

Ms. Amanda Armbruster
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Michigan Department of Environmental Quality
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Bay City, Michigan 48708

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Subject:
PFAS Groundwater Sampling Results - December 2018
RACER Trust Saginaw Malleable Industrial Land and Green Point Landfill
Saginaw, Michigan

ENVIRONMENT

Date:
February 8, 2019

Dear Ms. Armbruster:

Contact:
Scott Clearwater

This memo provides a summary of the analytical results for poly- and perfluorinated alkyl substances (PFAS) from groundwater samples collected on December 18 and 19, 2018 at the Revitalizing Auto Communities Environmental Response (RACER) Trust Saginaw Malleable Industrial Land (SMI) and Green Point Landfill (GPL) properties located in Saginaw, Michigan (the Site, **Figure 1**). The work was completed as per the sampling workplan submitted to MDEQ on November 20, 2018.

Phone:
810.225.1921

Email:
scott.clearwater@arcadis.com

Our ref:
B0064434.2019

Scope of Work

The PFAS sampling plan was submitted in response to the Michigan Department of Environmental Quality (MDEQ) request for PFAS assessment dated November 15, 2018. The sampling plan was approved by MDEQ on December 11, 2018.

The objectives of this sampling effort were to collect groundwater samples from areas of the site and analyze them for the possible presence of PFAS. This sampling event was completed per the sampling plan approved by MDEQ except for minor change in monitoring wells (MWs) noted below:

- Out of the 12 MWs proposed in the plan, MW- 117S1 was not safe to access due to pooled water in the vicinity, MW-118WT was completely submerged under water, and MW-150WT was not found.
- Instead, MW-118S1, MW-183WT and X-9AR were sampled. Sampled locations are shown on **Figure 2**. Field sampling logs are included as **Attachment 1**.

Samples were submitted under chain of custody procedures to SGS Accutest in Orlando, Florida for analysis of the 24 PFAS compounds outlined in the MDEQ PFAS Minimum Laboratory Analyte list (MDEQ, 2018).

Analytical results are discussed in the following sections.

Sample Collection and Analysis

Groundwater samples were collected from twelve monitoring wells near potentially suspect areas (**Figure 2**) and were analyzed for PFAS using Modified 537 (537M) method for non-potable water in compliance with the Department of Defense (DoD) Quality System Manual (QSM) 5.1. Samples were collected in accordance with the Arcadis technical guidance instruction (TGI) following protocol for PFAS-specific sampling.

Prior to sampling, monitoring wells were gauged with an electronic water level indicator graduated at 0.01-foot increments, to measure static groundwater elevations. Based on past annual groundwater monitoring events, the general direction of the sitewide groundwater flow at the water table is toward the southeast in the northern portion of the Site and to the south-southeast in the southern part of the Site, with localized variations as a result of mounding from the landfills and surface-water bodies. Generally, groundwater flow is toward the Saginaw River. Groundwater elevations from this event are summarized in **Table 1**.

Results

The investigation results indicated the following:

- PFAS were detected in all 12 of the groundwater samples collected.
- The drinking water criteria was not exceeded in any sample.
- Only three (B-3R, TW98-111WT, and X-2A) of the groundwater samples analyzed exceeded the groundwater surface water interface criteria (GSI) for Perfluorooctanesulfonic acid (PFOS).
- PFOS also exceeded GSI in the duplicate sample collected at X-2A.

The analytical data is provided in **Table 2** and summarized on **Figure 2**.

The SGS Accutest laboratory report is included as **Attachment 2**.

Data Validation Summary

The analytical results from the 537M-QSM 5.1 and 537M-In-line SPE methods were validated using a Tier II evaluation. The data validation reports are presented in their entirety in **Attachment 3**; however, a summary of the observations is presented below. The Tier II validation process performed on this data package includes a review of holding times, blanks, matrix spikes, laboratory control samples, and Isotope dilution standard recoveries. A review of the data quality indicators (DQIs) is completed, and qualifiers are applied to the data set as appropriate. The Tier II validation is “limited” in that no raw data are evaluated, and only the forms that list the DQIs are reviewed. The following samples/results were qualified but are considered useable:

- TW98-111WT (121818): Perfluorobutanoic acid and PFOSA were qualified as estimated (J/UJ) due to Isotope Dilution Standard recovery deviations.
- B-3R (121818): Perfluorobutanoic acid, Perfluoropentanoic acid and Perfluorooctanoic acid were qualified as estimated (J/UJ) due to field dup relative percent difference (RPD) deviations.
- X-2A_121818: Perfluorobutanoic acid was qualified as estimated (J) due to Isotope Dilution Standard recovery deviations.
- DUP-01_121818: Perfluorobutanoic acid, Perfluoropentanoic acid and Perfluorooctanoic acid were qualified as estimated (J/UJ) due to field dup RPD deviations.

Additionally, the original lab report included isotope dilution standard recoveries less than 10 percent for sample TW98-111WT (Lab ID: FA60391-4), which would have resulted in rejecting associated ND compounds. When the lab was contacted to confirm the results were reported correctly, they found an error in how the sample results were processed and reported. The lab analyst indicated that in reviewing the lab packages an error was identified due to the matrix in one sample. The lab report was revised as a result. This dataset is accurate in accordance with Tier II lab report package quality control measures.

Consideration of additional sampling will follow assessment of these results and consultation with MDEQ.

Please contact me at 810-225-1921 or David Favero with RACER if you have any questions regarding the enclosed report or its attachments.

Sincerely,

Arcadis of Michigan, LLC



Scott Clearwater
Certified Project Manager

Enclosures:

Tables

- 1 Summary of Water Elevation Table
- 2 Analytical Data Summary Table

Figures

- 1 Site Location Map
- 2 PFAS Sample Locations and Analytical Results

Attachments

- 1 Field Sampling Logs
- 2 Laboratory Analytical Reports
- 3 Data Validation Report

TABLES



RACER Saginaw Malleable
PFAS Groundwater Elevation Summary Table
Saginaw, Michigan
Table 1

Well ID	Date	Screen Interval	Reference Elevation (feet AMSL)	Measured Depth to Water (feet)	Groundwater Elevation (feet AMSL)
B-3R	12/18/2018	16-26	609.51	7.80	601.71
MW-108WT	12/18/2018	2.5-7.5	590.53	8.84	581.69
MW-118S1	12/18/2018	23.5-28.5	583.28	0.30	582.98
MW-131WT	12/18/2018	2-12	592.56	5.23	587.33
MW-134WT	12/18/2018	4-9	594.02	6.70	587.32
MW-183WT	12/19/2018	6-16	588.77	7.55	581.22
MW97-105WT	12/18/2018	4-14	595.42	9.18	586.24
TW98-111WT	12/18/2018	9-19	595.25	7.27	587.98
QPTW-13R	12/18/2018	4-14	594.04	4.65	589.39
X-2A (Dup-01)	12/18/2018	8.6-11.6	593.12	4.04	589.08
X-9AR	12/19/2018	3-13	586.95	4.89	582.06
X-10AR2	12/18/2018	6-16	594.67	3.35	591.32

Notes:

- Elevations are shown in feet above mean sea level (AMSL) relative to the NGVD datum of 1929.
- Depth to water measurements were taken from the top of well casing.

RACER Saginaw Malleable
PFAS Groundwater Analytical Summary Table
Saginaw, Michigan
Table 2

Analyte	CAS Number	Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Sample ID Sample Date Screen Int. (ft) Units	B-3R 12/18/2018 16-26	MW-108WT 12/18/2018 2.5-7.5	MW-118S1 12/18/2018 23.5-28.5	MW-131WT 12/18/2018 2-12	MW-134WT 12/18/2018 4-9	MW-183WT 12/19/2018 6-16	MW97-105WT 12/18/2018 4-14	TW98-111WT 12/18/2018 9-19	QPTW-13R 12/18/2018 4-14	X-2A 12/18/2018 8.6-11.6	X-9AR 12/19/2018 3-13	X-10AR2 12/18/2018 6-16
Poly- and Perfluorinated Compounds																
Perfluorobutanoic acid (PFBA)	375-22-4	--	--	µg/L	0.0023 J	0.00302 J	0.00971	0.00414 J	0.00564 J	0.0114	0.0657	0.0399	0.017	0.0341 [0.0263]	0.00598 J	< 0.004
Perfluoropentanoic acid (PFPeA)	2706-90-3	--	--	µg/L	0.00168 J	0.00177 J	0.00437	0.00224 J	0.00354 J	< 0.002	0.0208	< 0.002	0.0164	0.0181 [0.0144]	< 0.002	< 0.002
Perfluorohexanoic acid (PFHxA)	307-24-4	--	--	µg/L	0.00126 J	< 0.002	0.00177 J	0.00114 J	0.00166 J	< 0.002	0.0335	0.00210 J	0.00291 J	0.00646 [0.00532]	< 0.002	< 0.002
Perfluoroheptanoic acid (PFHpA)	375-85-9	--	--	µg/L	< 0.002	< 0.002	0.00193 J	0.0012 J	0.00128 J	< 0.002	0.0175	< 0.002	< 0.002	0.00493 [0.00515]	< 0.002	< 0.002
Perfluorooctanoic acid (PFOA)	335-67-1	--	12	µg/L	0.00558	0.00366 J	0.00195 J	0.00238 J	0.003 J	0.00207 J	0.0221	0.00636	0.00838	0.0506 [0.0465]	< 0.002	0.00213 J
Perfluorononanoic acid (PFNA)	375-95-1	--	--	µg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Perfluorodecanoic acid (PFDA)	335-76-2	--	--	µg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Perfluoroundecanoic acid (PFUnA)	2058-94-8	--	--	µg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Perfluorododecanoic acid (PFDoA)	307-55-1	--	--	µg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Perfluorotridecanoic acid (PFTriA)	72629-94-8	--	--	µg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Perfluorotetradecanoic acid (PFTeA)	376-06-7	--	--	µg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Perfluorobutanesulfonic acid (PFBS)	375-73-5	--	--	µg/L	< 0.002	< 0.002	< 0.002	0.00172 J	0.00199 J	0.00166 J	0.00929	< 0.002	0.00354 J	< 0.002	< 0.002	< 0.002
Perfluoropentanesulfonic acid (PFPeS)	2706-91-4	--	--	µg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	--	--	µg/L	0.00113 J	0.00192 J	< 0.002	0.00421	< 0.002	0.0015 J	0.00412	0.00476	0.00192 J	0.00773 [0.00589]	< 0.002	< 0.002
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8	--	--	µg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	--	0.012	µg/L	0.0156	0.00263 J	< 0.004	0.00488 J	< 0.004	< 0.004	0.0097	0.0180	0.00847	0.0165 [0.0146]	< 0.004	< 0.004
Combined PFOS and PFOA		0.070	--	µg/L	0.02118	0.00629	0.00195 J	0.00726	0.003 J	0.00207 J	0.0318	0.0244	0.01685	0.0611	< 0.006	0.00213 J
Perfluorononanesulfonic acid (PFNS)	68259-12-1	--	--	µg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Perfluorodecanesulfonic acid (PFDS)	335-77-3	--	--	µg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Perfluorooctane Sulfonamide (FOSA)	754-91-6	--	--	µg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
2-(N-Methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA)	2355-31-9	--	--	µg/L	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
2-(N-Ethyl-perfluorooctane sulfonamido) acetic acid (EtFOSAA)	2991-50-6	--	--	µg/L	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
4:2 Fluorotelemer Sulfonate (4:2 FTS)	757124-72-4	--	--	µg/L	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
6:2 Fluorotelemer Sulfonate (6:2 FTS)	27619-97-2	--	--	µg/L	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
8:2 Fluorotelemer Sulfonate (8:2 FTS)	39108-34-4	--	--	µg/L	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.008	< 0.004	< 0.004	< 0.004	< 0.004

Notes:

All values are in micrograms per liter (µg/L).

Bold result denotes detection is above the MDEQ Part 201 Generic Cleanup Criteria.

For combined PFOS and PFOA, detections of PFOA and PFOS were summed. If only one of the two analytes was detected, that result is provided as a detection. If both were not detected, the limits of quantitation are summed and the result is a non-detect.

< = not detected at the level of detection.

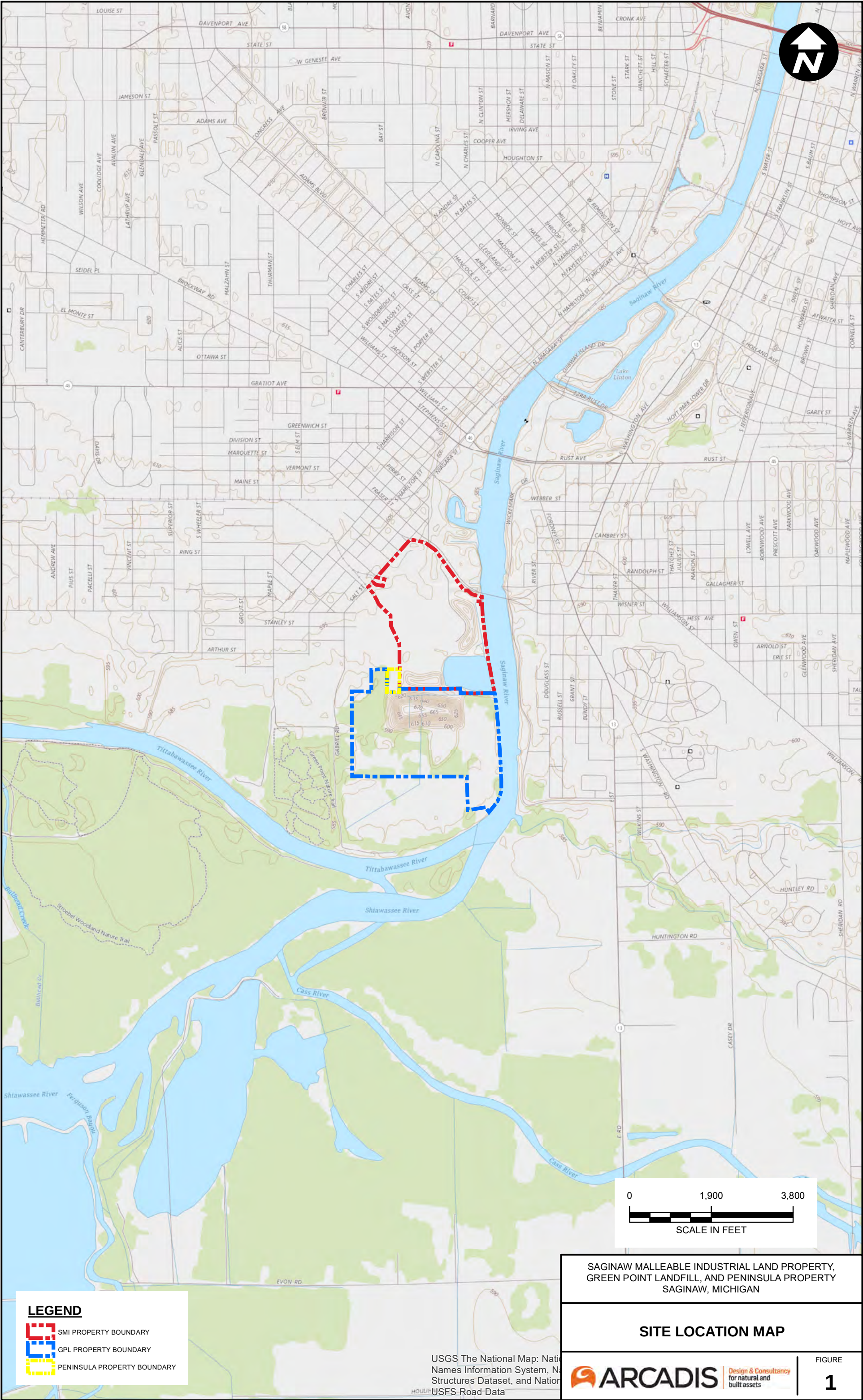
J = estimated value between the limit of quantitation and the method detection limit.

