

MEMORANDUM

To: Ron Paananen, HDR
Contract & Task Order: DA Deliverable 4.1.13
From: Joseph Sawdey, LG, LHG
Meg Strong, LG, LHG
Shannon & Wilson
Date: October 4, 2022
File Code:
Copies To: Robyn Boyd
Dave Becher
Margaret Kucharski

Subject: Groundwater Monitoring Memorandum – Quarter No. 2, Voluntary Cleanup Program NW3242, Montlake Gas Station, Seattle, Washington

Background

In 2019, the Washington State Department of Transportation (WSDOT) entered the Former Montlake Gas Station property located in Seattle, Washington (site), into the Washington State Department of Ecology (Ecology) Voluntary Cleanup Program (VCP).

As part of the VCP application, Shannon & Wilson submitted a Remedial Investigation (RI) work plan and a subsequent RI report to Ecology, on behalf of WSDOT. The RI report included investigation data that was used to characterize the nature and extent of petroleum hydrocarbon contamination in soil and groundwater associated with historic fueling operations at the site (Shannon & Wilson, 2020).

In 2021, PBS Engineering and Environmental prepared and submitted to Ecology a Remedial Action Work Plan detailing the proposed remediation excavation activities (PBS, 2021a). In August and September 2021, PBS oversaw the closure and removal of the former gas station underground storage tanks and piping, as well as the excavation of the associated petroleum contaminated soil source zone (source zone), as documented in the Remedial Action Completion Plan (PBS, 2021b). Soil compliance has been achieved at the site as documented by confirmation sampling performed by PBS during the remedial excavation.

Groundwater compliance is currently being evaluated. On April 19 and 20, 2022, Shannon & Wilson installed additional compliance groundwater monitoring (CGM) wells at the site following Ecology recommendations (Shannon & Wilson, 2022a). The CGM well network

for the site consists of six monitoring wells: MW-2-19, MW-3-19, MW-6-22, MW-7-22, MW-8-22, and MW-9-22. The monitoring wells have been surveyed and locations are depicted in Exhibit 1. This memorandum presents the results of Quarter No. 2 CGM and documents the continued effect(s) of the source zone removal on site groundwater quality. Results of the Quarter No. 1 CGM have been presented previously under a separate cover (Shannon & Wilson, 2022b).

Quarter No. 2 Groundwater Monitoring Activities

Well Gauging

On August 16 and 17, 2022, Shannon & Wilson gauged each of the CGM wells to monitor for the presence of free product and to measure groundwater elevations. Measurable free product (0.01 foot thick) was encountered at MW-3-19. Measurable free product was not encountered at the other five CGM wells.

Groundwater Sampling

On August 16 and 17, 2022, Shannon & Wilson purged each of the CGM wells using a peristaltic pump with a flow-through cell and water quality meter to measure the following field parameters: temperature, oxidation-reduction potential, pH, conductivity, dissolved oxygen, turbidity, salinity, and total dissolved solids. Field parameters collected during purging of the CGM wells can be found in Attachment 1 – Groundwater Sampling Field Forms. As is common industry practice, groundwater from MW-3-19 was not purged or sampled because measurable free product was encountered in the well and groundwater contaminant concentrations can be assumed to be near or equal to the contaminant aqueous solubility limit.

Upon stabilization of the field parameters during well purging (indicating steady groundwater flow to the well), groundwater samples were collected from five CGM wells by discharging groundwater from the end of the peristaltic tubing into clean, laboratory-supplied containers. Collected groundwater samples were immediately put on ice and stored within an insulated cooler. Groundwater samples from each of the CGM wells, except for MW-3-19 as discussed above, were delivered to Onsite Environmental Inc., of Redmond, Washington, under standard chain-of-custody procedures and analyzed for:

- Gasoline-range petroleum hydrocarbons using Ecology’s Northwest Total Petroleum Hydrocarbon (NWTPH)-Gasoline Extended Method;
- Benzene, toluene, ethylbenzene, and xylene (BTEX) by U.S. Environmental Protection Agency (EPA) 8260 Method;
- Diesel- and oil-range petroleum hydrocarbons using Ecology’s NWTPH-Diesel Extended Method; and
- Total and dissolved arsenic by EPA Method 200.8.

For complete details on the groundwater sampling methodology, refer to the Sample Collection and Chemical Testing sections of the Work Plan (Shannon & Wilson, 2019).

Quarter No. 2 Results and Interpretation

Groundwater Elevation and Flow Directions

Measured groundwater elevations are reported in Exhibit 2 and displayed in Exhibit 1. Groundwater elevations in North American Vertical Datum (of 1988) during August 2022 ranged from as low as 41.6 feet (MW-3-19) to as high as 48.7 feet above mean sea level (MW-2-19). Using the measured groundwater elevations, a groundwater potentiometric surface was interpolated with associated groundwater flow directions inferred to occur perpendicular to the equipotentials comprising the potentiometric surface (see Exhibit 1). Note that, due to the presence of free product in MW-3-19, we excluded the groundwater elevation measurements from that well when creating the potentiometric surface. Further, the groundwater elevation measured at MW-3-19 is significantly lower compared to the other CGM wells (see Exhibit 1) and the much lower groundwater elevation at MW-3-19 is suggestive of hydraulic isolation from the more uniform groundwater flow regime encountered across the former Gas Station property.

The groundwater setting at the site observed during Quarter No. 2 is consistent with that observed during the RI and Quarter No. 1 (Shannon & Wilson, 2020 and 2022b). In general, groundwater elevations measured in Quarter No. 2 were lower by approximately 1 to 2 feet compared to groundwater elevations measured during Quarter 1. Lower groundwater elevations were expected because seasonally, the groundwater elevations in the vicinity tend to be highest from March through May (end of wet season) and decrease throughout the summer (dry season). In MW-3-19, groundwater elevation only decreased 0.2 feet between Quarter No. 1 and Quarter No. 2 of groundwater monitoring (May to August 2022). This relatively low fluctuation of groundwater elevation is further suggesting of a groundwater flow regime in the vicinity of MW-3-19 that is somewhat hydraulically isolated from the other CGM wells.

The estimated groundwater flow direction for Quarter No. 2 is uniformly to the northeast, consistent with the Quarter No. 1 and RI findings. The northwesterly component documented in previous reports is not depicted due to exclusion of MW-3-19 as a potentiometric surface interpolation point.

Groundwater Sampling Results

The laboratory analytical results for collected groundwater samples are summarized in Exhibit 3. The laboratory report is included as Attachment 2. Exhibit 1 indicates which monitoring wells had groundwater sample contaminant concentrations that exceed applicable Cleanup Levels (CULs) during the August 2022 sampling event.

