by EPA-7471

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Mercury - BS	EPA-7471	105			81.8	117	10/16/2024	RAL
Mercury - BSD	EPA-7471	106	1		81.8	117	10/16/2024	RAL

ALS Test Batch ID: 219144 - Soil by EPA-6020

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Arsenic - BS	EPA-6020	99.0			80	120	10/16/2024	EBS
Arsenic - BSD	EPA-6020	102	3		80	120	10/16/2024	EBS
Barium - BS	EPA-6020	101			80	120	10/16/2024	EBS

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	11/6/2024
	228 E. Champion St, Suite 101	ALS SDG#:	EV24100114
	Bellingham, WA 98225	WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Olana Costa		
CLIENT PROJECT:	Marathon OWS		

LABORATORY CONTROL SAMPLE RESULTS

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Barium - BSD	EPA-6020	101	0		80	120	10/16/2024	EBS
Cadmium - BS	EPA-6020	101			80	120	10/16/2024	EBS
Cadmium - BSD	EPA-6020	104	3		80	120	10/16/2024	EBS
Lead - BS	EPA-6020	101			80	120	10/16/2024	EBS
Lead - BSD	EPA-6020	101	0		80	120	10/16/2024	EBS
Selenium - BS	EPA-6020	100			80	120	10/16/2024	EBS
Selenium - BSD	EPA-6020	104	4		80	120	10/16/2024	EBS
Silver - BS	EPA-6020	97.5			80	120	10/16/2024	EBS
Silver - BSD	EPA-6020	100	3		80	120	10/16/2024	EBS



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CLIENT PROJECT: Marathon OWS

MATRIX SPIKE RESULTS

ALS Test Batch ID: 219490 - Soil

Parent Sample: ALL4-DUP-1

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	SPIKE ADDED	PARENT SAMPLE RESULT	CALC RESULT*	MIN	MAX	RPD	ANALYSIS DATE	ANALYSIS BY
Naphthalene - MS	EPA-8270 SIM	74.8			1730	0	1300	20	150		10/24/2024	DBA
Naphthalene - MSD	EPA-8270 SIM	79.7	61	SR1	867	0	691 SR1	20	150	30	10/24/2024	DBA
2-Methylnaphthalene - MS	EPA-8270 SIM	77.8			1730	0	1350	20	150		10/24/2024	DBA
2-Methylnaphthalene - MSD	EPA-8270 SIM	84.0	60	SR1	867	0	728 SR1	20	150	30	10/24/2024	DBA
1-Methylnaphthalene - MS	EPA-8270 SIM	76.3			1730	0	1320	20	150		10/24/2024	DBA
1-Methylnaphthalene - MSD	EPA-8270 SIM	82.5	60	SR1	867	0	715 SR1	20	150	30	10/24/2024	DBA
Acenaphthylene - MS	EPA-8270 SIM	85.5			1730	0	1480	20	150		10/24/2024	DBA
Acenaphthylene - MSD	EPA-8270 SIM	89.7	62	SR1	867	0	777 SR1	20	150	30	10/24/2024	DBA
Acenaphthene - MS	EPA-8270 SIM	78.0			1730	0	1350	41	107		10/24/2024	DBA
Acenaphthene - MSD	EPA-8270 SIM	81.9	62	SR1	867	0	710 SR1	41	107	13	10/24/2024	DBA
Fluorene - MS	EPA-8270 SIM	81.9			1730	0	1420	20	150		10/24/2024	DBA
Fluorene - MSD	EPA-8270 SIM	87.5	61	SR1	867	0	758 SR1	20	150	30	10/24/2024	DBA
Phenanthrene - MS	EPA-8270 SIM	151		SQ2	867	0	1310 SQ2	20	150		10/24/2024	DBA
Phenanthrene - MSD	EPA-8270 SIM	79.5	62	SR1	867	0	689 SR1	20	150	30	10/24/2024	DBA
Anthracene - MS	EPA-8270 SIM	79.6			1730	0	1380	20	150		10/24/2024	DBA
Anthracene - MSD	EPA-8270 SIM	85.5	60	SR1	867	0	741 SR1	20	150	30	10/24/2024	DBA
Fluoranthene - MS	EPA-8270 SIM	71.0			1730	0	1230	20	150		10/24/2024	DBA
Fluoranthene - MSD	EPA-8270 SIM	79.3	57	SR1	867	0	687 SR1	20	150	30	10/24/2024	DBA
Pyrene - MS	EPA-8270 SIM	70.4			1730	0	1220	18	136		10/24/2024	DBA
Pyrene - MSD	EPA-8270 SIM	77.2	58	SR1	867	0	669 SR1	18	136	18	10/24/2024	DBA
Benzo[A]Anthracene - MS	EPA-8270 SIM	85.3			1730	0	1480	20	150		10/24/2024	DBA
Benzo[A]Anthracene - MSD	EPA-8270 SIM	89.2	63	SR1	867	0	773 SR1	20	150	30	10/24/2024	DBA
Chrysene - MS	EPA-8270 SIM	79.1			1730	0	1370	20	150		10/24/2024	DBA
Chrysene - MSD	EPA-8270 SIM	83.9	61	SR1	867	0	727 SR1	20	150	30	10/24/2024	DBA
Benzo[B]Fluoranthene - MS	EPA-8270 SIM	73.8			1730	0	1280	20	150		10/24/2024	DBA
Benzo[B]Fluoranthene - MSD	EPA-8270 SIM	81.4	58	SR1	867	0	706 SR1	20	150	30	10/24/2024	DBA
Benzo[K]Fluoranthene - MS	EPA-8270 SIM	69.1			1730	0	1200	20	150		10/24/2024	DBA
Benzo[K]Fluoranthene - MSD	EPA-8270 SIM	73.6	61	SR1	867	0	638 SR1	20	150	30	10/24/2024	DBA
Benzo[A]Pyrene - MS	EPA-8270 SIM	73.2			1730	0	1270	20	150		10/24/2024	DBA
Benzo[A]Pyrene - MSD	EPA-8270 SIM	77.4	62	SR1	867	0	670 SR1	20	150	30	10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene - MS	EPA-8270 SIM	89.4			1730	0	1550	20	150		10/24/2024	DBA
Indeno[1,2,3-Cd]Pyrene - MSD	EPA-8270 SIM	87.4	69	SR1	867	0	758 SR1	20	150	30	10/24/2024	DBA
Dibenz[A,H]Anthracene - MS	EPA-8270 SIM	90.9			1730	0	1580	20	150		10/24/2024	DBA
Dibenz[A,H]Anthracene - MSD	EPA-8270 SIM	88.0	70	SR1	867	0	762 SR1	20	150	30	10/24/2024	DBA
Benzo[G,H,I]Perylene - MS	EPA-8270 SIM	86.7			1730	0	1500	20	150		10/24/2024	DBA
Benzo[G,H,I]Perylene - MSD	EPA-8270 SIM	75.6	79	SR1	867	0	655 SR1	20	150	30	10/24/2024	DBA

CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

DATE: 11/6/2024
ALS SDG#: EV24100114
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

MATRIX SPIKE RESULTS

SQ2 - Spike outside of control limits due to matrix effect.
SR1 - RPD outside of control limits.

*Calc Result = (Sample Result - Parent Sample Result)

APPROVED BY



Carl Nott
Laboratory Director



Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only)

EV24100114

Date 10/14/24 Page 1 Of 2

PROJECT ID: Marathon OWS					
REPORT TO COMPANY: AWH					
PROJECT MANAGER: D. Costa					
ADDRESS: 228 E. Champion Street Unit 101 <i>Bellingham, WA 98225</i>					
PHONE: 360-752-9571 PO. #: 064533-0011.00					
E-MAIL: <i>Ocosto@aiffinc.com</i>					
INVOICE TO COMPANY: Same as above					
ATTENTION: <i>Diana Costa.</i>					
ADDRESS:					
SAMPLE I.D.	DATE	TIME	TYPE	LAB#	ANALYSIS REQUESTED
1.AOC2-SB4-10-10.5ft	10/9/24	0930	Soil	1	
2.AOC2-SB4-16-16.5ft	10/9/24	0930		2	
3.AOC2-SB1-8.5-9 ft.	10/9/24	1100		3	
4.AOC2-SB1-11.5-12ft.	10/9/24	1115		4	
5.AOC2-SB2-14.5-15ft	10/9/24	1356		5	
6.AOC2-SB2-6.5-7ft.	10/9/24	1355		6	
7.AOC2-24-55-7.5-ft	10/10/24	0845		7	
8.AOC2-24-55-18.5-19ft	10/10/24	0900		8	
9.AOC2-SB3-6.5-7 ft.	10/10/24	1110		9	
10.AOC2-SB3-7.5-8ft	10/10/24	1120		10	
NWTPH-HCID	X	X	X	X	OTHER (Specify)
NWTPH-DX	X	X	X	X	
NWTPH-GX	X	X	X	X	
BTEX by EPA 8021 ☐			BTEX by EPA 8260 ☒		
MTBE by EPA 8021 ☐			MTBE by EPA 8260 ☒		
Halogenated Volatiles by EPA 8260					
Volatile Organic Compounds by EPA 8260					
EDB / EDC by EPA 8260 SIM (water)					
EDB / EDC by EPA 8260 (soil)	X				
Semivolatile Organic Compounds by EPA 8270					
Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270 SIM	X				
PCB by EPA 8082 ☐			Pesticides by EPA 8081 ☐		
Metals-MTCA-5 ☐ RCRA-8 ☒	X	X	Pri Pol ☐ TAL ☐		
Metals Other (Specify)					
TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐					
Hexane	X	X	X	X	
cPAHs + Naphthalenes - EPA 8270 Sim	X	X	X	X	
EPH	X	X	X	X	
VPH	X	X	X	X	
NWTPH-Dx w/ silica gel cleanup	X	X	X	X	
NUMBER OF CONTAINERS	5	4	4	4	
RECEIVED IN GOOD CONDITION?					

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Olivia Cost, Aunt Olivia, 10/11/21 10:50

Received By: APRISTE, AIS, 10/11/24 ADIOSD

2. Relinquished By: _____

Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis

SAME DAY	1	2	3	5	10
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Fuels & Hydrocarbon Analysis

Standard	5	3	1	SAME DAY
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*Turnaround request less than standard may incur Rush Charges



Chain Of Custody/ Laboratory Analysis Request

(If Laboratory Use Only)

Date 10/1/21 Page 2 Of 2

[illegible]

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Olivia Costa, ALU1 10/11/24 15:50

Received By: APR 25, 10/11/21 @ 1050

2. Relinquished By:

Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis

Standard ☒ 10 ☐ 5 ☐ 3 ☐ 2 ☐ 1 ☐ 0

Fuels & Hydrocarbon Analysis

OTHER: _____

Specify: _____

Standard	100	5	3	2	1	SAVE DAY
Fuels & Hydrocarbon Analysis	☒	☐	☐	☐	☐	☐
	☒	☐	☐	☐	☐	☐

*Turnaround request less than standard may incur Rush Charges



SAMPLE RECEIVING CHECKLIST

Client: A11 4
Project: Marathon DWS

ALS Job #: EV24100114
Login Date: 10/11/24
Login Time: 1050
Login By: AV

Type of Shipping Container: ☒ Cooler
☐ Box
☐ Other: _____

Shipped Via: ☐ FedEx Ground
☐ FedEx Express
☐ UPS
☐ External Courier
☒ ALS Courier
☐ Hand Delivered

Were custody seals on the outside of the shipping container?

How Many? _____ Where? _____ Date: _____ Name: _____

Was CoC filled out properly? (in ink, signed, dated, etc.)

Did all bottles have labels?

Did all bottle labels and tags agree with CoC?

Were samples received within hold time?

Did all bottles arrive in good condition?

Was sufficient amount of sample sent for tests requested?

Was correct preservation added to samples?

Subcontract test containers added to subcontract bin?

Wetchem test containers marked with applicable tests?

Short hold time test containers delivered to analysts?

VOA vials checked for bubbles?

Bubbles in sample number(s): _____

5035A kits received?

Low kits: 13 High kits: _____ + 5 extra meth voas

5035A kits returned?

Low kits: _____ High kits: _____

Temperature upon receipt: 7.1 °C

On ice? ☒

Thermometer ID: 189

Other discrepancies:

Was client contacted? _____ Who was called? _____ By whom? _____ Date: _____
Outcome of call:



October 30, 2024

Ms. Olana Costa
ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

Dear Ms. Costa,

On October 15th, 6 samples were received by our laboratory and assigned our laboratory project number EV24100130. The project was identified as your Marathon OWS. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Carl Nott
Laboratory Director



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

DATE: 10/30/2024
ALS JOB#: EV24100130
ALS SAMPLE#: EV24100130-01
DATE RECEIVED: 10/15/2024
COLLECTION DATE: 10/14/2024 10:50:00 AM
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS
CLIENT SAMPLE ID: 24-2S

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	130	1	UG/L	10/23/2024	DHM
TPH-Oil Range	NWTPH-DX	U	250	1	UG/L	10/23/2024	DHM
Benzene	EPA-8260	U	2.0	1	UG/L	10/26/2024	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	10/26/2024	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	10/26/2024	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	10/26/2024	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	10/26/2024	DLC
Naphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Acenaphthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Fluorene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Phenanthrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Chrysene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Mercury	EPA-245.1	U	0.20	1	UG/L	10/16/2024	RAL
Arsenic	EPA-200.8	1.9	1.0	1	UG/L	10/28/2024	RAL
Barium	EPA-200.8	17	1.0	1	UG/L	10/28/2024	RAL
Cadmium	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Chromium	EPA-200.8	U	2.0	1	UG/L	10/28/2024	RAL
Lead	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Selenium	EPA-200.8	U	4.0	1	UG/L	10/28/2024	RAL
Silver	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	81.5	10/23/2024	MNC
C25	NWTPH-DX	96.7	10/23/2024	DHM

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	10/30/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100130
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100130-01
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/15/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/14/2024 10:50:00 AM
CLIENT SAMPLE ID	24-2S	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Toluene-d8	EPA-8260	99.5	10/26/2024	DLC
Terphenyl-d14	EPA-8270 SIM	58.1	10/18/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC DATE: 10/30/2024
228 E. Champion St, Suite 101 ALS JOB#: EV24100130
Bellingham, WA 98225 ALS SAMPLE#: EV24100130-02
CLIENT CONTACT: Olana Costa DATE RECEIVED: 10/15/2024
CLIENT PROJECT: Marathon OWS COLLECTION DATE: 10/14/2024 12:00:00 PM
CLIENT SAMPLE ID 24-3S WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	130	1	UG/L	10/23/2024	DHM
TPH-Oil Range	NWTPH-DX	U	250	1	UG/L	10/23/2024	DHM
Benzene	EPA-8260	U	2.0	1	UG/L	10/26/2024	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	10/26/2024	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	10/26/2024	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	10/26/2024	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	10/26/2024	DLC
Naphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Acenaphthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Fluorene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Phenanthrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Chrysene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Mercury	EPA-245.1	U	0.20	1	UG/L	10/16/2024	RAL
Arsenic	EPA-200.8	5.9	1.0	1	UG/L	10/28/2024	RAL
Barium	EPA-200.8	20	1.0	1	UG/L	10/28/2024	RAL
Cadmium	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Chromium	EPA-200.8	U	2.0	1	UG/L	10/28/2024	RAL
Lead	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Selenium	EPA-200.8	U	4.0	1	UG/L	10/28/2024	RAL
Silver	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	85.5	10/23/2024	MNC
C25	NWTPH-DX	83.2	10/23/2024	DHM

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	10/30/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100130
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100130-02
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/15/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/14/2024 12:00:00 PM
CLIENT SAMPLE ID	24-3S	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Toluene-d8	EPA-8260	102	10/26/2024	DLC
Terphenyl-d14	EPA-8270 SIM	67.1	10/18/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	10/30/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100130
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100130-03
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/15/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/14/2024 1:10:00 PM
CLIENT SAMPLE ID	92-P6	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	130	1	UG/L	10/23/2024	DHM
TPH-Oil Range	NWTPH-DX	U	250	1	UG/L	10/23/2024	DHM
Benzene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	10/27/2024	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
Naphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Acenaphthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Fluorene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Phenanthrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Chrysene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Mercury	EPA-245.1	U	0.20	1	UG/L	10/16/2024	RAL
Arsenic	EPA-200.8	1.7	1.0	1	UG/L	10/28/2024	RAL
Barium	EPA-200.8	18	1.0	1	UG/L	10/28/2024	RAL
Cadmium	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Chromium	EPA-200.8	U	2.0	1	UG/L	10/28/2024	RAL
Lead	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Selenium	EPA-200.8	U	4.0	1	UG/L	10/28/2024	RAL
Silver	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	84.4	10/23/2024	MNC
C25	NWTPH-DX	106	10/23/2024	DHM

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	10/30/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100130
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100130-03
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/15/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/14/2024 1:10:00 PM
CLIENT SAMPLE ID	92-P6	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Toluene-d8	EPA-8260	102	10/27/2024	DLC
Terphenyl-d14	EPA-8270 SIM	72.7	10/18/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	10/30/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100130
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100130-04
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/15/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/14/2024 2:00:00 PM
CLIENT SAMPLE ID	14-3	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	190	130	1	UG/L	10/23/2024	DHM
TPH-Oil Range	NWTPH-DX	280	250	1	UG/L	10/23/2024	DHM
Benzene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	10/27/2024	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
Naphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Acenaphthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Fluorene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Phenanthrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Chrysene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Mercury	EPA-245.1	U	0.20	1	UG/L	10/16/2024	RAL
Arsenic	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Barium	EPA-200.8	30	1.0	1	UG/L	10/28/2024	RAL
Cadmium	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Chromium	EPA-200.8	U	2.0	1	UG/L	10/28/2024	RAL
Lead	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Selenium	EPA-200.8	U	4.0	1	UG/L	10/28/2024	RAL
Silver	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	78.3	10/23/2024	MNC
C25	NWTPH-DX	93.0	10/23/2024	DHM

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC 228 E. Champion St, Suite 101 Bellingham, WA 98225	DATE:	10/30/2024
		ALS JOB#:	EV24100130
		ALS SAMPLE#:	EV24100130-04
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/15/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/14/2024 2:00:00 PM
CLIENT SAMPLE ID	14-3	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS	ANALYSIS
			DATE	BY
Toluene-d8	EPA-8260	100	10/27/2024	DLC
Terphenyl-d14	EPA-8270 SIM	48.5 SUR02	10/18/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

SUR02 -One or more surrogate recoveries were below the lower control limits. The sample results may be biased low.