[] = duplicate sample detections

FIGURES



CITY: Novi DIV: ENV DB: TRY PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl G:\COMMONRACER\Saginaw\64434 - SMI (10030) Main Location\GIS\Docs\Non-Res Summary Report\FIG 1 - Site Location Map.mxd PLOTTED: 2/2018 3:22:12 PM BY: doleva



CITY: Novi DIV: ENV DB: TRY PIC: PM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl G:\COMMONRACER\Saginaw\64434 - SMI (10030) Main Location\GIS\Docs\PFAS Sampling Results.mxd PLOTTED: 1/22/2019 1:53:56 PM BY: dolexa



TW98-111WT	Concentration
PFOA	0.00636
PFOS	0.018
PFOS + PFOA	0.02436
Other Detections	0.04676

MW97-105WT	Concentration
PFOA	0.0221
PFOS	0.0097
PFOS + PFOA	0.0318
Other Detections	0.15091

QPTW-13R	Concentration
PFOA	0.00838
PFOS	0.00847
PFOS + PFOA	0.01685
Other Detections	0.04177

MW-134WT	Concentration
PFOA	0.003 J
PFOS	<0.004
PFOS + PFOA	0.003 J
Other Detections	0.01411

MW-108WT	Concentration
PFOA	0.00366 J
PFOS	0.00263 J
PFOS + PFOA	0.00629
Other Detections	0.00671

MW-131WT	Concentration
PFOA	0.00238 J
PFOS	0.00488 J
PFOS + PFOA	0.00726
Other Detections	0.01465

B-3R	Concentration
PFOA	0.00558
PFOS	0.0156
PFOS + PFOA	0.02118
Other Detections	0.00637

X-2A	Concentration
PFOA	0.0506 [0.0465]
PFOS	0.0165 [0.0146]
PFOS + PFOA	0.0671 [0.0611]
Other Detections	0.07132 [0.06197]

X-10AR2	Concentration
PFOA	0.00213 J
PFOS	<0.004
PFOS + PFOA	0.00213 J
Other Detections	ND

MW-183WT	Concentration
PFOA	0.00207 J
PFOS	<0.004
PFOS + PFOA	0.00207 J
Other Detections	0.01456

MW-118S1	Concentration
PFOA	0.00195 J
PFOS	<0.004
PFOS + PFOA	0.00195 J
Other Detections	0.01778

X-9AR	Concentration
PFOA	<0.002
PFOS	<0.004
PFOS + PFOA	<0.006
Other Detections	0.00598

LEGEND

- GSI CRITERIA EXCEEDANCE
- DW CRITERIA EXCEEDANCE
- ▲ WELL SAMPLED FOR PFAS
- ▲ MONITORING WELL LOCATION
- ▲ WELL COULD NOT BE LOCATED
- SMI PROPERTY BOUNDARY
- GPL PROPERTY BOUNDARY
- PENINSULA PROPERTY BOUNDARY

NOTES:

ANALYTICAL RESULTS IN BRACKETS REPRESENT DUPLICATE SAMPLE DATA.

PFOS CRITERIA (GSI): 0.012 µg/L
PFOA CRITERIA (GSI): 12 µg/L
PFOS + PFOA CRITERIA (DW): 0.070 µg/L

PFOS: PERFLUOROOCTANESULFONIC ACID
PFOA: PERFLUOROOCTANOIC ACID
GSI: GROUNDWATER SURFAE WATER INTERFACE
DW: DRINKING WATER
µg/L: MICROGRAMS PER LITER



SAGINAW MALLEABLE INDUSTRIAL LAND PROPERTY,
GREEN POINT LANDFILL, AND PENINSULA PROPERTY
SAGINAW, MICHIGAN

PFAS SAMPLING RESULTS
DECEMBER 2018



FIGURE

2

ATTACHMENTS



ATTACHMENT 1

GROUNDWATER SAMPLING LOGS



ARCADIS

Water Sampling Log

Project Racer Saginaw Life Remodeled Durfee Middle School Project No. B0064434.2018 PROBONOS MALL 0005 Page 1 of 2
 Site Location Saginaw MI Date 5/3/2018 12/18/18
 Site/Well No. B-3R Replicate No. _____ Code No. _____
 Weather 32°F / Sunny Sampling Time: Begin 1705 End 1710

Evacuation Data

Measuring Point Top
 MP Elevation (ft) -
 Land Surface Elevation (ft) -
 Sounded Well Depth (ft bmp) 18.59
 Depth to Water (ft bmp) 7.80
 Water-Level Elevation (ft) -
 Water Column in Well (ft) 10.79
 Casing Diameter/Type 2" pvc
 Gallons in Well 1.72
 Gallons Pumped/Bailed Prior to Sampling ~~1.72~~ 0.6
 Sample Pump Intake Setting (ft bmp) _____
 Purge Time begin 1630 end 1705
 Pumping Rate (ml/min) 150 ml/min
 Evacuation Method peristaltic pump

Field Parameters

Temperature (°C) 7.6
 SpC (mS/cm) 0.010
 CND (mS/cm) 0.007
 Dissolved Oxygen (%) 2.0
 Dissolved Oxygen (mg/L) 0.21
 pH (s.u.) 8.04
 ORP (mV) -145.6
 Turbidity (NTU) 20.4
 Color None
 Odor None
 Appearance clear
 Sampling Method Low Flow Grab
 Remarks _____

Constituents Sampled	Container Description	Number	Preservative
<u>Lead</u> <u>PFAS</u>	<u>250 ml plastic</u>	<u>2</u>	<u>None</u>
<u>Copper</u>			
<u>Total Bacteria</u>			

Sampling Personnel DR

Well Casing Volumes

Gal./Ft.	0.5" = 0.01	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1" = 0.04	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 0.50	6" = 1.47

bmp	Below measuring point	mL	Milliliter	NTU	Nephelometric turbidity units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	Feet	msl	Mean sea level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not recorded	VOC	Volatile organic compounds

YSI/LOW FLOW SAMPLING LOG

PAGE 2 OF 2

WELL: B-3R (12/18/84)

PROJ #: B0064434.2018

DATE: 12/18/18

LOC: NA

Document #ENFM005, Revision 03

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Water Sampling Log

Project RACON SAGINAW Project No. 80064434.2018 Page 1 of 2
 Site Location SAGINAW, MI Date 12-18-18
 Site/Well No. MW-108 WT Replicate No. _____ Code No. _____
 Weather P.CLOUDY, 30's Sampling Time: Begin 17:10 End 17:15

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) N/A
 Land Surface Elevation (ft) N/A
 Sounded Well Depth (ft bmp) 10.40
 Depth to Water (ft bmp) 8.84
 Water-Level Elevation (ft) N/A
 Water Column in Well (ft) 1.56
 Casing Diameter/Type 2" PVC
 Gallons in Well .25
 Gallons Pumped/Bailed Prior to Sampling .5
 Sample Pump Intake Setting (ft bmp) 10.0
 Purge Time begin 16:45 end 17:10
 Pumping Rate (ml/min) 100
 Evacuation Method PERISTALTIC

Field Parameters

Temperature (°C) 7.3
 SpC (mS/cm) 734
 CND (mS/cm) 488
 Dissolved Oxygen (%) 20.1
 Dissolved Oxygen (mg/L) 2.42
 pH (s.u.) 6.96
 ORP (mV) 17.4
 Turbidity (NTU) 8.31
 Color CLEAN
 Odor NO
 Appearance CLEAN
 Sampling Method LOW FLOW
 Remarks SHUT UP WELL (LOCKED)

Constituents Sampled	Container Description	Number	Preservative
<u>PFAS 24 CONSTITUENTS</u>	<u>250 ml PERISTALTIC</u>	<u>2</u>	<u>TRIZINA</u>

Sampling Personnel Brian CUBBER

Well Casing Volumes

Gal./Ft.	0.5" = 0.01	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1" = 0.04	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 0.50	6" = 1.47

bmp	Below measuring point	mL	Milliliter	NTU	Nephelometric turbidity units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	Feet	msl	Mean sea level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not recorded	VOC	Volatile organic compounds

YSI/LOW FLOW SAMPLING LOG

PAGE 2 OF 2

PROJ #: B0064434.2018

LOC: NA

[illegible]

ARCADIS

Water Sampling Log

Project Racer Saginaw Project No. B0064434.2018 Page 1 of 2
 Site Location Saginaw, MI Date 12/18/2018
 Site/Well No. MW-11852 Replicate No. Code No. NA
 Weather 29°F / overcast Sampling Time: Begin 1120 End 1125

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) NA
 Land Surface Elevation (ft) NA
 Sounded Well Depth (ft bmp) 31.70
 Depth to Water (ft bmp) 0.30
 Water-Level Elevation (ft) NA
 Water Column in Well (ft) 31.40
 Casing Diameter/Type 2" PVC
 Gallons in Well 5.024
 Gallons Pumped/Bailed
 Prior to Sampling 1.5 gal
 Sample Pump Intake
 Setting (ft bmp)
 Purge Time begin 1045 end 1120
 Pumping Rate (ml/min) 200ml/min
 Evacuation Method NA

Field Parameters

Temperature (°C) 4.5
 SpC (mS/cm) 402.7
 CND (mS/cm) 244.8
 Dissolved Oxygen (%) 2.0
 Dissolved Oxygen (mg/L) 0.26
 pH (s.u.) 6.77
 ORP (mV) -10.8
 Turbidity (NTU) 4.68
 Color Nont.
 Odor Nont.
 Appearance clear
 Sampling Method Low Flow
 Remarks

Constituents Sampled	Container Description	Number	Preservative
PFAS 24 Constituents	250 mL Plastic	2	Trizma
Dissolved metals	25ml plastic	2	Nitric (Field Filtered)

Sampling Personnel DRR

Well Casing Volumes

Gal./Ft. 0.5" = 0.01 1-1/4" = 0.06 2" = 0.16 3" = 0.37 4" = 0.65
 1" = 0.04 1-1/2" = 0.09 2-1/2" = 0.26 3-1/2" = 0.50 6" = 1.47

bmp Below measuring point mL Milliliter NTU Nephelometric turbidity units
 °C Degrees Celsius mS/cm Millisiemens per centimeter PVC Polyvinyl chloride
 ft Feet msl Mean sea level s.u. Standard units

YSI/LOW FLOW SAMPLING LOG

PAGE 2 OF 2

WELL: MW-11851

DATE: 12/18/18

[illegible]

ARCADIS

Water Sampling Log

Project Racer Saginaw Project No. B0064434.2018 Page 1 of 2
 Site Location Saginaw, MI Date 12/18/2018
 Site/Well No. MW-131WT Replicate No. Code No. NA
 Weather P. cloudy 30's Sampling Time: Begin 15:20 End 15:25

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) NA
 Land Surface Elevation (ft) NA
 Sounded Well Depth (ft bmp) 14.40
 Depth to Water (ft bmp) 5.23
 Water-Level Elevation (ft) NA
 Water Column in Well (ft) 9.17
 Casing Diameter/Type 2" PVC
 Gallons in Well 1.49
 Gallons Pumped/Bailed Prior to Sampling .7
 Sample Pump Intake Setting (ft bmp) 12.0
 Purge Time begin 14:45 end 15:20
 Pumping Rate (ml/min) 100
 Evacuation Method NA

Field Parameters

Temperature (°C) 9.6
 SpC (mS/cm) .621
 CND (mS/cm) .439
 Dissolved Oxygen (%) 4.2
 Dissolved Oxygen (mg/L) .48
 pH (s.u.) 7.60
 ORP (mV) -21.0
 Turbidity (NTU) 7.32
 Color CCAN
 Odor NU
 Appearance Cloudy
 Sampling Method Low Flow
 Remarks stroke up well (leaked)

Constituents Sampled	Container Description	Number	Preservative
PFAS 24 Constituents	250 mL Plastic	2	Trizma

Sampling Personnel

Well Casing Volumes

Gal./Ft. 0.5" = 0.01 1-1/4" = 0.06 2" = 0.16 3" = 0.37 4" = 0.65
 1" = 0.04 1-1/2" = 0.09 2-1/2" = 0.26 3-1/2" = 0.50 6" = 1.47

bmp Below measuring point mL Milliliter NTU Nephelometric turbidity units
 °C Degrees Celsius mS/cm Millisiemens per centimeter PVC Polyvinyl chloride
 ft Feet msl Mean sea level s.u. Standard units

ARCADIS

Water Sampling Log

Project Racer Saginaw Project No. B0064434.2018 Page 1 of 2
 Site Location Saginaw, MI Date 12/18/2018
 Site/Well No. MW-134WT Replicate No. Code No. NA
 Weather P. Cloudy, 30s Sampling Time: Begin 16:15 End 16:20