Groundwater Sampling Interpretation

Gasoline-range petroleum hydrocarbons and BTEX are the primary contaminants of concern for the site. During this quarter of groundwater sampling, none of the five wells sampled within the CGM well network had detections of gasoline or BTEX in the groundwater samples. Because groundwater contaminant concentrations collected during Quarter No. 2 from the five CGM wells were below applicable CULs for the primary contaminants (gasoline and BTEX), these five wells document groundwater quality improvement following the remedial excavation.

Lube oil-range hydrocarbons were detected above laboratory reporting limits but below MTCA cleanup levels in four of the five sampled monitoring wells (MW-2-19, MW-6-22, MW-7-22, and MW-8-22). Lube oil-range hydrocarbons were non-detect at the laboratory reporting method in MW-9-22.

Diesel-range petroleum hydrocarbons were detected above the CUL in one well, MW-9-22. Diesel-range petroleum hydrocarbons were previously below the laboratory reporting limit during Quarter No. 1. This increase in diesel concentrations in groundwater suggests that there may be residual diesel associated with the nearby sewer main trench that may be migrating into the recently placed remediation excavation backfill.

Free product was observed in one well, MW-3-19. The free product observed in MW-3-19 may be related to the observed degree of hydraulic isolation in the vicinity of MW-3-19, which would impact timing for the remedial action to manifest near the well.

We appreciate this opportunity to provide environmental services to you for this project. If you have questions regarding this letter, please contact the undersigned at (206) 632-8020.

Sincerely,

Shannon & Wilson



Joseph Sawdey, LG, LHG
Senior Hydrogeologist

Meg Strong, LG, LHG
Senior Consultant

JXS:CL:MJS/jxs:mrh

References

PBS Engineering and Environmental, 2021a, Remedial action plan, Montlake Gas Station, State Route 520 Montlake to Lake Washington Interchange and Bridge Replacement Project, Seattle, Washington: Report prepared by PBS, Seattle, Wash., project no. 41221.003, for Graham Contracting Ltd, Bellevue, Wash., March Seattle, Wash., March 2021.

PBS Engineering and Environmental, 2021b, Remedial action completion report, Montlake Gas Station, State Route 520 Montlake to Lake Washington Interchange and Bridge Replacement Project, Seattle, Washington: Report prepared by PBS, Seattle, Wash., 41221.003, for Graham Contracting Ltd., Bellevue, Wash., December.

Shannon & Wilson, 2019, Data gaps investigation work plan/sampling and analysis plan for Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Workplan prepared by Shannon & Wilson, Seattle, Wash., 21-1-22242-101, for Washington State Department of Transportation, July.

Shannon & Wilson, 2020, Remedial investigation report for Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Report prepared by Shannon & Wilson, Seattle, Wash., 21-1-22242-104, for Washington State Department of Transportation, 1 v., March.

Shannon & Wilson, 2022a, Compliance groundwater monitoring well installation exhibit for Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Exhibit prepared by Shannon & Wilson, Seattle, Wash., 21-1-22242-104, for Washington State Department of Transportation, May 2022.

Shannon & Wilson, 2022b, Groundwater monitoring memorandum – quarter no. 1, voluntary cleanup program NW3242, Montlake Gas Station, SR 520 Bridge Replacement and HOV Program, Seattle, Washington: Memorandum from Joseph Sawdey and Meg Strong, Shannon & Wilson, Seattle, Wash., 21-1-22242-104, to Ron Paananen, HDR, June 27.

Exhibits

Exhibit 1 – Groundwater Potentiometric Surface Map with Groundwater Elevation

Exhibit 2 – Groundwater Level Measurements

Exhibit 3 – Summary of Groundwater Analytical Results

Attachments

Attachment 1 – Groundwater Sampling Field Forms

Attachment 2 – Laboratory Report and Chain-of-Custody Form

Filename: C:\Users\cyh\CAD Group Dropbox\OpenRoads\21122242\104\comments\211-22242-104-FIG.dgn
12/28/23 PM 10/4/2022
Model: FIG 2



NOTES:

1. VERTICAL DATUM: NAVD 88
2. HORIZONTAL DATUM
WSDOT PROJECT DATUM
SR520 BRIDGE REPLACEMENT
MODIFIED NAD 83/91 4601 WA NORTH
3. POST CONSTRUCTION CONFIGURATION SHOWN AS: ———

LEGEND:

- MONITORING WELL WITH MEASURABLE FREE PRODUCT (AUGUST 2022)

PLAN
SCALE: 1" = 30'

LEGEND (CONTINUED):

- ▲ H-691p-16 DECOMMISSIONED WELL LOCATION AND DESIGNATION
- ⊕ MW-2-19 MONITORING WELL LOCATION AND DESIGNATION
- ⊕ MW-3-19 GROUNDWATER CONCENTRATIONS FROM THE WELL EXCEED APPLICABLE CLEANUP LEVELS
- 47--- INTERPOLATED GROUNDWATER ELEVATION (FEET, NAVD 88)
- INTERPOLATED GROUNDWATER FLOWLINE
- 49.8 GROUNDWATER ELEVATION AT MONITORING WELL (AUGUST 2022)

SR 520 Bridge Replacement and HOV Program
SR 520 I-5 to Montlake -I/C and Bridge Replacement
Groundwater Monitoring Report-Quarter No.2

GROUNDWATER
POTENTIOMETRIC SURFACE MAP
WITH GROUNDWATER ELEVATION

OCTOBER 2022 21-1-22242-104

EXHIBIT 2
Groundwater Level Measurements

SR 520 Bridge Replacement and HOV Program
SR 520 I-5 to Montlake - I/C and Bridge Replacement
Groundwater Monitoring Memorandum - Quarter No. 2

Montlake Gas Station Monitoring Well	Screened Interval (feet bgs)	Surveyed Monitoring Well Elevation ¹ (feet)	TOC Elevation (feet)	Date	Depth to Water (feet below TOC)	Groundwater Elevation (feet)
MW-2-19	10 to 20	58.87	58.12	10/17/2019	10.1	48.0
MW-2-19	10 to 20	58.87	58.12	5/2/2022	8.3	49.8
MW-2-19	10 to 20	58.87	58.12	8/16/2022	9.4	48.7
MW-3-19	10 to 25	59.29	59.01	10/17/2019	17.4	41.6
MW-3-19	10 to 25	59.29	59.01	5/2/2022	17.3	41.8
MW-3-19	10 to 25	59.29	59.01	8/16/2022	17.4	41.6
MW-6-22	11 to 26	59.71	59.36	5/2/2022	12.2	47.2
MW-6-22	11 to 26	59.71	59.36	8/16/2022	13.9	45.5
MW-7-22	10.5 to 25.5	59.68	59.18	5/2/2022	12.1	47.1
MW-7-22	10.5 to 25.5	59.68	59.18	8/17/2022	13.8	45.4
MW-8-22	10.5 to 25.5	58.90	58.55	5/2/2022	11.3	47.2
MW-8-22	10.5 to 25.5	58.90	58.55	8/16/2022	13.0	45.6
MW-9-22	10 to 25	59.93	59.58	5/2/2022	12.4	47.2
MW-9-22	10 to 25	59.93	59.58	8/17/2022	14.1	45.5

