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Ahtna Engineering Services, LLC

Design-Build • Construction • Environmental • Government Services

December 13, 2023

Ms. Laurie Butler
Environmental Manager
Menzies Aviation
6000 DeHavilland Avenue
Anchorage, AK 99502
E-mail: laurie.butler@menziesaviation.com

Subject: FINAL AFSC 2023 Biennial Groundwater Monitoring, 19th Avenue and C Street, Anchorage, Alaska; DEC File ID 2100.38.437, Hazard ID 419

Dear Ms. Butler:

Ahtna Engineering Services, LLC, (Ahtna) has prepared this report for the Anchorage Fueling and Service Company (AFSC), owner, and Menzies Aviation (Menzies), operator, to present the results of the biennial groundwater sampling at 19th Avenue and C Street (19th & C) in Anchorage, Alaska.

This report describes the sampling protocols that were observed during the field work as well as the results of the collected analytical samples. Attachment 1 includes figures depicting the general vicinity of the project site (Figure 1) and the sampling locations (Figure 2). Attachment 2 includes analytical data tables summarizing the samples collected, the analytical results of the current groundwater sampling event, the analytical results of historical groundwater sampling events, and Mann-Kendall trend analysis. Attachment 3 includes field notes and forms generated during the project. Attachment 4 includes a photographic log of the field work, Attachment 5 includes the Data Quality Review (DQR), Laboratory Checklists, and laboratory reports of the analytical results, and Attachment 6 includes an updated conceptual site model (CSM).

SITE LOCATION

The site is located at the northwest intersection of 19th Avenue and C Street in Anchorage, Alaska. Monitoring well MW-2 is located between the north shoulder of 19th Avenue and the south bank of Chester Creek, approximately 60 feet west of C Street.

SITE HISTORY AND PREVIOUS INVESTIGATIONS

A release of Jet-A fuel from a pressurized pipeline occurred near Chester Creek, at the intersection of 19th Avenue and C Street, west of C Street and south of Chester Creek. The release was reported on December 20, 1988. The leaking section was removed on the south side of the creek, and a new section of pipeline was installed along a different route. A portion of the pipeline was abandoned

in place that runs under Chester Creek (the entire crosstown pipeline was decommissioned in 1999 after the new pipeline along the tidal flats was brought into service in May 1999). A volume of 130 cubic yards of contaminated soil was excavated and subsequently thermally treated. Two 42-inch product recovery wells were installed in 1989. A total of 141.6 gallons of product were recovered from the wells. Further investigation work was conducted in 2000 to help define the extent of the soil and groundwater contamination (DEC, 2021a).

Free-phase petroleum hydrocarbons had previously been measured and skimmed from recovery well RW-S at the site (Figure 2). As of 2006, free-phase petroleum hydrocarbons were no longer measurable in the recovery well. Recovery wells were decommissioned in 2007, and Oxygen Releasing Compound® Advanced (ORC-A) was placed into the groundwater prior to backfilling (Hart Crowser, 2007). Groundwater sampling at the site wells (MW-1, MW-2, and MW-3) has been performed since 2005.

Pore water sampling was conducted in 2018 at three locations (PW-1 through PW-3). A new well, MW-7 was installed, developed and sampled. The groundwater monitoring of MW-1 and MW-3 was discontinued in 2018 as a result of containing no exceedances above Alaska Department of Environmental Conservation (DEC) groundwater cleanup levels since the commencement of sampling in 2005. The groundwater and soil samples collected from MW-7 exhibited no exceedances above DEC cleanup levels. The pore water samples collected also exhibited no exceedances above DEC cleanup levels. Analytical results for PW-2 (near MW-2) suggest that the contamination found in MW-2 is not migrating to Chester Creek. Consistent with previous sampling events, five analytes were detected at concentrations above DEC groundwater cleanup levels in MW-2 (Ahtna, 2019).

Groundwater samples were collected from monitoring wells MW-2 and MW-7 in 2019. The groundwater samples collected from MW-7 exhibited no exceedances above DEC cleanup levels for the second consecutive sampling event and was approved to be decommissioned. Consistent with previous sampling events, five analytes were detected at concentrations above DEC groundwater cleanup levels in MW-2 (Ahtna, 2020).

Sediment sampling was conducted in 2021 at the three pore water locations sampled in 2018. The upstream sediment sample collected from location SS-1 exhibited no screening value exceedances for petroleum analytes, indicating that there are likely no impacted sediments from upstream being deposited at the site. The source area sediment samples collected from location SS-2 exhibited screening value exceedances of several polycyclic aromatic hydrocarbons (PAH) compounds, indicating that the exposure pathway for sediment is now complete. The downstream sediment sample collected from location SS-3 exhibited significantly fewer and lower concentrations of screening value exceedances for PAH compounds, indicating that petroleum impacted sediments are present at the site and have migrated a short distance downstream, however the significantly lower concentrations indicate that impacts are likely localized (Ahtna, 2021).

In 2021, sediment sampling was conducted for a second time from the bed of Chester Creek adjacent to the historical pore water sample locations. Additionally, a fourth sediment sampling

location (downstream) was added during the second sediment sampling event. Groundwater samples were collected from MW-2. MW-7 was decommissioned. The upstream sediment sample collected from location SS-1 exhibited screening value exceedances for petroleum analytes. The source area sediment samples collected from location SS-2 exhibited screening value exceedances of several PAH compounds. The downstream sediment sample closest to the source area was collected from location SS-3 and exhibited no screening value exceedances for petroleum analytes and the farthest downstream sediment sample collected from location SS-4 exhibited screening value exceedances for petroleum analytes. This indicates that petroleum-impacted sediments are present at the site. However, except for one result, the analyte levels observed in the upgradient sample were all higher than the results at the site and downstream from the site. This suggests that road runoff and other non-point petroleum sources may be the primary, or at least significant contributors to the petroleum compounds observed in the sediments at and downstream from the site. Based on the 2021 sediment sample results it is apparent that there are upstream sources contributing to sediment impacts in Chester Creek. Due to the presence of impacted sediments upstream from the source, continued groundwater monitoring activities at the site and the fact that the original sediment impact data gap has been answered, no further sediment sampling was recommended, however a final ecological evaluation would be part of the site closure process (Ahtna, 2022).

Consistent with previous sampling events, four analytes were detected at concentrations above DEC groundwater cleanup levels in MW-2 (Ahtna, 2022).

WORK PERFORMED

The objective of this work is to monitor current contamination levels in one site groundwater monitoring well and evaluate contaminant trends. All work was conducted in accordance with the DEC's *Field Sampling Guidance* (DEC, 2022) and the approved work plan (Ahtna, 2023).

Mobilization

Ahtna personnel mobilized to the 19th Avenue and C Street site on July 27, 2023, to collect groundwater samples from one monitoring well (MW-2). A safety and health meeting was held on site before any sampling activities commenced. Prior to mobilizing to the field, Ahtna coordinated with personnel from Menzies to schedule a purge water collection drum be provided at the Operations and Maintenance Base Facility in an effort to reduce the safety concerns of containerized purge and decontamination water being subjected to vandalism at the 19th Avenue and C Street site. A lock was placed on the well cap of MW-2, the lock key was delivered to a Menzies representative.

Sample Collection

A primary and duplicate groundwater sample was collected from monitoring well MW-2. Ahtna measured and recorded the static water level at the well, then purged the well with a bladder pump using low-flow sampling techniques. A sulfur odor was noted in the purge water, but no sheen was

observed. Ahtna collected and documented water quality parameters every three to five minutes using a YSI Pro Plus water meter with a flowthrough cell. Once groundwater parameters stabilized, analytical samples were collected in order of decreasing volatility. Field notes and groundwater sampling forms are provided in Attachment 3.

The samples were hand delivered to the project laboratory, SGS North America, located in Anchorage and submitted for analysis of gasoline-range organics (GRO), diesel-range organics (DRO), PAHs, and fuel related volatile organic compounds (FR-VOCs). A summary of the analytical samples collected is presented in Attachment 2, Table 1. A site map with locations of the monitoring wells is provided as Figure 2 in Attachment 1. A photolog of field activities can be found in Attachment 4.

Investigation Derived Waste Management

Purge and decontamination water was collected in a 5-gallon screw-top bucket and securely closed before being transferred to the staging area at the secured Menzies Base of Operations facility. The bucket was labeled and will be staged until being transported and disposed of offsite by US Ecology. Ahtna will complete and submit a Contaminated Media Transport and Treatment or Disposal Approval Form to DEC for review and approval prior to transport of the wastewater. Solid investigation-derived waste, such as disposable sampling equipment and personal protective equipment, was bagged and disposed of as solid waste.

ANALYTICAL SAMPLE RESULTS

The analytical data tables summarizing the samples collected and the analytical results of the current groundwater sampling event (Table 1), the analytical results of historical groundwater sampling events (Table 2), and Mann-Kendall trend analysis (Table 3 and Table 4) are included in Attachment 2. Laboratory reports, DEC Laboratory Data Review Checklists, and the Data Quality Review are provided as Attachment 5.

Groundwater Analytical Results

The groundwater samples collected at MW-2 resulted in three analytes detected in the primary sample (19&C-23-MW2) and duplicate sample (19&C-23-MW9) at concentrations greater than their respective DEC groundwater cleanup levels. The three analytes include (1-methylnaphthalene, naphthalene, and 1,2,4-trimethylbenzene).

Historically, DRO, benzene, ethylbenzene, xylenes, 1,3,5-trimethylbenzene, and 2-methylnaphthalene have been detected in MW-2 at concentrations above the DEC groundwater cleanup level.

DRO was last detected above DEC groundwater cleanup levels in 2019 in the primary sample, but not the duplicate. The last exceedance of DRO prior to 2019 was back in 2010.

To date, benzene has only been detected at concentrations above DEC groundwater cleanup levels during one sampling event (2017) since 2005.

Ethylbenzene was consistently detected at concentrations above DEC groundwater cleanup levels from 2005 to 2014. From 2014 to current, ethylbenzene has only been detected at concentrations above DEC groundwater cleanup levels in the 2018 sampling event.

Xylenes have been inconsistently detected at concentrations above DEC groundwater cleanup levels since 2006, but have not been detected at concentrations above DEC groundwater cleanup levels since the 2010 sampling event.

The analysis of PAHs began in 2017. 2-methylnaphthalene was detected at concentrations above DEC groundwater cleanup levels in 2017 and then again in 2019. Naphthalene, and 1-methylnaphthalene have been consistently detected at concentrations above DEC groundwater cleanup levels since 2017.

The analysis of FR-VOCs began in 2018. Since 2018, 1,2,4-trimethylbenzene and naphthalene have been consistently detected at concentrations above DEC groundwater cleanup levels. 1,3,5-trimethylbenzene was only detected at concentrations above DEC groundwater cleanup levels during the 2018 sampling event.

Data Quality Assessment

All data necessary to complete this review were provided. Based on the data review completed, minimal data were qualified, and project completeness goal was met. Although qualified results are considered estimated, they are considered usable. All other sample results are valid with no data qualifiers assigned. All samples collected were considered representative of site conditions. All analytical data is considered usable for the purpose of evaluating the presence or absence and magnitude of the suspected site contaminants.

MANN-KENDALL ANALYSIS

Contaminant concentration trends for DRO were evaluated by Mann-Kendall analysis. The Mann-Kendall analysis is a non-parametric test to evaluate the statistical significance of an apparent trend. Historically, MW-2 is the only well with DRO detections reported from more than one sampling event.

The Mann-Kendall analysis for DRO concentration in MW-2 suggests a decreasing trend with a confidence level of greater than 95%.

CONCEPTUAL SITE MODEL

An accurate CSM is the basis for an effective and defensible sampling design. This CSM uses available historical and current information to estimate where contamination is (or might be) located, how much contamination is (or might be) present, how variable the concentrations may be, how much spatial patterning may be present, the fate and transport of contaminants, and potential and actual receptors.

The CSM will be used to distinguish and delineate different areas of contaminant impact, for which decisions about risk and remediation may differ. Distinguishing between different contaminant areas of impact improves the quality and interpretation of data, as well as the confidence and resource effectiveness of project decisions.

This CSM is based upon the current understanding of the site history and conditions, and will be updated in the future based on information gained from investigation activities completed at the site. The CSM graphic scoping form and exposure pathway graphic are provided in Attachment 6.

Human Health Conceptual Site Model

Media that are potentially contaminated from the 1998 release of jet fuel at the site include groundwater, subsurface soil at the soil/groundwater interface, surface water, outdoor air, and sediment. Potential receptors to this contamination include residents, commercial/industrial workers, construction workers, subsistence harvesters, subsistence consumers, site visitors, trespassers, recreational users, and people using the community garden nearby. The incidental soil ingestion and dermal absorption of contaminants from soil pathways are considered complete. Construction or commercial/industrial workers digging in the subsurface soil have the possibility to be exposed to contaminated soil at the soil/groundwater interface located at approximately 4–7.5 feet below ground surface.

The ingestion of groundwater and dermal absorption of contaminants from groundwater pathways are considered complete. It is unknown if groundwater in this area is used as a drinking water source for the residential area west of this site. The ingestion of surface water pathway is considered complete but insignificant based on 2018 pore water sampling results which did not indicate the presence of any analytes above DEC cleanup values. The inhalation of outdoor air is considered complete. Volatile compounds are potentially present in the subsurface soil.

Dermal exposure to contaminants in the groundwater pathway is considered complete. Naphthalene and 1-methylnaphthlene were detected at concentrations higher than the DEC groundwater cleanup levels during the 2023 groundwater sampling event. These compounds are considered harmful by dermal exposure. The direct contact with sediment pathway is considered complete as a result of the 2021 sediment sampling. The surface water (Chester Creek) pathway has been deemed incomplete due to the results of pore water sampling conducted in 2018. Sampling indicated that none of the pore water samples exceeded DEC promulgated total aromatic hydrocarbon or total aqueous hydrocarbon values and there were no detections of PAH or FR-

VOC analytes with the exception of 1-methylnaphthalene and naphthalene, which were detected at very low levels (less than 1/10th of the DEC groundwater cleanup levels).

Ecoscoping

Multiple PAH analytes were detected above the designated screening values in sediment. All of the detected PAHs, with the exception of anthracene and naphthalene, are known to bioaccumulate.

Alaska Department of Fish and Game generally considers the reach of Chester Creek at the site, as a migration corridor for fish species. Some rearing and feeding habitat is provided, but it is of lower quality due to lack of structure and cover. Although it is not considered high-quality spawning or rearing habitat there may be some scattered spawning in this reach of Chester Creek, and certainly some salmon rearing, but more likely of the transient variety. This reach is also a migration corridor and provides habitat for resident rainbow trout that move into the area to feed at various times. The site's proximity to Westchester Lagoon, which rainbow trout and rearing juvenile fish regularly occupy, likely increases the habitat use by fish at the site even though it is not high-quality fish habitat (Ahtna, 2022).

Due to the presence of PAHs known to bioaccumulate in sediment, and because there is the potential for fish rearing and spawning in this area, further ecological evaluation may be necessary at the site.

CONCLUSIONS AND RECOMMENDATIONS

Although some contaminant concentrations detected in monitoring well MW-2 remain above the DEC Groundwater Cleanup Levels, the number of constituents detected is decreasing along with the detected concentrations. The Mann-Kendall analysis for DRO concentrations in MW-2 also suggests a decreasing trend.

It is recommended to continue the biennial sampling at MW-2 for DRO, FR-VOCs, and PAHs until all analytes are below cleanup levels or a risk assessment is completed. It is recommended that GRO be omitted from the list of analyses as GRO has never been detected above DEC Groundwater Cleanup Levels at this site.

Due to the presence of impacted sediments upstream from the source, continued groundwater monitoring activities at the site, and the fact that the original sediment impact data gap has been answered, it is recommended that no further sediment sampling at the site be conducted.

Please do not hesitate to contact me at 907-433-0764 if you have any questions regarding this report.

Sincerely,

Ahtna Engineering Services, LLC

Nicholas B. Simmons
Project Manager

Cc: Shawn Tisdell, ADEC

Attachments:
1. Figures
2. Tables
3. Field Notebook and Forms
4. Photographic Log
5. Laboratory Report and Data Quality Review
6. Conceptual Site Model

REFERENCES

Alaska Department of Environmental Conservation (DEC), 2022. *Field sampling Guidance.* January.

DEC, 2023. 18 AAC 75. Oil and Other Hazardous Substances Pollution Control. February.

Ahtna Engineering Services (Ahtna), 2019. *Final Letter Report for 2018 Monitoring Well Installation, Groundwater Sampling, and Pore Water Sampling, 19th Avenue and C Street, Alaska*. April.

Ahtna, 2020. *Final Report for 2019 Groundwater Sampling, 19th Avenue and C Street, Alaska*. May.

Ahtna, 2021. *Final AFCS 2020 Sediment Sampling, 19th Avenue and C Street, Alaska*. February.

Ahtna, 2022. *Final Report for Groundwater and Sediment Sampling, 19th Avenue and C Street, Alaska*. July.

Ahtna, 2023. Final Work Plan, *2023 Annual Groundwater Monitoring, AFSC Airport Fuel Facility, Anchorage, Alaska*. July.

