2023 Drainage Pond Groundwater Monitoring Report

	ADEC File No.	Hazard ID
Drainage Pond	100.38.188	1923

Prepared for:
Alaska Department of Transportation and Public Facilities
Fairbanks International Airport
6450 Airport Way
Fairbanks, Alaska 99709

Prepared by:
Jacobs Engineering Group Inc.

Responsible ADEC Qualified Environmental Professionals		
Groundwater Samplers		
Karri Sicard		Digitally signed 02/14/2024
Guy Wade	Guy Wade	Digitally signed 02/14/2024
Data Analysis		
Karri Sicard		Digitally signed 02/14/2024
Kari Hagen	Kari Hagen	Digitally signed 02/14/2024
Report Authors		
Karri Sicard		Digitally signed 02/14/2024
Guy Wade	Guy Wade	Digitally signed 02/14/2024

TABLE OF CONTENTS

SECTION **PAGE**

TABLES

CHART

APPENDICES

ACRONYMS AND ABBREVIATIONS

ºC	degrees Celsius
µg/L	microgram(s) per liter
µS/cm	microSiemens per centimeter
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
amsl	above mean sea level
bgs	below ground surface
COC	contaminant of concern
CSM	conceptual site model
DCE	1,2-dichloroethylene
DO	dissolved oxygen
DOT&PF	Alaska Department of Transportation and Public Facilities
EPA	U.S. Environmental Protection Agency
FAI	Fairbanks International Airport
GCL	groundwater cleanup level
IDW	investigation-derived waste
Jacobs	Jacobs Engineering Group Inc.
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOD	limit of detection
mg/L	milligram(s) per liter
MNA	monitored natural attenuation
MS	matrix spike
MSD	matrix spike duplicate
mV	millivolt(s)
ND	nondetect
NTU	nephelometric turbidity unit
Oasis	Oasis Environmental Inc.
ORP	oxidation-reduction potential
PCE	tetrachloroethylene
PFAS	per- and polyfluoroalkyl substances
QC	quality control
RPD	relative percent difference
SGS	SGS North America, Inc.
SLR	SLR International Corporation

TCE	trichloroethylene
TOC	total organic carbon
VOC	volatile organic compound

EXECUTIVE SUMMARY

The Alaska Department of Transportation and Public Facilities (DOT&PF) requested groundwater monitoring at the Alaska Department of Environmental Conservation (ADEC) Fairbanks International Airport (FAI) Drainage Pond site (File No. 100.38.188, Hazard ID 1923) located at the FAI (Figures A-1 to A-3 in Appendix A). At the request of DOT&PF, Jacobs Engineering Group Inc. conducted groundwater monitoring on 8 and 9 August 2023. During the project, six wells were visited for groundwater sampling (MW-11R, MW-34, MW-38S [shallow], MW-38D [deep], MW-39, and MW-40). Groundwater samples collected during the investigation were analyzed for the following contaminants of concern: benzene, tetrachloroethylene, trichloroethylene (TCE), cis-1,2-dichloroethylene (DCE), trans-DCE, and vinyl chloride. In addition, samples from select wells were analyzed for the following monitored natural attenuation (MNA) parameters: dissolved and total iron and manganese, total organic carbon (TOC), methane, sulfate, and nitrate/nitrite.

Similar to previous years, groundwater samples collected from MW-11R, MW-40, and MW-38S continued to have high concentrations of chloroethenes compared to the other wells sampled. Results from 2023 show that the concentrations of cis-DCE in MW-11R decreased by an order of magnitude and were lower than concentrations of cis-DCE in both MW-40 and MW-38S. TCE in MW-40 exceeded the groundwater cleanup level for the first time in five sampling events. These three wells plus MW-39 with the highest concentrations of total chloroethenes are located most centrally within the known contaminant plume (Figure A-3) and showed higher levels of cis-DCE and vinyl chloride, while the well farthest to the west, MW-34, was nondetect for all analytes.

Results of MNA parameter evaluation provide evidence that the geochemical environment within the plume might be supportive of reductive dechlorination, although it is somewhat inconclusive. Past results have concluded an apparent stall of this process at the trans-DCE stage due to an oxidizing environment within the contaminant plume. TOC has been present at concentrations high enough to provide energy for the process (as seen in 2021) and might continue to be in 2023 (only samples from wells outside the plume were analyzed for TOC). Dissolved oxygen results suggest the reductive pathway is not suppressed within the

contaminant plume, and oxidation-reduction potential suggests reductive dechlorination is possible. Manganese and iron results seem to indicate most of the available oxidized states of each metal have been reduced. It was concluded that conditions in 2006 and 2010 were supportive of a reducing environment; therefore, the total and dissolved iron and manganese concentrations observed in 2023 may be indicative of the historical reducing environment. Nitrate/nitrite concentrations indicate it is not inhibiting reductive dechlorination and that nitrate is not a significant presence as an electron receptor at the site. Historically decreasing sulfate concentrations indicated sulfate reduction was occurring, and concentrations of sulfate have not been great enough to compete with reductive dechlorination. However, the latest increase in sulfate concentrations in two wells sampled this year may point to the possibility of sulfate competing with reductive dichlorination.

1.0 INTRODUCTION

The Alaska Department of Transportation and Public Facilities (DOT&PF) contracted Jacobs Engineering Group Inc. (Jacobs) to perform groundwater monitoring activities at the Fairbanks International Airport (FAI) Drainage Pond contaminated site, Alaska Department of Environmental Conservation (ADEC) File No. 100.38.188 and Hazard ID 1923. The work was performed under the Alaska DOT&PF Term Agreement for FAI Environmental Services 2019, Notice-to-Proceed No. 6, Agreement No. 25-19-1-017.

1.1 PROJECT OBJECTIVES

The primary objectives of the 2023 groundwater monitoring project were as follows:

- Conduct biennial groundwater monitoring to meet ADEC requirements.
- Assess groundwater contaminant of concern (COC) concentrations in relation to the 2023 ADEC groundwater cleanup levels (GCLs) (ADEC 2023).
- Survey monitoring wells and inspect integrity of groundwater monitoring wells.
- Improve understanding of plume behavior and groundwater conditions at the Drainage Pond site through contaminant trend analysis and monitoring of natural attenuation parameters.

1.2 SITE DESCRIPTION

The DOT&PF is the owner and operator of FAI. The Drainage Pond site includes the FAI property and those adjacent to it. The Drainage Pond site is located within the Fairbanks Meridian, Township 1 South, Range 2 West, Section 24. The site is located at 64.814693 degrees north and 147.876707 degrees west, World Geodetic Datum 1984. Monitoring wells MW-11R, MW-38S, MW-38D, MW-39, and MW-40 are within block 02, lot 07 and MW-34 is located within the Mail Trail Road DOT&PF right-of-way. The monitoring wells are northwest of the FAI runways in the vicinity of the Mail Trail Road and Airport Industrial Road intersection (Figure A-2 in Appendix A); sampling at the site includes six monitoring wells closely grouped near the intersection. Monitoring wells MW-11R, MW-38S, MW-38D, MW-39, and MW-40 are installed in a low-lying area to the east of Airport Industrial Road and monitoring well MW-34 is located just west of the Airport Industrial Road. The groundwater aquifer in this area is believed to be perched on a thin silt lens in the vicinity of wells MW-39 and MW-40 and may taper toward MW-11R in the former Drainage Pond area (SLR International Corporation [SLR] 2018).

1.3 SITE HISTORY

A hydrant fuel system was used to fuel aircraft on the FAI south apron in the 1980s. In 1986, it was shut down due to operational and maintenance problems. FAI began site investigations in 1993, when free product associated with the past hydrant fuel system was discovered during a sewer line installation (ADEC 2019). A preliminary soil and groundwater investigation and evaluation of the hydrant fuel system performed from 1997 to 1998 concluded the hydrant fuel system was the source of groundwater contamination. In 1999, an initial site investigation was conducted at the present Drainage Pond site, which included installation of monitoring wells near the Hydrant Fuel System pump building (MW-10), crossgradient from the Hydrant Fuel System pump building (MW-12), upgradient (MW-29 and MW-30), and within the present-day groundwater plume (MW-11) (Oasis Environmental Inc. [Oasis] 2006) (Figure A-2). Results from this study revealed chlorinated solvents in groundwater in and around MW-11. Annual groundwater sampling continued and monitoring wells MW-34 and MW-35 were added in 2003 and 2005, respectively. Data obtained from these investigations produced results indicative of reductive dechlorination (i.e., sequential dechlorination from tetrachloroethylene [PCE] to trichloroethylene [TCE] to 1,2-dichloroethylene [DCE] to vinyl chloride to ethylene). In 2005, monitoring well MW-11 was replaced by MW-11R, which was installed deeper than the original well (16 feet) at a depth of 34.5 feet (Oasis 2006). In 2005, ADEC changed the site name from FAI – Hydrant Fuel System to FAI – Drainage Pond with the objective to track solvents (ADEC 2019).

In 2006, soil gas and groundwater monitoring studies were conducted at the Drainage Pond site (Oasis 2007). The following monitoring wells were sampled for benzene, PCE, TCE, cis-DCE, trans-DCE, and vinyl chloride: MW-10, MW-11R, MW-12, MW-29R, MW-30R, MW-34, MW-35, MW-36, and MW-37. At the time of the investigation, MW-11R was the only monitoring well from which analytical groundwater sample results exceeded the 2006 GCLs for PCE, TCE, cis-DCE, and vinyl chloride (Oasis 2007). During the 2006 investigation, two temporary well points (TW-1 and TW-2) were installed downgradient of the study site to better delineate the plume and determine if the contamination had migrated below the water table.

These wells had only trace concentrations of DCE and cis-DCE and showed no increased contamination with depth (Oasis 2007).

Groundwater sampling continued through 2007, 2008, and 2010; groundwater sampling was not conducted in 2009 (Oasis 2011). During the 2010 investigation, four new monitoring wells (MW-38S, MW-38D, MW-39, and MW-40) and one temporary well point (TW-3) were installed adjacent to MW-11R to characterize the magnitude and extent of chloroethene contamination in the area. Monitoring wells MW-38S and MW-38D were installed immediately adjacent to one another at total well depths of 14.55 feet and 34.24 feet, respectively, to compare shallow and deep contaminant concentrations. In 2010, samples collected from MW-11R continued to have results exceeding the GCLs for PCE, TCE, cis-DCE, and vinyl chloride.

Sampling at MW-11R, MW-34, MW-38S, MW-38D, MW-39, and MW-40 was conducted again in 2013 and in 2017 (Environmental Resources Management 2014; SLR 2018). Chloroethenes exceeded GCLs for PCE, TCE, and cis-DCE at MW-11R in both investigations. Concentrations of cis-DCE and vinyl chloride in groundwater at MW-38S and MW-40 also exceeded GCLs. Notably, the 2014 GCLs changed in 2017; the GCL for PCE was raised from 5 to 41 micrograms per liter (µg/L), and the GCL for TCE was reduced from 5 to 2.8 µg/L (SLR 2018).

Recent groundwater monitoring events in December 2019 and 2021 found that TCE, cis-DCE, and vinyl chloride concentrations exceeded the ADEC GCLs in monitoring well MW-11R (DOT&PF 2020, 2022). Those wells located within the know contaminant groundwater plume (MW-38S, MW-39, and MW-40) also showed higher levels of cis-DCE and vinyl chloride that exceeded ADEC GCLs (DOT&PF 2020, 2022). Interestingly, the well farthest to the west, in the direction previously reported to be downgradient (MW-34), was nondetect for all analytes besides per- and polyfluoroalkyl substances (PFAS), the results for which were below ADEC GCLs (DOT&PF 2022). Groundwater flow direction and gradient based on the 2021 survey data from the Drainage Pond and neighboring Hydrant Fuel System sites were recalculated at 0.0004-foot/foot to the southeast, not toward MW-34 as previously reported. Historical groundwater monitoring studies also mentioned an up to 180 degrees change in groundwater

flow direction was possible and observed (Oasis 1999). A more thorough discussion of groundwater flow direction and gradient is presented in Section 5.1.

1.4 REDUCTIVE DECHLORINATION

The reductive dechlorination process has been observed at this site, with the reduction of PCE concentrations and subsequent daughter products. Reductive dechlorination of chloroethenes is important for bioremediation of polluted groundwater (Wiedemeier et al. 1996). One particularly important example for public health is the organochloride respiration of PCE and TCE by naturally occurring anaerobic bacteria. During reductive dechlorination, chlorine atoms are replaced by electrons coupled to hydrogen atoms, resulting in sequential dechlorination from PCE to TCE to DCE to vinyl chloride to ethylene. During reductive dechlorination, cis-DCE is the commonly formed isomer of DCE (Wiedemeier et al. 1996).

To evaluate reductive dechlorination at the site, monitored natural attenuation (MNA) parameters were analyzed during the 2006, 2010, 2021, and 2023 field efforts to determine whether groundwater geochemistry reducing conditions were sufficient. Molar fractions of chloroethanes were calculated during historical groundwater monitoring events to allow for direct comparison of concentrations between years despite annual variability in total concentration.

In 2006, monitoring wells MW-11R (located within the Drainage Pond contaminant plume), MW-30R (located at the neighboring Hydrant Fuel System site upgradient from the Drainage Pond plume), and MW-35 (located downgradient from the Drainage Pond plume but later found to be destroyed/missing) (Figure A-2) were sampled for dissolved and total iron, manganese, sulfate, nitrate, chloride, and alkalinity (Oasis 2007). In 2010, monitoring wells MW-38S, MW-38D, MW-39, and MW-40, all located at the Drainage Pond site (Figure A-2), were analyzed for dissolved and total iron, dissolved and total manganese, total organic carbon (TOC), methane, sulfate, and nitrate-nitrite (Oasis 2011). In addition, water quality parameters were measured during groundwater purging and assessed in both 2006 and 2010, including dissolved oxygen (DO), temperature, pH, and oxidation-reduction potential (ORP) (Oasis 2007, 2011). The findings from 2006 indicated groundwater geochemistry conditions supported reductive dechlorination of PCE and TCE within the contaminant plume at MW-11R but were not sufficiently reducing for reductive dechlorination of cis-DCE and vinyl chloride (Oasis 2007).

The 2010 MNA parameter evaluation confirmed that reductive dechlorination of PCE and TCE is occurring in the groundwater plume, with the most highly reducing portion of the groundwater plume located near MW-39 and MW-40 (Oasis 2011).

Although MNA parameter results from both 2006 and 2010 indicated reducing conditions in the groundwater plume, and analytical data supported reduction of PCE and TCE to cis-DCE and further to vinyl chloride, elevated concentrations of cis-DCE and vinyl chloride found throughout the groundwater plume in both years suggest reductive dechlorination from cis-DCE to vinyl chloride was not yet dominant (Oasis 2007, 2011). MNA parameters were not assessed during sampling events between 2010 and 2021. However, in 2019, the molar fraction calculations when compared to historical calculations indicated a slight downward trend in vinyl chloride concentrations and a slight upward trend in trans-DCE concentrations, further indicating a stall in the dechlorination process at DCE (DOT&PF 2020).

Results of MNA parameter evaluation in 2021 provided evidence that the geochemical environment within the plume was prohibitive of reductive dechlorination and supports the apparent stall of this process at the trans-DCE stage. Although TOC was present at concentrations high enough to provide energy for the process, DO results suggested an oxidizing environment within the contaminant plume. Manganese and iron results seem to indicate most of the available oxidized states of each metal have been reduced. Because conditions in 2006 and 2010 were concluded to be supportive of a reducing environment, the total and dissolved iron and manganese concentrations observed in 2021 may be indicative of the historical reducing environment. Nitrate/nitrite concentrations indicated nitrate was not a significant presence as an electron receptor at the site. Decreasing sulfate concentrations over time indicated sulfate reduction was occurring, but concentrations of sulfate were not and have not been great enough to compete with reductive dechlorination.

1.5 CHANGES FROM THE 2021 EFFORT

The list of COCs at the Drainage Pond site was reduced to remove PFAS in 2023 due to results from the 2021 effort below ADEC GCLs despite the overlap of the site with the PFAS groundwater contamination plume at FAI (ADEC File No. 100.38.277, Hazard ID No. 26816). MNA parameters, added in 2021 to the list of analytes, as described in Section 5.1, were also kept for select wells; MW-11R, MW-30R, and MW-34.

2.0 FIELD ACTIVITIES

Field activities during the 2023 groundwater monitoring event included well integrity inspections, gauging, groundwater sampling, and waste management. All field work was conducted by ADEC Qualified Environmental Professionals from the Jacobs Fairbanks and Anchorage offices. Field work began on 7 August 2023 with sampling at the nearby Hydrant Fuel Site. Well integrity inspections, well gauging, groundwater sampling, and waste characterization sampling took place 8 and 9 August 2023. Monitoring wells MW-11R, MW-30R, MW-38S, MW-38D, and MW-39 were sampled on 8 August 2023 and monitoring wells MW-34 and MW-40 were sampled on 9 August 2023. All field activities were documented in the field logbook (Appendix B) and groundwater sampling forms (Appendix C).

2.1 WORK PLAN DEVIATIONS

The method cited for analyzing PFAS in investigation-derived waste (IDW) samples was changed following work plan approval. PFAS were included in the wastewater sampling plan via U.S. Environmental Protection Agency (EPA) Method 537.1, however upon submittal of the work plan it was noted that this method is no longer supported by ADEC, so PFAS was instead analyzed via EPA Method 537M, as recommended by ADEC.

The second deviation from the work plan involved the pump type used to collect MNA parameters from well MW-30R (part of the Hydrant Fuel System well network). A peristaltic pump was used to collect the groundwater sample from well MW-30R rather than a bladder pump (like all the other wells at the Drainage Pond site). MW-30R is part of the Hydrant Fuel System network and was only sampled as part of this study to assess the natural attenuation parameters at the southern edge of the Drainage Pond site. The analytes collected from MW-30R were not volatiles and thus were not expected to be affected by the change in pump.

2.2 MONITORING WELL INTEGRITY AND MAINTENANCE

While collecting groundwater samples, Jacobs field personnel inspected the monitoring well caps, cover bolts, casings, and plugs. All sampled monitoring wells were in good condition with no apparent frost jacking. Any missing cover bolts were replaced.

2.3 GROUNDWATER SAMPLING

Groundwater samples were collected at each of the six proposed monitoring wells on 8 and 9 August 2023. Sampling activities were conducted by Jacobs Project Manager Guy Wade and geologist Karri Sicard, both ADEC-qualified samplers. All sampled monitoring wells were gauged using a water level meter with interface probe to measure depth to product (if applicable), depth to groundwater, and total well depth. This information was recorded on groundwater sampling data sheets (Appendix C) and results are tabulated in Section 5.1. Groundwater sampling was conducted in general accordance with the 2023 Programmatic Work Plan (DOT&PF 2023) and the ADEC *Field Sampling Guidance* (ADEC 2022).

A bladder pump was used to purge and sample groundwater at each monitoring well. The pump intake was set to the approximate middle of the screen during purging and sampling since the screens were submerged due to high water at the site. During past event, the wells were sampled at approximately 1 foot below the static groundwater level within each well during both the purging and groundwater sampling process. Prior to sample collection, groundwater was purged from the monitoring wells using an in-line flow through cell and multi-parameter water quality meter (YSI 556) to measure water quality parameters and monitor for parameter stability. The following water quality parameters were recorded at 3- to 5-minute increments during well purging: temperature, pH, specific conductance, DO, and ORP. Turbidity and well drawdown height were also measured during purging using a turbidity meter and water level meter, respectively.

Analytical samples were collected once water quality parameters stabilized, or after three well volumes were purged from each monitoring well. Water quality parameters were considered stable once three of the five parameters, excluding temperature, met the parameter-specific stability criteria for three successive readings, per the Programmatic Work Plan (DOT&PF 2023). Groundwater sampling data sheets corresponding to monitoring wells sampled in 2023 are presented in Appendix C. Final water quality parameters at are tabulated in Section 5.1.

All groundwater samples were submitted to SGS North America, Inc. (SGS) laboratory in Fairbanks, Alaska and transferred to the SGS facility in Anchorage, Alaska, for analysis of the following COCs and analytical methods:

- Benzene, PCE, TCE, cis-DCE, trans-DCE, and vinyl chloride by EPA SW8260D.

In addition, samples collected from wells MW-11R, MW-34, and MW-30R (a Hydrant Fuel Site well) were submitted for analysis of the following MNA parameters by the methods indicated:

- Dissolved and total iron and manganese via EPA SW6020A
- TOC via EPA SM5310B/SW9060A
- Methane via EPA RSK 175
- Sulfate via EPA 300.0
- Nitrate and nitrite via EPA SM4500 NO3-F

Samples collected for analysis of dissolved iron and manganese were filtered at the time of sample collection with an in-line 0.45-micrometer filter.

2.4 MONITORING WELL SURVEY

During the 2021 groundwater monitoring event, Lounsbury, Inc. accompanied Jacobs field staff to the Drainage Pond site to perform a loop-level survey of all site monitoring wells using differential leveling procedures with digital level and real-time kinematic techniques with Trimble R10 global positioning system receivers (DOT&PF 2022). The survey report and results were used for the groundwater flow calculations. The wells were not resurveyed in 2023, but groundwater elevations displayed in Table 5-1 were recalculated based on remeasured depth to groundwater during 2023 sampling.

2.5 INVESTIGATION-DERIVED WASTE

Sampling was primarily conducted using disposable sampling equipment. Reusable equipment during the 2023 groundwater sampling event included the water level meter with interface probe, the YSI 556 water quality meter, turbidity meter, and bladder pump. None of the reusable equipment was used for sampling except for the bladder pump (and the disposable bladder was replaced between each well), and all reusable equipment was decontaminated between monitoring wells in accordance with the work plan. Decontamination water was containerized in 5-gallon buckets before being transferred to a 55-gallon drum at the FAI storage facility located at the DOT&PF Maintenance Facility (Figure A-1 in Appendix A). Other nonhazardous IDW included purge water, which was also containerized in the 55-gallon drum. Disposable personal protective equipment and sampling materials were bagged and disposed of at Fairbanks North Star Borough landfill.

2.6 WASTE CHARACTERIZATION

Containerized IDW (purge and decontamination water) was sampled from the 55-gallon drum using a peristaltic pump and disposable tubing. Waste characterization water samples were submitted to SGS for analysis of site COCs via the methods listed in Section 2.3 plus PFAS by EPA Method 537M. Waste samples were analyzed for PFAS since the Drainage Pond site lies within the known FAI PFAS plume. The analytical results of the waste sampling were used to characterize water for disposal purposes. Analytical results of the waste characterization sample (23DPS-01W) can be observed in the analytical results data table in Appendix D. Disposal of IDW purge and decontamination water is being coordinated with US Ecology. An ADEC Transport, Treatment, and Disposal Approval Form for the contaminated media will be completed and submitted to ADEC for approval. The final signed approval form will be included in Appendix E of this report.

3.0 PROJECT SCREENING LEVELS

Analytical sample results were screened against 2023 ADEC GCLs specified in Table C of the Alaska Administrative Code (AAC) Title 18, Chapter 75 (18 AAC 75), amended through 18 October 2023 (ADEC 2023). Table 3-1 lists the COCs along with the respective analytical methods, GCLs, and limit of detection (LOD). Although manganese is not considered a COC, it has been included in Table 3-1 because ADEC has established a GCL for it, and manganese was analyzed for as part of MNA.

Table 3-1
Project Groundwater Screening Levels

Analyte	Method	Project GCL (mg/L)	LOD[1]
Benzene	EPA SW8260D	0.0046	0.001
PCE	EPA SW8260D	0.041	0.0025
TCE	EPA SW8260D	0.0028	0.0025
cis-DCE	EPA SW8260D	0.036	0.01
trans-DCE	EPA SW8260D	0.36	0.0025
Vinyl chloride	EPA SW8260D	0.00019	0.000375
Manganese	EPA SW6020B	0.43	0.01

Notes:
[1] The LOD is the highest observed LOD in all samples.
For definitions, refer to the Acronyms and Abbreviations section.

(intentionally blank)

4.0 QUALITY ASSURANCE ASSESSMENT

This section details the quality control (QC) and sample preservation practices employed during groundwater sample collection to ensure data quality. Analytical data packets received by the laboratory were reviewed for data quality and usability by Kari Hagen, the Jacobs project chemist. Findings of the data review are presented in Section 5.2.

4.1 QUALITY CONTROL AND SAMPLE PRESERVATION

Samples were collected using the sample containers provided by SGS. The sample containers came prepared with the appropriate laboratory-provided preservative. Sample containers were labeled with the sample identification number, date and time of collection, sampler initials, and analyses requested. Sample temperature was maintained between 0 and 6 degrees Celsius (ºC) while in storage. The samples were submitted to SGS at the Fairbanks, Alaska office for shipment to their laboratory in Anchorage, Alaska for analytical testing. For QC, the following samples were included in the project sample analysis:

- One field duplicate was collected from MW-11R and submitted for analysis of all COCs and MNA parameters specified in Section 2.3.
- One trip blank was prepared for analysis of select volatile organic compounds (VOCs) (benzene, PCE, TCE, cis-DCE, trans-DCE, and vinyl chloride) and was transported with the sample cooler at all times.

4.2 DATA QUALITY

Jacobs performed this data quality review and completed the ADEC Laboratory Data Review Checklist for records associated with the analytical data (Appendix E). The Jacobs project chemist performed a completeness check to verify data packages included all requested information. All analytical data were reviewed, including the chain-of-custody and sample receipt records, laboratory case narratives, and laboratory data. Analytical data were reviewed for methodology, sample holding times, laboratory blanks, limits of quantitation, LODs, detection limits, laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) recoveries, and precision. Other QC parameters (initial calibration, continuing calibration, tuning, internal standards, interference check solutions, post-digestion spikes, and serial dilutions) were reviewed by means of the laboratory case narrative. The following qualifiers were applied during the review:

B The analyte was detected in the method blank, trip blank and/or equipment blank, and the sample concentration did not exceed the blank concentration by a factor of 10.

J The result is an estimated value because it is less than the limit of quantitation.

JD The result was qualified because the relative percent difference (RPD) between the primary sample and the field duplicate sample exceeded 30 percent. If one result was a detect, and the other was a nondetect, then the LOD value was used in the RPD calculation for the nondetect result.

JS+ The result was an estimated value, biased high because at least one surrogate failed recovery criteria for the sample. The result was biased high because the recovery exceeded the upper control limit.

JP- The result was considered an estimated value because incorrect or inadequate preservation methods were used.

UB The analyte was detected in the method blank within 10 times the reported result.

Project specific matrix spike (MS)/matrix spike duplicates (MSDs) were not required for this project; however, they were included in the analytical batches as the methods required. MS/MSDs were only evaluated if they were performed on samples from this project. All LCS/LCSD recoveries were within control limits; therefore, there was no effect on the data quality or usability.

The overall quality of the data was acceptable. The following QC issues were identified during the review:

- Several volatile organic analysis vials were received by the lab containing an air bubble greater than 6mm. One of three vials submitted contained an air bubble for the following SW8260D VOC samples: 23DPS-MW11R-GW, 23DPS-MW34-GW, 23DPS-MW38S-GW, 23DPS-MW39-GW, 23DPS-MW40-GW and 23DPS-01W. One of three vials submitted for RSK175 methane contained an air bubble in sample 23HFS-MW30R-GW. Not all vials submitted contained air bubbles, however if the samples were analyzed from a vial that did contain an air bubble, the result may be biased low. The affected samples results were qualified JP-. Most affected results were less than half the screening level; therefore, the effects on data quality or usability were minimal.
- Perfluorohexanoic acid (PFHxA) was detected in the batch method blank affecting sample 23DPS-01W. Sample results less than 10 times the blank concentration were qualified B, biased high. A screening level for PFHxA has not been established. The effects on data quality or usability were minimal.
- cis-DCE was detected in the equipment blank affecting sample 23DPS-MW38D-GW. Detected sample results less than 10 times the blank concentration were qualified B, biased high. The affected sample result was significantly less than the screening level; therefore, the effects on data quality or usability were minimal.
- The RPD between the vinyl chloride (SW8260D) results in the primary and field duplicate was greater than 30 percent. The sample results were qualified JD and considered estimated with unknown bias. The result of the primary sample 23DPS-MW11R-GW was greater than the screening level and the result of the field duplicate 23DPS-MW11R-GWA was nondetect. The primary sample result should be used for data analysis. The data are considered usable with unknown bias.

The overall quality of project data was acceptable. The qualifications applied during data validation did not adversely affect data usability.

(intentionally blank)

5.0 RESULTS AND FINDINGS

This section presents results of monitoring well gauging and survey, analytical groundwater results, result of MNA parameters, and the results of the reductive dechlorination analysis.

5.1 MONITORING WELL GAUGING AND SURVEY

A summary of monitoring well integrity, gauging, and groundwater depth data is included in Table 5-1. No free product was detected in any monitoring wells at the Drainage Pond site. Groundwater elevation at the site ranges from 421.08 feet above mean sea level (amsl) at MW-34 to 423.52 feet amsl at MW-39.

Table 5-1
Status and Depth to Groundwater of Drainage Pond Site Wells Sampled in 2023

Well ID	Integrity	Depth to Product	Depth to Groundwater (feet bgs)	Total Well Depth (feet bgs)	Groundwater Elevation (feet amsl)[1]
MW-11R	Good	No free product	5.20	33.94	425.29
MW-34	Good	No free product	4.09	13.20	425.49
MW-38S	Good	No free product	4.48	14.55	425.43
MW-38D	Good	No free product	4.55	34.24	425.42
MW-39	Good	No free product	6.35	16.50	423.88
MW-40	Good	No free product	6.00	15.67	424.56

Notes:
[1] Groundwater elevations recalculated from the well survey report conducted by Lounsbury Inc. in 2021 (DOT&PF 2021).
For definitions, refer to the Acronyms and Abbreviations section.

Groundwater flow direction and gradient calculations performed using survey data from wells at the Drainage Pond site only indicate a localized groundwater flow direction at a bearing of north 7 degrees west, with a gradient of 0.065. However, because groundwater monitoring wells are tightly spaced, with a maximum distance between wells of approximately 200 feet between MW-34 and MW-39 (as an example), the spatial coverage is likely too small and not representative of the flow direction over a wider footprint of the FAI. Calculations performed using all survey data from the Drainage Pond site and the neighboring Hydrant Fuel System site, both surveyed in October 2021, indicate groundwater flow direction at a bearing of south 32 degrees east, with a gradient of 0.0004 feet/foot. This indicates groundwater flow is parallel to the flow direction of the nearest section of the Chena River (located approximately 0.25 miles directly east of the Drainage Pond site) and toward the Tanana River (Figure A-1 in Appendix A).