NOTES:

¹ Monitoring well elevation was surveyed from the center of the well monument lid.
The reference vertical datum is the North American Vertical Datum (NAVD88) (feet).
bgs = below ground surface; TOC = top of casing

EXHIBIT 3
Summary of Groundwater Analytical Results

SR 520 Bridge Replacement and HOV Program
SR 520 I-5 to Montlake - I/C and Bridge Replacement
Groundwater Monitoring Memorandum - Quarter No. 2

Montlake Gas Station Monitoring Well:	MW-2-19			MW-3-19		MW-6-22		MW-7-22		MW-8-22				MW-9-22		Trip Blank		MTCA Method A CUL for Unrestricted Land Use
Sample Name:	MW-2-101719	MW-2-19:GW-05022022	MW-2-19:GW-081622	MW-3-101719	MW-3-19:GW-05022022	MW-6-22:GW-05022022	MW-6-22:GW-081622	MW-7-22:GW-05022022	MW-7-22:GW-081722	MW-8-22:GW-05022022	MW-100-22:GW-05022022	MW-8-22:GW-081622	MW-108-22:GW-081622	MW-9-22:GW-05022022	MW-9-22:GW-081722	TB-1-05022022	TB-1-081822	
Sample Date:	10/17/2019	5/2/2022	8/16/2022	10/17/2019	5/2/2022	5/2/2022	8/16/2022	5/2/2022	8/17/2022	5/2/2022	5/2/2022	8/16/2022	8/16/2022	5/2/2022	8/17/2022	5/2/2022	8/18/2022	
Petroleum Hydrocarbons (µg/L)																		
Gasoline Range Organics ¹	<100	<100	<100	1400	5800	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	1000/800*
Diesel Range Organics ²	<260	<180	<130	630	1300 M	210	<130	<170	<130	<170	<170	<130	<140	<160	1900	--	--	500
Lube Oil Range Organics ²	<420	<240	210	660	500	330	290	<230	250	<220	240	360	340	<220	<300	--	--	500
Volatile Organic Compounds (µg/L) ³																		
Benzene	<0.20	<0.20	<0.20	98	170	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	5.00
Toluene	<1.0	<1.0	<1.0	<4	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1000
Ethylbenzene	<0.20	<0.20	<0.20	24	190	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	700
m,p-Xylene	<0.40	<0.40	<0.40	9.3	220	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	1000†
o-Xylene	<0.20	<0.20	<0.20	1.1	3.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	1000†
Metals (µg/L) ⁴																		
Total Arsenic	<3.3	<3.3	<3.3	17	16	<3.3	6.3	<3.3	<3.3	<3.3	<3.3	6.6	6.5	<3.3	<3.3	--	--	20§
Dissolved Arsenic	<3.0	<3.0	<3.0	7.4	11	<3.0	4.5	<3.0	<3.0	<3.0	<3.0	3.8	4.3	<3.0	<3.0	--	--	20§

NOTES:
1 Gasoline-range petroleum hydrocarbons using Ecology's NWTPH-Gasoline Extended Method
2 Diesel- and oil-range petroleum hydrocarbons using Ecology's NWTPH-Diesel Extended Method
3 Volatile organic compounds by EPA Method 8260D
4 Total and dissolved arsenic by EPA Method 200.8
5 In August 2022, MW-3-19 had measurable free product and was not sampled.
Highlighted text indicates the analyte was detected above the MTCA Method A cleanup level.
Bold text indicates the analyte was detected above laboratory practical quantitation limit.
M flag indicates hydrocarbons in the gasoline range are impacting the diesel range result.
* Cleanup level (CUL) for gasoline-range organics is 1,000 micrograms (µg) without the presence of benzene and 800 µg with the presence of benzene.
† MTCA Method A CUL for total xylenes is used because a MTCA Method A CUL is not established for the isomers of m-, p-, or o-xylene.
§ Site specific CUL for arsenic (total and dissolved) based on statistical analysis of natural background levels of arsenic in groundwater.
-- = not analyzed; < = not detected above laboratory reporting limit; µg/L = micrograms per liter; CUL = cleanup level; EPA = U.S. Environmental Protection Agency; MTCA = Model Toxics Control Act; NWTPH = Northwest Total Petroleum Hydrocarbon

Attachment 1

Contents:

Groundwater Sampling Field Forms (5 Sheets)

WATER SAMPLING LOG

JOB NO. 21-1-22242-112
PAGE 1 OF 1

OWNER / LOCATION: Montlake 76 Gas Station DATE: 08/17/22
WELL NO: MW-7-22 SAMPLE NO: MW-7-22:6w-08/17/22 ECOLOGY TAG NO: BNV 408 DUPLICATE NO: _____
WEATHER: Sunny, 70's MS / MSD? Yes ☐ No ☐
WELL SITE CONDITIONS / MP DEFINITION: North TOC
(MP is typically the north PVC rim)

SAMPLING DATA

TIME STARTED: 9:05 LNAPL THICKNESS: _____ ft. Sample ☐
PID HEAD SPACE: _____ ppm DNAPL THICKNESS: _____ ft. Sample ☐
MP DISTANCE ABOVE / BELOW GROUND SURFACE: 0.51 ft.
TOTAL DEPTH OF WELL BELOW MP: 25.37 ft.
DTW BELOW MP: 13.78 ft.
WATER COLUMN IN WELL: 11.59 ft.
CASING DIAMETER: 2 in.
GALLONS PER FOOT: 0.16
GALLONS IN WELL: 1.85 x 3 = 5.55
TIME PURGING STARTED: 9:15

Number	Size	Type	Pres.
<u>5</u>	<u>0.5 nL</u>	<u>VOL</u>	<u>AC1</u>
<u>2</u>	<u>50 nL</u>	<u>Amber</u>	
<u>2</u>	<u>50 nL</u>	<u>poly</u>	<u>11/10/0</u>