Chromatogram indicates that it is likely that sample contains an unidentified diesel range product and an unidentified oil range product.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC DATE: 10/30/2024
228 E. Champion St, Suite 101 ALS JOB#: EV24100130
Bellingham, WA 98225 ALS SAMPLE#: EV24100130-05
CLIENT CONTACT: Olana Costa DATE RECEIVED: 10/15/2024
CLIENT PROJECT: Marathon OWS COLLECTION DATE: 10/14/2024 8:00:00 AM
CLIENT SAMPLE ID: OWS-DUP-1 WDOE ACCREDITATION: C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	130	1	UG/L	10/23/2024	DHM
TPH-Oil Range	NWTPH-DX	U	250	1	UG/L	10/23/2024	DHM
Benzene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	10/27/2024	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
Naphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Acenaphthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Fluorene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Phenanthrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Chrysene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Mercury	EPA-245.1	U	0.20	1	UG/L	10/16/2024	RAL
Arsenic	EPA-200.8	1.7	1.0	1	UG/L	10/28/2024	RAL
Barium	EPA-200.8	16	1.0	1	UG/L	10/28/2024	RAL
Cadmium	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Chromium	EPA-200.8	U	2.0	1	UG/L	10/28/2024	RAL
Lead	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Selenium	EPA-200.8	U	4.0	1	UG/L	10/28/2024	RAL
Silver	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	81.9	10/23/2024	MNC
C25	NWTPH-DX	76.1	10/23/2024	DHM

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	10/30/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100130
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100130-05
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/15/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/14/2024 8:00:00 AM
CLIENT SAMPLE ID	OWS-DUP-1	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Toluene-d8	EPA-8260	102	10/27/2024	DLC
Terphenyl-d14	EPA-8270 SIM	84.6	10/18/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	10/30/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100130
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100130-06
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/15/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/14/2024 9:55:00 AM
CLIENT SAMPLE ID	OWS-FEB-1	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	50	1	UG/L	10/23/2024	MNC
TPH-Diesel Range	NWTPH-DX	U	130	1	UG/L	10/23/2024	DHM
TPH-Oil Range	NWTPH-DX	U	250	1	UG/L	10/23/2024	DHM
Benzene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
Toluene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
Ethylbenzene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
m,p-Xylene	EPA-8260	U	4.0	1	UG/L	10/27/2024	DLC
o-Xylene	EPA-8260	U	2.0	1	UG/L	10/27/2024	DLC
Naphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Acenaphthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Fluorene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Phenanthrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Chrysene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	0.020	1	UG/L	10/18/2024	DBA
Mercury	EPA-245.1	U	0.20	1	UG/L	10/16/2024	RAL
Arsenic	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Barium	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Cadmium	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Chromium	EPA-200.8	U	2.0	1	UG/L	10/28/2024	RAL
Lead	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL
Selenium	EPA-200.8	U	4.0	1	UG/L	10/28/2024	RAL
Silver	EPA-200.8	U	1.0	1	UG/L	10/28/2024	RAL

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
TFT	NWTPH-GX	83.2	10/23/2024	MNC
C25	NWTPH-DX	102	10/23/2024	DHM

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	10/30/2024
	228 E. Champion St, Suite 101	ALS JOB#:	EV24100130
	Bellingham, WA 98225	ALS SAMPLE#:	EV24100130-06
CLIENT CONTACT:	Olana Costa	DATE RECEIVED:	10/15/2024
CLIENT PROJECT:	Marathon OWS	COLLECTION DATE:	10/14/2024 9:55:00 AM
CLIENT SAMPLE ID	OWS-FEB-1	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Toluene-d8	EPA-8260	99.4	10/27/2024	DLC
Terphenyl-d14	EPA-8270 SIM	73.7	10/18/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 10/30/2024
ALS SDG#: EV24100130
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY BLANK RESULTS

MBG-102224W - Batch 219755 - Water by NWTPH-GX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Volatile Range	NWTPH-GX	U	UG/L	50	10/23/2024	MNC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-101824W - Batch 219645 - Water by NWTPH-DX

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
TPH-Diesel Range	NWTPH-DX	U	UG/L	130	10/23/2024	DHM
TPH-Oil Range	NWTPH-DX	U	UG/L	250	10/23/2024	DHM

U - Analyte analyzed for but not detected at level above reporting limit.

MB-102624W - Batch 219770 - Water by EPA-8260

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Benzene	EPA-8260	U	UG/L	2.0	10/26/2024	DLC
Toluene	EPA-8260	U	UG/L	2.0	10/26/2024	DLC
Ethylbenzene	EPA-8260	U	UG/L	2.0	10/26/2024	DLC
m,p-Xylene	EPA-8260	U	UG/L	4.0	10/26/2024	DLC
o-Xylene	EPA-8260	U	UG/L	2.0	10/26/2024	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

MB-101824W - Batch 219413 - Water by EPA-8270 SIM

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Naphthalene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
2-Methylnaphthalene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
1-Methylnaphthalene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Acenaphthylene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Acenaphthene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Fluorene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Phenanthrene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Anthracene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Fluoranthene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Pyrene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Benzo[A]Anthracene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Chrysene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Benzo[B]Fluoranthene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Benzo[K]Fluoranthene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Benzo[A]Pyrene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225
DATE: 10/30/2024
ALS SDG#: EV24100130
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY BLANK RESULTS

MB-101824W - Batch 219413 - Water by EPA-8270 SIM

Indeno[1,2,3-Cd]Pyrene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Dibenz[A,H]Anthracene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA
Benzo[G,H,I]Perylene	EPA-8270 SIM	U	UG/L	0.020	10/18/2024	DBA

U - Analyte analyzed for but not detected at level above reporting limit.

MBLK-R480338 - Batch R480338 - Water by EPA-245.1

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Mercury	EPA-245.1	U	UG/L	0.20	10/16/2024	RAL

U - Analyte analyzed for but not detected at level above reporting limit.

MB-102824W - Batch 219680 - Water by EPA-200.8

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Arsenic	EPA-200.8	U	UG/L	1.0	10/28/2024	RAL
Barium	EPA-200.8	U	UG/L	1.0	10/28/2024	RAL
Cadmium	EPA-200.8	U	UG/L	1.0	10/28/2024	RAL
Chromium	EPA-200.8	U	UG/L	2.0	10/28/2024	RAL
Lead	EPA-200.8	U	UG/L	1.0	10/28/2024	RAL
Selenium	EPA-200.8	U	UG/L	4.0	10/28/2024	RAL
Silver	EPA-200.8	U	UG/L	1.0	10/28/2024	RAL

U - Analyte analyzed for but not detected at level above reporting limit.



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC DATE: 10/30/2024
228 E. Champion St, Suite 101 ALS SDG#: EV24100130
Bellingham, WA 98225 WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 219755 - Water by NWTPH-GX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Volatile Range - BS	NWTPH-GX	88.7			66.5	122.7	10/23/2024	MNC
TPH-Volatile Range - BSD	NWTPH-GX	95.4	7		66.5	122.7	10/23/2024	MNC

ALS Test Batch ID: 219645 - Water by NWTPH-DX

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
TPH-Diesel Range - BS	NWTPH-DX	73.3			67	125.2	10/23/2024	DHM
TPH-Diesel Range - BSD	NWTPH-DX	86.9	17	SR1	67	125.2	10/23/2024	DHM

SR1 - RPD outside of control limits.

ALS Test Batch ID: 219770 - Water by EPA-8260

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Benzene - BS	EPA-8260	108			74.7	143	10/26/2024	DLC
Benzene - BSD	EPA-8260	100	7		74.7	143	10/26/2024	DLC
Toluene - BS	EPA-8260	106			71.7	139	10/26/2024	DLC
Toluene - BSD	EPA-8260	98.8	7		71.7	139	10/26/2024	DLC
Ethylbenzene - BS	EPA-8260	113			50	150	10/26/2024	DLC
Ethylbenzene - BSD	EPA-8260	103	10		50	150	10/26/2024	DLC
m,p-Xylene - BS	EPA-8260	113			50	150	10/26/2024	DLC
m,p-Xylene - BSD	EPA-8260	102	10		50	150	10/26/2024	DLC
o-Xylene - BS	EPA-8260	105			50	150	10/26/2024	DLC
o-Xylene - BSD	EPA-8260	96.0	9		50	150	10/26/2024	DLC

ALS Test Batch ID: 219413 - Water by EPA-8270 SIM

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Naphthalene - BS	EPA-8270 SIM	100			36	118	10/18/2024	DBA
Naphthalene - BSD	EPA-8270 SIM	108	8		36	118	10/18/2024	DBA
2-Methylnaphthalene - BS	EPA-8270 SIM	104			20	150	10/18/2024	DBA
2-Methylnaphthalene - BSD	EPA-8270 SIM	112	8		20	150	10/18/2024	DBA
1-Methylnaphthalene - BS	EPA-8270 SIM	103			20	150	10/18/2024	DBA
1-Methylnaphthalene - BSD	EPA-8270 SIM	111	8		20	150	10/18/2024	DBA
Acenaphthylene - BS	EPA-8270 SIM	114			20	150	10/18/2024	DBA
Acenaphthylene - BSD	EPA-8270 SIM	124	9		20	150	10/18/2024	DBA
Acenaphthene - BS	EPA-8270 SIM	105			37	125	10/18/2024	DBA
Acenaphthene - BSD	EPA-8270 SIM	115	9		37	125	10/18/2024	DBA
Fluorene - BS	EPA-8270 SIM	113			20	150	10/18/2024	DBA
Fluorene - BSD	EPA-8270 SIM	122	8		20	150	10/18/2024	DBA

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ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626

ALS Group USA, Corp dba ALS Environmental



CERTIFICATE OF ANALYSIS

CLIENT: ALL4 LLC
228 E. Champion St, Suite 101
Bellingham, WA 98225

DATE: 10/30/2024
ALS SDG#: EV24100130
WDOE ACCREDITATION: C601

CLIENT CONTACT: Olana Costa
CLIENT PROJECT: Marathon OWS

LABORATORY CONTROL SAMPLE RESULTS

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Phenanthrene - BS	EPA-8270 SIM	103			20	150	10/18/2024	DBA
Phenanthrene - BSD	EPA-8270 SIM	111	7		20	150	10/18/2024	DBA
Anthracene - BS	EPA-8270 SIM	111			20	150	10/18/2024	DBA
Anthracene - BSD	EPA-8270 SIM	119	7		20	150	10/18/2024	DBA
Fluoranthene - BS	EPA-8270 SIM	106			20	150	10/18/2024	DBA
Fluoranthene - BSD	EPA-8270 SIM	113	7		20	150	10/18/2024	DBA
Pyrene - BS	EPA-8270 SIM	102			59	156	10/18/2024	DBA
Pyrene - BSD	EPA-8270 SIM	108	6		59	156	10/18/2024	DBA
Benzo[A]Anthracene - BS	EPA-8270 SIM	117			20	150	10/18/2024	DBA
Benzo[A]Anthracene - BSD	EPA-8270 SIM	123	5		20	150	10/18/2024	DBA
Chrysene - BS	EPA-8270 SIM	107			20	150	10/18/2024	DBA
Chrysene - BSD	EPA-8270 SIM	116	9		20	150	10/18/2024	DBA
Benzo[B]Fluoranthene - BS	EPA-8270 SIM	102			20	150	10/18/2024	DBA
Benzo[B]Fluoranthene - BSD	EPA-8270 SIM	111	9		20	150	10/18/2024	DBA
Benzo[K]Fluoranthene - BS	EPA-8270 SIM	102			20	150	10/18/2024	DBA
Benzo[K]Fluoranthene - BSD	EPA-8270 SIM	103	1		20	150	10/18/2024	DBA
Benzo[A]Pyrene - BS	EPA-8270 SIM	105			20	150	10/18/2024	DBA
Benzo[A]Pyrene - BSD	EPA-8270 SIM	112	6		20	150	10/18/2024	DBA
Indeno[1,2,3-Cd]Pyrene - BS	EPA-8270 SIM	127			20	150	10/18/2024	DBA
Indeno[1,2,3-Cd]Pyrene - BSD	EPA-8270 SIM	136	7		20	150	10/18/2024	DBA
Dibenz[A,H]Anthracene - BS	EPA-8270 SIM	129			20	150	10/18/2024	DBA
Dibenz[A,H]Anthracene - BSD	EPA-8270 SIM	139	7		20	150	10/18/2024	DBA
Benzo[G,H,I]Perylene - BS	EPA-8270 SIM	83.0			43	140	10/18/2024	DBA
Benzo[G,H,I]Perylene - BSD	EPA-8270 SIM	89.4	7		43	140	10/18/2024	DBA

ALS Test Batch ID: R480338 - Water by EPA-245.1

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Mercury - BS	EPA-245.1	108			80.6	118	10/16/2024	RAL
Mercury - BSD	EPA-245.1	107	1		80.6	118	10/16/2024	RAL

ALS Test Batch ID: 219680 - Water by EPA-200.8

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Arsenic - BS	EPA-200.8	97.9			89.1	110	10/28/2024	RAL
Arsenic - BSD	EPA-200.8	97.1	1		89.1	110	10/28/2024	RAL
Barium - BS	EPA-200.8	97.3			88.5	108	10/28/2024	RAL
Barium - BSD	EPA-200.8	97.5	0		88.5	108	10/28/2024	RAL
Cadmium - BS	EPA-200.8	100			89.4	110	10/28/2024	RAL
Cadmium - BSD	EPA-200.8	99.3	1		89.4	110	10/28/2024	RAL

CERTIFICATE OF ANALYSIS

CLIENT:	ALL4 LLC	DATE:	10/30/2024
	228 E. Champion St, Suite 101	ALS SDG#:	EV24100130
	Bellingham, WA 98225	WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Olana Costa		
CLIENT PROJECT:	Marathon OWS		

LABORATORY CONTROL SAMPLE RESULTS

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS		ANALYSIS DATE	ANALYSIS BY
					MIN	MAX		
Chromium - BS	EPA-200.8	94.6			88.3	110.2	10/28/2024	RAL
Chromium - BSD	EPA-200.8	93.6	1		88.3	110.2	10/28/2024	RAL
Lead - BS	EPA-200.8	95.8			87.5	107	10/28/2024	RAL
Lead - BSD	EPA-200.8	94.8	1		87.5	107	10/28/2024	RAL
Selenium - BS	EPA-200.8	98.9			90.2	113	10/28/2024	RAL
Selenium - BSD	EPA-200.8	98.9	0		90.2	113	10/28/2024	RAL
Silver - BS	EPA-200.8	99.0			80	120	10/28/2024	RAL
Silver - BSD	EPA-200.8	98.6	0		80	120	10/28/2024	RAL

APPROVED BY



Carl Nott
Laboratory Director



Chain Of Custody/ Laboratory Analysis Request

(Laboratory Use Only)

EV24100130

Date 10/15/17 Page 1 Of 1

[illegible]

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: Glenn Costa, April 10/18, David, 10:36, Glenn Costa

Received By: ATRESE, ALS 10/15/24 C103x

2. Relinquished By:

Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis

SAME DAY	1	2	3	5	10
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Fuels & Hydrocarbon Analysis

Standard	☒	3	1	SAME DAY
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*Turnaround request less than standard may incur Rush Charges



SAMPLE RECEIVING CHECKLIST

Client: Ally
Project: Marathon OWS

ALS Job #: E124100130
Login Date: 10/15/24
Login Time: 13:00
Login By: GW

Type of Shipping Container: ☒ Cooler (2)
☐ Box
☐ Other: _____

Shipped Via: ☐ FedEx Ground
☐ FedEx Express
☐ UPS
☐ External Courier
☒ ALS Courier
☐ Hand Delivered

Were custody seals on the outside of the shipping container?
How Many? N/A Where? _____ Date: _____ Name: _____
Was CoC filled out properly? (in ink, signed, dated, etc.)
Did all bottles have labels?
Did all bottle labels and tags agree with CoC?
Were samples received within hold time?
Did all bottles arrive in good condition?
Was sufficient amount of sample sent for tests requested?
Was correct preservation added to samples?
Subcontract test containers added to subcontract bin?
Wetchem test containers marked with applicable tests?
Short hold time test containers delivered to analysts?
VOA vials checked for bubbles? N/A
Bubbles in sample number(s): _____
5035A kits received?
Low kits: _____ High kits: _____
5035A kits returned?
Low kits: _____ High kits: _____

Yes	No	N/A
<u>/</u>		<u>/</u>
<u>/</u>		
<u>/</u>		
<u>/</u>		
<u>/</u>		
<u>/</u>		
		<u>/</u>
		<u>/</u>
<u>/</u>		<u>/</u>
		<u>/</u>
		<u>/</u>

Temperature upon receipt: 4.0 °C 0.8

On ice? ✓

Thermometer ID: 189

Other discrepancies:

Was client contacted? _____ Who was called? _____ By whom? _____ Date: _____
Outcome of call:



#100 8620 Holly Drive
Everett, WA 98208, USA
T: +1 425 356 2600
F: +1 425 356 2626

February 19, 2025

Olana Costa
ALL4 LLC
228 E. Champion St
Suite 101
Bellingham, WA 98225

Work Order: **EV24100166**

Laboratory Results for: **Marathon OWS**

Dear Olana Costa,

ALS Environmental received 2 sample(s) on Oct 18, 2024 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

//CN//

Generated By: PRESTON.MEDLEY

Carl Nott
Laboratory Director

Client:	ALL4 LLC	SAMPLE SUMMARY
Project:	Marathon OWS	
Work Order:	EV24100166	

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
EV24100166-01	24-1S	Water		17-Oct-2024 10:55	18-Oct-2024 14:23	☐
EV24100166-02	24-4	Water		17-Oct-2024 10:00	18-Oct-2024 14:23	☐

Client: ALL4 LLC
Project: Marathon OWS
Work Order: EV24100166

CASE NARRATIVE

GC Semivolatile Organics by Method NWTPH-DX

Batch ID: 219929

Sample ID: 24-4 (EV24100166-02)

- 1DC1;

Sample ID: BS-103124W

- None

Sample ID: BSD-103124W

- None

Sample ID: MB-103124W

- None

Batch ID: 219928

Sample ID: 24-1S (EV24100166-01)

- None

Sample ID: BS-103024W

- None

Sample ID: BSD-103024W

- None

Sample ID: MB-103024W

- None
-

Client: ALL4 LLC
Project: Marathon OWS
Work Order: EV24100166

CASE NARRATIVE

GC Volatile Organics by Method NWTPH-GX**Batch ID: 219995****Sample ID: 24-1S (EV24100166-01)**

- None

Sample ID: 24-4 (EV24100166-02)

- None

Sample ID: BG-103024W

- None

Sample ID: BGD-103024W

- None

Sample ID: MBG-103024W

- None

GCMS Semivolatile Organics by Method EPA-8270 SIM**Batch ID: 219481****Sample ID: 24-1S (EV24100166-01)**

- Base/neutral surrogate recovery were below the lower control limit. The base/neutral result may be biased low. (Terphenyl-d14)

Sample ID: 24-4 (EV24100166-02)

- Base/neutral surrogate recovery were below the lower control limit. The base/neutral result may be biased low. (Terphenyl-d14)

Sample ID: BS-102124W

- Base/neutral surrogate recovery were below the lower control limit. The base/neutral result may be biased low. (Terphenyl-d14)
- The LCS and/or LCSD recovery was below the lower control limit. The sample results may be biased low for analyte(s): (Naphthalene)

GCMS Volatile Organics by Method EPA-8260**Batch ID: 219917**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

Metals by Method EPA-7470**Batch ID: R498534**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

Metals by Method EPA-6020**Batch ID: 219471**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-
-

Client: ALL4 LLC
 Project: Marathon OWS
 Sample ID: 24-1S
 Collection Date: 17-Oct-2024 10:55