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) NA
 Land Surface Elevation (ft) NA
 Sounded Well Depth (ft bmp) 15.40
 Depth to Water (ft bmp) 6.70
 Water-Level Elevation (ft) NA
 Water Column in Well (ft) 8.70
 Casing Diameter/Type 2" pvc
 Gallons in Well 1.41
 Gallons Pumped/Bailed Prior to Sampling .5
 Sample Pump Intake Setting (ft bmp) 13.0
 Purge Time begin 15:50 end 16:15
 Pumping Rate (ml/min) 100
 Evacuation Method Peristaltic pump

Field Parameters

Temperature (°C) 8.7
 SpC (mS/cm) 1.02
 CND (mS/cm) .70
 Dissolved Oxygen (%) 3.5
 Dissolved Oxygen (mg/L) .41
 pH (s.u.) 7.12
 ORP (mV) -57.5
 Turbidity (NTU) 2.72
 Color Clear
 Odor NI
 Appearance Clear
 Sampling Method Low Flow

Remarks Stick up well (locked)

Constituents Sampled	Container Description	Number	Preservative
PFAS 24 Constituents	250 mL Plastic	2	Trizma

Sampling Personnel Bruce Coburn

Well Casing Volumes

Gal./Ft.	0.5" = 0.01	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1" = 0.04	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 0.50	6" = 1.47

bmp	Below measuring point	mL	Milliliter	NTU	Nephelometric turbidity units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	Feet	msl	Mean sea level	s.u.	Standard units

ARCADIS

Water Sampling Log

Project SMI Project No. B0064434.2018 Page 1 of 2
 Site Location Racer Saginaw Date 12-19-18
 Site/Well No. MW-183WT Replicate No. _____ Code No. _____
 Weather P. cloudy, 30's Sampling Time: Begin 10:40 End 10:50

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) N/A
 Land Surface Elevation (ft) N/A
 Sounded Well Depth (ft bmp) 18.40
 Depth to Water (ft bmp) 7.55
 Water-Level Elevation (ft) N/A
 Water Column in Well (ft) 10.85
 Casing Diameter/Type 2" pvc
 Gallons in Well 1.76
 Gallons Pumped/Bailed Prior to Sampling .6
 Sample Pump Intake Setting (ft bmp) 16.0
 begin 10:40 end 10:40
 Pumping Rate (ml/min) ml/min
 Evacuation Method Peristaltic

Field Parameters

Temperature (°C) 9.7
 SpC (mS/cm) .681
 CND (mS/cm) .482
 Dissolved Oxygen (%) 10.5
 Dissolved Oxygen (mg/L) 1.20
 pH (s.u.) 7.20
 ORP (mV) 11.7
 Turbidity (NTU) 34.6
 Color Clear
 Odor NO
 Appearance Clear
 Sampling Method Low Flow
 Remarks Stick up well (locked)

Constituents Sampled	Container Description	Number	Preservative
<u>PFAS 24</u>	<u>250 ml pvc</u>	<u>2</u>	<u>None</u>

Sampling Personnel Billy J Cobern

Well Casing Volumes

Gal./Ft.	0.5" = 0.01	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1" = 0.04	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 0.50	6" = 1.47

bmp	Below measuring point	mL	Milliliter	NTU	Nephelometric turbidity units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	Feet	msl	Mean sea level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not recorded	VOC	Volatile organic compounds

YSI/LOW FLOW SAMPLING LOG

PAGE 2 OF 2

PROJ #: B0064434.2018

LOC: Racer Saginaw SMI

Depth To Water After Purging:

ARCADIS

Water Sampling Log

Project Racer Saginaw BOC4434.2018 Page 1 of 2
~~Life Remediated Durfee Middle School~~ Project No. PROBONOS.MALL.0009
 Site Location Saginaw MI Date 5/8/2018 12/18/18
 Site/Well No. MW97-105WT Replicate No. _____ Code No. _____
 Weather 32° F / Sunny Sampling Time: Begin 1525 End 1530

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) -
 Land Surface Elevation (ft) -
 Sounded Well Depth (ft bmp) 16.43
 Depth to Water (ft bmp) 9.18
 Water-Level Elevation (ft) -
 Water Column in Well (ft) 7.25
 Casing Diameter/Type 2" pvc
 Gallons in Well 1.16
 Gallons Pumped/Bailed Prior to Sampling 0.75
 Sample Pump Intake Setting (ft bmp) _____
 Purge Time begin 1445 end 1525
 Pumping Rate (ml/min) 150 ml/min
 Evacuation Method hydrostatic pump

Field Parameters

Temperature (°C) 8.5
 SpC (mS/cm) 1.92
 CND (mS/cm) 1.31
 Dissolved Oxygen (%) 2.7
 Dissolved Oxygen (mg/L) 0.27
 pH (s.u.) 7.05
 ORP (mV) -64.5
 Turbidity (NTU) 1.52
 Color None
 Odor None
 Appearance Clear
 Sampling Method Low Flow Grab
 Remarks _____

Constituents Sampled	Container Description	Number	Preservative
~~Lead~~ <u>PFAS</u>	<u>250 ml plastic</u>	<u>2</u>	<u>None</u>
~~Copper~~			
~~Total Sulfate~~			

Sampling Personnel

DRR

Well Casing Volumes

Gal./Ft. 0.5" = 0.01 1-1/4" = 0.06 2" = 0.16 3" = 0.37 4" = 0.65
 1" = 0.04 1-1/2" = 0.09 2-1/2" = 0.26 3-1/2" = 0.50 6" = 1.47

bmp	Below measuring point	mL	Milliliter	NTU	Nephelometric turbidity units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	Feet	msl	Mean sea level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not recorded	VOC	Volatile organic compounds

YSI/LOW FLOW SAMPLING LOG

PAGE 2 OF 2

WELL: MW97-105WT

PROJ #: B0064434.2018

DATE: 12/18/18

LOC: NA

[illegible]

ARCADIS

Water Sampling Log

Project Racer Saginaw PROBONOS MALL 000 Page 1 of 2
 Site Location Saginaw MI Date 5/3/2018 12/18/18
 Site/Well No. TW 98-11WT Replicate No. _____ Code No. _____
 Weather 32°F / Sunny Sampling Time: Begin 1610 End 1615

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) -
 Land Surface Elevation (ft) -
 Sounded Well Depth (ft bmp) 19.95
 Depth to Water (ft bmp) 7.27
 Water-Level Elevation (ft) -
 Water Column in Well (ft) 12.68
 Casing Diameter/Type 2" PVC
 Gallons in Well 2.02
 Gallons Pumped/Bailed Prior to Sampling 5 gal
 Sample Pump Intake Setting (ft bmp) _____
 Purge Time begin 1545 end 1610
 Pumping Rate (ml/min) 150 ml/min
 Evacuation Method peristaltic pump

Field Parameters

Temperature (°C) 8.1
 SpC (mS/cm) 3.03
 CND (mS/cm) 2.06
 Dissolved Oxygen (%) 3.3
 Dissolved Oxygen (mg/L) 0.39
 pH (s.u.) 7.25
 ORP (mV) -88.2
 Turbidity (NTU) 6.95
 Color yellow
 Odor None
 Appearance clear
 Sampling Method Low Flow Grab
 Remarks _____

Constituents Sampled	Container Description	Number	Preservative
<u>PFAS</u>	<u>250ml plastic</u>	<u>2</u>	<u>None</u>
<u>Cooper</u>			
<u>Total Bacteria</u>			

Sampling Personnel DRR

Well Casing Volumes

Gal./Ft. 0.5" = 0.01 1-1/4" = 0.06 2" = 0.16 3" = 0.37 4" = 0.65
 1" = 0.04 1-1/2" = 0.09 2-1/2" = 0.26 3-1/2" = 0.50 6" = 1.47

bmp Below measuring point mL Milliliter NTU Nephelometric turbidity units
 °C Degrees Celsius mS/cm Millisiemens per centimeter PVC Polyvinyl chloride
 ft Feet msl Mean sea level s.u. Standard units
 gpm Gallons per minute N/A Not applicable umhos/cm Micromhos per centimeter
 mg/L Milligrams per liter NR Not recorded VOC Volatile organic compounds

YSI/LOW FLOW SAMPLING LOG

PAGE 2 OF 2

PROJ #: B0064434.2018

LOC: NA

Depth To Water After Purging:	7.85
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ARCADIS

Water Sampling Log

Project Racer Saginaw Life Remodeled Durfee Middle School Project No. 30064434, 2018 PROBONOS MALL 0005 Page 1 of 2
 Site Location Racer Saginaw Date 5/3/2018 12/18/18
 Site/Well No. QPTW-13R Replicate No. _____ Code No. _____
 Weather 32°F / Sunny Sampling Time: Begin 1755 End 1805

Evacuation Data

Measuring Point TGC
 MP Elevation (ft) -
 Land Surface Elevation (ft) -
 Sounded Well Depth (ft bmp) 14.29
 Depth to Water (ft bmp) 4.65
 Water-Level Elevation (ft) -
 Water Column in Well (ft) 9.64
 Casing Diameter/Type 2" pvc
 Gallons in Well 1.54
 Gallons Pumped/Bailed Prior to Sampling 0.70 gal
 Sample Pump Intake Setting (ft bmp) _____
 Purge Time begin 1725 end 1755
 Pumping Rate (ml/min) 150 ml/min
 Evacuation Method Parastaltic pump

Field Parameters

Temperature (°C) 10.4
 SpC (mS/cm) 1.06
 CND (mS/cm) 0.76
 Dissolved Oxygen (%) 3.8
 Dissolved Oxygen (mg/L) 0.42
 pH (s.u.) 6.90
 ORP (mV) -49.5
 Turbidity (NTU) 31.3
 Color None
 Odor None
 Appearance clear
 Sampling Method Low flow grab
 Remarks _____

Constituents Sampled	Container Description	Number	Preservative
<u>Lead</u> <u>PFAS</u>	<u>250ml plastic</u>	<u>2</u>	<u>None</u>
<u>Copper</u>			
<u>Total Bacteria</u>			

Sampling Personnel DPR

Well Casing Volumes

Gal./Ft.	0.5" = 0.01	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1" = 0.04	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47

bmp	Below measuring point	mL	Milliliter	NTU	Nephelometric turbidity units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	Feet	msl	Mean sea level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not recorded	VOC	Volatile organic compounds

YSI/LOW FLOW SAMPLING LOG

PAGE 2 OF 2

WELL: QPTW-13R

PROJ #: B0064434.2018

DATE: 12/18/18

LOC: NA

Depth To Water After Purging: 4.65

ARCADIS

Water Sampling Log

Project Racer Saginaw Project No. B0064434.2018 Page 1 of 2
 Site Location Saginaw, MI Date 12/18/2018
 Site/Well No. X-2A Replicate No. Dup-01 Code No. NA
 Weather Sunny, 30s Sampling Time: Begin 14:10 End 14:20

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) NA
 Land Surface Elevation (ft) NA
 Sounded Well Depth (ft bmp) 11.55
 Depth to Water (ft bmp) 4.04
 Water-Level Elevation (ft) NA
 Water Column in Well (ft) 7.51
 Casing Diameter/Type 2" PVC
 Gallons in Well 1.22
 Gallons Pumped/Bailed Prior to Sampling .8
 Sample Pump Intake Setting (ft bmp) 9.0
 Purge Time begin 13:30 end 14:10
 Pumping Rate (ml/min) 100
 Evacuation Method NA

Field Parameters

Temperature (°C) 8.4
 SpC (mS/cm) .75
 CND (mS/cm) .51
 Dissolved Oxygen (%) .39
 Dissolved Oxygen (mg/L) .47
 pH (s.u.) 9.22
 ORP (mV) 64.5
 Turbidity (NTU) 7.84
 Color CCGA
 Odor NO
 Appearance CCGA
 Sampling Method Low Flow

Remarks Stack up well (locked)
Dup-01
DIDN'T MEET DRAWDOWN REQUIREMENTS

Constituents Sampled	Container Description	Number	Preservative
PFAS 24 Constituents	250 mL Plastic	2	Trizma

Sampling Personnel

Well Casing Volumes

Gal./Ft.	0.5" = 0.01	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1" = 0.04	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 0.50	6" = 1.47

bmp	Below measuring point	mL	Milliliter	NTU	Nephelometric turbidity units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	Feet	msl	Mean sea level	s.u.	Standard units

YSI/LOW FLOW SAMPLING LOG

PAGE 2 OF 2

PROJ #: B0064434.2018

LOC: NA

Document #ENFM005, Revision 03

ARCADIS

Water Sampling Log

Project SMI Project No. B0064434.2018 Page 1 of 2
 Site Location Racer Saginaw Date 12.19.18
 Site/Well No. X-9AR Replicate No. _____ Code No. _____
 Weather P. cloudy, 30s Sampling Time: Begin 9:40 End 9:45

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) N/A
 Land Surface Elevation (ft) N/A
 Sounded Well Depth (ft bmp) 16.05
 Depth to Water (ft bmp) 4.89
 Water-Level Elevation (ft) N/A
 Water Column in Well (ft) 11.16
 Casing Diameter/Type 2" PVC
 Gallons in Well 1.81
 Gallons Pumped/Bailed Prior to Sampling .8
 Sample Pump Intake Setting (ft bmp) 13.5
 begin 9:00 end 9:40
 Pumping Rate (ml/min) 100 ml/min
 Evacuation Method Peristaltic

Field Parameters

Temperature (°C) 8.2
 SpC (mS/cm) 697
 CND (mS/cm) 476
 Dissolved Oxygen (%) 3.6
 Dissolved Oxygen (mg/L) .42
 pH (s.u.) 7.16
 ORP (mV) 34.1
 Turbidity (NTU) 7.69
 Color CLEAR
 Odor NO
 Appearance CLEAR
 Sampling Method Low Flow
 Remarks Stick up well (Locks)

Constituents Sampled	Container Description	Number	Preservative
<u>PFAS 24</u>	<u>250 ml peristaltic</u>	<u>2</u>	<u>NONE</u>

Sampling Personnel Billy J Cobern

Well Casing Volumes					
Gal./Ft.	0.5" = 0.01	1-1/4" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1" = 0.04	1-1/2" = 0.09	2-1/2" = 0.26	3-1/2" = 0.50	6" = 1.47
bmp	Below measuring point	mL	Milliliter	NTU	Nephelometric turbidity units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	Feet	msl	Mean sea level	s.u.	Standard units
gpm	Gallons per minute	N/A	Not applicable	umhos/cm	Micromhos per centimeter
mg/L	Milligrams per liter	NR	Not recorded	VOC	Volatile organic compounds