FIELD PARAMETERS

GALLONS REMOVED	TEMP. (C°)	EH (mV)	pH	COND. (µmhos / cm)	D.O. (mg / L)	TURBIDITY (NTU)	SALINITY (ppt)	TDS (g / L)	COLOR	TIME
Initial	17.4	-53.5	6.78	714	1.81	2.45	0.35	0.4615	clear	9:15
0.5	16.9	-108.9	6.77	719	0.71	2.42	0.35	0.4680	clear	9:20
0.9	16.7	-137.4	6.97	721	0.60	2.47	0.35	0.4680	clear	9:25
1.3	16.5	-181.1	6.95	721	0.51	2.42	0.35	0.4680	clear	9:30
1.8	16.5	-205.7	6.99	717	0.47	13.9	0.35	0.4680	clear	9:35
2.4	16.7	-226.7	7.08	715	0.44	15.5	0.35	0.4615	clear	9:40
3.0	16.6	-244.6	7.17	713	0.40	11.9	0.35	0.4615	clear	9:45
3.5	16.7	-252.3	7.21	711	0.41	10.9	0.35	0.4615	clear	9:50
4.0	16.5	-260.6	7.23	711	0.40	8.74	0.35	0.4615	clear	9:55
After Sampling		Parameters	stable	Begin	Sampling @	10:00				

EVACUATION METHOD: peri pump
PUMP INTAKE DEPTH (if applicable): mid screen
PURGE WATER DISPOSITION (e.g., drum #): drum on site
WATER QUALITY (e.g., sheen, odor): No sheen or odor
WATER QUALITY METER(S) USED: YSI CALIBRATION DATE / TIME: _____
SAMPLING METHOD: EPA low flow SAMPLE TIME: 10:00
SAMPLING PERSONNEL: MEH DUPLICATE "TIME": _____
REMARKS (e.g., recovery rate): _____

TIME COMPLETED: 10:20

WELL CASING VOLUMES

Gal / ft 1-1/4" = 0.077 2" = 0.16 3" = 0.37 4" = 0.65
1-1/2" = 0.10 2-1/2" = 0.24 3-1/2" = 0.50 6" = 1.46

WATER SAMPLING LOG

JOB NO. 21-1-22242-112
PAGE 1 OF 1

OWNER / LOCATION: Martlake Gas Station DATE: 08/16/22
WELL NO: MW-2-19 SAMPLE NO: MW-2-19:GW-081622 ECOLOGY TAG NO: BLT 996 DUPLICATE NO: —
WEATHER: Sunny, 60's MS / MSD? Yes ☐ No ☒
WELL SITE CONDITIONS / MP DEFINITION: NTOC
(MP is typically the north PVC rim)

SAMPLING DATA

TIME STARTED: 10:41 LNAPL THICKNESS: 0 ft. Sample ☐
PID HEAD SPACE: _____ ppm DNAPL THICKNESS: _____ ft. Sample ☐
MP DISTANCE ABOVE / BELOW GROUND SURFACE: 0.79 ft.
TOTAL DEPTH OF WELL BELOW MP: 19.26 ft.
DTW BELOW MP: 9.40 ft. —
WATER COLUMN IN WELL: 9.86 ft.
CASING DIAMETER: 2 in.
GALLONS PER FOOT: 0.16
GALLONS IN WELL: 1.58 x 3 = 4.73
TIME PURGING STARTED: 10:41

Number	Size	Type	Pres.
5	0.5mL	VGA	HCI
2	50mL	Amber	
2	50mL	Poly	1/2 1/4

FIELD PARAMETERS

GALLONS REMOVED	TEMP. (C°)	Eh (mV)	pH	COND. (µmhos / cm)	D.O. (mg / L)	TURBIDITY (NTU)	SALINITY (%ppt)	TDS (g / L)	COLOR	TIME
Initial				MS						
0.5	17.7	-191.3	7.83	650	0.64		0.27	0.3601	Clear	10:46
1.0	17.6	-226.6	7.95	542.2	0.82		0.28	0.3517	Clear	10:51
1.1	18.2	-303.2	9.55	548.0	0.53	11.7	0.27	0.3555	Clear	10:56
1.5	17.7	-282.6	6.65	537.1	0.46	7.00	0.26	0.3503	Clear	11:01
2.0	17.6	-257.8	6.19	539.1	0.44	6.39	0.26	0.3510	Clear	11:06
2.3	17.6	-244.7	6.37	535.2	0.40	5.42	0.26	0.3490	Clear	11:11
2.5	17.5	-245.1	6.42	534.1	0.36	4.98	0.25	0.3478	Clear	11:16
										11:21
After Sampling										11:26

EVACUATION METHOD: Peri pump
PUMP INTAKE DEPTH (if applicable): mid screen
PURGE WATER DISPOSITION (e.g., drum #): Drum on site
WATER QUALITY (e.g., sheen, odor): NO sheen or odor
WATER QUALITY METER(S) USED; CALIBRATION DATE / TIME: YSI
SAMPLING METHOD: EPA low flow SAMPLE TIME: 11:20
SAMPLING PERSONNEL: MEN DUPLICATE "TIME": _____
REMARKS (e.g., recovery rate): * PH outside calibration range on YSI

WELL CASING VOLUMES

Gal / ft 1-1/4" = 0.077 2" = 0.16 3" = 0.37 4" = 0.65
1-1/2" = 0.10 2-1/2" = 0.24 3-1/2" = 0.50 6" = 1.46

TIME COMPLETED: 11:35

WATER SAMPLING LOG

JOB NO. 21-1-22242-112
PAGE 1 OF 1

OWNER / LOCATION: Mortlake Gas Station DATE: 08/16/22
WELL NO: MW-6-22 SAMPLE NO: MW-6-22.60-081622 ECOLOGY TAG NO: BNW 407 DUPLICATE NO: _____
WEATHER: Sunny, 80's MS / MSD? Yes ☐ No ☐
WELL SITE CONDITIONS / MP DEFINITION: North TOC
(MP is typically the north PVC rim)

SAMPLING DATA

TIME STARTED: 15:20 LNAPL THICKNESS: _____ ft. Sample ☐
PID HEAD SPACE: _____ ppm DNAPL THICKNESS: _____ ft. Sample ☐
MP DISTANCE ABOVE / BELOW GROUND SURFACE: 0.34 ft.
TOTAL DEPTH OF WELL BELOW MP: 25.98 ft.
DTW BELOW MP: 13.89 ft.
WATER COLUMN IN WELL: 12.07 ft.
CASING DIAMETER: 2 in.
GALLONS PER FOOT: 0.16
GALLONS IN WELL: 1.93 x3 = 5.79
TIME PURGING STARTED: 15:30

SAMPLE CONTAINERS			
Number	Size	Type	Pres.