ATTACHMENT 1

FIGURES

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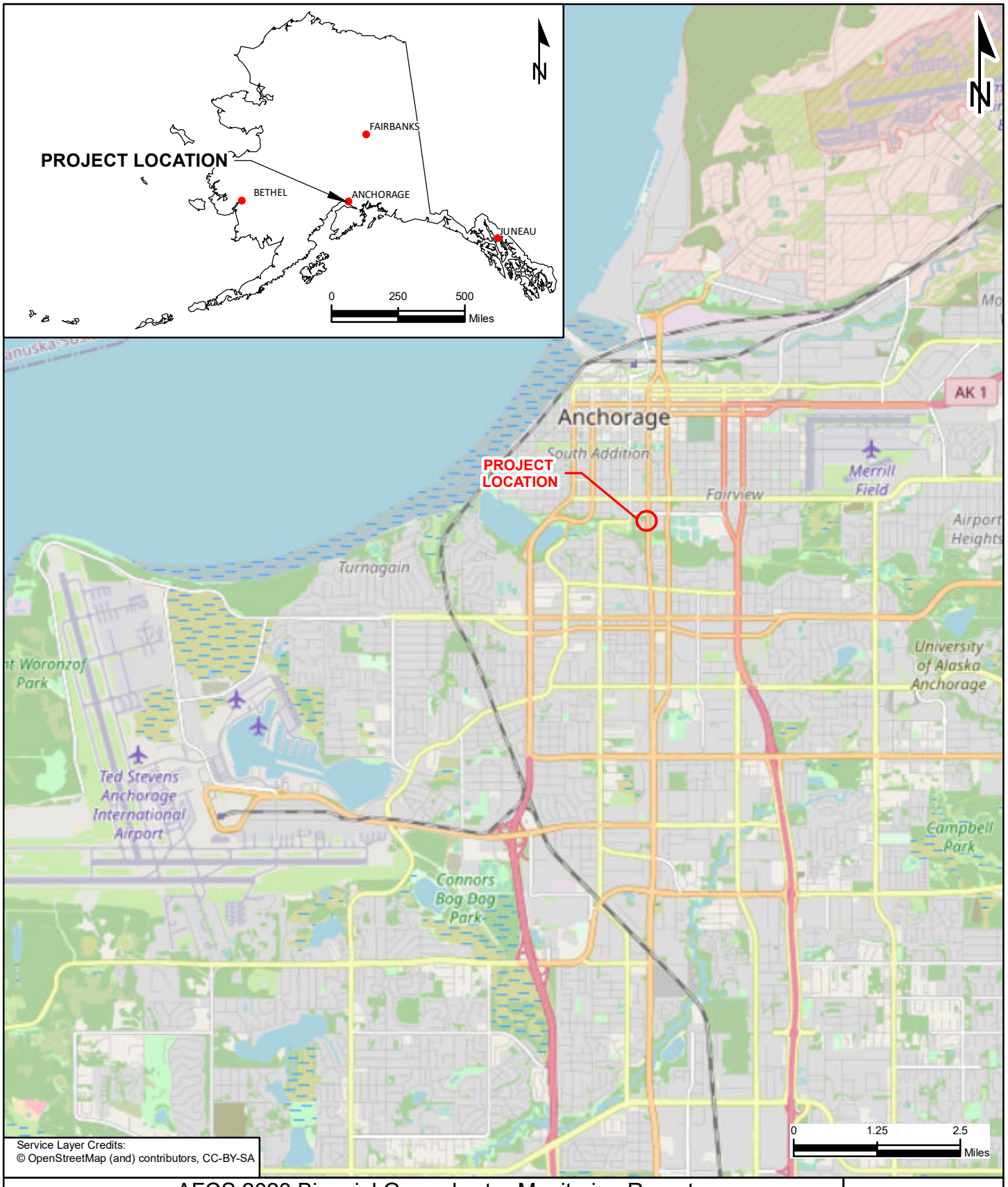


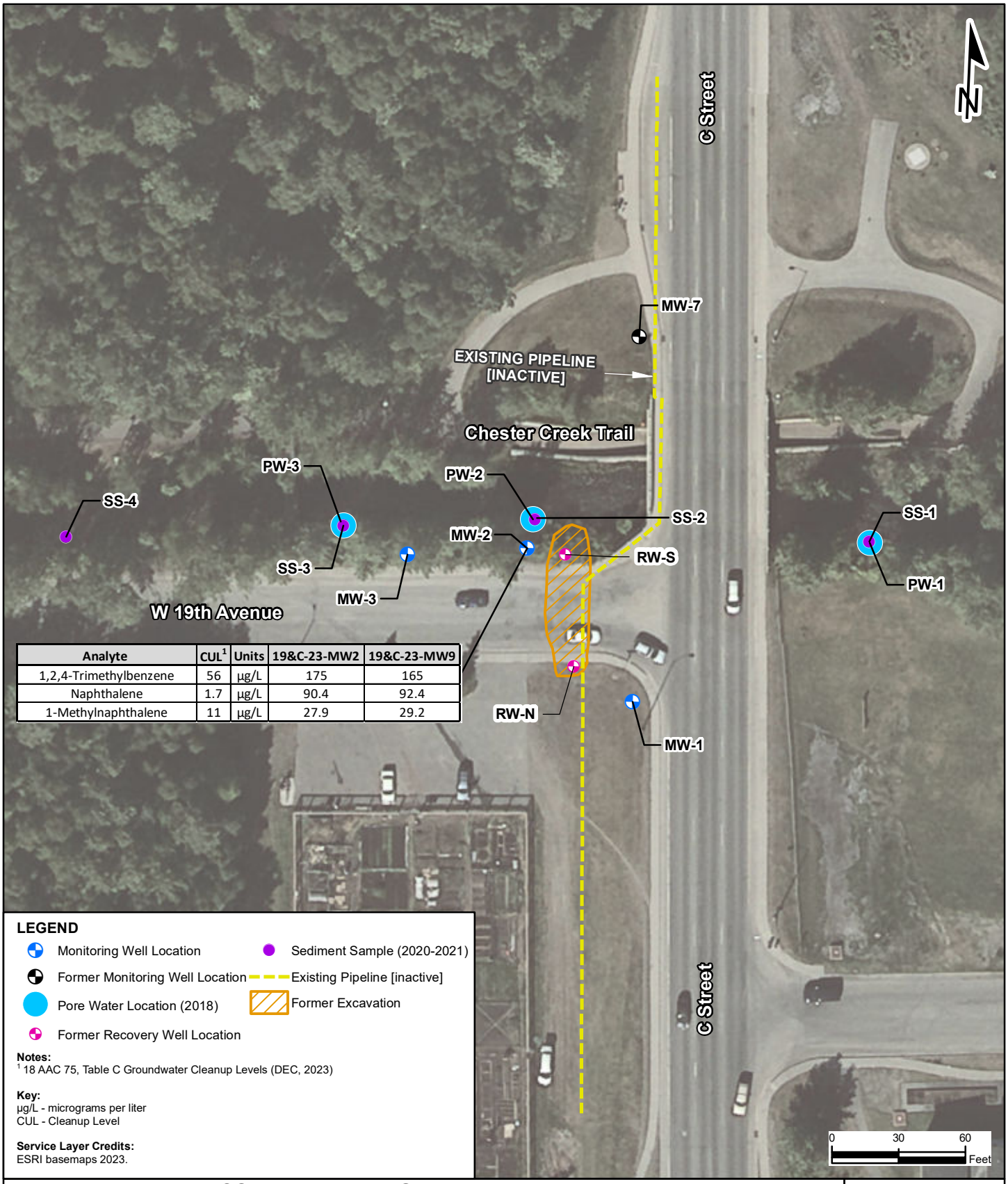
AFCS 2023 Biennial Groundwater Monitoring Report
19th Avenue and C Street,
Anchorage, Alaska

Ahtna Engineering Services, LLC

State and Site Vicinity Maps

Project Number: 20204.058.02	Figure Number: 1
Date: 10/17/2023	
Drafted By: V.Z.	

Prepared by vzlatkovski, 10/17/2023, L:\Anchorage\20204.058\GIS\MXD\F1State&Site\Vicinity.mxd



Analyte	CUL[1]	Units	19&C-23-MW2	19&C-23-MW9
1,2,4-Trimethylbenzene	56	µg/L	175	165
Naphthalene	1.7	µg/L	90.4	92.4
1-Methylnaphthalene	11	µg/L	27.9	29.2

LEGEND

- Monitoring Well Location
- Former Monitoring Well Location
- Pore Water Location (2018)
- Former Recovery Well Location
- Sediment Sample (2020-2021)
- Existing Pipeline [inactive]
- Former Excavation

Notes:
[1] 18 AAC 75, Table C Groundwater Cleanup Levels (DEC, 2023)

Key:
µg/L - micrograms per liter
CUL - Cleanup Level

Service Layer Credits:
ESRI basemaps 2023.

Prepared by vzlatkovski, 10/18/2023; L:\Anchorage\20204.083\GIS\MXD\F2_SiteOverview_v4.mxd

AFCS 2023 Biennial Groundwater Monitoring Report
19th Avenue and C Street,
Anchorage, Alaska

Ahtna Engineering Services, LLC

Site Overview and Analytical Exceedances

Project Number:	Figure Number:
20204.058	2
Date: 10/18/2023	
Drafted By: VZ	

ATTACHMENT 2

TABLES

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Table 1: 2023 19th and C Analytical Groundwater Results

				Sample Name:	**19&C-23-MW2**	**19&C-23-MW9**	**19&C-23-TB01**
				Lab Sample ID:	1233886001	1233886002	1233886003
				SDG:	1233886	1233886	1233886
				Sample Date:	7/27/2023	7/27/2023	7/27/2023
				Sample Time:	11:50	11:50	08:00
				Sample Type:	N	FD	TB
				Parent Sample:	--	19&C-23-MW2	--
Method	**CAS ID**	**Analyte**	**CUL[1]**	**Units**			
Bulk Fuels							
AK101	GRO	Gaoline-Range Organics	2200	µg/L	564 QH	566 QH	ND (50.0)
AK102	DRO	Diesel-Range Organics	1500	µg/L	1350 B	1360 B	--
Fuel Related Volatile Organic Compounds							
SW8260D	95-63-6	1,2,4-Trimethylbenzene	56	µg/L	**175**	**165**	ND (0.500)
SW8260D	106-93-4	1,2-Dibromoethane	0.075	µg/L	ND (0.0375)	ND (0.0375)	ND (0.0375)
SW8260D	107-06-2	1,2-Dichloroethane	1.7	µg/L	ND (0.250)	ND (0.250)	ND (0.250)
SW8260D	108-67-8	1,3,5-Trimethylbenzene	60	µg/L	39.7	40.9	ND (0.500)
SW8260D	71-43-2	Benzene	4.6	µg/L	2.12	2.19	ND (0.200)
SW8260D	98-82-8	Cumene	450	µg/L	23.3 QH	24.0	ND (0.500)
SW8260D	100-41-4	Ethylbenzene	15	µg/L	9.38 QH	9.53	ND (0.500)
SW8260D	1634-04-4	Methyl-tert-butyl ether (MTBE)	140	µg/L	ND (5.00)	ND (5.00)	ND (5.00)
SW8260D	91-20-3	Naphthalene	1.7	µg/L	**90.4**	**92.4**	ND (0.500)
SW8260D	104-51-8	n-Butylbenzene	1000	µg/L	ND (0.500)	ND (0.500)	ND (0.500)
SW8260D	135-98-8	sec-Butylbenzene	2000	µg/L	12.5	13.0	ND (0.500)
SW8260D	98-06-6	tert-Butylbenzene	690	µg/L	1.32	1.38	ND (0.500)
SW8260D	108-88-3	Toluene	1100	µg/L	ND (0.500)	ND (0.500)	ND (0.500)
SW8260D	1330-20-7	Xylenes	190	µg/L	63.3 QH	63.8	ND (1.50)
Polynuclear Aromatic Hydrocarbons							
SW8270D SIM PAH	90-12-0	1-Methylnaphthalene	11	µg/L	**27.9 QL**	**29.2 QL**	--
SW8270D SIM PAH	91-57-6	2-Methylnaphthalene	36	µg/L	21.2 QL	22.7 QL	--
SW8270D SIM PAH	83-32-9	Acenaphthene	530	µg/L	0.156 QL	0.168 QL	--
SW8270D SIM PAH	208-96-8	Acenaphthylene	260	µg/L	0.0536	0.0638	--
SW8270D SIM PAH	120-12-7	Anthracene	43	µg/L	ND (0.0240) QL	0.0156 QL	--
SW8270D SIM PAH	56-55-3	Benz[a]anthracene	0.30	µg/L	ND (0.0240)	0.0170 B	--
SW8270D SIM PAH	50-32-8	Benzo(a)pyrene	0.25	µg/L	ND (0.00960)	ND (0.00960)	--
SW8270D SIM PAH	205-99-2	Benzo(b)fluoranthene	2.5	µg/L	ND (0.0240)	ND (0.0240)	--
SW8270D SIM PAH	207-08-9	Benzo(k)fluoranthene	0.8	µg/L	ND (0.0240)	ND (0.0240)	--
SW8270D SIM PAH	191-24-2	Benzo[g,h,i]perylene	0.26	µg/L	ND (0.0240)	ND (0.0240)	--
SW8270D SIM PAH	218-01-9	Chrysene	2	µg/L	ND (0.0240)	0.0154 B	--
SW8270D SIM PAH	53-70-3	Dibenz[a,h]anthracene	0.25	µg/L	ND (0.00960)	ND (0.00960)	--
SW8270D SIM PAH	206-44-0	Fluoranthene	260	µg/L	ND (0.0240)	0.0150 B	--
SW8270D SIM PAH	86-73-7	Fluorene	290	µg/L	0.184 QL	0.214 QL	--
SW8270D SIM PAH	193-39-5	Indeno(1,2,3-cd)pyrene	0.19	µg/L	ND (0.0240)	ND (0.0240)	--
SW8270D SIM PAH	91-20-3	Naphthalene	1.7	µg/L	**35.9 QL**	**37.7 QL**	--
SW8270D SIM PAH	85-01-8	Phenanthrene	170	µg/L	ND (0.0481) QL	0.0348 B, QL	--
SW8270D SIM PAH	129-00-0	Pyrene	120	µg/L	ND (0.0240)	0.0153 B	--

Notes:

[1] 18 AAC 75, Table C Groundwater Cleanup Levels (DEC, 2023)

Bold and highlighted Result exceeds the CUL

Key:

-- = Not applicable

µg/L = micrograms per liter

AAC = Alaska Administrative Code

B = Result is considered biased high due to blank contamination

CUL = cleanup level

DEC = Alaska Department of Environmental Conservation

FD = field duplicate

LOD = limit of detection

N = normal

ND = analyte not detected at the LOD shown in parenthesis

QC = quality control

QH = result is estimated because QC criteria were not met; may be biased high

QL = result is estimated because QC criteria were not met; may be biased low

TB = trip blank

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Table 2: Groundwater Levels and Analytical Results 2005-2019
AFSC 19th Avenue C Street Groundwater Sampling
Anchorage, Alaska