Notably, the gradient of 0.0004 foot/foot suggests comparative flatness across the two sites, indicating that a slight change in groundwater slope in any one direction would have a dramatic effect on the calculated flow direction. The calculated 2021 flow direction to the southeast conflicts with the flow direction reported in the 2006 VOC site characterization (Oasis 2007), which reported that frost jacking of monitoring wells was evident and that groundwater elevations derived from the 2005 well survey should therefore be considered approximate. Past groundwater studies at the site have found that groundwater flow direction can change from northwest to southeast due to its proximity to the Chena and Tanana Rivers which experience seasonal stage changes from runoff, ice jams, and flooding events (Oasis 1999).

5.2 WATER QUALITY PARAMETERS

During the 2023 sampling event, water quality parameters reached stability prior to groundwater sample collection at all the wells sampled. Purge volume and/or groundwater parameters were recorded in the Groundwater Sample Data Sheets (Appendix C). Table 5-2 shows the water quality parameters measured during monitoring well purging.

Table 5-2
Water Quality Parameters from Wells Sampled in 2023

Well ID	Groundwater Depth* (feet bgs)	Sample Depth (feet bgs)	Temperature (ºC)	Conductivity (µS/cm)	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)
MW-11R	5.20	19.53	6.80	503	0.27	7.08	22.8	2.49
MW-34	4.09	8.65	7.63	693	1.39	6.70	59.5	6.35
MW-38S	4.48	9.50	7.81	588	0.25	7.08	5.90	2.53
MW-38D	4.55	19.40	5.94	337	0.38	7.19	3.70	3.51
MW-39	6.35	11.42	9.66	965	0.50	6.86	20.90	3.12
MW-40	6.00	10.94	8.23	1208	0.38	6.65	77.30	16.22
MW-30R	8.03	15.50	4.20	618	1.15	6.69	92.60	17.68

Notes:
*Depth to groundwater corresponds to the depth at the start of sampling.
For definitions, refer to the Acronyms and Abbreviations section.

5.3 COC ANALYTICAL RESULTS

Table 5-3 presents the 2023 groundwater analytical results; these are also depicted on Figure A-3 (Appendix A). Appendix D presents the historical and 2023 results for VOCs. Historical results (pre-2019 data) in this appendix have been rescreened against the 2023 ADEC GCLs. Appendix D presents the sample summary and results tables, the ADEC Laboratory Data Review Checklist, and laboratory reports.

The 2023 groundwater results are summarized in this section following Table 5-3, and a comparison with the historical data is also provided in the narrative. Note that all references to GCLs throughout this section are in reference to the 2023 ADEC GCLs that are presented in Section 3.0 and the data tables within this report.

Similar to previous years, groundwater samples collected from MW-11R, MW-40, and MW-38S continued to have high concentrations of chloroethenes compared to the other wells sampled. However, results from 2023 show that the concentrations of cis-DCE in MW-11R decreased by an order of magnitude and were lower than concentrations of both MW-40 and MW-38S. TCE in MW-40 exceeded the GCL for the first time in five sampling events. These three wells containing the highest concentrations of total chloroethenes are located most centrally within the known contaminant plume (Figure A-3) and showed higher levels of cis-DCE and vinyl chloride, while the well farthest to the west, MW-34, was nondetect for all analytes. The deepest monitoring well, MW-38D, continues to show concentrations of COCs under the GCLs or nondetect in the deeper groundwater zone. For historical comparison, monitoring wells MW-38S, MW-38D, MW-39, and MW-40 are relatively new (established in 2010), whereas MW-11R was first sampled in 2005 and MW-34 in 2003.

Table 5-3
Groundwater Results from the 2023 Sampling Event

Analyte:		Benzene	PCE	TCE	cis-DCE	trans-DCE	Vinyl Chloride
2023 ADEC GCL[1] (mg/L):		0.0046	0.041	0.0028	0.036	0.36	0.00019
Monitoring Well ID	Sample Date	Analytical Result (mg/L)					
MW-11R	8/8/2023	0.00236 JP-	0.00596 JP-	0.00121 JP-	**0.116 B,JP-**	0.00145 JP-	**0.00072 JD,JP-**
MW-11R (DUP)	8/8/2023	0.0024	0.00597	0.00116	**0.116 B**	0.00148	ND [0.000075] JD
MW-34	8/9/2023	ND [0.0002] JP-	ND [0.0005] JP-	ND [0.0005] JP-	ND [0.0005] JP-	ND [0.0005] JP-	ND [0.000075] JP-
MW-38S	8/8/2023	0.00319 JP-	0.00062 JP-	0.00021 J,JP-	**0.148 B,JP-**	0.00207 JP-	**0.0018 JP-**
MW-38D	8/8/2023	ND [0.0002]	ND [0.0005]	0.00015 J	0.00048 J,B	ND [0.0005]	ND [0.000075]
MW-39	8/8/2023	0.00148 JP-	ND [0.0005] JP-	0.00121 JP-	**0.0487 B,JP-**	0.00214 JP-	**0.00224 JP-**
MW-40	8/9/2023	0.0008 JP-	0.0156 JP-	**0.0258 JP-**	**0.467 B,JP-**	0.00617 JP-	**0.00344 JP-**

Notes:
[1]18 AAC 75. Table C Groundwater Human Health Cleanup Levels (ADEC 2023)
Bold red indicates value exceeds ADEC GCL.
[ ] = LOD
DUP = Field duplicate sample collected from monitoring well MW-11R.
For data qualifiers, refer to Section 4.2.
For definitions, refer to the Acronyms and Abbreviations section.

Benzene: There were no exceedances of benzene GCL (0.0046 milligrams per liter [mg/L]) in 2023, but benzene was detected in monitoring wells MW-11R (and field duplicate), MW-38S, MW-39, and MW-40 at concentrations less than the GCL. Historically, benzene has exceeded the GCL at MW-11R, MW-38S, and MW-39 but has been below those concentrations during the last four sampling events.

PCE: PCE concentrations did not exceed the GCL (0.041 mg/L) in any sampled monitoring wells in 2023. However, PCE was detected at concentrations less than the GCL at MW-11R, MW-38S, and MW-40. Concentrations ranged from 0.00062 mg/L (qualified J, JP-) at MW-38S to 0.0156 mg/L (qualified JP-) at MW-40. Historically, PCE concentrations have not exceeded the GCL in any monitoring wells but have been detected at concentrations below the GCL in at least one monitoring event at MW-11R, MW-38S, MW-38D, MW-39, and MW-40. At MW-11R, PCE has been detected below the GCL in all monitoring years, and at MW-38S and MW-40, PCE has been detected in all monitoring events except the 2013 monitoring event.

TCE: The concentration of TCE exceeded the GCL (0.0028 mg/L) in monitoring well MW-40 with a concentration of 0.0258 (qualified JP-) in 2023. TCE was detected at concentrations less than the GCL at MW-11R (and field duplicate), MW-38S, and MW-38D. Historically, TCE exceeded the GCL at MW-11R in all monitoring events except for 2013. At MW-40 TCE only exceeded the GCL during the 2017 monitoring event and has not exceeded the GCL but has been detected at concentrations below the GCL in at least one monitoring event at MW-38S, MW-38D, and MW-39. The maximum historical concentration of TCE at the site was 0.0112 mg/L, detected at MW-11R in 2008.

cis-DCE: Concentrations of cis-DCE at MW-11R, MW-38S, MW-39, and MW-40 exceeded the GCL (0.036 mg/L) in 2023. cis-DCE ranged from the minimum detected concentration of 0.0487 mg/L (qualified B, JP-) at MW-39, to a maximum concentration of 0.467 mg/L (qualified B, JP-) at MW-40. Historically, at MW-11R and MW-40, cis-DCE has exceeded the GCL in all monitoring events. At MW-38S and MW-39, cis-DCE has exceeded the GCL in all sampling events except in 2013 at MW-38S and 2017 at MW-39. The maximum historical concentration of cis-DCE at the site was 2.68 mg/L, detected at MW-11R in 2008.

trans-DCE: In 2023, trans-DCE did not exceed the GCL (0.36 mg/L) in any sampled monitoring wells. However, trans-DCE was detected at concentrations less than the GCL at MW-11R, MW-38S, MW-39, and MW-40. This pattern is consistent with historical data.

Vinyl chloride: Concentrations of vinyl chloride exceeded the GCL (0.00019 mg/L) at monitoring wells MW-11R, MW-38S, MW-39, and MW-40 in 2023. Vinyl chloride was nondetect at monitoring wells MW-34 and MW-38D in 2023, which is consistent with historical data. Historically, vinyl chloride concentrations have exceeded the GCL in all monitoring events at MW-40; and at MW-11R, in all events except 2013 and 2017. At MW-38S and MW-39, concentrations exceeded the GCL in all events except 2013 at MW-38S and 2017 at MW-39. The maximum historical concentration of vinyl chloride at the site was 0.00694 mg/L, detected at MW-11R in 2010.

5.4 REDUCTIVE DECHLORINATION

The following sections present 2023 MNA parameter and molar fraction data alongside historical data for comparison.

5.4.1 MNA PARAMETER EVALUATION

Analytical MNA parameter results and select water quality measurements taken during well purging provide insight about the geochemical conditions at the site and whether they are favorable for reductive dechlorination. This section discusses each parameter and the results obtained during the 2023 sampling event.

5.4.1.1 Water Quality Parameters

Temperature, pH, DO, and ORP are water quality parameters measured at each sampled monitoring well in 2023 and presented in Table 5-2. These parameters can provide evidence that either suggest site conditions are conducive to reductive dechlorination or that the process is unlikely. For example, at low temperatures (less than 5ºC) biodegradation is inhibited (Wiedemeier et al. 1998). Groundwater with a pH that is too acidic (less than 5) or to alkaline (greater than 9) can also inhibit biodegradation. DO at concentrations less than 0.5 mg/L suggests the reductive pathway is not suppressed and that reductive dechlorination may be occurring. ORP measurements provide evidence for either oxidizing (aerobic) conditions that inhibit reductive dechlorination or reducing (anaerobic) conditions that are supportive of dechlorination. More specifically, at ORP levels between 50 millivolts (mV) and -100 mV, reductive dechlorination is possible, and at levels less than -100 mV, reductive dechlorination is likely.

Temperatures at the Drainage Pond site during sampling in August 2023 were greater than 5ºC in all monitoring wells. Monitoring well MW-30R fell slightly below 5 ºC (4.20ºC) but is technically part of the Hydrant Fuel System wells south of the Drainage Pond site. Notably, in Fairbanks, Alaska, these temperatures are expected to drop significantly as winter freeze sets in, which implies that temperatures are favorable for reductive dechlorination in the spring, summer, and fall periods when the ground is not frozen. Results for pH in all sampled monitoring wells was measured between 6.65 and 7.08 pH, which falls within the optimal range for reductive dechlorination (5-9). DO was measured at concentrations lower than 0.5 mg/L in all sampled monitoring wells except for MW-34 and MW-30R (upgradient and downgradient

from the plume), which implies reductive dechlorination may be occurring. ORP was within the range of possible dechlorination (-100 to 50 mV) at four monitoring wells within the groundwater plume MW-11R, MW38S, MW-38D, and MW-39 but was outside the range of possible dechlorination in MW-34, MW-40, and MW-30R. The temperature, pH, DO and ORP results suggest conditions are possible for the reductive dechlorination pathway.

5.4.1.2 Analytical MNA Results

The analytical results for ethane and ethene, methane, dissolved and total iron, dissolved and total manganese, nitrate and nitrite, sulfate, and TOC help to determine if the geochemistry of the groundwater is actively supportive of reductive dechlorination. The analytical results of MNA parameters measured during the 2023 sampling event are tabulated in Table 5-4 along with historical results.

Table 5-4
2023 and Historical MNA Parameters

Analyte:		Ethane	Ethene	Methane	Total Iron[3]	Dissolved Iron[3]	Total Manganese[4]	Dissolved Manganese[4]	Sulfate	Total Nitrate/Nitrite	TOC
2023 ADEC GCL[1](mg/L):		-	-	-	-	-	0.43	0.43	-	-	-
Monitoring Well ID	Sample Date	Analytical Result (mg/L)									
MW-11R	11/1/2006	-	-	-	-	34	**3.83**	-	9.17	0.122	-
	10/17/2007	-	-	5.82	-	-	-	**4.61**	7.06	0.100 UB	11.9
	10/20/2021	ND [0.0005]	ND [0.0005]	10.5	80.3	82.3	**2.24**	**2.17**	1.6	0.163 J	36.7
	8/8/2023[2]	*ND [0.0005]*	*ND [0.0005]*	*1.85*	*32.9*	*26.8*	***3.42***	***3.46***	*17*	*0.112 J*	*9.29*
MW-30R	*8/8/2023*	*ND [0.0005] JP-*	*ND [0.0005] JP-*	*1.03 JP-*	*13.8*	*21.8*	***4.93***	***5.2***	*1.08*	*ND [100]*	*53.4*
MW-34	10/21/2021	ND [0.0005]	ND [0.0005]	0.00028 J	1.58	1.23	0.0204	0.0191	16.9	0.126 J	4.1
	8/9/2023	*ND [0.0005]*	*ND [0.0005]*	*0.00074*	*0.563*	*0.243 J*	*0.0489*	*0.0411*	*37.6*	*0.956*	*5.8*
MW-38S	10/29/2010	-	-	2.1	411	36.8	**2.42**	**2.16**	10.7	0.111	15.2
	10/21/2021	0.00193	ND [0.0005]	6.62	98.5	93.5	**2.73**	**2.64**	5.35	0.265	38.1
MW-38D	10/29/2010	-	-	0.2	8.09	7.32	**1.85**	**1.84**	17.8	0.255	4.53
	10/21/2021	0.0072	ND [0.0005]	1.07	2.64	2.36	**0.566**	**0.592**	1.42	0.128 J	7.64
MW-39	10/29/2010	-	-	8.2	29.6	24.4	**1.17**	**1.17**	1.18	0.052 J	46
	10/20/2021	ND [0.0005]	ND [0.0005]	11.7	91.4	100	**4.07**	**4.17**	0.208	0.202	22.1
MW-40	10/29/2010	-	-	7.8	89.2	84.4	**0.868**	**0.83**	0.317	0.139	77.4
	10/20/2021[2]	ND [0.0005]	ND [0.0005]	6.85	75.2	71.7	**1.11**	**1.08**	0.565	0.143 J	42.6

Notes:
[1] 18 AAC 75, Table C Groundwater Human Health Cleanup Levels (ADEC 2023).
[2] Result is the maximum obtained from the primary and duplicate sample pair.
[3] Total iron is a combination of ferric and ferrous (i.e., dissolved) iron; dissolved iron is indicative of reducing conditions.
[4] Total manganese is a combination of reduced valence (2+) manganese and valence 4+ manganese whereas dissolved manganese is a measure of reduced manganese only.
- = No ADEC GCL has been established for the analyte or the sample was not analyzed for the analyte.
[ ] = LOD
Bold red indicates value exceeds ADEC GCL.
Italics and gray rows signify 2023 results.
Historical results prior to 2021 were obtained from the 2006 VOC characterization report (Oasis 2007) and the 2010 Drainage Pond Groundwater Monitoring Report (Oasis 2011).
For data qualifiers, refer to Section 4.2.
For definitions, refer to the Acronyms and Abbreviations section.

Ethane and Ethene

Ethane and ethene are produced during reductive dechlorination, and analytical results greater than 0.01 mg/L are indicative of reducing conditions (Wiedemeier et al. 1998).

Ethane and ethene were not detected in any monitoring wells sampled for them in 2023. This suggests the reductive pathway is unlikely and that reductive dechlorination is not supported to a significant extent. Historically, ethane and ethene were not monitored, but in 2021 ethane was detected at MW-38S and MW-38D only, at concentrations less than 0.01 mg/L. Ethene was not detected in 2021.

Methane

Methane detections in groundwater are indicative of methanogenesis, which typically occurs after oxygen, nitrate, and sulfate are depleted. Concentrations greater than 0.5 mg/L indicate the reductive pathway is likely but that methanogenesis may be competing with reductive dechlorination (Wiedemeier et al. 1998).

Methane was detected at concentrations greater than 0.5 mg/L in both MW-11R and MW-30R in 2023, and below 0.5 mg/L at MW-34, located outside the contaminant plume footprint (Figure A-3). This suggests the reductive pathway is likely within the contaminant plume but that methanogenesis may be competing with reductive dechlorination. MW-11R showed an order of magnitude decrease in methane from 10.1 mg/L in 2021 to 1.85 mg/L in 2023. Historically, methane concentrations have been greater than the 0.5 mg/L threshold in all sampled wells, except MW-38S, which had a concentration of 0.2 mg/L in 2010, and at MW-34, which was not sampled for methane. In general, concentrations of methane have increased slightly (within the same order of magnitude) in all sampled monitoring wells since 2010, except MW-40, which showed a slight decrease in 2021, and MW-11R, which showed a decrease since 2021.

Iron

Dissolved iron is produced during reducing conditions when the supply of ferric iron, supplied by subsurface soil, is reduced during anaerobic biodegradation. The measure of total versus

dissolved iron is important for determining the available supply of iron in its oxidized state compared to that which has been reduced. At concentrations of dissolved iron greater than 1 mg/L, the reductive pathway may be active (Wiedemeier et al. 1998).

Dissolved iron concentrations were greater than 1 mg/L in monitoring wells MW-11R and MW-30R, but less than 1 mg/L in MW-34 in 2023. Total iron concentrations were generally very similar to dissolved iron concentrations. The data suggest the reductive pathway is active but that most of the ferric iron available for reduction has been depleted.

Manganese

Similar to iron, manganese sourced from the subsurface soil serves as an electron acceptor for anaerobic biodegradation; high concentrations of dissolved manganese are indicative that the anaerobic biodegradation process is occurring (Wiedemeier et al. 1998).

Dissolved and total manganese concentrations in each well were generally very similar to one another, suggesting that the majority of the available oxidized manganese has been reduced. Concentrations were generally one order of magnitude greater than the 2023 ADEC GCL in both MW-11R and MW-30R, but not in MW-34, located outside the groundwater contaminant plume, concentrations were one order of magnitude less than the GCL. The observed concentrations of dissolved manganese within the groundwater contaminant plume suggest a reducing environment with active anaerobic biodegradation.

Nitrate/Nitrite

Nitrate serves as an electron receptor for anaerobic biodegradation once DO has been depleted from the groundwater. Nitrite in groundwater is the reduced form of nitrate. Measures of nitrate/nitrite in groundwater can offer information on whether nitrate is available in the subsurface environment to serve as an electron acceptor. Concentrations of nitrate less than 1 mg/L are optimal for the reductive pathway; concentrations greater than 1 mg/L may compete with and inhibit reductive dechlorination (Wiedemeier et al. 1998).

Analytical results for nitrate/nitrite in 2023 and in historical monitoring events were less than 1 mg/L in all sampled monitoring wells. This indicates nitrate is not inhibiting reductive dechlorination and supports the idea that DO in groundwater, as previously discussed, has yet to be depleted.

Sulfate

Sulfate becomes an electron receptor once both DO and nitrate have been depleted from the subsurface environment. Optimal concentrations of sulfate to support reductive dechlorination are less than 20 mg/L. At concentrations greater than this threshold, reduction of sulfate may compete with reductive dechlorination (Wiedemeier et al. 1998).

The 2023 sulfate concentrations in MW-11R and MW-30R were less than 20 mg/L, although they increased by an order of magnitude at MW-11R. Sulfate was above 20 mg/L at MW-34 (outside the contaminant plume) at a concentration of 37.6 mg/L. Historical sulfate concentrations in all sampled monitoring wells were less than 20 mg/L with concentrations generally decreasing over time in most sampled monitoring wells. The data suggest the sulfate-reducing process may be occurring; sulfate concentrations are not great enough to compete against the reductive dechlorination process within the known contaminant plume.

TOC

TOC serves as an energy source that drives the reductive dechlorination process. Optimal concentrations of TOC are greater than 20 mg/L. At concentrations less than this threshold, TOC is not considered a significant enough source of energy to promote the process (Wiedemeier et al. 1998).

In 2023, TOC concentrations were greater than 20 mg/L in only one of the three wells sampled for this parameter: MW-30R that is outside the contaminant plume. TOC concentrations were below 10 mg/L in MW-11R and MW-34. Historically TOC concentrations were greater than 20 mg/L in all sampled monitoring wells in 2021 except at MW-34, located outside the contaminant plume, and at MW-38D, located immediately east of the plume. Historically concentrations at MW-39 and MW-40 were greater than 20 mg/L, whereas concentrations at

other sampled wells were less than the 20 mg/L threshold. Since all wells were not sampled for TOC, it is inconclusive whether the concentrations within the plume have changed, but 2021 sampling results concluded that TOC was likely a significant source of energy to promote the reductive dechlorination process.

Conclusions of MNA Analytical Results

Results of MNA parameter evaluation provide evidence that the geochemical environment within the plume might be supportive of reductive dechlorination. Past results have concluded an apparent stall of this process at the trans-DCE stage due to an oxidizing environment within the contaminant plume. TOC has been present at concentrations high enough to provide energy for the process (as seen in 2021) and might continue to be in 2023 (only samples from wells outside the plume were analyzed for TOC). DO results suggest the reductive pathway is not suppressed within the contaminant plume, and ORP suggests reductive dechlorination is possible. Manganese and iron results seem to indicate most of the available oxidized states of each metal have been reduced. It was concluded that conditions in 2006 and 2010 were supportive of a reducing environment; therefore, the total and dissolved iron and manganese concentrations observed in 2023 may be indicative of the historical reducing environment. Nitrate/nitrite concentrations indicate it is not inhibiting reductive dechlorination, and nitrate is not a significant presence as an electron receptor at the site. Historically, decreasing sulfate concentrations indicated sulfate reduction was occurring, and concentrations of sulfate have not been great enough to compete with reductive dechlorination, but the latest increases in sulfate in two wells sampled this year may point to this possibility.

5.4.2 MOLAR FRACTION CALCULATIONS

To better evaluate the reductive dechlorination process at this site, molar factions for each chloroethene were calculated, allowing for direct comparison between years despite annual variability in total concentrations (Table 5-5 and Chart 5-1). Over the years, there is a slight downward trend in vinyl chloride concentrations in all sampled monitoring wells and a slight increase in trans-DCE concentrations in all monitoring wells except MW-38S. Studies of reductive dechlorination have found that when conditions for completed dechlorination of PCE or TCE to ethylene are not present, degradation stalls at DCE (Northwind Inc. 2003). The stall at DCE implies the process may not reach complete dechlorination to ethylene soon, if ever. This process has likely converted a substantial fraction of dissolved TCE to cis-DCE and trans-DCE, but the follow-on conversion to vinyl chloride is generally less effective, as evidenced by the relatively static concentrations of vinyl chloride at the monitoring wells.

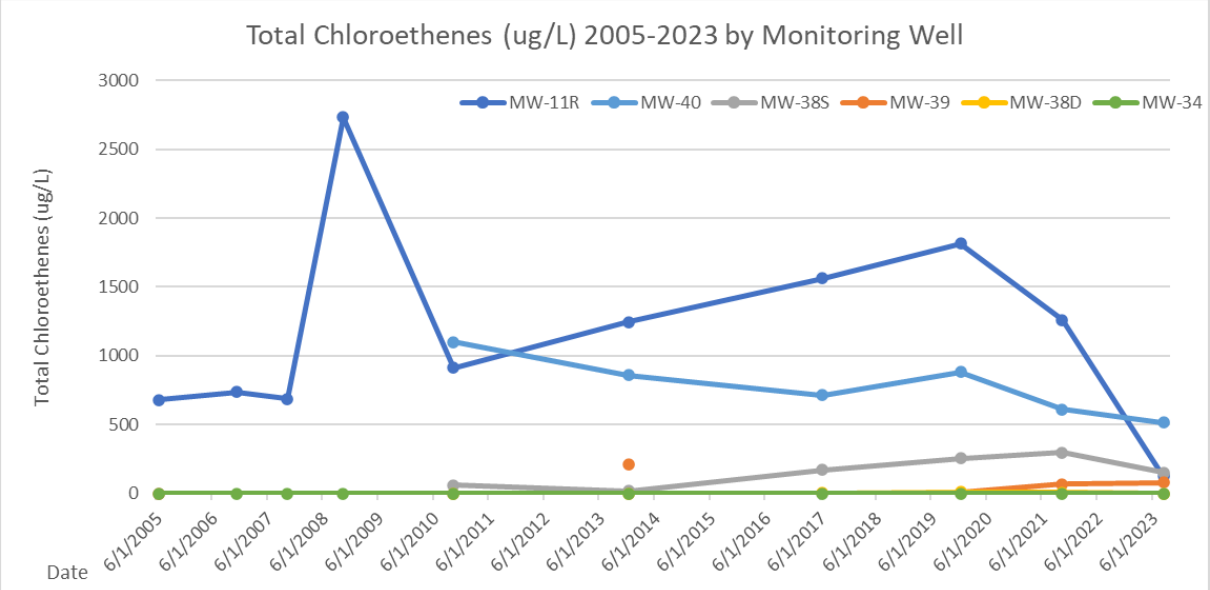
Table 5-5
Chloroethene Molar Fraction Trends for Drainage Pond Site Wells Sampled in 2023

Monitoring Well ID	Sample Date[1]	Total Chloroethenes[2] (µg/L)	Molar Fraction[3]				
			PCE	TCE	cis-DCE	trans-DCE	Vinyl Chloride
MW-11R	9/27/2005	680	2.40%	1.50%	94.40%	0.60%	1.10%
	11/2/2006	737	0.80%	0.70%	96.80%	1.10%	0.50%
	10/17/2007	688	2.20%	0.60%	96.10%	0.70%	0.50%
	10/21/2008	2,733	0.40%	0.30%	98.40%	0.60%	0.30%
	10/29/2010	915	1.50%	0.40%	96.20%	0.80%	1.10%
	12/5/2013	1,244	0.70%	--	98.50%	0.80%	--
	6/15/2017	1,561	1.20%	1.20%	96.70%	0.90%	--
	12/12/2019	1,813	0.44%	0.30%	97.92%	0.96%	0.38%
	10/20/2021	1,260	0.54%	0.22%	97.78%	1.09%	0.38%
	8/8/2023	125	2.84%	0.73%	94.40%	1.20%	0.83%
MW-34	8/27/2003 through 8/9/23	ND	--	--	--	--	--
MW-38S	10/29/2010	62	0.50%	--	95.90%	1.00%	2.60%
	12/5/2013	21	--	--	100%	--	--
	6/15/2017	173	1.50%	0.20%	96.50%	0.60%	1.20%
	12/11/2019	258	1.18%	0.23%	97.03%	0.84%	0.72%
	10/21/2021	299	0.17%	0.10%	97.85%	0.76%	1.12%
	8/8/2023	153	0.24%	0.10%	96.65%	1.35%	1.66%
MW-38D	10/29/2010	ND	--	--	--	--	--
	12/5/2013	ND	--	--	--	--	--
	6/15/2017	4	9.80%	11.10%	79.10%	--	--
	12/11/2019	12	--	2.62%	97.38%	--	--
	10/21/2021	10	--	3.83%	96.17%	--	--
	8/8/2023	1	--	18.74%	81.26%	--	--
MW-39	10/29/2010	213	0.20%	0.30%	93.20%	2.30%	4.00%
	6/15/2017	7	--	6.00%	89.10%	4.90%	--
	12/11/2019	70	--	1.22%	91.75%	4.54%	2.49%
	10/20/2021	79	--	--	92.67%	4.12%	3.21%

Monitoring Well ID	Sample Date[1]	Total Chloroethenes[2] (µg/L)	Molar Fraction[3]				
			PCE	TCE	cis-DCE	trans-DCE	Vinyl Chloride
	8/8/2023	53	--	1.63%	88.70%	3.90%	5.77%
MW-40	10/29/2010	1,102	0.10%	0.10%	97.60%	0.70%	1.60%
	12/5/2013	861	--	--	97.40%	0.90%	1.70%
	6/15/2017	715	1.80%	0.60%	96.00%	1.00%	0.70%
	12/11/2019	883	0.64%	0.26%	97.77%	1.03%	0.30%
	10/20/2021	611	0.22%	0.28%	97.66%	1.32%	0.52%
	8/9/2023	518	1.80%	3.76%	92.26%	1.22%	0.96%

Notes:
[1]Pre-2019 sample data obtained from the 2017 Drainage Pond Groundwater Monitoring Report (SLR 2018).
[2]Total chloroethene (µg/L) is calculated as the sum of individual analyte concentrations. For samples having primary and duplicate sample results, the maximum result from each sample pair for each analyte is used in the calculation.
[3]Molar fraction is calculated for individual detected chloroethene congeners as the fraction of the total molar concentration.
-- = Molar fractions not calculated for NDs; results below laboratory LODs.
For definitions, refer to the Acronyms and Abbreviations section.

Chart 5-1
Total Chloroethene Trends for Drainage Pond Site Wells Sampled in 2023



	6/27/2005	11/2/2006	10/17/2007	10/21/2008	10/29/2010	12/5/2013	6/15/2017	12/12/2019	10/20/2021	8/8/2023
MW-11R	680	737	688	2,733	915	1,244	1,561	1,813	1,260	125
MW-40					1,102	861	715	883	611	518
MW-38S					62	21	173	258	299	153
MW-39	0					213		7	70	79
MW-38D					0	0	4	12	10	1
MW-34	0	0	0	0	0	0	0	0	0	0

Notes:
Chart data taken from Table 5-5.
Total chloroethene (µg/L) is calculated as the sum of individual analyte concentrations. For samples having primary and duplicate sample results, the maximum result from each sample pair for each analyte is used in the calculation.
Blank values in table mean analyte was not measured.
0 = Nondetections; results below laboratory LODs.
For definitions, refer to the Acronyms and Abbreviations section.

6.0 CONCEPTUAL SITE MODEL UPDATE

The Human Health Conceptual Site Model (CSM) was revisited and updated based on results the 2023 groundwater monitoring event. The Human Health CSM Scoping and Graphic forms are presented in Appendix G.

PFAS was added to the list of analytes to investigate at the Drainage Pond site in 2021 but was removed from this updated CSM due to its inclusion in the larger FAI PFAS plume and listing as a COC under a different site.

Impacted media at the Drainage Pond site include surface and subsurface soil, groundwater, air, and biota. Receptors considered for potential exposure include construction, industrial, commercial workers and site employees, site visitors, and trespassers. Exposure pathways include incidental soil ingestion, dermal absorption of contaminants from soil, and inhalation of outdoor air for current and future commercial or industrial workers, site employees, site visitors and trespassers, and potential future construction workers. Inhalation of fugitive dust is also considered a complete pathway for current and future site visitors, trespassers, and site employees, as well as for potential future commercial, industrial or construction workers. Ingestion of groundwater and dermal absorption of contaminants in groundwater are considered complete exposure pathways for potential future commercial or industrial workers, future site visitors and trespassers, future construction workers, and future site employees. The rationales behind those impacted media, receptors, and exposure pathways are presented in the scoping and graphic forms (Appendix G).