ANALYTICAL REPORT

WorkOrder:EV24100166
 Lab ID:EV24100166-01
 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILE ORGANICS BY EPA-8260D		Method:EPA-8260		Prep:SW5030 / 28-Oct-2024		Analyst: DLC
Benzene	ND		2.0	UG/L	1	28-Oct-2024 15:45
Toluene	ND		2.0	UG/L	1	28-Oct-2024 15:45
Ethylbenzene	ND		2.0	UG/L	1	28-Oct-2024 15:45
m,p-Xylene	ND		4.0	UG/L	1	28-Oct-2024 15:45
o-Xylene	ND		2.0	UG/L	1	28-Oct-2024 15:45
Surr: Toluene-d8	102		80-120	%REC	1	28-Oct-2024 15:45
TPH-GASOLINE BY NWTPH-GX		Method:NWTPH-GX		Prep:EPA-8021 / 30-Oct-2024		Analyst: MNC
TPH-Volatile Range	ND		50	UG/L	1	30-Oct-2024 22:59
Surr: TFT	90.3		60-140	%REC	1	30-Oct-2024 22:59
SEMI-VOLATILE ORGANICS BY EPA-8270 SIM		Method:EPA-8270 SIM		Prep:SW3510 / 21-Oct-2024		Analyst: DBA
Naphthalene	ND		0.020	UG/L	1	25-Oct-2024 14:46
2-Methylnaphthalene	ND		0.020	UG/L	1	25-Oct-2024 14:46
1-Methylnaphthalene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Acenaphthylene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Acenaphthene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Fluorene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Phenanthrene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Anthracene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Fluoranthene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Pyrene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Benzo[A]Anthracene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Chrysene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Benzo[B]Fluoranthene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Benzo[K]Fluoranthene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Benzo[A]Pyrene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Indeno[1,2,3-Cd]Pyrene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Dibenz[A,H]Anthracene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Benzo[G,H,I]Perylene	ND		0.020	UG/L	1	25-Oct-2024 14:46
Surr: Terphenyl-d14	49.4	S	50-147	%REC	1	25-Oct-2024 14:46
TPH-DIESEL		Method:NWTPH-DX		Prep:SW3510 / 30-Oct-2024		Analyst: DHM
TPH-Diesel Range	ND		130	UG/L	1	01-Nov-2024 03:53
TPH-Oil Range	ND		250	UG/L	1	01-Nov-2024 03:53
Surr: C25	90.0		60-126	%REC	1	01-Nov-2024 03:53

Client: ALL4 LLC
Project: Marathon OWS
Sample ID: 24-1S
Collection Date: 17-Oct-2024 10:55

ANALYTICAL REPORT
WorkOrder:EV24100166
Lab ID:EV24100166-01
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
ICP/MS METALS ANALYSIS BY EPA-200.8		Method:EPA-6020		Prep:EPA 3010 / 21-Oct-2024		Analyst: RAL
Arsenic	8.0		1.0	UG/L	1	22-Oct-2024 17:49
Barium	24		1.0	UG/L	1	22-Oct-2024 17:49
Cadmium	ND		1.0	UG/L	1	22-Oct-2024 17:49
Lead	ND		1.0	UG/L	1	22-Oct-2024 17:49
Selenium	ND		4.0	UG/L	1	22-Oct-2024 17:49
Silver	ND		1.0	UG/L	1	22-Oct-2024 17:49
CV MERCURY ANALYSIS BY EPA-245.1		Method:EPA-7470		Prep:EPA 3010		Analyst: RAL
Mercury	ND		0.20	UG/L	1	23-Oct-2024 16:57

Client: ALL4 LLC
Project: Marathon OWS
Sample ID: 24-4
Collection Date: 17-Oct-2024 10:00

ANALYTICAL REPORT

WorkOrder:EV24100166
Lab ID:EV24100166-02
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILE ORGANICS BY EPA-8260D		Method:EPA-8260		Prep:SW5030 / 28-Oct-2024		Analyst: DLC
Benzene	ND		2.0	UG/L	1	28-Oct-2024 16:18
Toluene	ND		2.0	UG/L	1	28-Oct-2024 16:18
Ethylbenzene	ND		2.0	UG/L	1	28-Oct-2024 16:18
m,p-Xylene	ND		4.0	UG/L	1	28-Oct-2024 16:18
o-Xylene	ND		2.0	UG/L	1	28-Oct-2024 16:18
Surr: Toluene-d8	99.8		80-120	%REC	1	28-Oct-2024 16:18
TPH-GASOLINE BY NWTPH-GX		Method:NWTPH-GX		Prep:EPA-8021 / 30-Oct-2024		Analyst: MNC
TPH-Volatile Range	ND		50	UG/L	1	30-Oct-2024 23:25
Surr: TFT	94.4		60-140	%REC	1	30-Oct-2024 23:25
SEMI-VOLATILE ORGANICS BY EPA-8270 SIM		Method:EPA-8270 SIM		Prep:SW3510 / 21-Oct-2024		Analyst: DBA
Naphthalene	ND		0.020	UG/L	1	25-Oct-2024 15:11
2-Methylnaphthalene	ND		0.020	UG/L	1	25-Oct-2024 15:11
1-Methylnaphthalene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Acenaphthylene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Acenaphthene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Fluorene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Phenanthrene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Anthracene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Fluoranthene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Pyrene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Benzo[A]Anthracene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Chrysene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Benzo[B]Fluoranthene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Benzo[K]Fluoranthene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Benzo[A]Pyrene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Indeno[1,2,3-Cd]Pyrene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Dibenz[A,H]Anthracene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Benzo[G,H,I]Perylene	ND		0.020	UG/L	1	25-Oct-2024 15:11
Surr: Terphenyl-d14	34.1	S	50-147	%REC	1	25-Oct-2024 15:11
TPH-DIESEL		Method:NWTPH-DX		Prep:SW3510 / 31-Oct-2024		Analyst: DHM
TPH-Diesel Range	270		130	UG/L	1	01-Nov-2024 05:36
TPH-Oil Range	ND		250	UG/L	1	01-Nov-2024 05:36
Surr: C25	80.2		60-126	%REC	1	01-Nov-2024 05:36

Client:	ALL4 LLC	ANALYTICAL REPORT
Project:	Marathon OWS	WorkOrder:EV24100166
Sample ID:	24-4	Lab ID:EV24100166-02
Collection Date:	17-Oct-2024 10:00	Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
ICP/MS METALS ANALYSIS BY EPA-200.8		Method:EPA-6020		Prep:EPA 3010 / 21-Oct-2024		Analyst: RAL
Arsenic	3.4		1.0	UG/L	1	22-Oct-2024 17:52
Barium	33		1.0	UG/L	1	22-Oct-2024 17:52
Cadmium	ND		1.0	UG/L	1	22-Oct-2024 17:52
Lead	2.6		1.0	UG/L	1	22-Oct-2024 17:52
Selenium	ND		4.0	UG/L	1	22-Oct-2024 17:52
Silver	ND		1.0	UG/L	1	22-Oct-2024 17:52
CV MERCURY ANALYSIS BY EPA-245.1		Method:EPA-7470		Prep:EPA 3010		Analyst: RAL
Mercury	ND		0.20	UG/L	1	23-Oct-2024 16:57

Client: ALL4 LLC
Project: Marathon OWS
WorkOrder: EV24100166

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 219471 (0)		Test Name : ICP/MS METALS ANALYSIS BY EPA-200.8			Matrix: Water	
EV24100166-01	24-1S	17 Oct 2024 10:55		21 Oct 2024 10:00	22 Oct 2024 17:49	1
EV24100166-02	24-4	17 Oct 2024 10:00		21 Oct 2024 10:00	22 Oct 2024 17:52	1
Batch ID: 219481 (0)		Test Name : SEMI-VOLATILE ORGANICS BY EPA-8270 SIM			Matrix: Water	
EV24100166-01	24-1S	17 Oct 2024 10:55		21 Oct 2024 10:31	25 Oct 2024 14:46	1
EV24100166-02	24-4	17 Oct 2024 10:00		21 Oct 2024 10:31	25 Oct 2024 15:11	1
Batch ID: 219917 (0)		Test Name : VOLATILE ORGANICS BY EPA-8260D			Matrix: Water	
EV24100166-01	24-1S	17 Oct 2024 10:55		28 Oct 2024 08:00	28 Oct 2024 15:45	1
EV24100166-02	24-4	17 Oct 2024 10:00		28 Oct 2024 08:00	28 Oct 2024 16:18	1
Batch ID: 219928 (0)		Test Name : TPH-DIESEL			Matrix: Water	
EV24100166-01	24-1S	17 Oct 2024 10:55		30 Oct 2024 14:30	01 Nov 2024 03:53	1
Batch ID: 219929 (0)		Test Name : TPH-DIESEL			Matrix: Water	
EV24100166-02	24-4	17 Oct 2024 10:00		31 Oct 2024 12:00	01 Nov 2024 05:36	1
Batch ID: 219995 (0)		Test Name : TPH-GASOLINE BY NWTPH-GX			Matrix: Water	
EV24100166-01	24-1S	17 Oct 2024 10:55		30 Oct 2024 08:00	30 Oct 2024 22:59	1
EV24100166-02	24-4	17 Oct 2024 10:00		30 Oct 2024 08:00	30 Oct 2024 23:25	1
Batch ID: R498534 (0)		Test Name : CV MERCURY ANALYSIS BY EPA-245.1			Matrix: Water	
EV24100166-01	24-1S	17 Oct 2024 10:55			23 Oct 2024 16:57	1
EV24100166-02	24-4	17 Oct 2024 10:00			23 Oct 2024 16:57	1

Client: ALL4 LLC
Project: Marathon OWS
WorkOrder: EV24100166

QC BATCH REPORT

Batch ID: 219995 (0)		Instrument: GBTEX_119		Method: TPH-GASOLINE BY NWTPH-GX					
MBLK	Sample ID: MBG-103024W	Units: UG/L		Analysis Date: 30-Oct-2024 20:49					
Client ID:	Run ID: GBTEX_119_498910		SeqNo: 8492353		PrepDate: 30-Oct-2024		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Volatile Range	ND	50							
Surr: TFT	8.905	0	10	0	89.0	60 - 140			

LCS	Sample ID: BG-103024W	Units: UG/L		Analysis Date: 30-Oct-2024 21:15					
Client ID:	Run ID: GBTEX_119_498910		SeqNo: 8492354		PrepDate: 30-Oct-2024		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Volatile Range	489.1	50	500	0	97.8	66.5 - 122.7			
Surr: TFT	9.673	0	10	0	96.7	60 - 140			

LCSD	Sample ID: BGD-103024W	Units: UG/L		Analysis Date: 30-Oct-2024 21:41					
Client ID:	Run ID: GBTEX_119_498910		SeqNo: 8492355		PrepDate: 30-Oct-2024		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Volatile Range	511	50	500	0	102	66.5 - 122.7	489.1	4.39	15
Surr: TFT	9.881	0	10	0	98.8	60 - 140	9.673	2.13	25

MS	Sample ID: EV24100191-05 MS	Units: UG/L		Analysis Date: 31-Oct-2024 01:34					
Client ID:	Run ID: GBTEX_119_498910		SeqNo: 8500101		PrepDate: 30-Oct-2024		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Volatile Range	463.9	50	500	14.6	89.9	66.5 - 122.7			
Surr: TFT	9.465	0	10	0	94.6	60 - 140			

MSD	Sample ID: EV24100191-05 MSD	Units: UG/L		Analysis Date: 31-Oct-2024 01:34					
Client ID:	Run ID: GBTEX_119_498910		SeqNo: 8500100		PrepDate: 30-Oct-2024		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Volatile Range	466.9	50	500	14.6	90.5	66.5 - 122.7	463.9	0.646	9.14
Surr: TFT	9.864	0	10	0	98.6	60 - 140	9.465	4.13	25

The following samples were analyzed in this batch:

Client: ALL4 LLC
Project: Marathon OWS
WorkOrder: EV24100166

QC BATCH REPORT

Batch ID: 219928 (0)		Instrument: DX_144		Method: TPH-DIESEL					
MBLK	Sample ID: MB-103024W	Units: UG/L		Analysis Date: 31-Oct-2024 21:03					
Client ID:	Run ID: DX_144_498912		SeqNo: 8492401		PrepDate: 30-Oct-2024		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Diesel Range	ND	130							
TPH-Oil Range	ND	250							
Surr: C25	63.46	0	80	0	79.3	60 - 126			

LCS	Sample ID: BS-103024W	Units: UG/L		Analysis Date: 31-Oct-2024 21:28					
Client ID:	Run ID: DX_144_498912		SeqNo: 8492402		PrepDate: 30-Oct-2024		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Diesel Range	631.9	130	640	0	98.7	67 - 125.2			
Surr: C25	70.7	0	80	0	88.4	60 - 126			

LCSD	Sample ID: BSD-103024W	Units: UG/L		Analysis Date: 31-Oct-2024 21:54					
Client ID:	Run ID: DX_144_498912		SeqNo: 8492403		PrepDate: 30-Oct-2024		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Diesel Range	628.8	130	640	0	98.2	67 - 125.2	631.9	0.504	15.2
Surr: C25	70.56	0	80	0	88.2	60 - 126	70.7	0.198	25

The following samples were analyzed in this batch:

Client: ALL4 LLC
Project: Marathon OWS
WorkOrder: EV24100166

QC BATCH REPORT

Batch ID: 219929 (0)		Instrument: DX_144		Method: TPH-DIESEL					
MBLK	Sample ID: MB-103124W	Units: UG/L		Analysis Date: 01-Nov-2024 04:19					
Client ID:	Run ID: DX_144_498914		SeqNo: 8492411		PrepDate: 31-Oct-2024		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

TPH-Diesel Range	ND	130							
TPH-Oil Range	ND	250							
Surr: C25	76.32	0	80	0	95.4	60 - 126			

LCS	Sample ID: BS-103124W	Units: UG/L		Analysis Date: 01-Nov-2024 04:44					
Client ID:	Run ID: DX_144_498914		SeqNo: 8492412		PrepDate: 31-Oct-2024		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

TPH-Diesel Range	742.4	130	1000	0	74.2	67 - 125.2			
Surr: C25	76.72	0	80	0	95.9	60 - 126			

LCSD	Sample ID: BSD-103124W	Units: UG/L		Analysis Date: 01-Nov-2024 05:10					
Client ID:	Run ID: DX_144_498914		SeqNo: 8492413		PrepDate: 31-Oct-2024		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual

TPH-Diesel Range	756.3	130	1000	0	75.6	67 - 125.2	742.4	1.85	15.2
Surr: C25	74.78	0	80	0	93.5	60 - 126	76.72	2.56	25

The following samples were analyzed in this batch:



SAMPLE RECEIVING CHECKLIST

Client: ALL4
Project: Marathon OWS

ALS Job #: 9W24100166
Login Date: 10/18/24
Login Time: 1545
Login By: CE

Type of Shipping Container: ☒ Cooler
☐ Box
☐ Other: _____

Shipped Via: ☐ FedEx Ground
☐ FedEx Express
☐ UPS
☐ External Courier
☒ ALS Courier
☐ Hand Delivered

Were custody seals on the outside of the shipping container?

How Many? _____ Where? _____ Date: _____ Name: _____

Was CoC filled out properly? (in ink, signed, dated, etc.)

Did all bottles have labels?

Did all bottle labels and tags agree with CoC?

Were samples received within hold time?

Did all bottles arrive in good condition?

Was sufficient amount of sample sent for tests requested?

Was correct preservation added to samples?

Subcontract test containers added to subcontract bin?

Wetchem test containers marked with applicable tests?

Short hold time test containers delivered to analysts?

VOA vials checked for bubbles?

Bubbles in sample number(s): 1

5035A kits received?

Low kits: _____ High kits: _____

5035A kits returned?

Low kits: _____ High kits: _____

Temperature upon receipt: 2.9 °C

On ice? Y

Thermometer ID: 189

Other discrepancies:

Was client contacted? _____ Who was called? _____ By whom? _____ Date: _____
Outcome of call:



#100 8620 Holly Drive
Everett, WA 98208, USA
T: +1 425 356 2600
F: +1 425 356 2626

February 19, 2025

Olana Costa
ALL4 LLC
228 E. Champion St
Suite 101
Bellingham, WA 98225

Work Order: **EV24110092**

Laboratory Results for: **Marathon OWS**

Dear Olana Costa,

ALS Environmental received 1 sample(s) on Nov 13, 2024 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

//CN//

Generated By: PRESTON.MEDLEY

Carl Nott
Laboratory Director

Client: ALL4 LLC
Project: Marathon OWS
Work Order: EV24110092

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
EV24110092-01	24-5	Water		11-Nov-2024 11:25	13-Nov-2024 12:10	☐

Client: ALL4 LLC
Project: Marathon OWS
Work Order: EV24110092

CASE NARRATIVE

GC Semivolatile Organics by Method NWTPH-DX**Batch ID: 220718****Sample ID: 24-5 (EV24110092-01)**

- None

Sample ID: BS-111824W

- None

Sample ID: BSD-111824W

- None

Sample ID: MB-111824W

- None

GC Volatile Organics by Method NWTPH-GX**Batch ID: 221024****Sample ID: 24-5 (EV24110092-01)**

- None

Sample ID: BG-111924W

- None

Sample ID: BGD-111924W

- None

Sample ID: MBG-111924W

- None

GCMS Semivolatile Organics by Method EPA-8270 SIM**Batch ID: 220809**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

GCMS Volatile Organics by Method EPA-8260**Batch ID: 220927**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

Metals by Method EPA-7470**Batch ID: R500289**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

Client: ALL4 LLC
Project: Marathon OWS
Work Order: EV24110092

CASE NARRATIVE

Metals by Method EPA-6020

Batch ID: 220579

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

Client: ALL4 LLC
 Project: Marathon OWS
 Sample ID: 24-5
 Collection Date: 11-Nov-2024 11:25

ANALYTICAL REPORT

WorkOrder:EV24110092
 Lab ID:EV24110092-01
 Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
VOLATILE ORGANICS BY EPA-8260D		Method:EPA-8260		Prep:SW5030 / 18-Nov-2024		Analyst: DLC
Benzene	ND		2.0	UG/L	1	19-Nov-2024 13:50
Toluene	ND		2.0	UG/L	1	19-Nov-2024 13:50
Ethylbenzene	ND		2.0	UG/L	1	19-Nov-2024 13:50
m,p-Xylene	ND		4.0	UG/L	1	19-Nov-2024 13:50
o-Xylene	ND		2.0	UG/L	1	19-Nov-2024 13:50
Surr: Toluene-d8	97.2		80-120	%REC	1	19-Nov-2024 13:50
TPH-GASOLINE BY NWTPH-GX		Method:NWTPH-GX		Prep:EPA-8021 / 19-Nov-2024		Analyst: MNC
TPH-Volatile Range	ND		50	UG/L	1	20-Nov-2024 15:03
Surr: TFT	88.8		60-140	%REC	1	20-Nov-2024 15:03
SEMI-VOLATILE ORGANICS BY EPA-8270 SIM		Method:EPA-8270 SIM		Prep:SW3510 / 15-Nov-2024		Analyst: DBA
Benzo[A]Anthracene	ND		0.020	UG/L	1	18-Nov-2024 14:42
Chrysene	ND		0.020	UG/L	1	18-Nov-2024 14:42
Benzo[B]Fluoranthene	ND		0.020	UG/L	1	18-Nov-2024 14:42
Benzo[K]Fluoranthene	ND		0.021	UG/L	1	18-Nov-2024 14:42
Benzo[A]Pyrene	ND		0.020	UG/L	1	18-Nov-2024 14:42
Indeno[1,2,3-Cd]Pyrene	ND		0.020	UG/L	1	18-Nov-2024 14:42
Dibenz[A,H]Anthracene	ND		0.020	UG/L	1	18-Nov-2024 14:42
Surr: Terphenyl-d14	88.5		50-147	%REC	1	18-Nov-2024 14:42
TPH-DIESEL		Method:NWTPH-DX		Prep:SW3510 / 18-Nov-2024		Analyst: DHM
TPH-Diesel Range	ND		130	UG/L	1	19-Nov-2024 15:52
TPH-Oil Range	ND		250	UG/L	1	19-Nov-2024 15:52
Surr: C25	85.8		60-126	%REC	1	19-Nov-2024 15:52
ICP/MS METALS ANALYSIS BY EPA-200.8		Method:EPA-6020		Prep:EPA 3010 / 14-Nov-2024		Analyst: EBS
Arsenic	3.0		1.0	UG/L	1	15-Nov-2024 17:40
Barium	41		1.0	UG/L	1	15-Nov-2024 17:40
Cadmium	ND		1.0	UG/L	1	15-Nov-2024 17:40
Lead	ND		1.0	UG/L	1	15-Nov-2024 17:40
Selenium	5.0		4.0	UG/L	1	15-Nov-2024 17:40
Silver	ND		1.0	UG/L	1	15-Nov-2024 17:40
CV MERCURY ANALYSIS BY EPA-245.1		Method:EPA-7470		Prep:EPA 3010		Analyst: RAL
Mercury	ND		0.20	UG/L	1	18-Nov-2024 15:21