Sample Location	Date	Water Level (ft btoc)	BTEX/Fuel Related VOCs - EPA Methods 8260B/C											AK 101	AK 102	TAH (mg/L)	PAH - EPA Method 8270D																TAqH[3] (mg/L)
			Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	1,2,4-Trimethyl-benzene (mg/L)	1,3,5-Trimethyl-benzene (mg/L)	Isopropyl-benzene (mg/L)	Naphthalene (mg/L)	n-Butylbenzene (mg/L)	sec-Butylbenzene (mg/L)	tert-Butylbenzene (mg/L)	GRO (mg/L)	DRO (mg/L)		1-Methyl-naphthalene (mg/L)	2-Methyl-naphthalene (mg/L)	Acenaphthene (mg/L)	Acenaphthylene (mg/L)	Anthracene (mg/L)	Benz[a]anthracene (mg/L)	Benzo(a)pyrene (mg/L)	Benzo(b)-fluoranthene (mg/L)	Benzo(k)-fluoranthene (mg/L)	Benzo[g,h,i]-perylene (mg/L)	Chrysene (mg/L)	Dibenz[a,h]-anthracene (mg/L)	Fluoranthene (mg/L)	Fluorene (mg/L)	Indeno-(1,2,3-cd)pyrene (mg/L)	Naphthalene (mg/L)	Phenanthrene (mg/L)	Pyrene (mg/L)	
MW-1	17-Oct-17	7.64	ND (0.0002)	ND (0.0005)	ND (0.0005)	ND (0.0015)	--	--	--	--	--	--	--	ND (0.05)	ND (0.30)	0.003	ND (0.0000256)	ND (0.0000256)	ND (0.0000256)	ND (0.000256)	ND (0.000256)	ND (0.000256)	ND (0.0000103)	ND (0.000256)	ND (0.000256)	ND (0.000256)	ND (0.000256)	ND (0.0000103)	ND (0.000256)	ND (0.0000256)	ND (0.000256)	ND (0.0000510)	ND (0.000256)	ND (0.000256)	0.003
	19-Aug-14	7.84	ND (0.0009)	ND (0.001)	ND (0.0007)	ND (0.0032)	--	--	--	--	--	--	--	ND (0.014)	ND (0.12)	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	26-Jul-12	7.84	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.003)	--	--	--	--	--	--	--	ND (0.050)	ND (0.42)	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5-Jun-10	7.72	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.003)	--	--	--	--	--	--	--	ND (0.050)	ND (0.43)	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	23-Jun-09	7.85	ND (0.0005)	ND (0.001)	ND (0.001)	ND (0.003)	--	--	--	--	--	--	--	ND (0.05)	ND (0.41) B	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	25-Jul-08	7.55	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0015)	--	--	--	--	--	--	--	ND (0.05)	ND (0.40)	0.003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12-Jun-07	--	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0015)	--	--	--	--	--	--	--	ND (0.05)	ND (0.39)	0.003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	31-Jul-06	--	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0015)	--	--	--	--	--	--	--	ND (0.05)	ND (0.42)	0.003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4-Oct-05	--	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0015)	--	--	--	--	--	--	--	ND (0.05)	ND (0.40)	0.003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-2	27-Jul-23	4.60	0.00212	ND (0.0005)	0.00938 QH	0.0633 QH	**0.175**	0.0397	0.0233 QH	**0.0904**	ND (0.0005)	0.0125	0.00132	0.564 QH	1.35 B	0.002	**0.0279 QL**	0.021 QL	0.000156 QL	0.0000536	ND (0.000024) QL	ND (0.000024)	ND (0.0000096)	ND (0.000024)	ND (0.000024)	ND (0.000024)	ND (0.000024)	ND (0.0000096)	ND (0.000024)	0.000184 QL	ND (0.000024)	**0.0359 QL**	ND (0.0000481) QL	ND (0.000024)	**0.039**
			0.00219	ND (0.0005)	0.00953	0.0638	**0.165**	0.0409	0.024	**0.0924**	ND (0.0005)	0.013	0.00138	0.566 QH	1.36 B	0.076	**0.0292 QL**	0.023 QL	0.000168 QL	0.0000638	0.0000156 QL	0.000017 B	ND (0.0000096)	ND (0.000024)	ND (0.000024)	ND (0.000024)	0.000154 B	ND (0.0000096)	0.000015 B	0.000214 QL	ND (0.000024)	**0.0377 QL**	0.0348 B, QL	0.0000153 B	**0.149**
	14-Aug-19	4.90	0.000380 J	ND (0.0005)	0.0145	0.0896	**0.258**	**0.0701**	0.0294	**0.109**	0.0234	0.0256	0.00229	0.884 QH	1.16	**0.105**	**0.0557**	**0.048**	0.00023	0.000103	ND (0.0000252)	ND (0.0000252)	ND (0.0000101)	ND (0.0000252)	ND (0.0000252)	ND (0.0000252)	ND (0.0000252)	ND (0.0000101)	ND (0.0000252)	0.000322	ND (0.0000252)	**0.0365**	ND (0.0000252)	ND (0.0000252)	**0.142**
			0.000380 J	ND (0.0005)	0.0146	0.0898	**0.254**	**0.072**	0.030	**0.115**	0.023	0.026	0.00239	0.911 QH	**1.52**	**0.105**	**0.0692**	**0.061**	0.000281	0.000129	ND (0.0000245)	ND (0.0000245)	ND (0.0000980)	ND (0.0000245)	ND (0.0000245)	ND (0.0000245)	ND (0.0000245)	ND (0.0000980)	ND (0.0000245)	0.000387	ND (0.0000245)	**0.0429**	ND (0.0000245)	ND (0.0000245)	**0.149**
	30-Aug-18	4.77	0.0017	ND (.001)	**0.024**	0.022	**0.260**	0.056 Q	0.027	**0.150**	0.013	0.014	0.0018	0.71	0.86	0.049	**0.038 Q**	0.028 Q	0.00022 Q	ND (0.000095) Q	ND (0.000095) Q	ND (0.000095) Q	ND (0.000095) Q	ND (0.000095) Q	ND (0.000095) Q	ND (0.000095) Q	ND (0.000095) Q	ND (0.000095) Q	ND (0.000095) Q	0.00023 Q	ND (0.000095) Q	**0.0480 Q**	ND (0.000095) Q	ND (0.000095) Q	**0.050**
			0.0016	ND (.001)	**0.021**	0.022	**0.270**	0.040 Q	0.025	**0.140**	0.013	0.013	0.0017	--	--	0.046	**0.039 Q**	0.028 Q	0.00021 Q	ND (0.000093) Q	ND (0.000093) Q	ND (0.000093) Q	ND (0.000093) Q	ND (0.000093) Q	ND (0.000093) Q	ND (0.000093) Q	ND (0.000093) Q	ND (0.000093) Q	ND (0.000093) Q	ND (0.000093) Q	0.00022 Q	ND (0.000093) Q	**0.0480 Q**	ND (0.000093) Q	ND (0.000093) Q	**0.047**
	17-Oct-17	4.71	**0.00639**	ND (0.0005)	0.00591 Q	0.02389 Q	--	--	--	--	--	--	--	0.213 Q	0.663	0.037	**0.0362**	0.030	0.0002	ND (0.0000250)	ND (0.0000250)	ND (0.0000250)	ND (0.0000100)	ND (0.0000250)	ND (0.0000250)	ND (0.0000250)	ND (0.0000250)	ND (0.0000100)	ND (0.0000250)	0.000245	ND (0.0000250)	**0.0258**	ND (0.0000250)	ND (0.0000250)	**0.063**
			0.00646	ND (0.0005)	0.00102 Q	0.05281 Q	--	--	--	--	--	--	--	0.481 Q	0.805	0.070	**0.0407**	**0.037**	0.000189	0.0000846 Q	ND (0.0000262)	ND (0.0000262)	ND (0.0000262)	ND (0.0000262)	ND (0.0000262)	ND (0.0000262)	ND (0.0000262)	ND (0.0000262)	ND (0.0000105)	ND (0.0000262)	0.000236	ND (0.0000262)	**0.0316**	ND (0.0000262)	ND (0.0000262)	**0.102**
	19-Aug-14	4.83	0.0007	0.0027	**0.022**	0.160	--	--	--	--	--	--	--	0.830	1.00	**0.185**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	26-Jul-12	4.76	0.00123	ND (0.001)	**0.0216**	0.137	--	--	--	--	--	--	--	1.29	1.23	**0.161**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			0.00137	ND (0.001)	**0.0213**	0.133	--	--	--	--	--	--	--	1.39	0.986	**0.157**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5-Jun-10	4.75	0.0015	ND (0.001)	**0.028**	**0.194**	--	--	--	--	--	--	--	1.71 J5	**1.5**	**0.225**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4-Sep-09	4.91	0.0009	ND (0.001)	**0.0233**	0.0883	--	--	--	--	--	--	--	1.11	**1.5**	**0.114**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	25-Jul-08	4.58	0.0019	ND (0.0005)	**0.030**	**0.198**	--	--	--	--	--	--	--	0.77	**2.11**	**0.230**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12-Jun-07	--	0.003	ND (0.0005)	**0.032**	0.141	--	--	--	--	--	--	--	0.64	**3.55**	**0.177**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	31-Jul-06	--	0.002	ND (0.0005)	**0.037**	**0.190**	--	--	--	--	--	--	--	0.85	**5.02**	**0.230**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4-Oct-05	--	0.004	ND (0.0005)	**0.048**	0.188	--	--	--	--	--	--	--	0.93	**1.62**	**0.241**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	17-Oct-17	3.65	ND (0.0002)	ND (0.0005)	ND (0.0005)	ND (0.0015)	--	--	--	--	--	--	--	ND (0.05)	ND (0.294)	0.003	0.000323	0.000364	ND (0.0000250)	ND (0.0000250)	ND (0.0000250)	ND (0.0000250)	ND (0.0000100)	ND (0.0000250)	ND (0.0000250)	ND (0.0000250)	ND (0.0000250)	ND (0.0000100)	ND (0.0000250)	ND (0.0000250)	ND (0.0000250)	0.000224	ND (0.0000250)	ND (0.0000250)	0.004
	19-Aug-14	3.67	ND (0.0009)	ND (0.001)	ND (0.0007)	ND (0.0032)	--	--	--	--	--	--	--	ND (0.014)	0.63	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	27-Jul-12	3.66	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.003)	--	--	--	--	--	--	--	ND (0.050)	ND (0.42)	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5-Jun-10	3.65	ND (0.001)	ND (0.001)	ND (0.001)	0.002	--	--	--	--	--	--	--	ND (0.050)	ND (0.42)	0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	23-Jun-09	3.82	ND (0.0005)	ND (0.001)	ND (0.001)	ND (0.003)	--	--	--	--	--	--	--	ND (0.05)	ND (0.40) B	0.006	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	25-Jul-08	3.67	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0015)	--	--	--	--	--	--	--	ND (0.05)	ND (0.40)	0.003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12-Jun-07	--	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0015)	--	--	--	--	--	--	--	ND (0.05)	ND (0.39)	0.003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	31-Jul-06	--	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0015)	--	--	--	--	--	--	--	ND (0.05)	ND (0.42)	0.003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4-Oct-05	--	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0015)	--	--	--	--	--	--	--	ND (0.05)	ND (0.40)	0.003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	14-Aug-19	7.71	ND (0.0002)	ND (0.0005)	ND (0.0005)	ND (0.0015)	ND (0.000500)	ND (0.000500)	ND (0.000500)	0.000450 J	ND (0.000500)	ND (0.000500)	ND (0.000500)	ND (0.05)	0.189 J	0.003	ND (0.0000232)	ND (0.0000232)	ND (0.0000232)	ND (0.0000232)	ND (0.0000232)	ND (0.0000232)	ND (0.0000925)	ND (0.0000232)	ND (0.0000232)	ND (0.0000232)	ND (0.0000232)	ND (0.0000925)	ND (0.0000232)	ND (0.0000232)	ND (0.0000232)	ND (0.0000463)	ND (0.0000232)	ND (0.0000232)	0.003
	30-Aug-18	7.54	ND (.001)	ND (.001)	ND (.001)	ND (.003)	ND (0.000001)	ND (0.000001)	ND (0.000001)	ND (0.000002)	ND (0.000001)	ND (0.000001)	ND (0.000001)	ND (0.15)	1.1	0.004	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	ND (0.000091) Q	0.006
DEC Table C Groundwater Cleanup Levels [1] (ft btoc)			***0.0046***	*1.1*	***0.015***	***0.19***	***0.0056***	***0.06***	*0.45*	***0.0017***	*1.0*	*2.0*	*0.69*	*2.2*	***1.5***	*--*	***0.011***	***0.036***	*0.53*	*0.26*	*0.043*	*0.0003*	*0.00025*	*0.0025*	*0.0008*	*0.00026*	*0.002*	*0.00025*	*0.26*	*0.29*	*0.00019*	***0.0017***	*0.17*	*0.12*	*--*
DEC Water Quality Standards [2] (mg/L)			--	--	--	--	--	--	--	--	--	--	--	--	--	**0.01**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***0.015***

Notes:
Results may be rounded.
[1] 18 AAC 75.345, Table C; **bolded and highlighted Orange** results exceed cleanup level
[2] 18 AAC 70 Water Quality Standards; **Bolded and highlighted Green** results exceed water quality standard
[3] Calculation does not incude 1 and 2 Methylnaphthalene

Key:
-- = not applicable
B = analyte found in associated blank
BTEX = benzene, toluene, ethylbenzene, and xylenes
btoc = below top of casing
DEC = Alaska Department of Environmental Conservation
DRO = diesel-range organics
EPA = United States Environmental Protection Agency
ft = feet
GRO = gasoline-range organics
J = the quantitation is an estimation
J5 = estimated value due to surrogate percent recovery outside the quality control criteria.
mg/L = milligrams per liter
ND = not detected at concentration shown in parentheses
Q = the result is qualified due to quality control criteria not being met
TAH = total aromatic hydrocarbons
QH = sample is biased high

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Table 3: Mann-Kendall Trend Analysis for DRO in MW-2
AFSC 19th Ave. and C St. Groundwater Sampling
Anchorage, Alaska

Monitoring Well: MW-2
Contaminant: DRO

Monitoring Date:	**Oct-05**	**Jul-06**	**Jun-07**	**Jul-08**	**Sep-09**	**Jun-10**	**Jul-12**	**Aug-14**	**Oct-17**	**Aug-18**	**Aug-19**	**Jul-23**
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 7	Event 8	Event 9	Event 10	Event 11	Event 12
DRO in mg/L:	1.62	5.02	3.55	2.11	1.51	1.50	1.23	1.00	0.80	0.86	1.52	1.36

Row 1: Compare to Event 1	1	1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-5
Row 2: Compare to Event 2		-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-10
Row 3: Compare to Event 3			-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-9
Row 4: Compare to Event 4				-1	-1	-1	-1	-1	-1	-1	-1	-1	-8
Row 5: Compare to Event 5					-1	-1	-1	-1	-1	-1	1	-1	-5
Row 6: Compare to Event 6						-1	-1	-1	-1	-1	1	-1	-4
Row 7: Compare to Event 7							-1	-1	-1	-1	1	1	-1
Row 8: Compare to Event 8								-1	-1	-1	1	1	0
Row 9: Compare to Event 9									1	1	1	1	3
Row 10: Compare to Event 10										1	1	1	2
Row 11: Compare to Event 11												-1	-1

Mann-Kendall Statistic (S) = Total	**-38**
Confidence Level	**>95%**
Coefficient of Variance (CV)	**0.70**
Result	**Decreasing**

Notes:

– A minimum of four (4) independent sampling events are required for the Mann-Kendall test to be valid.
– Non-detects are listed as 1/2 of the Reporting Limit (RL).
– A negative S value with confidence > 90% and < 95% indicates a probable decreasing concentration trend.
– A negative S value with confidence > 95% indicates a decreasing concentration trend.
– A positive S value with confidence > 90% and < 95% indicates a probable increasing concentration trend.
– A positive S value with confidence > 95% indicates an increasing concentration trend.
– A positive S value with confidence < 90% indicates that there is likely no concentration trend.
– A negative S value with confidence < 90% and CV > 1 indicates that there is likely no concentration trend.
– A negative S value with confidence < 90% and CV < 1 indicates a stable concentration trend.
– The closer to zero the CV is, the less variation in concentrations between sampling events.
Confidence Level Determination Based on Table A18 (Gilbert, 1987)
Effects of Coefficient of Variance based on Table 3.2 (AFCEE, 2000)

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Table 4-1: Confidence Levels for Mann-Kendall S Statistic and Sample Size From Normal Z-Score
AFSC 19th Avenue C Street Groundwater Sampling
Anchorage, Alaska

Confidence Levels for Mann-Kendall S Statistic and Sample Size, from Standard Normal Z-Score

Total Number of Sampling Events

S (+/-)	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
4	0.912884306	0.836406561	0.77381482	0.725997214	0.68965464	0.661671339	0.639742606	0.622251563	0.60806919	0.596398357	0.586667	0.5784574	0.57145907	0.5654377	0.5602136	0.5556472	0.5516286
5	0.95528532	0.889664319	0.826220982	0.773655395	0.73190661	0.698916236	0.672639577	0.651454195	0.634149138	0.619833846	0.6078518	0.5977145	0.589054154	0.5815901	0.5751058	0.5694318	0.5644343
6	0.979229966	0.929177655	0.870171822	0.816239631	0.77104947	0.734192712	0.704247482	0.679785606	0.659623309	0.642837358	0.6287216	0.6167374	0.606471841	0.5976062	0.5898916	0.5831324	0.5771727
7	0.991291435	0.956794634	0.905756981	0.853443022	0.80676188	0.767243915	0.734375007	0.707105793	0.68438909	0.665332993	0.6492195	0.6354828	0.623679009	0.61346	0.6045507	0.5967327	0.5898309
8	0.996710793	0.974978239	0.933572522	0.885221893	0.8388502	0.797875753	0.762862825	0.733291743	0.708353275	0.68725026	0.669292	0.6539096	0.640643785	0.6291266	0.6190633	0.610217	0.6023962
9	0.99888273	0.986256832	0.95456303	0.911762855	0.86724481	0.825958688	0.78958568	0.75823897	0.731433071	0.708524721	0.6888891	0.671979	0.657335722	0.644582	0.6334103	0.6235699	0.6148561
10	0.999659145	0.992847061	0.969855413	0.933435758	0.89198971	0.851426735	0.814453315	0.781862536	0.753556882	0.729098532	0.7079648	0.6896546	0.673725955	0.6598033	0.6475733	0.6367765	0.6271986
11	0.999906706	0.996474635	0.980611248	0.95073949	0.91322689	0.874273907	0.83741026	0.804097573	0.774664857	0.748920874	0.7264774	0.7069027	0.689787353	0.6747684	0.6615345	0.6498225	0.6394118
12	0.999977111	0.998355693	0.987914726	0.964247292	0.93117708	0.894548537	0.858434565	0.824899305	0.794709202	0.767948263	0.7443898	0.7236924	0.705494648	0.6894569	0.6752772	0.662694	0.6514845
13	0.99999497	0.999274569	0.992702483	0.974557129	0.94611885	0.91234596	0.877535611	0.844242598	0.813654255	0.786144745	0.7616696	0.739996	0.720824545	0.7038494	0.6887853	0.6753779	0.6634056
14	0.999999011	0.999697414	0.99573254	0.982250934	0.95836774	0.927800104	0.89475115	0.862121076	0.831476337	0.803481974	0.7782893	0.7557888	0.735755822	0.7179278	0.7020438	0.6878616	0.6751647
15	0.999999826	0.999880718	0.99758388	0.98786468	0.96825673	0.941074552	0.910143753	0.87854587	0.848163393	0.819939176	0.7942262	0.7710495	0.750269398	0.7316759	0.7150387	0.7001332	0.6867519
16	0.999999973	0.999955575	0.998675918	0.991869532	0.97611938	0.952353581	0.923796858	0.893544049	0.863714441	0.835503	0.8094628	0.7857598	0.764348397	0.7450785	0.727757	0.7121815	0.6981575
17	0.999999996	0.999984373	0.999297797	0.994662991	0.98227605	0.96183363	0.935810614	0.907156815	0.878138858	0.850167276	0.8239861	0.799905	0.77797818	0.7581221	0.7401866	0.7239963	0.7093726
18	1	0.99999481	0.99963969	0.996568103	0.98702377	0.96971557	0.946297682	0.919437525	0.891455525	0.86393268	0.8377882	0.8134734	0.791146365	0.7707949	0.7523169	0.7355677	0.7203889
19	1	0.999998372	0.999821154	0.997838444	0.99062943	0.976198023	0.955379177	0.930449617	0.903691863	0.87680632	0.8508656	0.8264569	0.803842826	0.7830866	0.7641378	0.7468871	0.7311984
20	1	0.999999518	0.999914137	0.998666659	0.99332621	0.981471891	0.963180865	0.940264507	0.91488279	0.888801251	0.8632193	0.8388502	0.816059679	0.7949883	0.775641	0.7579462	0.7417939
21	1	0.999999865	0.999960135	0.999194603	0.99531262	0.985716159	0.969829734	0.948959519	0.925069626	0.899935941	0.8748545	0.8506512	0.827791239	0.806493	0.7868188	0.768738	0.7521686
22	1	0.999999965	0.999982103	0.999523646	0.99675357	0.98909494	0.975451009	0.956615914	0.934298979	0.910233697	0.8857801	0.8618608	0.839033975	0.817595	0.7976649	0.7792559	0.7623166
23	1	0.999999991	0.999992232	0.999724159	0.997783	0.991755672	0.980165665	0.963317037	0.942621633	0.919722054	0.8960088	0.8724825	0.849786442	0.8282903	0.808174	0.7894944	0.7722323
24	1	0.999999998	0.99999674	0.999843628	0.99850726	0.99382832	0.984088436	0.969146655	0.950091469	0.928432162	0.9055563	0.8825226	0.860049198	0.8385762	0.818342	0.7994487	0.7819108
25	1	1	0.999998678	0.999913224	0.99900911	0.995425426	0.987326341	0.974187483	0.956764436	0.936398156	0.9144413	0.8919897	0.869824715	0.8484517	0.828166	0.8091149	0.7913479
26	1	1	0.999999482	0.999952865	0.99935155	0.996642805	0.989977666	0.978519927	0.962697589	0.94365655	0.9226851	0.9008947	0.879117274	0.8579172	0.8376438	0.8184898	0.8005399
27	1	1	0.999999804	0.999974941	0.99958169	0.997560718	0.992131389	0.982221047	0.967948212	0.950245634	0.9303111	0.9092504	0.887932849	0.8669741	0.8467747	0.8275711	0.8094838
28	1	1	0.999999928	0.999986961	0.999734	0.998245355	0.993866969	0.985363745	0.97257303	0.956204911	0.9373444	0.9170717	0.896278993	0.8756256	0.8555586	0.8363572	0.8181771
29	1	1	0.999999975	0.99999336	0.99983327	0.998750486	0.995254452	0.98801616	0.976627529	0.961574564	0.9438118	0.9243747	0.904164704	0.8838756	0.8639967	0.8448473	0.8266179
30	1	1	0.999999991	0.999996691	0.999897	0.999119149	0.996354821	0.990241259	0.980165372	0.966394961	0.9497409	0.9311771	0.911600299	0.8917296	0.872091	0.8530414	0.834805
31	1	1	0.999999997	0.999998387	0.99993728	0.999385308	0.99722054	0.992096613	0.983237917	0.970706212	0.9551603	0.9374977	0.918597275	0.8991938	0.8798443	0.8609401	0.8427376
32	1	1	0.999999999	0.99999923	0.99996236	0.999575387	0.997896224	0.993634318	0.985893849	0.974547776	0.960099	0.9433564	0.925168175	0.9062756	0.8872604	0.8685447	0.8504155
33	1	1	1	0.999999641	0.99997774	0.999709667	0.998419389	0.994901062	0.988178891	0.977958108	0.9645862	0.9487735	0.931326452	0.9129832	0.8943437	0.8758573	0.8578391
34	1	1	1	0.999999836	0.99998703	0.999803503	0.998821236	0.995938288	0.990135616	0.980974372	0.9686509	0.9537702	0.93708633	0.9193256	0.9010995	0.8828804	0.8650094
35	1	1	1	0.999999927	0.99999255	0.99986837	0.999127441	0.996782454	0.991803342	0.983632195	0.972322	0.9583677	0.942462676	0.9253124	0.9075337	0.8896172	0.8719275
36	1	1	1	0.999999968	0.99999578	0.999912725	0.999358908	0.997465345	0.993218085	0.985965475	0.9756275	0.9625877	0.947470869	0.9309541	0.9136528	0.8960716	0.8785955
37	1	1	1	0.999999986	0.99999765	0.999942728	0.999532487	0.998014436	0.994412594	0.988006233	0.9785951	0.9664516	0.952126672	0.9362615	0.919464	0.9022478	0.8850155