(intentionally blank)

7.0 CONCLUSIONS

In 2006, the Gore-Sober soil gas survey (Oasis 2007) identified an unknown PCE source area east of MW-11R. There is currently no evidence of a discreet point source of contamination. The site was historically a drainage pond where contaminants could have settled out or been transported by runoff.

The addition of monitoring wells MW-38S, MW-38D, MW-39, and MW-40 in 2010 helped to fill data gaps associated with the Drainage Pond site, increased knowledge of contaminant boundaries, and provided additional information on the natural attenuation that is occurring at the site. Results from the 2021 groundwater monitoring efforts indicated chloroethenes persisted in the groundwater at similar concentrations to those detected in previous studies, and reductive dechlorination may have stalled at DCE. Results from 2023 study decreased by an order of magnitude for cis-DCE at the center of the contaminant plume, and no MNA parameters are no longer conclusive of this stall. Benzene has decreased in concentration and was not found to be in exceedance of the GCL for the past four sample events.

The 2023 sampling event is the sixth in which chloroethene concentrations were less than GCLs or nondetect in samples collected from MW-38D, which has a total well depth of 34.24 feet. This comparatively deep well was installed to determine whether contaminants were present below the groundwater interface, as results from samples collected from MW-11R (installed to 34.5 feet below ground surface [bgs]) might suggest. Unlike MW-11R, which has a screened interval of 5.0 to 34.5 feet bgs, MW-38D is only screened at the interval from 30 to 35 feet bgs. The 2023 groundwater sample results from MW-38D suggest contaminants are not present at depth, while contaminant concentrations detected in MW-11R are likely the result of mixing. The apparent decrease in total chloroethenes in MW-11R is likely due to the deep sampling level of the tubing at this well (19.5 feet bgs), which may not have sampled from the highest concentration of soil contamination. The soil data from the 2010 site investigation support the theory that contaminants are confined to the groundwater interface, extending from the ground surface to 11 feet bgs.

Although the 2023 groundwater monitoring effort provided recent data of the known chloroethene plume, it did not define plume boundaries or verify the plume is not migrating. According to hydrological assessments in 2013 and 2017, the prevailing groundwater flow direction is westerly, away from the 2006 Gore-Sober soil gas plume delineation. However, groundwater flow direction calculated from 2021 survey data conflicts with this information and supports other historical data that indicate groundwater flow is influenced by hydrologic conditions in the Chena and Tanana Rivers. If the flow direction is westerly, as suggested in some historical reports, data from 2003 to 2023 at MW-34 and from 2006 at TW-1 and TW-2 (Figure A-2 in Appendix A) suggest that the plume is likely confined to the east side of Airport Industrial Road. However, if this flow direction has long periods of opposite flow direction, MW-34 may be representative of upgradient groundwater conditions during times of water backup and/or flooding of the Chena River.

MNA parameter evaluation and molar fraction calculations are somewhat inconclusive and indicate geochemical conditions are possibly conducive to reductive dechlorination. It is inconclusive as they may have been in the past, and there was also significant evidence that the reductive dechlorination process may have stalled at DCE.

8.0 RECOMMENDATIONS

Based on this report, the following actions are recommended for the Drainage Pond site:

- Continue biennial groundwater monitoring of wells MW-11R, MW-34, MW-38S, MW-38D, MW-39, and MW-40.
    a) It might be beneficial to test for ethylene in future samplings since it is the final stage of the dichlorination process and there seems to be a stall in the DCE conversion. It would be curious to see if ethylene levels are high enough that there may be some conversion back and forth between ethylene and PVC which might be inhibiting electron transfer higher up the chain.
- Continue use of a down-hole bladder pump for sample collection at all monitoring wells.
- Continue monitoring natural attenuation parameters (dissolved and total iron, dissolved and total manganese, TOC, methane, sulfate, and nitrate-nitrite) at the site to evaluate dechlorination. Consider increasing the number and distribution of wells at which MNA parameters are collected to gather a better picture of conditions within the contaminant plume as well as outside the plume.

(intentionally blank)

9.0 REFERENCES

ADEC (Alaska Department of Environmental Conservation). 2019 (October). *ADEC Contaminated Site Program – FAI – Drainage Pond*. https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/1923. Accessed on October 2019.

ADEC. 2022 (January). *Field Sampling Guidance for Contaminated Sites and Leaking Underground Storage Tank Sites*. Final. Division of Spill Prevention and Response, Contaminated Sites Program.

ADEC. 2023 (October). *Oil and Other Hazardous Substances Pollution Control*. Division of Spill Prevention and Response, Contaminated Sites Program. 18 AAC 75.

DOT&PF (Alaska Department of Transportation and Public Facilities). 2020. *2019 Drainage Pond Groundwater Monitoring Report.* Prepared by Jacobs.

DOT&PF. 2022 (April). *2021 Drainage Pond Groundwater Monitoring Report.* Prepared by Jacobs.

DOT&PF. 2023 (August). *2023 Drainage Pond Groundwater Monitoring Programmatic Work Plan.* Prepared by Jacobs.

Environmental Resources Management. 2014. *2013 Drainage Pond Groundwater Monitoring Report.* Submitted to DOT&PF 19 June 2014.

Northwind Inc. 2003. *DCE/VC Stall at Natural Attenuation Sites, Strategies for Mitigation during Natural Attenuation or Bioremediation of Chlorinated Ethenes.* Remediation Innovative Technology Seminar. Naval Facilities Engineering Command.

Oasis (Oasis Environmental Inc.). 1999. *Expedited Site Assessment/Release Investigation Report, Fairbanks International Airport Fuel Hydrant Distribution System*, Submitted to DOT&PF on 20 December 1999.

Oasis. 2006. *Work Plan for Former Drainage Pond Area, Fairbanks International Airport, Fairbanks, Alaska*. Submitted to DOT&PF 16 October 2006.

Oasis. 2007 (March). *Further VOC Characterization at Former Drainage Pond Area: Fairbanks International Airport*. Submitted to DOT&PF 25 March 2007.

Oasis. 2011. *Additional Characterization and Groundwater Monitoring, Former Drainage Pond Site, Fairbanks International Airport*. Submitted to DOT&PF on 23 May 2011.

SLR International Corporation. 2018. *2017 Groundwater Monitoring Report, Former Drainage Pond*. Fairbanks, Alaska. Submitted to DOT&PF 23 January 2018.

Wiedemeier, Todd H., Matthew A. Swanson, David E. Moutoux, and E. Kinzie Gordon. 1996. *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater*. Air Force Center for Environmental Excellence, Technology Division. Brooks Air Force Base, San Antonio, Texas.

(intentionally blank)

APPENDIX A
Site Figures

Airport

Project Location

Existing Structure

Water Feature

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Geospatial Features from Fairbanks North Star Borough GIS.

1 inch = 2,500 feet

0 0.5 1

Miles

WGS 1984 UTM Zone 6N Transverse Mercator

N

DOT&PF FAI DRAINAGE POND SITE LOCATION 2023 GROUNDWATER MONITORING REPORT

FAIRBANKS INTERNATIONAL AIRPORT, FAIRBANKS, ALASKA

Jacobs	DATE: 27 NOV 2023	PROJECT MANAGER: G. WADE	FIGURE NO: A-1

\\dc1vs01\GISProj\AVAKDOT\Transfer\Fairbanks\MXD\FormerDrainagePond\Fig\A1_FAI_DrainagePond_SiteLocation.mxd MATAITRJ

MAIL TRAIL

AIRPORT INDUSTRIAL

MW-34

MW-38S

MW-38D

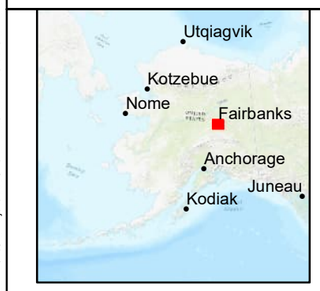
MW-11R

MW-39

MW-40

MW-30R

Approximate Groundwater Flow Direction (Gradient= 0.004)



Groundwater Monitoring Well - Sampled in 2023

Area of Highest TCE (>5 µg) from 2006 Gore-Sorber Soil Gas Survey (Environmental Resource Management, 2013)

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Geospatial Features from

1 inch = 35 feet

0 35 70
Feet

WGS 1984 UTM Zone 6N Transverse Mercator

N

DOT&PF FAI DRAINAGE POND
SITE OVERVIEW
2023 GROUNDWATER MONITORING REPORT
FAIRBANKS INTERNATIONAL AIRPORT, FAIRBANKS, ALASKA

Jacobs	DATE: 27 NOV 2023	PROJECT MANAGER: G. WADE	FIGURE NO: A-2

\\dc1vs01\GISProj\AI\AKDOT\Transfer\Fairbanks\MXD\FormerDrainagePond\2023\FigA2_FAI_FormerDrainagePondArea_SiteOverview_2023.mxd MATAITRJ

MW-38D (mg/L)	
Benzene	ND [0.0002]
PCE	ND [0.0005]
TCE	0.00015 J
cis-DCE	0.00048 J,B
trans-DCE	ND [0.0005]
VC	ND [0.000075]

MW-34 (mg/L)	
Benzene	ND [0.0002] JP-
PCE	ND [0.0005] JP-
TCE	ND [0.00025] JP-
cis-DCE	ND [0.0005] B,JP-
trans-DCE	ND [0.0005] JP-
VC	ND [0.000075] JP-
Total Mn	0.0489
Dissolved Mn	0.0411

MW-38S (mg/L)	
Benzene	0.00319 JP-
PCE	0.00062 J,JP-
TCE	0.00021 J,JP-
cis-DCE	**0.148 B,JP-**
trans-DCE	0.00207 JP-
VC	**0.0018 JP-**
Total Mn	0.0489
Dissolved Mn	0.0411

MW-11R (mg/L)		Field Duplicate
Benzene	0.00236 JP-	0.0024
PCE	0.00596 JP-	0.00597
TCE	0.00121 JP-	0.00116
cis-DCE	**1.16 B,JP-**	**1.16 B**
trans-DCE	0.00145 JP-	0.00148
VC	**0.00072 JD,JP-**	ND [0.000075]
Total Mn	**3.42**	**3.4**
Dissolved Mn	**3.29**	**3.46**

MAIL TRAIL

Approximate Groundwater Flow Direction (Gradient= 0.004)

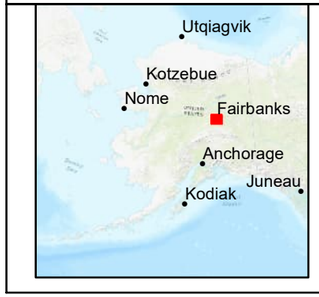
2023 ADEC GCL	
Analyte	**(mg/L)**
Benzene	0.0046
PCE	0.041
TCE	0.0028
cis-DCE	0.036
trans-DCE	0.36
VC	0.00019
Total Mn	0.43
Dissolved Mn	0.43

MW-40 (mg/L)	
Benzene	0.0008 JP-
PCE	0.0156 JP-
TCE	0.00208
cis-DCE	**0.467 B,JP-**
trans-DCE	0.00617 JP-
VC	**0.00344 JP-**

MW-39 (mg/L)	
Benzene	0.00148 JP-
PCE	ND [0.0005] JP-
TCE	0.00121 JP-
cis-DCE	**0.0487 B,JP-**
trans-DCE	0.00214 JP-
VC	**0.00224 JP-**

MW-30R (mg/L)	
Total Mn	**4.93**
Dissolved Mn	**5.2**

Notes
2023 (November) ADEC 18 AAC 75. Table C Groundwater Human Health Cleanup Levels (GCL)
Red value indicates value exceeds ADEC GCL
GCL = groundwater cleanup level
mg/L = milligrams per liter
Mn = Manganese
ND = Result is nondetect; LODs are listed in parentheses.
U = Results is below the laboratory limit of detection.
B = The analyte was detected in the method blank, trip blank and/or equipment blank and the sample concentration did not exceed the blank concentration by a factor of 10.
J = The result is an estimated value because it is less than the limit of quantification.
JD = The result was qualified because the field duplicate RPD value was greater than 30 percent and at least one of the results was greater than the LOD.
JP- = The result was considered an estimated value because incorrect or inadequate preservation methods were used.
JS+ = The result is an estimated value and biased high because at least one surrogate was recovered high for that sample.



Groundwater Monitoring Well, Exceedance

Groundwater Monitoring Well, No Exceedance

Existing Structure

Area of Highest TCE (>5 µg) from 2006 Gore-Sorber Soil Gas Survey (Environmental Resource Management, 2013)

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Geospatial Features from Fairbanks

1 inch = 35 feet
0 35 70
Feet
WGS 1984 UTM Zone 6N Transverse Mercator

N

DOT&PF FAI DRAINAGE POND
GROUNDWATER SAMPLING RESULTS
2023 GROUNDWATER MONITORING REPORT
FAIRBANKS INTERNATIONAL AIRPORT, FAIRBANKS, ALASKA

Jacobs	DATE: 27 NOV 2023	PROJECT MANAGER: G. WADE	FIGURE NO: A-3

\\dc1vs01\GISProj\AIAKDOT\Transfer\Fairbanks\MXD\FormerDrainagePond\2023\FigA3_FAI_FormerDrainagePondWP_WellLocations_2023.mxd MATAITRJ

APPENDIX B
Logbook

Location FAI/DOT HFS Date 8/7/23

Project / Client HFS ADOT/FAI Gwm

PN: D3745200

Weather: 55-72F smoky

Personnel: K. Sicard, G. Wade (both Jacobs)

PPE: Modified level D, N95 mask optional

Objectives: GW sampling, meet w/client pickup access remote, manage waste

0800 Safety tailgate at office and Calibrate equipment. See forms

Note - very smoky, paused work.

A. Jemison ran to TTT for YSI & turbidimeter.

08:50 Calibrate PID - Isobutylene bottle 100ppm Bottle # 23-9778 Exp. 6/23/27

Fresh air cal = 0.0 ppm

Gas cal = 100.0 ppm

Calibrate/check Turbidimeter done by TTT 8/7/23.

Calibrate/check - YSI -

Conf. sol. = 23EIC exp: 05/02/25

	Temp (°C)	pH	Cond (µS/cm)	ORP (mV/H)
0952	23.14	✓6.85	✓754	210.4

all within limits with error.

0955 Pack vehicle with gear.

Location FAI/ADOT HFS Date 8/7/23

Project / Client HFS Gwm

PN: D3745200

10:12 Depart Jacobs office for Badging @ FA DOT

Still dense smoke - low visibility

Purple Air sensors say 405 to 321 in this area, higher on hills.

Hoping it will blow off by noon.

10:40 Drive to Airport to meet E Thomas

11:10 Depart to Lake IDW drums at the cool storage bldg.

11:45 Meet G. Wade at AK Air Cargo

11:55 Enter area to sample HFS

12:10 Open well MW-18

12:14 Pump on, minor product <0.01 on top. Strong odor upon removing IF probe but no smell while pumping.

TD = 18.88 WL = 9.60

12:35 Collect 23HFS-MW18-GW (x) stabilized at 12:33

Dup: 23HFS-MW18-GWA

12:47 Pump off. Close up well.

IDW = 1.5 gals, MW-18

13:00 Drive to MW-15

13:08 Open well, PID = 2.6 max

Rite in the Rain

Location HFS FAI/ADOT Date 8/7/23

Project / Client HFS

13:12 Pump on at MW-1S

13:28 Stable. IDW = 1.0 gals

13:30 Collect 23HFS-MW1S-GW

GW = 8.56 at start 3 VOAs 2-250 mL

TD = 18.88 ft bgs

13:37 Close up well, decon. Pack up. Drive to MW-1R. Lunch.

14:15 GW = 8.97

TD = 18.55 ft bgs

14:30 Pump on. Large well - 3.5" diameter

14:50 Stabilized. Note: Tubing in well

14:50 Collect 23HFS-MW1R-GW

2-250mL glass. DRO

3-40mL VOAs GRO/BTEX

14:59 Pump off. Slight smell sulfur

total IDW MW1R = 1.5 gals

15:01 Close up well. Decon.

15:05 mob out of gate to bathroom. Return to MW-2 by AK air Cargo

15:15 Talk to representative & she advised us to sample MW-1R before 8am tomorrow at 30R

15:25 Open well MW-2 next to bldg.

PID = 0.0

Location HFS FAI/ADOT Date 8/7/23

Project / Client HFS

15:35 GW = 9.50 TD = 18.10

15:40 Pump on.

Slight sulfur smell

16:03 Reach stability. IDW = 1.5 gals

16:05 Collect 23HFS-MW2-GW

2-250mL amber HCl for DRO

3-40 mL VOAs

GRO/BTEX

16:10 Decon. close up well - well could use a shorter bolt and washer, and MW-1R could as well.

16:25 Depart gate area for waste dump

16:35 Dump HFS IDW into dump 23HFS1 dump, total 55 gals so far from 4 wells today.

16:40 Depart IDW shed for office

17:00 Unpack at office.

17:20 Prep forms & kits for tomorrow

18:00 End of field day.

8-7-23

Rite in the Rain

Location ADOT / FAI HFS Date 8/7/23

Project / Client

HFS

Date	well	Gals	Drum
8-7-23	mw-18	1.5	23HFS1
8-7-23	mw-15	1.0	23HFS1
8-7-23	mw-1R	1.5	23HFS1
8-7-23	mw-2	1.5	23HFS1
8-8-23	mw-30R	0.75	23HFS1
		6.25	

DP		gals	Drum
8-8-23	mw-39	1.5	23DPS1
8-8-23	mw-11R	1.5	23DPS1
8-8-23	mw-38D	1.25	23DPS1
8-8-23	mw-38S	2.25	23DPS1
8-9-23	mw-40	1.5	"
8-9-23	mw-34	1.5	"
8-9-23	Decon Water	0.5	"
		9 gals	

Rite in the Rain

Location HFS / DPS FAI DOT Date 8-8-23

Project / Client HFS / DPS

PN: D3745200 / D3745100

Weather: 58-75 of, smoky

Personnel: K. Sicard, G. Wade

PPE: mod. Level D

Objectives: sample wells at HFS 30R (one)
DPS - as many as we can manage waste.

0630 Safety tailgate (see forms)
Calibrate equip: cal/check

0638 Turbidimeter: 1000 ✓ 10.0 ✓ 0.1 NTUs
check/cal YSI - same standards as yesterday - see p. 72

0642 Temp (°C) pH Cond (MS/cm) ORP (mV's)
24.45 ✓6.79 ✓7855 ✓212.7
✓ within limits on cal check bottle.

0645 Cal PID w/ isobutylene 100.0 (same as p. 72)
Fresh air = 0.0 ISO = 100.3 ppm
Grab ice & TB's.

0655 pack gear in vehicle

0701 Depart office for MW-30R

0719 Set up cones & gear at HFS MW30R
MW30R GW = 8.03
TD = 17.1

0737 Pump on. Drawdown moderate, slow pump
Drop tubing to 16.7 max to finish sample

Location HFS / DP FAI DOT Date 8-8-23

Project / Client HFS / DPS

0755 Collect 23HFS-MW30R-GW
3 VOAs GRO / BTEX
3 VOAs - methane
2 250 glass 1+1
+ MNA
IDW = 0.75 gals
*note turbid at end for filtered sample due to almost pumped dry.

0813 Pack up

0815 Well needs maintenance - frost jacked. Come back to cut down

0823 MOB to DPS wells

0835 Run to office for well cutting tools.

0905 Open well MW-39. WL = 6.35

0945 XS Run to office for air compressor and TTT.

0945 GW replace bolts at HFS MW-2, MW1R

1045 Return to MW-39.
Put pump at 11.42 ft bgs

1058 Pump on.

1116 Stabilize

1117 Collect 23DPS-MW39-GW
3 VOAs (SW8260D)

1125 Close up well, decon. IDW = 1.5 gals

1134 MOB to MW11R

Rite in the Rain

Location DPS FAIDOT Date 8/8/23.

Project / Client DP

PN: D3745100

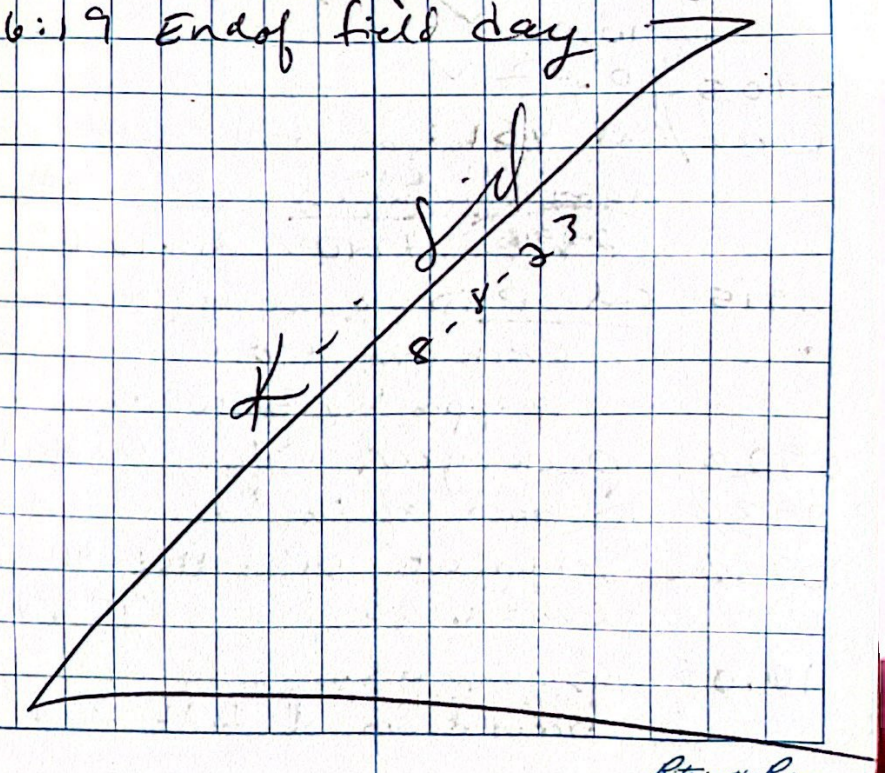
11:40	Open mw-11R
	GW = 5.12 ft btoc. rod scum on probe IF
	TD = 33.94
	Pump at 19.53
11:45	Pump on mw-11R
12:13	Stablize. ~~DPS~~ (KS) IDW = 1.5 gals
12:15	Collect ~~23DPS~~-mw11R-GW
12:15	Dup: ~~23DPS~~ (KS) -mw11R-GW-A
	3 VOAs (SW8260D)
	+ mNA prameters (see forms)
12:40	Decon. mob to next well.
12:50	Thunder & lightning. Pack up. go for bio break
~~13:50~~	
(KS) ~~13:00~~	Return. set up at mw-38D
14:1~~0~~	pump on. GW = 4.55
	TD = 34.24
19:28	Stabilize -
14:30	Collect 23DPS-mw38D-GW
	3 VOAs (SW8260D)
14:35	Decon. Close up well. mw 38D IDW = 1.25 gals
14:4	Open mw-38S
	GW = 4.48 TD = 14.55
	pump at ~~14.5~~ (KS) 9.5 ft btoc

Location DPS FAIDOT Date 8/8/23

Project / Client DPS

PN: D3745100

14:51	Pump on. at DPS mw 38S
15:13	Stabilize 3 parameter. IDW = 2.25 gals.
15:15	Collect 23DPS-mw38S-GW
	3 VOAs w/ HCl SW8260D
15:25	Decon. Close well. Pack
15:38	mob to waste/IDW bldg.
15:42	Dump waste into drum 23DPS1.
15:50	mob to office. Unpack.
16:05	Load samples to fridge.
16:19	End of field day.



Rite in the Rain

Location DPS FAI/DOT Date 8/9/23

Project / Client DPS

PN: D3745100

Weather: 65-70F partly cloudy, smoky

Personnel: K. Sicard, G. Wade

Objective: Finish sampling wells at DPS MW34, MW40 collect EB, collect waste sample sample summary.

0900 Calibrate (check) equip at office

Turbidimeter:

1000 - 980. (check)

calibrate, check again: 1000 ✓

10.0 ✓

0.02 ✓

0905 Check/Cal YSI: SP within accepted range

Temp	Cond (uS/cm)	ORP	pH
24.94 °C	7940 ✓	215.9 ✓	6.91 ✓

0915 Cal PID - same as prev. day

Fresh air = 0.0

100 ppm iso = 100.0

0920 Pack gear. Safety powRA.

0930 Depart office

0950 Setup at DPS MW-40

GW = 6.00 TD = 15.87 ft btoc

1005 Pump on.

Draw down of 1 ft for 10 mins

Location DPS FAI/DOT Date 8-9-23

Project / Client DPS FAI/DOT

PN: D3745100

10:24 Stabilize. Total IDW = 1.5 gal

10:25 Collect 23DPS-MW40-GW

3-40 mL VOAs / HCl for SW8260D

10:35 Decon pump. Well maint:

10:45 G.W. cut down MW-30R due to frost jacking, by 0.06 ft

10:50 KS. set up at MW-34

PID = 0.0 GW = 4.09

TD = 13.24 ft bgs

11:10 Pump on at MW-34

11:33 Stabilize.

IDW total = 1.5 gals

11:35 Collect 23DPS-MW34-GW

3 VOAs / HCl SW8260D

* MNA parameters

11:50 Decon pump. Close well

11:55 Prep. for EB collection

Collect EB from bladder pump

12:00 23DPS-EB-GW

3-40 mL VOAs / HCl

Water from Decon into waste drum

23DPS 1 ~~2 gals~~ 0.5 gals

Location DPS / HFS Date 8/9/23

Project / Client

12:19 moB to IDW drums
Dump waste from DPS into 23DPS1 drum.
Collect:

12:30 23DPS-01W waste sample
3 VOAs (8260D)
~~2-250mL amber/HCl for GRO/BTEX~~ (KS)
2-HDPE 125mL for PFAS (537m)
from Drum 23DPS1

12:45 Collect 23HFS-01W
3 VOAs BTEX/GRO
2-250mL amber HCl for
2-HDPE for PFAS (537m) 125mL
from Drum 23~~DPS~~ (KS) HFS1

13:05 Return Airfield pass to OPS.
13:10 Depart badging office for lunch and office unload of samples/gear.
15:1 Return gear to TTT.
End of field day

8-9-23

Location Date

Project / Client

Rite in the Rain

APPENDIX C
Groundwater Monitoring Forms

Groundwater Sampling Data Sheet

Jacobs

Project Name / Client	Site Name / Event	Project No.	Well ID
DPS / ADOT FAI	Drainage Pond GWM 2023	D3745100	MW-11R
Weather	**Total VOCs (ppm)**	**Sampler(s)**	**Date**
70 F, partly cloudy	Ambient 0.0 Breathing Zone 0.0 In Well 3.2	KS, GW	8-8-23

Well Information

Well Integrity	TOC Stickup (ft ags)	Well Casing Material	Casing Diameter(in) / Gallons per linear foot(gal/ft)
(Good) Fair Poor	-0.46	(PVC) SS	1 / 0.041 (2 / 0.163) 4 / 0.653 6 / 1.47
Depth to Product (ft)	**Depth to GW (ft btoc)**	**Total Casing Depth (ft btoc)**	**Product Thickness (ft) and Volume Recovered (mL)**
—	5.12	33.94 (final)	—

Max Purge Volume = (33.94 ft – 5.12 ft) * 0.163 gal/ft = 4.7 x 3 = 14.1 gal * 3.785 L/gal = 53.27 L

(Previous Total Depth; Depth to Water or Depth to Top of Filter Pack; Gallons per Ft; Max Purge Vol; Max Purge Vol)

Well Purging Information

Start Time	Finish Time	Tubing Depth (ft btoc)	Equipment Used
11:45	12:13	19.53	Bailer Peristaltic Pump (Submersible Bladder Pump)

Color	Odor	Sheen	Purged Dry	Meters Used
(Clear) Cloudy Brown Other:	(None) Faint Moderate Strong	Yes (No)	Yes (No)	(YSI Multi Meter) (Hach Turbidimeter) Water Level Meter (Interface Probe)

Purging reached: (Stability) Max Vol. | Purge water was: Treated / (Stored) | Approx. volume: 1.5 gal | Drum Name/#: 23DPS1

Time (HH:mm)	Volume: Gals / Liters Change	Volume: Gals / Liters Total	Flow Rate (0.013-0.13 gpm, 50-500 mL/min)	Temp (°C)	Water Quality (three must stabilize) ± 3% Conductivity (µS/cm)	± 10% or 0.1 mg/L DO (mg/L)	± 0.1 pH (std units)	± 10 mV ORP (mV)	± 10% NTU Turbidity (NTU)	Water Level Drawdown < 0.3 ft (feet btoc)
Pump on: 11:45	-	-	(KS)	~~8.20~~	~~572~~	~~1.47~~	~~7.06~~	~~45.5~~		5.12
11:50	0.2	0.2	0.04	8.2	572	1.47	7.06	45.5	24.32	5.12
11:55	0.2	0.4	0.04	10.12	587	0.69	7.04	36.5	9.02	5.12
11:58	0.2	0.6	0.07	10.15	585	0.62	✓7.03	31.4	7.18	5.11
12:01	0.2	0.8	0.07	8.74	555	✓0.61	✓7.04	✓30.5	5.03	5.10
(E) ~~12:04~~ 12:04	0.2	~~0.8~~ 1.0	0.07	7.51	534	0.45	✓7.04	✓30.4	1.60	5.10
12:07	0.2	1.2	0.07	7.11	523	0.36	✓7.05	✓28.1	4.62	5.11
12:10	0.2	1.4	0.07	6.91	511	0.30	✓7.07	✓26.3	2.96	5.11
12:13	0.2	1.6	0.07	6.80	503	✓0.27	✓7.08	✓22.8	2.49	5.10

Sample Collection Information

Start Time	Finish Date/ Time	Tubing Depth (ft btoc)	Equipment Used
12:15	8-8-23 / 12:40	19.53	Peristaltic Pump (Submersible Bladder Pump)
SAMPLE ID(s): 23DPS-MW11R-GWA		QC: (Dup) MS/MSD	Ferrous Iron (Fe^{2+}) (mg/L) = —
23DPS-MW11R-GWA		QC Time: ~~12:20~~ (E)	Sampler Initials: KS, GW

# / Container / Preservative	Analyses	Notes
3 - 40 mL VOAs / HCl	Benzene, PCE, TCE, cis-DCE, trans DCE, VC (EPA SW8260D)	
many others →	MNA parameters (See sample summary)	

Suggested Notation: "—" = not measured "✓"= stable "+" = rising "-" = falling

Groundwater Sampling Data Sheet

Jacobs

Project Name / Client	Site Name / Event	Project No.	Well ID
DPS / ADOT FAI	DPS GWM 2023	D3745100	MW-34
Weather	**Total VOCs (ppm)**	**Sampler(s)**	**Date**
68F dense fog mostly cloudy	Ambient 0.0 Breathing Zone 0.0 In Well 0.0	KS, GW	~~8-8-23~~ (KS) ~~8-9-23~~ 8-9-23