YSI/LOW FLOW SAMPLING LOG

PAGE 2 OF 2

PROJ #: B0064434.2018

LOC: Racer Saginaw SMI

Total Depth of Well:									
Depth To Water Before Purging:									
Depth To Water After Purging:									

ARCADIS

Water Sampling Log

Project Racer Saginaw Project No. B0064434.2018 Page 1 of 2
 Site Location Saginaw, MI Date 12/18/2018
 Site/Well No. X-WAR2 Replicate No. Code No. NA
 Weather 32°F/Sunny Sampling Time: Begin 1405 End 1415

Evacuation Data

Measuring Point TOC
 MP Elevation (ft) NA
 Land Surface Elevation (ft) NA
 Sounded Well Depth (ft bmp) 18.61
 Depth to Water (ft bmp) 3.35
 Water-Level Elevation (ft) NA
 Water Column in Well (ft) 15.26
 Casing Diameter/Type 2" pvc
 Gallons in Well 2.44
 Gallons Pumped/Bailed Prior to Sampling 1 gal
 Sample Pump Intake Setting (ft bmp)
 Purge Time begin 1315 end 1405
 Pumping Rate (ml/min) 150 ml/min
 Evacuation Method NA

Field Parameters

Temperature (°C) 6.7
 SpC (mS/cm) 674.1
 CND (mS/cm) 438.0
 Dissolved Oxygen (%) 21.9
 Dissolved Oxygen (mg/L) 2.70
 pH (s.u.) 7.21
 ORP (mV) 41.0
 Turbidity (NTU) 9.79
 Color None
 Odor None
 Appearance clear
 Sampling Method Low Flow
 Remarks MSM&D taken

Constituents Sampled	Container Description	Number	Preservative
PFAS 24 Constituents	250 mL Plastic	<u>26</u>	Trizma

Sampling Personnel DRE

Well Casing Volumes					
Gal./Ft.	0.5" = 0.01	1-¼" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65
	1" = 0.04	1-½" = 0.09	2-½" = 0.26	3-½" = 0.50	6" = 1.47
bmp	Below measuring point	mL	Milliliter	NTU	Nephelometric turbidity units
°C	Degrees Celsius	mS/cm	Millisiemens per centimeter	PVC	Polyvinyl chloride
ft	Feet	msl	Mean sea level	s.u.	Standard units

YSI/LOW FLOW SAMPLING LOG

PAGE 2 OF 2

PROJ #: B0064434.2018

LOC: NA

Document #ENFM005, Revision 03

ATTACHMENT 2

LABORATORY REPORT



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

e-Hardcopy 2.0
Automated Report

Technical Report for

Arcadis

Racer Saginaw

B0064434.2018

SGS Job Number: FA60391

Sampling Dates: 12/18/18 - 12/19/18

Report to:

andrea.colby@sgs.com

Total number of pages in report: 73



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.

Caitlin Brice, M.S.
General Manager

Client Service contact: Andrea Colby 407-425-6700

Certifications: FL(E83510), LA(03051), KS(E-10327), IL(200063), NC(573), NJ(FL002), NY(12022), SC(96038001)
DoD ELAP(ANAB L2229), AZ(AZ0806), CA(2937), TX(T104704404), PA(68-03573), VA(460177),
AK, AR, IA, KY, MA, MS, ND, NH, NV, OK, OR, UT, WA, WV

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Test results relate only to samples analyzed.



January 14, 2019

Ms. Divya Kamath
Arcadis
28550 Cabot Dr
Novi, MI 48377

RE: SGS North America Inc. - Orlando job FA60391 Reissue

Dear Ms. Kamath,

The final report for job number FA60391 has been edited to reflect requested corrections. These edits have been incorporated into the revised report.

The sample ID on -4 has been revised per your request.

Please feel free to contact us if we can be of further assistance.

Sincerely,

SGS North America, Inc. - Orlando



January 17, 2019

Ms. Divya Kamath
Arcadis
28550 Cabot Dr, Suite 500
Novi, MI 48377

RE: SGS North America Inc. - Orlando job FA60391 Reissue

Dear Ms. Kamath,

The final report for job number FA60391 has been edited to reflect requested corrections. These edits have been incorporated into the revised report.

The sample results have been corrected on -4.

SGS North America Inc. - Orlando apologies for any inconvenience this may have caused. Please feel free to contact us if we can be of further assistance.

Sincerely,

SGS North America, Inc. - Orlando

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Sample Summary

Arcadis

Job No: FA60391

Racer Saginaw

Project No: B0064434.2018

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
FA60391-1	12/18/18	11:20 DR	12/20/18	AQ	Ground Water	MW-118S1 (121818)
FA60391-1F	12/18/18	11:20 DR	12/20/18	AQ	Groundwater Filtered	MW-118S1 (121818)
FA60391-2	12/18/18	14:05 DR	12/20/18	AQ	Ground Water	X-10AR2 (121818)
FA60391-3	12/18/18	15:25 DR	12/20/18	AQ	Ground Water	MW97-105WT (121818)
FA60391-4	12/18/18	16:10 DR	12/20/18	AQ	Ground Water	TW98-111WT (121818)
FA60391-5	12/18/18	17:05 DR	12/20/18	AQ	Ground Water	B-3R (121818)
FA60391-6	12/18/18	17:55 DR	12/20/18	AQ	Ground Water	QPTW-13R (121818)
FA60391-7	12/18/18	14:10 DR	12/20/18	AQ	Ground Water	X-2A_121818
FA60391-8	12/18/18	14:30 DR	12/20/18	AQ	Equipment Blank	EB-01_121818
FA60391-9	12/18/18	15:20 DR	12/20/18	AQ	Ground Water	MW-131WT_121818
FA60391-10	12/18/18	16:15 DR	12/20/18	AQ	Ground Water	MW-134WT_121818
FA60391-11	12/18/18	17:10 DR	12/20/18	AQ	Ground Water	MW-108WT_121818
FA60391-12	12/18/18	00:00 DR	12/20/18	AQ	Ground Water	DUP-01_121818



Sample Summary
(continued)

Arcadis

Job No: FA60391

Racer Saginaw
Project No: B0064434.2018

Sample Number	Collected		Time By	Received	Matrix		Client Sample ID
	Date				Code	Type	
FA60391-13	12/19/18	09:40	DR	12/20/18	AQ	Ground Water	X-9AR_121918
FA60391-14	12/19/18	10:40	DR	12/20/18	AQ	Ground Water	MW-183WT_121918

Summary of Hits

Job Number: FA60391
Account: Arcadis
Project: Racer Saginaw
Collected: 12/18/18 thru 12/19/18

Lab Sample ID	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
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FA60391-1 MW-118S1 (121818)

Perfluorobutanoic acid	0.00971	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
Perfluoropentanoic acid	0.00437	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanoic acid	0.00177 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluoroheptanoic acid	0.00193 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanoic acid	0.00195 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15

FA60391-1F MW-118S1 (121818)

Aluminum	15.0 J	200	25	ug/l	SW846 6010C
Barium	47.3 J	200	5.0	ug/l	SW846 6010C
Calcium	49500	1000	100	ug/l	SW846 6010C
Copper	7.6 J	25	2.0	ug/l	SW846 6010C
Iron	5590	300	50	ug/l	SW846 6010C
Lead	6.8	5.0	2.0	ug/l	SW846 6010C
Magnesium	13000	5000	100	ug/l	SW846 6010C
Manganese	487	15	2.0	ug/l	SW846 6010C
Potassium	6720 J	10000	500	ug/l	SW846 6010C
Sodium	13000	10000	2000	ug/l	SW846 6010C
Zinc	35.1	20	5.0	ug/l	SW846 6010C

FA60391-2 X-10AR2 (121818)

Perfluorooctanoic acid	0.00213 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
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FA60391-3 MW97-105WT (121818)

Perfluorobutanoic acid	0.0657	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
Perfluoropentanoic acid	0.0208	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanoic acid	0.0335	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluoroheptanoic acid	0.0175	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanoic acid	0.0221	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorobutanesulfonic acid	0.00929	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanesulfonic acid	0.00412	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanesulfonic acid	0.00970	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15

FA60391-4 TW98-111WT (121818)

Perfluorobutanoic acid ^a	0.0399	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanoic acid	0.00210 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanoic acid	0.00636	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanesulfonic acid	0.00476	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanesulfonic acid	0.0180	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15

Summary of Hits

Job Number: FA60391
Account: Arcadis
Project: Racer Saginaw
Collected: 12/18/18 thru 12/19/18

Lab Sample ID	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
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FA60391-5 B-3R (121818)

Perfluorobutanoic acid	0.00230 J	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
Perfluoropentanoic acid	0.00168 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanoic acid	0.00126 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanoic acid	0.00558	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanesulfonic acid	0.00113 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanesulfonic acid	0.0156	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15

FA60391-6 QPTW-13R (121818)

Perfluorobutanoic acid	0.0170	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
Perfluoropentanoic acid	0.0164	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanoic acid	0.00291 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanoic acid	0.00838	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorobutanesulfonic acid	0.00354 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanesulfonic acid	0.00192 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanesulfonic acid	0.00847	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15

FA60391-7 X-2A_121818

Perfluorobutanoic acid ^a	0.0341	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
Perfluoropentanoic acid	0.0181	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanoic acid	0.00646	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluoroheptanoic acid	0.00493	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanoic acid	0.0506	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanesulfonic acid	0.00773	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanesulfonic acid	0.0165	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15

FA60391-8 EB-01_121818

No hits reported in this sample.

FA60391-9 MW-131WT_121818

Perfluorobutanoic acid	0.00414 J	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
Perfluoropentanoic acid	0.00224 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanoic acid	0.00114 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluoroheptanoic acid	0.00120 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanoic acid	0.00238 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorobutanesulfonic acid	0.00172 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanesulfonic acid	0.00421	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanesulfonic acid	0.00488 J	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15

Summary of Hits

Job Number: FA60391
Account: Arcadis
Project: Racer Saginaw
Collected: 12/18/18 thru 12/19/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
FA60391-10 MW-134WT_121818						
Perfluorobutanoic acid		0.00564 J	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
Perfluoropentanoic acid		0.00354 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanoic acid		0.00166 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluoroheptanoic acid		0.00128 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanoic acid		0.00300 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorobutanesulfonic acid		0.00199 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
FA60391-11 MW-108WT_121818						
Perfluorobutanoic acid		0.00302 J	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
Perfluoropentanoic acid		0.00177 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanoic acid		0.00366 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanesulfonic acid		0.00192 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanesulfonic acid		0.00263 J	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
FA60391-12 DUP-01_121818						
Perfluorobutanoic acid ^a		0.0263	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
Perfluoropentanoic acid		0.0144	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanoic acid		0.00532	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluoroheptanoic acid		0.00515	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanoic acid		0.0465	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorobutanesulfonic acid		0.00491	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanesulfonic acid		0.00589	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanesulfonic acid		0.0146	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
FA60391-13 X-9AR_121918						
Perfluorobutanoic acid		0.00598 J	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
FA60391-14 MW-183WT_121918						
Perfluorobutanoic acid		0.0114	0.0080	0.0040	ug/l	EPA 537M QSM5.1 B-15
Perfluorooctanoic acid		0.00207 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorobutanesulfonic acid		0.00166 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15
Perfluorohexanesulfonic acid		0.00150 J	0.0040	0.0020	ug/l	EPA 537M QSM5.1 B-15

(a) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

Sample Results

Report of Analysis

Report of Analysis

Page 1 of 2

Client Sample ID:	MW-118S1 (121818)		
Lab Sample ID:	FA60391-1	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26026.D	1	01/03/19 02:51	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00971	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.00437	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00177	0.0040	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00193	0.0040	0.0020	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00195	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	MW-118S1 (121818)		
Lab Sample ID:	FA60391-1	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	92%		50-150%
	13C5-PFPeA	106%		50-150%
	13C5-PFHxA	115%		50-150%
	13C4-PFHpA	116%		50-150%
	13C8-PFOA	135%		50-150%
	13C9-PFNA	133%		50-150%
	13C6-PFDA	134%		50-150%
	13C7-PFUnDA	103%		50-150%
	13C2-PFDoDA	112%		50-150%
	13C2-PFTeDA	68%		50-150%
	13C3-PFBS	96%		50-150%
	13C3-PFHxS	101%		50-150%
	13C8-PFOS	101%		50-150%
	13C8-FOSA	104%		50-150%
	d3-MeFOSAA	118%		50-150%
	13C2-4:2FTS	110%		50-150%
	13C2-6:2FTS	130%		50-150%
	13C2-8:2FTS	137%		50-150%

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

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Client Sample ID: MW-118S1 (121818)
Lab Sample ID: FA60391-1F
Matrix: AQ - Groundwater Filtered
Project: Racer Saginaw

Date Sampled: 12/18/18**Date Received:** 12/20/18**Percent Solids:** n/a

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	15.0 J	200	25	14	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Antimony	5.0 U	6.0	5.0	1.0	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Arsenic	5.0 U	10	5.0	1.3	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Barium	47.3 J	200	5.0	1.0	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Beryllium	1.0 U	4.0	1.0	0.20	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Cadmium	1.0 U	5.0	1.0	0.20	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Calcium	49500	1000	100	50	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Chromium	5.0 U	10	5.0	1.0	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Cobalt	1.0 U	50	1.0	0.20	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Copper	7.6 J	25	2.0	1.0	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Iron	5590	300	50	17	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Lead	6.8	5.0	2.0	1.1	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Magnesium	13000	5000	100	35	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Manganese	487	15	2.0	1.0	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Mercury	0.10 U	0.50	0.10	0.030	ug/l	1	12/24/18	12/24/18 JC	SW846 7470A	¹ SW846 7470A ³
Nickel	1.0 U	40	1.0	0.40	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Potassium	6720 J	10000	500	200	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Selenium	5.0 U	10	5.0	2.9	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Silver	2.0 U	10	2.0	0.70	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Sodium	13000	10000	2000	500	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Thallium	2.0 U	10	2.0	1.4	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Vanadium	2.0 U	50	2.0	0.60	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Zinc	35.1	20	5.0	4.4	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴

(1) Instrument QC Batch: MA15490

(2) Instrument QC Batch: MA15498

(3) Prep QC Batch: MP34853

(4) Prep QC Batch: MP34866

LOQ = Limit of Quantitation

DL = Detection Limit

U = Indicates a result < LOD

LOD = Limit of Detection

B = Analyte found in associated blank

J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Page 1 of 2

Client Sample ID:	X-10AR2 (121818)			Date Sampled:	12/18/18
Lab Sample ID:	FA60391-2			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26027.D	1	01/03/19 03:07	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00213	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	X-10AR2 (121818)			Date Sampled:	12/18/18
Lab Sample ID:	FA60391-2			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID	Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA		95%		50-150%
	13C5-PFPeA		106%		50-150%
	13C5-PFHxA		110%		50-150%
	13C4-PFHpA		111%		50-150%
	13C8-PFOA		134%		50-150%
	13C9-PFNA		118%		50-150%
	13C6-PFDA		110%		50-150%
	13C7-PFUnDA		99%		50-150%
	13C2-PFDoDA		98%		50-150%
	13C2-PFTeDA		89%		50-150%
	13C3-PFBS		98%		50-150%
	13C3-PFHxS		99%		50-150%
	13C8-PFOS		84%		50-150%
	13C8-FOSA		115%		50-150%
	d3-MeFOSAA		92%		50-150%
	13C2-4:2FTS		109%		50-150%
	13C2-6:2FTS		127%		50-150%
	13C2-8:2FTS		103%		50-150%

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

Page 1 of 2

Client Sample ID:	MW97-105WT (121818)		
Lab Sample ID:	FA60391-3	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26028.D	1	01/03/19 03:23	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2 ^a	2Q26174.D	1	01/08/19 15:15	NAF	01/04/19 09:00	OP73281	S2Q403

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	260 ml	1.0 ml

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0657	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0208	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0335	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0175	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0221	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00929	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00412	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00970	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA ^b	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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

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Client Sample ID: MW97-105WT (121818)**Lab Sample ID:** FA60391-3**Date Sampled:** 12/18/18**Matrix:** AQ - Ground Water**Date Received:** 12/20/18**Method:** EPA 537M QSM5.1 B-15 EPA 537 MOD**Percent Solids:** n/a**Project:** Racer Saginaw

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	66%	60%	50-150%
	13C5-PFPeA	81%	71%	50-150%
	13C5-PFHxA	85%	70%	50-150%
	13C4-PFHpA	87%	72%	50-150%
	13C8-PFOA	105%	72%	50-150%
	13C9-PFNA	89%	62%	50-150%
	13C6-PFDA	91%	59%	50-150%
	13C7-PFUnDA	81%	41%	50-150%
	13C2-PFDoDA	82%	45%	50-150%
	13C2-PFTeDA	67%	27%	50-150%
	13C3-PFBS	72%	69%	50-150%
	13C3-PFHxS	71%	65%	50-150%
	13C8-PFOS	69%	62%	50-150%
	13C8-FOSA	48% ^C	34%	50-150%
	d3-MeFOSAA	75%	46%	50-150%
	13C2-4:2FTS	92%	77%	50-150%
	13C2-6:2FTS	114%	86%	50-150%
	13C2-8:2FTS	99%	65%	50-150%

(a) Confirmation run.

(b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(c) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

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

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Client Sample ID:	TW98-111WT (121818)			Date Sampled:	12/18/18
Lab Sample ID:	FA60391-4			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26029.D	1	01/03/19 03:38	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2 ^a	2Q26175.D	1	01/08/19 15:30	NAF	01/04/19 09:00	OP73281	S2Q403
Run #3	2Q26059.D	2	01/03/19 11:33	NAF	12/27/18 08:30	OP73201	S2Q400

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	260 ml	1.0 ml
Run #3	250 ml	1.0 ml

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYL CARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid ^b	0.0399	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00210	0.0040	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00636	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0040 U ^c	0.0080	0.0040	0.0020	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0040 U ^c	0.0080	0.0040	0.0020	ug/l	

PERFLUOROALKYL SULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00476	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0180	0.0040	0.0020	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCCTANESULFONAMIDES

754-91-6	PFOSA ^b	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCCTANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

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

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Client Sample ID: TW98-111WT (121818)**Lab Sample ID:** FA60391-4**Date Sampled:** 12/18/18**Matrix:** AQ - Ground Water**Date Received:** 12/20/18**Method:** EPA 537M QSM5.1 B-15 EPA 537 MOD**Percent Solids:** n/a**Project:** Racer Saginaw

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate ^d	0.0040 U	0.0080	0.0040	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	0.0080 U ^c	0.016	0.0080	0.0040	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C4-PFBA	22% ^e	19%	27%	50-150%
	13C5-PFPeA	56%	45%	68%	50-150%
	13C5-PFHxA	61%	46%	84%	50-150%
	13C4-PFHpA	66%	51%	93%	50-150%
	13C8-PFOA	87%	60%	120%	50-150%
	13C9-PFNA	108%	76%	129%	50-150%
	13C6-PFDA	119%	85%	107%	50-150%
	13C7-PFUnDA	76%	46%	61%	50-150%
	13C2-PFDoDA	115%	41%	104%	50-150%
	13C2-PFTeDA	49%	24%	51%	50-150%
	13C3-PFBS	71%	64%	78%	50-150%
	13C3-PFHxS	73%	65%	82%	50-150%
	13C8-PFOS	74%	71%	85%	50-150%
	13C8-FOSA	11% ^e	9%	21%	50-150%
	d3-MeFOSAA	122%	80%	137%	50-150%
	13C2-4:2FTS	97%	74%	97%	50-150%
	13C2-6:2FTS	158% ^f	116%	155% ^f	50-150%
	13C2-8:2FTS	171%	119%	129%	50-150%

(a) Confirmation Run.

(b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(c) Result is from Run# 3

(d) Associated ID Standard outside control limits high, however sample is ND. Confirmed by re-extraction and reanalysis.

(e) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(f) 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

Report of Analysis

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Client Sample ID:	B-3R (121818)		
Lab Sample ID:	FA60391-5	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26030.D	1	01/03/19 03:54	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00230	0.0080	0.0040	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00168	0.0040	0.0020	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.00126	0.0040	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00558	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00113	0.0040	0.0020	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0156	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	B-3R (121818)	Date Sampled:	12/18/18
Lab Sample ID:	FA60391-5	Date Received:	12/20/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	71%		50-150%
	13C5-PFPeA	88%		50-150%
	13C5-PFHxA	94%		50-150%
	13C4-PFHpA	95%		50-150%
	13C8-PFOA	113%		50-150%
	13C9-PFNA	102%		50-150%
	13C6-PFDA	88%		50-150%
	13C7-PFUnDA	84%		50-150%
	13C2-PFDoDA	115%		50-150%
	13C2-PFTeDA	137%		50-150%
	13C3-PFBS	81%		50-150%
	13C3-PFHxS	80%		50-150%
	13C8-PFOS	78%		50-150%
	13C8-FOSA	62%		50-150%
	d3-MeFOSAA	78%		50-150%
	13C2-4:2FTS	109%		50-150%
	13C2-6:2FTS	129%		50-150%
	13C2-8:2FTS	93%		50-150%

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

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Client Sample ID:	QPTW-13R (121818)			Date Sampled:	12/18/18
Lab Sample ID:	FA60391-6			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26031.D	1	01/03/19 04:10	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2 ^a	2Q26176.D	1	01/08/19 15:46	NAF	01/04/19 09:00	OP73281	S2Q403

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	260 ml	1.0 ml

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0170	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0164	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00291	0.0040	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00838	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00354	0.0040	0.0020	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00192	0.0040	0.0020	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00847	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA ^b	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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

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Client Sample ID: QPTW-13R (121818)**Lab Sample ID:** FA60391-6**Date Sampled:** 12/18/18**Matrix:** AQ - Ground Water**Date Received:** 12/20/18**Method:** EPA 537M QSM5.1 B-15 EPA 537 MOD**Percent Solids:** n/a**Project:** Racer Saginaw

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate ^c	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	56%	53%	50-150%
	13C5-PFPeA	64%	57%	50-150%
	13C5-PFHxA	61%	51%	50-150%
	13C4-PFHpA	67%	59%	50-150%
	13C8-PFOA	86%	68%	50-150%
	13C9-PFNA	102%	84%	50-150%
	13C6-PFDA	114%	77%	50-150%
	13C7-PFUnDA	75%	28%	50-150%
	13C2-PFDoDA	94%	18%	50-150%
	13C2-PFTeDA	118%	19%	50-150%
	13C3-PFBS	69%	67%	50-150%
	13C3-PFHxS	65%	65%	50-150%
	13C8-PFOS	69%	66%	50-150%
	13C8-FOSA	14% ^d	10%	50-150%
	d3-MeFOSAA	122%	63%	50-150%
	13C2-4:2FTS	105%	0%	50-150%
	13C2-6:2FTS	150%	114%	50-150%
	13C2-8:2FTS	153% ^e	96%	50-150%

(a) Confirmation run.

(b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(c) Associated ID Standard outside control limits high, however sample is ND.

(d) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(e) Outside control limits. However, sample was ND.

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

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Client Sample ID:	X-2A_121818				
Lab Sample ID:	FA60391-7			Date Sampled:	12/18/18
Matrix:	AQ - Ground Water			Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD			Percent Solids:	n/a
Project:	Racer Saginaw				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26032.D	1	01/03/19 04:25	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2 ^a	2Q26177.D	1	01/08/19 16:02	NAF	01/04/19 09:00	OP73281	S2Q403

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	260 ml	1.0 ml

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid ^b	0.0341	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0181	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00646	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00493	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0506	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00773	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0165	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA ^b	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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

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Client Sample ID:	X-2A_121818			Date Sampled:	12/18/18
Lab Sample ID:	FA60391-7			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	23% ^C	20%	50-150%
	13C5-PFPeA	79%	76%	50-150%
	13C5-PFHxA	78%	68%	50-150%
	13C4-PFHpA	86%	71%	50-150%
	13C8-PFOA	96%	67%	50-150%
	13C9-PFNA	80%	61%	50-150%
	13C6-PFDA	93%	61%	50-150%
	13C7-PFUnDA	104%	64%	50-150%
	13C2-PFDoDA	83%	64%	50-150%
	13C2-PFTeDA	80%	47%	50-150%
	13C3-PFBS	71%	72%	50-150%
	13C3-PFHxS	70%	67%	50-150%
	13C8-PFOS	66%	60%	50-150%
	13C8-FOSA	33% ^C	29%	50-150%
	d3-MeFOSAA	95%	62%	50-150%
	13C2-4:2FTS	97%	82%	50-150%
	13C2-6:2FTS	107%	80%	50-150%
	13C2-8:2FTS	88%	62%	50-150%

(a) Confirmation run.

(b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(c) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

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

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Client Sample ID:	EB-01_121818		
Lab Sample ID:	FA60391-8	Date Sampled:	12/18/18
Matrix:	AQ - Equipment Blank	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26025.D	1	01/03/19 02:35	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	EB-01_121818	Date Sampled:	12/18/18
Lab Sample ID:	FA60391-8	Date Received:	12/20/18
Matrix:	AQ - Equipment Blank	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	115%		50-150%
	13C5-PFPeA	111%		50-150%
	13C5-PFHxA	114%		50-150%
	13C4-PFHpA	113%		50-150%
	13C8-PFOA	146%		50-150%
	13C9-PFNA	121%		50-150%
	13C6-PFDA	128%		50-150%
	13C7-PFUnDA	116%		50-150%
	13C2-PFDoDA	116%		50-150%
	13C2-PFTeDA	93%		50-150%
	13C3-PFBS	106%		50-150%
	13C3-PFHxS	102%		50-150%
	13C8-PFOS	97%		50-150%
	13C8-FOSA	128%		50-150%
	d3-MeFOSAA	106%		50-150%
	13C2-4:2FTS	107%		50-150%
	13C2-6:2FTS	127%		50-150%
	13C2-8:2FTS	113%		50-150%

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

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Client Sample ID:	MW-131WT_121818		
Lab Sample ID:	FA60391-9	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26035.D	1	01/03/19 05:13	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00414	0.0080	0.0040	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00224	0.0040	0.0020	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.00114	0.0040	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00120	0.0040	0.0020	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00238	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00172	0.0040	0.0020	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00421	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00488	0.0080	0.0040	0.0020	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	MW-131WT_121818	Date Sampled:	12/18/18
Lab Sample ID:	FA60391-9	Date Received:	12/20/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	76%		50-150%
	13C5-PFPeA	83%		50-150%
	13C5-PFHxA	91%		50-150%
	13C4-PFHpA	94%		50-150%
	13C8-PFOA	114%		50-150%
	13C9-PFNA	112%		50-150%
	13C6-PFDA	112%		50-150%
	13C7-PFUnDA	100%		50-150%
	13C2-PFDoDA	103%		50-150%
	13C2-PFTeDA	95%		50-150%
	13C3-PFBS	76%		50-150%
	13C3-PFHxS	84%		50-150%
	13C8-PFOS	93%		50-150%
	13C8-FOSA	111%		50-150%
	d3-MeFOSAA	92%		50-150%
	13C2-4:2FTS	93%		50-150%
	13C2-6:2FTS	115%		50-150%
	13C2-8:2FTS	109%		50-150%

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

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Client Sample ID:	MW-134WT_121818		
Lab Sample ID:	FA60391-10	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26037.D	1	01/03/19 05:44	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00564	0.0080	0.0040	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00354	0.0040	0.0020	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.00166	0.0040	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00128	0.0040	0.0020	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00300	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00199	0.0040	0.0020	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	MW-134WT_121818	Date Sampled:	12/18/18
Lab Sample ID:	FA60391-10	Date Received:	12/20/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	88%		50-150%
	13C5-PFPeA	95%		50-150%
	13C5-PFHxA	102%		50-150%
	13C4-PFHpA	107%		50-150%
	13C8-PFOA	124%		50-150%
	13C9-PFNA	121%		50-150%
	13C6-PFDA	115%		50-150%
	13C7-PFUnDA	118%		50-150%
	13C2-PFDoDA	136%		50-150%
	13C2-PFTeDA	116%		50-150%
	13C3-PFBS	86%		50-150%
	13C3-PFHxS	92%		50-150%
	13C8-PFOS	100%		50-150%
	13C8-FOSA	91%		50-150%
	d3-MeFOSAA	107%		50-150%
	13C2-4:2FTS	104%		50-150%
	13C2-6:2FTS	125%		50-150%
	13C2-8:2FTS	119%		50-150%