> 90% and < 95% Confidence
> 95% Confidence

Notes:
– The test statistic, tau, is computed as $\tau = S/(n(n-1)/2)$
Donald W. Meals, Jean Spooner, Steven A. Dressing, and Jon B. Harcum. 2011. Statistical analysis for monotonic trends, Tech Notes 6, November 2011. Developed for U.S. Environmental Protection Agency by Tetra Tech, Inc., Fairfax, VA, 23 p. Available online at www.bae.ncsu.edu/programs/extension/wqg/319monitoring/tech_notes.htm.

– The standard normal z -score is defined as $z = \tau((9n(n-1))/(2(2n+5)))^{1/2}$
Ajit C. Tamhane and Dorothy D. Dunlop. 2000. Statistics and Data Analysis, from Elementary to Intermediate. Prentice Hall, Upper Saddle River, NJ 07458. p. 591

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Table 4-2: Confidence Levels for Mann-Kendall S Statistic and Sample Size From Normal Z-Score
AFSC 19th Avenue C Street Groundwater Sampling
Anchorage, Alaska

S (+/-)	Number of Sampling Events						
	4	5	6	7	8	9	10
4	0.9128843	0.8364066	0.7738148	0.7259972	0.6896546	0.6616713	0.6397426
5	0.9552853	0.8896643	0.826221	0.7736554	0.7319066	0.6989162	0.672640
6	0.97923	0.9291777	0.8701718	0.8162396	0.7710495	0.7341927	0.7042475
7	0.9912914	0.9567946	0.905757	0.853443	0.8067619	0.7672439	0.734375
8	0.9967108	0.9749782	0.9335725	0.8852219	0.8388502	0.7978758	0.7628628
9	0.9988827	0.9862568	0.954563	0.9117629	0.8672448	0.8259587	0.7895857
10	0.9996591	0.9928471	0.9698554	0.9334358	0.8919897	0.8514267	0.8144533
11	0.9999067	0.9964746	0.9806112	0.9507395	0.9132269	0.8742739	0.8374103
12	0.9999771	0.9983557	0.9879147	0.9642473	0.9311771	0.8945485	0.8584346
13	0.999995	0.9992746	0.9927025	0.9745571	0.9461189	0.912346	0.8775356
14	0.999999	0.9996974	0.9957325	0.9822509	0.9583677	0.9278001	0.8947511
15	0.9999998	0.9998807	0.9975839	0.9878647	0.9682567	0.9410746	0.9101438
16	1	0.9999556	0.9986759	0.9918695	0.9761194	0.9523536	0.9237969
17	1	0.9999844	0.9992978	0.994663	0.9822761	0.9618336	0.9358106
18	1	0.9999948	0.9996397	0.9965681	0.9870238	0.9697156	0.9462977
19	1	0.9999984	0.9998212	0.9978384	0.9906294	0.976198	0.9553792

Key:

	> 90% and < 95% Confidence
	> 95% Confidence

Notes:

- The test statistic, tau, is computed as $\tau = S/(n(n-1)/2)$
  Donald W. Meals, Jean Spooner, Steven A. Dressing, and Jon B. Harcum. 2011. Statistical analysis for monotonic trends, Tech Notes 6, November 2011. Developed for U.S. Environmental Protection Agency by Tetra Tech, Inc., Fairfax, VA, 23 p. Available online at www.bae.ncsu.edu/programs/extension/wqg/319monitoring/tech_notes.htm.
- The standard normal z-score is defined as $z = \tau((9n(n-1))/(2(2n+5)))1/2$
  Ajit C. Tamhane and Dorothy D. Dunlop. 2000. Statistics and Data Analysis, from Elementary to Intermediate. Prentice Hall, Upper Saddle River, NJ 07458. p. 591

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ATTACHMENT 3

FIELD NOTES AND FORMS

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G. Mamikunian
↳ Hoffman

19th & C st. 6/10/21

1010 Prep off sample cooler with groundwater samples @ SGS Lab.

1100 Transport 15 gallon purgewater drum to US Ecology, Viking Drive Facility for disposal.

1130 EOD

G. Mamikunian
6/10/21

Scale: 1 square = _____

A Olson 19th & C 7/27/23 630F
N Simmons 20204.082.02 W7mph Cloudy

0800 Arrived at Antea warehouse. Calibrated YSI and loaded gear in truck

0900 Departed ware house for C st sites

0930 Arrived @ 19th. Located well. well is a 1", do not have the correct pump.

1000 Depart site for Antea warehouse to get correct pump

1055 Arrived back @ 19th and began sample set up @ mw-2

1125 Began purging mw-2 Ltd color is dark grey & there is a Sulfur ~~ord~~ odor.

1150 Collected sample @ mw-2 for DRO, PAH, GRO, FP-VOCs
Primary 19tC-23-mw2
Duplicate 19tC-23-mw9

Scale: 1 square = _____

A Olson
11/7

A. Olsen
N Simmons

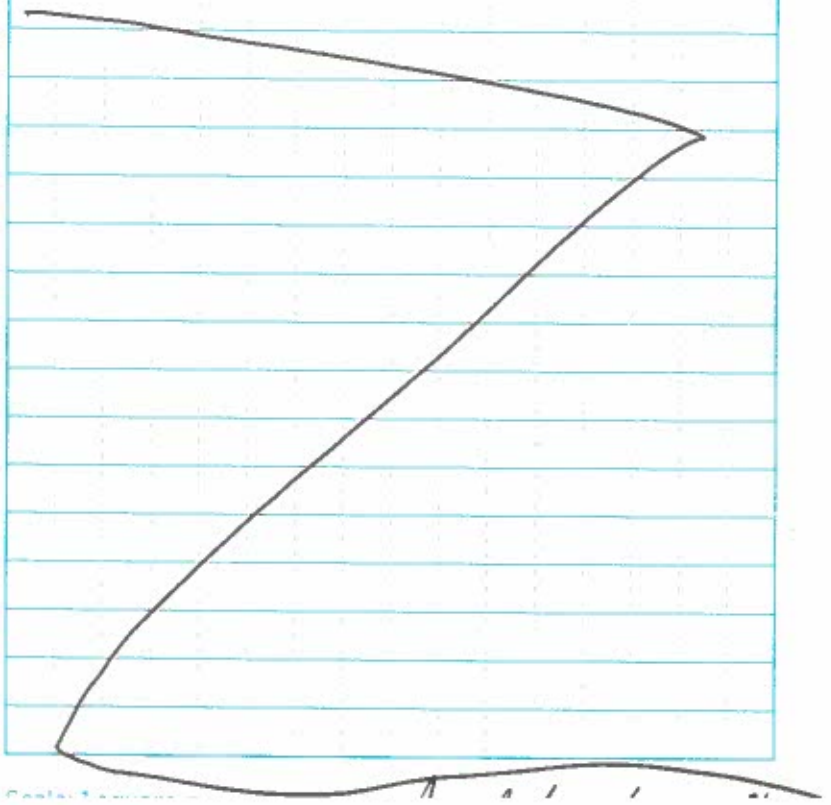
19+C GW
20204.083.02

7/27/23
64°F
sunny

Timed trip blanks WSMPN
19+C-23-TB01 @0800

1230 Began packing up sampling equipment. placed Lock on well

1240 completed sampling @ 19th +C. moved to 16th +C.



Ahtna Engineering Services, LLC

GROUNDWATER SAMPLING FORM

PROJECT NUMBER:

WELL NUMBER: MW-2

SHEET: 1 of 1

PROJECT NAME	19th & C GW monitoring
CLIENT	Menzies
DATE	7/27/23
AOC	19th & C
SCIENTIST	Aasen/N. Simmons
WEATHER/ TEMPERATURE	62°F, partly sunny
WIND	N 5mph
WELL CONDITION	Good
DEPTH TO BASE (ft FROM TOC)	12.35
DEPTH TO WATER (ft FROM TOC)	4.60
HEIGHT OF WATER COLUMN (ft)	7.75
WELL VOLUME (gal)	0.31
3 WELL VOLUMES (gal)	0.93

NOMINAL DIAMETER	O.D.	I.D.	VOLUME (GAL/LIN FT)
(1")	1.315"	1.049"	0.04
1.5"	1.9"	1.610"	0.11
2"	2.375"	2.067"	0.17
3"	3.5"	3.068"	0.38
4"	4.5"	4.026"	0.66

SAMPLING DATA

DEPTH OF PUMP INTAKE: 5' BTOC

SAMPLE COLLECTED WITH: __ Bailer; ✓ Pump, Type: 1" bladder pump; __ Other, Specify:

MADE OF: ✓ Stainless Steel; ___ PVC; ___ Teflon; ___ Disposable LDPE; __ Other, Specify:

SAMPLING DECON PROCEDURE: Alconox, DI H2O

SAMPLE DESCRIPTION: (color, free product thickness, odor, turbidity): dark grey, sulfur odor

FIELD WATER QUALITY PARAMETERS

						Stabilization Requirements (3 must be stable) ± 3%	± 10%	± 0.1	± 10 mV	± 10%		
Time	Purged Volume (Gal)	Purge Rate (mL/min)	Water Level	Draw Down (ft)	Temperature (°C)	Spec. Cond. (µS/cm)[C]	D.O. (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Color	Odor
1125	0	150	4.81	0.21	—	—	—	—	—	—	dark	yes
1138	0.25	150	4.81	0.21	11.0	306.5	2.4	5.84	66.5	7999	dark	yes
1142	0.50	150	4.80	0.20	10.9	294.5	2.3	5.91	55.0	>999	"	"
1145	0.75	150	4.80	0.20	10.9	288.3	1.7	5.93	48.6	7999	"	"
1148	1.0	150	4.80	0.20	10.8	281.5	1.7	5.91	42.8	>999	"	"

ANALYTICAL SAMPLE INFORMATION

Sample ID	Time	Analytes
19+C-23-MW2	1150	(DRO) RRO (GRO) BTEX (PAH) (VOCs) PEST HERB
19+C-23-MW9	1150	(DRO) RRO (GRO) BTEX (PAH) (VOCs) PEST HERB
		DRO RRO GRO BTEX PAH VOCs PEST HERB

Sampling Notes: fuel related VOCs

MW9 is Dup of MW2

Site Health and Safety Plan Acknowledgement Form

Project Name: 19th + C St Project No.: 20204.083.02

This is to certify that I have read this Site Safety and Health Plan (SSHP) and understand its contents. I have attended a site orientation and safety briefing discussing the elements of this SSHP and the safety and health hazards associated with operations to be performed at this site. Failure to comply with the requirements contained in this SSHP may result in my removal from the project.

Print Name	Signature	Date
Ashley Olson		7/27/23
Nick Simmons		7/27/23

Ahtna
Engineering Services, LLC

Daily Tailgate Safety Meeting

Ahtna Engineering Services, LLC

Site Location: 19 + 16 IC Street

Date: 7/27/23

HSE Hazard Identification/Considerations

Hazard possibilities	Considerations	Comments
☑ Slips, trips & falls	☑ Hazard areas acknowledged	
☑ Adverse weather conditions	☑ Proper clothing available	
☐ Noise	☐ Hearing protection	
☑ Power tools/hand tools	☑ Inspected & in good working condition ☑ Operator familiar with proper use	
☐ Presence of heavy equipment	☐ Communication/eye contact w/ operator	
☐ Electrical	☐ GFCI/Power shut-off switch or breaker	
☑ Flam./explosive materials	☑ Correct storage/secure if transporting	MeOH
☑ Hazardous materials	☑ Spill prevention measures in place ☑ MSDS readily available	Sample preservative
☑ Travel to and from site	☑ Load secured ☑ Vehicle in good working condition	
☑ Wildlife interaction	☑ Right of way to wildlife/avoid interaction	people
☐ Travel over sensitive areas	☐ Minimize unnecessary impacts	
☐ Hazardous atmospheres	☐ Atmospheric monitoring devices (i.e. PID)	
☐ Below ground utilities	☐ Utility location complete	
☐ Pinch Points	☐ Hand protection	
☐ Vibration	☐ Anti-vibration gloves	
☐ Overhead hazards	☐ Power lines, loose items, pipelines, etc.	
☑ Site traffic	☑ Reflective and/or bright colored clothing	
Other -- Perform site walk and talk through activities to recognize other hazards(Use comment section if necessary)		
☐	☐	
☐	☐	
☐	☐	
☐	☐	

PPE (As necessary to reduce or eliminate hazards)

☐ Hard hats	☑ Foot protection (i.e. steel toes,	☐ H2S monitor, PID, Multi-gas meter
☑ Safety glasses	☐ Hand (i.e anti-vibration, nitrile)	☐ Respirators or dust guard
☐ Hearing protection	☐ Flotation devices	☐ Fall protection
☐ Fire resistant clothing	☐ Slip Protection (ice grippers)	☐ Face Shields
☐ Other:	☐ Other:	☐ Other:

Other considerations

☑ Spill kit	☑ Viable means of communication available	☑ Safe site access/egress
☑ Fire extinguisher	☐ Ensure necessary permits are in place	☑ Proper waste disposal
☑ First aid kit	☐ Confined space/trenching hazards	

Emergency gathering area: Truck

Location of nearest medical facility: PrCN

Emergency contacts:

Police: 911 Ambulance: 911 Fire: 911

Other:

Comments or special considerations:

I understand the HSE hazards of this job and agree to work safe and work smart.

Print name/company	Signature
Ashley Olson / Ahtna	
Nicic Simmons / Ahtna	

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ATTACHMENT 4

PHOTOGRAPHIC LOG

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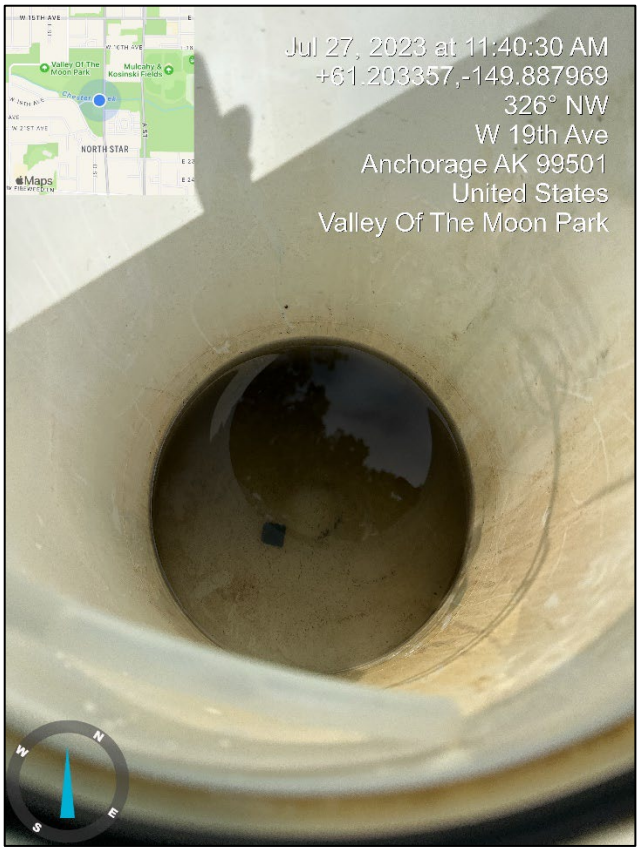
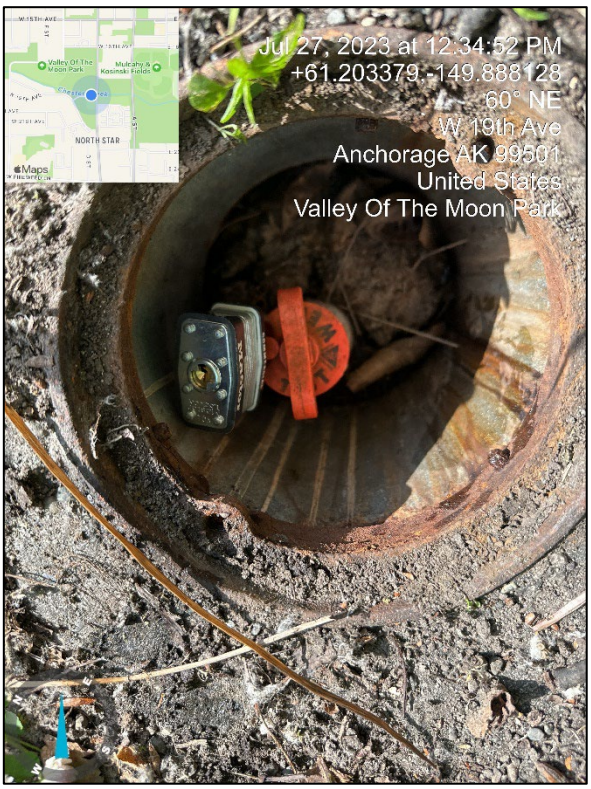
Photograph 1: View looking north. Sampling setup at MW-2.