Well Information

Well Integrity	TOC Stickup (ft ags)	Well Casing Material	Casing Diameter(in) / Gallons per linear foot(gal/ft)
(Good) Fair Poor	-0.37	(PVC) SS	1 / 0.041 (2 / 0.163) 4 / 0.653 6 / 1.47
Depth to Product (ft)	**Depth to GW (ft btoc)**	**Total Casing Depth (ft btoc)**	**Product Thickness (ft) and Volume Recovered (mL)**
—	4.09	13.20 (final)	—

Max Purge Volume = (13.2 (Previous Total Depth) ft − 4.09 (Depth to Water or Depth to Top of Filter Pack) ft) * 0.163 (Gallons per Ft) gal/ft = 4.45 (Max Purge Vol) gal * 3.785 L/gal = 16.86 (Max Purge Vol) L

= 9.11 * 3

Well Purging Information

Start Time	Finish Time	Tubing Depth (ft btoc)	Equipment Used
11:10	11:33	8.65	Bailer Peristaltic Pump (Submersible Bladder Pump)

Color	Odor	Sheen	Purged Dry	Meters Used
(Clear) Cloudy Brown Other:	(None) Faint Moderate Strong	Yes (No)	Yes No	(YSI Multi Meter) (Hach Turbidimeter) Water Level Meter (Interface Probe)

Purging reached: (Stability) Max Vol. | Purge water was: Treated / (Stored) | Approx. volume: 1.5 gals | Drum Name/#: 23DPS 1

Time (HH:mm)	Volume: Gals / Liters Change	Volume: Gals / Liters Total	Flow Rate (0.013-0.13 gpm, 50-500 mL/min)	Temp (°C)	Water Quality (three must stabilize) ± 3% Conductivity (µS/cm)	± 10% or 0.1 mg/L DO (mg/L)	± 0.1 pH (std units)	± 10 mV ORP (mV)	± 10% NTU Turbidity (NTU)	Water Level Drawdown < 0.3 ft (feet btoc)
Pump on: 11:10	-	-								4.09
11:15	0.2	0.2	0.05	11.22	788	3.03	6.86	66.9	31.17	4.15
11:20	0.2	0.4	0.05	8.85	733	2.16	6.70	65.1	16.21	4.12
11:25	0.2	0.6	0.05	8.20	713	2.07	6.68	62.7 ✓	10.59	4.12
11:29	0.2	0.8	0.05	7.96	702	1.33	6.70 ✓	60.4 ✓	7.71	4.13
11:33	0.2	1.0	0.05	7.63	693 ✓	1.39	6.70 ✓	59.5 ✓	6.35	4.15

Sample Collection Information

Start Time	Finish Date/ Time	Tubing Depth (ft btoc)	Equipment Used
11:35	8-9-23 / 11:48	8.65	Peristaltic Pump (Submersible Bladder Pump)
SAMPLE ID(s): 23DPS-MW34-GW		QC: ~~Dup MS/MSD~~	Ferrous Iron (Fe^{2+}) (mg/L) = —
		QC Time: —	Sampler Initials: KS, GW

# / Container / Preservative	Analyses	Notes
3 - 40 mL VOAs / HCl	Benzene, PCE, TCE, c.t.DCE, trans-DCE, VC (EPA SW8260D)	
3 - 40 mL VOAs / HCl	methane (RSK175)	
2 - ~~250~~ 125 mL amber / HCl	TOC (SM5310B/SW9060A)	
2 - 125 mL poly / unpreserved	Sulfate (300.0)	
2+2 - 125 mL HDPE / HNO_3	Fe, Mn (Total & Dissolved) (6020A)	
2 - 125 mL poly / H_2SO_4	N. trate / N. trite (SM4500 NO3-F)	

Suggested Notation: "—" = not measured "✓" = stable "+" = rising "-" = falling

Groundwater Sampling Data Sheet

Jacobs

Project Name / Client	Site Name / Event	Project No.	Well ID
DPS / ADOT FAI	DPS GWM 2023	D3745100	MW-385
Weather	**Total VOCs (ppm)**	**Sampler(s)**	**Date**
Overcast, smoky 65F	Ambient 0.0 Breathing Zone 0.0 In Well 0.2	KS, GW	8-8-23

Well Information

Well Integrity	TOC Stickup (ft ags)	Well Casing Material	Casing Diameter(in) / Gallons per linear foot(gal/ft)
(Good) Fair Poor	-0.60	(PVC) SS	1 / 0.041 (2 / 0.163) 4 / 0.653 6 / 1.47
Depth to Product (ft)	**Depth to GW (ft btoc)**	**Total Casing Depth (ft btoc)**	**Product Thickness (ft) and Volume Recovered (mL)**
—	4.48	14.55 (final)	—

Max Purge Volume = (14.55 ft (Previous Total Depth) − 4.48 ft (Depth to Water or Depth to Top of Filter Pack) 10.07 x 3) * .163 gal/ft (Gallons per Ft) = 4.92 gal (Max Purge Vol) * 3.785 L/gal = 18.64 L (Max Purge Vol)

Well Purging Information

Start Time	Finish Time	Tubing Depth (ft btoc)	Equipment Used
14:51	15:13	9.50	Bailer Peristaltic Pump (Submersible Bladder Pump)

Color	Odor	Sheen	Purged Dry	Meters Used
(Clear) Cloudy Brown Other:	(None) Faint Moderate Strong	Yes (No)	Yes (No)	(YSI Multi Meter) (Hach Turbidimeter) Water Level Meter (Interface Probe)

Purging reached: (Stability) Max Vol. | Purge water was: Treated / (Stored) | Approx. volume: 2.25 | Drum Name/#: 23 DPS 1

Time (HH:mm)	Volume: Gals / Liters Change	Volume: Gals / Liters Total	Flow Rate (0.013-0.13 gpm, 50-500 mL/min)	Temp (°C)	Water Quality (three must stabilize) ± 3% Conductivity (µS/cm)	± 10% or 0.1 mg/L DO (mg/L)	± 0.1 pH (std units)	± 10 mV ORP (mV)	± 10% NTU Turbidity (NTU)	Water Level Drawdown < 0.3 ft (feet btoc)
Pump on: 14:51	-	-								4.48
14:56	0.25	0.25	0.05	8.05	577	1.33	7.11	39.0	6.74	4.55
14:59	0.35	0.6	0.09	7.27	577	0.65	7.02	30.7	3.93	4.52
(KS) ~~14:15~~ 15:03	0.40	1.0	0.1	7.07	✓578	0.49	✓7.06	22.9	4.70	4.52
15:07	0.40	1.4	0.1	6.84	✓578	0.42	✓7.08	15.9	2.29	4.52
15:10	0.40	1.8	0.1	6.81	✓577	0.32	✓7.08	9.8	2.71	4.52
15:13	0.40	2.2	0.1	7.81	✓588	0.25	✓7.08	✓5.9	2.53	4.50

Sample Collection Information

Start Time	Finish Date/ Time	Tubing Depth (ft btoc)	Equipment Used
15:15	8-8-23 / 15:19	~~14.5~~ 9.50 ~~4.4~~ (KS)	Peristaltic Pump (Submersible Bladder Pump)
SAMPLE ID(s): 23DPS-MW385-GW		QC: ~~Dup MS/MSD~~	Ferrous iron (Fe^{2+}) (mg/L) = —
		QC Time: —	Sampler Initials: KS, GW

# / Container / Preservative	Analyses	Notes
3 - 40 mL vows / HCl	(SW8260D)	

Suggested Notation: "—" = not measured "✓"= stable "+" = rising "-" = falling

Groundwater Sampling Data Sheet

Jacobs

Project Name / Client	Site Name / Event	Project No.	Well ID
DPS / ADOT FAI	DPS GWM 2023	D3745100	MW-38D
Weather	**Total VOCs (ppm)**	**Sampler(s)**	**Date**
65 F rainy, smoky	Ambient 0.0 Breathing Zone 0.0 In Well 0.5	KS, GW	8-8-23

Well Information

Well Integrity	TOC Stickup (ft ags)	Well Casing Material	Casing Diameter(in) / Gallons per linear foot(gal/ft)
(Good) Fair Poor	-0.6	(PVC) SS	1 / 0.041 (2 / 0.163) 4 / 0.653 6 / 1.47
Depth to Product (ft)	**Depth to GW (ft btoc)**	**Total Casing Depth (ft btoc)**	**Product Thickness (ft) and Volume Recovered (mL)**
—	4.55	34.24 (final)	—

Max Purge Volume = (34.24 (Previous Total Depth) ft − 4.55 (Depth to Water or Depth to Top of Filter Pack) = 29.69 × 3 ft) × 0.163 (Gallons per Ft) gal/ft = 14.52 (Max Purge Vol) gal × 3.785 L/gal = 54.9 (Max Purge Vol) L

Well Purging Information

Start Time	Finish Time	Tubing Depth (ft btoc)	Equipment Used
14:10	14:28	19.4	Bailer Peristaltic Pump (Submersible Bladder Pump)

Color	Odor	Sheen	Purged Dry	Meters Used
(Clear) Cloudy Brown Other:	(None) Faint Moderate Strong	Yes (No)	Yes (No)	(YSI Multi Meter) (Hach Turbidimeter) Water Level Meter (Interface Probe)

Purging reached: (Stability) Max Vol. | Purge water was: Treated / (Stored) | Approx. volume: 1.25 gals | Drum Name/#: 23 DPS 1

Time (HH:mm)	Volume: Gals / Liters Change	Volume: Gals / Liters Total	Flow Rate (0.013-0.13 gpm, 50-500 mL/min)	Temp (°C)	Water Quality (three must stabilize) ± 3% Conductivity (µS/cm)	± 10% or 0.1 mg/L DO (mg/L)	± 0.1 pH (std units)	± 10 mV ORP (mV)	± 10% NTU Turbidity (NTU)	Water Level Drawdown < 0.3 ft (feet btoc)
Pump on: 14:10	-	-								4.55
14:15	0.2	0.2	0.04	8.16	330	3.60	7.19	17.2	2.21	4.60
14:20	0.2	0.4	0.04	6.53	335	0.90	7.17	9.9	1.63	4.60
14:25	0.2	0.6	0.04	6.07	336	0.49	7.18	6.1	2.86	4.60
14:28	0.2	0.8	0.07	5.94	✓337	0.38	✓7.19	✓3.7	3.51	4.61

Sample Collection Information

Start Time	Finish Date/ Time	Tubing Depth (ft btoc)	Equipment Used
14:30	8-8-23 / 14:34	19.4	Peristaltic Pump (Submersible Bladder Pump)
SAMPLE ID(s):	QC: ~~Dup MS/MSD~~	Ferrous Iron (Fe^{2+}) (mg/L) = —	
23DPS-MW38D-GW	QC Time: —	Sampler Initials: KS, GW	

# / Container / Preservative	Analyses	Notes
3-40mL VOAs / HCl	Benzene, PCE, TCE, cis-DCE, trans-DCE, VC (EPA SW8260D)	

Suggested Notation: "—" = not measured "✓"= stable "+" = rising "-" = falling

Groundwater Sampling Data Sheet

Jacobs

Project Name / Client	Site Name / Event	Project No.	Well ID
DPS / ADOT FAI	DPS GWM 2023	D3745100	MW-39
Weather Hot, Smoky 70 °F, scattered clouds	**Total VOCs (ppm)** Ambient 0.0 Breathing Zone 0.0 In Well 11.8	**Sampler(s)** KS. GW	**Date** 8-8-23

Well Information

Well Integrity	TOC Stickup (ft ags)	Well Casing Material	Casing Diameter(in) / Gallons per linear foot(gal/ft)
(Good) Fair Poor	-0.65	(PVC) SS	1 / 0.041 (2 / 0.163) 4 / 0.653 6 / 1.47
Depth to Product (ft)	**Depth to GW (ft btoc)**	**Total Casing Depth (ft btoc)**	**Product Thickness (ft) and Volume Recovered (mL)**
—	6.35	16.5 (final)	—

Max Purge Volume = (16.50 Previous Total Depth ft − 6.35 Depth to Water or Depth to Top of Filter Pack ft) * 10.15 * 3 = 15.2 / 0.163 Gallons per Ft gal/ft = 2.48 Max Purge Vol gal * 3.785 L/gal = 9.4 Max Purge Vol L

Well Purging Information

Start Time	Finish Time	Tubing Depth (ft btoc)	Equipment Used
10:58	11:16	11.42	Bailer Peristaltic Pump (Submersible Bladder Pump)

Color	Odor	Sheen	Purged Dry	Meters Used
(Clear) Cloudy Brown Other:	(None) Faint Moderate Strong	Yes (No)	Yes (No)	(YSI Multi Meter) (Hach Turbidimeter) Water Level Meter (Interface Probe)

Purging reached: (Stability) Max Vol. | Purge water was: Treated (Stored) | Approx. volume: 1.5 gals | Drum Name/#: 23DPS 1

Time (HH:mm)	Volume: Gals / Liters Change	Volume: Gals / Liters Total	Flow Rate (0.013-0.13 gpm, 50-500 mL/min)	Temp (°C)	Water Quality (three must stabilize) ± 3% Conductivity (µS/cm)	± 10% or 0.1 mg/L DO (mg/L)	± 0.1 pH (std units)	± 10 mV ORP (mV)	± 10% NTU Turbidity (NTU)	Water Level Drawdown < 0.3 ft (feet btoc)
Pump on: 10:58	-	-								6.35
11:03	0.3	0.3	0.06	8.61	944	1.70	6.85	34.4	6.72	7.51
11:07	0.3	0.6	0.075	8.51	936	0.92	6.86	29.0	5.45	7.52
11:10	0.3	~~0.875~~ 0.9 (KS)	0.1	9.54	969	0.72	✓6.85	25.4	3.46	7.9
11:13	0.3	1.2	0.1	9.28	962	0.64	✓6.86	✓23.4	4.70	8.2
11:16	0.2	1.4		9.66	✓965	0.50	✓6.86	✓20.9	3.12	8.4

Sample Collection Information

Start Time	Finish Date/ Time	Tubing Depth (ft btoc)	Equipment Used
11:17	8-8-23 / 11:21	11.42	Peristaltic Pump (Submersible Bladder Pump)
SAMPLE ID(s): 23DPS-MW39-GW		QC: Dup MS/MSD	Ferrous Iron (Fe^{2+}) (mg/L) = —
		QC Time: —	Sampler Initials: KS, GW

# / Container / Preservative	Analyses	Notes
3-40 mL VOAs / HCl	Benzene, PCE, TCE, cis-DCE, trans-DCE, VC (EPA SW8260D)	

Suggested Notation: "—" = not measured "✓"= stable "+" = rising "-" = falling

Groundwater Sampling Data Sheet

Jacobs

Project Name / Client	Site Name / Event	Project No.	Well ID
DPS ADOT / FAI	DPS GWM 2023	D3745200	MW-40
Weather	**Total VOCs (ppm)**	**Sampler(s)**	**Date**
65°F foggy, smoky	Ambient 0.0 Breathing Zone 0.0 In Well 5.2	KS, GW	8-9-23

Well Information

Well Integrity	TOC Stickup (ft ags)	Well Casing Material	Casing Diameter(in) / Gallons per linear foot(gal/ft)
(Good) Fair Poor	-0.50	(PVC) SS	1 / 0.041 (2 / 0.163) 4 / 0.653 6 / 1.47
Depth to Product (ft)	**Depth to GW (ft btoc)**	**Total Casing Depth (ft btoc)**	**Product Thickness (ft) and Volume Recovered (mL)**
—	6.00	15.87 (final)	—

Max Purge Volume = (15.87 ft – 6.00 ft) * 0.163 gal/ft = 4.83 gal * 3.785 L/gal = 18.3 L

9.87 * 3

(Previous Total Depth; Depth to Water or Depth to Top of Filter Pack; Gallons per Ft; Max Purge Vol; Max Purge Vol)

Well Purging Information

Start Time	Finish Time	Tubing Depth (ft btoc)	Equipment Used
10:05	10:24	10.94	Bailer Peristaltic Pump (Submersible Bladder Pump)

Color	Odor	Sheen	Purged Dry	Meters Used
Clear (Cloudy) Brown Other:	(None) Faint Moderate Strong	Yes (No)	Yes (No)	(YSI Multi Meter) (Hach Turbidimeter) Water Level Meter (Interface Probe)

Purging reached: (Stability) Max Vol. Purge water was: Treated (Stored) Approx. volume: 1.5 gals Drum Name/#: 23DPS 1

Time (HH:mm)	Volume: Gals / Liters Change	Volume: Gals / Liters Total	Flow Rate (0.013-0.13 gpm, 50-500 mL/min)	Temp (°C)	Water Quality (three must stabilize) ± 3% Conductivity (µS/cm)	± 10% or 0.1 mg/L DO (mg/L)	± 0.1 pH (std units)	± 10 mV ORP (mV)	± 10% NTU Turbidity (NTU)	Water Level Drawdown < 0.3 ft (feet btoc)
Pump on: 10:05	-	-								6.00
10:10	0.1	0.1	0.02	9.84	1270	1.02	6.40	88.8	42.56	6.50
10:15	0.1	0.2	0.02	8.54	1219	0.67	6.53	84.8	33.04	6.96
10:18	0.15	0.35	0.05	8.27	1203	0.50	6.60	81.3✓	29.38	6.88
10:21	0.15	0.5	0.05	8.30	1208✓	0.42	6.63✓	78.8✓	18.19	6.75
10:24	0.15	0.65	0.05	8.23	1208✓	0.38	6.65✓	77.3	16.22	6.78

Sample Collection Information

Start Time	Finish Date/ Time	Tubing Depth (ft btoc)	Equipment Used
10:25	8-9-23 / 10:29	10.94	Peristaltic Pump (Submersible Bladder Pump)
SAMPLE ID(s):		QC: ~~Dup~~ ~~MS/MSD~~	Ferrous Iron (Fe^{2+}) (mg/L) = —
23DPS-MW40		QC Time: —	Sampler Initials: KS, GW

# / Container / Preservative	Analyses	Notes
3-40mL VOAs / HCl	SW8260D	

Suggested Notation: "—" = not measured "✓"= stable "+" = rising "-" = falling

Groundwater Sampling Data Sheet

Jacobs

Project Name / Client	Site Name / Event	Project No.	Well ID
HFS / ADOT FAI	2023 Hydrant Fuel System GWM	D3745200	MW-30R
Weather	**Total VOCs (ppm)**	**Sampler(s)**	**Date**
59°F, smoky, ~~scattered~~ clouds	Ambient 0.0 Breathing Zone 0.0 In Well 0.0	KS, GW	8-8-23

Well Information

Well Integrity	TOC Stickup (ft ags)	Well Casing Material	Casing Diameter(in) / Gallons per linear foot(gal/ft)
Good (Fair) Poor (frost jacked)	-0.05	(PVC) SS	(1 / 0.041) 2 / 0.163 4 / 0.653 6 / 1.47
Depth to Product (ft)	**Depth to GW (ft btoc)**	**Total Casing Depth (ft btoc)**	**Product Thickness (ft) and Volume Recovered (mL)**
N/A	8.03	17.1 (final)	N/A

Max Purge Volume = (17.1 Previous Total Depth ft – 8.03 Depth to Water or Depth to Top of Filter Pack ft) * 0.041 Gallons per Ft gal/ft = 1.11 Max Purge Vol gal * 3.785 L/gal = 4.2 Max Purge Vol L

~~9x3=27~~

Well Purging Information

Start Time	Finish Time	Tubing Depth (ft btoc)	Equipment Used
07:37	07:52	12.5ϕ	Bailer (Peristaltic Pump) Submersible Bladder Pump

Color	Odor	Sheen	Purged Dry	Meters Used
(Clear) Cloudy Brown Other:	(None) Faint Moderate Strong	Yes (No)	Yes (No)	(YSI Multi Meter) (Hach Turbidimeter) Water Level Meter (Interface Probe)

Purging reached: (Stability) Max Vol. | Purge water was: Treated / (Stored) | Approx. volume: 0.75 | Drum Name/#: 23 HFS 1

Time (HH:mm)	Volume: Gals / Liters Change	Volume: Gals / Liters Total	Flow Rate (0.013-0.13 gpm, 50-500 mL/min)	Temp (°C)	Water Quality (three must stabilize) ± 3% Conductivity (µS/cm)	± 10% or 0.1 mg/L DO (mg/L)	± 0.1 pH (std units)	± 10 mV ORP (mV)	± 10% NTU Turbidity (NTU)	Water Level Drawdown < 0.3 ft (feet btoc)
Pump on: 07:37	-	-								8.03
07:43	0.15	0.15		4.93	655	~~5~~ 3.90	6.50	106.5	16.42	10.35
07:46	0.15	0.30		4.71	638	1.24	6.59	100.3	19.42	11.80
07:49	0.15	0.45		4.45	627	1.18	✓6.66	✓98.4	21.10	12.70
07:52	0.15	0.60		4.20	618	1.15	6.69	92.6	17.68	13.45

Sample Collection Information

* Note turbid at end due to almost purged dry

15.5

Start Time	Finish Date/ Time	Tubing Depth (ft btoc)	Equipment Used
07:55	8-8-23 / 08:16	~~12.5ϕ~~	(Peristaltic Pump) Submersible Bladder Pump
SAMPLE ID(s): 23HFS-MW30R-GW		QC: Dup MS/MSD	Ferrous Iron (Fe^{2+}) (mg/L) = N/A
		QC Time:	Sampler Initials: KS, GW

# / Container / Preservative	Analyses	Notes
2-250 mL amber w/ HCl	DRO (AK102)	HFS well, but analyze for MNA parameters for DP wells
3-40 mL VOAs w/ HCl	GRO/BTEX (AK101) (SW8021B)	
3-40 mL VOAs w/ HCl →	Methane (EPA RSK 175)	
2-125mL ~~1-250mL~~ amber w/ HCl →	TOC (EPA SM5310B/SW9060A)	* 250mL filtered for dissolved analysis
2-125 mL poly unpreserved →	Sulfate (EPA 300.0)	

Suggested Notation: "____" = not measured "✓"= stable "+" = rising "-" = falling

* 2+2-125 mL HDPE/HNO_3 → Fe, Mn total & Dissolved (EPA 6020A)
2-125 mL poly/H_2SO_4 → Nitrate (EPA SM4500 NO3-C)

APPENDIX D
Historical and Current (2023) Results

2023 Drainage Pond Groundwater Monitoring Report
Appendix D Historical and Current (2023) Results

Analyte:		Benzene	PCE	TCE	cDCE	tDCE	Vinyl Chloride
2023 ADEC GCL[1] (mg/L):		0.0046	0.041	0.0028	0.036	0.36	0.00019
Monitoring Well ID	**Sample Date[3]**	**Analytical Result (mg/L)**					
MW-11R	9/27/2005	**0.0095**	0.027	**0.014**	**0.63**	0.0038	**0.0053**
	11/2/2006	0.0043	0.0105	**0.00684**	**0.709**	0.00828	**0.00266**
	10/17/2007	**0.0051**	0.025	**0.0055**	**0.65**	0.0046	**0.0024**
	10/21/2008	**0.00499**	0.0201	**0.0112**	**2.68**	0.0158	**0.00614**
	10/29/2010	**0.00672**	0.0235	**0.00458**	**0.873**	0.00729	**0.00694**
	12/5/2013	**0.00612**	0.0147	ND (0.0005)	**1.22**	0.0094	ND (0.0005)
	6/15/2017	0.00178	0.0327	**0.0241**	**1**	0.014	ND (0.000075)
	12/12/2019	0.00128	0.0135	**0.0074**	**1.77**	0.0173	**0.00491**
	10/20/2021	0.00105 J	0.0146	**0.0047 J**	**1.55**	0.0172	**0.00425**
	8/8/2023 (Primary)	0.00236 JP-	0.00596 JP-	0.00121 JP-	**0.116 B,JP-**	0.00145 JP-	**0.00072 JD,JP-**
	8/8/2023 (Duplicate)	0.0024	0.00597	0.00116	**0.116 B**	0.00148	ND [0.000075]JD
MW-34	8/27/2003	ND (0.0004)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
	8/27/2004	ND (0.0004)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
	9/27/2005	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
	11/2/2006	ND (0.0004)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.001)
	10/7/2007	ND (0.0002)	ND (0.0002)	ND (0.0002)	ND (0.0002)	ND (0.0002)	ND (0.0002)
	6/15/2017	ND (0.0002)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.000075)
	12/11/2019	ND (0.0002)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.000075)
	10/21/2021	ND (0.0002)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.000075)
	8/9/2023	ND [0.0002] JP-	ND [0.0005] JP-	ND [0.0005] JP-	ND [0.0005] JP-	ND [0.0005] JP-	ND [0.000075] JP-
MW-38S	10/29/2010	**0.00892**	0.00054 J	ND (0.00062)	**0.0597**	0.0006 J	**0.00116**
	12/5/2013	**0.012**	ND (0.0005)	ND (0.0005)	0.0209	ND (0.0005)	ND (0.0005)
	6/15/2017	0.00365	0.00433	0.000397 J	**0.166**	0.00108	**0.00144**
	12/11/2019	0.00239	0.00305	0.000580 J	**0.25**	0.00216	**0.00186**
	10/21/2021	0.00193	0.00089 J	0.00039 J	**0.293**	0.00227	**0.00237**
	8/8/2023	0.00319 JP-	0.00062 JP-	0.00021 J,JP-	**0.148 B,JP-**	0.00207 JP-	**0.0018 JP-**
MW-38D	10/29/2010	ND (0.00062)	ND (0.00062)	ND (0.00062)	ND (0.00062)	ND (0.00062)	ND (0.00062)
	12/5/2013	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)	ND (0.0005)
	6/15/2017	ND (0.0002)	0.000557 J	ND (0.0005)	0.00263	ND (0.0005)	ND (0.000075)
	12/11/2019	ND (0.0002)	ND (0.0005)	0.000312 J	0.0116	ND (0.0005)	ND (0.000075)
	10/21/2021	ND (0.0002)	ND (0.0005)	0.00049 J	0.00909	ND (0.0005)	ND (0.000075)
	8/8/2023	ND [0.0002]	ND [0.0005]	0.00015 J	0.00048 J,B	ND [0.0005]	ND [0.000075]
MW-39	10/29/2010	**0.00796**	0.00071	0.00079	**0.20**	0.00501	**0.0061**
	6/15/2017	ND (0.0005)	ND (0.0005)	0.000593 J	0.00654	0.00036 J	ND (0.000075)
	12/11/2019	0.000548	ND (0.0005)	0.000852 J	**0.0641**	0.00317	**0.00174**
	10/20/2021	0.00136	ND (0.0005)	ND (0.0005)	**0.074**	0.00329	**0.00181**
	8/8/2023	0.00148 JP-	ND [0.0005] JP-	0.00121 JP-	**0.0487 B,JP-**	0.00214 JP-	**0.00224 JP-**
MW-40	10/29/2010	0.0027	0.00114	0.00088	**1.08**	0.00738	**0.0129**
	12/5/2013	0.0028	ND (0.005)	ND (0.005)	**0.872**	0.00785	**0.0109**
	6/15/2017 (Primary)	0.00102	0.0209	**0.00538**	**0.648**	0.0071	**0.00333**
	6/15/2017 (Duplicate)	0.000998	0.0212	**0.00524**	**0.678**	0.00702	**0.00306**
	12/11/2019 (Primary)	0.0011	0.00561	0.00227	**0.863**	0.00909	**0.00267**
	12/11/2019 (Duplicate)	0.00102	0.00608	0.00245	**0.797**	0.00842	**0.0025**
	10/20/2021 (Primary)	0.00084	0.0023	0.00228	**0.558**	0.00774	**0.00198**
	10/20/2021 (Duplicate)	0.00092	0.00194 J	0.00208	**0.595**	0.00806	**0.00222**
	8/9/2023	0.0008 JP-	0.0156 JP-	**0.0258 JP-**	**0.467 B,JP-**	0.00617 JP-	**0.00344 JP-**

Notes:

Bold value indicates value exceeds the ADEC GCL for the most recent 2023 GCL[1].

[1]2023 ADEC 18 AAC 75. Table C Groundwater Human Health Cleanup Levels

[3]Sample data obtained from the 2017 Drainage Pond Groundwater Monitoring Report (SLR 2018)

ADEC = Alaska Department of Environmental Conservation

GCL = groundwater cleanup level

mg/L = miligrams per liter

ND = Results is below the laboratory limit of detection.

U = Results is below the laboratory detection.

J = The result is an estimated value because it is less than the limit of quantitation.

Historical results were obtained from *2017 Groundwater Monitoring Report, Former Drainage Pond* (SLR, 2018).

APPENDIX E
Data Quality Assessment

ADEC Contaminated Sites Program Laboratory Data Review Checklist

Completed By:	Kari Hagen	**CS Site Name:**	2023 ADOT Drainage Pond	**Lab Name:**	EMAX Laboratories, Inc.
Title:	Chemist	**ADEC File No.:**	100.38.188	**Lab Report No.:**	1234232
Consulting Firm:	Jacobs Engineering	**Hazard ID No.:**	1923	**Lab Report Date:**	9/19/2023

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: Samples were submitted to SGS Anchorage, AK.

   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: SGS of Anchorage, AK and SGS of Orlando, FL performed all analyses.

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: SW8260D, RSK 175, SM5310B/SW9060A, EPA 300.0, SM4500 N03-F, EPA 6020A and EPA 537M.
   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 ☐

Comments: Temperatures were:
Fairbanks temperature: 4.8°C
Anchorage temperature: <6°C
Orlando temperature: 4.0°C

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:
SW8260 - A few VOC vials were received with air bubbles possibly affecting the following samples:
23DPS-MW11R-GW
23DPS-MW34-GW
23DPS-MW38S-GW
23DPS-MW39-GW
23DPS-MW40-GW
23DPS-01W

RSK 175 - One methane vial was received with air bubbles possibly affecting sample 23HFS-MW30R-GW.

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: All vials submitted did not contain air bubbles. If the samples were analyzed from one of the vials that contained air bubbles, the results may be biased low. The affected samples results were qualified JP-.

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: QC failures identified by the lab are discussed in the relevant sections of this checklist.

c. Were all the corrective actions documented?
Yes ☐ No ☐ N/A ☒
Comments: Corrective actions were not necessary.

d. What is the effect on data quality/usability according to the case narrative?
Comments: Data quality/usability were not affected.

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: Soil samples were not submitted with this project.

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: The data quality and useability are not affected.

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: EPA 537M – PFHxA was detected in the method blank less than the LOQ.

iii. If above LoQ or RL, what samples are affected?
Comments: Sample 23DPS-01W was affected.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes ☒ No ☐ N/A ☐
Comments: EPA 537M – The sample result for PFHxA was qualified B to indicate the result may be biased high.

v. Data quality or usability affected?
Yes ☒ No ☐ N/A ☐
Comments: EPA 537M – The sample result for PFHxA may be biased high.

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: Click or tap here to enter text.