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

Page 1 of 2

Client Sample ID:	MW-108WT_121818		
Lab Sample ID:	FA60391-11	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26038.D	1	01/03/19 06:00	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00302	0.0080	0.0040	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00177	0.0040	0.0020	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00366	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00192	0.0040	0.0020	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00263	0.0080	0.0040	0.0020	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	MW-108WT_121818	Date Sampled:	12/18/18
Lab Sample ID:	FA60391-11	Date Received:	12/20/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	85%		50-150%
	13C5-PFPeA	92%		50-150%
	13C5-PFHxA	100%		50-150%
	13C4-PFHpA	105%		50-150%
	13C8-PFOA	121%		50-150%
	13C9-PFNA	125%		50-150%
	13C6-PFDA	126%		50-150%
	13C7-PFUnDA	118%		50-150%
	13C2-PFDoDA	137%		50-150%
	13C2-PFTeDA	119%		50-150%
	13C3-PFBS	83%		50-150%
	13C3-PFHxS	93%		50-150%
	13C8-PFOS	103%		50-150%
	13C8-FOSA	121%		50-150%
	d3-MeFOSAA	102%		50-150%
	13C2-4:2FTS	102%		50-150%
	13C2-6:2FTS	124%		50-150%
	13C2-8:2FTS	116%		50-150%

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

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Client Sample ID:	DUP-01_121818		
Lab Sample ID:	FA60391-12	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26040.D	1	01/03/19 06:31	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2 ^a	2Q26178.D	1	01/08/19 16:18	NAF	01/04/19 09:00	OP73281	S2Q403

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	260 ml	1.0 ml

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid ^b	0.0263	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0144	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00532	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00515	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0465	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00491	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00589	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0146	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCTANESULFONAMIDES

754-91-6	PFOSA ^b	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCTANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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

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Client Sample ID: DUP-01_121818

Lab Sample ID: FA60391-12

Date Sampled: 12/18/18

Matrix: AQ - Ground Water

Date Received: 12/20/18

Method: EPA 537M QSM5.1 B-15 EPA 537 MOD

Percent Solids: n/a

Project: Racer Saginaw

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	32% ^C	22%	50-150%
	13C5-PFPeA	88%	73%	50-150%
	13C5-PFHxA	90%	68%	50-150%
	13C4-PFHpA	92%	71%	50-150%
	13C8-PFOA	105%	68%	50-150%
	13C9-PFNA	92%	59%	50-150%
	13C6-PFDA	104%	54%	50-150%
	13C7-PFUnDA	89%	57%	50-150%
	13C2-PFDoDA	103%	70%	50-150%
	13C2-PFTeDA	93%	51%	50-150%
	13C3-PFBS	80%	71%	50-150%
	13C3-PFHxS	78%	66%	50-150%
	13C8-PFOS	75%	54%	50-150%
	13C8-FOSA	37% ^C	27%	50-150%
	d3-MeFOSAA	110%	60%	50-150%
	13C2-4:2FTS	107%	83%	50-150%
	13C2-6:2FTS	118%	81%	50-150%
	13C2-8:2FTS	99%	59%	50-150%

(a) Confirmation run.

(b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(c) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

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

Page 1 of 2

Client Sample ID:	X-9AR_121918				
Lab Sample ID:	FA60391-13			Date Sampled:	12/19/18
Matrix:	AQ - Ground Water			Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD			Percent Solids:	n/a
Project:	Racer Saginaw				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26041.D	1	01/03/19 06:47	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00598	0.0080	0.0040	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	X-9AR_121918			Date Sampled:	12/19/18
Lab Sample ID:	FA60391-13			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID	Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA		93%		50-150%
	13C5-PFPeA		103%		50-150%
	13C5-PFHxA		111%		50-150%
	13C4-PFHpA		112%		50-150%
	13C8-PFOA		138%		50-150%
	13C9-PFNA		125%		50-150%
	13C6-PFDA		142%		50-150%
	13C7-PFUnDA		142%		50-150%
	13C2-PFDoDA		130%		50-150%
	13C2-PFTeDA		99%		50-150%
	13C3-PFBS		97%		50-150%
	13C3-PFHxS		104%		50-150%
	13C8-PFOS		104%		50-150%
	13C8-FOSA		125%		50-150%
	d3-MeFOSAA		119%		50-150%
	13C2-4:2FTS		107%		50-150%
	13C2-6:2FTS		132%		50-150%
	13C2-8:2FTS		137%		50-150%

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

Page 1 of 2

Client Sample ID:	MW-183WT_121918		
Lab Sample ID:	FA60391-14	Date Sampled:	12/19/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26042.D	1	01/03/19 07:03	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0114	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00207	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00166	0.0040	0.0020	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00150	0.0040	0.0020	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	MW-183WT_121918	Date Sampled:	12/19/18
Lab Sample ID:	FA60391-14	Date Received:	12/20/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID	Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	80%			50-150%
	13C5-PFPeA	87%			50-150%
	13C5-PFHxA	94%			50-150%
	13C4-PFHpA	96%			50-150%
	13C8-PFOA	122%			50-150%
	13C9-PFNA	107%			50-150%
	13C6-PFDA	114%			50-150%
	13C7-PFUnDA	101%			50-150%
	13C2-PFDoDA	100%			50-150%
	13C2-PFTeDA	82%			50-150%
	13C3-PFBS	82%			50-150%
	13C3-PFHxS	87%			50-150%
	13C8-PFOS	85%			50-150%
	13C8-FOSA	111%			50-150%
	d3-MeFOSAA	90%			50-150%
	13C2-4:2FTS	90%			50-150%
	13C2-6:2FTS	114%			50-150%
	13C2-8:2FTS	109%			50-150%

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:

- Chain of Custody
- QC Evaluation: DOD QSM5 Limits

FA60391

[illegible]

ORLD-SMT-0001-03-FORM-COC (4).xls Rev 031318

<http://www.sgs.com/en/terms-and-conditions>

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FA60391: Chain of Custody

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SGS North America Inc - Orlando

Chain of Custody

4405 Vineland Road, Suite C-15 Orlando, FL 32811
TEL: 407-425-6700 FAX: 407-425-0707
www.sgs.com

FA60391

SGS - ORLANDO JOB #:

PAGE 2 OF 2

Client / Reporting Information				Project Information				Analytical Information												Matrix Codes	
Company Name: ARCADIS				Project Name: RACON SAGINAW																DW - Drinking Water	
Address: 28550 CABOT DR				Street: 77-79 WEST LENOX ST.																GW - Ground Water	
City: NOVI State: MI Zip: 48371				City: SAGINAW State: MI																WW - Water	
Project Contact: SCOTT CECAMMER Email: SCOTT.CECAMMER@ARCADIS.COM				Project # 80064434.2018.00011																SW - Surface Water	
Phone #: 248.994.2240				Fax #: 248.994.2241																SO - Soil	
Sampler(s) Name(s) (Printed)				Client Purchase Order #																SL - Sludge	
Sampler 1: BUCKLE SAMPLER 2:																				OI - Oil	
SGS Orlando Sample #				COLLECTION				CONTAINER INFORMATION												LAB USE ONLY	
Field ID / Point of Collection				DATE	TIME	SAMPLED BY:	MATRIX	TOTAL # OF BOTTLES	OTHER	NO3	HCl	NaOH	INOS	HOSCA	NACH2N3	DI WATER	MECH				
7	X-2A-121818			4/18/18	14:40	BC	GW	2		X											
8	EA-01-121818			4/18/18	14:30	BC	WW	2		X											
9	MW-131WT-121818			4/18/18	15:20	BC	GW	2		X											
10	MW-134WT-121818			4/18/18	16:15	BC	GW	2		X											
11	MW-108WT-121818			4/18/18	17:10	BC	GW	2		X											
12	DUP-01-121818			4/18/18	—	BC	GW	2		X											
13	X-9AR-121918			4/19/18	9:40	BC	GW	2		X											
14	MW-183WT-121918			4/19/18	10:40	BC	GW	2		X											
Turnaround Time (Business days)				Data Deliverable Information				Comments / Remarks													
10 Day (Business) Approved By: / Date:				☐ COMMERCIAL "A" (RESULTS ONLY)				ANALYSIS PER LOG-IN LOGE LCQSM5370 ODFL													
7 Day				☐ COMMERCIAL "B" (RESULTS PLUS QC)																	
5 Day				☐ REDT1 (EPA LEVEL 3)																	
3 Day RUSH				☐ FULLT1 (EPA LEVEL 4)																	
2 Day RUSH				☐ EDD'S																	
1 Day RUSH																					
Other																					
Rush T/A Data Available VIA Email or Lablink				Sample Custody must be documented below each time samples change possession, including courier delivery.																	
Relinquished by Sampler/Affiliation		Date Time:		Received By/Affiliation		Relinquished By/Affiliation		Date Time:		Received By/Affiliation											
1 ARCADIS		4/18/18 15:45		2 Fed Ex		3 Fed Ex		4/18/18 15:45		4 JLC 12/20/18											
Relinquished by/Affiliation		Date Time:		Received By/Affiliation		Relinquished By/Affiliation		Date Time:		Received By/Affiliation											
5				6		7		8													
Lab Use Only : Cooler Temperature (s) Celsius (corrected):																		http://www.sgs.com/en/terms-and-conditions			

ORLD-SMT-0001-03-FORM-COC (4).xls Rev 031318

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FA60391: Chain of Custody

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SGS Sample Receipt Summary

Job Number: FA60391

Client: ARCADIS

Project: RACER SAGINAW

Date / Time Received: 12/20/2018 11:00:00 AM

Delivery Method: FED EX

Airbill #'s: 1002258372860003281100813939287596

Therm ID: IR 1;

Therm CF: -0.2;

of Coolers: 1

Cooler Temps (Raw Measured) °C: Cooler 1: (3.3);

Cooler Temps (Corrected) °C: Cooler 1: (3.1);

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 preserved properly ☒ ☐
3. Sufficient volume/containers recvd for analysis: ☒ ☐
4. Condition of sample Intact
5. Sample recvd 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 _____

Test Strip Lot #: pH 0-3 230315

Residual Chlorine Test Strip Lot #: _____

Number of 5035 Field Kits: _____

pH 10-12 219813A

Number of Lab Filtered Metals: _____

Other: (Specify) _____

Comments

SM001
Rev. Date 05/24/17

Technician: SHAYLAP

Date: 12/20/2018 11:00:00

Reviewer: _____

Date: _____

FA60391: Chain of Custody

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Job Change Order: FA60391

Requested Date:	1/14/2019	Received Date:	12/20/2018
Account Name:	Arcadis	Due Date:	1/4/2019
Project Description:	Racer Saginaw	Deliverable:	COMMB
CSR:	AC	TAT (Days):	1

=====

Sample #:	FA60391-4	Change:	
Dept:			Please change the sample ID to TW-98-111WT
TAT:	1		
TW98-111WT (121818)			

=====

FA60391: Chain of Custody

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Above Changes Per: Divya Kamath

Date/Time: 1/14/2019 4:14:49 PM

To Client: This Change Order is confirmation of the revisions, previously discussed with the Client Service Representative.

Page 1 of 1

QC Evaluation: DOD QSM5 Limits

Page 1 of 3

Job Number: FA60391
Account: Arcadis
Project: Racer Saginaw
Collected: 12/18/18 thru 12/19/18

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
MP34853 SW846 7470A							
MP34853-B1	7439-97-6	Mercury	BSP	REC	103.3	%	82-119
MP34853-S1*	7439-97-6	Mercury	MS	REC	89.3	%	82-119
MP34853-S2*	7439-97-6	Mercury	MSD	REC	92.7	%	82-119
MP34853-S2*	7439-97-6	Mercury	MSD	RPD	3.5	%	20
MP34853-D1*	7439-97-6	Mercury	DUP	RPD	24.3 ^a	%	20
MP34866 SW846 6010C							
MP34866-B1	7429-90-5	Aluminum	BSP	REC	100	%	86-115
MP34866-B1	7440-36-0	Antimony	BSP	REC	106.8	%	88-113
MP34866-B1	7440-38-2	Arsenic	BSP	REC	99	%	87-113
MP34866-B1	7440-39-3	Barium	BSP	REC	103.5	%	88-113
MP34866-B1	7440-41-7	Beryllium	BSP	REC	104	%	89-112
MP34866-B1	7440-43-9	Cadmium	BSP	REC	99.2	%	88-113
MP34866-B1	7440-70-2	Calcium	BSP	REC	100.4	%	87-113
MP34866-B1	7440-47-3	Chromium	BSP	REC	101	%	90-113
MP34866-B1	7440-48-4	Cobalt	BSP	REC	102.4	%	89-114
MP34866-B1	7440-50-8	Copper	BSP	REC	104.4	%	86-114
MP34866-B1	7439-89-6	Iron	BSP	REC	104.2	%	87-115
MP34866-B1	7439-92-1	Lead	BSP	REC	95.2	%	86-113
MP34866-B1	7439-95-4	Magnesium	BSP	REC	98	%	85-113
MP34866-B1	7439-96-5	Manganese	BSP	REC	104.4	%	90-114
MP34866-B1	7440-02-0	Nickel	BSP	REC	102.6	%	88-113
MP34866-B1	7440-09-7	Potassium	BSP	REC	102	%	86-114
MP34866-B1	7782-49-2	Selenium	BSP	REC	98.5	%	83-114
MP34866-B1	7440-22-4	Silver	BSP	REC	101.2	%	84-115
MP34866-B1	7440-23-5	Sodium	BSP	REC	103.2	%	87-115
MP34866-B1	7440-28-0	Thallium	BSP	REC	97	%	85-114
MP34866-B1	7440-62-2	Vanadium	BSP	REC	98.4	%	90-111
MP34866-B1	7440-66-6	Zinc	BSP	REC	99.8	%	87-115
MP34866-S1*	7429-90-5	Aluminum	MS	REC	98.3	%	86-115
MP34866-S1*	7440-36-0	Antimony	MS	REC	103.6	%	88-113
MP34866-S1*	7440-38-2	Arsenic	MS	REC	97.9	%	87-113
MP34866-S1*	7440-39-3	Barium	MS	REC	101.4	%	88-113
MP34866-S1*	7440-41-7	Beryllium	MS	REC	103	%	89-112
MP34866-S1*	7440-43-9	Cadmium	MS	REC	97.6	%	88-113
MP34866-S1*	7440-70-2	Calcium	MS	REC	97.6	%	87-113
MP34866-S1*	7440-47-3	Chromium	MS	REC	100.4	%	90-113
MP34866-S1*	7440-48-4	Cobalt	MS	REC	100	%	89-114
MP34866-S1*	7440-50-8	Copper	MS	REC	101.5	%	86-114
MP34866-S1*	7439-89-6	Iron	MS	REC	102.5	%	87-115
MP34866-S1*	7439-92-1	Lead	MS	REC	94.6	%	86-113