Photograph 2: View closeup. Color of purge water.



Photograph 3: View closeup. Lock installed on MW-2 well cap.

ATTACHMENT 5

LABORATORY REPORT, DATA QUALITY REPORT, AND ADEC LABORATORY DATA REVIEW CHECKLIST

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DATA QUALITY REVIEW

Date: 9/6/2023

Project: Menzies 19th & C 2023
Laboratory: SGS North America, Inc.
Work Orders: 1233866

Reviewer Name: Keather McLoone, Ahtna
Reviewer Title: Project Chemist

1.0 INTRODUCTION

A Stage 2A data review was conducted accordance with the United States Environmental Protection Agency (EPA) document *Test Methods for Evaluating Solid Wastes, SW-846,* revision 8 (July 2014 and updates), EPA *Contract Laboratory Program National Functional Guidelines for Organic* (January 2017) *Methods Data Review*, and Alaska Department of Environmental Conservation's (DEC's) *Minimum Quality Assurance Requirements for Sample Handling, Reports, and Laboratory Data Technical Memorandum* (October 2019) where and when applicable.

The key data quality indicators (DQIs) of precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) of the project data were evaluated in this Data Quality Review (DQR) by reviewing, where appropriate, the following parameters:

- Chain-of-Custody (CoC) and Sample Receipt Conditions
- Holding times and preservation
- Analytical reporting limits (limits of quantitation [LOQ] and limits of detection [LOD])
- Blank analysis results
- Surrogate recoveries (organics only)
- Field duplicates
- Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results

1.1 Data Qualifier Definitions

For the purpose of this DQR the following code letters and associated definitions are provided for use by the project chemist to summarize the data quality.

- B Result is considered biased high due to blank contamination (method, trip, or equipment blank).
- J Result is considered estimated because it was detected above detection limit (DL), but below LOQ.
- Q Result is considered an estimated value because quality control (QC) criteria were not met; may be biased high (QH) or low (QL) or unknown (QN).

- R Result is rejected and unusable.
- U Analyte is reported as not detected at the LOD.

In the case where a sample result was affected by more than one sample-handling anomaly or QC failure that would result in differing qualifiers, a determination was made as to which qualifier was most conservative, and only that qualifier was retained and reported with the results. The ranking of the qualifiers is generally as follows: R>B>Q>J>U.

1.2 Chain of Custody (CoC) and Sample Receipt Condition

Samples were submitted to SGS, North America, Inc. located in Anchorage, Alaska. Three water samples, including one duplicate, and a trip blank were submitted in under intact custody seals. The sample summary table presents field and sample identification (ID) and sampling details.

Table 1 summarizes field quality control samples by matrix and analyses.

TABLE 1: FIELD QUALITY CONTROL SAMPLES

Field ID	Lab ID	Analyses	Quality Control
19&C-23-MW2	1233866001	DRO, FR-VOCs, GRO, PAHs	Primary
19&C-23-MW9	1233866002	DRO, FR-VOCs, GRO, PAHs	Duplicate of 19&C-23-MW2
19&C-23-TB01	1233866003	FR-VOCs & GRO	Trip Blank

Key:
DRO – diesel range organics
FR-VOCs – fuel related VOCs
GRO – gasoline range organics
PAH - polyaromatic hydrocarbons

1.3 Holding Times and Preservation

Samples were received in good condition, within acceptable temperature range, properly preserved, and within the method specified hold times.

1.4 Analytical Reporting Limits

Analytical reporting limits were compared to project action/screening limits to determine if the laboratory had adequate analytical sensitivity to support project data quality objectives. Project action limits were based upon Alaska Administrative Code Title 18 Chapter 75 (18 AAC 75) Table C Groundwater Cleanup Levels and 18 AAC 70 Water Quality Standards.

1.5 Blanks

1.5.1 Trip Blanks

A trip blank accompanied the sample cooler that contained samples for volatiles analyses. There were no trip blank detections.

1.5.2 Method Blanks

No analytes were detected in the method blanks (MBs) with the following exceptions:

- There were 11 PAH compounds detected above the LOD in the MB. Also, DRO was detected above the LOQ in the MB. Both samples had DRO and 19&C-23-MW9 had benzo(a)anthracene, chrysene, fluoranthene, phenanthrene, and pyrene detected within five times the concentration in the MB. These results were B flagged. B flagged data should be considered estimated with a high bias.

1.5.3 Equipment Blanks

No equipment blanks were submitted. Disposable sampling equipment was used during field sample collection.

1.6 Surrogates

Surrogate spike recoveries were evaluated as a measure of analytical accuracy and assessment of potential matric effects. All surrogates were acceptable with the following exceptions:

- The AK101 surrogate for 19&C-23-MW9 and 19&C-23-MW2 were above acceptance criteria. Therefore, these result were QH flagged. QH flagged results are considered estimated with a high bias.

- The VOC surrogate toluene-d8 was above acceptance criteria in 19&C-23-MW2 and the associated detected results for ethylbenzene, toluene, isopropylbenzene and xylenes were QH flagged. QH flagged results are considered estimated with a high bias. Note that the lab reported 2 result for isopropylbenzene, one diluted and the other undiluted. While these 2 results are very comparable, only the undiluted result was QH flagged.

- There were also surrogates out for lab QC samples such as MBs and LCSs but no sample qualifications were made on this basis. Field Duplicates

1.7 Field Duplicates

Field duplicates were collected at the required frequency as specified in the work plan. The relative percent difference (RPD) between the primary and field duplicate sample results were evaluated as a measure of field precision. Duplicate RPDs were calculated when a given analyte was detected

in both samples. Duplicate RPDs were compared to the 30% criteria for waters. All duplicate RPDs were within criteria.

1.8 Laboratory Control Spike/Laboratory Control Spike Duplicate (LCS/LCSD)

Percent recoveries of spiked analyte concentrations were evaluated for the Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (LCSD) samples as a measure of analytical accuracy. RPDs of LCS/LCSD analyte concentrations were evaluated to assess analytical precision. All LCS/LCSD recoveries and RPDs were within quality control criteria with the following exceptions:

- There were six compounds in the PAH LCS and seven in the LCSD that were below acceptance criteria; therefore, 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, anthracene, fluorene, naphthalene, and phenanthrene results in both samples were QL flagged on this basis. QL flagged results should be considered estimated with a low bias.

1.9 Matrix Spikes/Matrix Spike Duplicate (MS/MSD)

No project specific MS/MSD were analyzed.

2.0 OVERALL ASSSESSMENT

All data necessary to complete this review were provided. Based on the data review completed, minimal data were qualified, and project completeness goal was met. Although qualified results are considered estimated, they are considered usable. All other sample results are valid with no data qualifiers assigned. All samples were collected considered representative of site conditions. All analytical data is considered usable for the purpose of evaluating the presence or absence and magnitude of the suspected site contaminants.

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3.0 REFERENCES

Alaska Department of Environmental Conservation (ADEC), 2019. *Field Sampling Guidance for Contaminated Sites and Leaking Underground Storage Tank Sites.*

ADEC. 2019. *Minimum Quality Assurance Requirements for Sample Handling, Reports, and Laboratory Data.*

EPA, 2017. *National Functional Guidelines for Organic Superfund Methods Data Review* (SOM02.4).

EPA, 2014. SW-846 Update V: *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*.

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ADEC Contaminated Sites Program Laboratory Data Review Checklist

Completed By:	Keather McLoone	**CS Site Name:**	Menzies 19th & C 2023	**Lab Name:**	SGS
Title:	Senior Chemist	**ADEC File No.:**	2100.38.437	**Lab Report No.:**	1233886
Consulting Firm:	Ahtna	**Hazard ID No.:**	419	**Lab Report Date:**	9/5/23

Note: *Any N/A or No box checked must have an explanation in the comments box.*

1. **Laboratory**

   a. Did an ADEC Contaminated Sites Laboratory Approval Program (CS-LAP) approved laboratory receive and perform all of the submitted sample analyses?
   Yes ☒ No ☐ N/A ☐
   Comments: Click or tap here to enter text.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses CS-LAP approved?
   Yes ☐ No ☐ N/A ☒
   Comments: No transfer.

2. **Chain of Custody (CoC)**

   a. Is the CoC information completed, signed, and dated (including released/received by)?
   Yes ☒ No ☐ N/A ☐
   Comments: Click or tap here to enter text.

   b. Were the correct analyses requested?
   Yes ☒ No ☐ N/A ☐
   Analyses requested: Click or tap here to enter text.
   Comments: Click or tap here to enter text.

3. **Laboratory Sample Receipt Documentation**

   a. Is the sample/cooler temperature documented and within range at receipt (0° to 6° C)?
   Yes ☒ No ☐ N/A ☐
   Cooler temperature(s): Click or tap here to enter text.
   Sample temperature(s): Click or tap here to enter text.

Comments: Click or tap here to enter text.

b. Is the sample preservation acceptable – acidified waters, methanol preserved soil (GRO, BTEX, VOCs, etc.)?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

c. Is the sample condition documented – broken, leaking, zero headspace (VOA vials); canister vacuum/pressure checked and no open valves, etc.?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, canister not holding a vacuum, etc.?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

e. Is the data quality or usability affected?
Yes ☐ No ☒ N/A ☐
Comments: No issues

4. Case Narrative

a. Is the case narrative present and understandable?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

b. Are there discrepancies, errors, or QC failures identified by the lab?
Yes ☐ No ☒ N/A ☐
Comments: No issues

c. Were all the corrective actions documented?
Yes ☐ No ☐ N/A ☒
Comments: No issues

d. What is the effect on data quality/usability according to the case narrative?
Comments: None, no issues

5. Sample Results

a. Are the correct analyses performed/reported as requested on CoC?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

b. Are all applicable holding times met?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

c. Are all soils reported on a dry weight basis?
Yes ☐ No ☐ N/A ☒
Comments: just water

d. Are the reported limits of quantitation (LoQ) or limits of detections (LOD), or reporting limits (RL) less than the Cleanup Level or the action level for the project?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

e. Is the data quality or usability affected?
Yes ☐ No ☒ N/A ☐
Comments: No issues.

6. QC Samples

a. Method Blank

i. Was one method blank reported per matrix, analysis, and 20 samples?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

ii. Are all method blank results less than LOQ (or RL)?
Yes ☐ No ☒
Comments: There were 11 PAH compounds detected above the LOD in the MB. Also, DRO was detected above the LOQ in the MB.

iii. If above LoQ or RL, what samples are affected?
Comments: .Both samples had DRO and 19+C-23-MW9 had benzo(a)anthracene, chrysene, fluoranthene, phenanthrene, and pyrene detected within five times the concentration in the MB.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes ☒ No ☐ N/A ☐
Comments: These results were B flagged.

v. Data quality or usability affected?
Yes ☒ No ☐ N/A ☐
Comments: B flagged data should be considered estimated with a high bias.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – Are one LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

ii. Metals/Inorganics – Are one LCS and one sample duplicate reported per matrix, analysis and 20 samples?
Yes ☐ No ☐ N/A ☒
Comments: No inorganics/metals

iii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)
Yes ☐ No ☒ N/A ☐
Comments: There were six compounds in the PAH LCS and seven in the LCSD that were below acceptance criteria; therefore, 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, anthracene, fluorene, naphthalene, and phenanthrene results in both samples were QL flagged on this basis.

iv. Precision – Are all relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? Was the RPD reported from LCS/LCSD, and or sample/sample duplicate? (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

v. If %R or RPD is outside of acceptable limits, what samples are affected?
Comments: Both samples.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes ☒ No ☐ N/A ☐
Comments:

vii. Is the data quality or usability affected?
Yes ☒ No ☐ N/A ☐
Comments: QL flagged results should be considered estimated with a low bias.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

i. Organics – Are one MS/MSD reported per matrix, analysis and 20 samples?
Yes ☐ No ☐ N/A ☒
Comments: not planned or required

ii. Metals/Inorganics – Are one MS/MSD reported per matrix, analysis and 20 samples?
Yes ☐ No ☐ N/A ☒
Comments: no inorganics/metals

iii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?
Yes ☐ No ☐ N/A ☒
Comments: not planned or required

iv. Precision – Are all relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.
Yes ☐ No ☐ N/A ☒
Comments: not planned or required

v. If %R or RPD is outside of acceptable limits, what samples are affected?
Comments: Click or tap here to enter text.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes ☐ No ☐ N/A ☒
Comments: not planned or required

vii. Is the data quality or usability affected?
Yes ☐ No ☐ N/A ☒
Comments: not planned or required

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC, and laboratory samples?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

ii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK

Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)
Yes ☐ No ☒ N/A ☐
Comments: The AK101 surrogate for 19+C-23-MW9 and 19+C-23-MW2 were above acceptance criteria. Therefore, these result were QH flagged. The VOC surrogate toluene-d8 was above acceptance criteria in 19+C-23-MW2 and the associated detected results for ethylbenzene, toluene, isopropylbenzene and xylenes were QH flagged. Note that the lab reported 2 result for isopropylbenzene, one diluted and the other undiluted. While these 2 results are very comparable, only the undiluted result was QH flagged.There were also surrogates out for lab QC samples such as MBs and LCSs but no sample qualifications were made on this basis.

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?
Yes ☒ No ☐ N/A ☐
Comments:

iv. Is the data quality or usability affected?
Yes ☒ No ☐ N/A ☐
Comments QH flagged results are considered estimated with a high bias.

e. Trip Blanks

i. Is one trip blank reported per matrix, analysis, and for each cooler containing volatile samples? Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

ii. Are all results less than LoQ or RL?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

iii. If above LoQ or RL, what samples are affected?
Comments: Click or tap here to enter text.

iv. Is the data quality or usability affected?
Yes ☐ No ☐ N/A ☒
Comments: No issues

f. Field Duplicate

i. Are one field duplicate submitted per matrix, analysis, and 10 project samples?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

ii. Was the duplicate submitted blind to lab?
Yes ☒ No ☐ N/A ☐
Comments: 19+C-23-MW9 is the field duplicate for 19+C-23-MW2

iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water or air, 50% soil)

$$RPD\ (\%) = \left| \frac{R_1 - R_2}{\left(\frac{R_1 + R_2}{2}\right)} \right| X\ 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Is the data quality or usability affected? (Explain)

Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

iv. Is the data quality or usability affected? (Explain)
Yes ☐ No ☒ N/A ☐
Comments: No issues

g. Decontamination or Equipment Blanks

i. Were decontamination or equipment blanks collected?
Yes ☐ No ☐ N/A ☒
Comments: not planned

ii. Are all results less than LoQ or RL?
Yes ☐ No ☐ N/A ☒
Comments: not planned

iii. If above LoQ or RL, specify what samples are affected.
Comments: Click or tap here to enter text.

iv. Are data quality or usability affected?
Yes ☐ No ☐ N/A ☒
Comments: not planned

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Are they defined and appropriate?
Yes ☐ No ☐ N/A ☒
Comments: no other flags/qualifiers warranted

Laboratory Report of Analysis

To: Ahtna Engineering Svs (AES)
110 W 38th Ave Suite 100
Anchorage, AK 99503
433-0710

Report Number: **1233886**

Client Project: **19 + C St GW Monitoring**

Dear Nick Simmons,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Justin at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

_____

Justin Nelson Date
Project Manager
Justin.Nelson@sgs.com

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Case Narrative

SGS Client: **Ahtna Engineering Svs (AES)**
SGS Project: **1233886**
Project Name/Site: **19 + C St GW Monitoring**
Project Contact: **Nick Simmons**

Revised Report - Case narrative corrections have been made.
Refer to sample receipt form for information on sample condition.

19+C-23-MW2 (1233886001) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene does not meet QC criteria due to matrix interference.
8260D - Surrogate recovery for Toluene-d8 does not meet QC criteria. Surrogate recovery was biased high.
8270D SIM - PAH LCS/LCSD recoveries for several analytes do not meet QC criteria. Sample was re-extracted outside of hold time and results confirmed. In hold data reported.
AK102 - DRO is detected in the MB above the LOQ. Sample was re-extracted outside of hold-time and results confirmed. In-hold results are reported.

19+C-23-MW9 (1233886002) PS

AK101 - Surrogate recovery for 4-bromofluorobenzene does not meet QC criteria due to matrix interference.
8270D SIM - PAH LCS/LCSD recoveries for several analytes do not meet QC criteria. Sample was re-extracted outside of hold time and results confirmed. In hold data reported.
AK102 - DRO is detected in the MB above the LOQ. Sample was re-extracted outside of hold-time and results confirmed. In-hold results are reported.

MB for HBN 1860594 [XXX/48321] (1726076) MB

8270D SIM - PAH surrogate recovery for 2-Methylnaphthalene-d10 does not meet QC criteria.

LCS for HBN 1860594 [XXX/48321 (1726077) LCS

8270D SIM - PAH LCS recoveries for several analytes do not meet QC criteria.
8270D SIM - PAH surrogate recovery for 2-methylnaphthalene-d10 does not meet QC criteria.

LCSD for HBN 1860594 [XXX/4832 (1726078) LCSD

8270D SIM - PAH LCSD recoveries for several analytes do not meet QC criteria.
8270D SIM - PAH surrogate recovery for 2-methylnaphthalene-d10 does not meet QC criteria.

MB for HBN 1861474 [XXX/48377] (1727684) MB

AK102 - DRO is detected in the MB above the LOQ. The associated sample concentrations are less than the LOQ or 5X greater than LOQ.
AK102/103 - Surrogate recoveries for 5a-androstane and n-triacontane do not meet QC criteria.