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: Click or tap here to enter text.

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: No samples were affected.

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

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

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: MS/MSD were not required for this project. MS/MSDs were only evaluated if the batch MS/MSD was part of this SDG.

ii. Metals/Inorganics – Are one MS/MSD reported per matrix, analysis and 20 samples?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

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: Batch MS/MSDs were not performed on samples from this project.

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: Batch MS/MSDs were not performed on samples from this project.

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: No samples were affected.

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

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: Click or tap here to enter text.

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: All surrogates were in control.

iv. Is the data quality or usability affected?
Yes ☐ No ☐ N/A ☒
Comments: Data quality or usability were not affected.

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: The data quality and usability were not affected.

f. Field Duplicate

i. Are one field duplicate submitted per matrix, analysis, and 10 project samples?
Yes ☒ No ☐ N/A ☐
Comments: One field duplicate was submitted with 8 primary samples for this SDG.

ii. Was the duplicate submitted blind to lab?
Yes ☒ No ☐ N/A ☐
Comments: Primary/Field Duplicate IDs: 23DPS-MW11R-GW/23DPS-MW11R-GWA.

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: RPDs were only evaluated if at least one result in the duplicate pair was greater than the LOD. If one result was non-detect, the LOD value was used to calculate the RPD.

SW8260D: The RPD between the primary sample and field duplicate for vinyl chloride (VC) was greater than 30 percent.

All affected results were qualified JD to indicate poor precision with unknown bias.

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

Comments: The primary sample (23DPS-MW11R-GW) result exceeded the screening level for VC. The field duplicate (23DPS-MW11R-GWA) was non-detect.

g. Decontamination or Equipment Blanks

i. Were decontamination or equipment blanks collected?

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: SW8260D - cis-DCE was detected in the equipment blank less than the LOQ, but greater than the LOD.

iii. If above LoQ or RL, specify what samples are affected.
Comments: The following samples were affected:
23DPS-MW11R-GW
23DPS-MW11R-GWA
23DPS-MW34-GW
23DPS-MW38D-GW
23DPS-MW38S-GW
23DPS-MW39-GW
23DPS-01W
23DPS-MW40-GW

All affected results were qualified B.

iv. Are data quality or usability affected?
Yes ☒ No ☐ N/A ☐
Comments: Affected results may be biased high.

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

a. Are they defined and appropriate?
Yes ☒ No ☐ N/A ☐
Comments: Click or tap here to enter text.

Laboratory Report of Analysis

To: Jacobs Technology Inc.
794 University Ave #201
Fairbanks, AK 99709

Report Number: **1234232**

Client Project: **D3745100/ADOT FAI DrainagePond**

Dear Kari Hagen,

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
2023.09.19
16:40:55 -08'00'

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

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Case Narrative

SGS Client: **Jacobs Technology Inc.**
SGS Project: **1234232**
Project Name/Site: **D3745100/ADOT FAI DrainagePond**
Project Contact: **Kari Hagen**

Refer to sample receipt form for information on sample condition.

23DPS-EB-01 (1234232009) PS

8260D - Sample was re-analyzed outside of hold to confirm Cis-1,2-Dichloroethene carryover. Data within hold time is being reported.

1234342002(1729344MS) (1729349) MS

300.0 - Anions - MS recovery for sulfate is outside of QC criteria. Refer to LCS for accuracy requirements.

Light Gases by RSK-175 and 537M PFAS List 24 were analyzed by SGS of Orlando, FL.

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

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

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.

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
23DPS-MW11R-GW	1234232001	08/08/2023	08/11/2023	Water (Surface, Eff., Ground)
23DPS-MW11R-GWA	1234232002	08/08/2023	08/11/2023	Water (Surface, Eff., Ground)
23HFS-MW30R-GW	1234232003	08/08/2023	08/11/2023	Water (Surface, Eff., Ground)
23DPS-MW34-GW	1234232004	08/09/2023	08/11/2023	Water (Surface, Eff., Ground)
23DPS-MW38S-GW	1234232005	08/08/2023	08/11/2023	Water (Surface, Eff., Ground)
23DPS-MW38D-GW	1234232006	08/08/2023	08/11/2023	Water (Surface, Eff., Ground)
23DPS-MW39-GW	1234232007	08/08/2023	08/11/2023	Water (Surface, Eff., Ground)
23DPS-MW40-GW	1234232008	08/09/2023	08/11/2023	Water (Surface, Eff., Ground)
23DPS-EB-01	1234232009	08/09/2023	08/11/2023	Water (Surface, Eff., Ground)
23DPS-01W	1234232010	08/09/2023	08/11/2023	Water (Surface, Eff., Ground)
23-DPS-TB01	1234232011	08/08/2023	08/11/2023	Water (Surface, Eff., Ground)
23DPS-MW11R-GW	1234232012	08/08/2023	08/11/2023	Water (Surface, Eff., Ground)
23DPS-MW11R-GWA	1234232013	08/08/2023	08/11/2023	Water (Surface, Eff., Ground)
23DPS-MW30R-GW	1234232014	08/08/2023	08/11/2023	Water (Surface, Eff., Ground)
23DPS-MW34-GW	1234232015	08/08/2023	08/11/2023	Water (Surface, Eff., Ground)

Method	Method Description
SW6020B	Dissolved Metals by ICP-MS
EPA 300.0	Ion Chromatographic Analysis (W)
SW6020B	Metals by ICP-MS
SM21 4500NO3-F	Nitrate/Nitrite Flow injection Pres.
SM 5310B	Total Organic Carbon
SW8260D	Volatile Organic Compounds(W)Custom List

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Detectable Results Summary

Client Sample ID: **23DPS-MW11R-GW**
Lab Sample ID: 1234232001

	Parameter	Result	Units
Metals by ICP/MS	Iron	32900	ug/L
	Manganese	3420	ug/L
Volatile GC/MS	Benzene	2.36	ug/L
	cis-1,2-Dichloroethene	116	ug/L
	Tetrachloroethene	5.96	ug/L
	trans-1,2-Dichloroethene	1.45	ug/L
	Trichloroethene	1.21	ug/L
	Vinyl chloride	0.720	ug/L
Waters Department	Sulfate	15.7	mg/L
	Total Nitrate/Nitrite-N	0.112J	mg/L
	Total Organic Carbon Average	9.29	mg/L

Client Sample ID: **23DPS-MW11R-GWA**
Lab Sample ID: 1234232002

	Parameter	Result	Units
Metals by ICP/MS	Iron	29600	ug/L
	Manganese	3400	ug/L
Volatile GC/MS	Benzene	2.40	ug/L
	cis-1,2-Dichloroethene	116	ug/L
	Tetrachloroethene	5.97	ug/L
	trans-1,2-Dichloroethene	1.48	ug/L
	Trichloroethene	1.16	ug/L
Waters Department	Sulfate	17.0	mg/L
	Total Nitrate/Nitrite-N	0.0964J	mg/L
	Total Organic Carbon Average	9.27	mg/L

Client Sample ID: **23HFS-MW30R-GW**
Lab Sample ID: 1234232003

	Parameter	Result	Units
Metals by ICP/MS	Iron	13800	ug/L
	Manganese	4930	ug/L
Waters Department	Sulfate	1.08	mg/L
	Total Organic Carbon Average	53.4	mg/L

Client Sample ID: **23DPS-MW34-GW**
Lab Sample ID: 1234232004

	Parameter	Result	Units
Metals by ICP/MS	Iron	563	ug/L
	Manganese	48.9	ug/L
Waters Department	Sulfate	37.6	mg/L
	Total Nitrate/Nitrite-N	0.956	mg/L
	Total Organic Carbon Average	5.82	mg/L

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Detectable Results Summary

Client Sample ID: **23DPS-MW38S-GW**
Lab Sample ID: 1234232005
Volatile GC/MS

Parameter	Result	Units
Benzene	3.19	ug/L
cis-1,2-Dichloroethene	148	ug/L
Tetrachloroethene	0.620J	ug/L
trans-1,2-Dichloroethene	2.07	ug/L
Trichloroethene	0.210J	ug/L
Vinyl chloride	1.80	ug/L

Client Sample ID: **23DPS-MW38D-GW**
Lab Sample ID: 1234232006
Volatile GC/MS

Parameter	Result	Units
cis-1,2-Dichloroethene	0.480J	ug/L
Trichloroethene	0.150J	ug/L

Client Sample ID: **23DPS-MW39-GW**
Lab Sample ID: 1234232007
Volatile GC/MS

Parameter	Result	Units
Benzene	1.48	ug/L
cis-1,2-Dichloroethene	48.7	ug/L
trans-1,2-Dichloroethene	2.14	ug/L
Trichloroethene	1.21	ug/L
Vinyl chloride	2.24	ug/L

Client Sample ID: **23DPS-MW40-GW**
Lab Sample ID: 1234232008
Volatile GC/MS

Parameter	Result	Units
Benzene	0.800	ug/L
cis-1,2-Dichloroethene	467	ug/L
Tetrachloroethene	15.6	ug/L
trans-1,2-Dichloroethene	6.17	ug/L
Trichloroethene	25.8	ug/L
Vinyl chloride	3.44	ug/L

Client Sample ID: **23DPS-EB-01**
Lab Sample ID: 1234232009
Volatile GC/MS

Parameter	Result	Units
cis-1,2-Dichloroethene	0.790J	ug/L

Client Sample ID: **23DPS-01W**
Lab Sample ID: 1234232010
Volatile GC/MS

Parameter	Result	Units
Benzene	0.380J	ug/L
cis-1,2-Dichloroethene	45.8	ug/L
Tetrachloroethene	1.04	ug/L
trans-1,2-Dichloroethene	0.590J	ug/L
Trichloroethene	1.44	ug/L

Client Sample ID: **23DPS-MW11R-GW**
Lab Sample ID: 1234232012
Dissolved Metals by ICP/MS

Parameter	Result	Units
Iron	26600	ug/L
Manganese	3290	ug/L

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Detectable Results Summary

Client Sample ID: **23DPS-MW11R-GWA**
Lab Sample ID: 1234232013

Dissolved Metals by ICP/MS

Parameter	Result	Units
Iron	26800	ug/L
Manganese	3460	ug/L

Client Sample ID: **23DPS-MW30R-GW**
Lab Sample ID: 1234232014

Dissolved Metals by ICP/MS

Parameter	Result	Units
Iron	21800	ug/L
Manganese	5200	ug/L

Client Sample ID: **23DPS-MW34-GW**
Lab Sample ID: 1234232015

Dissolved Metals by ICP/MS

Parameter	Result	Units
Iron	243J	ug/L
Manganese	41.1	ug/L

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Results of **23DPS-MW11R-GW**

Client Sample ID: **23DPS-MW11R-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232001
Lab Project ID: 1234232

Collection Date: 08/08/23 12:15
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-11R

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Iron	32900		500	150	250	ug/L	5		08/22/23 14:50
Manganese	3420		10.0	3.10	5.00	ug/L	25		08/22/23 16:47

Batch Information

Analytical Batch: MMS12040
Analytical Method: SW6020B
Analyst: ACF
Analytical Date/Time: 08/22/23 14:50
Container ID: 1234232001-M

Prep Batch: MXX36089
Prep Method: SW3010A
Prep Date/Time: 08/14/23 13:04
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Analytical Batch: MMS12040
Analytical Method: SW6020B
Analyst: ACF
Analytical Date/Time: 08/22/23 16:47
Container ID: 1234232001-M

Prep Batch: MXX36089
Prep Method: SW3010A
Prep Date/Time: 08/14/23 13:04
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Results of **23DPS-MW11R-GW**

Client Sample ID: **23DPS-MW11R-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232001
Lab Project ID: 1234232

Collection Date: 08/08/23 12:15
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-11R

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Benzene	2.36		0.400	0.120	0.200	ug/L	1		08/15/23 17:56
cis-1,2-Dichloroethene	116		1.00	0.310	0.500	ug/L	1		08/15/23 17:56
Tetrachloroethene	5.96		1.00	0.310	0.500	ug/L	1		08/15/23 17:56
trans-1,2-Dichloroethene	1.45		1.00	0.310	0.500	ug/L	1		08/15/23 17:56
Trichloroethene	1.21		0.500	0.150	0.250	ug/L	1		08/15/23 17:56
Vinyl chloride	0.720		0.150	0.0500	0.0750	ug/L	1		08/15/23 17:56
Surrogates									
1,2-Dichloroethane-D4 (surr)	108		81-118			%	1		08/15/23 17:56
4-Bromofluorobenzene (surr)	99.2		85-114			%	1		08/15/23 17:56
Toluene-d8 (surr)	99.6		89-112			%	1		08/15/23 17:56

Batch Information

Analytical Batch: VMS22670
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/15/23 17:56
Container ID: 1234232001-A

Prep Batch: VXX40277
Prep Method: SW5030B
Prep Date/Time: 08/15/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **23DPS-MW11R-GW**

Client Sample ID: **23DPS-MW11R-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232001
Lab Project ID: 1234232

Collection Date: 08/08/23 12:15
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-11R

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Sulfate	15.7		2.00	0.500	1.00	mg/L	10		08/17/23 06:52

Batch Information

Analytical Batch: WIC6488
Analytical Method: EPA 300.0
Analyst: EBH
Analytical Date/Time: 08/17/23 06:52
Container ID: 1234232001-I

Prep Batch: WXX14903
Prep Method: METHOD
Prep Date/Time: 08/16/23 19:30
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon Average	9.29		1.00	0.400	0.500	mg/L	1		08/14/23 22:18

Batch Information

Analytical Batch: WTC3314
Analytical Method: SM 5310B
Analyst: EBH
Analytical Date/Time: 08/14/23 22:18
Container ID: 1234232001-H

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Total Nitrate/Nitrite-N	0.112	J	0.200	0.0500	0.100	mg/L	2		08/18/23 12:51

Batch Information

Analytical Batch: WFI3061
Analytical Method: SM21 4500NO3-F
Analyst: EBH
Analytical Date/Time: 08/18/23 12:51
Container ID: 1234232001-K

Results of **23DPS-MW11R-GWA**

Client Sample ID: **23DPS-MW11R-GWA**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232002
Lab Project ID: 1234232

Collection Date: 08/08/23 12:15
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-11R

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Iron	29600		500	150	250	ug/L	5		08/22/23 14:52
Manganese	3400		10.0	3.10	5.00	ug/L	25		08/22/23 16:50

Batch Information

Analytical Batch: MMS12040
Analytical Method: SW6020B
Analyst: ACF
Analytical Date/Time: 08/22/23 14:52
Container ID: 1234232002-M

Prep Batch: MXX36089
Prep Method: SW3010A
Prep Date/Time: 08/14/23 13:04
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Analytical Batch: MMS12040
Analytical Method: SW6020B
Analyst: ACF
Analytical Date/Time: 08/22/23 16:50
Container ID: 1234232002-M

Prep Batch: MXX36089
Prep Method: SW3010A
Prep Date/Time: 08/14/23 13:04
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Results of **23DPS-MW11R-GWA**

Client Sample ID: **23DPS-MW11R-GWA**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232002
Lab Project ID: 1234232

Collection Date: 08/08/23 12:15
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-11R

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Benzene	2.40		0.400	0.120	0.200	ug/L	1		08/15/23 18:11
cis-1,2-Dichloroethene	116		1.00	0.310	0.500	ug/L	1		08/15/23 18:11
Tetrachloroethene	5.97		1.00	0.310	0.500	ug/L	1		08/15/23 18:11
trans-1,2-Dichloroethene	1.48		1.00	0.310	0.500	ug/L	1		08/15/23 18:11
Trichloroethene	1.16		0.500	0.150	0.250	ug/L	1		08/15/23 18:11
Vinyl chloride	0.0750	U	0.150	0.0500	0.0750	ug/L	1		08/15/23 18:11
Surrogates									
1,2-Dichloroethane-D4 (surr)	109		81-118			%	1		08/15/23 18:11
4-Bromofluorobenzene (surr)	99.8		85-114			%	1		08/15/23 18:11
Toluene-d8 (surr)	100		89-112			%	1		08/15/23 18:11

Batch Information

Analytical Batch: VMS22670
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/15/23 18:11
Container ID: 1234232002-A

Prep Batch: VXX40277
Prep Method: SW5030B
Prep Date/Time: 08/15/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **23DPS-MW11R-GWA**

Client Sample ID: **23DPS-MW11R-GWA**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232002
Lab Project ID: 1234232

Collection Date: 08/08/23 12:15
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-11R

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Sulfate	17.0		1.00	0.250	0.500	mg/L	5		08/17/23 07:10

Batch Information

Analytical Batch: WIC6488
Analytical Method: EPA 300.0
Analyst: EBH
Analytical Date/Time: 08/17/23 07:10
Container ID: 1234232002-I

Prep Batch: WXX14903
Prep Method: METHOD
Prep Date/Time: 08/16/23 19:30
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon Average	9.27		1.00	0.400	0.500	mg/L	1		08/14/23 22:32

Batch Information

Analytical Batch: WTC3314
Analytical Method: SM 5310B
Analyst: EBH
Analytical Date/Time: 08/14/23 22:32
Container ID: 1234232002-H

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Total Nitrate/Nitrite-N	0.0964	J	0.200	0.0500	0.100	mg/L	2		08/18/23 12:53

Batch Information

Analytical Batch: WFI3061
Analytical Method: SM21 4500NO3-F
Analyst: EBH
Analytical Date/Time: 08/18/23 12:53
Container ID: 1234232002-K

Results of **23HFS-MW30R-GW**

Client Sample ID: **23HFS-MW30R-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232003
Lab Project ID: 1234232

Collection Date: 08/08/23 07:55
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-30R

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Iron	13800		500	150	250	ug/L	5		08/22/23 14:55
Manganese	4930		10.0	3.10	5.00	ug/L	25		08/22/23 16:53

Batch Information

Analytical Batch: MMS12040
Analytical Method: SW6020B
Analyst: ACF
Analytical Date/Time: 08/22/23 14:55
Container ID: 1234232003-J

Prep Batch: MXX36089
Prep Method: SW3010A
Prep Date/Time: 08/14/23 13:04
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Analytical Batch: MMS12040
Analytical Method: SW6020B
Analyst: ACF
Analytical Date/Time: 08/22/23 16:53
Container ID: 1234232003-J

Prep Batch: MXX36089
Prep Method: SW3010A
Prep Date/Time: 08/14/23 13:04
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Results of **23HFS-MW30R-GW**

Client Sample ID: **23HFS-MW30R-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232003
Lab Project ID: 1234232

Collection Date: 08/08/23 07:55
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-30R

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Sulfate	1.08		0.200	0.0500	0.100	mg/L	1		08/17/23 20:04

Batch Information

Analytical Batch: WIC6489
Analytical Method: EPA 300.0
Analyst: EBH
Analytical Date/Time: 08/17/23 20:04
Container ID: 1234232003-F

Prep Batch: WXX14906
Prep Method: METHOD
Prep Date/Time: 08/17/23 16:20
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon Average	53.4		1.00	0.400	0.500	mg/L	1		08/14/23 22:46

Batch Information

Analytical Batch: WTC3314
Analytical Method: SM 5310B
Analyst: EBH
Analytical Date/Time: 08/14/23 22:46
Container ID: 1234232003-E

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Total Nitrate/Nitrite-N	0.100	U	0.200	0.0500	0.100	mg/L	2		08/18/23 12:54

Batch Information

Analytical Batch: WFI3061
Analytical Method: SM21 4500NO3-F
Analyst: EBH
Analytical Date/Time: 08/18/23 12:54
Container ID: 1234232003-H

Results of **23DPS-MW34-GW**

Client Sample ID: **23DPS-MW34-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232004
Lab Project ID: 1234232

Collection Date: 08/09/23 11:35
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-34

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Iron	563		500	150	250	ug/L	5		08/22/23 14:57
Manganese	48.9		2.00	0.620	1.00	ug/L	5		08/22/23 14:57

Batch Information

Analytical Batch: MMS12040
Analytical Method: SW6020B
Analyst: ACF
Analytical Date/Time: 08/22/23 14:57
Container ID: 1234232004-M

Prep Batch: MXX36089
Prep Method: SW3010A
Prep Date/Time: 08/14/23 13:04
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Results of **23DPS-MW34-GW**

Client Sample ID: **23DPS-MW34-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232004
Lab Project ID: 1234232

Collection Date: 08/09/23 11:35
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-34

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.200	U	0.400	0.120	0.200	ug/L	1		08/15/23 18:25
cis-1,2-Dichloroethene	0.500	U	1.00	0.310	0.500	ug/L	1		08/15/23 18:25
Tetrachloroethene	0.500	U	1.00	0.310	0.500	ug/L	1		08/15/23 18:25
trans-1,2-Dichloroethene	0.500	U	1.00	0.310	0.500	ug/L	1		08/15/23 18:25
Trichloroethene	0.250	U	0.500	0.150	0.250	ug/L	1		08/15/23 18:25
Vinyl chloride	0.0750	U	0.150	0.0500	0.0750	ug/L	1		08/15/23 18:25
Surrogates									
1,2-Dichloroethane-D4 (surr)	114		81-118			%	1		08/15/23 18:25
4-Bromofluorobenzene (surr)	101		85-114			%	1		08/15/23 18:25
Toluene-d8 (surr)	99.3		89-112			%	1		08/15/23 18:25

Batch Information

Analytical Batch: VMS22670
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/15/23 18:25
Container ID: 1234232004-A

Prep Batch: VXX40277
Prep Method: SW5030B
Prep Date/Time: 08/15/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **23DPS-MW34-GW**

Client Sample ID: **23DPS-MW34-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232004
Lab Project ID: 1234232

Collection Date: 08/09/23 11:35
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-34

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Sulfate	37.6		2.00	0.500	1.00	mg/L	10		08/17/23 07:46

Batch Information

Analytical Batch: WIC6488
Analytical Method: EPA 300.0
Analyst: EBH
Analytical Date/Time: 08/17/23 07:46
Container ID: 1234232004-I

Prep Batch: WXX14903
Prep Method: METHOD
Prep Date/Time: 08/16/23 19:30
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon Average	5.82		1.00	0.400	0.500	mg/L	1		08/14/23 23:01

Batch Information

Analytical Batch: WTC3314
Analytical Method: SM 5310B
Analyst: EBH
Analytical Date/Time: 08/14/23 23:01
Container ID: 1234232004-H

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Total Nitrate/Nitrite-N	0.956		0.200	0.0500	0.100	mg/L	2		08/18/23 12:56

Batch Information

Analytical Batch: WFI3061
Analytical Method: SM21 4500NO3-F
Analyst: EBH
Analytical Date/Time: 08/18/23 12:56
Container ID: 1234232004-K

Results of **23DPS-MW38S-GW**

Client Sample ID: **23DPS-MW38S-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232005
Lab Project ID: 1234232

Collection Date: 08/08/23 15:15
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-38S

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Benzene	3.19		0.400	0.120	0.200	ug/L	1		08/15/23 18:40
cis-1,2-Dichloroethene	148		1.00	0.310	0.500	ug/L	1		08/15/23 18:40
Tetrachloroethene	0.620	J	1.00	0.310	0.500	ug/L	1		08/15/23 18:40
trans-1,2-Dichloroethene	2.07		1.00	0.310	0.500	ug/L	1		08/15/23 18:40
Trichloroethene	0.210	J	0.500	0.150	0.250	ug/L	1		08/15/23 18:40
Vinyl chloride	1.80		0.150	0.0500	0.0750	ug/L	1		08/15/23 18:40
Surrogates									
1,2-Dichloroethane-D4 (surr)	109		81-118			%	1		08/15/23 18:40
4-Bromofluorobenzene (surr)	101		85-114			%	1		08/15/23 18:40
Toluene-d8 (surr)	99.5		89-112			%	1		08/15/23 18:40

Batch Information

Analytical Batch: VMS22670
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/15/23 18:40
Container ID: 1234232005-A

Prep Batch: VXX40277
Prep Method: SW5030B
Prep Date/Time: 08/15/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **23DPS-MW38D-GW**

Client Sample ID: **23DPS-MW38D-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232006
Lab Project ID: 1234232

Collection Date: 08/08/23 14:30
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-38D

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.200	U	0.400	0.120	0.200	ug/L	1		08/15/23 18:55
cis-1,2-Dichloroethene	0.480	J	1.00	0.310	0.500	ug/L	1		08/15/23 18:55
Tetrachloroethene	0.500	U	1.00	0.310	0.500	ug/L	1		08/15/23 18:55
trans-1,2-Dichloroethene	0.500	U	1.00	0.310	0.500	ug/L	1		08/15/23 18:55
Trichloroethene	0.150	J	0.500	0.150	0.250	ug/L	1		08/15/23 18:55
Vinyl chloride	0.0750	U	0.150	0.0500	0.0750	ug/L	1		08/15/23 18:55
Surrogates									
1,2-Dichloroethane-D4 (surr)	108		81-118			%	1		08/15/23 18:55
4-Bromofluorobenzene (surr)	102		85-114			%	1		08/15/23 18:55
Toluene-d8 (surr)	99.5		89-112			%	1		08/15/23 18:55

Batch Information

Analytical Batch: VMS22670
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/15/23 18:55
Container ID: 1234232006-A

Prep Batch: VXX40277
Prep Method: SW5030B
Prep Date/Time: 08/15/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **23DPS-MW39-GW**

Client Sample ID: **23DPS-MW39-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232007
Lab Project ID: 1234232

Collection Date: 08/08/23 11:17
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-39

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Benzene	1.48		0.400	0.120	0.200	ug/L	1		08/15/23 19:10
cis-1,2-Dichloroethene	48.7		1.00	0.310	0.500	ug/L	1		08/15/23 19:10
Tetrachloroethene	0.500	U	1.00	0.310	0.500	ug/L	1		08/15/23 19:10
trans-1,2-Dichloroethene	2.14		1.00	0.310	0.500	ug/L	1		08/15/23 19:10
Trichloroethene	1.21		0.500	0.150	0.250	ug/L	1		08/15/23 19:10
Vinyl chloride	2.24		0.150	0.0500	0.0750	ug/L	1		08/15/23 19:10
Surrogates									
1,2-Dichloroethane-D4 (surr)	106		81-118			%	1		08/15/23 19:10
4-Bromofluorobenzene (surr)	98.8		85-114			%	1		08/15/23 19:10
Toluene-d8 (surr)	101		89-112			%	1		08/15/23 19:10

Batch Information

Analytical Batch: VMS22670
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/15/23 19:10
Container ID: 1234232007-A

Prep Batch: VXX40277
Prep Method: SW5030B
Prep Date/Time: 08/15/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **23DPS-MW40-GW**

Client Sample ID: **23DPS-MW40-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232008
Lab Project ID: 1234232

Collection Date: 08/09/23 10:25
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-40

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.800		0.400	0.120	0.200	ug/L	1		08/15/23 19:25
cis-1,2-Dichloroethene	467		5.00	1.55	2.50	ug/L	5		08/17/23 23:34
Tetrachloroethene	15.6		1.00	0.310	0.500	ug/L	1		08/15/23 19:25
trans-1,2-Dichloroethene	6.17		1.00	0.310	0.500	ug/L	1		08/15/23 19:25
Trichloroethene	25.8		0.500	0.150	0.250	ug/L	1		08/15/23 19:25
Vinyl chloride	3.44		0.150	0.0500	0.0750	ug/L	1		08/15/23 19:25
Surrogates									
1,2-Dichloroethane-D4 (surr)	109		81-118			%	1		08/15/23 19:25
4-Bromofluorobenzene (surr)	100		85-114			%	1		08/15/23 19:25
Toluene-d8 (surr)	98.7		89-112			%	1		08/15/23 19:25

Batch Information

Analytical Batch: VMS22670
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/15/23 19:25
Container ID: 1234232008-A

Prep Batch: VXX40277
Prep Method: SW5030B
Prep Date/Time: 08/15/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS22677
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/17/23 23:34
Container ID: 1234232008-B

Prep Batch: VXX40287
Prep Method: SW5030B
Prep Date/Time: 08/17/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **23DPS-EB-01**

Client Sample ID: **23DPS-EB-01**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232009
Lab Project ID: 1234232

Collection Date: 08/09/23 12:00
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: DPS-EB

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.200	U	0.400	0.120	0.200	ug/L	1		08/15/23 19:39
cis-1,2-Dichloroethene	0.790	J	1.00	0.310	0.500	ug/L	1		08/15/23 19:39
Tetrachloroethene	0.500	U	1.00	0.310	0.500	ug/L	1		08/15/23 19:39
trans-1,2-Dichloroethene	0.500	U	1.00	0.310	0.500	ug/L	1		08/15/23 19:39
Trichloroethene	0.250	U	0.500	0.150	0.250	ug/L	1		08/15/23 19:39
Vinyl chloride	0.0750	U	0.150	0.0500	0.0750	ug/L	1		08/15/23 19:39
Surrogates									
1,2-Dichloroethane-D4 (surr)	114		81-118			%	1		08/15/23 19:39
4-Bromofluorobenzene (surr)	99		85-114			%	1		08/15/23 19:39
Toluene-d8 (surr)	98.1		89-112			%	1		08/15/23 19:39

Batch Information

Analytical Batch: VMS22670
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/15/23 19:39
Container ID: 1234232009-A

Prep Batch: VXX40277
Prep Method: SW5030B
Prep Date/Time: 08/15/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **23DPS-01W**

Client Sample ID: **23DPS-01W**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232010
Lab Project ID: 1234232

Collection Date: 08/09/23 12:30
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: DPS-01W

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.380	J	0.400	0.120	0.200	ug/L	1		08/15/23 19:54
cis-1,2-Dichloroethene	45.8		1.00	0.310	0.500	ug/L	1		08/15/23 19:54
Tetrachloroethene	1.04		1.00	0.310	0.500	ug/L	1		08/15/23 19:54
trans-1,2-Dichloroethene	0.590	J	1.00	0.310	0.500	ug/L	1		08/15/23 19:54
Trichloroethene	1.44		0.500	0.150	0.250	ug/L	1		08/15/23 19:54
Vinyl chloride	0.0750	U	0.150	0.0500	0.0750	ug/L	1		08/15/23 19:54
Surrogates									
1,2-Dichloroethane-D4 (surr)	108		81-118			%	1		08/15/23 19:54
4-Bromofluorobenzene (surr)	101		85-114			%	1		08/15/23 19:54
Toluene-d8 (surr)	99.8		89-112			%	1		08/15/23 19:54

Batch Information

Analytical Batch: VMS22670
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/15/23 19:54
Container ID: 1234232010-A

Prep Batch: VXX40277
Prep Method: SW5030B
Prep Date/Time: 08/15/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **23-DPS-TB01**

Client Sample ID: **23-DPS-TB01**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232011
Lab Project ID: 1234232

Collection Date: 08/08/23 08:00
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: DPS-TB01