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Client: ALL4 LLC
Project: Marathon OWS
WorkOrder: EV24110092

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 220579 (0)		Test Name : ICP/MS METALS ANALYSIS BY EPA-200.8			Matrix: Water	
EV24110092-01	24-5	11 Nov 2024 11:25		14 Nov 2024 10:00	15 Nov 2024 17:40	1
Batch ID: 220718 (0)		Test Name : TPH-DIESEL			Matrix: Water	
EV24110092-01	24-5	11 Nov 2024 11:25		18 Nov 2024 11:00	19 Nov 2024 15:52	1
Batch ID: 220809 (0)		Test Name : SEMI-VOLATILE ORGANICS BY EPA-8270 SIM			Matrix: Water	
EV24110092-01	24-5	11 Nov 2024 11:25		15 Nov 2024 11:30	18 Nov 2024 14:42	1
Batch ID: 220927 (0)		Test Name : VOLATILE ORGANICS BY EPA-8260D			Matrix: Water	
EV24110092-01	24-5	11 Nov 2024 11:25		18 Nov 2024 08:00	19 Nov 2024 13:50	1
Batch ID: 221024 (0)		Test Name : TPH-GASOLINE BY NWTPH-GX			Matrix: Water	
EV24110092-01	24-5	11 Nov 2024 11:25		19 Nov 2024 08:00	20 Nov 2024 15:03	1
Batch ID: R500289 (0)		Test Name : CV MERCURY ANALYSIS BY EPA-245.1			Matrix: Water	
EV24110092-01	24-5	11 Nov 2024 11:25			18 Nov 2024 15:21	1

Client: ALL4 LLC
Project: Marathon OWS
WorkOrder: EV24110092

QC BATCH REPORT

Batch ID: 221024 (0)		Instrument: GBTEX_119		Method: TPH-GASOLINE BY NWTPH-GX					
MBLK	Sample ID: MBG-111924W	Units: UG/L		Analysis Date: 19-Nov-2024 11:49					
Client ID:	Run ID: GBTEX_119_501091	SeqNo: 8553965		PrepDate: 19-Nov-2024		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Volatile Range	ND	50							
Surr: TFT	8.935	0	10	0	89.4	60 - 140			
LCS	Sample ID: BG-111924W	Units: UG/L		Analysis Date: 19-Nov-2024 12:15					
Client ID:	Run ID: GBTEX_119_501091	SeqNo: 8553966		PrepDate: 19-Nov-2024		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Volatile Range	469.9	50	500	0	94.0	66.5 - 122.7			
Surr: TFT	9.442	0	10	0	94.4	60 - 140			
LCSD	Sample ID: BGD-111924W	Units: UG/L		Analysis Date: 19-Nov-2024 12:41					
Client ID:	Run ID: GBTEX_119_501091	SeqNo: 8553967		PrepDate: 19-Nov-2024		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Volatile Range	503.1	50	500	0	101.6	66.5 - 122.7	469.9	6.82	15
Surr: TFT	9.687	0	10	0	96.9	60 - 140	9.442	2.56	25
MS	Sample ID: EV24110091-07 MS	Units: UG/L		Analysis Date: 20-Nov-2024 12:53					
Client ID:	Run ID: GBTEX_119_501091	SeqNo: 8554310		PrepDate: 19-Nov-2024		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Volatile Range	816.2	50	500	329	97.4	66.5 - 122.7			
Surr: TFT	11.65	0	10	0	116	60 - 140			
MSD	Sample ID: EV24110091-07 MSD	Units: UG/L		Analysis Date: 20-Nov-2024 12:53					
Client ID:	Run ID: GBTEX_119_501091	SeqNo: 8554309		PrepDate: 19-Nov-2024		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	RPD %RPD	RPD Limit Qual
TPH-Volatile Range	824.6	50	500	329	99.1	66.5 - 122.7	816.2	1.02	9.14
Surr: TFT	11.85	0	10	0	118	60 - 140	11.65	1.7	25
The following samples were analyzed in this batch:									

Client: ALL4 LLC
 Project: Marathon OWS
 WorkOrder: EV24110092

QC BATCH REPORT

Batch ID: 220718 (0)		Instrument: DX_144		Method: TPH-DIESEL					
MBLK	Sample ID: MB-111824W	Units: UG/L		Analysis Date: 19-Nov-2024 14:09					
Client ID:	Run ID: DX_144_500650	SeqNo: 8541692		PrepDate: 18-Nov-2024		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
TPH-Diesel Range	ND	130							
TPH-Oil Range	ND	250							
Surr: C25	70.46	0	80	0	88.1	60 - 126			
LCS	Sample ID: BS-111824W	Units: UG/L		Analysis Date: 19-Nov-2024 14:35					
Client ID:	Run ID: DX_144_500650	SeqNo: 8541693		PrepDate: 18-Nov-2024		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
TPH-Diesel Range	871	130	1000	0	87.1	67 - 125.2			
Surr: C25	80.24	0	80	0	100	60 - 126			
LCSD	Sample ID: BSD-111824W	Units: UG/L		Analysis Date: 19-Nov-2024 15:01					
Client ID:	Run ID: DX_144_500650	SeqNo: 8541694		PrepDate: 18-Nov-2024		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
TPH-Diesel Range	915.9	130	1000	0	91.6	67 - 125.2	871	5.02	15.2
Surr: C25	75.84	0	80	0	94.8	60 - 126	80.24	5.64	25

The following samples were analyzed in this batch:

APPENDIX I
ENVIRONMENTAL INFORMATION MANAGEMENT SUBMITTAL RECORD

Marathon OWS Soil Sample Locations
Study ID: AODE16299
Study Name: Marathon OWS
Date Study Created: 12/4/2024
Level of Data Validation: 2A

Sample ID	Area of Concern	Location	Date Collected	Date Data Received	Date Uploaded
2023					
2023-11-09-B1-7ft	AOC-1	Between manholes F-3 and F-4, 7 ft depth.	9/11/2023	10/24/2023	1/17/2024 ^(a)
2023-11-09-B2-7ft	AOC-1	Between manholes F-3 and F-4, 7 ft depth.	9/11/2023	10/24/2023	1/17/2024 ^(a)
2023-11-09-B3-7.7ft	AOC-1	Between manholes F-3 and F-4, 7.7 ft depth.	9/11/2023	10/24/2023	1/17/2024 ^(a)
2023-12-09-B4-8.5ft	AOC-1	Between manholes F-3 and F-4, 8.5 ft depth.	9/12/2023	10/24/2023	1/17/2024 ^(a)
2023-12-09-B5-8ft	AOC-1	Between manholes F-3 and F-4, 8 ft depth.	9/12/2023	10/24/2023	1/17/2024 ^(a)
2023-13-09-B6-8ft	AOC-1	Between manholes F-3 and F-4, 8 ft depth.	9/13/2023	10/24/2023	1/17/2024 ^(a)
2023-13-09-B7-8ft	AOC-1	Between manholes F-3 and F-4, 8 ft depth.	9/13/2023	10/24/2023	1/17/2024 ^(a)
2023-13-09-B8-8ft	AOC-1	Between manholes F-3 and F-4, 8 ft depth.	9/13/2023	10/24/2023	1/17/2024 ^(a)
2024					
AOC-1-24-15-8-8.5ft	AOC-1	Between manholes F-3 and F-4, ~10ft west of OWS, depth of 8-8.5 ft	10/8/2024	10/24/2024	12/4/2024
AOC-1-24-15-13-13.5ft	AOC-1	Between manholes F-3 and F-4, ~10ft west of OWS, depth of 13-13.5 ft	10/8/2024	10/24/2024	12/4/2024
AOC-1-24-25-12.5-13ft	AOC-1	Between manholes F-3 and F-4, west side of F street, depth of 12.5-13 ft	10/8/2024	10/24/2024	12/4/2024
AOC-1-24-35-13.5-14ft	AOC-1	Between manholes F-3 and F-4, south of 24-15, depth of 13.5-14 ft	10/8/2024	10/24/2024	12/4/2024
AOC2-24-4-4ft	AOC-2	Between manholes F-11 and F-12, ~10 ft west of OWS, depth of 4 ft	10/7/2024	10/24/2024	12/4/2024
AOC2-24-4-6.5-7ft	AOC-2	Between manholes F-11 and F-12, ~10 ft west of OWS, depth of 6.5-7 ft	10/10/2024	10/30/2024	12/4/2024
AOC2-24-4-8-8.5ft	AOC-2	Between manholes F-11 and F-12, ~10 ft west of OWS, depth of 8-8.5 ft	10/10/2024	10/30/2024	12/4/2024
AOC2-SB4-5ft	AOC-2	Between manholes F-11 and F-12, ~10 ft west of OWS, south of 24-4 depth of 5 ft	10/7/2024	10/24/2024	12/4/2024
AOC2-SB4-10-10.5ft	AOC-2	Between manholes F-11 and F-12, ~10 ft west of OWS, south of 24-4 depth of 10-10.5 ft	10/9/2024	10/30/2024	12/4/2024
AOC2-SB4-16-16.5ft	AOC-2	Between manholes F-11 and F-12, ~10 ft west of OWS, south of 24-4 depth of 16-16.5 ft	10/9/2024	10/30/2024	12/4/2024
AOC2-SB1-8.5-9ft	AOC-2	Between manholes F-11 and F-12, ~10 ft west of OWS, south of SB-4 depth of 8.5-9 ft	10/9/2024	10/30/2024	12/4/2024
AOC2-SB1-11.5-12ft	AOC-2	Between manholes F-11 and F-12, ~10 ft west of OWS, south of SB-4 depth of 11.5-12 ft	10/9/2024	10/30/2024	12/4/2024
AOC2-SB2-5ft	AOC-2	Between manholes F-11 and F-12, ~10 ft west of OWS, south of F and 8th intersection, depth of 5 ft	10/3/2024	10/19/2024	12/4/2024
AOC2-SB2-6.5-7ft	AOC-2	Between manholes F-11 and F-12, ~10 ft west of OWS, south of F and 8th intersection, depth of 6.5-7 ft	10/9/2024	10/30/2024	12/4/2024
AOC2-SB2-14.5-15ft	AOC-2	Between manholes F-11 and F-12, ~10 ft west of OWS, south of F and 8th intersection, depth of 14.5-15 ft	10/9/2024	10/30/2024	12/4/2024
AOC2-SB3-3ft	AOC-2	South of manhole F-11, ~10 ft west of OWS, depth of 3 ft	10/3/2024	10/19/2024	12/4/2024
AOC2-SB3-6.5-7ft	AOC-2	South of manhole F-11, ~10 ft west of OWS, depth of 6.5-7 ft	10/10/2024	10/30/2024	12/4/2024
AOC2-SB3-7.5-8ft	AOC-2	South of manhole F-11, ~10 ft west of OWS, depth of 7.5-8 ft	10/10/2024	10/30/2024	12/4/2024
AOC2-24-5-7.5-8ft	AOC-2	South of manhole F-11, ~10 ft west of OWS, south of SB3, depth of 7.5-8 ft	10/10/2024	10/30/2024	12/4/2024
AOC2-24-5-18.5-19ft	AOC-2	South of manhole F-11, ~10 ft west of OWS, south of SB3, depth of 18.5-19 ft	10/10/2024	10/30/2024	12/4/2024

^(a) Data submitted outside of 60-day window because of a change in project consultant. Data was originally submitted January 17, 2024 under Whatcom Environmental Services (WES). WES was acquired by ALL4, LLC in January 2024. Data was resubmitted under an updated ALL4 EIM account February 20, 2025.

Marathon OWS Groundwater Sample Locations
Study ID: AODE16299
Study Name: Marathon OWS
Date Study Created: 12/4/2024
Level of Data Validation: 2A

Sample ID	Area of Concern	Location	Date Collected	Date Data Received	Date Uploaded
2023					
2023-12-09-B5-8ft	AOC-1	Between manholes F-3 and F-4	9/12/2023	10/24/2023	1/17/2024 ^(a)
2024					
24-1S	AOC-1	Between manholes F-3 and F-4, ~10ft west of OWS	10/17/2024	12/1/2024	12/4/2024
24-2S	AOC-1	Between manholes F-3 and F-4, west side of F street	10/14/2024	10/30/2024	12/4/2024
24-3S	AOC-1	Between manholes F-3 and F-4, south of 24-1S	10/14/2024	10/30/2024	12/4/2024
24-4	AOC-2	Between manholes F-11 and F-12, ~10 ft west of OWS	10/17/2024	12/1/2024	12/4/2024
25-5	AOC-2	South of manhole F-11, ~10 ft west of OWS	11/11/2024	11/26/2024	12/4/2024
92-P6	AOC-2	Between manholes F-11 and F-12, west side of F st, south of SB2, north of SB3	10/14/2024	10/30/2024	12/4/2024
14-3	AOC-2	Between manholes F-11 and F-12, south side of 8th St, south of SB1, north of SB2	10/14/2024	10/30/2024	12/4/2024

^(a) Data submitted outside of 60-day window because of a change in project consultant. Data was originally submitted January 17, 2024 under Whatcom Environmental Services (WES). WES was acquired by ALL4, LLC in Januray 2024. Data was resubmitted under an updated ALL4 EIM account February 20, 2025.

APPENDIX J
MTCATPH EXCEL WORKBOOKS

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry**1. Enter Site Information**

Date: 11/04/24
 Site Name: Marathon OWS AOC-2
 Sample Name: AOC2-24-4-6.5-7ft

Enter Site Data in Non-
shaded (white) Cells

2. Enter Soil Concentration Measured

Chemical or Petroleum Fraction	Measured Soil Conc mg/kg	Composition Ratio %
AL_EC >5-6	2.415	4.6%
AL_EC >6-8	2.5	4.8%
AL_EC >8-10	2.5	4.8%
AL_EC >10-12	2.5	4.8%
AL_EC >12-16	5.5	10.6%
AL_EC >16-21	5.5	10.6%
AL_EC >21-34	5.5	10.6%
AR_EC >8-10	9.273	17.8%
AR_EC >10-12	2.49	4.8%
AR_EC >12-16	2.48	4.8%
AR_EC >16-21	5.5	10.6%
AR_EC >21-34	5.5	10.6%
Benzene	0.031	0.1%
Toluene	0.059	0.1%
Ethylbenzene	0.031	0.1%
Total Xylenes	0.096	0.2%
Naphthalene	0.01	0.0%
1-Methyl Naphthalene	0.01	0.0%
2-Methyl Naphthalene	0.01	0.0%
n-Hexane	0.085	0.2%
MTBE	0.017	0.0%
Ethylene Dibromide (EDB)	0.0039	0.0%
1,2 Dichloroethane (EDC)	0.005	0.0%
Benzo(a)anthracene	0.01	0.0%
Benzo(b)fluoranthene	0.01	0.0%
Benzo(k)fluoranthene	0.01	0.0%
Benzo(a)pyrene	0.01	0.0%
Chrysene	0.01	0.0%
Dibenz(a,h)anthracene	0.01	0.0%
Indeno(1,2,3-cd)pyrene	0.01	0.0%
	52.0859	100%

Clear Soil
Data

REMARK:
Enter site specific information here.....

3. Enter Site-Specific Hydrogeological Data (MTCA defaults are provided for unsaturated soil)

Total soil porosity (n): 0.43 Unitless
 Volumetric water content (θ_w): 0.3 Unitless
 Volumetric air content (θ_a): 0.13 Unitless (calculated) $\rightarrow \theta_a = n - \theta_w$
 Soil bulk density (ρ_b): 1.5 kg/L
 Fraction Organic Carbon (f_{oc}): 0.001 Unitless
 Dilution Factor (DF): 20 Unitless

Reset Hydro
Defaults

4. Enter Target TPH Groundwater Concentration ($\mu\text{g/L}$)

Enter value here: 500 $\mu\text{g/L}$ (see worksheet B2_Groundwater Meth B)

Reset Target TPH
GW Conc
Information

Basis: Method A Potable Groundwater

Remark: Petroleum fractionated data (EPH/VPH) and individual compounds tested in groundwater generated a Method B potable drinking water cleanup level of 340 $\mu\text{g/L}$ (see Worksheet B2.1A). This level is below the most restrictive default Method A value of 500 $\mu\text{g/L}$. As a result, the Method A default potable groundwater cleanup level of 500 $\mu\text{g/L}$ is selected as the target groundwater concentration to develop a TPH concentration in soil that is protective of potable groundwater.

A2.1A Worksheet for Calculating TPH Soil Cleanup Levels (based on noncancer effects) for Protection of Human Health: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact
Method B: Unrestricted Land Use (WAC 173-340-740)

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-24-4-6.5-7ft

**Soil Method B
(noncancer)**

Chemical of Concern or EC group	Measured Sample Concentration					DIRECT CONTACT - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Noncancer Hazards			Noncancer-based Concentration @ HQ 1	
		Noncancer HQ MTCA Eq. 740-4 (1)	Percent Contribution to the Total HI	Noncancer Exceedances (2)		
	mg/kg	unitless	percent		mg/kg	Measured TPH Soil Conc, mg/kg = 52.09
<u>Petroleum EC Fraction</u>						HI = 3.7E-02 Pass
						<u>MTCA Eq. 740-3 (1)</u>
						TPH Cleanup Level (mg/kg) (HI = 1) = 1424.42
						2 Significant Figures = 1400
						The overall TPH Method B direct contact protective cleanup level is based on a noncancer HI of 1. See WAC 173-340-740(3)(b)(iii)(B)(III). The TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0.
						To assess the vapor pathway for petroleum mixtures, see Ecology's Guidance for Evaluating Soil Vapor Intrusion in Washington State (click on this link).

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equations 740-3 and -4 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures. Revised July 2023.*

(2) Noncancer results for the petroleum mixture that exceed a hazard index (HI) of 1 "Fail" compliance with Method B cleanup requirements and are not sufficiently protective. Note that the TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0.

(3) Benzo(a)pyrene has an oral RfD in EPA's IRIS database; however, since it's not sufficiently volatile, it's not included in the noncancer HI and the overall TPH cleanup level (173-340-740(3)(b)(iii)(B)(III)). cPAHs are accounted for in the cancer risk calculations (see worksheet A2.1B).