LCS for HBN 1861474 [XXX/48377 (1727685) LCS

AK102 - Surrogate recovery for 5a-androstane does not meet QC criteria.

LCSD for HBN 1861474 [XXX/4837 (1727686) LCSD

AK102 - Surrogate recovery for 5a-androstane does not meet QC criteria.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

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Report of Manual Integrations

Laboratory ID	Client Sample ID	Analytical Batch	Analyte	Reason
SW8260D				
1233886001	19+C-23-MW2	VMS22627	tert-Butylbenzene	SP
1233886002	19+C-23-MW9	VMS22627	tert-Butylbenzene	SP

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Print Date: 09/11/2023 8:37:14AM

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. The results apply to the samples as received. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020B, 7470A, 7471B, 8015C, 8021B, 8082A, 8260D, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). SGS is only certified for the analytes listed on our Drinking Water Certification (DW methods: 200.8, 2130B, 2320B, 2510B, 300.0, 4500-CN-C,E, 4500-H-B, 4500-NO3-F, 4500-P-E and 524.2) and only those analytes will be reported to the State of Alaska for compliance. Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
TNTC	Too Numerous To Count
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
19+C-23-MW2	1233886001	07/27/2023	07/28/2023	Water (Surface, Eff., Ground)
19+C-23-MW9	1233886002	07/27/2023	07/28/2023	Water (Surface, Eff., Ground)
19+C-23-TB01	1233886003	07/27/2023	07/28/2023	Water (Surface, Eff., Ground)

Method	Method Description
8270D SIM LV (PAH)	8270 PAH SIM GC/MS LV
AK102	DRO Low Volume (W)
AK101	Gasoline Range Organics (W)
SW8260D	Volatile Organic Compounds (W) FULL

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Detectable Results Summary

Client Sample ID: **19+C-23-MW2**
Lab Sample ID: 1233886001

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	27.9	ug/L
	2-Methylnaphthalene	21.2	ug/L
	Acenaphthene	0.156	ug/L
	Acenaphthylene	0.0536	ug/L
	Fluorene	0.184	ug/L
	Naphthalene	35.9	ug/L
Semivolatile Organic Fuels	Diesel Range Organics	1.35	mg/L
Volatile Fuels	Gasoline Range Organics	0.564	mg/L
Volatile GC/MS- Petroleum VOC Group	1,2,4-Trimethylbenzene	175	ug/L
	1,3,5-Trimethylbenzene	39.7	ug/L
	Benzene	2.12	ug/L
	Ethylbenzene	9.38	ug/L
	Isopropylbenzene (Cumene)	23.3	ug/L
	Isopropylbenzene (Cumene)	21.1	ug/L
	Naphthalene	90.4	ug/L
	o-Xylene	0.321J	ug/L
	P & M -Xylene	63.0	ug/L
	sec-Butylbenzene	12.5	ug/L
	tert-Butylbenzene	1.32	ug/L
	Xylenes (total)	63.3	ug/L

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Detectable Results Summary

Client Sample ID: **19+C-23-MW9**
Lab Sample ID: 1233886002

	Parameter	Result	Units
Polynuclear Aromatics GC/MS	1-Methylnaphthalene	29.2	ug/L
	2-Methylnaphthalene	22.7	ug/L
	Acenaphthene	0.168	ug/L
	Acenaphthylene	0.0638	ug/L
	Anthracene	0.0156J	ug/L
	Benzo(a)Anthracene	0.0170J	ug/L
	Chrysene	0.0154J	ug/L
	Fluoranthene	0.0150J	ug/L
	Fluorene	0.214	ug/L
	Naphthalene	37.7	ug/L
	Phenanthrene	0.0348J	ug/L
	Pyrene	0.0153J	ug/L
Semivolatile Organic Fuels	Diesel Range Organics	1.36	mg/L
Volatile Fuels	Gasoline Range Organics	0.566	mg/L
Volatile GC/MS- Petroleum VOC Group	1,2,4-Trimethylbenzene	165	ug/L
	1,3,5-Trimethylbenzene	40.9	ug/L
	Benzene	2.19	ug/L
	Ethylbenzene	9.53	ug/L
	Isopropylbenzene (Cumene)	24.0	ug/L
	Naphthalene	92.4	ug/L
	o-Xylene	0.317J	ug/L
	P & M -Xylene	63.5	ug/L
	sec-Butylbenzene	13.0	ug/L
	tert-Butylbenzene	1.38	ug/L
	Xylenes (total)	63.8	ug/L

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Results of **19+C-23-MW2**

Client Sample ID: **19+C-23-MW2**
Client Project ID: **19 + C St GW Monitoring**
Lab Sample ID: 1233886001
Lab Project ID: 1233886

Collection Date: 07/27/23 11:50
Received Date: 07/28/23 09:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	27.9		0.240	0.0721	0.120	ug/L	5		08/09/23 19:23
2-Methylnaphthalene	21.2		0.240	0.0721	0.120	ug/L	5		08/09/23 19:23
Acenaphthene	0.156		0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:09
Acenaphthylene	0.0536		0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:09
Anthracene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:09
Benzo(a)Anthracene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:09
Benzo[a]pyrene	0.00960	U	0.0192	0.00596	0.00960	ug/L	1		08/04/23 17:09
Benzo[b]Fluoranthene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:09
Benzo[g,h,i]perylene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:09
Benzo[k]fluoranthene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:09
Chrysene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:09
Dibenzo[a,h]anthracene	0.00960	U	0.0192	0.00596	0.00960	ug/L	1		08/04/23 17:09
Fluoranthene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:09
Fluorene	0.184		0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:09
Indeno[1,2,3-c,d] pyrene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:09
Naphthalene	35.9		0.481	0.149	0.240	ug/L	5		08/09/23 19:23
Phenanthrene	0.0481	U	0.0962	0.0298	0.0481	ug/L	1		08/04/23 17:09
Pyrene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:09
Surrogates									
2-Methylnaphthalene-d10 (surr)	56.6		38-100			%	1		08/04/23 17:09
Fluoranthene-d10 (surr)	45.9		30-111			%	1		08/04/23 17:09

Batch Information

Analytical Batch: XMS13818
Analytical Method: 8270D SIM LV (PAH)
Analyst: HMW
Analytical Date/Time: 08/04/23 17:09
Container ID: 1233886001-C

Prep Batch: XXX48321
Prep Method: SW3535A
Prep Date/Time: 08/01/23 10:00
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS13822
Analytical Method: 8270D SIM LV (PAH)
Analyst: HMW
Analytical Date/Time: 08/09/23 19:23
Container ID: 1233886001-C

Prep Batch: XXX48321
Prep Method: SW3535A
Prep Date/Time: 08/01/23 10:00
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 09/11/2023 8:37:20AM

J flagging is activated

Results of **19+C-23-MW2**

Client Sample ID: **19+C-23-MW2**
Client Project ID: **19 + C St GW Monitoring**
Lab Sample ID: 1233886001
Lab Project ID: 1233886

Collection Date: 07/27/23 11:50
Received Date: 07/28/23 09:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	1.35		0.638	0.213	0.319	mg/L	1		08/23/23 20:47
Surrogates									
5a Androstane (surr)	115		50-150			%	1		08/23/23 20:47

Batch Information

Analytical Batch: XFC16623
Analytical Method: AK102
Analyst: T.L
Analytical Date/Time: 08/23/23 20:47
Container ID: 1233886001-A

Prep Batch: XXX48377
Prep Method: SW3520C
Prep Date/Time: 08/09/23 14:54
Prep Initial Wt./Vol.: 235 mL
Prep Extract Vol: 1 mL

Print Date: 09/11/2023 8:37:20AM

J flagging is activated

Results of **19+C-23-MW2**

Client Sample ID: **19+C-23-MW2**
Client Project ID: **19 + C St GW Monitoring**
Lab Sample ID: 1233886001
Lab Project ID: 1233886

Collection Date: 07/27/23 11:50
Received Date: 07/28/23 09:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.564		0.100	0.0450	0.0500	mg/L	1		07/30/23 22:40
Surrogates									
4-Bromofluorobenzene (surr)	164	*	50-150			%	1		07/30/23 22:40

Batch Information

Analytical Batch: VFC16548
Analytical Method: AK101
Analyst: CWD
Analytical Date/Time: 07/30/23 22:40
Container ID: 1233886001-H

Prep Batch: VXX40208
Prep Method: SW5030B
Prep Date/Time: 07/30/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/11/2023 8:37:20AM

J flagging is activated

Results of **19+C-23-MW2**

Client Sample ID: **19+C-23-MW2**
Client Project ID: **19 + C St GW Monitoring**
Lab Sample ID: 1233886001
Lab Project ID: 1233886

Collection Date: 07/27/23 11:50
Received Date: 07/28/23 09:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS- Petroleum VOC Group**

Parameter	Result	Qual		LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	175			10.0	3.10	5.00	ug/L	10		08/07/23 17:40
1,2-Dibromoethane	0.0375	U		0.0750	0.0180	0.0375	ug/L	1		08/01/23 20:49
1,2-Dichloroethane	0.250	U		0.500	0.200	0.250	ug/L	1		08/01/23 20:49
1,3,5-Trimethylbenzene	39.7			1.00	0.310	0.500	ug/L	1		08/01/23 20:49
Benzene	2.12			0.400	0.120	0.200	ug/L	1		08/01/23 20:49
Ethylbenzene	9.38			1.00	0.310	0.500	ug/L	1		08/01/23 20:49
Isopropylbenzene (Cumene)	23.3			1.00	0.310	0.500	ug/L	1		08/01/23 20:49
Isopropylbenzene (Cumene)	21.1			10.0	3.10	5.00	ug/L	10		08/07/23 17:40
Methyl-t-butyl ether	5.00	U		10.0	3.10	5.00	ug/L	1		08/01/23 20:49
Naphthalene	90.4			1.00	0.310	0.500	ug/L	1		08/01/23 20:49
n-Butylbenzene	0.500	U		1.00	0.310	0.500	ug/L	1		08/01/23 20:49
o-Xylene	0.321	J		1.00	0.310	0.500	ug/L	1		08/01/23 20:49
P & M -Xylene	63.0			2.00	0.620	1.00	ug/L	1		08/01/23 20:49
sec-Butylbenzene	12.5			1.00	0.310	0.500	ug/L	1		08/01/23 20:49
tert-Butylbenzene	1.32			1.00	0.310	0.500	ug/L	1		08/01/23 20:49
Toluene	0.500	U		1.00	0.310	0.500	ug/L	1		08/01/23 20:49
Xylenes (total)	63.3			3.00	1.00	1.50	ug/L	1		08/01/23 20:49
Surrogates										
1,2-Dichloroethane-D4 (surr)	112			81-118			%	1		08/01/23 20:49
4-Bromofluorobenzene (surr)	94.6			85-114			%	1		08/01/23 20:49
Toluene-d8 (surr)	114		*	89-112			%	1		08/01/23 20:49

Batch Information

Analytical Batch: VMS22643
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/07/23 17:40
Container ID: 1233886001-F

Prep Batch: VXX40239
Prep Method: SW5030B
Prep Date/Time: 08/07/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS22627
Analytical Method: SW8260D
Analyst: PHK
Analytical Date/Time: 08/01/23 20:49
Container ID: 1233886001-E

Prep Batch: VXX40216
Prep Method: SW5030B
Prep Date/Time: 08/01/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/11/2023 8:37:20AM

J flagging is activated

Results of **19+C-23-MW9**

Client Sample ID: **19+C-23-MW9**
Client Project ID: **19 + C St GW Monitoring**
Lab Sample ID: 1233886002
Lab Project ID: 1233886

Collection Date: 07/27/23 11:50
Received Date: 07/28/23 09:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	29.2		0.240	0.0721	0.120	ug/L	5		08/09/23 19:39
2-Methylnaphthalene	22.7		0.240	0.0721	0.120	ug/L	5		08/09/23 19:39
Acenaphthene	0.168		0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:25
Acenaphthylene	0.0638		0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:25
Anthracene	0.0156	J	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:25
Benzo(a)Anthracene	0.0170	J	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:25
Benzo[a]pyrene	0.00960	U	0.0192	0.00596	0.00960	ug/L	1		08/04/23 17:25
Benzo[b]Fluoranthene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:25
Benzo[g,h,i]perylene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:25
Benzo[k]fluoranthene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:25
Chrysene	0.0154	J	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:25
Dibenzo[a,h]anthracene	0.00960	U	0.0192	0.00596	0.00960	ug/L	1		08/04/23 17:25
Fluoranthene	0.0150	J	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:25
Fluorene	0.214		0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:25
Indeno[1,2,3-c,d] pyrene	0.0240	U	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:25
Naphthalene	37.7		0.481	0.149	0.240	ug/L	5		08/09/23 19:39
Phenanthrene	0.0348	J	0.0962	0.0298	0.0481	ug/L	1		08/04/23 17:25
Pyrene	0.0153	J	0.0481	0.0144	0.0240	ug/L	1		08/04/23 17:25
Surrogates									
2-Methylnaphthalene-d10 (surr)	58.6		38-100			%	1		08/04/23 17:25
Fluoranthene-d10 (surr)	53.5		30-111			%	1		08/04/23 17:25

Batch Information

Analytical Batch: XMS13818
Analytical Method: 8270D SIM LV (PAH)
Analyst: HMW
Analytical Date/Time: 08/04/23 17:25
Container ID: 1233886002-C

Prep Batch: XXX48321
Prep Method: SW3535A
Prep Date/Time: 08/01/23 10:00
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Analytical Batch: XMS13822
Analytical Method: 8270D SIM LV (PAH)
Analyst: HMW
Analytical Date/Time: 08/09/23 19:39
Container ID: 1233886002-C

Prep Batch: XXX48321
Prep Method: SW3535A
Prep Date/Time: 08/01/23 10:00
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 09/11/2023 8:37:20AM

J flagging is activated

Results of **19+C-23-MW9**

Client Sample ID: **19+C-23-MW9**
Client Project ID: **19 + C St GW Monitoring**
Lab Sample ID: 1233886002
Lab Project ID: 1233886

Collection Date: 07/27/23 11:50
Received Date: 07/28/23 09:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	1.36		0.638	0.213	0.319	mg/L	1		08/23/23 20:36
Surrogates									
5a Androstane (surr)	103		50-150			%	1		08/23/23 20:36

Batch Information

Analytical Batch: XFC16623
Analytical Method: AK102
Analyst: T.L
Analytical Date/Time: 08/23/23 20:36
Container ID: 1233886002-A

Prep Batch: XXX48377
Prep Method: SW3520C
Prep Date/Time: 08/09/23 14:54
Prep Initial Wt./Vol.: 235 mL
Prep Extract Vol: 1 mL

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Results of **19+C-23-MW9**

Client Sample ID: **19+C-23-MW9**
Client Project ID: **19 + C St GW Monitoring**
Lab Sample ID: 1233886002
Lab Project ID: 1233886

Collection Date: 07/27/23 11:50
Received Date: 07/28/23 09:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.566		0.100	0.0450	0.0500	mg/L	1		07/30/23 22:58
Surrogates									
4-Bromofluorobenzene (surr)	162	*	50-150			%	1		07/30/23 22:58

Batch Information

Analytical Batch: VFC16548
Analytical Method: AK101
Analyst: CWD
Analytical Date/Time: 07/30/23 22:58
Container ID: 1233886002-H

Prep Batch: VXX40208
Prep Method: SW5030B
Prep Date/Time: 07/30/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/11/2023 8:37:20AM

J flagging is activated

Results of **19+C-23-MW9**

Client Sample ID: **19+C-23-MW9**
Client Project ID: **19 + C St GW Monitoring**
Lab Sample ID: 1233886002
Lab Project ID: 1233886

Collection Date: 07/27/23 11:50
Received Date: 07/28/23 09:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS- Petroleum VOC Group**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	165		10.0	3.10	5.00	ug/L	10		08/07/23 17:25
1,2-Dibromoethane	0.0375	U	0.0750	0.0180	0.0375	ug/L	1		08/01/23 21:04
1,2-Dichloroethane	0.250	U	0.500	0.200	0.250	ug/L	1		08/01/23 21:04
1,3,5-Trimethylbenzene	40.9		1.00	0.310	0.500	ug/L	1		08/01/23 21:04
Benzene	2.19		0.400	0.120	0.200	ug/L	1		08/01/23 21:04
Ethylbenzene	9.53		1.00	0.310	0.500	ug/L	1		08/01/23 21:04
Isopropylbenzene (Cumene)	24.0		1.00	0.310	0.500	ug/L	1		08/01/23 21:04
Methyl-t-butyl ether	5.00	U	10.0	3.10	5.00	ug/L	1		08/01/23 21:04
Naphthalene	92.4		1.00	0.310	0.500	ug/L	1		08/01/23 21:04
n-Butylbenzene	0.500	U	1.00	0.310	0.500	ug/L	1		08/01/23 21:04
o-Xylene	0.317	J	1.00	0.310	0.500	ug/L	1		08/01/23 21:04
P & M -Xylene	63.5		2.00	0.620	1.00	ug/L	1		08/01/23 21:04
sec-Butylbenzene	13.0		1.00	0.310	0.500	ug/L	1		08/01/23 21:04
tert-Butylbenzene	1.38		1.00	0.310	0.500	ug/L	1		08/01/23 21:04
Toluene	0.500	U	1.00	0.310	0.500	ug/L	1		08/01/23 21:04
Xylenes (total)	63.8		3.00	1.00	1.50	ug/L	1		08/01/23 21:04
Surrogates									
1,2-Dichloroethane-D4 (surr)	112		81-118			%	1		08/01/23 21:04
4-Bromofluorobenzene (surr)	96.3		85-114			%	1		08/01/23 21:04
Toluene-d8 (surr)	99.8		89-112			%	1		08/01/23 21:04

Batch Information

Analytical Batch: VMS22643
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/07/23 17:25
Container ID: 1233886002-F

Prep Batch: VXX40239
Prep Method: SW5030B
Prep Date/Time: 08/07/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS22627
Analytical Method: SW8260D
Analyst: PHK
Analytical Date/Time: 08/01/23 21:04
Container ID: 1233886002-E

Prep Batch: VXX40216
Prep Method: SW5030B
Prep Date/Time: 08/01/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/11/2023 8:37:20AM