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Benzene	0.200	U	0.400	0.120	0.200	ug/L	1		08/15/23 17:41
cis-1,2-Dichloroethene	0.500	U	1.00	0.310	0.500	ug/L	1		08/15/23 17:41
Tetrachloroethene	0.500	U	1.00	0.310	0.500	ug/L	1		08/15/23 17:41
trans-1,2-Dichloroethene	0.500	U	1.00	0.310	0.500	ug/L	1		08/15/23 17:41
Trichloroethene	0.250	U	0.500	0.150	0.250	ug/L	1		08/15/23 17:41
Vinyl chloride	0.0750	U	0.150	0.0500	0.0750	ug/L	1		08/15/23 17:41
Surrogates									
1,2-Dichloroethane-D4 (surr)	108		81-118			%	1		08/15/23 17:41
4-Bromofluorobenzene (surr)	103		85-114			%	1		08/15/23 17:41
Toluene-d8 (surr)	101		89-112			%	1		08/15/23 17:41

Batch Information

Analytical Batch: VMS22670
Analytical Method: SW8260D
Analyst: JY
Analytical Date/Time: 08/15/23 17:41
Container ID: 1234232011-A

Prep Batch: VXX40277
Prep Method: SW5030B
Prep Date/Time: 08/15/23 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **23DPS-MW11R-GW**

Client Sample ID: **23DPS-MW11R-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232012
Lab Project ID: 1234232

Collection Date: 08/08/23 12:15
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-11R

Results by **Dissolved Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Iron	26600		500	150	250	ug/L	5		08/22/23 15:00
Manganese	3290		10.0	3.10	5.00	ug/L	25		08/22/23 16:55

Batch Information

Analytical Batch: MMS12040
Analytical Method: SW6020B
Analyst: ACF
Analytical Date/Time: 08/22/23 15:00
Container ID: 1234232012-A

Prep Batch: MXX36089
Prep Method: SW3010A
Prep Date/Time: 08/14/23 13:04
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Analytical Batch: MMS12040
Analytical Method: SW6020B
Analyst: ACF
Analytical Date/Time: 08/22/23 16:55
Container ID: 1234232012-A

Prep Batch: MXX36089
Prep Method: SW3010A
Prep Date/Time: 08/14/23 13:04
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Results of **23DPS-MW11R-GWA**

Client Sample ID: **23DPS-MW11R-GWA**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232013
Lab Project ID: 1234232

Collection Date: 08/08/23 12:15
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-11R

Results by **Dissolved Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Iron	26800		500	150	250	ug/L	5		08/22/23 15:02
Manganese	3460		10.0	3.10	5.00	ug/L	25		08/22/23 16:58

Batch Information

Analytical Batch: MMS12040
Analytical Method: SW6020B
Analyst: ACF
Analytical Date/Time: 08/22/23 15:02
Container ID: 1234232013-A

Prep Batch: MXX36089
Prep Method: SW3010A
Prep Date/Time: 08/14/23 13:04
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Analytical Batch: MMS12040
Analytical Method: SW6020B
Analyst: ACF
Analytical Date/Time: 08/22/23 16:58
Container ID: 1234232013-A

Prep Batch: MXX36089
Prep Method: SW3010A
Prep Date/Time: 08/14/23 13:04
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Results of **23DPS-MW30R-GW**

Client Sample ID: **23DPS-MW30R-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232014
Lab Project ID: 1234232

Collection Date: 08/08/23 07:55
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-30R

Results by **Dissolved Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Iron	21800		500	150	250	ug/L	5		08/17/23 15:22
Manganese	5200		10.0	3.10	5.00	ug/L	25		08/24/23 15:10

Batch Information

Analytical Batch: MMS12042
Analytical Method: SW6020B
Analyst: ACF
Analytical Date/Time: 08/24/23 15:10
Container ID: 1234232014-A

Prep Batch: MXX36103
Prep Method: SW3010A
Prep Date/Time: 08/16/23 13:37
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Analytical Batch: MMS12037
Analytical Method: SW6020B
Analyst: HGS
Analytical Date/Time: 08/17/23 15:22
Container ID: 1234232014-A

Prep Batch: MXX36103
Prep Method: SW3010A
Prep Date/Time: 08/16/23 13:37
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Results of **23DPS-MW34-GW**

Client Sample ID: **23DPS-MW34-GW**
Client Project ID: **D3745100/ADOT FAI DrainagePond**
Lab Sample ID: 1234232015
Lab Project ID: 1234232

Collection Date: 08/08/23 11:35
Received Date: 08/11/23 09:27
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location: MW-34R

Results by **Dissolved Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	LOD	Units	DF	Allowable Limits	Date Analyzed
Iron	243	J	500	150	250	ug/L	5		08/17/23 15:25
Manganese	41.1		2.00	0.620	1.00	ug/L	5		08/17/23 15:25

Batch Information

Analytical Batch: MMS12037
Analytical Method: SW6020B
Analyst: HGS
Analytical Date/Time: 08/17/23 15:25
Container ID: 1234232015-A

Prep Batch: MXX36103
Prep Method: SW3010A
Prep Date/Time: 08/16/23 13:37
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

Print Date: 09/19/2023 10:30:49AM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1862142 [MXX/36089]
Blank Lab ID: 1728372

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1234232001, 1234232002, 1234232003, 1234232004, 1234232012, 1234232013

Results by **SW6020B**

Parameter	Results	LOQ/CL	DL	LOD	Units
Iron	250U	500	150	250	ug/L
Manganese	1.00U	2.00	0.620	1.00	ug/L

Batch Information

Analytical Batch: MMS12040
Analytical Method: SW6020B
Instrument: P7 Agilent 7800
Analyst: ACF
Analytical Date/Time: 8/22/2023 1:48:11PM

Prep Batch: MXX36089
Prep Method: SW3010A
Prep Date/Time: 8/14/2023 1:04:26PM
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1234232 [MXX36089]
Blank Spike Lab ID: 1728373
Date Analyzed: 08/22/2023 13:50

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1234232001, 1234232002, 1234232003, 1234232004, 1234232012, 1234232013

Results by **SW6020B**

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Iron	5000	5220	104	(87-118)
Manganese	500	537	107	(87-115)

Batch Information

Analytical Batch: **MMS12040**
Analytical Method: **SW6020B**
Instrument: **P7 Agilent 7800**
Analyst: **ACF**

Prep Batch: **MXX36089**
Prep Method: **SW3010A**
Prep Date/Time: **08/14/2023 13:04**
Spike Init Wt./Vol.: 5000 ug/L Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Matrix Spike Summary

Original Sample ID: 1728386
MS Sample ID: 1728387 MS
MSD Sample ID: 1728388 MSD

Analysis Date: 08/22/2023 13:53
Analysis Date: 08/22/2023 13:55
Analysis Date: 08/22/2023 13:58
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1234232001, 1234232002, 1234232003, 1234232004, 1234232012, 1234232013

Results by **SW6020B**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Iron	384J	5000	5300	98	5000	5220	97	87-118	1.58	(< 20)
Manganese	66.1	500	555	98	500	561	99	87-115	1.21	(< 20)

Batch Information

Analytical Batch: MMS12040
Analytical Method: SW6020B
Instrument: P7 Agilent 7800
Analyst: ACF
Analytical Date/Time: 8/22/2023 1:55:00PM

Prep Batch: MXX36089
Prep Method: 3010 H20 Digest for Metals ICP-MS
Prep Date/Time: 8/14/2023 1:04:26PM
Prep Initial Wt./Vol.: 25.00mL
Prep Extract Vol: 25.00mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Method Blank

Blank ID: MB for HBN 1862364 [MXX/36103]
Blank Lab ID: 1728940

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1234232014, 1234232015

Results by **SW6020B**

Parameter	Results	LOQ/CL	DL	LOD	Units
Iron	250U	500	150	250	ug/L
Manganese	1.00U	2.00	0.620	1.00	ug/L

Batch Information

Analytical Batch: MMS12037
Analytical Method: SW6020B
Instrument: P7 Agilent 7800
Analyst: HGS
Analytical Date/Time: 8/17/2023 2:52:22PM

Prep Batch: MXX36103
Prep Method: SW3010A
Prep Date/Time: 8/16/2023 1:37:57PM
Prep Initial Wt./Vol.: 25 mL
Prep Extract Vol: 25 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1234232 [MXX36103]
Blank Spike Lab ID: 1728941
Date Analyzed: 08/17/2023 14:55

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1234232014, 1234232015

Results by **SW6020B**

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Iron	5000	5060	101	(87-118)
Manganese	500	506	101	(87-115)

Batch Information

Analytical Batch: **MMS12037**
Analytical Method: **SW6020B**
Instrument: **P7 Agilent 7800**
Analyst: **HGS**

Prep Batch: **MXX36103**
Prep Method: **SW3010A**
Prep Date/Time: **08/16/2023 13:37**
Spike Init Wt./Vol.: 5000 ug/L Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Matrix Spike Summary

Original Sample ID: 1728942
MS Sample ID: 1728943 MS
MSD Sample ID: 1728944 MSD

Analysis Date: 08/17/2023 14:57
Analysis Date: 08/17/2023 15:00
Analysis Date: 08/17/2023 15:07
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1234232014, 1234232015

Results by **SW6020B**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Iron	643	5000	5510	97	5000	5580	99	87-118	1.27	(< 20)
Manganese	65.9	500	550	97	500	564	100	87-115	2.44	(< 20)

Batch Information

Analytical Batch: MMS12037
Analytical Method: SW6020B
Instrument: P7 Agilent 7800
Analyst: HGS
Analytical Date/Time: 8/17/2023 3:00:00PM

Prep Batch: MXX36103
Prep Method: 3010 H20 Digest for Metals ICP-MS
Prep Date/Time: 8/16/2023 1:37:57PM
Prep Initial Wt./Vol.: 25.00mL
Prep Extract Vol: 25.00mL

Print Date: 09/19/2023 10:31:05AM

Method Blank

Blank ID: MB for HBN 1862539 [VXX/40277]
Blank Lab ID: 1729265

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1234232001, 1234232002, 1234232004, 1234232005, 1234232006, 1234232007, 1234232008, 1234232009, 1234232010, 1234232011

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	LOD	Units
Benzene	0.200U	0.400	0.120	0.200	ug/L
cis-1,2-Dichloroethene	0.500U	1.00	0.310	0.500	ug/L
Tetrachloroethene	0.500U	1.00	0.310	0.500	ug/L
trans-1,2-Dichloroethene	0.500U	1.00	0.310	0.500	ug/L
Trichloroethene	0.250U	0.500	0.150	0.250	ug/L
Vinyl chloride	0.0750U	0.150	0.0500	0.0750	ug/L
Surrogates					
1,2-Dichloroethane-D4 (surr)	118	81-118		0	%
4-Bromofluorobenzene (surr)	99	85-114		0	%
Toluene-d8 (surr)	99.2	89-112		0	%

Batch Information

Analytical Batch: VMS22670
Analytical Method: SW8260D
Instrument: VPA 780/5975 GC/MS
Analyst: JY
Analytical Date/Time: 8/15/2023 1:22:00PM

Prep Batch: VXX40277
Prep Method: SW5030B
Prep Date/Time: 8/15/2023 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1234232 [VXX40277]
Blank Spike Lab ID: 1729266
Date Analyzed: 08/15/2023 13:37

Spike Duplicate ID: LCSD for HBN 1234232 [VXX40277]
Spike Duplicate Lab ID: 1729267
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1234232001, 1234232002, 1234232004, 1234232005, 1234232006, 1234232007, 1234232008, 1234232009, 1234232010, 1234232011

Results by **SW8260D**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	30	30.0	100	30	31.2	104	(79-120)	4.00	(< 20)
cis-1,2-Dichloroethene	30	29.5	98	30	29.8	99	(78-123)	0.91	(< 20)
Tetrachloroethene	30	31.1	104	30	31.6	105	(74-129)	1.70	(< 20)
trans-1,2-Dichloroethene	30	30.7	102	30	31.3	104	(75-124)	2.00	(< 20)
Trichloroethene	30	30.5	102	30	31.5	105	(79-123)	3.00	(< 20)
Vinyl chloride	30	34.9	116	30	35.7	119	(58-137)	2.20	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30		102	30		102	(81-118)	0.07	
4-Bromofluorobenzene (surr)	30		97	30		99	(85-114)	1.40	
Toluene-d8 (surr)	30		102	30		101	(89-112)	0.98	

Batch Information

Analytical Batch: **VMS22670**
Analytical Method: **SW8260D**
Instrument: **VPA 780/5975 GC/MS**
Analyst: **JY**

Prep Batch: **VXX40277**
Prep Method: **SW5030B**
Prep Date/Time: **08/15/2023 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

Method Blank

Blank ID: MB for HBN 1862924 [VXX/40287]
Blank Lab ID: 1729850

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1234232008

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	LOD	Units
cis-1,2-Dichloroethene	0.500U	1.00	0.310	0.500	ug/L
Surrogates					
1,2-Dichloroethane-D4 (surr)	112	81-118		0	%
4-Bromofluorobenzene (surr)	102	85-114		0	%
Toluene-d8 (surr)	98.5	89-112		0	%

Batch Information

Analytical Batch: VMS22677
Analytical Method: SW8260D
Instrument: VPA 780/5975 GC/MS
Analyst: JY
Analytical Date/Time: 8/17/2023 2:37:00PM

Prep Batch: VXX40287
Prep Method: SW5030B
Prep Date/Time: 8/17/2023 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1234232 [VXX40287]
Blank Spike Lab ID: 1729851
Date Analyzed: 08/17/2023 14:52

Spike Duplicate ID: LCSD for HBN 1234232 [VXX40287]
Spike Duplicate Lab ID: 1729852
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1234232008

Results by **SW8260D**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
cis-1,2-Dichloroethene	30	29.7	99	30	29.3	98	(78-123)	1.60	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30		101	30		103	(81-118)	1.90	
4-Bromofluorobenzene (surr)	30		99	30		98	(85-114)	0.61	
Toluene-d8 (surr)	30		102	30		100	(89-112)	1.60	

Batch Information

Analytical Batch: **VMS22677**
Analytical Method: **SW8260D**
Instrument: **VPA 780/5975 GC/MS**
Analyst: **JY**

Prep Batch: **VXX40287**
Prep Method: **SW5030B**
Prep Date/Time: **08/17/2023 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Method Blank

Blank ID: MB for HBN 1862635 (WFI/3061)
Blank Lab ID: 1729453

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1234232001, 1234232002, 1234232003, 1234232004

Results by **SM21 4500NO3-F**

Parameter	Results	LOQ/CL	DL	LOD	Units
Nitrate-N	0.100U	0.200	0.0500	0.100	mg/L
Nitrite-N	0.100U	0.200	0.0500	0.100	mg/L
Total Nitrate/Nitrite-N	0.100U	0.200	0.0500	0.100	mg/L

Batch Information

Analytical Batch: WFI3061
Analytical Method: SM21 4500NO3-F
Instrument: Astoria segmented flow
Analyst: EBH
Analytical Date/Time: 8/18/2023 1:26:22PM

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Method Blank

Blank ID: MB for HBN 1862635 (WFI/3061)
Blank Lab ID: 1729460

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1234232001, 1234232002, 1234232003, 1234232004

Results by **SM21 4500NO3-F**

Parameter	Results	LOQ/CL	DL	LOD	Units
Nitrate-N	0.100U	0.200	0.0500	0.100	mg/L
Nitrite-N	0.100U	0.200	0.0500	0.100	mg/L
Total Nitrate/Nitrite-N	0.100U	0.200	0.0500	0.100	mg/L

Batch Information

Analytical Batch: WFI3061
Analytical Method: SM21 4500NO3-F
Instrument: Astoria segmented flow
Analyst: EBH
Analytical Date/Time: 8/18/2023 12:39:07PM

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1234232 [WFI3061]
Blank Spike Lab ID: 1729455
Date Analyzed: 08/18/2023 13:24

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1234232001, 1234232002, 1234232003, 1234232004

Results by **SM21 4500NO3-F**

Blank Spike (mg/L)

Parameter	Spike	Result	Rec (%)	CL
Nitrate-N	2.5	2.77	111	(70-130)
Nitrite-N	2.5	2.54	102	(90-110)
Total Nitrate/Nitrite-N	5	5.31	106	(90-110)

Batch Information

Analytical Batch: **WFI3061**
Analytical Method: **SM21 4500NO3-F**
Instrument: **Astoria segmented flow**
Analyst: **EBH**

Print Date: 09/19/2023 10:31:18AM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1234232 [WFI3061]
Blank Spike Lab ID: 1729462
Date Analyzed: 08/18/2023 12:37

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1234232001, 1234232002, 1234232003, 1234232004

Results by **SM21 4500NO3-F**

Blank Spike (mg/L)

Parameter	Spike	Result	Rec (%)	CL
Nitrate-N	2.5	2.56	103	(70-130)
Nitrite-N	2.5	2.53	101	(90-110)
Total Nitrate/Nitrite-N	5	5.09	102	(90-110)

Batch Information

Analytical Batch: **WFI3061**
Analytical Method: **SM21 4500NO3-F**
Instrument: **Astoria segmented flow**
Analyst: **EBH**

Print Date: 09/19/2023 10:31:18AM

Matrix Spike Summary

Original Sample ID: 1234240001
MS Sample ID: 1729446 MS
MSD Sample ID: 1729447 MSD

Analysis Date: 08/18/2023 12:46
Analysis Date: 08/18/2023 12:47
Analysis Date: 08/18/2023 12:49
Matrix: Drinking Water

QC for Samples: 1234232001, 1234232002, 1234232003, 1234232004

Results by **SM21 4500NO3-F**

		Matrix Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Total Nitrate/Nitrite-N	0.200U	5.00	5.07	101	5.00	5.13	103	90-110	1.20	(< 25)

Batch Information

Analytical Batch: WFI3061
Analytical Method: SM21 4500NO3-F
Instrument: Astoria segmented flow
Analyst: EBH
Analytical Date/Time: 8/18/2023 12:47:00PM

Print Date: 09/19/2023 10:31:20AM

Matrix Spike Summary

Original Sample ID: 1234333001
MS Sample ID: 1729448 MS
MSD Sample ID: 1729449 MSD

Analysis Date: 08/18/2023 13:29
Analysis Date: 08/18/2023 13:31
Analysis Date: 08/18/2023 13:33
Matrix: Drinking Water

QC for Samples: 1234232001, 1234232002, 1234232003, 1234232004

Results by **SM21 4500NO3-F**

		Matrix Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Total Nitrate/Nitrite-N	0.905	5.00	5.51	92	5.00	5.78	98	90-110	4.70	(< 25)

Batch Information

Analytical Batch: WFI3061
Analytical Method: SM21 4500NO3-F
Instrument: Astoria segmented flow
Analyst: EBH
Analytical Date/Time: 8/18/2023 1:31:00PM

Print Date: 09/19/2023 10:31:20AM

Method Blank

Blank ID: MB for HBN 1862271 [WTC/3314]
Blank Lab ID: 1728615

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1234232001, 1234232002, 1234232003, 1234232004

Results by **SM 5310B**

Parameter	Results	LOQ/CL	DL	LOD	Units
Total Organic Carbon Average	0.500U	1.00	0.400	0.500	mg/L

Batch Information

Analytical Batch: WTC3314
Analytical Method: SM 5310B
Instrument: TOC Analyzer 2
Analyst: EBH
Analytical Date/Time: 8/14/2023 6:29:32PM

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1234232 [WTC3314]
Blank Spike Lab ID: 1728613
Date Analyzed: 08/14/2023 18:15

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1234232001, 1234232002, 1234232003, 1234232004

Results by **SM 5310B**

Blank Spike (mg/L)

Parameter	Spike	Result	Rec (%)	CL
Total Organic Carbon Average	75	77.3	103	(80-120)

Batch Information

Analytical Batch: **WTC3314**
Analytical Method: **SM 5310B**
Instrument: **TOC Analyzer 2**
Analyst: **EBH**

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Matrix Spike Summary

Original Sample ID: 1234189008
MS Sample ID: 1728617 MS
MSD Sample ID: 1728618 MSD

Analysis Date: 08/14/2023 20:05
Analysis Date: 08/14/2023 20:18
Analysis Date: 08/14/2023 20:33
Matrix: Drinking Water

QC for Samples: 1234232001, 1234232002, 1234232003, 1234232004

Results by **SM 5310B**

		Matrix Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Total Organic Carbon Average	4.03	10.0	13.6	96	10.0	13.6	96	75-125	0.15	(< 25)

Batch Information

Analytical Batch: WTC3314
Analytical Method: SM 5310B
Instrument: TOC Analyzer 2
Analyst: EBH
Analytical Date/Time: 8/14/2023 8:18:44PM

Print Date: 09/19/2023 10:31:27AM

Method Blank

Blank ID: MB for HBN 1862436 [WXX/14903]
Blank Lab ID: 1729163

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1234232001, 1234232002, 1234232004

Results by **EPA 300.0**

Parameter	Results	LOQ/CL	DL	LOD	Units
Sulfate	0.100U	0.200	0.0500	0.100	mg/L

Batch Information

Analytical Batch: WIC6488
Analytical Method: EPA 300.0
Instrument: 930 Metrohm compact IC flex
Analyst: EBH
Analytical Date/Time: 8/17/2023 4:28:31AM

Prep Batch: WXX14903
Prep Method: METHOD
Prep Date/Time: 8/16/2023 7:30:00PM
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1234232 [WXX14903]
Blank Spike Lab ID: 1729164
Date Analyzed: 08/17/2023 04:46

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1234232001, 1234232002, 1234232004

Results by **EPA 300.0**

Blank Spike (mg/L)

Parameter	Spike	Result	Rec (%)	CL
Sulfate	5	5.34	107	(90-110)

Batch Information

Analytical Batch: **WIC6488**
Analytical Method: **EPA 300.0**
Instrument: **930 Metrohm compact IC flex**
Analyst: **EBH**

Prep Batch: **WXX14903**
Prep Method: **METHOD**
Prep Date/Time: **08/16/2023 19:30**
Spike Init Wt./Vol.: 5 mg/L Extract Vol: 10 mL
Dupe Init Wt./Vol.: Extract Vol:

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Matrix Spike Summary

Original Sample ID: 1729154
MS Sample ID: 1729165 MS
MSD Sample ID:

Analysis Date: 08/17/2023 5:22
Analysis Date: 08/17/2023 6:16
Analysis Date:
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1234232001, 1234232002, 1234232004

Results by **EPA 300.0**

		Matrix Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Sulfate	0.200U	10.0	10.5	105				90-110		

Batch Information

Analytical Batch: WIC6488
Analytical Method: EPA 300.0
Instrument: 930 Metrohm compact IC flex
Analyst: EBH
Analytical Date/Time: 8/17/2023 6:16:00AM

Prep Batch: WXX14903
Prep Method: EPA 300.0 Extraction Waters/Liquids
Prep Date/Time: 8/16/2023 7:30:00PM
Prep Initial Wt./Vol.: 10.00mL
Prep Extract Vol: 10.00mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Method Blank

Blank ID: MB for HBN 1862560 [WXX/14906]
Blank Lab ID: 1729345

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1234232003

Results by **EPA 300.0**

Parameter	Results	LOQ/CL	DL	LOD	Units
Sulfate	0.100U	0.200	0.0500	0.100	mg/L

Batch Information

Analytical Batch: WIC6489
Analytical Method: EPA 300.0
Instrument: 930 Metrohm compact IC flex
Analyst: EBH
Analytical Date/Time: 8/17/2023 5:58:24PM

Prep Batch: WXX14906
Prep Method: METHOD
Prep Date/Time: 8/17/2023 4:20:00PM
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1234232 [WXX14906]
Blank Spike Lab ID: 1729346
Date Analyzed: 08/17/2023 18:16

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1234232003

Results by **EPA 300.0**

Blank Spike (mg/L)

Parameter	Spike	Result	Rec (%)	CL
Sulfate	5	5.04	101	(90-110)

Batch Information

Analytical Batch: **WIC6489**
Analytical Method: **EPA 300.0**
Instrument: **930 Metrohm compact IC flex**
Analyst: **EBH**

Prep Batch: **WXX14906**
Prep Method: **METHOD**
Prep Date/Time: **08/17/2023 16:20**
Spike Init Wt./Vol.: 5 mg/L Extract Vol: 10 mL
Dupe Init Wt./Vol.: Extract Vol:

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Matrix Spike Summary

Original Sample ID: 1729343
MS Sample ID: 1729348 MS
MSD Sample ID:

QC for Samples: 1234232003

Analysis Date: 08/17/2023 18:52
Analysis Date: 08/17/2023 19:10
Analysis Date:
Matrix: Water (Surface, Eff., Ground)

Results by **EPA 300.0**

		Matrix Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Sulfate	3.48	5.00	8.46	100				90-110		

Batch Information

Analytical Batch: WIC6489
Analytical Method: EPA 300.0
Instrument: 930 Metrohm compact IC flex
Analyst: EBH
Analytical Date/Time: 8/17/2023 7:10:27PM

Prep Batch: WXX14906
Prep Method: EPA 300.0 Extraction Waters/Liquids
Prep Date/Time: 8/17/2023 4:20:00PM
Prep Initial Wt./Vol.: 10.00mL
Prep Extract Vol: 10.00mL

Matrix Spike Summary

Original Sample ID: 1729344
MS Sample ID: 1729349 MS
MSD Sample ID:

QC for Samples: 1234232003

Analysis Date: 08/17/2023 19:28
Analysis Date: 08/17/2023 19:46
Analysis Date:
Matrix: Water (Surface, Eff., Ground)

Results by **EPA 300.0**

		Matrix Spike (mg/L)				Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Sulfate	25.0	5.00	28.5	72	*				90-110		

Batch Information

Analytical Batch: WIC6489
Analytical Method: EPA 300.0
Instrument: 930 Metrohm compact IC flex
Analyst: EBH
Analytical Date/Time: 8/17/2023 7:46:27PM

Prep Batch: WXX14906
Prep Method: EPA 300.0 Extraction Waters/Liquids
Prep Date/Time: 8/17/2023 4:20:00PM
Prep Initial Wt./Vol.: 10.00mL
Prep Extract Vol: 10.00mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Profile #401771 GM

Chain-of-Custody Report

Collection Organization: Jacobs | **Chain-of-Custody:** 23ADOT-DPS01 | **Cooler ID:** DPS | **NPDL Number:** NA

Project Number: D3745100 | ADOT FAI Drainage Pond GWM | **Laboratory:** SGS | **Bill To:** Jacobs | **Report To:** Jacobs

COC Sample ID	Loc ID	Collection Date	Collection Time	Sampler	Quantity	Container Type	Volume	Preservative	Matrix	Analyses Requested Group	QC	TAT (days)	Notes:	
23DPS-MW11R-GW	MW-11R	8/8/2023	1215	KS/GW	3	VOA	40mL	0-6°C, HCl	WG	SW8260D		14 Day	Benzene, PCE,TCE,cis-DCE, trans-DCE, VC	1AC
23DPS-MW11R-GW	MW-11R	8/8/2023	1215	KS/GW	3	VOA	40mL	0-6°C, HCl	WG	RSK 175		14 Day	Methane	1DF
23DPS-MW11R-GW	MW-11R	8/8/2023	1215	KS/GW	2	AG	125mL	0-6°C, HCl	WG	SM5310B/SW9060A		14 Day	TOC	1EGH
23DPS-MW11R-GW	MW-11R	8/8/2023	1215	KS/GW	2	poly	125mL	0-6°C	WG	EPA 300.0		14 Day	Sulfate	1IJ
23DPS-MW11R-GW	MW-11R	8/8/2023	1215	KS/GW	2	poly	125mL	0-6°C, H2SO4	WG	SM4500 N03-F		14 Day	Nitrate/Nitrite	1KL
23DPS-MW11R-GW	MW-11R	8/8/2023	1215	KS/GW	2	HDPE	125mL	0-6°C, HN03	WG	EPA 6020A		14 Day	Iron/Manganese (Total)	1MN
23DPS-MW11R-GW	MW-11R	8/8/2023	1215	KS/GW	2	HDPE	125mL	0-6°C, HN03	WG	EPA 6020A		14 Day	Iron/Manganese (Pre-filtered, Dissolved)	12A
23DPS-MW11R-GWA	MW-11R	8/8/2023	1215	KS/GW	3	VOA	40mL	0-6°C, HCl	WG	SW8260D		14 Day	Benzene, PCE,TCE,cis-DCE, trans-DCE, VC	2AC
23DPS-MW11R-GWA	MW-11R	8/8/2023	1215	KS/GW	3	VOA	40mL	0-6°C, HCl	WG	RSK 175		14 Day	Methane	2DF
23DPS-MW11R-GWA	MW-11R	8/8/2023	1215	KS/GW	2	AG	125mL	0-6°C, HCl	WG	SM5310B/SW9060A		14 Day	TOC	2EGH
23DPS-MW11R-GWA	MW-11R	8/8/2023	1215	KS/GW	2	poly	125mL	0-6°C	WG	EPA 300.0		14 Day	Sulfate	2IJ
23DPS-MW11R-GWA	MW-11R	8/8/2023	1215	KS/GW	2	poly	125mL	0-6°C, H2SO4	WG	SM4500 N03-F		14 Day	Nitrate/Nitrite	2KL
23DPS-MW11R-GWA	MW-11R	8/8/2023	1215	KS/GW	2	HDPE	125mL	0-6°C, HN03	WG	EPA 6020A		14 Day	Iron/Manganese (Total)	2MN
23DPS-MW11R-GWA	MW-11R	8/8/2023	1215	KS/GW	2	HDPE	125mL	0-6°C, HN03	WG	EPA 6020A		14 Day	Iron/Manganese (Pre-filtered, Dissolved)	13A
23HFS-MW30R-GW	MW-30R	8/8/2023	0755	KS/GW	3	VOA	40mL	0-6°C, HCl	WG	RSK 175		14 Day	Methane	3AC
23HFS-MW30R-GW	MW-30R	8/8/2023	0755	KS/GW	2	AG	125mL	0-6°C, HCl	WG	SM5310B/SW9060A		14 Day	TOC	3DE
23HFS-MW30R-GW	MW-30R	8/8/2023	0755	KS/GW	2	poly	125mL	0-6°C	WG	EPA 300.0		14 Day	Sulfate	3FG
23HFS-MW30R-GW	MW-30R	8/8/2023	0755	KS/GW	2	poly	125mL	0-6°C, H2SO4	WG	SM4500 N03-F		14 Day	Nitrate/Nitrite	3HI
23HFS-MW30R-GW	MW-30R	8/8/2023	0755	KS/GW	2	HDPE	125mL	0-6°C, HN03	WG	EPA 6020A		14 Day	Iron/Manganese (Total)	3JK
23HFS-MW30R-GW	MW-30R	8/8/2023	0755	KS/GW	2	HDPE	125mL	0-6°C, HN03	WG	EPA 6020A		14 Day	Iron/Manganese (Pre-filtered, Dissolved)	14A

Special Instructions:

Relinquish By: Kari Hagen /Kari Hagen 8/10/2023 1534 — Signature/Printed Name — Date/Time

Received By: Cecelia I Missik 8/10/23 1534 — Signature/Printed Name — Date/Time

Relinquish By: Cecelia I Missik 8/10/23 1600 — Signature/Printed Name — Date/Time