A2.1B Worksheet for Calculating Cancer Risks Associated with the Petroleum Mixture: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact**Method B: Unrestricted Land Use (WAC 173-340-740)**

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-24-4-6.5-7ft

**Soil Method B
(Cancer)**

Chemical of Concern or EC group	Measured Sample Concentration					CANCER RISK - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Cancer Risk				Measured TPH Soil Conc, mg/kg = 52.09
		Cancer Risk MTCA Eq. 740-5 (1)	Percent Contribution to the Total Cancer Risk	Cancer Risk Exceedances (2)	Cancer-based Concentration @ 1E-06 Risk	
	mg/kg	unitless	percent		mg/kg	
Petroleum EC Fraction						Cancer Risk = 1.2E-07 <i>Below Target Risk</i>
AL_EC >5-6	2.415					Note for Carcinogens: Known or suspected carcinogenic chemicals that contribute to unacceptable risk within the petroleum mixture as calculated herein <u>are evaluated separately</u> and must meet compliance with soil cleanup standards both on an individual basis (i.e., not to exceed a 1E-06 risk under Method B), and when accounting for cumulative risk from multiple chemicals and pathways at the site (not to exceed a risk of 1E-05). MTCA Equation 740-5 is used to evaluate cancer risk for carcinogens within the petroleum mixture.
AL_EC >6-8	2.5					
AL_EC >8-10	2.5					
AL_EC >10-12	2.5					
AL_EC >12-16	5.5					
AL_EC >16-21	5.5					
AL_EC >21-34	5.5					
AR_EC >8-10	9.273					
AR_EC >10-12	2.49					
AR_EC >12-16	2.48					
AR_EC >16-21	5.5					
AR_EC >21-34	5.5					
Benzene	0.031	1.7E-09	1.4%		18	
Toluene	0.059					
Ethylbenzene	0.031					
Total Xylenes	0.096					
Naphthalene	0.01					
1-Methyl Naphthalene	0.01	6.7E-10	0.6%		15	
2-Methyl Naphthalene	0.01					
n-Hexane	0.085					
MTBE	0.017	3.1E-11	0.0%		550	
Ethylene Dibromide (EDB)	0.0039	8.4E-09	7.2%		0.46	
1,2 Dichloroethane (EDC)	0.005	4.9E-10	0.4%		10	
Benzo(a)anthracene	0.01					0.14
Benzo(b)fluoranthene	0.01					
Benzo(k)fluoranthene	0.01					
Benzo(a)pyrene	0.01					
Chrysene	0.01					
Dibenz(a,h)anthracene	0.01					
Indeno(1,2,3-cd)pyrene	0.01					
cPAH TEQ (using TEFs) (3), (4)	0.015	1.1E-07	90.4%			
Sum	52.0859	1.2E-07	100%	≤ 1E-05		

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equation 740-5 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures*. Revised July 2023.

(2) Cancer risks greater than 1E-06 exceed the Method B target risk goal. Also see "Note for Carcinogens" under the "Cancer Risk - Current Sample" box that describes MTCA's regulatory requirements for evaluating known or suspected carcinogens within the petroleum mixture.

(3) The "cPAH TEQ" concentration is derived using the toxicity equivalent factor (TEF) approach outlined in Ecology's Implementation Memorandum No. 10 (see weblink below). This concentration represents the total toxic equivalent (TEQ) concentration for the cPAH mixture, and is compared to the cleanup level for benzo(a)pyrene. cPAH = Carcinogenic Polycyclic Aromatic Hydrocarbons.

(4) cPAHs have a documented mutagenic mode of action and pose an increased risk to children. Therefore, Method B cancer risk calculations for cPAHs incorporate early-life exposure (ELE) adjustments using age-dependent adjustment factors (ADAFs). See Ecology's CLARC PAH guidance titled: *Polycyclic Aromatic Hydrocarbons and Benzo[a]pyrene: Changes to MTCA default cleanup levels for 2017 (Revised July 2021)*. See CLARC PAH weblink below.

[Link to Ecology Implementation Memo 10](#)
[Link to CLARC PAH Guidance](#)

3/1/2025

A3.1A Worksheet for Calculating TPH Soil Cleanup Levels (based on noncancer effects) for Protection of Human Health: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact
Method C: Industrial Land Use (WAC 173-340-745)

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-24-4-6.5-7ft

**Soil Method C
(noncancer)**

Chemical of Concern or EC group	Measured Sample Concentration					DIRECT CONTACT - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Noncancer Hazards			Noncancer-based Concentration @ HQ 1	Measured TPH Soil Conc, mg/kg = 52.09
		Noncancer HQ MTCA Eq. 745-4 (1)	Percent Contribution to the Total HI	Noncancer Exceedances (2)		
		unitless	percent		mg/kg	HI = 2.0E-03 Pass
<u>Petroleum EC Fraction</u>						MTCA Eq. 745-3 (1)
AL_EC >5-6	2.415	3.32E-04	16.2%			TPH Cleanup Level (mg/kg) (HI = 1) = 25425.21
AL_EC >6-8	2.5	3.44E-04	16.8%			2 Significant Figures = 25000
AL_EC >8-10	2.5	1.72E-04	8.4%			The overall TPH Method C direct contact protective cleanup level is based on a noncancer HI of 1. See WAC 173-340-745(5)(b)(iii)(B)(III). The TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0. <i>To assess the vapor pathway for petroleum mixtures, see Ecology's Guidance for Evaluating Soil VI in WA State (click on this link).</i>
AL_EC >10-12	2.5	1.72E-04	8.4%			
AL_EC >12-16	5.5	3.78E-04	18.5%			
AL_EC >16-21	5.5	1.26E-06	0.1%			
AL_EC >21-34	5.5	1.26E-06	0.1%			
AR_EC >8-10	9.273	6.38E-05	3.1%			
AR_EC >10-12	2.49	8.56E-05	4.2%			
AR_EC >12-16	2.48	7.44E-06	0.4%			
AR_EC >16-21	5.5	2.75E-04	13.4%			
AR_EC >21-34	5.5	2.06E-04	10.1%			
Benzene	0.031	3.89E-06	0.2%		8,000	
Toluene	0.059	4.79E-07	0.0%		120,000	
Ethylbenzene	0.031	2.06E-07	0.0%		150,000	
Total Xylenes	0.096	3.18E-07	0.0%		300,000	
Naphthalene	0.01	6.15E-07	0.0%		16,000	
1-Methyl Naphthalene	0.01	1.76E-07	0.0%		57,000	
2-Methyl Naphthalene	0.01	3.08E-06	0.2%		3,300	
n-Hexane	0.085	7.13E-07	0.0%		120,000	
MTBE	0.017					
Ethylene Dibromide (EDB)	0.0039	2.98E-07	0.0%		13,000	
1,2 Dichloroethane (EDC)	0.005	5.73E-07	0.0%		8,700	
Benzo(a)anthracene	0.01	see Note (3)				
Benzo(b)fluoranthene	0.01					
Benzo(k)fluoranthene	0.01					
Benzo(a)pyrene	0.01					
Chrysene	0.01					
Dibenz(a,h)anthracene	0.01					
Indeno(1,2,3-cd)pyrene	0.01					
Sum	52.0859	2.05E-03	100%	HI ≤ 1		

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equations 745-3 and -4 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures. Revised July 2023.*

(2) Noncancer results for the petroleum mixture that exceed a hazard index (HI) of 1 "Fail" compliance with Method C cleanup requirements and are not sufficiently protective. Note that the TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0.

(3) Benzo(a)pyrene has an oral RfD in EPA's IRIS; however, since it's not sufficiently volatile, it's not included in the noncancer HI and the overall TPH cleanup level (173-340-745(5)(b)(iii)(B)(III)). cPAHs are accounted for in the cancer risk calculations (see worksheet A3.1B).

A3.1B Worksheet for Calculating Cancer Risks Associated with the Petroleum Mixture: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact					
Method C: Industrial Land Use (WAC 173-340-745)					
Date: 11/04/24 Site Name: Marathon OWS AOC-2 Sample Name: AOC2-24-4-6.5-7ft					Soil Method C (Cancer)
Chemical of Concern or EC group	Measured Sample Concentration				
	Measured Soil Conc @dry basis mg/kg	Cancer Risk			Cancer-based Concentration @ 1E-06 Risk mg/kg
		Cancer Risk MTCA Eq. 745-5 (1)	Percent Contribution to the Total Cancer Risk	Cancer Risk Exceedances (2)	
Petroleum EC Fraction					Measured TPH Soil Conc, mg/kg = 52.09 Cancer Risk = 6.9E-09 Below Target Risk
AL_EC >5-6	2.415				Note for Carcinogens: Known or suspected carcinogenic chemicals that contribute to unacceptable risk within the petroleum mixture as calculated herein are evaluated separately and must meet compliance with soil cleanup standards both on an individual basis (i.e., not to exceed a 1E-05 risk under Method C), and when accounting for cumulative risk from multiple chemicals and pathways at the site (not to exceed a risk of 1E-05). MTCA Equation 745-5 is used to evaluate cancer risk for carcinogens within the petroleum mixture.
AL_EC >6-8	2.5				
AL_EC >8-10	2.5				
AL_EC >10-12	2.5				
AL_EC >12-16	5.5				
AL_EC >16-21	5.5				
AL_EC >21-34	5.5				
AR_EC >8-10	9.273				
AR_EC >10-12	2.49				
AR_EC >12-16	2.48				
AR_EC >16-21	5.5				
AR_EC >21-34	5.5				
Benzene	0.031	2.3E-10	3.3%		1400
Toluene	0.059				
Ethylbenzene	0.031				
Total Xylenes	0.096				
Naphthalene	0.01				
1-Methyl Naphthalene	0.01	1.7E-10	2.4%		600
2-Methyl Naphthalene	0.01				
n-Hexane	0.085				
MTBE	0.017	4.1E-12	0.1%		41000
Ethylene Dibromide (EDB)	0.0039	1.4E-09	20.8%		27
1,2 Dichloroethane (EDC)	0.005	8.3E-11	1.2%		600
Benzo(a)anthracene	0.01				
Benzo(b)fluoranthene	0.01				
Benzo(k)fluoranthene	0.01				
Benzo(a)pyrene	0.01				30
Chrysene	0.01				
Dibenz(a,h)anthracene	0.01				
Indeno(1,2,3-cd)pyrene	0.01				
cPAH TEQ (using TEFs) (3)	0.015	5.0E-09	72.1%		
Sum	52.0859	6.9E-09	100%	≤ 1E-05	

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equation 745-5 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures*. Revised July 2023.

(2) Cancer risks greater than 1E-05 exceed the Method C target risk goal. See note under the "Cancer Risk - Current Sample" box that describes MTCA's regulatory requirements for evaluating known or suspected carcinogens within the petroleum mixture.

(3) The "cPAH TEQ" concentration is derived using the toxicity equivalent factor (TEF) approach outlined in Ecology's Implementation Memorandum No. 10 (see weblink below). This concentration represents the total toxic equivalent (TEQ) concentration for the cPAH mixture, and is compared to the cleanup level for benzo(a)pyrene. cPAH = Carcinogenic Polycyclic Aromatic Hydrocarbons.

[Link to Ecology Implementation Memo 10](#)

A4 Soil Cleanup Levels: Summary of Results. Refer to WAC 173-340-720, 740, 745, 747**Date:** 11/04/24**Site Name:** Marathon OWS AOC-2**Sample Name:** AOC2-24-4-6.5-7ft**Measured Soil TPH Concentration, mg/kg:** 52.09**Summary of Calculation Results**

Exposure Pathway	Method/Goal	Protective TPH Conc (mg/kg)	With Measured Soil Conc	
			HI or Risk	Pass or Fail
<u>Soil Direct Contact</u> Protection of Soil Incidental Ingestion and Dermal Contact: Human Health	Method B: Unrestricted Land Use			
	TPH Soil Cleanup Level (@ HI =1)	1,400	3.7E-02	Pass
	Cancer Risk (1)		1.2E-07	Pass
	Method C: Industrial Land Use			
	TPH Soil Cleanup Level (@ HI = 1)	25,000	2.0E-03	Pass
	Cancer Risk (1)		6.9E-09	Pass
<u>Soil Leaching</u> Protection of Groundwater Quality	Soil Concentration Protective of Target TPH Groundwater Concentration			
	Protective TPH Soil Concentration, mg/kg =	86	---	Pass
	Target TPH Groundwater Concentration (µg/L)			
	500	Method A Potable Groundwater		
Remark:	Petroleum fractionated data (EPH/VPH) and individual compounds tested in groundwater generated a Method B potable drinking water cleanup level of 340 µg/L (see Worksheet B2.1A). This level is below the most restrictive default Method A value of 500 µg/L. As a result, the Method A default potable groundwater cleanup level of 500 µg/L is selected as the target groundwater concentration to develop a TPH concentration in soil that is protective of potable groundwater.			

Notes:

(1) Known or suspected carcinogenic chemicals that contribute to unacceptable cancer risk within the petroleum mixture are evaluated separately and must meet compliance with soil cleanup standards both on an individual basis and when accounting for cumulative risk from multiple chemicals and pathways at the site. See [Worksheets: A2.1B and A3.1B \(Soil Direct Contact\); B2.1B \(Potable Water Ingestion\)](#).

Terrestrial Ecological Pathway: Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (see WAC 173-340-7490 through ~7494).

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry**1. Enter Site Information**

Date: 11/04/24
 Site Name: Marathon OWS AOC-2
 Sample Name: AOC2-SB1-8.5-9ft

Enter Site Data in Non-
shaded (white) Cells

2. Enter Soil Concentration Measured

Chemical or Petroleum Fraction	Measured Soil Conc mg/kg	Composition Ratio %
AL_EC >5-6	2.04	4.0%
AL_EC >6-8	2.5	4.8%
AL_EC >8-10	2.5	4.8%
AL_EC >10-12	2.5	4.8%
AL_EC >12-16	5.5	10.6%
AL_EC >16-21	5.5	10.6%
AL_EC >21-34	5.5	10.6%
AR_EC >8-10	0.08	0.2%
AR_EC >10-12	2.49	4.8%
AR_EC >12-16	2.462	4.8%
AR_EC >16-21	5.5	10.6%
AR_EC >21-34	5.5	10.6%
Benzene	0.35	0.7%
Toluene	3.5	6.8%
Ethylbenzene	0.91	1.8%
Total Xylenes	4.21	8.2%
Naphthalene	0.01	0.0%
1-Methyl Naphthalene	0.01	0.0%
2-Methyl Naphthalene	0.028	0.1%
n-Hexane	0.46	0.9%
MTBE	0.015	0.0%
Ethylene Dibromide (EDB)	0.0035	0.0%
1,2 Dichloroethane (EDC)	0.005	0.0%
Benzo(a)anthracene	0.01	0.0%
Benzo(b)fluoranthene	0.01	0.0%
Benzo(k)fluoranthene	0.01	0.0%
Benzo(a)pyrene	0.01	0.0%
Chrysene	0.01	0.0%
Dibenz(a,h)anthracene	0.01	0.0%
Indeno(1,2,3-cd)pyrene	0.01	0.0%
	51.6435	100%

Clear Soil
Data

REMARK:
Enter site specific information here.....

3. Enter Site-Specific Hydrogeological Data (MTCA defaults are provided for unsaturated soil)

Total soil porosity (n):	0.43	Unitless
Volumetric water content (θ_w):	0.3	Unitless
Volumetric air content (θ_a):	0.13	Unitless (calculated) $\rightarrow \theta_a = n - \theta_w$
Soil bulk density (ρ_b):	1.5	kg/L
Fraction Organic Carbon (f_{oc}):	0.001	Unitless
Dilution Factor (DF):	20	Unitless

Reset Hydro
Defaults

4. Enter Target TPH Groundwater Concentration (µg/L)

Enter value here: 500 µg/L (see worksheet B2_Groundwater Meth B)

Basis: Method A Potable Groundwater

Reset Target TPH
GW Conc
Information

Remark: Petroleum fractionated data (EPH/VPH) and individual compounds tested in groundwater generated a Method B potable drinking water cleanup level of 340 µg/L (see Worksheet B2.1A). This level is below the most restrictive default Method A value of 500 µg/L. As a result, the Method A default potable groundwater cleanup level of 500 µg/L is selected as the target groundwater concentration to develop a TPH concentration in soil that is protective of potable groundwater.

A2.1A Worksheet for Calculating TPH Soil Cleanup Levels (based on noncancer effects) for Protection of Human Health: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact
Method B: Unrestricted Land Use (WAC 173-340-740)

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-SB1-8.5-9ft

**Soil Method B
(noncancer)**

Chemical of Concern or EC group	Measured Sample Concentration					DIRECT CONTACT - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Noncancer Hazards			Noncancer-based Concentration @ HQ 1	
		Noncancer HQ MTCA Eq. 740-4 (1)	Percent Contribution to the Total HI	Noncancer Exceedances (2)		
	mg/kg	unitless	percent		mg/kg	Measured TPH Soil Conc, mg/kg = 51.64
Petroleum EC Fraction						HI = 3.6E-02 Pass
						MTCA Eq. 740-3 (1)
						TPH Cleanup Level (mg/kg) (HI = 1) = 1417.86
						2 Significant Figures = 1400
						The overall TPH Method B direct contact protective cleanup level is based on a noncancer HI of 1. See WAC 173-340-740(3)(b)(iii)(B)(III). The TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0. To assess the vapor pathway for petroleum mixtures, see Ecology's Guidance for Evaluating Soil Vapor Intrusion in Washington State (click on this link).
AL_EC > 5-6	2.04	5.52E-03	15.2%			
AL_EC > 6-8	2.5	6.77E-03	18.6%			
AL_EC > 8-10	2.5	3.38E-03	9.3%			
AL_EC > 10-12	2.5	3.38E-03	9.3%			
AL_EC > 12-16	5.5	7.44E-03	20.4%			
AL_EC > 16-21	5.5	2.48E-05	0.1%			
AL_EC > 21-34	5.5	2.48E-05	0.1%			
AR_EC > 8-10	0.08	1.08E-05	0.0%			
AR_EC > 10-12	2.49	1.68E-03	4.6%			
AR_EC > 12-16	2.462	8.86E-05	0.2%			
AR_EC > 16-21	5.5	3.30E-03	9.1%			
AR_EC > 21-34	5.5	2.48E-03	6.8%			
Benzene	0.35	1.09E-03	3.0%		320	
Toluene	3.5	5.83E-04	1.6%		6,000	
Ethylbenzene	0.91	1.22E-04	0.3%		7,500	
Total Xylenes	4.21	2.82E-04	0.8%		15,000	
Naphthalene	0.01	8.26E-06	0.0%		1,200	
1-Methyl Naphthalene	0.01	2.36E-06	0.0%		4,200	
2-Methyl Naphthalene	0.028	1.16E-04	0.3%		240	
n-Hexane	0.46	9.60E-05	0.3%		4,800	
MTBE	0.015					
Ethylene Dibromide (EDB)	0.0035	5.26E-06	0.0%		670	
1,2 Dichloroethane (EDC)	0.005	1.13E-05	0.0%		440	
Benzo(a)anthracene	0.01	see Note (3)				
Benzo(b)fluoranthene	0.01					
Benzo(k)fluoranthene	0.01					
Benzo(a)pyrene	0.01					
Chrysene	0.01					
Dibenz(a,h)anthracene	0.01					
Indeno(1,2,3-cd)pyrene	0.01					
Sum	51.6435	3.64E-02	100%	HI ≤ 1		

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equations 740-3 and -4 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures*. Revised July 2023.

(2) Noncancer results for the petroleum mixture that exceed a hazard index (HI) of 1 "Fail" compliance with Method B cleanup requirements and are not sufficiently protective. Note that the TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0.

(3) Benzo(a)pyrene has an oral RfD in EPA's IRIS database; however, since it's not sufficiently volatile, it's not included in the noncancer HI and the overall TPH cleanup level (173-340-740(3)(b)(iii)(B)(III)). cPAHs are accounted for in the cancer risk calculations (see worksheet A2.1B).