* Sample used for QC is not from job FA60391

QC Evaluation: DOD QSM5 Limits

Page 2 of 3

Job Number: FA60391
Account: Arcadis
Project: Racer Saginaw
Collected: 12/18/18 thru 12/19/18

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
MP34866-S1*	7439-95-4	Magnesium	MS	REC	97.9	%	85-113
MP34866-S1*	7439-96-5	Manganese	MS	REC	102.5	%	90-114
MP34866-S1*	7440-02-0	Nickel	MS	REC	99.5	%	88-113
MP34866-S1*	7440-09-7	Potassium	MS	REC	101.1	%	86-114
MP34866-S1*	7782-49-2	Selenium	MS	REC	96.9	%	83-114
MP34866-S1*	7440-22-4	Silver	MS	REC	98.8	%	84-115
MP34866-S1*	7440-23-5	Sodium	MS	REC	100	%	87-115
MP34866-S1*	7440-28-0	Thallium	MS	REC	94.9	%	85-114
MP34866-S1*	7440-62-2	Vanadium	MS	REC	97.4	%	90-111
MP34866-S1*	7440-66-6	Zinc	MS	REC	97.8	%	87-115
MP34866-S2*	7429-90-5	Aluminum	MSD	REC	98	%	86-115
MP34866-S2*	7429-90-5	Aluminum	MSD	RPD	.4	%	20
MP34866-S2*	7440-36-0	Antimony	MSD	REC	104.2	%	88-113
MP34866-S2*	7440-36-0	Antimony	MSD	RPD	.6	%	20
MP34866-S2*	7440-38-2	Arsenic	MSD	REC	97.9	%	87-113
MP34866-S2*	7440-38-2	Arsenic	MSD	RPD	0	%	20
MP34866-S2*	7440-39-3	Barium	MSD	REC	100.4	%	88-113
MP34866-S2*	7440-39-3	Barium	MSD	RPD	.9	%	20
MP34866-S2*	7440-41-7	Beryllium	MSD	REC	101.6	%	89-112
MP34866-S2*	7440-41-7	Beryllium	MSD	RPD	1.4	%	20
MP34866-S2*	7440-43-9	Cadmium	MSD	REC	97	%	88-113
MP34866-S2*	7440-43-9	Cadmium	MSD	RPD	.6	%	20
MP34866-S2*	7440-70-2	Calcium	MSD	REC	96	%	87-113
MP34866-S2*	7440-70-2	Calcium	MSD	RPD	.7	%	20
MP34866-S2*	7440-47-3	Chromium	MSD	REC	98.9	%	90-113
MP34866-S2*	7440-47-3	Chromium	MSD	RPD	1.5	%	20
MP34866-S2*	7440-48-4	Cobalt	MSD	REC	99.2	%	89-114
MP34866-S2*	7440-48-4	Cobalt	MSD	RPD	.8	%	20
MP34866-S2*	7440-50-8	Copper	MSD	REC	100.7	%	86-114
MP34866-S2*	7440-50-8	Copper	MSD	RPD	.8	%	20
MP34866-S2*	7439-89-6	Iron	MSD	REC	101.7	%	87-115
MP34866-S2*	7439-89-6	Iron	MSD	RPD	.7	%	20
MP34866-S2*	7439-92-1	Lead	MSD	REC	93.4	%	86-113
MP34866-S2*	7439-92-1	Lead	MSD	RPD	1.3	%	20
MP34866-S2*	7439-95-4	Magnesium	MSD	REC	96.7	%	85-113
MP34866-S2*	7439-95-4	Magnesium	MSD	RPD	1.1	%	20
MP34866-S2*	7439-96-5	Manganese	MSD	REC	102.1	%	90-114
MP34866-S2*	7439-96-5	Manganese	MSD	RPD	.4	%	20
MP34866-S2*	7440-02-0	Nickel	MSD	REC	99.1	%	88-113
MP34866-S2*	7440-02-0	Nickel	MSD	RPD	.4	%	20
MP34866-S2*	7440-09-7	Potassium	MSD	REC	99.9	%	86-114
MP34866-S2*	7440-09-7	Potassium	MSD	RPD	1.2	%	20
MP34866-S2*	7782-49-2	Selenium	MSD	REC	96.4	%	83-114
MP34866-S2*	7782-49-2	Selenium	MSD	RPD	.5	%	20
MP34866-S2*	7440-22-4	Silver	MSD	REC	100	%	84-115

* Sample used for QC is not from job FA60391

QC Evaluation: DOD QSM5 Limits

Page 3 of 3

Job Number: FA60391
Account: Arcadis
Project: Racer Saginaw
Collected: 12/18/18 thru 12/19/18

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
MP34866-S2*	7440-22-4	Silver	MSD	RPD	1.2	%	20
MP34866-S2*	7440-23-5	Sodium	MSD	REC	97.2	%	87-115
MP34866-S2*	7440-23-5	Sodium	MSD	RPD	1.2	%	20
MP34866-S2*	7440-28-0	Thallium	MSD	REC	93.9	%	85-114
MP34866-S2*	7440-28-0	Thallium	MSD	RPD	1.1	%	20
MP34866-S2*	7440-62-2	Vanadium	MSD	REC	96.8	%	90-111
MP34866-S2*	7440-62-2	Vanadium	MSD	RPD	.6	%	20
MP34866-S2*	7440-66-6	Zinc	MSD	REC	96.8	%	87-115
MP34866-S2*	7440-66-6	Zinc	MSD	RPD	1	%	20
MP34866-D1*	7429-90-5	Aluminum	DUP	RPD	7.8	%	20
MP34866-D1*	7440-36-0	Antimony	DUP	RPD	200 ^a	%	20
MP34866-D1*	7440-38-2	Arsenic	DUP	RPD	200 ^a	%	20
MP34866-D1*	7440-39-3	Barium	DUP	RPD	0	%	20
MP34866-D1*	7440-41-7	Beryllium	DUP	RPD	0	%	20
MP34866-D1*	7440-43-9	Cadmium	DUP	RPD	0	%	20
MP34866-D1*	7440-70-2	Calcium	DUP	RPD	.3	%	20
MP34866-D1*	7440-47-3	Chromium	DUP	RPD	200 ^a	%	20
MP34866-D1*	7440-48-4	Cobalt	DUP	RPD	200 ^a	%	20
MP34866-D1*	7440-50-8	Copper	DUP	RPD	13.3	%	20
MP34866-D1*	7439-89-6	Iron	DUP	RPD	6.4	%	20
MP34866-D1*	7439-92-1	Lead	DUP	RPD	7.6	%	20
MP34866-D1*	7439-95-4	Magnesium	DUP	RPD	.8	%	20
MP34866-D1*	7439-96-5	Manganese	DUP	RPD	.5	%	20
MP34866-D1*	7440-02-0	Nickel	DUP	RPD	4.1	%	20
MP34866-D1*	7440-09-7	Potassium	DUP	RPD	2.4	%	20
MP34866-D1*	7782-49-2	Selenium	DUP	RPD	12.6	%	20
MP34866-D1*	7440-22-4	Silver	DUP	RPD	0	%	20
MP34866-D1*	7440-23-5	Sodium	DUP	RPD	.6	%	20
MP34866-D1*	7440-28-0	Thallium	DUP	RPD	200 ^a	%	20
MP34866-D1*	7440-62-2	Vanadium	DUP	RPD	5.6	%	20
MP34866-D1*	7440-66-6	Zinc	DUP	RPD	2.1	%	20

(a) RPD acceptable due to low duplicate and sample concentrations.

* Sample used for QC is not from job FA60391

MS Semi-volatiles

5

QC Data Summaries

Includes the following where applicable:

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

Instrument Blank

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Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q400-IBLK	2Q25967.D	1	01/02/19	NAF	n/a	n/a	S2Q400

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60391-1, FA60391-2, FA60391-3, FA60391-4, FA60391-5, FA60391-6, FA60391-7, FA60391-8, FA60391-9, FA60391-10, FA60391-11, FA60391-12, FA60391-13, FA60391-14

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.015	0.0038	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0077	0.0029	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0077	0.0019	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0077	0.0019	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0077	0.0019	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0077	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0077	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0077	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0077	0.0029	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0077	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0077	0.0019	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0077	0.0019	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0077	0.0019	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0077	0.0019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0077	0.0019	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.015	0.0038	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0077	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0077	0.0019	ug/l	
754-91-6	PFOSA	ND	0.0077	0.0019	ug/l	
2355-31-9	MeFOSAA	ND	0.038	0.0077	ug/l	
2991-50-6	EtFOSAA	ND	0.038	0.0077	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	

CAS No.	ID Standard Recoveries	Limits	
	13C4-PFBA	99%	50-150%
	13C5-PFPeA	99%	50-150%
	13C5-PFHxA	101%	50-150%
	13C4-PFHpA	99%	50-150%
	13C8-PFOA	105%	50-150%
	13C9-PFNA	104%	50-150%
	13C6-PFDA	109%	50-150%
	13C7-PFUnDA	110%	50-150%

Instrument Blank

Page 2 of 2

Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q400-IBLK	2Q25967.D	1	01/02/19	NAF	n/a	n/a	S2Q400

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60391-1, FA60391-2, FA60391-3, FA60391-4, FA60391-5, FA60391-6, FA60391-7, FA60391-8, FA60391-9, FA60391-10, FA60391-11, FA60391-12, FA60391-13, FA60391-14

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	105% 50-150%
	13C2-PFTeDA	104% 50-150%
	13C3-PFBS	99% 50-150%
	13C3-PFHxS	99% 50-150%
	13C8-PFOS	101% 50-150%
	13C8-FOSA	107% 50-150%
	d3-MeFOSAA	105% 50-150%
	13C2-4:2FTS	94% 50-150%
	13C2-6:2FTS	97% 50-150%
	13C2-8:2FTS	98% 50-150%

Instrument Blank

Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q403-IBLK	2Q26169.D	1	01/08/19	NAF	n/a	n/a	S2Q403

The QC reported here applies to the following samples: Method: EPA 537M QSM5.1 B-15
FA60391-4

CAS No. Compound Result RL MDL Units Q

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	98% 50-150%
	13C5-PFPeA	90% 50-150%
	13C5-PFHxA	88% 50-150%
	13C4-PFHpA	88% 50-150%
	13C8-PFOA	81% 50-150%
	13C9-PFNA	79% 50-150%
	13C6-PFDA	75% 50-150%
	13C7-PFUnDA	72% 50-150%
	13C2-PFDoDA	63% 50-150%
	13C2-PFTeDA	59% 50-150%
	13C3-PFBS	99% 50-150%
	13C3-PFHxS	97% 50-150%
	13C8-PFOS	98% 50-150%
	13C8-FOSA	96% 50-150%
	d3-MeFOSAA	69% 50-150%
	13C2-4:2FTS	77% 50-150%
	13C2-6:2FTS	73% 50-150%
	13C2-8:2FTS	62% 50-150%

Method Blank Summary

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Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73201-MB	2Q26024.D	1	01/03/19	NAF	12/27/18	OP73201	S2Q400

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60391-1, FA60391-2, FA60391-3, FA60391-4, FA60391-5, FA60391-6, FA60391-7, FA60391-8, FA60391-9, FA60391-10, FA60391-11, FA60391-12, FA60391-13, FA60391-14

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	0.0015	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	0.0015	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	0.0080	0.0020	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	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-44:2	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	114% 50-150%
	13C5-PFPeA	107% 50-150%
	13C5-PFHxA	110% 50-150%
	13C4-PFHpA	110% 50-150%
	13C8-PFOA	123% 50-150%
	13C9-PFNA	115% 50-150%
	13C6-PFDA	138% 50-150%
	13C7-PFUnDA	130% 50-150%

Method Blank Summary

Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73201-MB	2Q26024.D	1	01/03/19	NAF	12/27/18	OP73201	S2Q400

The QC reported here applies to the following samples: Method: EPA 537M QSM5.1 B-15

FA60391-1, FA60391-2, FA60391-3, FA60391-4, FA60391-5, FA60391-6, FA60391-7, FA60391-8, FA60391-9, FA60391-10, FA60391-11, FA60391-12, FA60391-13, FA60391-14

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	120% 50-150%
	13C2-PFTeDA	93% 50-150%
	13C3-PFBS	105% 50-150%
	13C3-PFHxS	108% 50-150%
	13C8-PFOS	107% 50-150%
	13C8-FOSA	115% 50-150%
	d3-MeFOSAA	119% 50-150%
	13C2-4:2FTS	107% 50-150%
	13C2-6:2FTS	115% 50-150%
	13C2-8:2FTS	119% 50-150%

Method Blank Summary

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Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73281-MB	2Q26173.D	1	01/08/19	NAF	01/04/19	OP73281	S2Q403

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60391-4

CAS No.	Compound	Result	RL	MDL	Units	Q
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CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	112% 50-150%
	13C5-PFPeA	97% 50-150%
	13C5-PFHxA	94% 50-150%
	13C4-PFHpA	90% 50-150%
	13C8-PFOA	87% 50-150%
	13C9-PFNA	83% 50-150%
	13C6-PFDA	79% 50-150%
	13C7-PFUnDA	65% 50-150%
	13C2-PFDoDA	69% 50-150%
	13C2-PFTeDA	46%* a 50-150%
	13C3-PFBS	108% 50-150%
	13C3-PFHxS	103% 50-150%
	13C8-PFOS	104% 50-150%
	13C8-FOSA	101% 50-150%
	d3-MeFOSAA	68% 50-150%
	13C2-4:2FTS	88% 50-150%
	13C2-6:2FTS	83% 50-150%
	13C2-8:2FTS	68% 50-150%

(a) Outside control limits.