J flagging is activated

Results of **19+C-23-TB01**

Client Sample ID: **19+C-23-TB01**
Client Project ID: **19 + C St GW Monitoring**
Lab Sample ID: 1233886003
Lab Project ID: 1233886

Collection Date: 07/27/23 08:00
Received Date: 07/28/23 09:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.0500	U	0.100	0.0450	0.0500	mg/L	1		07/30/23 23:16
Surrogates									
4-Bromofluorobenzene (surr)	72.1		50-150			%	1		07/30/23 23:16

Batch Information

Analytical Batch: VFC16548
Analytical Method: AK101
Analyst: CWD
Analytical Date/Time: 07/30/23 23:16
Container ID: 1233886003-D

Prep Batch: VXX40208
Prep Method: SW5030B
Prep Date/Time: 07/30/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/11/2023 8:37:20AM

J flagging is activated

Results of **19+C-23-TB01**

Client Sample ID: **19+C-23-TB01**
Client Project ID: **19 + C St GW Monitoring**
Lab Sample ID: 1233886003
Lab Project ID: 1233886

Collection Date: 07/27/23 08:00
Received Date: 07/28/23 09:30
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS- Petroleum VOC Group**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
1,2,4-Trimethylbenzene	0.500	U	1.00	0.310	0.500	ug/L	1		08/01/23 15:48
1,2-Dibromoethane	0.0375	U	0.0750	0.0180	0.0375	ug/L	1		08/01/23 15:48
1,2-Dichloroethane	0.250	U	0.500	0.200	0.250	ug/L	1		08/01/23 15:48
1,3,5-Trimethylbenzene	0.500	U	1.00	0.310	0.500	ug/L	1		08/01/23 15:48
Benzene	0.200	U	0.400	0.120	0.200	ug/L	1		08/01/23 15:48
Ethylbenzene	0.500	U	1.00	0.310	0.500	ug/L	1		08/01/23 15:48
Isopropylbenzene (Cumene)	0.500	U	1.00	0.310	0.500	ug/L	1		08/01/23 15:48
Methyl-t-butyl ether	5.00	U	10.0	3.10	5.00	ug/L	1		08/01/23 15:48
Naphthalene	0.500	U	1.00	0.310	0.500	ug/L	1		08/01/23 15:48
n-Butylbenzene	0.500	U	1.00	0.310	0.500	ug/L	1		08/01/23 15:48
o-Xylene	0.500	U	1.00	0.310	0.500	ug/L	1		08/01/23 15:48
P & M -Xylene	1.00	U	2.00	0.620	1.00	ug/L	1		08/01/23 15:48
sec-Butylbenzene	0.500	U	1.00	0.310	0.500	ug/L	1		08/01/23 15:48
tert-Butylbenzene	0.500	U	1.00	0.310	0.500	ug/L	1		08/01/23 15:48
Toluene	0.500	U	1.00	0.310	0.500	ug/L	1		08/01/23 15:48
Xylenes (total)	1.50	U	3.00	1.00	1.50	ug/L	1		08/01/23 15:48
Surrogates									
1,2-Dichloroethane-D4 (surr)	108		81-118			%	1		08/01/23 15:48
4-Bromofluorobenzene (surr)	94.9		85-114			%	1		08/01/23 15:48
Toluene-d8 (surr)	99.2		89-112			%	1		08/01/23 15:48

Batch Information

Analytical Batch: VMS22627
Analytical Method: SW8260D
Analyst: PHK
Analytical Date/Time: 08/01/23 15:48
Container ID: 1233886003-A

Prep Batch: VXX40216
Prep Method: SW5030B
Prep Date/Time: 08/01/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/11/2023 8:37:20AM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1860552 [VXX/40208]
Blank Lab ID: 1725902

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1233886001, 1233886002, 1233886003

Results by **AK101**

Parameter	Results	LOQ/CL	DL	LOD	Units
Gasoline Range Organics	0.0500U	0.100	0.0450	0.0500	mg/L
Surrogates					
4-Bromofluorobenzene (surr)	74.5	50-150		0	%

Batch Information

Analytical Batch: VFC16548
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: CWD
Analytical Date/Time: 7/30/2023 10:00:00AM

Prep Batch: VXX40208
Prep Method: SW5030B
Prep Date/Time: 7/30/2023 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/11/2023 8:37:22AM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1233886 [VXX40208]
Blank Spike Lab ID: 1725905
Date Analyzed: 07/30/2023 10:54

Spike Duplicate ID: LCSD for HBN 1233886 [VXX40208]
Spike Duplicate Lab ID: 1725906
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1233886001, 1233886002, 1233886003

Results by **AK101**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	1.00	0.925	93	1.00	0.875	88	(60-120)	5.50	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	0.0500		79	0.0500		78	(50-150)	1.80	

Batch Information

Analytical Batch: **VFC16548**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **CWD**

Prep Batch: **VXX40208**
Prep Method: **SW5030B**
Prep Date/Time: **07/30/2023 06:00**
Spike Init Wt./Vol.: 0.0500 mg/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 0.0500 mg/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1860681 [VXX/40216]
Blank Lab ID: 1726371

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1233886001, 1233886002, 1233886003

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	LOD	Units
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	0.500	ug/L
1,2-Dibromoethane	0.0375U	0.0750	0.0180	0.0375	ug/L
1,2-Dichloroethane	0.250U	0.500	0.200	0.250	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	0.500	ug/L
Benzene	0.200U	0.400	0.120	0.200	ug/L
Ethylbenzene	0.500U	1.00	0.310	0.500	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	0.500	ug/L
Methyl-t-butyl ether	5.00U	10.0	3.10	5.00	ug/L
Naphthalene	0.500U	1.00	0.310	0.500	ug/L
n-Butylbenzene	0.500U	1.00	0.310	0.500	ug/L
o-Xylene	0.500U	1.00	0.310	0.500	ug/L
P & M -Xylene	1.00U	2.00	0.620	1.00	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	0.500	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	0.500	ug/L
Toluene	0.500U	1.00	0.310	0.500	ug/L
Xylenes (total)	1.50U	3.00	1.00	1.50	ug/L
Surrogates					
1,2-Dichloroethane-D4 (surr)	102	81-118		0	%
4-Bromofluorobenzene (surr)	98.6	85-114		0	%
Toluene-d8 (surr)	99.5	89-112		0	%

Batch Information

Analytical Batch: VMS22627
Analytical Method: SW8260D
Instrument: VPA 780/5975 GC/MS
Analyst: PHK
Analytical Date/Time: 8/1/2023 12:10:00PM

Prep Batch: VXX40216
Prep Method: SW5030B
Prep Date/Time: 8/1/2023 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/11/2023 8:37:27AM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1233886 [VXX40216]
Blank Spike Lab ID: 1726372
Date Analyzed: 08/01/2023 12:25

Spike Duplicate ID: LCSD for HBN 1233886 [VXX40216]
Spike Duplicate Lab ID: 1726373
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1233886001, 1233886002, 1233886003

Results by **SW8260D**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	29.9	100	30	28.8	96	(79-124)	3.90	(< 20)
1,2-Dibromoethane	30	27.2	91	30	26.9	90	(77-121)	1.20	(< 20)
1,2-Dichloroethane	30	27.0	90	30	27.7	92	(73-128)	2.40	(< 20)
1,3,5-Trimethylbenzene	30	30.2	101	30	29.0	97	(75-124)	4.10	(< 20)
Benzene	30	29.9	100	30	29.1	97	(79-120)	2.80	(< 20)
Ethylbenzene	30	30.4	101	30	29.5	98	(79-121)	3.10	(< 20)
Isopropylbenzene (Cumene)	30	29.4	98	30	29.2	97	(72-131)	0.77	(< 20)
Methyl-t-butyl ether	45	43.5	97	45	43.6	97	(71-124)	0.11	(< 20)
Naphthalene	30	27.0	90	30	29.1	97	(61-128)	7.30	(< 20)
n-Butylbenzene	30	26.6	89	30	25.9	86	(75-128)	2.60	(< 20)
o-Xylene	30	29.9	100	30	28.8	96	(78-122)	3.60	(< 20)
P & M -Xylene	60	58.8	98	60	57.2	95	(80-121)	2.70	(< 20)
sec-Butylbenzene	30	26.7	89	30	25.7	86	(77-126)	3.50	(< 20)
tert-Butylbenzene	30	29.3	98	30	28.8	96	(78-124)	1.80	(< 20)
Toluene	30	28.1	94	30	26.9	90	(80-121)	4.20	(< 20)
Xylenes (total)	90	88.6	99	90	86.0	96	(79-121)	3.00	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30		94	30		97	(81-118)	3.10	
4-Bromofluorobenzene (surr)	30		99	30		96	(85-114)	2.50	
Toluene-d8 (surr)	30		101	30		100	(89-112)	1.30	

Batch Information

Analytical Batch: **VMS22627**
Analytical Method: **SW8260D**
Instrument: **VPA 780/5975 GC/MS**
Analyst: **PHK**

Prep Batch: **VXX40216**
Prep Method: **SW5030B**
Prep Date/Time: **08/01/2023 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Print Date: 09/11/2023 8:37:29AM

Method Blank

Blank ID: MB for HBN 1861456 [VXX/40239]
Blank Lab ID: 1727626

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1233886001, 1233886002

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	LOD	Units
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	0.500	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	0.500	ug/L
Surrogates					
1,2-Dichloroethane-D4 (surr)	104	81-118		0	%
4-Bromofluorobenzene (surr)	104	85-114		0	%
Toluene-d8 (surr)	97.1	89-112		0	%

Batch Information

Analytical Batch: VMS22643
Analytical Method: SW8260D
Instrument: VPA 780/5975 GC/MS
Analyst: JY
Analytical Date/Time: 8/7/2023 1:43:00PM

Prep Batch: VXX40239
Prep Method: SW5030B
Prep Date/Time: 8/7/2023 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1233886 [VXX40239]
Blank Spike Lab ID: 1727627
Date Analyzed: 08/07/2023 13:58

Spike Duplicate ID: LCSD for HBN 1233886 [VXX40239]
Spike Duplicate Lab ID: 1727628
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1233886001, 1233886002

Results by **SW8260D**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,2,4-Trimethylbenzene	30	31.3	104	30	31.9	106	(79-124)	1.90	(< 20)
Isopropylbenzene (Cumene)	30	31.5	105	30	31.1	104	(72-131)	1.10	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30		95	30		95	(81-118)	0.04	
4-Bromofluorobenzene (surr)	30		100	30		102	(85-114)	2.00	
Toluene-d8 (surr)	30		100	30		100	(89-112)	0.03	

Batch Information

Analytical Batch: **VMS22643**
Analytical Method: **SW8260D**
Instrument: **VPA 780/5975 GC/MS**
Analyst: **JY**

Prep Batch: **VXX40239**
Prep Method: **SW5030B**
Prep Date/Time: **08/07/2023 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Print Date: 09/11/2023 8:37:34AM

Method Blank

Blank ID: MB for HBN 1860594 [XXX/48321]
Blank Lab ID: 1726076

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1233886001, 1233886002

Results by **8270D SIM LV (PAH)**

Parameter	Results	LOQ/CL	DL	LOD	Units
1-Methylnaphthalene	0.0250U	0.0500	0.0150	0.0250	ug/L
2-Methylnaphthalene	0.0250U	0.0500	0.0150	0.0250	ug/L
Acenaphthene	0.0250U	0.0500	0.0150	0.0250	ug/L
Acenaphthylene	0.0250U	0.0500	0.0150	0.0250	ug/L
Anthracene	0.0250U	0.0500	0.0150	0.0250	ug/L
Benzo(a)Anthracene	0.0192J	0.0500	0.0150	0.0250	ug/L
Benzo[a]pyrene	0.0176J	0.0200	0.00620	0.0100	ug/L
Benzo[b]Fluoranthene	0.0204J	0.0500	0.0150	0.0250	ug/L
Benzo[g,h,i]perylene	0.0184J	0.0500	0.0150	0.0250	ug/L
Benzo[k]fluoranthene	0.0185J	0.0500	0.0150	0.0250	ug/L
Chrysene	0.0195J	0.0500	0.0150	0.0250	ug/L
Dibenzo[a,h]anthracene	0.0162J	0.0200	0.00620	0.0100	ug/L
Fluoranthene	0.0185J	0.0500	0.0150	0.0250	ug/L
Fluorene	0.0250U	0.0500	0.0150	0.0250	ug/L
Indeno[1,2,3-c,d] pyrene	0.0161J	0.0500	0.0150	0.0250	ug/L
Naphthalene	0.0500U	0.100	0.0310	0.0500	ug/L
Phenanthrene	0.0386J	0.100	0.0310	0.0500	ug/L
Pyrene	0.0164J	0.0500	0.0150	0.0250	ug/L
Surrogates					
2-Methylnaphthalene-d10 (surr)	35.9*	38-100		0	%
Fluoranthene-d10 (surr)	60.7	30-111		0	%

Batch Information

Analytical Batch: XMS13818
Analytical Method: 8270D SIM LV (PAH)
Instrument: Agilent 8890 GC/MS SYA
Analyst: HMW
Analytical Date/Time: 8/4/2023 2:59:00PM

Prep Batch: XXX48321
Prep Method: SW3535A
Prep Date/Time: 8/1/2023 10:00:00AM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1233886 [XXX48321]
Blank Spike Lab ID: 1726077
Date Analyzed: 08/04/2023 15:15

Spike Duplicate ID: LCSD for HBN 1233886 [XXX48321]
Spike Duplicate Lab ID: 1726078
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1233886001, 1233886002

Results by **8270D SIM LV (PAH)**

	Blank Spike (ug/L)				Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)		Spike	Result	Rec (%)		CL	RPD (%)	RPD CL
1-Methylnaphthalene	2	0.575	29	*	2	0.638	32	*	(41-115)	10.40	(< 20)
2-Methylnaphthalene	2	0.528	26	*	2	0.608	30	*	(39-114)	14.10	(< 20)
Acenaphthene	2	0.820	41	*	2	0.828	41	*	(48-114)	0.96	(< 20)
Acenaphthylene	2	0.836	42		2	0.880	44		(35-121)	5.10	(< 20)
Anthracene	2	1.05	52	*	2	1.03	52	*	(53-119)	1.10	(< 20)
Benzo(a)Anthracene	2	1.24	62		2	1.25	63		(59-120)	1.00	(< 20)
Benzo[a]pyrene	2	1.33	66		2	1.32	66		(53-120)	0.57	(< 20)
Benzo[b]Fluoranthene	2	1.29	65		2	1.27	64		(53-126)	1.40	(< 20)
Benzo[g,h,i]perylene	2	1.53	77		2	1.51	76		(44-128)	1.30	(< 20)
Benzo[k]fluoranthene	2	1.28	64		2	1.28	64		(54-125)	0.36	(< 20)
Chrysene	2	1.27	63		2	1.27	63		(57-120)	0.04	(< 20)
Dibenzo[a,h]anthracene	2	1.31	65		2	1.28	64		(44-131)	1.90	(< 20)
Fluoranthene	2	1.19	60		2	1.17	58		(58-120)	2.10	(< 20)
Fluorene	2	0.915	46	*	2	0.929	46	*	(50-118)	1.40	(< 20)
Indeno[1,2,3-c,d] pyrene	2	1.33	67		2	1.32	66		(48-130)	1.30	(< 20)
Naphthalene	2	0.529	26	*	2	0.615	31	*	(43-114)	15.10	(< 20)
Phenanthrene	2	1.07	53		2	1.05	53	*	(53-115)	1.20	(< 20)
Pyrene	2	1.20	60		2	1.17	59		(53-121)	2.40	(< 20)
Surrogates											
2-Methylnaphthalene-d10 (surr)	2		29	*	2		32	*	(38-100)	9.30	
Fluoranthene-d10 (surr)	2		62		2		61		(30-111)	1.10	

Batch Information

Analytical Batch: **XMS13818**
Analytical Method: **8270D SIM LV (PAH)**
Instrument: **Agilent 8890 GC/MS SYA**
Analyst: **HMW**

Prep Batch: **XXX48321**
Prep Method: **SW3535A**
Prep Date/Time: **08/01/2023 10:00**
Spike Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 2 ug/L Extract Vol: 1 mL

Print Date: 09/11/2023 8:37:39AM

Method Blank

Blank ID: MB for HBN 1861474 [XXX/48377]
Blank Lab ID: 1727684

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1233886001, 1233886002

Results by **AK102**

Parameter	Results	LOQ/CL	DL	LOD	Units
Diesel Range Organics	0.817*	0.600	0.200	0.300	mg/L
Surrogates					
5a Androstane (surr)	122*	60-120		0	%

Batch Information

Analytical Batch: XFC16625
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: NGG
Analytical Date/Time: 8/24/2023 9:30:00PM

Prep Batch: XXX48377
Prep Method: SW3520C
Prep Date/Time: 8/9/2023 2:54:00PM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Print Date: 09/11/2023 8:37:41AM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1233886 [XXX48377]
Blank Spike Lab ID: 1727685
Date Analyzed: 08/23/2023 18:26

Spike Duplicate ID: LCSD for HBN 1233886 [XXX48377]
Spike Duplicate Lab ID: 1727686
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1233886001, 1233886002

Results by **AK102**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	20	20.3	101	20	19.3	96	(75-125)	5.20	(< 20)
Surrogates									
5a Androstane (surr)	0.4		134 *	0.4		127 *	(60-120)	5.40	

Batch Information

Analytical Batch: **XFC16623**
Analytical Method: **AK102**
Instrument: **Agilent 7890B R**
Analyst: **T.L**

Prep Batch: **XXX48377**
Prep Method: **SW3520C**
Prep Date/Time: **08/09/2023 14:54**
Spike Init Wt./Vol.: 0.4 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 0.4 mg/L Extract Vol: 1 mL

Print Date: 09/11/2023 8:37:44AM

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CHAIN OF CUSTODY RECORD

Revised Report - Revision 3

1233886

Profile #: 366049 Int.: CM

Page 1 of 1

Instructions: Sections 1 - 5 must be filled out. Omissions may delay the onset of analysis.