A2.1B Worksheet for Calculating Cancer Risks Associated with the Petroleum Mixture: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact**Method B: Unrestricted Land Use (WAC 173-340-740)**

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-SB1-8.5-9ft

**Soil Method B
(Cancer)**

Chemical of Concern or EC group	Measured Sample Concentration					CANCER RISK - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Cancer Risk				Measured TPH Soil Conc, mg/kg = 51.64
		Cancer Risk MTCA Eq. 740-5 (1)	Percent Contribution to the Total Cancer Risk	Cancer Risk Exceedances (2)	Cancer-based Concentration @ 1E-06 Risk	
<u>Petroleum EC Fraction</u>						Cancer Risk = 1.3E-07 <i>Below Target Risk</i>
AL_EC > 5-6	2.04					Note for Carcinogens: Known or suspected carcinogenic chemicals that contribute to unacceptable risk within the petroleum mixture as calculated herein are <u>evaluated separately</u> and must meet compliance with soil cleanup standards both on an individual basis (i.e., not to exceed a 1E-06 risk under Method B), and when accounting for cumulative risk from multiple chemicals and pathways at the site (not to exceed a risk of 1E-05). MTCA Equation 740-5 is used to evaluate cancer risk for carcinogens within the petroleum mixture.
AL_EC > 6-8	2.5					
AL_EC > 8-10	2.5					
AL_EC > 10-12	2.5					
AL_EC > 12-16	5.5					
AL_EC > 16-21	5.5					
AL_EC > 21-34	5.5					
AR_EC > 8-10	0.08					
AR_EC > 10-12	2.49					
AR_EC > 12-16	2.462					
AR_EC > 16-21	5.5					
AR_EC > 21-34	5.5					
Benzene	0.35	1.9E-08	14.3%		18	
Toluene	3.5					
Ethylbenzene	0.91					
Total Xylenes	4.21					
Naphthalene	0.01					
1-Methyl Naphthalene	0.01	6.7E-10	0.5%		15	
2-Methyl Naphthalene	0.028					
n-Hexane	0.46					
MTBE	0.015	2.7E-11	0.0%		550	
Ethylene Dibromide (EDB)	0.0035	7.6E-09	5.6%		0.46	
1,2 Dichloroethane (EDC)	0.005	4.9E-10	0.4%		10	
Benzo(a)anthracene	0.01					0.14
Benzo(b)fluoranthene	0.01					
Benzo(k)fluoranthene	0.01					
Benzo(a)pyrene	0.01					
Chrysene	0.01					
Dibenz(a,h)anthracene	0.01					
Indeno(1,2,3-cd)pyrene	0.01					
cPAH TEQ (using TEFs) (3), (4)	0.015	1.1E-07	79.1%			
Sum	51.6435	1.3E-07	100%	≤ 1E-05		

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equation 740-5 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures*. Revised July 2023.

(2) Cancer risks greater than 1E-06 exceed the Method B target risk goal. Also see "Note for Carcinogens" under the "Cancer Risk - Current Sample" box that describes MTCA's regulatory requirements for evaluating known or suspected carcinogens within the petroleum mixture.

(3) The "cPAH TEQ" concentration is derived using the toxicity equivalent factor (TEF) approach outlined in Ecology's Implementation Memorandum No. 10 (see weblink below). This concentration represents the total toxic equivalent (TEQ) concentration for the cPAH mixture, and is compared to the cleanup level for benzo(a)pyrene. cPAH = Carcinogenic Polycyclic Aromatic Hydrocarbons.

(4) cPAHs have a documented mutagenic mode of action and pose an increased risk to children. Therefore, Method B cancer risk calculations for cPAHs incorporate early-life exposure (ELE) adjustments using age-dependent adjustment factors (ADAFs). See Ecology's CLARC PAH guidance titled: *Polycyclic Aromatic Hydrocarbons and Benzo[a]pyrene: Changes to MTCA default cleanup levels for 2017 (Revised July 2021)*. See CLARC PAH weblink below.

[Link to Ecology Implementation Memo 10](#)
[Link to CLARC PAH Guidance](#)

A3.1A Worksheet for Calculating TPH Soil Cleanup Levels (based on noncancer effects) for Protection of Human Health: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact
Method C: Industrial Land Use (WAC 173-340-745)

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-SB1-8.5-9ft

**Soil Method C
(noncancer)**

Chemical of Concern or EC group	Measured Sample Concentration					DIRECT CONTACT - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Noncancer Hazards			Noncancer-based Concentration @ HQ 1	Measured TPH Soil Conc, mg/kg = 51.64
		Noncancer HQ MTCA Eq. 745-4 (1)	Percent Contribution to the Total HI	Noncancer Exceedances (2)		
		unitless	percent			
<u>Petroleum EC Fraction</u>						HI = 2.0E-03 Pass MTCA Eq. 745-3 (1) TPH Cleanup Level (mg/kg) (HI = 1) = 25441.02 2 Significant Figures = 25000
AL_EC >5-6	2.04	2.81E-04	13.8%			The overall TPH Method C direct contact protective cleanup level is based on a noncancer HI of 1. See WAC 173-340-745(5)(b)(iii)(B)(III). The TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0. <i>To assess the vapor pathway for petroleum mixtures, see Ecology's Guidance for Evaluating Soil VI in WA State (click on this link).</i>
AL_EC >6-8	2.5	3.44E-04	16.9%			
AL_EC >8-10	2.5	1.72E-04	8.5%			
AL_EC >10-12	2.5	1.72E-04	8.5%			
AL_EC >12-16	5.5	3.78E-04	18.6%			
AL_EC >16-21	5.5	1.26E-06	0.1%			
AL_EC >21-34	5.5	1.26E-06	0.1%			
AR_EC >8-10	0.08	5.50E-07	0.0%			
AR_EC >10-12	2.49	8.56E-05	4.2%			
AR_EC >12-16	2.462	7.39E-06	0.4%			
AR_EC >16-21	5.5	2.75E-04	13.5%			
AR_EC >21-34	5.5	2.06E-04	10.2%			
Benzene	0.35	4.40E-05	2.2%		8,000	
Toluene	3.5	2.84E-05	1.4%		120,000	
Ethylbenzene	0.91	6.03E-06	0.3%		150,000	
Total Xylenes	4.21	1.40E-05	0.7%		300,000	
Naphthalene	0.01	6.15E-07	0.0%		16,000	
1-Methyl Naphthalene	0.01	1.76E-07	0.0%		57,000	
2-Methyl Naphthalene	0.028	8.61E-06	0.4%		3,300	
n-Hexane	0.46	3.86E-06	0.2%		120,000	
MTBE	0.015					
Ethylene Dibromide (EDB)	0.0035	2.67E-07	0.0%		13,000	
1,2 Dichloroethane (EDC)	0.005	5.73E-07	0.0%		8,700	
Benzo(a)anthracene	0.01	see Note (3)				
Benzo(b)fluoranthene	0.01					
Benzo(k)fluoranthene	0.01					
Benzo(a)pyrene	0.01					
Chrysene	0.01					
Dibenz(a,h)anthracene	0.01					
Indeno(1,2,3-cd)pyrene	0.01					
Sum	51.6435	2.03E-03	100%	HI ≤ 1		

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equations 745-3 and -4 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures. Revised July 2023.*

(2) Noncancer results for the petroleum mixture that exceed a hazard index (HI) of 1 "Fail" compliance with Method C cleanup requirements and are not sufficiently protective. Note that the TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0.

(3) Benzo(a)pyrene has an oral RfD in EPA's IRIS; however, since it's not sufficiently volatile, it's not included in the noncancer HI and the overall TPH cleanup level (173-340-745(5)(b)(iii)(B)(III)). cPAHs are accounted for in the cancer risk calculations (see worksheet A3.1B).

A3.1B Worksheet for Calculating Cancer Risks Associated with the Petroleum Mixture: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact
Method C: Industrial Land Use (WAC 173-340-745)

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-SB1-8.5-9ft

**Soil Method C
(Cancer)**

Chemical of Concern or EC group	Measured Sample Concentration					CANCER RISK - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Cancer Risk				Measured TPH Soil Conc, mg/kg = 51.64
		Cancer Risk MTCA Eq. 745-5 (1)	Percent Contribution to the Total Cancer Risk	Cancer Risk Exceedances (2)	Cancer-based Concentration @ 1E-06 Risk	
	mg/kg	unitless	percent		mg/kg	
Petroleum EC Fraction						Cancer Risk = 9.1E-09 <i>Below Target Risk</i>
AL_EC >5-6	2.04					Note for Carcinogens: Known or suspected carcinogenic chemicals that contribute to unacceptable risk within the petroleum mixture as calculated herein are evaluated separately and must meet compliance with soil cleanup standards both on an individual basis (i.e., not to exceed a 1E-05 risk under Method C), and when accounting for cumulative risk from multiple chemicals and pathways at the site (not to exceed a risk of 1E-05). MTCA Equation 745-5 is used to evaluate cancer risk for carcinogens within the petroleum mixture.
AL_EC >6-8	2.5					
AL_EC >8-10	2.5					
AL_EC >10-12	2.5					
AL_EC >12-16	5.5					
AL_EC >16-21	5.5					
AL_EC >21-34	5.5					
AR_EC >8-10	0.08					
AR_EC >10-12	2.49					
AR_EC >12-16	2.462					
AR_EC >16-21	5.5					
AR_EC >21-34	5.5					
Benzene	0.35	2.6E-09	28.4%		1400	
Toluene	3.5					
Ethylbenzene	0.91					
Total Xylenes	4.21					
Naphthalene	0.01					30
1-Methyl Naphthalene	0.01	1.7E-10	1.8%		600	
2-Methyl Naphthalene	0.028					
n-Hexane	0.46					
MTBE	0.015	3.6E-12	0.0%		41000	
Ethylene Dibromide (EDB)	0.0035	1.3E-09	14.1%		27	
1,2 Dichloroethane (EDC)	0.005	8.3E-11	0.9%		600	
Benzo(a)anthracene	0.01					
Benzo(b)fluoranthene	0.01					
Benzo(k)fluoranthene	0.01					
Benzo(a)pyrene	0.01					
Chrysene	0.01					
Dibenz(a,h)anthracene	0.01					
Indeno(1,2,3-cd)pyrene	0.01					
cPAH TEQ (using TEFs) (3)	0.015	5.0E-09	54.6%			
Sum	51.6435	9.1E-09	100%	≤ 1E-05		

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equation 745-5 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures*. Revised July 2023.

(2) Cancer risks greater than 1E-05 exceed the Method C target risk goal. See note under the "Cancer Risk - Current Sample" box that describes MTCA's regulatory requirements for evaluating known or suspected carcinogens within the petroleum mixture.

(3) The "cPAH TEQ" concentration is derived using the toxicity equivalent factor (TEF) approach outlined in Ecology's Implementation Memorandum No. 10 (see weblink below). This concentration represents the total toxic equivalent (TEQ) concentration for the cPAH mixture, and is compared to the cleanup level for benzo(a)pyrene. cPAH = Carcinogenic Polycyclic Aromatic Hydrocarbons.

[Link to Ecology Implementation Memo 10](#)

A4 Soil Cleanup Levels: Summary of Results. Refer to WAC 173-340-720, 740, 745, 747

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-SB1-8.5-9ft

Measured Soil TPH Concentration, mg/kg: 51.64

Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective TPH Conc (mg/kg)	With Measured Soil Conc	
			HI or Risk	Pass or Fail
<u>Soil Direct Contact</u> Protection of Soil Incidental Ingestion and Dermal Contact: Human Health	Method B: Unrestricted Land Use			
	TPH Soil Cleanup Level (@ HI = 1)	1,400	3.6E-02	Pass
	Cancer Risk (1)		1.3E-07	Pass
	Method C: Industrial Land Use			
	TPH Soil Cleanup Level (@ HI = 1)	25,000	2.0E-03	Pass
	Cancer Risk (1)		9.1E-09	Pass
<u>Soil Leaching</u> Protection of Groundwater Quality	Soil Concentration Protective of Target TPH Groundwater Concentration			
	Protective TPH Soil Concentration, mg/kg =	21	---	Fail
	Target TPH Groundwater Concentration (µg/L)			
	500 Method A Potable Groundwater			
Remark:	Petroleum fractionated data (EPH/VPH) and individual compounds tested in groundwater generated a Method B potable drinking water cleanup level of 340 µg/L (see Worksheet B2.1A). This level is below the most restrictive default Method A value of 500 µg/L. As a result, the Method A default potable groundwater cleanup level of 500 µg/L is selected as the target groundwater concentration to develop a TPH concentration in soil that is protective of potable groundwater.			

Notes:

(1) Known or suspected carcinogenic chemicals that contribute to unacceptable cancer risk within the petroleum mixture are evaluated separately and must meet compliance with soil cleanup standards both on an individual basis and when accounting for cumulative risk from multiple chemicals and pathways at the site. [See Worksheets: A2.1B and A3.1B \(Soil Direct Contact\); B2.1B \(Potable Water Ingestion\).](#)

Terrestrial Ecological Pathway: Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (see WAC 173-340-7490 through ~7494).

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry**1. Enter Site Information**

Date: 11/04/24
 Site Name: Marathon OWS AOC-2
 Sample Name: AOC2-SB2-6.5-7ft

Enter Site Data in Non-
shaded (white) Cells

2. Enter Soil Concentration Measured

Chemical or Petroleum Fraction	Measured Soil Conc mg/kg	Composition Ratio %
AL_EC >5-6	18.8	3.6%
AL_EC >6-8	88	16.8%
AL_EC >8-10	60	11.4%
AL_EC >10-12	60	11.4%
AL_EC >12-16	21	4.0%
AL_EC >16-21	15	2.9%
AL_EC >21-34	13	2.5%
AR_EC >8-10	73.3	14.0%
AR_EC >10-12	58.78	11.2%
AR_EC >12-16	57.24	10.9%
AR_EC >16-21	6	1.1%
AR_EC >21-34	6	1.1%
Benzene	0.73	0.1%
Toluene	14	2.7%
Ethylbenzene	4.3	0.8%
Total Xylenes	22.4	4.3%
Naphthalene	0.22	0.0%
1-Methyl Naphthalene	0.3	0.1%
2-Methyl Naphthalene	0.46	0.1%
n-Hexane	5.2	1.0%
MTBE	0.0185	0.0%
Ethylene Dibromide (EDB)	0.0043	0.0%
1,2 Dichloroethane (EDC)	0.0055	0.0%
Benzo(a)anthracene	0.01	0.0%
Benzo(b)fluoranthene	0.01	0.0%
Benzo(k)fluoranthene	0.01	0.0%
Benzo(a)pyrene	0.01	0.0%
Chrysene	0.01	0.0%
Dibenz(a,h)anthracene	0.01	0.0%
Indeno(1,2,3-cd)pyrene	0.01	0.0%
	524.8283	100%

Clear Soil
Data

REMARK:
Enter site specific information here.....

3. Enter Site-Specific Hydrogeological Data (MTCA defaults are provided for unsaturated soil)

Total soil porosity (n): 0.43 Unitless
 Volumetric water content (θ_w): 0.3 Unitless
 Volumetric air content (θ_a): 0.13 Unitless (calculated) $\rightarrow \theta_a = n - \theta_w$
 Soil bulk density (ρ_b): 1.5 kg/L
 Fraction Organic Carbon (f_{oc}): 0.001 Unitless
 Dilution Factor (DF): 20 Unitless

Reset Hydro
Defaults

4. Enter Target TPH Groundwater Concentration ($\mu\text{g/L}$)

Enter value here: 500 $\mu\text{g/L}$ (see worksheet B2_Groundwater Meth B)

Reset Target TPH
GW Conc
Information

Basis: Method A Potable Groundwater

Remark: Petroleum fractionated data (EPH/VPH) and individual compounds tested in groundwater generated a Method B potable drinking water cleanup level of 340 $\mu\text{g/L}$ (see Worksheet B2.1A). This level is below the most restrictive default Method A value of 500 $\mu\text{g/L}$. As a result, the Method A default potable groundwater cleanup level of 500 $\mu\text{g/L}$ is selected as the target groundwater concentration to develop a TPH concentration in soil that is protective of potable groundwater.

A2.1A Worksheet for Calculating TPH Soil Cleanup Levels (based on noncancer effects) for Protection of Human Health: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact
Method B: Unrestricted Land Use (WAC 173-340-740)

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-SB2-6.5-7ft

**Soil Method B
(noncancer)**

Chemical of Concern or EC group	Measured Sample Concentration					DIRECT CONTACT - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Noncancer Hazards			Noncancer-based Concentration @ HQ 1	
		Noncancer HQ MTCA Eq. 740-4 (1)	Percent Contribution to the Total HI	Noncancer Exceedances (2)		
	mg/kg	unitless	percent		mg/kg	Measured TPH Soil Conc, mg/kg = 524.83
<u>Petroleum EC Fraction</u>						HI = 5.5E-01 Pass
						<u>MTCA Eq. 740-3 (1)</u>
						TPH Cleanup Level (mg/kg) (HI = 1) = 957.82
						2 Significant Figures = 960
						The overall TPH Method B direct contact protective cleanup level is based on a noncancer HI of 1. See WAC 173-340-740(3)(b)(iii)(B)(III). The TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0.
						<i>To assess the vapor pathway for petroleum mixtures, see Ecology's Guidance for Evaluating Soil Vapor Intrusion in Washington State (click on this link).</i>

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equations 740-3 and -4 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures. Revised July 2023.*

(2) Noncancer results for the petroleum mixture that exceed a hazard index (HI) of 1 "Fail" compliance with Method B cleanup requirements and are not sufficiently protective. Note that the TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0.

(3) Benzo(a)pyrene has an oral RfD in EPA's IRIS database; however, since it's not sufficiently volatile, it's not included in the noncancer HI and the overall TPH cleanup level (173-340-740(3)(b)(iii)(B)(III)). cPAHs are accounted for in the cancer risk calculations (see worksheet A2.1B).

A2.1B Worksheet for Calculating Cancer Risks Associated with the Petroleum Mixture: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact**Method B: Unrestricted Land Use (WAC 173-340-740)**

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-SB2-6.5-7ft

**Soil Method B
(Cancer)**

Chemical of Concern or EC group	Measured Sample Concentration					CANCER RISK - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Cancer Risk				Measured TPH Soil Conc, mg/kg = 524.83
		Cancer Risk MTCA Eq. 740-5 (1)	Percent Contribution to the Total Cancer Risk	Cancer Risk Exceedances (2)	Cancer-based Concentration @ 1E-06 Risk	
	mg/kg	unitless	percent		mg/kg	
Petroleum EC Fraction						Cancer Risk = 1.8E-07 <i>Below Target Risk</i>
AL_EC >5-6	18.8					Note for Carcinogens: Known or suspected carcinogenic chemicals that contribute to unacceptable risk within the petroleum mixture as calculated herein <u>are evaluated separately</u> and must meet compliance with soil cleanup standards both on an individual basis (i.e., not to exceed a 1E-06 risk under Method B), and when accounting for cumulative risk from multiple chemicals and pathways at the site (not to exceed a risk of 1E-05). MTCA Equation 740-5 is used to evaluate cancer risk for carcinogens within the petroleum mixture.
AL_EC >6-8	88					
AL_EC >8-10	60					
AL_EC >10-12	60					
AL_EC >12-16	21					
AL_EC >16-21	15					
AL_EC >21-34	13					
AR_EC >8-10	73.3					
AR_EC >10-12	58.78					
AR_EC >12-16	57.24					
AR_EC >16-21	6					
AR_EC >21-34	6					
Benzene	0.73	4.0E-08	22.7%		18	
Toluene	14					
Ethylbenzene	4.3					
Total Xylenes	22.4					
Naphthalene	0.22					
1-Methyl Naphthalene	0.3	2.0E-08	11.4%		15	
2-Methyl Naphthalene	0.46					
n-Hexane	5.2					
MTBE	0.0185	3.3E-11	0.0%		550	
Ethylene Dibromide (EDB)	0.0043	9.3E-09	5.3%		0.46	
1,2 Dichloroethane (EDC)	0.0055	5.4E-10	0.3%		10	
Benzo(a)anthracene	0.01					0.14
Benzo(b)fluoranthene	0.01					
Benzo(k)fluoranthene	0.01					
Benzo(a)pyrene	0.01					
Chrysene	0.01					
Dibenz(a,h)anthracene	0.01					
Indeno(1,2,3-cd)pyrene	0.01					
cPAH TEQ (using TEFs) (3), (4)	0.015	1.1E-07	60.2%			
Sum	524.8283	1.8E-07	100%	≤ 1E-05		

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equation 740-5 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures*. Revised July 2023.