FIELD PARAMETERS

GALLONS REMOVED	TEMP. (C°)	ORP (mV)	pH	COND. (umhos / cm)	D.O. (mg / L)	TURBIDITY (NTU)	SALINITY (ppt)	TDS (g / L)	COLOR	TIME
Initial	17.3	-48.4		75					Clear	15:30
										15:35
1.5	22.6	-281.5	7.27	649	1.00	3.12	0.32	0.4225	Clear	15:55
2.0	16.8	-284.3	7.02	645	0.43	2.40	0.32	0.4160	Clear	16:00
2.5	17.0	-227.8	7.09	645	0.76	2.48	0.31	0.4160	Clear	16:05
3.0	17.0	-247.5	7.45	651	0.56	14.6	0.32	0.4226	Clear	16:10
3.5	17.0	-274.5	7.83	655	0.44	8.40	0.32	0.4226	Clear	16:15
4.0	16.7	-295.3	7.04	657	0.35	7.61	0.32	0.4355	Clear	16:20
4.5	17.9	-262.6	7.73	640	3.20	2.01	0.34	0.4485	Clear	16:25
After Sampling										

EVACUATION METHOD: Peri pump
PUMP INTAKE DEPTH (if applicable): mid screen
PURGE WATER DISPOSITION (e.g., drum #): drum on site
WATER QUALITY (e.g., sheen, odor): Faint odor
WATER QUALITY METER(S) USED; CALIBRATION DATE / TIME: YSI
SAMPLING METHOD: EPA low flow SAMPLE TIME: 16:45
SAMPLING PERSONNEL: MEH DUPLICATE "TIME": _____
REMARKS (e.g., recovery rate): Heavy condensation on YSI → waited 25 min to purge again

WELL CASING VOLUMES

Gal / ft 1-1/4" = 0.077 2" = 0.16 3" = 0.37 4" = 0.65
1-1/2" = 0.10 2-1/2" = 0.24 3-1/2" = 0.50 6" = 1.46

TIME COMPLETED: 16:55

WATER SAMPLING LOG

JOB NO. 21-1-22242-112
PAGE 1 OF 1

OWNER / LOCATION: Montlake Gas Station
WELL NO: MW-8-22 SAMPLE NO: MW-8-22-GW-081622 ECOLOGY TAG NO: BNV 406
WEATHER: partly cloudy, 80's
WELL SITE CONDITIONS / MP DEFINITION: North TOC
(MP is typically the north PVC rim)

DATE: 08/16/22
DUPLICATE NO: MW-108-22-GW-081622
MS / MSD? Yes ☐ No ☐

SAMPLING DATA

TIME STARTED: 13:15
PID HEAD SPACE: _____ ppm
MP DISTANCE ABOVE / BELOW GROUND SURFACE: 0.31 ft.
TOTAL DEPTH OF WELL BELOW MP: 26.05 ft.
DTW BELOW MP: 12.99 ft.
WATER COLUMN IN WELL: 13.06 ft.
CASING DIAMETER: 2 in.
GALLONS PER FOOT: 0.16
GALLONS IN WELL: 2.09 $\times 3 = 6.27$
TIME PURGING STARTED: 13:25

LNAPL THICKNESS: 0 ft. Sample ☐

DNAPL THICKNESS: _____ ft. Sample ☐

SAMPLE CONTAINERS			
Number	Size	Type	Pres.

FIELD PARAMETERS

GALLONS REMOVED	TEMP. (C°)	E_h (mV)	pH	COND. ($\mu mhos/cm$)	D.O. (mg/L)	TURBIDITY (NTU)	SALINITY (%ppt)	TDS (g/L)	COLOR	TIME
Initial	23.6	202.6	7.65	728	12.02		0.00	0.0000	clear	13:25
0.5	18.4	202.6	7.65	728	0.68		0.36	0.4745	clear	13:30
1.3	17.9	215.7	7.76	726	0.49	32.1	0.36	0.4745	clear	13:35
1.8	17.5	231.4	7.95	725	0.37	31.9	0.36	0.4745	clear	13:40
2.3	17.0	241.4	7.01	718	0.34	19.7	0.35	0.4680	clear	13:45
2.8	17.0	268.9	7.15	717	0.79	13.2	0.36	0.4680	clear	13:50
3.3	16.8	274.4	7.25	717	0.48	14.9	0.36	0.4680	clear	13:55
3.8	16.8	281.6	7.31	717	0.38	16.2	0.35	0.4680	clear	14:00
4.3	16.9	321.5	7.45	710	0.34	11.9	0.36	0.4615	clear	14:05
After Sampling										14:

EVACUATION METHOD: peripump
PUMP INTAKE DEPTH (if applicable): mid screen
PURGE WATER DISPOSITION (e.g., drum #): Down on side
WATER QUALITY (e.g., sheen, odor): clear, faint odor
WATER QUALITY METER(S) USED; CALIBRATION DATE / TIME: YSI
SAMPLING METHOD: EPA low flow SAMPLE TIME: 14:35
SAMPLING PERSONNEL: MEH DUPLICATE "TIME": 14:25
REMARKS (e.g., recovery rate): _____

TIME COMPLETED: 15:10

WELL CASING VOLUMES

Gal / ft 1-1/4" = 0.077 2" = 0.16 3" = 0.37 4" = 0.65
1-1/2" = 0.10 2-1/2" = 0.24 3-1/2" = 0.50 6" = 1.46

WATER SAMPLING LOG

JOB NO. 21-1-22242-162

PAGE _____ OF _____

OWNER / LOCATION: Montlake Gas Station
WELL NO: MW-9-22 SAMPLE NO: MW-9-22:GW-081722 ECOLOGY TAG NO: BNV 409
WEATHER: Sunny, 70's
WELL SITE CONDITIONS / MP DEFINITION: North TOC
(MP is typically the north PVC rim)

DATE: 08/17/22
DUPLICATE NO: _____
MS / MSD? Yes ☐ No ☐

SAMPLING DATA

TIME STARTED: 10:40
PID HEAD SPACE: _____ ppm
MP DISTANCE ABOVE / BELOW GROUND SURFACE: 0.36 ft.
TOTAL DEPTH OF WELL BELOW MP: 25.15 ft.
DTW BELOW MP: 14.09 ft.
WATER COLUMN IN WELL: 11.06 ft.
CASING DIAMETER: 2 in.
GALLONS PER FOOT: 0.16
GALLONS IN WELL: 1.77 $\times 3 = 5.31$
TIME PURGING STARTED: 10:55 11:35

LNAPL THICKNESS: _____ ft. Sample ☐
DNAPL THICKNESS: _____ ft. Sample ☐

SAMPLE CONTAINERS
Number Size Type Pres.
5 0.5ml VGA HCl
2 50ml Amber
2 50ml poly 10/106