Section 1

CLIENT: FBX Nortech / Antea Enginteering	
CONTACT: Jen Nick Simmons	PHONE #: (907) 433-0764
PROJECT NAME: 19+C St GW monitoring — Stock Jars	Project/Permit Number:
REPORTS TO: Nick Simmons	NPDL Number(DOD): / E-MAIL: nsimmons@antea.net
INVOICE TO: Nick Simmons	QUOTE #: / P.O. #:

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Sample Type (Comp / Grab / MI)	Analysis* DRO	PAH	VOC - FR2	Trip Blanks	GRO	DRO + PAH			Trip Blanks		REMARKS/LOC ID
					Preservative		HCl	None	HCl		HCl	None					
1AJ	19+C-23-MW2	07/27/23	1150	W	G	10	X	X	X		X						
2AJ	19+C-23-MW9	07/27/23	1150	W	G	10	X	X	X		X						
3AF	19+C-23-TB01	07/27/23	0800	W	G	6			X		X						

NOTE: *The following analyses require specific method and/or compound list: BTEX, Metals, PFAS

Comments:

Section 4

DOD Project? YES (NO)

Data Deliverables Requested: DataView / SEDD / EQUIS / Level 4 / ERPIMS / Other: Level 2

Turnaround Time Requested: (Standard) / Rush — Requested Rush Report Date:

SGS Sample Receipt (Lab Use Only)

Delivery Method: (Client) / Commercial

Did each cooler have a corresponding COC? (Yes) / No

Chain of Custody Seal Condition: INTACT / BROKEN / (ABSENT)

COC Seal Location(s):

Section 5

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	Cooler ID	Temperature (°C)	Therm. ID
	7/28/23	9:30		1	2.5	D58
	7/28/23	9:30	Jeremy Grete			

If more than three coolers are received, or for documentation of non-compliant coolers, use form FS-0029.

Note: If temp. is outside 0-6° and samples were not taken <8 hours ago OR are waste samples, Client or PM should initial here or attach an email change order to proceed with analysis. If ice is present, note on form F102B.

Intials:_____

Laboratory Use Only

http://www.sgs.com/terms-and-conditions

1233886

SGS

SAMPLE RECEIPT FORM

Project Manager Completion				
Was all necessary information recorded on the COC upon receipt? (temperature, COC seals, etc.?)	Yes	No	N/A	
Was temperature between 0-6° C?	Yes	No	N/A	If "No", are the samples either exempt* or sampled <8 hours prior to receipt?
Were all analyses received within holding time*?	Yes	No	N/A	
Was a method specified for each analysis, where applicable? If no, please note correct methods.	Yes	No	N/A	8270 SIM PAH 8260 PetroVOC
Are compound lists specified, where applicable? For project specific or special compound lists please note correct analysis code.	Yes	No	N/A	
If rush was requested by the client, was the requested TAT approved?	Yes	No	N/A	If "NO", what is the approved TAT?
If SEDD Deliverables are required, were Location ID's and an NPDL Number provided?	Yes	No	N/A	*If "NO", contact client for information.*
Sample Login Completion				
Do ID's on sample containers match COC?	Yes	No	N/A	
If provided on containers, do dates/times collected match COC?	Yes	No	N/A	Note: If times differ <1 hr., record details below and login per COC.
Were all sample containers received in good condition?	Yes	No	N/A	
Were proper containers (type/mass/volume/preservative) received for all samples? **See form F-083 "Sample Guide"*	Yes	No	N/A	*Note: If 200.8/6020 Total Metals are received unpreserved, preserve and note HNO3 lot here:* *If 200.8/6020 Dissolved Metals are received unpreserved, log in for LABFILTER and do not preserve.* *For all non-metals methods, inform Project Manager.*
Were Trip Blanks (VOC, GRO, Low-Level Hg, etc.) received with samples, where applicable*?	Yes	No	N/A	
Were all VOA vials free of headspace >6mm?	Yes	No	N/A	
Were all soil VOA samples received field extracted with Methanol?	Yes	No	N/A	
Did all soil VOA samples have an accompanying unpreserved container for % solids?	Yes	No	N/A	
If special handling is required, were containers labelled appropriately? e.g. MI/ISM, foreign soils, lab filter, Ref Lab, limited volume	Yes	No	N/A	
For Rush/Short Holding time, was the lab notified?	Yes	No	N/A	
For any question answered "NO", was the Project Manager notified?	Yes	No	N/A	PM Initials:
Was Peer Review of sample numbering/labelling completed?	Yes	No	N/A	Reviewer Initials: JC.
Additional Notes/Clarification where Applicable, including resolution of "No" answers when a change order is not attached:				

1233886

SGS North America Inc.

200 W. Potter Dr., Anchorage, AK 99518 (ph) 907-562-2343, (fax) 907-561-5301

3180 Peger Rd. Ste. 190, Fairbanks, AK 99709 (ph) 907-474-8656

Sample Kit Request

Client pickup Date: 7/26/2(

Be sure to ask if client will ship by

Does a Profile exist in LIMS? **If not, please send a request for new profile build.**

Client Name: Ahtna

Ordered By: Ashley Olson

Email: aolson@ahtna.net

Project Name: 19th Ave and C st 20204.083.02

Quote #: **Profile#:**

Delivery Address:

Deliver to client:

Ship by/Air Carrier:

Airbill Number:

Date to ship by:

Notes:

Kit request taken by: JAN **Date:** July 24, 2023

Kit prepared by: MAC **Date:** 7/25/23

Kit *(including lid tightness for pres'd bottles)* checked by: NC **Date:** 7/25/23

Kit packed & shipped by: MAC **Date:** 7/25/23

Filename: SKIT_Ahtna_19th Ave and C st 20204.083.02_2023-07 *Required Items

No. Samples	Matrix	Analysis	Container Size & Type		Pres.	Bottle Lot #	Preservative Lot #	Hold Time	# QC Bottles	Total Bottles
3	Water	8260 PVOC	3 x 40 mL	VOA	HCl			14 d	0	9
3	Water	AK101 GRO	3 x 40 mL	VOA	HCl			14 d	0	9
3	Water	AK102 DRO	2 x 250 mL	Amber	HCl			14 d	0	6
3	Water	8270 SIM PAH	2 x 250 mL	Amber	None			7 D	0	6

Note: The first 10 Analysis and Preservative columns will auto-fill up to the capacity of the associated COC.

Additional Information	
Pack for Shipment via:	N/A
Temperature Blank:	Yes - Small (125 mL)
Trip Blank:	Yes - Water (8260, AK101, 8021, 624)
Coolers:	Yes
Gel Ice:	Yes
Labels:	Yes
Custody Seals:	Yes
Paper Chain of Custody:	Yes - Standard COC
Lot Number Tracking (Required for DOD):	No

Notes for Kit Prep

2 X Water TB

Attention Client/Sampler:

1. Do not rinse container, be aware of any acid preservative.
2. Fill container, but do not overfill (except volatiles).
3. Label the container with your sample ID and date/time of collection
4. Fill out the Chain of Custody.
5. Add frozen gel packs to your cooler and pack to prevent breakage.

If you have any questions please contact your Project Manager.

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1233886001-A	HCL to pH < 2	OK			
1233886001-B	HCL to pH < 2	OK			
1233886001-C	No Preservative Required	OK			
1233886001-D	No Preservative Required	OK			
1233886001-E	HCL to pH < 2	OK			
1233886001-F	HCL to pH < 2	OK			
1233886001-G	HCL to pH < 2	OK			
1233886001-H	HCL to pH < 2	OK			
1233886001-I	HCL to pH < 2	OK			
1233886001-J	HCL to pH < 2	OK			
1233886002-A	HCL to pH < 2	OK			
1233886002-B	HCL to pH < 2	OK			
1233886002-C	No Preservative Required	OK			
1233886002-D	No Preservative Required	OK			
1233886002-E	HCL to pH < 2	OK			
1233886002-F	HCL to pH < 2	OK			
1233886002-G	HCL to pH < 2	OK			
1233886002-H	HCL to pH < 2	OK			
1233886002-I	HCL to pH < 2	OK			
1233886002-J	HCL to pH < 2	OK			
1233886003-A	HCL to pH < 2	OK			
1233886003-B	HCL to pH < 2	OK			
1233886003-C	HCL to pH < 2	OK			
1233886003-D	HCL to pH < 2	OK			
1233886003-E	HCL to pH < 2	OK			
1233886003-F	HCL to pH < 2	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM - The container was received damaged.
FR - The container was received frozen and not usable for Bacteria or BOD analyses.
IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.
NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
QN - Insufficient sample quantity provided.

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ATTACHMENT 6

CONCEPTUAL SITE MODEL

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Print Form

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name: 19th Avenue & C Street, Anchorage, Alaska

File Number: 2100.38.437

Completed by: Ahtna

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☐ USTs
- ☐ ASTs
- ☐ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☒ Other: Pipeline

Release Mechanisms *(check potential release mechanisms at the site)*

- ☐ Spills
- ☒ Leaks
- ☐ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☐ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☒ Air
- ☒ Sediment
- ☒ Groundwater
- ☒ Surface water
- ☒ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☒ Commercial or industrial worker
- ☒ Construction worker
- ☒ Subsistence harvester (i.e. gathers wild foods)
- ☒ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☒ Recreational user
- ☐ Farmer
- ☒ Other: Community Garden

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

Current presence and concentration of contaminants in soil is unknown.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Current presence and concentration of contaminants in soil is unknown.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Unknown if groundwater in this area is used as a drinking water source in the residential area west of the site.

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☐

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☒

If both boxes are checked, label this pathway complete: Incomplete

Comments:

Contaminants are not present in Chester Creek at levels that exceed the ADEC CULs or TAH and TAqH values. This pathway has been deemed incomplete due to pore water sampling conducted in 2018, that indicated that none of the samples exceeded ADEC promulgated TAH or TAqH values and there were no detections of PAH or Fuel related VOC analytes with the exception of 1-Methylnaphthalene and

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☒

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☒

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☒

If all of the boxes are checked, label this pathway complete: Complete

Comments:

Chester Creek is used for fishing, and groundwater is potentially connected to the creek. There is a community garden just south of the site. Indeno[1,2,3-c,d] pyrene was detected in sediment samples above the SQuiRTs Target Screening Values for Sediment from Chester creek at location SS-2 (the source area) and SS-3 (downstream)

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☐

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Incomplete

Comments:

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Chester Creek borders the site to the North. The creek is accessible to potential waders via the Chester Creek Trail or Valley of the Moon Park. 1-Methylnaphthalene and naphthalene exceed ADEC cleanup levels in the groundwater near MW-2. Both of these compounds are a risk for dermal exposure, though the surface water pathway has been deemed insignificant due to pore water sampling conducted in 2018, that indicated no detections of GRO, PAH and Fuel related VOC analytes and DRO detections at less than 10% of the ADEC migration to groundwater clean-up level.

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Unknown if groundwater drinking wells are present in residential area west of the site.

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the inhalation of particulates is incorporated into the soil exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Area is vegetated.

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Chester Creek is physically accessible to the public and people have been known to swim in the creek. Although pore water sampling conducted in 2018 indicated no detections of GRO, PAH and Fuel related VOC analytes and DRO detections at less than 10% of the ADEC migration to groundwater clean-up level, contaminants above the SQuiRTs Dutch Sediment Target Value are present in the sediment of the creek (Anthracene, Benz(a)anthracene, Benzo[a]pyrene, Indeno[1,2,3-c,d] pyrene, and Naphthalene).

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: 19th Avenue and C Street, Anchorage, Alaska
2100.38.437

Completed By: Ahtna
Date Completed: 10/11/2021

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.*

Media	Transport Mechanisms	
☐ Surface Soil (0-2 ft bgs)	Direct release to surface soil	check soil
	☐ Migration to subsurface	check soil
	☐ Migration to groundwater	check groundwater
	☐ Volatilization	check air
	☐ Runoff or erosion	check surface water
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	
☑ Subsurface Soil (2-15 ft bgs)	Direct release to subsurface soil	check soil
	☑ Migration to groundwater	check groundwater
	☑ Volatilization	check air
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	
☑ Ground-water	Direct release to groundwater	check groundwater
	☐ Volatilization	check air
	☑ Flow to surface water body	check surface water
	☑ Flow to sediment	check sediment
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	
☑ Surface Water	Direct release to surface water	check surface water
	☐ Volatilization	check air
	☑ Sedimentation	check sediment
	☐ Uptake by plants or animals	check biota
	☐ Other (list):	
☑ Sediment	Direct release to sediment	check sediment
	☑ Resuspension, runoff, or erosion	check surface water
	☑ Uptake by plants or animals	check biota
	☐ Other (list):	

(3) *Check all exposure media identified in (2).*

(4) *Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Current & Future Receptors

Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ soil	☑ Incidental Soil Ingestion	C/F	C/F	C/F	C/F	C/F	C/F	C/F
	☑ Dermal Absorption of Contaminants from Soil	C/F	C/F	C/F	C/F	C/F	C/F	C/F
	☐ Inhalation of Fugitive Dust							
☑ groundwater	☑ Ingestion of Groundwater	C/F	C/F	C/F	C/F	C/F	C/F	C/F
	☑ Dermal Absorption of Contaminants in Groundwater	C/F	C/F	C/F	C/F	C/F	C/F	C/F
	☐ Inhalation of Volatile Compounds in Tap Water							
☑ air	☑ Inhalation of Outdoor Air	C/F	C/F	C/F	C/F	C/F	C/F	C/F
	☐ Inhalation of Indoor Air							
	☐ Inhalation of Fugitive Dust							
☑ surface water	☑ Ingestion of Surface Water	I	I	I	I	I	I	I
	☑ Dermal Absorption of Contaminants in Surface Water	I	I	I	I	I	I	I
	☐ Inhalation of Volatile Compounds in Tap Water							
☑ sediment	☑ Direct Contact with Sediment	C/F	C/F	C/F	C/F	C/F	C/F	C/F
☑ biota	☑ Ingestion of Wild or Farmed Foods	C/F	C/F	C/F	C/F	C/F	C/F	C/F

Revised, 10/01/2010

Appendix C: Ecoscoping Form

Site Name: 19th Avenue & C Street, Anchorage, Alaska
Completed by: Ashley Olson
Date: 9/27/2023

Instructions: Follow the italicized instructions in each section below. "Off-ramps," where the evaluation ends before completing all of the sections, can be taken when indicated by the instructions. Comment boxes should be used to help support your answers.

1. Direct Visual Impacts and Acute Toxicity

Are direct impacts that may result from the site contaminants evident, or is acute toxicity from high contaminant concentrations suspected? C*heck the appropriate box.*

☐ Yes – D*escribe observations below and evaluate all of the remaining sections without taking any off-ramps.*
☒ No – *Go to next section.*

Comments:

2. Terrestrial and Aquatic Exposure Routes

Check each terrestrial and aquatic route that could occur at the site.

Terrestrial Exposure Routes

☐ Exposure to water-borne contaminants as a result of wading or swimming in contaminated waters or ingesting contaminated water.
☐ Contaminant uptake in terrestrial plants whose roots are in contact with contaminated surface water.
☐ Contaminant migration via saturated or unsaturated groundwater zones and discharge at upland "seep" locations (not associated with a wetland or waterbody).
☐ Contaminant uptake by terrestrial plants whose roots are in contact with soil moisture or groundwater present within the root zone (generally no more than 4 feet below ground surface.
☐ Particulates deposited on plants directly or from rain splash.
☒ Incidental ingestion and/or exposure while animals grub for food, burrow (up to 2 feet for small animals or 6 feet for large animals), or groom.

☐ Inhalation of fugitive dust or vapors disturbed by foraging or burrowing activities.

☒ Bioaccumulatives (other than PAHs, which bioaccumulate more readily in aquatic environments) taken up by soil invertebrates, which are in turn eaten by higher food chain organisms (see the *Policy Guidance on Developing Conceptual Site Models*).

☐ Other site-specific exposure pathways.

Aquatic Exposure Routes

☐ Contaminated surface runoff migration to water bodies through swales, drainage ditches, or overland flow.

☐ Aquatic receptors exposed through osmotic exchange, respiration, or ventilation of surface waters.

☐ Contaminant migration via saturated or unsaturated groundwater zones and discharge at "seep" locations along banks or directly to surface water.

☒ Deposition into sediments from upwelling of contaminated groundwater.

☒ Aquatic receptors may be exposed directly to contaminated sediments through foraging or burrowing, or indirectly exposed due to osmotic exchange, respiration, or ventilation of sediment pore water.

☒ Aquatic plants rooted in contaminated sediments.

☒ Bioaccumulatives (see the *Policy Guidance on Developing Conceptual Site Models*) taken up by sediment invertebrates, which are in turn eaten by higher food chain organisms.

☐ Other site-specific exposure pathways.

If any of the above boxes are checked, go on to the next section. If none are checked, end the evaluation and check the box below.

☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

3. Habitat

Check all that may apply. See Ecoscoping Guidance for additional help.

☒ Habitat that could be affected by the contamination supports valued species (i.e., species that are regulated, used for subsistence, have ceremonial importance, have commercial value, or provide recreational opportunity).

☒ Critical habitat or anadromous stream in an area that could be affected by the contamination.

☐ Habitat that is important to the region that could be affected by the contamination.

☐ Contamination is in a park, preserve, or wildlife refuge.

If any of the above boxes are checked, go on to the next scoping factor. If none are checked, end the evaluation and check the box below.

☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

4. Contaminant Quantity

Check all that may apply. See Ecoscoping Guidance for additional help.

☐ Endangered or threatened species are present.

☒ The aquatic environment is or could be affected.

☐ Non-petroleum contaminants may be present, or the total area of petroleum-contaminated surface soil exceeds one-half acre.

If any of the above boxes are checked, go on to the next scoping factor. If none are checked, end the evaluation and check the box below.

☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Alaska Department of Fish and Game considers this stretch of Chester Creek primarily as a migration route, however minimal feeding, rearing and spawning may occur in the site vicinity.

5. Toxicity Determination

Check all that apply.

☒ Bioaccumulative chemicals are present (see *Policy Guidance on Developing Conceptual Site Models*).

☒ Contaminants exceed benchmark levels (see the Ecological Benchmark Tool in RAIS, available at: http://rais.ornl.gov/tools/eco_search.php).

If either box is checked, complete a detailed Ecological Conceptual Site Model (see DEC's Policy Guidance on Developing Conceptual Site Models*) and submit it with the form to your DEC project manager.*

If neither box is checked, check the box below and submit this form to your DEC project manager.

☐ OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Multiple PAH compounds detected in sediment at the site exceeded the screening values presented in the SQuiRTs sediment screening table for the Dutch Sediment Target Value, the TEL, and the PEL.