Received By: Jordan Cecchi 08/11/23 0927 — Signature/Printed Name — Date/Time

1234232

Temp: 4.8 758 HD

Chain-of-Custody Report

Collection Organization: Jacobs | **Chain-of-Custody:** 23ADOT-DPS01 | **Cooler ID:** DPS | **NPDL Number:** NA

Project Number: D3745100 | ADOT FAI Drainage Pond GWM | **Laboratory:** SGS | **Bill To:** Jacobs | **Report To:** Jacobs

COC Sample ID	Loc ID	Collection Date	Collection Time	Sampler	Quantity	Container Type	Volume	Preservative	Matrix	Analyses Requested Group	QC	TAT (days)	Notes:	
23DPS-MW34-GW	MW-34	8/9/2023	1135	KS/GW	3	VOA	40mL	0-6°C, HCl	WG	SW8260D		14 Day	Benzene, PCE,TCE,cis-DCE, trans-DCE, VC	4AC
23DPS-MW34-GW	MW-34	8/9/2023	1135	KS/GW	3	VOA	40mL	0-6°C, HCl	WG	RSK 175		14 Day	Methane	4DF
23DPS-MW34-GW	MW-34	8/9/2023	1135	KS/GW	2	AG	125mL	0-6°C, HCl	WG	SM5310B/SW9060A		14 Day	TOC	4GH
23DPS-MW34-GW	MW-34	8/9/2023	1135	KS/GW	2	poly	125mL	0-6°C	WG	EPA 300.0		14 Day	Sulfate	4IS
23DPS-MW34-GW	MW-34	8/9/2023	1135	KS/GW	2	poly	125mL	0-6°C, H2SO4	WG	SM4500 N03-F		14 Day	Nitrate/Nitrite	4KL
23DPS-MW34-GW	MW-34	8/9/2023	1135	KS/GW	2	HDPE	125mL	0-6°C, HN03	WG	EPA 6020A		14 Day	Iron/Manganese (Total)	4MW
23DPS-MW34-GW	MW-34	8/9/2023	1135	KS/GW	2	HDPE	125mL	0-6°C, HN03	WG	EPA 6020A		14 Day	Iron/Manganese (Pre-filtered, Dissolved)	15A
23DPS-MW38S-GW	MW-38S	8/8/2023	1515	KS/GW	3	VOA	40mL	0-6°C, HCl	WG	SW8260D		14 Day	Benzene, PCE,TCE,cis-DCE, trans-DCE, VC	5AC
23DPS-MW38D-GW	MW-38D	8/8/2023	1430	KS/GW	3	VOA	40mL	0-6°C, HCl	WG	SW8260D		14 Day	Benzene, PCE,TCE,cis-DCE, trans-DCE, VC	6AC
23DPS-MW39-GW	MW-39	8/8/2023	1117	KS/GW	3	VOA	40mL	0-6°C, HCl	WG	SW8260D		14 Day	Benzene, PCE,TCE,cis-DCE, trans-DCE, VC	7AC
23DPS-MW40-GW	MW-40	8/9/2023	1025	KS/GW	3	VOA	40mL	0-6°C, HCl	WG	SW8260D		14 Day	Benzene, PCE,TCE,cis-DCE, trans-DCE, VC	8AC
23DPS-EB-01	DPS-EB	8/9/2023	1200	KS/GW	3	VOA	40mL	0-6°C, HCl	WQ	SW8260D	EB	14 Day	Benzene, PCE,TCE,cis-DCE, trans-DCE, VC	9AC
23DPS-01W	DPS-01W	8/9/2023	1230	KS/GW	3	VOA	40mL	0-6°C, HCl	WW	SW8260D		14 Day	Benzene, PCE,TCE,cis-DCE, trans-DCE, VC	10AC
23DPS-01W	DPS-01W	8/9/2023	1230	KS/GW	2	HDPE	125mL	0-6°C	WW	EPA 537M		14 Day	PFAS	10DE
21DPS-TB01	DPS-TB01	8/8/2023	0800	KS/GW	3	VOA	40mL	0-6°C, HCl	WQ	SW8260D	TB	14 Day	Benzene, PCE,TCE,cis-DCE, trans-DCE, VC	11AC

Special Instructions:

Relinquish By: Kari Hagen /Kari Hagen 8/10/2023 1534 — Relinquish By: Cecelia I Mizik 8/10/23 1600

Received By: Cecelia I Mizik 8/10/23 1534 — Received By: Jordan Creech 08/11/23 0927

Temp: 4.8 758

1234232

SGS

1234232

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	
Are compound lists specified, where applicable? For project specific or special compound lists please note correct analysis code.	(Yes)	No	N/A	8260D = VMA8260c.1
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	Ref Lab, Limited Volume
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: MAC

Additional Notes/Clarification where Applicable, including resolution of "No" answers when a change order is not attached:

* 1C, 3C, 4C, 5C, 7B, 7C, 8C, 10C >6mm headspace

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1234232001-A	HCL to pH < 2	OK	1234232004-K	H2SO4 to pH < 2	OK
1234232001-B	HCL to pH < 2	OK	1234232004-L	H2SO4 to pH < 2	OK
1234232001-C	HCL to pH < 2	OK	1234232004-M	HNO3 to pH < 2	OK
1234232001-D	HCL to pH < 2	OK	1234232004-N	HNO3 to pH < 2	OK
1234232001-E	HCL to pH < 2	OK	1234232005-A	HCL to pH < 2	OK
1234232001-F	HCL to pH < 2	OK	1234232005-B	HCL to pH < 2	OK
1234232001-G	HCL to pH < 2	OK	1234232005-C	HCL to pH < 2	BU
1234232001-H	HCL to pH < 2	OK	1234232006-A	HCL to pH < 2	OK
1234232001-I	No Preservative Required	OK	1234232006-B	HCL to pH < 2	OK
1234232001-J	No Preservative Required	OK	1234232006-C	HCL to pH < 2	OK
1234232001-K	H2SO4 to pH < 2	OK	1234232007-A	HCL to pH < 2	OK
1234232001-L	H2SO4 to pH < 2	OK	1234232007-B	HCL to pH < 2	BU
1234232001-M	HNO3 to pH < 2	OK	1234232007-C	HCL to pH < 2	BU
1234232001-N	HNO3 to pH < 2	OK	1234232008-A	HCL to pH < 2	OK
1234232002-A	HCL to pH < 2	OK	1234232008-B	HCL to pH < 2	OK
1234232002-B	HCL to pH < 2	OK	1234232008-C	HCL to pH < 2	BU
1234232002-C	HCL to pH < 2	OK	1234232009-A	HCL to pH < 2	OK
1234232002-D	HCL to pH < 2	OK	1234232009-B	HCL to pH < 2	OK
1234232002-E	HCL to pH < 2	OK	1234232009-C	HCL to pH < 2	OK
1234232002-F	HCL to pH < 2	OK	1234232010-A	HCL to pH < 2	OK
1234232002-G	HCL to pH < 2	OK	1234232010-B	HCL to pH < 2	OK
1234232002-H	HCL to pH < 2	OK	1234232010-C	HCL to pH < 2	BU
1234232002-I	No Preservative Required	OK	1234232010-D	No Preservative Required	OK
1234232002-J	No Preservative Required	OK	1234232010-E	No Preservative Required	OK
1234232002-K	H2SO4 to pH < 2	OK	1234232011-A	HCL to pH < 2	OK
1234232002-L	H2SO4 to pH < 2	OK	1234232011-B	HCL to pH < 2	OK
1234232002-M	HNO3 to pH < 2	OK	1234232011-C	HCL to pH < 2	OK
1234232002-N	HNO3 to pH < 2	OK	1234232012-A	HNO3 to pH < 2	OK
1234232003-A	HCL to pH < 2	OK	1234232012-B	HNO3 to pH < 2	OK
1234232003-B	HCL to pH < 2	OK	1234232013-A	HNO3 to pH < 2	OK
1234232003-C	HCL to pH < 2	BU	1234232013-B	HNO3 to pH < 2	OK
1234232003-D	HCL to pH < 2	OK	1234232014-A	HNO3 to pH < 2	OK
1234232003-E	HCL to pH < 2	OK	1234232014-B	HNO3 to pH < 2	OK
1234232003-F	No Preservative Required	OK	1234232015-A	HNO3 to pH < 2	OK
1234232003-G	No Preservative Required	OK	1234232015-B	HNO3 to pH < 2	OK
1234232003-H	H2SO4 to pH < 2	OK			
1234232003-I	H2SO4 to pH < 2	OK			
1234232003-J	HNO3 to pH < 2	OK			
1234232003-K	HNO3 to pH < 2	OK			
1234232004-A	HCL to pH < 2	OK			
1234232004-B	HCL to pH < 2	OK			
1234232004-C	HCL to pH < 2	BU			
1234232004-D	HCL to pH < 2	OK			
1234232004-E	HCL to pH < 2	BU			
1234232004-F	HCL to pH < 2	BU			
1234232004-G	HCL to pH < 2	OK			
1234232004-H	HCL to pH < 2	OK			
1234232004-I	No Preservative Required	OK			
1234232004-J	No Preservative Required	OK			

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition

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.

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0
Automated Report

Technical Report for

SGS North America, Inc

1234232

SGS Job Number: FC8820

Sampling Dates: 08/08/23 - 08/09/23

Report to:

SGS North America, Inc
200 W Potter Dr
Anchorage, AK 99518
justin.nelson@sgs.com; env.alaska.reflabteam@sgs.com

ATTN: Justin Nelson

Total number of pages in report: 40

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable unless noted in the narrative, comments or footnotes.

Norm Farmer
Technical Director

Client Service contact: Andrea Colby 407-425-6700
Certifications: FL(E83510), LA(03051), KS(E-10327), NC(573), NJ(FL002), NY(12022), SC(96038001) DoD ELAP(ANAB L2229), AZ(AZ0806), CA(2937), TX(T104704404), PA(68-03573), VA(460177), AL, AK, AR, CT, IA, KY, MA, MI. MS, ND, NH, NV, OK, OR, IL, UT, VT, WA, WI, WV

Sections: 1 2 3 4 5 6 7

Table of Contents

Sample Summary

SGS North America, Inc

1234232

Job No: FC8820

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
FC8820-1	08/08/23	12:15		08/16/23	AQ	Ground Water	23DPS-MW11R-GW
FC8820-2	08/08/23	12:15		08/16/23	AQ	Ground Water	23DPS-MW11R-GWA
FC8820-3	08/08/23	07:55		08/16/23	AQ	Ground Water	23DPS-MW30R-GW
FC8820-4	08/09/23	11:35		08/16/23	AQ	Ground Water	23DPS-MW34R-GW
FC8820-5	08/09/23	12:30		08/16/23	AQ	Ground Water	23DPS-01W

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client: SGS North America, Inc **Job No:** FC8820

Site: 1234232 **Report Date:** 9/15/2023 4:07:42 PM

On 08/16/2023, 5 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were received at SGS North America Inc - Orlando. at a maximum corrected temperature of 3.8 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. - Orlando Job Number of FC8820 was assigned to the project.

Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section. Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

MS Semi-volatiles By Method EPA 537M BY ID

Matrix: AQ **Batch ID:** OP98676

Sample(s) FC8805-1MS, FC8805-2DUP were used as the QC samples indicated.

RPD(s) for Duplicate for Perfluoropentanoic acid are outside control limits for sample OP98676-DUP. Probable cause is due to sample non-homogeneity.

Sample(s) FC8820-5 have surrogates outside control limits.

FC8820-5: Dilution required (ID recovery standard failure).

GC Volatiles By Method RSKSOP-147/175

Matrix: AQ **Batch ID:** GLL2929

Sample(s) FC8852-3DUP, FC8852-3MS were used as the QC samples indicated.

Matrix: AQ **Batch ID:** GLL2930

Sample(s) FC8738-1DUP, FC8738-1MS were used as the QC samples indicated.

SGS North America Inc. - Orlando certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted. Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria. SGS North America Inc.- Orlando is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety.

Narrative prepared by:

_____

Kim Benham, Client Services *(Signature on File)*

Summary of Hits

Job Number: FC8820
Account: SGS North America, Inc
Project: 1234232
Collected: 08/08/23 thru 08/09/23

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
FC8820-1	**23DPS-MW11R-GW**					
Methane		1850	5.0	2.5	ug/l	RSKSOP-147/175
FC8820-2	**23DPS-MW11R-GWA**					
Methane		1670	5.0	2.5	ug/l	RSKSOP-147/175
FC8820-3	**23DPS-MW30R-GW**					
Methane		1030	5.0	2.5	ug/l	RSKSOP-147/175
FC8820-4	**23DPS-MW34R-GW**					
Methane		0.74	0.50	0.25	ug/l	RSKSOP-147/175
FC8820-5	**23DPS-01W**					
Perfluorobutanoic acid [a]		0.0719 J	0.091	0.045	ug/l	EPA 537M BY ID
Perfluoropentanoic acid [a]		0.0727	0.045	0.023	ug/l	EPA 537M BY ID
Perfluorohexanoic acid [a]		0.222	0.045	0.023	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid [a]		0.252	0.045	0.023	ug/l	EPA 537M BY ID
Perfluorooctanoic acid [a]		0.274	0.045	0.023	ug/l	EPA 537M BY ID
Perfluorononanoic acid [a]		1.17	0.045	0.023	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid [a]		0.221	0.045	0.023	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid [a]		0.150	0.045	0.023	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid [a]		0.894	0.045	0.023	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid [a]		0.0780	0.045	0.023	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid [a]		2.63	0.045	0.023	ug/l	EPA 537M BY ID

(a) Dilution required (ID recovery standard failure).

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	23DPS-MW11R-GW		
Lab Sample ID:	FC8820-1	**Date Sampled:**	08/08/23
Matrix:	AQ - Ground Water	**Date Received:**	08/16/23
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	1234232		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LL84420.D	1	08/21/23 10:49	SS	n/a	n/a	GLL2929
Run #2	LL84452.D	10	08/22/23 11:38	SS	n/a	n/a	GLL2930

	Initial Volume	Headspace Volume	Volume Injected	Temperature
Run #1	37.5 ml	5.0 ml	500 ul	21 Deg. C
Run #2	38.0 ml	5.0 ml	500 ul	20 Deg. C

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	1850 [a]	5.0	2.5	1.6	ug/l	
74-84-0	Ethane	0.50 U	1.0	0.50	0.32	ug/l	
74-85-1	Ethene	0.50 U	1.0	0.50	0.43	ug/l	

(a) Result is from Run# 2

U = Not detected LOD = Limit of Detection
LOQ = Limit of Quantitation DL = Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	23DPS-MW11R-GWA		
Lab Sample ID:	FC8820-2	**Date Sampled:**	08/08/23
Matrix:	AQ - Ground Water	**Date Received:**	08/16/23
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	1234232		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LL84421.D	1	08/21/23 10:57	SS	n/a	n/a	GLL2929
Run #2	LL84453.D	10	08/22/23 11:46	SS	n/a	n/a	GLL2930

	Initial Volume	Headspace Volume	Volume Injected	Temperature
Run #1	38.0 ml	5.0 ml	500 ul	21 Deg. C
Run #2	38.0 ml	5.0 ml	500 ul	20 Deg. C

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	1670 [a]	5.0	2.5	1.6	ug/l	
74-84-0	Ethane	0.50 U	1.0	0.50	0.32	ug/l	
74-85-1	Ethene	0.50 U	1.0	0.50	0.43	ug/l	

(a) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	23DPS-MW30R-GW		
Lab Sample ID:	FC8820-3	**Date Sampled:**	08/08/23
Matrix:	AQ - Ground Water	**Date Received:**	08/16/23
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	1234232		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LL84422.D	1	08/21/23 11:05	SS	n/a	n/a	GLL2929
Run #2	LL84466.D	10	08/22/23 14:03	SS	n/a	n/a	GLL2930

	Initial Volume	Headspace Volume	Volume Injected	Temperature
Run #1	38.0 ml	5.0 ml	500 ul	21 Deg. C
Run #2	38.0 ml	5.0 ml	500 ul	20 Deg. C

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	1030 [a]	5.0	2.5	1.6	ug/l	
74-84-0	Ethane	0.50 U	1.0	0.50	0.32	ug/l	
74-85-1	Ethene	0.50 U	1.0	0.50	0.43	ug/l	

(a) Result is from Run# 2

U = Not detected LOD = Limit of Detection
LOQ = Limit of Quantitation DL = Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: 23DPS-MW34R-GW
Lab Sample ID: FC8820-4
Matrix: AQ - Ground Water
Method: RSKSOP-147/175
Project: 1234232

Date Sampled: 08/09/23
Date Received: 08/16/23
Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LL84428.D	1	08/21/23 12:15	SS	n/a	n/a	GLL2929
Run #2							

	Initial Volume	Headspace Volume	Volume Injected	Temperature
Run #1	38.0 ml	5.0 ml	500 ul	21 Deg. C
Run #2				

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	0.74	0.50	0.25	0.16	ug/l	
74-84-0	Ethane	0.50 U	1.0	0.50	0.32	ug/l	
74-85-1	Ethene	0.50 U	1.0	0.50	0.43	ug/l	

U = Not detected LOD = Limit of Detection
LOQ = Limit of Quantitation DL = Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	23DPS-01W		
Lab Sample ID:	FC8820-5	**Date Sampled:**	08/09/23
Matrix:	AQ - Ground Water	**Date Received:**	08/16/23
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	1234232		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	2Q114359.D	5	09/13/23 20:34	LR	08/28/23 11:15	OP98676	S2Q1621
Run #2	2Q114360.D	25	09/13/23 20:51	LR	08/28/23 11:15	OP98676	S2Q1621

	Initial Volume	Final Volume
Run #1	110 ml	1.0 ml
Run #2	110 ml	1.0 ml

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS							
375-22-4	Perfluorobutanoic acid	0.0719	0.091	0.045	0.023	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.0727	0.045	0.023	0.011	ug/l	
307-24-4	Perfluorohexanoic acid	0.222	0.045	0.023	0.011	ug/l	
375-85-9	Perfluoroheptanoic acid	0.252	0.045	0.023	0.011	ug/l	
335-67-1	Perfluorooctanoic acid	0.274	0.045	0.023	0.011	ug/l	
375-95-1	Perfluorononanoic acid	1.17	0.045	0.023	0.011	ug/l	
335-76-2	Perfluorodecanoic acid	0.11 U [b]	0.23	0.11	0.057	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.11 U [b]	0.23	0.11	0.057	ug/l	
307-55-1	Perfluorododecanoic acid	0.11 U [b]	0.23	0.11	0.057	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.11 U [b]	0.23	0.11	0.057	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.023 U	0.045	0.023	0.011	ug/l	
PERFLUOROALKYLSULFONIC ACIDS							
375-73-5	Perfluorobutanesulfonic acid	0.221	0.045	0.023	0.011	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.150	0.045	0.023	0.011	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.894	0.045	0.023	0.011	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0780	0.045	0.023	0.011	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	2.63	0.045	0.023	0.011	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.023 U	0.045	0.023	0.011	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.11 U [b]	0.23	0.11	0.057	ug/l	
PERFLUOROOCTANESULFONAMIDES							
754-91-6	PFOSA	0.045 U	0.045	0.045	0.023	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS							
2355-31-9	MeFOSAA	0.23 U [b]	0.45	0.23	0.11	ug/l	
2991-50-6	EtFOSAA	0.23 U [b]	0.45	0.23	0.11	ug/l	
FLUOROTELOMER SULFONATES							
757124-72-4	4:2 Fluorotelomer sulfonate	0.045 U	0.091	0.045	0.023	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.045 U	0.091	0.045	0.023	ug/l	

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	23DPS-01W		
Lab Sample ID:	FC8820-5	**Date Sampled:**	08/09/23
Matrix:	AQ - Ground Water	**Date Received:**	08/16/23
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	1234232		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.23 U [b]	0.45	0.23	0.11	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	73%	88%	35-135%
	13C5-PFPeA	79%	97%	50-150%
	13C5-PFHxA	78%	98%	50-150%
	13C4-PFHpA	80%	100%	50-150%
	13C8-PFOA	78%	97%	50-150%
	13C9-PFNA	80%	101%	50-150%
	13C6-PFDA	0% [c]	99%	50-150%
	13C7-PFUnDA	0% [c]	81%	40-140%
	13C2-PFDoDA	0% [c]	69%	40-140%
	13C2-PFTeDA	85%	105%	30-130%
	13C3-PFBS	81%	100%	50-150%
	13C3-PFHxS	83%	109%	50-150%
	13C8-PFOS	80%	115%	50-150%
	13C8-FOSA	63%	109%	30-130%
	d3-MeFOSAA	0% [c]	100%	40-140%
	d5-EtFOSAA	0% [c]	106%	40-140%
	13C2-4:2FTS	74%	103%	50-150%
	13C2-6:2FTS	81%	97%	50-150%
	13C2-8:2FTS	0% [c]	89%	50-150%

(a) Dilution required (ID recovery standard failure).
(b) Result is from Run# 2
(c) Outside control limits.

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Certification Exceptions
- Chain of Custody

Parameter Certification Exceptions

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

The following parameters included in this report are exceptions to NELAC certification.
The certification status of each is indicated below.

Parameter	CAS#	Method	Mat	Certification Status
4:2 Fluorotelomer sulfonate	757124-72-4	EPA 537M BY ID	AQ	Certified by SOP MS014
6:2 Fluorotelomer sulfonate	27619-97-2	EPA 537M BY ID	AQ	Certified by SOP MS014
8:2 Fluorotelomer sulfonate	39108-34-4	EPA 537M BY ID	AQ	Certified by SOP MS014
EtFOSAA	2991-50-6	EPA 537M BY ID	AQ	Certified by SOP MS014
MeFOSAA	2355-31-9	EPA 537M BY ID	AQ	Certified by SOP MS014
PFOSA	754-91-6	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorobutanesulfonic acid	375-73-5	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorobutanoic acid	375-22-4	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorodecanesulfonic acid	335-77-3	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorodecanoic acid	335-76-2	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorododecanoic acid	307-55-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoroheptanesulfonic acid	375-92-8	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoroheptanoic acid	375-85-9	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorohexanesulfonic acid	355-46-4	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorohexanoic acid	307-24-4	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorononanesulfonic acid	68259-12-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorononanoic acid	375-95-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorooctanesulfonic acid	1763-23-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorooctanoic acid	335-67-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoropentanesulfonic acid	2706-91-4	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoropentanoic acid	2706-90-3	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorotetradecanoic acid	376-06-7	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorotridecanoic acid	72629-94-8	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoroundecanoic acid	2058-94-8	EPA 537M BY ID	AQ	Certified by SOP MS014

SGS North America Inc.
CHAIN OF CUSTODY RECORD

FC8820

Locations Nationwide
Alaska Florida
New Jersey Colorado
Texas North Carolina
Virginia Louisiana
www.us.sgs.com

CLIENT:	SGS North America Inc. - Alaska Division	SGS Reference:	**SGS Orlando, FL**
CONTACT:	Justin Nelson	PHONE NO: (907) 562-2343	Additional Comments: All soils report out in dry weight unless
PROJECT NAME:	1234232	PWSID#:	
		NPDL#:	
REPORTS TO:	Justin.Nelson	E-MAIL: Justin.Nelson@sgs.com; Env.Alaska.RefLabTeam@sgs.com	
INVOICE TO:	SGS - Alaska; env.alaska.accounting@sgs.com	QUOTE #:	
		P.O. #: 1234232	

Page 1 of 1

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HHMM	MATRIX/ MATRIX CODE	# CONTAINERS	Preservative Used: TYPE C = COMP G = GRAB MI = Multi Incremental Soils	HCl Light Gases by RSK-175	NONE 537M PFAS List 24			MS	MSD	SGS lab #	Location ID
1	23DPS-MW11R-GW	08/08/2023	12:15:00	Water	1		X						1234232001	MW-11R
2	23DPS-MW11R-GWA	08/08/2023	12:15:00	Water	1		X						1234232002	MW-11R
3	23HFS-MW30R-GW	08/08/2023	07:55:00	Water	1		X						1234232003	MW-30R
4	23DPS-MW34R-GW	08/09/2023	11:35:00	Water	1		X						1234232004	MW-34R
5	23DPS-01W	08/09/2023	12:30:00	Water	1			X					1234232010	DPS-01W

INITIAL ASSESSMENT

Relinquished By: (1)	Date 8/15	Time 11am	Received By:
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received For Laboratory By: 1000 08/16/23

DOD Project? LABEL VERIFICATION
Report to DL (J Flags)? If J- Report as DL/LOD/LOQ. YES
Data Deliverable Requirements: Level 2 + SGS EDD
Cooler ID:
Requested Turnaround Time and-or Special Instructions:
Temp Blank °C: 4.0 IR #1 or Ambient [ ]
Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

[X 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557
http://www.sgs.com/terms_and_conditions.htm

REVIEWED CJW

F088_COC_REF_LAB_20190411

FC8820: Chain of Custody
Page 1 of 2

SGS Sample Receipt Summary

Job Number: fc8820 **Client:** SGS ALASKA **Project:** 1234232

Date / Time Received: 8/16/2023 10:00:00 AM **Delivery Method:** FED EX **Airbill #'s:** N/A

Cooler Temps (Raw Measured) °C: Cooler 1: (4.0);

Cooler Temps (Corrected) °C: Cooler 1: (3.8);

Cooler Information	Y	or	N
1. Custody Seals Present:	☑		☐
2. Custody Seals Intact:	☑		☐
3. Temp criteria achieved:	☑		☐
4. Cooler temp verification:	IR Gun		
5. Cooler media:	Ice (Bag)		

Trip Blank Information	Y	or	N	N/A
1. Trip Blank present / cooler:	☐		☑	☐
2. Trip Blank listed on COC:	☐		☑	☐

	W	or	S	N/A
3. Type of TB Received	☐		☐	☐

Sample Information	Y	or	N	N/A
1. Sample labels present on bottles:	☑		☐	
2. Samples presented properly	☑		☐	
3. Suffiient volume/containers recv'd for analysis	☑		☐	
4. Condition of sample:	Intact			
5. Sample recv'd within HT	☑		☐	
6. Dates/Times/IDs on COC match sample label	☐		☐	
7. VOCs have headspace	☑		☐	☐
8. Bottles received for unspecified tests	☐		☑	
9. Compositing instructions clear	☐		☐	☑
10. Voa Soil Kits/Jars received past 48hrs?	☐		☐	☐
11. % Solids Jar Received?	☐		☐	☐
12. Residual Chlorine Present?	☐		☐	☐

Misc Information

Number of Encores: 25 Gram 5 Gram

Number of Lab Filtered Metals:

Test Strip Lot #s: pH 0-3: _____ pH 10-12: _____ Other: (Specify) _____ _____

Residual Chlorine Test Strip Lot # _____

Comments SAMPLE #3 HAS (1) VIAL HAS HEADSPACE
SAMPLE #4 HAS (2) VIALS HEADSPACE.