FIELD PARAMETERS

GALLONS REMOVED	TEMP. (C°)	ORP Eh (mV)	pH	COND. COND. (µmhos/cm)	D.O. (mg/L)	TURBIDITY (NTU)	SALINITY (ppt)	TDS (g/L)	COLOR	TIME
Initial	17.7	-117.2	7.30	631	2.06	57.9	0.31	0.4095	Clear	11:35
0.8	17.1	-219.1	7.07	630	0.75	25.5	0.31	0.4095	Clear	11:40
1.2	17.2	-242.9	7.11	628	0.70	28.0	0.31	0.4095	Clear	11:45
1.5	17.1	-269.9	7.03	632	0.65	18.3	0.31	0.4095	Clear	11:50
2.0	17.0	-280.7	7.15	633	0.54	15.2	0.31	0.4095	Clear	11:55
2.6	16.7	-293.1	7.07	633	0.46	14.7	0.31	0.4095	Clear	12:00
3.1	16.7	-302.7	7.15	631	0.41	10.5	0.31	0.4095	Clear	12:05
3.6	16.9	-304.1	6.93	630	0.40	8.94	0.31	0.4095	Clear	12:10
			Parameters stabilized →			Start sampling @		12:15		12:15
After Sampling										

EVACUATION METHOD: Peri pump
PUMP INTAKE DEPTH (if applicable): mid screen
PURGE WATER DISPOSITION (e.g., drum #): drum on site
WATER QUALITY (e.g., sheen, odor): _____
WATER QUALITY METER(S) USED; CALIBRATION DATE / TIME: YSI
SAMPLING METHOD: EPA low flow SAMPLE TIME: 12:15
SAMPLING PERSONNEL: MEM DUPLICATE "TIME": _____
REMARKS (e.g., recovery rate): pump issues & delayed 20min.

WELL CASING VOLUMES

Gal / ft 1-1/4" = 0.077 2" = 0.16 3" = 0.37 4" = 0.65
1-1/2" = 0.10 2-1/2" = 0.24 3-1/2" = 0.50 6" = 1.46

TIME COMPLETED: 12:50

Attachment 2

Contents:

Laboratory Report and Chain-of-Custody Form (16 Sheets)



14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 25, 2022

Joseph Sawdey
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, WA 98103

Re: Analytical Data for Project 21-1-22242-112
Laboratory Reference No. 2208-188

Dear Joseph:

Enclosed are the analytical results and associated quality control data for samples submitted on August 17, 2022.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

A handwritten signature in black ink, appearing to read 'DB', with a long horizontal flourish extending to the right.

David Baumeister
Project Manager

Enclosures



OnSite Environmental, Inc. 14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

This report pertains to the samples analyzed in accordance with the chain of custody, and is intended only for the use of the individual or company to whom it is addressed.

Date of Report: August 25, 2022
Samples Submitted: August 17, 2022
Laboratory Reference: 2208-188
Project: 21-1-22242-112

Case Narrative

Samples were collected on August 16 and 17, 2022 and received by the laboratory on August 17, 2022. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.



Date of Report: August 25, 2022
 Samples Submitted: August 17, 2022
 Laboratory Reference: 2208-188
 Project: 21-1-22242-112

GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MW-2-19:GW-081622					
Laboratory ID:	08-188-01					
Gasoline	ND	100	NWTPH-Gx	8-18-22	8-18-22	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	80	65-122				
Client ID:	MW-6-22:GW-081622					
Laboratory ID:	08-188-02					
Gasoline	ND	100	NWTPH-Gx	8-18-22	8-18-22	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	79	65-122				
Client ID:	MW-8-22:GW-081622					
Laboratory ID:	08-188-03					
Gasoline	ND	100	NWTPH-Gx	8-18-22	8-18-22	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	79	65-122				
Client ID:	MW-108-22:GW-081622					
Laboratory ID:	08-188-04					
Gasoline	ND	100	NWTPH-Gx	8-18-22	8-18-22	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	79	65-122				
Client ID:	MW-7-22:GW-081722					
Laboratory ID:	08-188-05					
Gasoline	ND	100	NWTPH-Gx	8-18-22	8-18-22	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	79	65-122				
Client ID:	MW-9-22:GW-081722					
Laboratory ID:	08-188-06					
Gasoline	ND	100	NWTPH-Gx	8-18-22	8-18-22	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	78	65-122				
Client ID:	Trip Blank					
Laboratory ID:	08-188-07					
Gasoline	ND	100	NWTPH-Gx	8-18-22	8-18-22	
Surrogate:	Percent Recovery	Control Limits				
Fluorobenzene	78	65-122				



Date of Report: August 25, 2022
 Samples Submitted: August 17, 2022
 Laboratory Reference: 2208-188
 Project: 21-1-22242-112

**GASOLINE RANGE ORGANICS
 NWTPH-Gx
 QUALITY CONTROL**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0818W1					
Gasoline	ND	100	NWTPH-Gx	8-18-22	8-18-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Fluorobenzene</i>	79	65-122				

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-188-06							
	ORIG	DUP						
Gasoline	ND	ND	NA	NA	NA	NA	30	
<i>Surrogate:</i>								
<i>Fluorobenzene</i>				78	79	65-122		



Date of Report: August 25, 2022
 Samples Submitted: August 17, 2022
 Laboratory Reference: 2208-188
 Project: 21-1-22242-112

**DIESEL AND HEAVY OIL RANGE ORGANICS
 NWTPH-Dx**

Matrix: Water
 Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	MW-2-19:GW-081622					
Laboratory ID:	08-188-01					
Diesel Range Organics	ND	0.13	NWTPH-Dx	8-23-22	8-23-22	
Lube Oil Range Organics	0.21	0.20	NWTPH-Dx	8-23-22	8-23-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	95	50-150				

Client ID:	MW-6-22:GW-081622					
Laboratory ID:	08-188-02					
Diesel Range Organics	ND	0.13	NWTPH-Dx	8-23-22	8-23-22	
Lube Oil Range Organics	0.29	0.20	NWTPH-Dx	8-23-22	8-23-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	88	50-150				

Client ID:	MW-8-22:GW-081622					
Laboratory ID:	08-188-03					
Diesel Range Organics	ND	0.13	NWTPH-Dx	8-23-22	8-23-22	
Lube Oil Range Organics	0.36	0.21	NWTPH-Dx	8-23-22	8-23-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	87	50-150				