(2) Cancer risks greater than 1E-06 exceed the Method B target risk goal. Also see "Note for Carcinogens" under the "Cancer Risk - Current Sample" box that describes MTCA's regulatory requirements for evaluating known or suspected carcinogens within the petroleum mixture.

(3) The "cPAH TEQ" concentration is derived using the toxicity equivalent factor (TEF) approach outlined in Ecology's Implementation Memorandum No. 10 (see weblink below). This concentration represents the total toxic equivalent (TEQ) concentration for the cPAH mixture, and is compared to the cleanup level for benzo(a)pyrene. cPAH = Carcinogenic Polycyclic Aromatic Hydrocarbons.

(4) cPAHs have a documented mutagenic mode of action and pose an increased risk to children. Therefore, Method B cancer risk calculations for cPAHs incorporate early-life exposure (ELE) adjustments using age-dependent adjustment factors (ADAFs). See Ecology's CLARC PAH guidance titled: *Polycyclic Aromatic Hydrocarbons and Benzo[a]pyrene: Changes to MTCA default cleanup levels for 2017 (Revised July 2021)*. See CLARC PAH weblink below.

[Link to Ecology Implementation Memo 10](#)
[Link to CLARC PAH Guidance](#)

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Groundwater Quality: Leaching Pathway
WAC 173-340-740 and 747

Date: 11/04/24 Site Name: Marathon OWS AOC-2 Sample Name: AOC2-SB2-6.5-7ft				Site-Specific Hydrogeological Properties previously entered:			
				Item	Symbol	Value	Units
Chemical of Concern or EC Group				Total soil porosity:	n	0.43	unitless
				Volumetric water content:	Q_w	0.3	unitless
				Volumetric air content:	Q_a	0.13	unitless
				Soil bulk density measured:	ρ_b	1.5	kg/L
				Fraction Organic Carbon:	f_{oc}	0.001	unitless
				Dilution Factor:	DF	20	unitless
Petroleum EC Fraction				Target TPH Groundwater Concentration			
AL_EC >5-6 AL_EC >6-8 AL_EC >8-10 AL_EC >10-12 AL_EC >12-16 AL_EC >16-21 AL_EC >21-34				Target Groundwater TPH Conc, µg/L: 500			
AR_EC >8-10 AR_EC >10-12 AR_EC >12-16 AR_EC >16-21 AR_EC >21-34				Calculate Soil Leaching Protective Condition for the Measured Sample Concentration			
Benzene Toluene Ethylbenzene Total Xylenes				Calculate a Soil Concentration that is Protective of the Target TPH Groundwater Concentration			
Naphthalene 1-Methyl Naphthalene 2-Methyl Naphthalene n-Hexane MTBE Ethylene Dibromide (EDB) 1,2 Dichloroethane (EDC)				Click the button below to run Soil Leaching calculations. Note: a target TPH Groundwater Conc must be entered in Worksheet A1_Soil Data Entry to run the soil leaching calculation.			
Benzo(a)anthracene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Chrysene Dibenz(a,h)anthracene Indeno(1,2,3-cd)pyrene				Calculate Soil Leaching Cleanup Level			
Sum				Model Results			
				Soil Leaching Criterion: Protection of Target TPH Groundwater Concentration			
				Protective TPH Soil Concentration, mg/kg = 28.05 @ 2 sig figures 28 TPH GW Concentration, ug/L = 5.00E+02 @ 2 sig figures 500 Soil Leaching Pass or Fail? Fail			
				Additional Model Details			
				Type of model used for computation: 4-Phase Model Computation completed? Yes!			
				100% NAPL, mg/kg 69762.3 Mass Distribution Pattern @ 4-phase in soil pore system: Total Mass distributed in Water Phase: 7.13% in Solid: 61.98% Total Mass distributed in Air Phase: 14.00% in NAPL: 16.89%			

Notes:

(1) These are the soil leaching concentrations calculated by the 3- or 4-phase equilibrium partitioning models. These modelled concentrations are predicted to be protective of the target TPH groundwater concentration.

(2) Individual cPAHs are not included in the soil leaching calculations to predict a total TPH concentration protective of potable groundwater. Compliance with cPAHs in soil for the protection of groundwater is determined separately using the 3-phase partitioning model - see Ecology Implementation Memo No. 10 - Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) Using Toxicity Equivalency Factors (TEFs) (April 20, 2015). See [weblink](#) below.

A3.1A Worksheet for Calculating TPH Soil Cleanup Levels (based on noncancer effects) for Protection of Human Health: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact
Method C: Industrial Land Use (WAC 173-340-745)

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-SB2-6.5-7ft

**Soil Method C
(noncancer)**

Chemical of Concern or EC group	Measured Sample Concentration					DIRECT CONTACT - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Noncancer Hazards			Noncancer-based Concentration @ HQ 1	Measured TPH Soil Conc, mg/kg = 524.83
		Noncancer HQ MTCA Eq. 745-4 (1)	Percent Contribution to the Total HI	Noncancer Exceedances (2)		
		unitless	percent			HI = 2.8E-02 Pass
						MTCA Eq. 745-3 (1)
						TPH Cleanup Level (mg/kg) (HI = 1) = 18664.22
						2 Significant Figures = 19000
<u>Petroleum EC Fraction</u>						The overall TPH Method C direct contact protective cleanup level is based on a noncancer HI of 1. See WAC 173-340-745(5)(b)(iii)(B)(III). The TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0. <i>To assess the vapor pathway for petroleum mixtures, see Ecology's Guidance for Evaluating Soil VI in WA State (click on this link).</i>
AL_EC >5-6	18.8	2.59E-03	9.2%			
AL_EC >6-8	88	1.21E-02	43.0%			
AL_EC >8-10	60	4.13E-03	14.7%			
AL_EC >10-12	60	4.13E-03	14.7%			
AL_EC >12-16	21	1.44E-03	5.1%			
AL_EC >16-21	15	3.44E-06	0.0%			
AL_EC >21-34	13	2.98E-06	0.0%			
AR_EC >8-10	73.3	5.04E-04	1.8%			
AR_EC >10-12	58.78	2.02E-03	7.2%			
AR_EC >12-16	57.24	1.72E-04	0.6%			
AR_EC >16-21	6	3.00E-04	1.1%			
AR_EC >21-34	6	2.25E-04	0.8%			
Benzene	0.73	9.17E-05	0.3%		8,000	
Toluene	14	1.14E-04	0.4%		120,000	
Ethylbenzene	4.3	2.85E-05	0.1%		150,000	
Total Xylenes	22.4	7.43E-05	0.3%		300,000	
Naphthalene	0.22	1.35E-05	0.0%		16,000	
1-Methyl Naphthalene	0.3	5.27E-06	0.0%		57,000	
2-Methyl Naphthalene	0.46	1.41E-04	0.5%		3,300	
n-Hexane	5.2	4.36E-05	0.2%		120,000	
MTBE	0.0185					
Ethylene Dibromide (EDB)	0.0043	3.28E-07	0.0%		13,000	
1,2 Dichloroethane (EDC)	0.0055	6.30E-07	0.0%		8,700	
Benzo(a)anthracene	0.01	see Note (3)				
Benzo(b)fluoranthene	0.01					
Benzo(k)fluoranthene	0.01					
Benzo(a)pyrene	0.01					
Chrysene	0.01					
Dibenz(a,h)anthracene	0.01					
Indeno(1,2,3-cd)pyrene	0.01					
Sum	524.8283	2.81E-02	100%	HI ≤ 1		

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equations 745-3 and -4 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures. Revised July 2023.*

(2) Noncancer results for the petroleum mixture that exceed a hazard index (HI) of 1 "Fail" compliance with Method C cleanup requirements and are not sufficiently protective. Note that the TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0.

(3) Benzo(a)pyrene has an oral RfD in EPA's IRIS; however, since it's not sufficiently volatile, it's not included in the noncancer HI and the overall TPH cleanup level (173-340-745(5)(b)(iii)(B)(III)). cPAHs are accounted for in the cancer risk calculations (see worksheet A3.1B).

A3.1B Worksheet for Calculating Cancer Risks Associated with the Petroleum Mixture: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact						
Method C: Industrial Land Use (WAC 173-340-745)						
Date: 11/04/24 Site Name: Marathon OWS AOC-2 Sample Name: AOC2-SB2-6.5-7ft					Soil Method C (Cancer)	
Chemical of Concern or EC group	Measured Sample Concentration					CANCER RISK - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis mg/kg	Cancer Risk			Cancer-based Concentration @ 1E-06 Risk mg/kg	
		Cancer Risk MTCA Eq. 745-5 (1) unitless	Percent Contribution to the Total Cancer Risk percent	Cancer Risk Exceedances (2)		
Petroleum EC Fraction						Measured TPH Soil Conc, mg/kg = 524.83 Cancer Risk = 1.7E-08 <i>Below Target Risk</i> <i>Note for Carcinogens:</i> Known or suspected carcinogenic chemicals that contribute to unacceptable risk within the petroleum mixture as calculated herein are evaluated separately and must meet compliance with soil cleanup standards both on an individual basis (i.e., not to exceed a 1E-05 risk under Method C), and when accounting for cumulative risk from multiple chemicals and pathways at the site (not to exceed a risk of 1E-05). MTCA Equation 745-5 is used to evaluate cancer risk for carcinogens within the petroleum mixture.
AL_EC >5-6	18.8					
AL_EC >6-8	88					
AL_EC >8-10	60					
AL_EC >10-12	60					
AL_EC >12-16	21					
AL_EC >16-21	15					
AL_EC >21-34	13					
AR_EC >8-10	73.3					
AR_EC >10-12	58.78					
AR_EC >12-16	57.24					
AR_EC >16-21	6					
AR_EC >21-34	6					
Benzene	0.73	5.4E-09	31.6%		1400	
Toluene	14					
Ethylbenzene	4.3					
Total Xylenes	22.4					
Naphthalene	0.22					
1-Methyl Naphthalene	0.3	5.0E-09	29.5%		600	
2-Methyl Naphthalene	0.46					
n-Hexane	5.2					
MTBE	0.0185	4.5E-12	0.0%		41000	
Ethylene Dibromide (EDB)	0.0043	1.6E-09	9.3%		27	
1,2 Dichloroethane (EDC)	0.0055	9.2E-11	0.5%		600	
Benzo(a)anthracene	0.01					
Benzo(b)fluoranthene	0.01					
Benzo(k)fluoranthene	0.01					
Benzo(a)pyrene	0.01				30	
Chrysene	0.01					
Dibenz(a,h)anthracene	0.01					
Indeno(1,2,3-cd)pyrene	0.01					
cPAH TEQ (using TEFs) (3)	0.015	5.0E-09	29.1%			
Sum	524.8283	1.7E-08	100%	≤ 1E-05		

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equation 745-5 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures*. Revised July 2023.

(2) Cancer risks greater than 1E-05 exceed the Method C target risk goal. See note under the "Cancer Risk - Current Sample" box that describes MTCA's regulatory requirements for evaluating known or suspected carcinogens within the petroleum mixture.

(3) The "cPAH TEQ" concentration is derived using the toxicity equivalent factor (TEF) approach outlined in Ecology's Implementation Memorandum No. 10 (see weblink below). This concentration represents the total toxic equivalent (TEQ) concentration for the cPAH mixture, and is compared to the cleanup level for benzo(a)pyrene. cPAH = Carcinogenic Polycyclic Aromatic Hydrocarbons.

[Link to Ecology Implementation Memo 10](#)

A4 Soil Cleanup Levels: Summary of Results. Refer to WAC 173-340-720, 740, 745, 747**Date:** 11/04/24**Site Name:** Marathon OWS AOC-2**Sample Name:** AOC2-SB2-6.5-7ft**Measured Soil TPH Concentration, mg/kg:** 524.83**Summary of Calculation Results**

Exposure Pathway	Method/Goal	Protective TPH Conc (mg/kg)	With Measured Soil Conc	
			HI or Risk	Pass or Fail
<u>Soil Direct Contact</u> Protection of Soil Incidental Ingestion and Dermal Contact: Human Health	Method B: Unrestricted Land Use			
	TPH Soil Cleanup Level (@ HI = 1)	960	5.5E-01	Pass
	Cancer Risk (1)		1.8E-07	Pass
	Method C: Industrial Land Use			
	TPH Soil Cleanup Level (@ HI = 1)	19,000	2.8E-02	Pass
	Cancer Risk (1)		1.7E-08	Pass
<u>Soil Leaching</u> Protection of Groundwater Quality	Soil Concentration Protective of Target TPH Groundwater Concentration			
	Protective TPH Soil Concentration, mg/kg =	28	---	Fail
	Target TPH Groundwater Concentration (µg/L)			
	500	Method A Potable Groundwater		
Remark:	Petroleum fractionated data (EPH/VPH) and individual compounds tested in groundwater generated a Method B potable drinking water cleanup level of 340 µg/L (see Worksheet B2.1A). This level is below the most restrictive default Method A value of 500 µg/L. As a result, the Method A default potable groundwater cleanup level of 500 µg/L is selected as the target groundwater concentration to develop a TPH concentration in soil that is protective of potable groundwater.			

Notes:

(1) Known or suspected carcinogenic chemicals that contribute to unacceptable cancer risk within the petroleum mixture are evaluated separately and must meet compliance with soil cleanup standards both on an individual basis and when accounting for cumulative risk from multiple chemicals and pathways at the site. *See Worksheets: A2.1B and A3.1B (Soil Direct Contact); B2.1B (Potable Water Ingestion).*

Terrestrial Ecological Pathway: Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (see WAC 173-340-7490 through ~7494).

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry**1. Enter Site Information**

Date: 11/04/24
 Site Name: Marathon OWS AOC-2
 Sample Name: AOC2-SB4-10-10.5ft

Enter Site Data in Non-
shaded (white) Cells

2. Enter Soil Concentration Measured

Chemical or Petroleum Fraction	Measured Soil Conc mg/kg	Composition Ratio %
AL_EC >5-6	4.2	2.2%
AL_EC >6-8	19	10.0%
AL_EC >8-10	18	9.5%
AL_EC >10-12	23	12.2%
AL_EC >12-16	6	3.2%
AL_EC >16-21	6	3.2%
AL_EC >21-34	6	3.2%
AR_EC >8-10	29.1	15.4%
AR_EC >10-12	20.89	11.0%
AR_EC >12-16	18.821	10.0%
AR_EC >16-21	6	3.2%
AR_EC >21-34	6	3.2%
Benzene	0.66	0.3%
Toluene	9.8	5.2%
Ethylbenzene	2.6	1.4%
Total Xylenes	11.3	6.0%
Naphthalene	0.11	0.1%
1-Methyl Naphthalene	0.069	0.0%
2-Methyl Naphthalene	0.11	0.1%
n-Hexane	1.3	0.7%
MTBE	0.019	0.0%
Ethylene Dibromide (EDB)	0.00435	0.0%
1,2 Dichloroethane (EDC)	0.0055	0.0%
Benzo(a)anthracene	0.01	0.0%
Benzo(b)fluoranthene	0.01	0.0%
Benzo(k)fluoranthene	0.01	0.0%
Benzo(a)pyrene	0.01	0.0%
Chrysene	0.01	0.0%
Dibenz(a,h)anthracene	0.01	0.0%
Indeno(1,2,3-cd)pyrene	0.01	0.0%
	189.05885	100%

Clear Soil
Data

REMARK:
Enter site specific information here.....

3. Enter Site-Specific Hydrogeological Data (MTCA defaults are provided for unsaturated soil)

Total soil porosity (n): 0.43 Unitless
 Volumetric water content (θ_w): 0.3 Unitless
 Volumetric air content (θ_a): 0.13 Unitless (calculated) $\rightarrow \theta_a = n - \theta_w$
 Soil bulk density (ρ_b): 1.5 kg/L
 Fraction Organic Carbon (f_{oc}): 0.001 Unitless
 Dilution Factor (DF): 20 Unitless

Reset Hydro
Defaults

4. Enter Target TPH Groundwater Concentration ($\mu\text{g/L}$)

Enter value here: 500 $\mu\text{g/L}$ (see worksheet B2_Groundwater Meth B)

Reset Target TPH
GW Conc
Information

Basis: Method A Potable Groundwater

Remark: Petroleum fractionated data (EPH/VPH) and individual compounds tested in groundwater generated a Method B potable drinking water cleanup level of 340 $\mu\text{g/L}$ (see Worksheet B2.1A). This level is below the most restrictive default Method A value of 500 $\mu\text{g/L}$. As a result, the Method A default potable groundwater cleanup level of 500 $\mu\text{g/L}$ is selected as the target groundwater concentration to develop a TPH concentration in soil that is protective of potable groundwater.

A2.1A Worksheet for Calculating TPH Soil Cleanup Levels (based on noncancer effects) for Protection of Human Health: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact
Method B: Unrestricted Land Use (WAC 173-340-740)

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-SB4-10-10.5ft

**Soil Method B
(noncancer)**

Chemical of Concern or EC group	Measured Sample Concentration					DIRECT CONTACT - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Noncancer Hazards			Noncancer-based Concentration @ HQ 1	
		Noncancer HQ MTCA Eq. 740-4 (1)	Percent Contribution to the Total HI	Noncancer Exceedances (2)		
	mg/kg	unitless	percent		mg/kg	
<u>Petroleum EC Fraction</u>						Measured TPH Soil Conc, mg/kg = 189.06
AL_EC >5-6	4.2	1.14E-02	7.2%			HI = 1.6E-01 Pass
AL_EC >6-8	19	5.14E-02	32.7%			MTCA Eq. 740-3 (1)
AL_EC >8-10	18	2.44E-02	15.5%			TPH Cleanup Level (mg/kg) (HI = 1) = 1203.14
AL_EC >10-12	23	3.11E-02	19.8%			2 Significant Figures = 1200
AL_EC >12-16	6	8.12E-03	5.2%			The overall TPH Method B direct contact protective cleanup level is based on a noncancer HI of 1. See WAC 173-340-740(3)(b)(iii)(B)(III). The TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0.
AL_EC >16-21	6	2.71E-05	0.0%			
AL_EC >21-34	6	2.71E-05	0.0%			
AR_EC >8-10	29.1	3.94E-03	2.5%			
AR_EC >10-12	20.89	1.41E-02	9.0%			
AR_EC >12-16	18.821	6.78E-04	0.4%			
AR_EC >16-21	6	3.60E-03	2.3%			
AR_EC >21-34	6	2.70E-03	1.7%			
Benzene	0.66	2.06E-03	1.3%		320	
Toluene	9.8	1.63E-03	1.0%		6,000	
Ethylbenzene	2.6	3.48E-04	0.2%		7,500	
Total Xylenes	11.3	7.57E-04	0.5%		15,000	
Naphthalene	0.11	9.08E-05	0.1%		1,200	
1-Methyl Naphthalene	0.069	1.63E-05	0.0%		4,200	
2-Methyl Naphthalene	0.11	4.54E-04	0.3%		240	
n-Hexane	1.3	2.71E-04	0.2%		4,800	
MTBE	0.019					
Ethylene Dibromide (EDB)	0.00435	6.54E-06	0.0%		670	
1,2 Dichloroethane (EDC)	0.0055	1.24E-05	0.0%		440	
Benzo(a)anthracene	0.01	<i>see Note (3)</i>				
Benzo(b)fluoranthene	0.01					
Benzo(k)fluoranthene	0.01					
Benzo(a)pyrene	0.01					
Chrysene	0.01					
Dibenz(a,h)anthracene	0.01					
Indeno(1,2,3-cd)pyrene	0.01					
Sum	189.05885	1.57E-01	100%	HI ≤ 1		

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equations 740-3 and -4 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures. Revised July 2023.*

(2) Noncancer results for the petroleum mixture that exceed a hazard index (HI) of 1 "Fail" compliance with Method B cleanup requirements and are not sufficiently protective. Note that the TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0.