SM089-03
Rev. Date 12/7/17

FC8820: Chain of Custody
Page 2 of 2

MS Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP98676-MB	2Q114275.D	1	09/12/23	LR	08/28/23	OP98676	S2Q1620

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FC8820-5

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0020	0.0010	ug/l	
307-24-4	Perfluorohexanoic acid	0.0014	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	ND	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0020	0.0010	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0020	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0020	0.0010	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0020	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0020	ug/l	
2355-31-9	MeFOSAA	ND	0.0040	0.0020	ug/l	
2991-50-6	EtFOSAA	ND	0.0040	0.0020	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	90%	35-135%
	13C5-PFPeA	90%	50-150%
	13C5-PFHxA	92%	50-150%
	13C4-PFHpA	94%	50-150%
	13C8-PFOA	94%	50-150%
	13C9-PFNA	93%	50-150%
	13C6-PFDA	94%	50-150%
	13C7-PFUnDA	91%	40-140%

Method Blank Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP98676-MB	2Q114275.D	1	09/12/23	LR	08/28/23	OP98676	S2Q1620

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FC8820-5

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	84%	40-140%
	13C2-PFTeDA	75%	30-130%
	13C3-PFBS	90%	50-150%
	13C3-PFHxS	91%	50-150%
	13C8-PFOS	92%	50-150%
	13C8-FOSA	92%	30-130%
	d3-MeFOSAA	96%	40-140%
	d5-EtFOSAA	90%	40-140%
	13C2-4:2FTS	85%	50-150%
	13C2-6:2FTS	86%	50-150%
	13C2-8:2FTS	81%	50-150%
	13C3-HFPO-DA	74%	50-150%

Method Blank Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP98676-MB	2Q114355.D	1	09/13/23	LR	08/28/23	OP98676	S2Q1621

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FC8820-5

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0020	0.0010	ug/l	
307-24-4	Perfluorohexanoic acid	0.0013	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	ND	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0020	0.0010	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0020	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0020	0.0010	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0020	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0020	ug/l	
2355-31-9	MeFOSAA	ND	0.0040	0.0020	ug/l	
2991-50-6	EtFOSAA	ND	0.0040	0.0020	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	78%	35-135%
	13C5-PFPeA	78%	50-150%
	13C5-PFHxA	78%	50-150%
	13C4-PFHpA	80%	50-150%
	13C8-PFOA	81%	50-150%
	13C9-PFNA	79%	50-150%
	13C6-PFDA	79%	50-150%
	13C7-PFUnDA	77%	40-140%

Method Blank Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP98676-MB	2Q114355.D	1	09/13/23	LR	08/28/23	OP98676	S2Q1621

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FC8820-5

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	70%	40-140%
	13C2-PFTeDA	60%	30-130%
	13C3-PFBS	77%	50-150%
	13C3-PFHxS	78%	50-150%
	13C8-PFOS	79%	50-150%
	13C8-FOSA	76%	30-130%
	d3-MeFOSAA	81%	40-140%
	d5-EtFOSAA	72%	40-140%
	13C2-4:2FTS	72%	50-150%
	13C2-6:2FTS	71%	50-150%
	13C2-8:2FTS	72%	50-150%
	13C3-HFPO-DA	68%	50-150%

Instrument Blank

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q1621-IBLK	2Q114348.D	1	09/13/23	LR	n/a	n/a	S2Q1621

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

FC8820-5

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0010	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0010	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0010	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.0080	0.0020	ug/l	
2991-50-6	EtFOSAA	ND	0.0080	0.0020	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	88%	50-150%
	13C5-PFPeA	88%	50-150%
	13C5-PFHxA	90%	50-150%
	13C4-PFHpA	92%	50-150%
	13C8-PFOA	90%	50-150%
	13C9-PFNA	90%	50-150%
	13C6-PFDA	90%	50-150%
	13C7-PFUnDA	89%	50-150%

Instrument Blank

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q1621-IBLK	2Q114348.D	1	09/13/23	LR	n/a	n/a	S2Q1621

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

FC8820-5

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	89%	50-150%
	13C2-PFTeDA	89%	50-150%
	13C3-PFBS	90%	50-150%
	13C3-PFHxS	89%	50-150%
	13C8-PFOS	91%	50-150%
	13C8-FOSA	93%	50-150%
	d3-MeFOSAA	93%	50-150%
	d5-EtFOSAA	87%	50-150%
	13C2-4:2FTS	81%	50-150%
	13C2-6:2FTS	82%	50-150%
	13C2-8:2FTS	81%	50-150%

Instrument Blank

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q1620-IBLK	2Q114253.D	1	09/12/23	LR	n/a	n/a	S2Q1620

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

OP98676-BS, OP98676-DUP, OP98676-MS

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0010	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0010	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0010	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.0080	0.0020	ug/l	
2991-50-6	EtFOSAA	ND	0.0080	0.0020	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	93%	50-150%
	13C5-PFPeA	93%	50-150%
	13C5-PFHxA	94%	50-150%
	13C4-PFHpA	96%	50-150%
	13C8-PFOA	95%	50-150%
	13C9-PFNA	95%	50-150%
	13C6-PFDA	95%	50-150%
	13C7-PFUnDA	92%	50-150%

Instrument Blank

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q1620-IBLK	2Q114253.D	1	09/12/23	LR	n/a	n/a	S2Q1620

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

OP98676-BS, OP98676-DUP, OP98676-MS

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	91%	50-150%
	13C2-PFTeDA	93%	50-150%
	13C3-PFBS	94%	50-150%
	13C3-PFHxS	95%	50-150%
	13C8-PFOS	94%	50-150%
	13C8-FOSA	102%	50-150%
	d3-MeFOSA	94%	50-150%
	d3-MeFOSAA	96%	50-150%
	d5-EtFOSAA	97%	50-150%
	13C2-4:2FTS	86%	50-150%
	13C2-6:2FTS	86%	50-150%
	13C2-8:2FTS	85%	50-150%
	13C3-HFPO-DA	94%	50-150%

Blank Spike Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP98676-BS	2Q114274.D	1	09/12/23	LR	08/28/23	OP98676	S2Q1620

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FC8820-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0841	105	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0829	104	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0841	105	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0812	102	70-130
335-67-1	Perfluorooctanoic acid	0.08	0.0829	104	70-130
375-95-1	Perfluorononanoic acid	0.08	0.0818	102	70-130
335-76-2	Perfluorodecanoic acid	0.08	0.0827	103	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0815	102	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0854	107	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0755	94	60-140
376-06-7	Perfluorotetradecanoic acid	0.08	0.0865	108	70-130
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0834	104	70-130
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0846	106	70-130
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0838	105	70-130
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0875	109	70-130
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0797	100	70-130
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0812	102	65-130
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0791	99	60-130
754-91-6	PFOSA	0.08	0.0840	105	70-130
2355-31-9	MeFOSAA	0.08	0.0832	104	70-130
2991-50-6	EtFOSAA	0.08	0.0808	101	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.08	0.0801	100	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.0852	107	70-130
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0809	101	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	100%	35-135%
	13C5-PFPeA	100%	50-150%
	13C5-PFHxA	101%	50-150%
	13C4-PFHpA	102%	50-150%
	13C8-PFOA	102%	50-150%
	13C9-PFNA	103%	50-150%
	13C6-PFDA	103%	50-150%
	13C7-PFUnDA	103%	40-140%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP98676-BS	2Q114274.D	1	09/12/23	LR	08/28/23	OP98676	S2Q1620

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FC8820-5

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	91%	40-140%
	13C2-PFTeDA	81%	30-130%
	13C3-PFBS	99%	50-150%
	13C3-PFHxS	101%	50-150%
	13C8-PFOS	103%	50-150%
	13C8-FOSA	85%	30-130%
	d3-MeFOSAA	97%	40-140%
	d5-EtFOSAA	98%	40-140%
	13C2-4:2FTS	106%	50-150%
	13C2-6:2FTS	101%	50-150%
	13C2-8:2FTS	104%	50-150%
	13C3-HFPO-DA	81%	50-150%

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP98676-MS	2Q114298.D	1	09/13/23	LR	08/28/23	OP98676	S2Q1620
FC8805-1	2Q114297.D	1	09/13/23	LR	08/28/23	OP98676	S2Q1620

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FC8820-5

CAS No.	Compound	FC8805-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
375-22-4	Perfluorobutanoic acid	0.016	U	0.16	0.154	96	70-130
2706-90-3	Perfluoropentanoic acid	0.0080	U	0.16	0.158	99	70-130
307-24-4	Perfluorohexanoic acid	0.0080	U	0.16	0.160	100	70-130
375-85-9	Perfluoroheptanoic acid	0.0080	U	0.16	0.156	98	70-130
335-67-1	Perfluorooctanoic acid	0.0080	U	0.16	0.159	99	70-130
375-95-1	Perfluorononanoic acid	0.0080	U	0.16	0.158	99	70-130
335-76-2	Perfluorodecanoic acid	0.0080	U	0.16	0.154	96	70-130
2058-94-8	Perfluoroundecanoic acid	0.0080	U	0.16	0.155	97	70-130
307-55-1	Perfluorododecanoic acid	0.0080	U	0.16	0.162	101	70-130
72629-94-8	Perfluorotridecanoic acid	0.0080	U	0.16	0.149	93	60-140
376-06-7	Perfluorotetradecanoic acid	0.0080	U	0.16	0.162	101	70-130
375-73-5	Perfluorobutanesulfonic acid	0.0080	U	0.16	0.159	99	70-130
2706-91-4	Perfluoropentanesulfonic acid	0.0080	U	0.16	0.154	96	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0080	U	0.16	0.161	101	70-130
375-92-8	Perfluoroheptanesulfonic acid	0.0080	U	0.16	0.169	106	70-130
1763-23-1	Perfluorooctanesulfonic acid	0.0080	U	0.16	0.155	97	70-130
68259-12-1	Perfluorononanesulfonic acid	0.0080	U	0.16	0.154	96	65-130
335-77-3	Perfluorodecanesulfonic acid	0.0080	U	0.16	0.149	93	60-130
754-91-6	PFOSA	0.0080	U	0.16	0.159	99	70-130
2355-31-9	MeFOSAA	0.016	U	0.16	0.154	96	70-130
2991-50-6	EtFOSAA	0.016	U	0.16	0.151	94	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.016	U	0.16	0.153	96	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.016	U	0.16	0.163	102	70-130
39108-34-4	8:2 Fluorotelomer sulfonate	0.016	U	0.16	0.149	93	70-130

CAS No.	ID Standard Recoveries	MS	FC8805-1	Limits
	13C4-PFBA	98%	90%	35-135%
	13C5-PFPeA	98%	91%	50-150%
	13C5-PFHxA	96%	90%	50-150%
	13C4-PFHpA	96%	91%	50-150%
	13C8-PFOA	98%	95%	50-150%
	13C9-PFNA	97%	92%	50-150%
	13C6-PFDA	98%	91%	50-150%
	13C7-PFUnDA	93%	86%	40-140%

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP98676-MS	2Q114298.D	1	09/13/23	LR	08/28/23	OP98676	S2Q1620
FC8805-1	2Q114297.D	1	09/13/23	LR	08/28/23	OP98676	S2Q1620

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FC8820-5

CAS No.	ID Standard Recoveries	MS	FC8805-1	Limits
	13C2-PFDoDA	88%	84%	40-140%
	13C2-PFTeDA	78%	72%	30-130%
	13C3-PFBS	95%	88%	50-150%
	13C3-PFHxS	93%	88%	50-150%
	13C8-PFOS	93%	87%	50-150%
	13C8-FOSA	72%	72%	30-130%
	d3-MeFOSAA	97%	95%	40-140%
	d5-EtFOSAA	97%	93%	40-140%
	13C2-4:2FTS	99%	81%	50-150%
	13C2-6:2FTS	100%	85%	50-150%
	13C2-8:2FTS	100%	82%	50-150%
	13C3-HFPO-DA	82%		50-150%

* = Outside of Control Limits.

Duplicate Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP98676-DUP	2Q114300.D	1	09/13/23	LR	08/28/23	OP98676	S2Q1620
FC8805-2	2Q114299.D	1	09/13/23	LR	08/28/23	OP98676	S2Q1620

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FC8820-5

CAS No.	Compound	FC8805-2 ug/l	Q	DUP ug/l	Q	RPD	Limits
375-22-4	Perfluorobutanoic acid	0.016 U		ND		nc	30
2706-90-3	Perfluoropentanoic acid	0.0080 U		0.0024	J	200*	30
307-24-4	Perfluorohexanoic acid	0.0080 U		ND		nc	30
375-85-9	Perfluoroheptanoic acid	0.0080 U		ND		nc	30
335-67-1	Perfluorooctanoic acid	0.0080 U		ND		nc	30
375-95-1	Perfluorononanoic acid	0.0080 U		ND		nc	30
335-76-2	Perfluorodecanoic acid	0.0080 U		ND		nc	30
2058-94-8	Perfluoroundecanoic acid	0.0080 U		ND		nc	30
307-55-1	Perfluorododecanoic acid	0.0080 U		ND		nc	30
72629-94-8	Perfluorotridecanoic acid	0.0080 U		ND		nc	30
376-06-7	Perfluorotetradecanoic acid	0.0080 U		ND		nc	30
375-73-5	Perfluorobutanesulfonic acid	0.0080 U		ND		nc	30
2706-91-4	Perfluoropentanesulfonic acid	0.0080 U		ND		nc	30
355-46-4	Perfluorohexanesulfonic acid	0.0080 U		ND		nc	30
375-92-8	Perfluoroheptanesulfonic acid	0.0080 U		ND		nc	30
1763-23-1	Perfluorooctanesulfonic acid	0.0080 U		ND		nc	30
68259-12-1	Perfluorononanesulfonic acid	0.0080 U		ND		nc	30
335-77-3	Perfluorodecanesulfonic acid	0.0080 U		ND		nc	30
754-91-6	PFOSA	0.0080 U		ND		nc	30
2355-31-9	MeFOSAA	0.016 U		ND		nc	30
2991-50-6	EtFOSAA	0.016 U		ND		nc	30
757124-72-4	4:2 Fluorotelomer sulfonate	0.016 U		ND		nc	30
27619-97-2	6:2 Fluorotelomer sulfonate	0.016 U		ND		nc	30
39108-34-4	8:2 Fluorotelomer sulfonate	0.016 U		ND		nc	30

CAS No.	ID Standard Recoveries	DUP	FC8805-2	Limits
	13C4-PFBA	90%	88%	35-135%
	13C5-PFPeA	90%	89%	50-150%
	13C5-PFHxA	90%	88%	50-150%
	13C4-PFHpA	91%	88%	50-150%
	13C8-PFOA	94%	91%	50-150%
	13C9-PFNA	91%	90%	50-150%
	13C6-PFDA	90%	90%	50-150%
	13C7-PFUnDA	87%	89%	40-140%

* = Outside of Control Limits.

Duplicate Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP98676-DUP	2Q114300.D	1	09/13/23	LR	08/28/23	OP98676	S2Q1620
FC8805-2	2Q114299.D	1	09/13/23	LR	08/28/23	OP98676	S2Q1620

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FC8820-5

CAS No.	ID Standard Recoveries	DUP	FC8805-2	Limits
	13C2-PFDoDA	83%	84%	40-140%
	13C2-PFTeDA	72%	81%	30-130%
	13C3-PFBS	87%	88%	50-150%
	13C3-PFHxS	89%	85%	50-150%
	13C8-PFOS	90%	89%	50-150%
	13C8-FOSA	38%	42%	30-130%
	d3-MeFOSAA	90%	93%	40-140%
	d5-EtFOSAA	89%	88%	40-140%
	13C2-4:2FTS	84%	81%	50-150%
	13C2-6:2FTS	89%	86%	50-150%
	13C2-8:2FTS	82%	82%	50-150%
	13C3-HFPO-DA	74%		50-150%

* = Outside of Control Limits.

GC Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GLL2929-MB	LL84419.D	1	08/21/23	SS	n/a	n/a	GLL2929

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

FC8820-1, FC8820-2, FC8820-3, FC8820-4

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.16	ug/l	
74-84-0	Ethane	ND	1.0	0.32	ug/l	
74-85-1	Ethene	ND	1.0	0.43	ug/l	

Method Blank Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GLL2930-MB	LL84451.D	1	08/22/23	SS	n/a	n/a	GLL2930

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

FC8820-1, FC8820-2, FC8820-3

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.16	ug/l	

Blank Spike/Blank Spike Duplicate Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GLL2929-BS	LL84416.D	1	08/21/23	SS	n/a	n/a	GLL2929
GLL2929-BSD	LL84417.D	1	08/21/23	SS	n/a	n/a	GLL2929

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

FC8820-1, FC8820-2, FC8820-3, FC8820-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
74-82-8	Methane	108	105	97	106	98	1	62-139/30
74-84-0	Ethane	219	188	86	187	85	1	67-141/30
74-85-1	Ethene	290	232	80	235	81	1	68-141/30

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GLL2930-BS	LL84448.D	1	08/22/23	SS	n/a	n/a	GLL2930
GLL2930-BSD	LL84449.D	1	08/22/23	SS	n/a	n/a	GLL2930

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

FC8820-1, FC8820-2, FC8820-3

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
74-82-8	Methane	108	116	107	113	105	3	62-139/30

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FC8852-3MS	LL84442.D	25	08/21/23	SS	n/a	n/a	GLL2929
FC8852-3	LL84439.D	1	08/21/23	SS	n/a	n/a	GLL2929
FC8852-3	LL84440.D	25	08/21/23	SS	n/a	n/a	GLL2929

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

FC8820-1, FC8820-2, FC8820-3, FC8820-4

CAS No.	Compound	FC8852-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
74-82-8	Methane	20600 [a]		2700	24300	137	62-139
74-84-0	Ethane	2240 [a]		5480	7510	96	67-141
74-85-1	Ethene	840 [a]		7250	7470	91	68-141

(a) Result is from Run #2.

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FC8738-1MS	LL84465.D	1	08/22/23	SS	n/a	n/a	GLL2930
FC8738-1	LL84457.D	1	08/22/23	SS	n/a	n/a	GLL2930

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

FC8820-1, FC8820-2, FC8820-3

CAS No.	Compound	FC8738-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
74-82-8	Methane	31.7		108	142	102	62-139

* = Outside of Control Limits.

Duplicate Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FC8852-3DUP	LL84441.D	25	08/21/23	SS	n/a	n/a	GLL2929
FC8852-3	LL84439.D	1	08/21/23	SS	n/a	n/a	GLL2929
FC8852-3	LL84440.D	25	08/21/23	SS	n/a	n/a	GLL2929

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

FC8820-1, FC8820-2, FC8820-3, FC8820-4

CAS No.	Compound	FC8852-3 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	20600 [a]		23800		14	30
74-84-0	Ethane	2240 [a]		2560		13	30
74-85-1	Ethene	840 [a]		920		9	30

(a) Result is from Run #2.

* = Outside of Control Limits.

Duplicate Summary

Job Number: FC8820
Account: SGSAKA SGS North America, Inc
Project: 1234232

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
FC8738-1DUP	LL84464.D	1	08/22/23	SS	n/a	n/a	GLL2930
FC8738-1	LL84457.D	1	08/22/23	SS	n/a	n/a	GLL2930

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

FC8820-1, FC8820-2, FC8820-3

CAS No.	Compound	FC8738-1 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	31.7		32.5		2	30

* = Outside of Control Limits.

APPENDIX F
Human Health CSM Scoping and Graphic Forms

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: FIA - Drainage Pond - ADEC File: 100.38.188 Hazard ID: 1923

Completed By: Karri Sicard - Jacobs Engineering

Date Completed: 11/22/2023

***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	F			
	☑ Dermal Absorption of Contaminants from Soil		C/F	C/F	F			
	☑ Inhalation of Fugitive Dust		C/F	C/F	F			
☑ groundwater	☑ Ingestion of Groundwater		F	F	F			
	☑ Dermal Absorption of Contaminants in Groundwater		F	F	F			
	☐ Inhalation of Volatile Compounds in Tap Water							
☑ air	☑ Inhalation of Outdoor Air		C/F	C/F	F			
	☐ Inhalation of Indoor Air							
	☑ Inhalation of Fugitive Dust		F	F	F			
☐ surface water	☐ Ingestion of Surface Water							
	☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Inhalation of Volatile Compounds in Tap Water							
☐ sediment	☐ Direct Contact with Sediment							
☑ biota	☐ Ingestion of Wild or Farmed Foods							

Revised, 10/01/2010

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

Site Name: FIA - Drainage Pond

File Number: ADEC File: 100.38.188 Hazard ID: 1923

Completed by: Karri Sicard, Jacobs Engineering

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: Unconfirmed source of chlorinated solvents.

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

- ☒ Spills
- ☒ Leaks
- ☐ Direct discharge
- ☐ Burning
- ☒ Other: Chlorinated solvents from unknown source.

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:

* 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:

This site is located in an industrial area near the airport primarily restricted to foot traffic of site visitors or workers. The area has no development planned for the foreseeable future for residential land use, recreational areas, or subsistence activities.

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: Incomplete

Comments:

Based on results from the 2010 Oasis study, concentrations of benzene, PCE, TCE, cis-DCE and VC exceeded Table B1. Method Two Migration to Groundwater (GW) levels and 1/10 Human Health (HH) Cleanup Levels (CULs) for the Under 40-inch Zone at depth between 0 and 15 feet below ground surface. However, these contaminants are not listed in Appendix B.

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 ground-water 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:

2023 results indicate contaminant concentrations greater than 1/10 ADEC 18 AAC 75 Table C GW HH CULs. Groundwater is currently not used for drinking water and area-wide contamination widely known by ADEC should prohibit future use as such. However, ADEC has not made a formal determination under 18 AAC 75.350 that it is not a current or reasonably expected future drinking water source.

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:

No surface water bodies are present at the former Drainage Pond site nor is migration to surface water documented or predicted.

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: Incomplete

Comments:

Trees and shrubs are present, but the small lot size and its proximity to the road prohibits the biota from providing habitat for animals. The site is not used for hunting or harvesting.

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:

Volatile contaminants of concern (from Appendix D) that have been found in soil between 0 and 15 feet below ground surface include: benzene, PCE, TCE, cis-DCE, and VC.

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:

No buildings are currently located within the identified Drainage Pond contaminant plume. There is a chance commercial buildings could be built here in the future, but it is not reasonably expected; therefore this pathway is considered incomplete. Volatile chemicals of concern (from Appendix D) in groundwater and surface soil at this site are: benzene, PCE, TCE, cis-DCE, trans-DCE, and VC.

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:

Groundwater depth is approximately 10-feet below ground surface. Exposure during construction activities during the summer is possible but not likely. No construction is currently planned for the site.
There is no surface water body and no wells are used for household purposes.

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:

Exposure to groundwater is considered for a future scenario only since no drinking water wells currently exist and this is in a commercial area and not a residential zone.
Development of new water wells for drinking or household purposes is unlikely given the known groundwater contamination status of the region.

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:

Site is covered in grass, shrubs, trees, and asphalt. Fugitive dust is possible during construction, but no construction is currently planned on the site.

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:

There is no sediment at this site because no surface water is present and vegetation and asphalt cover the site.

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

APPENDIX G
ADEC Transport, Treatment, and Disposal Approval Form for Contaminated Media

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites and Prevention Preparedness and Response Programs

Contaminated Media Transport and Treatment or Disposal Approval Form

HAZARD ID # or SPILL ID #	NAME OF CONTAMINATED SITE OR SPILL	
1923	FIA - Drainage Pond	
CONTAMINATED SITE OR SPILL LOCATION – ADDRESS OR OTHER APPROPRIATE DESCRIPTION		
5250 Airport Industrial Road, Fairbanks Alaska 99709		
CURRENT PHYSICAL LOCATION OF MEDIA	**SOURCE OF THE CONTAMINATION (DAY TANK, FIRE TRAINING PIT, LUST, ETC.)**	
FIA storage facility (Building 50)	Unknown solvent source at former drainage pond	
CONTAMINANTS OF CONCERN	**ESTIMATED VOLUME**	**DATE(S) GENERATED**
PCE, TCE, cisDCE, transDCE, vinyl chloride, PFOA, PFOS	approx. 10 gals	August 8 - 9, 2023
POST TREATMENT ANALYSIS REQUIRED *(such as GRO, DRO, RRO, VOCs, metals, PFAS, and/or Chlorinated Solvents)*		
N/A Per US Ecology Alaska discharge permit		
COMMENTS OR OTHER IMPORTANT INFORMATION		
Waste characterization completed (attached). Sample ID: 23DPS-01W		

TREATMENT FACILITY, LANDFILL, AND/OR FINAL DESTINATION OF MEDIA	PHYSICAL ADDRESS/PHONE NUMBER
US Ecology	2020 Viking Dr. Anchorage AK 99501/907-222-5238
RESPONSIBLE PARTY	**ADDRESS/PHONE NUMBER**
FIA ADOT	6450 Airport Way Ste 1 Fairbanks AK 99709/907-474-2598
WASTE MANAGEMENT CO. / ORGANIZER	**ADDRESS/PHONE NUMBER**
US Ecology	1315 Queens Way, Fairbanks AK 99701/907-328-7025

***Note, disposal of polluted soil in a landfill requires prior approval from the landfill operator and ADEC Solid Waste Program.**

Jake Matter
Name of the Person Requesting Approval (printed)

FIA Environmental Manager
Title/Association

Jacob Matter
Signature

2/5/24
Date

907-474-2598
Phone Number

----------DEC USE ONLY----------

Based on the information provided, ADEC approves transport of the above mentioned material. The Responsible Party or their consultant must submit to the DEC Project Manager a copy of weight receipts of the loads transported and a post treatment analytical report, if disposed of at an approved treatment facility. The contaminated soil shall be transported as a covered load in compliance with 18 AAC 60.015.

Rebekah Reams
DEC Project Manager Name (printed)

Rebekah Reams
Digitally signed by Rebekah Reams
Date: 2024.02.06 15:42:47 -09'00'
Signature

Environmental Program Specialist
Project Manager Title

2/6/2024
Date

907-451-2144
Phone Number

Appendix G: IDW Table

Drainage Pond 2023 IDW Analytical Results

			Location ID:		DPS-01W	DPS-TB01
			Sample ID:		23DPS-01W	23-DPS-TB01
			Lab Sample ID:		1234232010/FC8820-5	1234232011
			SDG:		1234232/FC8820	1234232
			Sample Date/Time:		08/09/2023 12:30	08/08/2023 08:00
			QA/QC:		Primary Sample	Trip Blank
CAS Number	**Method**	**Analyte**	**Screening Level[1] (ug/L)**	**TCLP Action Level[2] (ug/L)**	**Result (ug/L)**	**Result (ug/L)**
71-43-2	SW8260D	Benzene	**4.6**	500	0.38 [0.2] J,JP-	ND [0.2]
156-59-2	SW8260D	cis-DCE	**36**	-	**45.8 [0.5] B,JP-**	ND [0.5]
127-18-4	SW8260D	PCE	**41**	700	1.04 [0.5] JP-	ND [0.5]
79-01-6	SW8260D	TCE	**2.8**	500	1.44 [0.25] JP-	ND [0.25]
156-60-5	SW8260D	trans-DCE	**360**	-	0.59 [0.5] J,JP-	ND [0.5]
75-01-4	SW8260D	VC	**0.19**	200	ND [0.075] JP-	ND [0.075]
757124-72-4	EPA 537M BY ID	4:2 Fluorotelomer sulfonate	-	-	ND [0.045]	-
27619-97-2	EPA 537M BY ID	6:2 Fluorotelomer sulfonate	-	-	ND [0.045]	-
39108-34-4	EPA 537M BY ID	8:2 Fluorotelomer sulfonate	-	-	ND [0.23]	-
2991-50-6	EPA 537M BY ID	EtFOSAA	-	-	ND [0.23]	-
2355-31-9	EPA 537M BY ID	MeFOSAA	-	-	ND [0.23]	-
335-77-3	EPA 537M BY ID	Perfluorodecanesulfonic acid	-	-	ND [0.11]	-
68259-12-1	EPA 537M BY ID	Perfluorononanesulfonic acid	-	-	ND [0.023]	-
2706-91-4	EPA 537M BY ID	Perfluoropentanesulfonic acid	-	-	0.15 [0.023]	-
2706-90-3	EPA 537M BY ID	Perfluoropentanoic acid	-	-	0.0727 [0.023]	-
376-06-7	EPA 537M BY ID	Perfluorotetradecanoic acid	-	-	ND [0.023]	-
72629-94-8	EPA 537M BY ID	Perfluorotridecanoic acid	-	-	ND [0.11]	-
375-22-4	EPA 537M BY ID	PFBA	-	-	0.0719 [0.045] J	-
375-73-5	EPA 537M BY ID	PFBS	-	-	0.221 [0.023]	-
335-76-2	EPA 537M BY ID	PFDA	-	-	ND [0.11]	-
307-55-1	EPA 537M BY ID	PFDoA	-	-	ND [0.11]	-
375-85-9	EPA 537M BY ID	PFHpA	-	-	0.252 [0.023]	-
375-92-8	EPA 537M BY ID	PFHPS	-	-	0.078 [0.023]	-
307-24-4	EPA 537M BY ID	PFHxA	-	-	0.222 [0.023] B	-
355-46-4	EPA 537M BY ID	PFHxS	-	-	0.894 [0.023]	-
375-95-1	EPA 537M BY ID	PFNA	-	-	1.17 [0.023]	-
335-67-1	EPA 537M BY ID	PFOA	**0.4**	-	0.274 [0.023]	-
1763-23-1	EPA 537M BY ID	PFOS	**0.4**	-	**2.63 [0.023]**	-
754-91-6	EPA 537M BY ID	PFOSA	-		ND [0.045]	-
2058-94-8	EPA 537M BY ID	PFUnA	-		ND [0.11]	-

Notes:

[1] 18 AAC 75. Table C Groundwater Human Health Cleanup Levels (ADEC 2023)

[2] 40 CFR 261, Appendix II, 1993 ed., as amended by 58 FR 46040, August 31, 1993.

bold = exceeds PSL

- = not analyzed or not applicable

[ ] = limit of detection (LOD)

ug/L = micrograms per liter

B = The analyte was detected in the method blank, trip blank and/or equipment blank and the sample concentration did not exceed the blank concentration by a factor of 10.

J = The result is an estimated value because it is less than the limit of quantitation.

JP- = The result was considered an estimated value because incorrect or inadequate preservation methods were used.

ND = nondetect

PSL = project screening level

SDG = sample delivery group

QA/QC = quality assurance/quality control

APPENDIX H
ADEC Response Letter and Response to Comments

THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Environmental Conservation

SPILL PREVENTION & RESPONSE
Contaminated Sites Program

P.O. Box 1535
Haines, Alaska 99827
Main: 907.451.2144
www.dec.alaska.gov

File: 100.38.188

January 17, 2024

Fairbanks International Airport
ATTN: Jake Matter
6450 Airport Way, Suite 1
Fairbanks, AK 99709

RE: FIA – Drainage Pond

Dear Mr. Matter:

The Alaska Department of Environmental Conservation (DEC) has reviewed the *2023 Drainage Pond Groundwater Monitoring Report* submitted on December 26, 2023. This report documents groundwater sampling conducted in August 2023 at monitoring wells MW-11R, MW-34, MW-38S, MW-38D, MW-39, and MW-40 and the evaluation of monitored natural attenuation (MNA) parameters at the site.

The DEC concurs with the recommendations outlined in Section 8 of the report to continue biennial groundwater monitoring, evaluate the presence of ethylene to better assess the dechlorination process occurring at the site, and expand the well network where MNA parameters are evaluated to provide a better understanding of site conditions. In addition to these recommendations, please note the outstanding requests for site characterization that are summarized below:

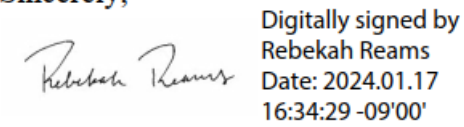
- Based on the groundwater cleanup level exceedances observed at monitoring wells MW-38S, MW-39, MW-40, and MW-11R, DEC does not consider the extent of the groundwater plume to be fully delineated. Additional groundwater monitoring wells should be installed to fully delineate the extent of the plume and to monitor contaminant trends.

- Current soil analytical data available for the site indicates that the extent of soil contamination has not been fully defined. Additional site characterization should be completed to address this data gap and may help determine whether there is an ongoing source of contamination at this site.

Please submit a work plan that details the next biennial groundwater sampling event and proposes additional site characterization efforts to address remaining data gaps at the site.

Do not hesitate to contact me at (907) 451-2144 or rebekah.reams@alaska.gov if you have any questions or concerns regarding the contents of this letter or if you would like the discuss the path forward at this site.

Sincerely,



Rebekah Reams
Environmental Program Specialist

cc (via email): Angie Spear, FIA
Robert Burgess, DEC
Guy Wade, Jacobs
Karii Sicard, Jacobs

DEC Comments to *2023 Drainage Pond Groundwater Monitoring Report*

ADEC File: 100.38.188 Hazard ID: 1923

Reviewer: Rebekah Reams, Alaska Department of Environmental Conservation, Contaminated Sites Program

Response to comments by Jacobs, on behalf of ADOT & PF Fairbanks International Airport; February 14, 2024

Comment	Pg.	Section	Comment / Recommendations	Response
1.	--	General	"Based on the groundwater cleanup level exceedances observed at monitoring wells MW-38S, MW-39, MW-40, and MW-11R, DEC does not consider the extent of the groundwater plume to be fully delineated. Additional groundwater monitoring wells should be installed to fully delineate the extent of the plume and to monitor contaminant trends."	Accepted; ADEC and FIA discussed drilling and installing additional wells, some temporary well points, to provide more confidence that the extent of the groundwater contamination is defined (especially to the north of MW-38S, MW-11R, MW-39, and former TW-3, and to the south of MW-40 and MW-39). The well locations will also be chosen to determine if contamination is confined to the lot boundary, and to pinpoint where a permanent well may be needed for ongoing monitoring. ADEC agreed that MW-34 has had non-detect results since 2003 and can be removed from the upcoming monitoring plan.
2.	--	General	"Current soil analytical data available for the site indicates that the extent of soil contamination has not been fully defined. Additional site characterization should be completed to address this data gap and may help determine whether there is an ongoing source of contamination at this site."	Accepted; the extent of soil contamination was not fully delineated. ADEC and FAI discussed advancing four step-out borings to define the extent of contamination, and ADEC recommended completing additional soil investigation in the vicinity of MW-38 to evaluate current concentrations in soil, assess attenuation, and help determine if there is a potential source in this area (buried asphalt was identified here in the 2011 SC Report).
3.	--	General	"Please submit a work plan that details the next biennial groundwater sampling event and proposes additional site characterization efforts to address remaining data gaps at the site."	Accepted; FIA to submit a work plan addressing these data gaps. ADEC agreed the work can be spaced out over multiple years to account for budget constraints.