Client ID:	MW-108-22:GW-081622					
Laboratory ID:	08-188-04					
Diesel Range Organics	ND	0.14	NWTPH-Dx	8-23-22	8-23-22	
Lube Oil Range Organics	0.34	0.22	NWTPH-Dx	8-23-22	8-23-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	83	50-150				

Client ID:	MW-7-22:GW-081722					
Laboratory ID:	08-188-05					
Diesel Range Organics	ND	0.13	NWTPH-Dx	8-23-22	8-23-22	
Lube Oil Range Organics	0.25	0.20	NWTPH-Dx	8-23-22	8-23-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	89	50-150				

Client ID:	MW-9-22:GW-081722					
Laboratory ID:	08-188-06					
Diesel Fuel #2	1.9	0.13	NWTPH-Dx	8-23-22	8-23-22	
Lube Oil Range Organics	ND	0.30	NWTPH-Dx	8-23-22	8-23-22	U1
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>o-Terphenyl</i>	93	50-150				



Date of Report: August 25, 2022
 Samples Submitted: August 17, 2022
 Laboratory Reference: 2208-188
 Project: 21-1-22242-112

**DIESEL AND HEAVY OIL RANGE ORGANICS
 NWTPH-Dx
 QUALITY CONTROL**

Matrix: Water
 Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0823W1					
Diesel Range Organics	ND	0.10	NWTPH-Dx	8-23-22	8-23-22	
Lube Oil Range Organics	ND	0.16	NWTPH-Dx	8-23-22	8-23-22	
Surrogate:	Percent Recovery	Control Limits				
o-Terphenyl	100	50-150				

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	SB0823W1							
	ORIG	DUP						
Diesel Fuel #2	0.528	0.522	NA	NA	NA	NA	1	NA
Surrogate:								
o-Terphenyl				109	108	50-150		



Date of Report: August 25, 2022
 Samples Submitted: August 17, 2022
 Laboratory Reference: 2208-188
 Project: 21-1-22242-112

VOLATILE ORGANICS EPA 8260D

Matrix: Water
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: MW-2-19:GW-081622						
Laboratory ID: 08-188-01						
Benzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
Toluene	ND	1.0	EPA 8260D	8-19-22	8-19-22	
Ethylbenzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
m,p-Xylene	ND	0.40	EPA 8260D	8-19-22	8-19-22	
o-Xylene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	94	75-127				
<i>Toluene-d8</i>	100	80-127				
<i>4-Bromofluorobenzene</i>	100	78-125				

Client ID: MW-6-22:GW-081622						
Laboratory ID: 08-188-02						
Benzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
Toluene	ND	1.0	EPA 8260D	8-19-22	8-19-22	
Ethylbenzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
m,p-Xylene	ND	0.40	EPA 8260D	8-19-22	8-19-22	
o-Xylene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	93	75-127				
<i>Toluene-d8</i>	99	80-127				
<i>4-Bromofluorobenzene</i>	99	78-125				

Client ID: MW-8-22:GW-081622						
Laboratory ID: 08-188-03						
Benzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
Toluene	ND	1.0	EPA 8260D	8-19-22	8-19-22	
Ethylbenzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
m,p-Xylene	ND	0.40	EPA 8260D	8-19-22	8-19-22	
o-Xylene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	92	75-127				
<i>Toluene-d8</i>	99	80-127				
<i>4-Bromofluorobenzene</i>	97	78-125				



Date of Report: August 25, 2022
 Samples Submitted: August 17, 2022
 Laboratory Reference: 2208-188
 Project: 21-1-22242-112

VOLATILE ORGANICS EPA 8260D

Matrix: Water
 Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: MW-108-22:GW-081622						
Laboratory ID: 08-188-04						
Benzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
Toluene	ND	1.0	EPA 8260D	8-19-22	8-19-22	
Ethylbenzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
m,p-Xylene	ND	0.40	EPA 8260D	8-19-22	8-19-22	
o-Xylene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	93	75-127				
<i>Toluene-d8</i>	99	80-127				
<i>4-Bromofluorobenzene</i>	100	78-125				

Client ID: MW-7-22:GW-081722						
Laboratory ID: 08-188-05						
Benzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
Toluene	ND	1.0	EPA 8260D	8-19-22	8-19-22	
Ethylbenzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
m,p-Xylene	ND	0.40	EPA 8260D	8-19-22	8-19-22	
o-Xylene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	93	75-127				
<i>Toluene-d8</i>	100	80-127				
<i>4-Bromofluorobenzene</i>	100	78-125				

Client ID: MW-9-22:GW-081722						
Laboratory ID: 08-188-06						
Benzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
Toluene	ND	1.0	EPA 8260D	8-19-22	8-19-22	
Ethylbenzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
m,p-Xylene	ND	0.40	EPA 8260D	8-19-22	8-19-22	
o-Xylene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	93	75-127				
<i>Toluene-d8</i>	100	80-127				
<i>4-Bromofluorobenzene</i>	100	78-125				



Date of Report: August 25, 2022
 Samples Submitted: August 17, 2022
 Laboratory Reference: 2208-188
 Project: 21-1-22242-112

VOLATILE ORGANICS EPA 8260D

Matrix: Water

Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	Trip Blank					
Laboratory ID:	08-188-07					
Benzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
Toluene	ND	1.0	EPA 8260D	8-19-22	8-19-22	
Ethylbenzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
m,p-Xylene	ND	0.40	EPA 8260D	8-19-22	8-19-22	
o-Xylene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	<i>93</i>	<i>75-127</i>				
<i>Toluene-d8</i>	<i>100</i>	<i>80-127</i>				
<i>4-Bromofluorobenzene</i>	<i>99</i>	<i>78-125</i>				



Date of Report: August 25, 2022
 Samples Submitted: August 17, 2022
 Laboratory Reference: 2208-188
 Project: 21-1-22242-112

**VOLATILE ORGANICS EPA 8260D
 QUALITY CONTROL**

Matrix: Water

Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0819W1					
Benzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
Toluene	ND	1.0	EPA 8260D	8-19-22	8-19-22	
Ethylbenzene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
m,p-Xylene	ND	0.40	EPA 8260D	8-19-22	8-19-22	
o-Xylene	ND	0.20	EPA 8260D	8-19-22	8-19-22	
<i>Surrogate:</i>	<i>Percent Recovery</i>	<i>Control Limits</i>				
<i>Dibromofluoromethane</i>	95	75-127				
<i>Toluene-d8</i>	101	80-127				
<i>4-Bromofluorobenzene</i>	101	78-125				