(3) Benzo(a)pyrene has an oral RfD in EPA's IRIS database; however, since it's not sufficiently volatile, it's not included in the noncancer HI and the overall TPH cleanup level (173-340-740(3)(b)(iii)(B)(III)). cPAHs are accounted for in the cancer risk calculations (see worksheet A2.1B).

A2.1B Worksheet for Calculating Cancer Risks Associated with the Petroleum Mixture: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact**Method B: Unrestricted Land Use (WAC 173-340-740)**

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-SB4-10-10.5ft

**Soil Method B
(Cancer)**

Chemical of Concern or EC group	Measured Sample Concentration					CANCER RISK - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Cancer Risk				Measured TPH Soil Conc, mg/kg = 189.06
		Cancer Risk MTCA Eq. 740-5 (1)	Percent Contribution to the Total Cancer Risk	Cancer Risk Exceedances (2)	Cancer-based Concentration @ 1E-06 Risk	
	mg/kg	unitless	percent		mg/kg	
Petroleum EC Fraction						Cancer Risk = 1.6E-07 <i>Below Target Risk</i>
AL_EC >5-6	4.2					Note for Carcinogens: Known or suspected carcinogenic chemicals that contribute to unacceptable risk within the petroleum mixture as calculated herein <u>are evaluated separately</u> and must meet compliance with soil cleanup standards both on an individual basis (i.e., not to exceed a 1E-06 risk under Method B), and when accounting for cumulative risk from multiple chemicals and pathways at the site (not to exceed a risk of 1E-05). MTCA Equation 740-5 is used to evaluate cancer risk for carcinogens within the petroleum mixture.
AL_EC >6-8	19					
AL_EC >8-10	18					
AL_EC >10-12	23					
AL_EC >12-16	6					
AL_EC >16-21	6					
AL_EC >21-34	6					
AR_EC >8-10	29.1					
AR_EC >10-12	20.89					
AR_EC >12-16	18.821					
AR_EC >16-21	6					
AR_EC >21-34	6					
Benzene	0.66	3.6E-08	23.1%		18	
Toluene	9.8					
Ethylbenzene	2.6					
Total Xylenes	11.3					
Naphthalene	0.11					
1-Methyl Naphthalene	0.069	4.6E-09	3.0%		15	
2-Methyl Naphthalene	0.11					
n-Hexane	1.3					
MTBE	0.019	3.4E-11	0.0%		550	
Ethylene Dibromide (EDB)	0.00435	9.4E-09	6.0%		0.46	
1,2 Dichloroethane (EDC)	0.0055	5.4E-10	0.3%		10	
Benzo(a)anthracene	0.01					0.14
Benzo(b)fluoranthene	0.01					
Benzo(k)fluoranthene	0.01					
Benzo(a)pyrene	0.01					
Chrysene	0.01					
Dibenz(a,h)anthracene	0.01					
Indeno(1,2,3-cd)pyrene	0.01					
cPAH TEQ (using TEFs) (3), (4)	0.015	1.1E-07	67.6%			
Sum	189.05885	1.6E-07	100%	≤ 1E-05		

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equation 740-5 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures*. Revised July 2023.

(2) Cancer risks greater than 1E-06 exceed the Method B target risk goal. Also see "Note for Carcinogens" under the "Cancer Risk - Current Sample" box that describes MTCA's regulatory requirements for evaluating known or suspected carcinogens within the petroleum mixture.

(3) The "cPAH TEQ" concentration is derived using the toxicity equivalent factor (TEF) approach outlined in Ecology's Implementation Memorandum No. 10 (see weblink below). This concentration represents the total toxic equivalent (TEQ) concentration for the cPAH mixture, and is compared to the cleanup level for benzo(a)pyrene. cPAH = Carcinogenic Polycyclic Aromatic Hydrocarbons.

(4) cPAHs have a documented mutagenic mode of action and pose an increased risk to children. Therefore, Method B cancer risk calculations for cPAHs incorporate early-life exposure (ELE) adjustments using age-dependent adjustment factors (ADAFs). See Ecology's CLARC PAH guidance titled: *Polycyclic Aromatic Hydrocarbons and Benzo[a]pyrene: Changes to MTCA default cleanup levels for 2017 (Revised July 2021)*. See CLARC PAH weblink below.

[Link to Ecology Implementation Memo 10](#)
[Link to CLARC PAH Guidance](#)

A2.2 Worksheet for Calculating Soil Cleanup Level for the Protection of Groundwater Quality: Leaching Pathway
WAC 173-340-740 and 747

Date: 11/04/24 Site Name: Marathon OWS AOC-2 Sample Name: AOC2-SB4-10-10.5ft				Site-Specific Hydrogeological Properties previously entered:			
				Item	Symbol	Value	Units
				Total soil porosity:	n	0.43	unitless
				Volumetric water content:	Q_w	0.3	unitless
				Volumetric air content:	Q_a	0.13	unitless
				Soil bulk density measured:	ρ_b	1.5	kg/L
				Fraction Organic Carbon:	f_{oc}	0.001	unitless
				Dilution Factor:	DF	20	unitless
Chemical of Concern or EC Group				Measured Soil Conc @dry basis	Soil Leaching Pathway Results		
					Soil Conc being tested (1)	Predicted Conc @Well	
				mg/kg	mg/kg	µg/L	
Petroleum EC Fraction				Target TPH Groundwater Concentration			
AL_EC >5-6				4.2	4.82E-01	6.03E+00	
AL_EC >6-8				19	2.18E+00	1.15E+01	
AL_EC >8-10				18	2.07E+00	1.85E+00	
AL_EC >10-12				23	2.64E+00	2.49E-01	
AL_EC >12-16				6	6.89E-01	1.61E-03	
AL_EC >16-21				6	6.89E-01	1.55E-06	
AL_EC >21-34				6	6.89E-01	2.12E-11	
AR_EC >8-10				29.1	3.34E+00	8.63E+01	
AR_EC >10-12				20.89	2.40E+00	3.95E+01	
AR_EC >12-16				18.821	2.16E+00	1.59E+01	
AR_EC >16-21				6	6.89E-01	8.91E-01	
AR_EC >21-34				6	6.89E-01	1.47E-02	
Benzene				0.66	7.57E-02	1.37E+01	
Toluene				9.8	1.12E+00	1.55E+02	
Ethylbenzene				2.6	2.98E-01	3.27E+01	
Total Xylenes				11.3	1.30E+00	1.34E+02	
Naphthalene				0.11	1.26E-02	3.84E-01	
1-Methyl Naphthalene				0.069	7.92E-03	1.29E-01	
2-Methyl Naphthalene				0.11	1.26E-02	2.08E-01	
n-Hexane				1.3	1.49E-01	9.29E-01	
MTBE				0.019	2.18E-03	5.14E-01	
Ethylene Dibromide (EDB)				0.00435	4.99E-04	9.24E-02	
1,2 Dichloroethane (EDC)				0.0055	6.31E-04	1.31E-01	
Benzo(a)anthracene							
Benzo(b)fluoranthene							
Benzo(k)fluoranthene							
Benzo(a)pyrene							
Chrysene							
Dibenz(a,h)anthracene							
Indeno(1,2,3-cd)pyrene							
Sum				188.98885	2.17E+01	5.00E+02	
				Calculate a Soil Concentration that is Protective of the Target TPH Groundwater Concentration			
				Click the button below to run Soil Leaching calculations. Note: a target TPH Groundwater Conc must be entered in Worksheet A1_Soil Data Entry to run the soil leaching calculation.			
				Calculate Soil Leaching Cleanup Level			
				Model Results			
				Soil Leaching Criterion: Protection of Target TPH Groundwater Concentration			
				Protective TPH Soil Concentration, mg/kg = 21.69 @ 2 sig figures 22 TPH GW Concentration, ug/L = 5.00E+02 @ 2 sig figures 500 Soil Leaching Pass or Fail? Fail			
				Additional Model Details			
				Type of model used for computation: 3-Phase Model Computation completed? Yes!			
				100% NAPL, mg/kg 72050.2 Mass Distribution Pattern @ 4-phase in soil pore system: Total Mass distributed in Water Phase: 9.22% in Solid: 53.70% Total Mass distributed in Air Phase: 8.73% in NAPL: 28.34%			

Notes:

(1) These are the soil leaching concentrations calculated by the 3- or 4-phase equilibrium partitioning models. These modelled concentrations are predicted to be protective of the target TPH groundwater concentration.

(2) Individual cPAHs are not included in the soil leaching calculations to predict a total TPH concentration protective of potable groundwater. Compliance with cPAHs in soil for the protection of groundwater is determined separately using the 3-phase partitioning model - see Ecology Implementation Memo No. 10 - Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) Using Toxicity Equivalency Factors (TEFs) (April 20, 2015). See [weblink](#) below.

A3.1A Worksheet for Calculating TPH Soil Cleanup Levels (based on noncancer effects) for Protection of Human Health: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact
Method C: Industrial Land Use (WAC 173-340-745)

Date: 11/04/24

Site Name: Marathon OWS AOC-2

Sample Name: AOC2-SB4-10-10.5ft

**Soil Method C
(noncancer)**

Chemical of Concern or EC group	Measured Sample Concentration					DIRECT CONTACT - MEASURED SAMPLE CONCENTRATION
	Measured Soil Conc @dry basis	Noncancer Hazards			Noncancer-based Concentration @ HQ 1	Measured TPH Soil Conc, mg/kg = 189.06
		Noncancer HQ MTCA Eq. 745-4 (1)	Percent Contribution to the Total HI	Noncancer Exceedances (2)		
		unitless	percent			HI = 8.2E-03 Pass
						MTCA Eq. 745-3 (1)
						TPH Cleanup Level (mg/kg) (HI = 1) = 23071.30
						2 Significant Figures = 23000
<u>Petroleum EC Fraction</u>						The overall TPH Method C direct contact protective cleanup level is based on a noncancer HI of 1. See WAC 173-340-745(5)(b)(iii)(B)(III). The TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0. <i>To assess the vapor pathway for petroleum mixtures, see Ecology's Guidance for Evaluating Soil VI in WA State (click on this link).</i>
AL_EC >5-6	4.2	5.78E-04	7.0%			
AL_EC >6-8	19	2.61E-03	31.9%			
AL_EC >8-10	18	1.24E-03	15.1%			
AL_EC >10-12	23	1.58E-03	19.3%			
AL_EC >12-16	6	4.13E-04	5.0%			
AL_EC >16-21	6	1.38E-06	0.0%			
AL_EC >21-34	6	1.38E-06	0.0%			
AR_EC >8-10	29.1	2.00E-04	2.4%			
AR_EC >10-12	20.89	7.18E-04	8.8%			
AR_EC >12-16	18.821	5.65E-05	0.7%			
AR_EC >16-21	6	3.00E-04	3.7%			
AR_EC >21-34	6	2.25E-04	2.7%			
Benzene	0.66	8.29E-05	1.0%		8,000	
Toluene	9.8	7.96E-05	1.0%		120,000	
Ethylbenzene	2.6	1.72E-05	0.2%		150,000	
Total Xylenes	11.3	3.75E-05	0.5%		300,000	
Naphthalene	0.11	6.77E-06	0.1%		16,000	
1-Methyl Naphthalene	0.069	1.21E-06	0.0%		57,000	
2-Methyl Naphthalene	0.11	3.38E-05	0.4%		3,300	
n-Hexane	1.3	1.09E-05	0.1%		120,000	
MTBE	0.019					
Ethylene Dibromide (EDB)	0.00435	3.32E-07	0.0%		13,000	
1,2 Dichloroethane (EDC)	0.0055	6.30E-07	0.0%		8,700	
Benzo(a)anthracene	0.01	see Note (3)				
Benzo(b)fluoranthene	0.01					
Benzo(k)fluoranthene	0.01					
Benzo(a)pyrene	0.01					
Chrysene	0.01					
Dibenz(a,h)anthracene	0.01					
Indeno(1,2,3-cd)pyrene	0.01					
Sum	189.05885	8.19E-03	100%	HI ≤ 1		

Notes:

(1) Default exposure assumptions provided in the MTCA Rule for Equations 745-3 and -4 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: *Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures. Revised July 2023.*

(2) Noncancer results for the petroleum mixture that exceed a hazard index (HI) of 1 "Fail" compliance with Method C cleanup requirements and are not sufficiently protective. Note that the TPH Cleanup Level at 2 significant figures is considered to be sufficiently protective even though in some cases it may slightly exceed an HI of 1.0.

(3) Benzo(a)pyrene has an oral RfD in EPA's IRIS; however, since it's not sufficiently volatile, it's not included in the noncancer HI and the overall TPH cleanup level (173-340-745(5)(b)(iii)(B)(III)). cPAHs are accounted for in the cancer risk calculations (see worksheet A3.1B).

A3.1B Worksheet for Calculating Cancer Risks Associated with the Petroleum Mixture: Soil Direct Contact Pathway - Exposure via Combined Incidental Soil Ingestion and Dermal Contact					
Method C: Industrial Land Use (WAC 173-340-745)					
Date: 11/04/24 Site Name: Marathon OWS AOC-2 Sample Name: AOC2-SB4-10-10.5ft					Soil Method C (Cancer)
Chemical of Concern or EC group	Measured Sample Concentration				
	Measured Soil Conc @dry basis	Cancer Risk			
		Cancer Risk MTCA Eq. 745-5 (1)	Percent Contribution to the Total Cancer Risk	Cancer Risk Exceedances (2)	Cancer-based Concentration @ 1E-06 Risk
	mg/kg	unitless	percent		mg/kg
Petroleum EC Fraction					
AL_EC >5-6	4.2				
AL_EC >6-8	19				
AL_EC >8-10	18				
AL_EC >10-12	23				
AL_EC >12-16	6				
AL_EC >16-21	6				
AL_EC >21-34	6				
AR_EC >8-10	29.1				
AR_EC >10-12	20.89				
AR_EC >12-16	18.821				
AR_EC >16-21	6				
AR_EC >21-34	6				
Benzene	0.66	4.9E-09	38.4%		1400
Toluene	9.8				
Ethylbenzene	2.6				
Total Xylenes	11.3				
Naphthalene	0.11				
1-Methyl Naphthalene	0.069	1.2E-09	9.1%		600
2-Methyl Naphthalene	0.11				
n-Hexane	1.3				
MTBE	0.019	4.6E-12	0.0%		41000
Ethylene Dibromide (EDB)	0.00435	1.6E-09	12.6%		27
1,2 Dichloroethane (EDC)	0.0055	9.2E-11	0.7%		600
Benzo(a)anthracene	0.01				
Benzo(b)fluoranthene	0.01				
Benzo(k)fluoranthene	0.01				
Benzo(a)pyrene	0.01				30
Chrysene	0.01				
Dibenz(a,h)anthracene	0.01				
Indeno(1,2,3-cd)pyrene	0.01				
cPAH TEQ (using TEFs) (3)	0.015	5.0E-09	39.1%		
Sum	189.05885	1.3E-08	100%	≤ 1E-05	
Notes: (1) Default exposure assumptions provided in the MTCA Rule for Equation 745-5 were used in combination with the values provided in the Chemical Database worksheet. Supporting information for the Chemical Database is contained in Ecology's CLARC Guidance titled: <i>Toxicity Data and Physical/Chemical Properties for Petroleum Mixtures</i> . Revised July 2023. (2) Cancer risks greater than 1E-05 exceed the Method C target risk goal. See note under the "Cancer Risk - Current Sample" box that describes MTCA's regulatory requirements for evaluating known or suspected carcinogens within the petroleum mixture. (3) The "cPAH TEQ" concentration is derived using the toxicity equivalent factor (TEF) approach outlined in Ecology's Implementation Memorandum No. 10 (see weblink below). This concentration represents the total toxic equivalent (TEQ) concentration for the cPAH mixture, and is compared to the cleanup level for benzo(a)pyrene. cPAH = Carcinogenic Polycyclic Aromatic Hydrocarbons. Link to Ecology Implementation Memo 10					

A4 Soil Cleanup Levels: Summary of Results. Refer to WAC 173-340-720, 740, 745, 747**Date:** 11/04/24**Site Name:** Marathon OWS AOC-2**Sample Name:** AOC2-SB4-10-10.5ft**Measured Soil TPH Concentration, mg/kg:** 189.06**Summary of Calculation Results**

Exposure Pathway	Method/Goal	Protective TPH Conc (mg/kg)	With Measured Soil Conc	
			HI or Risk	Pass or Fail
<u>Soil Direct Contact</u> Protection of Soil Incidental Ingestion and Dermal Contact: Human Health	Method B: Unrestricted Land Use			
	TPH Soil Cleanup Level (@ HI = 1)	1,200	1.6E-01	Pass
	Cancer Risk (1)		1.6E-07	Pass
	Method C: Industrial Land Use			
	TPH Soil Cleanup Level (@ HI = 1)	23,000	8.2E-03	Pass
	Cancer Risk (1)		1.3E-08	Pass
<u>Soil Leaching</u> Protection of Groundwater Quality	Soil Concentration Protective of Target TPH Groundwater Concentration			
	Protective TPH Soil Concentration, mg/kg =	22	---	Fail
	Target TPH Groundwater Concentration (µg/L)			
	500	Method A Potable Groundwater		
Remark:	Petroleum fractionated data (EPH/VPH) and individual compounds tested in groundwater generated a Method B potable drinking water cleanup level of 340 µg/L (see Worksheet B2.1A). This level is below the most restrictive default Method A value of 500 µg/L. As a result, the Method A default potable groundwater cleanup level of 500 µg/L is selected as the target groundwater concentration to develop a TPH concentration in soil that is protective of potable groundwater.			

Notes:

(1) Known or suspected carcinogenic chemicals that contribute to unacceptable cancer risk within the petroleum mixture are evaluated separately and must meet compliance with soil cleanup standards both on an individual basis and when accounting for cumulative risk from multiple chemicals and pathways at the site. See [Worksheets: A2.1B and A3.1B \(Soil Direct Contact\)](#); [B2.1B \(Potable Water Ingestion\)](#).

Terrestrial Ecological Pathway: Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (see WAC 173-340-7490 through ~7494).