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0819W1									
	SB	SBD	SB	SBD	SB	SBD				
Benzene	9.82	9.97	10.0	10.0	98	100	80-121	2	16	
Toluene	9.81	10.1	10.0	10.0	98	101	80-120	3	18	
Ethylbenzene	10.4	10.5	10.0	10.0	104	105	80-125	1	18	
m,p-Xylene	20.3	20.5	20.0	20.0	102	103	80-127	1	18	
o-Xylene	10.1	10.2	10.0	10.0	101	102	80-126	1	18	
Surrogate:										
Dibromofluoromethane					95	94	75-127			
Toluene-d8					101	101	80-127			
4-Bromofluorobenzene					100	99	78-125			



Date of Report: August 25, 2022
 Samples Submitted: August 17, 2022
 Laboratory Reference: 2208-188
 Project: 21-1-22242-112

TOTAL ARSENIC
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: MW-2-19:GW-081622						
Laboratory ID: 08-188-01						
Arsenic	ND	3.3	EPA 200.8	8-23-22	8-23-22	

Client ID: MW-6-22:GW-081622						
Laboratory ID: 08-188-02						
Arsenic	6.3	3.3	EPA 200.8	8-23-22	8-23-22	

Client ID: MW-8-22:GW-081622						
Laboratory ID: 08-188-03						
Arsenic	6.6	3.3	EPA 200.8	8-23-22	8-23-22	

Client ID: MW-108-22:GW-081622						
Laboratory ID: 08-188-04						
Arsenic	6.5	3.3	EPA 200.8	8-23-22	8-23-22	

Client ID: MW-7-22:GW-081722						
Laboratory ID: 08-188-05						
Arsenic	ND	3.3	EPA 200.8	8-23-22	8-23-22	

Client ID: MW-9-22:GW-081722						
Laboratory ID: 08-188-06						
Arsenic	ND	3.3	EPA 200.8	8-23-22	8-23-22	



Date of Report: August 25, 2022
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**TOTAL ARSENIC
 EPA 200.8
 QUALITY CONTROL**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0823WM1					
Arsenic	ND	3.3	EPA 200.8	8-23-22	8-23-22	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-160-08							
	ORIG	DUP						
Arsenic	ND	ND	NA	NA	NA	NA	NA	20

MATRIX SPIKES

Laboratory ID:	08-160-08									
	MS	MSD	MS	MSD		MS	MSD			
Arsenic	124	120	111	111	ND	112	108	75-125	4	20



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DISSOLVED ARSENIC
EPA 200.8

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID: MW-2-19:GW-081622						
Laboratory ID: 08-188-01						
Arsenic	ND	3.0	EPA 200.8	8-18-22	8-23-22	

Client ID: MW-6-22:GW-081622						
Laboratory ID: 08-188-02						
Arsenic	4.5	3.0	EPA 200.8	8-18-22	8-23-22	

Client ID: MW-8-22:GW-081622						
Laboratory ID: 08-188-03						
Arsenic	3.8	3.0	EPA 200.8	8-18-22	8-23-22	

Client ID: MW-108-22:GW-081622						
Laboratory ID: 08-188-04						
Arsenic	4.3	3.0	EPA 200.8	8-18-22	8-23-22	

Client ID: MW-7-22:GW-081722						
Laboratory ID: 08-188-05						
Arsenic	ND	3.0	EPA 200.8	8-18-22	8-23-22	

Client ID: MW-9-22:GW-081722						
Laboratory ID: 08-188-06						
Arsenic	ND	3.0	EPA 200.8	8-18-22	8-23-22	



Date of Report: August 25, 2022
 Samples Submitted: August 17, 2022
 Laboratory Reference: 2208-188
 Project: 21-1-22242-112

**DISSOLVED ARSENIC
 EPA 200.8
 QUALITY CONTROL**

Matrix: Water
 Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0818F1					
Arsenic	ND	3.0	EPA 200.8	8-18-22	8-23-22	

Analyte	Result	Spike Level	Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	08-188-02							
	ORIG	DUP						
Arsenic	4.50	4.70	NA	NA	NA	NA	4	20

MATRIX SPIKES

Laboratory ID:	08-188-02									
	MS	MSD	MS	MSD		MS	MSD			
Arsenic	91.2	90.0	80.0	80.0	4.50	108	107	75-125	1	20





Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- E - The value reported exceeds the quantitation range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range are impacting the diesel range result.
- M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
- N - Hydrocarbons in the lube oil range are impacting the diesel range result.
- N1 - Hydrocarbons in diesel range are impacting lube oil range results.
- O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical _____.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- U1 - The practical quantitation limit is elevated due to interferences present in the sample.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a mercury cleanup procedure.
- X1 - Sample extract treated with a sulfuric acid/silica gel cleanup procedure.
- X2 - Sample extract treated with a silica gel cleanup procedure.
- Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.
- Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.
- Z -
- ND - Not Detected at PQL
- PQL - Practical Quantitation Limit
- RPD - Relative Percent Difference





MVA Onsite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Chain of Custody

Company: Shannon & Wilson, INC			Turnaround Request (in working days)			Laboratory Number: 08-188																		
Project Number: 21-1-22242-112			<input type="checkbox"/> Same Day <input type="checkbox"/> 1 Day																					
Project Name: former Northlake 76 Gas Station			<input type="checkbox"/> 2 Days <input type="checkbox"/> 3 Days																					
Project Manager: Joseph Sauder			<input checked="" type="checkbox"/> Standard (7 Days)																					
Sampled by: Mason Hall			<input type="checkbox"/> (other)																					
Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021 <input type="checkbox"/> 8260 <input checked="" type="checkbox"/>)	NWTPH-Gx	NWTPH-Dx (Acid / SG Clean-up <input type="checkbox"/>)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	total & dissolved Arsenic by 6010/7470	% Moisture
1	MW-2-19: GW-081622	8/16/22	11:20	water	9		X		X														X	
2	MW-6-22: GW-081622	8/16/22	16:45		9		X		X														X	
3	MW-8-22: GW-081622	8/16/22	14:35		9		X		X														X	
4	MW-108-22: GW-081622	8/16/22	14:25		9		X		X														X	
5	MW-7-22: GW-081722	8/17/22	10:00		9		X		X														X	
6	MW-a-22: GW-081722	8/17/22	12:15		9		X		X														X	
7	Trip Blank	8/16/22	11:20		3		X																	
Signature		Company		Date	Time	Comments/Special Instructions																		
		Shannon & Wilson		08/14/22	15:22	lab files																		
Relinquished		Received																						
Relinquished		Received																						
Relinquished		Received																						
Relinquished		Received																						
Reviewed/Date		Reviewed/Date		Data Package: Standard <input type="checkbox"/> Level III <input type="checkbox"/> Level IV <input type="checkbox"/> Chromatograms with final report <input type="checkbox"/> Electronic Data Deliverables (EDDs) <input type="checkbox"/>																				