Blank Spike Summary

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Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73201-BS	2Q26023.D	1	01/03/19	NAF	12/27/18	OP73201	S2Q400

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60391-1, FA60391-2, FA60391-3, FA60391-4, FA60391-5, FA60391-6, FA60391-7, FA60391-8, FA60391-9, FA60391-10, FA60391-11, FA60391-12, FA60391-13, FA60391-14

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0799	100	50-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0768	96	50-131
307-24-4	Perfluorohexanoic acid	0.08	0.0688	86	63-146
375-85-9	Perfluoroheptanoic acid	0.08	0.0782	98	71-138
335-67-1	Perfluorooctanoic acid	0.08	0.0765	96	74-137
375-95-1	Perfluorononanoic acid	0.08	0.0694	87	76-140
335-76-2	Perfluorodecanoic acid	0.08	0.0698	87	65-148
2058-94-8	Perfluoroundecanoic acid	0.08	0.0719	90	57-138
307-55-1	Perfluorododecanoic acid	0.08	0.0836	105	58-123
72629-94-8	Perfluorotridecanoic acid	0.08	0.0903	113	52-130
376-06-7	Perfluorotetradecanoic acid	0.08	0.0773	97	59-132
375-73-5	Perfluorobutanesulfonic acid	0.0708	0.0658	93	73-148
2706-91-4	Perfluoropentanesulfonic acid	0.0752	0.0681	91	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0728	0.0652	90	74-142
375-92-8	Perfluoroheptanesulfonic acid	0.076	0.0769	101	74-133
1763-23-1	Perfluorooctanesulfonic acid	0.074	0.0718	97	70-134
68259-12-1	Perfluorononanesulfonic acid	0.0768	0.0638	83	70-130
335-77-3	Perfluorodecanesulfonic acid	0.0772	0.0521	67	56-127
754-91-6	PFOSA	0.08	0.0791	99	50-142
2355-31-9	MeFOSAA	0.08	0.0782	98	57-128
2991-50-6	EtFOSAA	0.08	0.0700	88	55-135
757124-72-44:2	Fluorotelomer sulfonate	0.0748	0.0724	97	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.076	0.0732	96	70-143
39108-34-4	8:2 Fluorotelomer sulfonate	0.0768	0.0715	93	61-144

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	102%	50-150%
	13C5-PFPeA	97%	50-150%
	13C5-PFHxA	100%	50-150%
	13C4-PFHpA	97%	50-150%
	13C8-PFOA	106%	50-150%
	13C9-PFNA	100%	50-150%
	13C6-PFDA	112%	50-150%
	13C7-PFUnDA	101%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Page 2 of 2

Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73201-BS	2Q26023.D	1	01/03/19	NAF	12/27/18	OP73201	S2Q400

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60391-1, FA60391-2, FA60391-3, FA60391-4, FA60391-5, FA60391-6, FA60391-7, FA60391-8, FA60391-9, FA60391-10, FA60391-11, FA60391-12, FA60391-13, FA60391-14

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	97%	50-150%
	13C2-PFTeDA	80%	50-150%
	13C3-PFBS	97%	50-150%
	13C3-PFHxS	96%	50-150%
	13C8-PFOS	96%	50-150%
	13C8-FOSA	99%	50-150%
	d3-MeFOSAA	101%	50-150%
	13C2-4:2FTS	100%	50-150%
	13C2-6:2FTS	106%	50-150%
	13C2-8:2FTS	105%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Page 1 of 1

Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73281-BS ^a	2Q26172.D	1	01/08/19	NAF	01/04/19	OP73281	S2Q403

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60391-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
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CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	110%	50-150%
	13C5-PFPeA	97%	50-150%
	13C5-PFHxA	93%	50-150%
	13C4-PFHpA	89%	50-150%
	13C8-PFOA	84%	50-150%
	13C9-PFNA	79%	50-150%
	13C6-PFDA	77%	50-150%
	13C7-PFUnDA	68%	50-150%
	13C2-PFDoDA	89%	50-150%
	13C2-PFTeDA	57%	50-150%
	13C3-PFBS	108%	50-150%
	13C3-PFHxS	102%	50-150%
	13C8-PFOS	100%	50-150%
	13C8-FOSA	95%	50-150%
	d3-MeFOSAA	70%	50-150%
	13C2-4:2FTS	91%	50-150%
	13C2-6:2FTS	82%	50-150%
	13C2-8:2FTS	73%	50-150%

(a) Insufficient sample for MS/MSD.

* = Outside of Control Limits.

Matrix Spike Summary

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Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73201-MS	2Q26036.D	1	01/03/19	NAF	12/27/18	OP73201	S2Q400
FA60391-9	2Q26035.D	1	01/03/19	NAF	12/27/18	OP73201	S2Q400

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60391-1, FA60391-2, FA60391-3, FA60391-4, FA60391-5, FA60391-6, FA60391-7, FA60391-8, FA60391-9, FA60391-10, FA60391-11, FA60391-12, FA60391-13, FA60391-14

CAS No.	Compound	FA60391-9 ug/l	Spike Q	MS ug/l	MS %	Limits
375-22-4	Perfluorobutanoic acid	0.00414 J	0.08	0.0830	99	50-130
2706-90-3	Perfluoropentanoic acid	0.00224 J	0.08	0.0811	99	50-131
307-24-4	Perfluorohexanoic acid	0.00114 J	0.08	0.0688	85	63-146
375-85-9	Perfluoroheptanoic acid	0.00120 J	0.08	0.0775	95	71-138
335-67-1	Perfluorooctanoic acid	0.00238 J	0.08	0.0801	97	74-137
375-95-1	Perfluorononanoic acid	0.0040 U	0.08	0.0693	87	76-140
335-76-2	Perfluorodecanoic acid	0.0040 U	0.08	0.0700	88	65-148
2058-94-8	Perfluoroundecanoic acid	0.0040 U	0.08	0.0796	100	57-138
307-55-1	Perfluorododecanoic acid	0.0040 U	0.08	0.0826	103	58-123
72629-94-8	Perfluorotridecanoic acid	0.0040 U	0.08	0.0789	99	52-130
376-06-7	Perfluorotetradecanoic acid	0.0040 U	0.08	0.0779	97	59-132
375-73-5	Perfluorobutanesulfonic acid	0.00172 J	0.0708	0.0674	93	73-148
2706-91-4	Perfluoropentanesulfonic acid	0.0040 U	0.0752	0.0752	100	70-130
355-46-4	Perfluorohexanesulfonic acid	0.00421	0.0728	0.0702	91	74-142
375-92-8	Perfluoroheptanesulfonic acid	0.0040 U	0.076	0.0786	103	74-133
1763-23-1	Perfluorooctanesulfonic acid	0.00488 J	0.074	0.0748	94	70-134
68259-12-1	Perfluorononanesulfonic acid	0.0040 U	0.0768	0.0618	80	70-130
335-77-3	Perfluorodecanesulfonic acid	0.0040 U	0.0772	0.0493	64	56-127
754-91-6	PFOSA	0.0040 U	0.08	0.0769	96	50-142
2355-31-9	MeFOSAA	0.020 U	0.08	0.0796	100	57-128
2991-50-6	EtFOSAA	0.020 U	0.08	0.0703	88	55-135
757124-72-44:2	Fluorotelomer sulfonate	0.0080 U	0.0748	0.0721	96	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.0080 U	0.076	0.0744	98	70-143
39108-34-4	8:2 Fluorotelomer sulfonate	0.0080 U	0.0768	0.0678	88	61-144

CAS No.	ID Standard Recoveries	MS	FA60391-9	Limits
	13C4-PFBA	81%	76%	50-150%
	13C5-PFPeA	88%	83%	50-150%
	13C5-PFHxA	96%	91%	50-150%
	13C4-PFHpA	102%	94%	50-150%
	13C8-PFOA	117%	114%	50-150%
	13C9-PFNA	108%	112%	50-150%
	13C6-PFDA	111%	112%	50-150%
	13C7-PFUnDA	97%	100%	50-150%

* = Outside of Control Limits.

Matrix Spike Summary

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Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73201-MS	2Q26036.D	1	01/03/19	NAF	12/27/18	OP73201	S2Q400
FA60391-9	2Q26035.D	1	01/03/19	NAF	12/27/18	OP73201	S2Q400

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60391-1, FA60391-2, FA60391-3, FA60391-4, FA60391-5, FA60391-6, FA60391-7, FA60391-8, FA60391-9, FA60391-10, FA60391-11, FA60391-12, FA60391-13, FA60391-14

CAS No.	ID Standard Recoveries	MS	FA60391-9	Limits
	13C2-PFDoDA	102%	103%	50-150%
	13C2-PFTeDA	94%	95%	50-150%
	13C3-PFBS	81%	76%	50-150%
	13C3-PFHxS	91%	84%	50-150%
	13C8-PFOS	96%	93%	50-150%
	13C8-FOSA	103%	111%	50-150%
	d3-MeFOSAA	90%	92%	50-150%
	13C2-4:2FTS	104%	93%	50-150%
	13C2-6:2FTS	123%	115%	50-150%
	13C2-8:2FTS	113%	109%	50-150%

* = Outside of Control Limits.

Duplicate Summary

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Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73201-DUP	2Q26039.D	1	01/03/19	NAF	12/27/18	OP73201	S2Q400
FA60391-11	2Q26038.D	1	01/03/19	NAF	12/27/18	OP73201	S2Q400

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60391-1, FA60391-2, FA60391-3, FA60391-4, FA60391-5, FA60391-6, FA60391-7, FA60391-8, FA60391-9, FA60391-10, FA60391-11, FA60391-12, FA60391-13, FA60391-14

CAS No.	Compound	FA60391-11 DUP		Q	RPD	Limits
		ug/l	Q ug/l			
375-22-4	Perfluorobutanoic acid	0.00302 J	0.00312 J	3		30
2706-90-3	Perfluoropentanoic acid	0.00177 J	0.00177 J	0		30
307-24-4	Perfluorohexanoic acid	0.0040 U	0.00128 J	200*		30
375-85-9	Perfluoroheptanoic acid	0.0040 U	ND	nc		30
335-67-1	Perfluorooctanoic acid	0.00366 J	0.00401	9		30
375-95-1	Perfluorononanoic acid	0.0040 U	ND	nc		30
335-76-2	Perfluorodecanoic acid	0.0040 U	ND	nc		30
2058-94-8	Perfluoroundecanoic acid	0.0040 U	ND	nc		30
307-55-1	Perfluorododecanoic acid	0.0040 U	ND	nc		30
72629-94-8	Perfluorotridecanoic acid	0.0040 U	ND	nc		30
376-06-7	Perfluorotetradecanoic acid	0.0040 U	ND	nc		30
375-73-5	Perfluorobutanesulfonic acid	0.0040 U	0.00105 J	200*		30
2706-91-4	Perfluoropentanesulfonic acid	0.0040 U	ND	nc		30
355-46-4	Perfluorohexanesulfonic acid	0.00192 J	0.00197 J	3		30
375-92-8	Perfluoroheptanesulfonic acid	0.0040 U	ND	nc		30
1763-23-1	Perfluorooctanesulfonic acid	0.00263 J	0.00292 J	10		30
68259-12-1	Perfluorononanesulfonic acid	0.0040 U	ND	nc		30
335-77-3	Perfluorodecanesulfonic acid	0.0040 U	ND	nc		30
754-91-6	PFOSA	0.0040 U	ND	nc		30
2355-31-9	MeFOSAA	0.020 U	ND	nc		30
2991-50-6	EtFOSAA	0.020 U	ND	nc		30
757124-72-44:2	Fluorotelomer sulfonate	0.0080 U	ND	nc		30
27619-97-2	6:2 Fluorotelomer sulfonate	0.0080 U	ND	nc		30
39108-34-4	8:2 Fluorotelomer sulfonate	0.0080 U	ND	nc		30

CAS No.	ID Standard Recoveries	DUP	FA60391-11	Limits
	13C4-PFBA	80%	85%	50-150%
	13C5-PFPeA	86%	92%	50-150%
	13C5-PFHxA	93%	100%	50-150%
	13C4-PFHpA	99%	105%	50-150%
	13C8-PFOA	112%	121%	50-150%
	13C9-PFNA	108%	125%	50-150%
	13C6-PFDA	107%	126%	50-150%
	13C7-PFUnDA	100%	118%	50-150%

* = Outside of Control Limits.

Duplicate Summary

Page 2 of 2

Job Number: FA60391
Account: ARCMIN Arcadis
Project: Racer Saginaw

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73201-DUP	2Q26039.D	1	01/03/19	NAF	12/27/18	OP73201	S2Q400
FA60391-11	2Q26038.D	1	01/03/19	NAF	12/27/18	OP73201	S2Q400

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60391-1, FA60391-2, FA60391-3, FA60391-4, FA60391-5, FA60391-6, FA60391-7, FA60391-8, FA60391-9, FA60391-10, FA60391-11, FA60391-12, FA60391-13, FA60391-14

CAS No.	ID Standard Recoveries	DUP	FA60391-11	Limits
	13C2-PFDoDA	108%	137%	50-150%
	13C2-PFTeDA	90%	119%	50-150%
	13C3-PFBS	79%	83%	50-150%
	13C3-PFHxS	87%	93%	50-150%
	13C8-PFOS	96%	103%	50-150%
	13C8-FOSA	102%	121%	50-150%
	d3-MeFOSAA	92%	102%	50-150%
	13C2-4:2FTS	95%	102%	50-150%
	13C2-6:2FTS	115%	124%	50-150%
	13C2-8:2FTS	103%	116%	50-150%

* = Outside of Control Limits.



Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: FA60391
Account: ARCMIN - Arcadis
Project: Racer Saginaw

QC Batch ID: MP34853
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 12/24/18

Metal	RL	IDL	MDL	MB raw	final
Mercury	0.50	.03	.03	0.023	<0.50

Associated samples MP34853: FA60391-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: FA60391
Account: ARCMIN - Arcadis
Project: Racer Saginaw

QC Batch ID: MP34853
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 12/24/18 12/24/18

Metal	FA60406-1 Original	DUP	RPD	QC Limits	FA60406-1 Original MS	Spikelot HGFLWS1	% Rec	QC Limits
Mercury	0.12	0.094	24.3 (a)	0-20	0.12 2.8	3	89.3	80-120

Associated samples MP34853: FA60391-1F

Results < IDL are shown as zero for calculation purposes

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

(anr) Analyte not requested

(a) RPD acceptable due to low duplicate and sample concentrations.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: FA60391
 Account: ARCMIN - Arcadis
 Project: Racer Saginaw

QC Batch ID: MP34853
 Matrix Type: AQUEOUS

Methods: SW846 7470A
 Units: ug/l

Prep Date: 12/24/18

Metal	FA60406-1 Original MSD	Spike lot HGFLWS1	% Rec	MSD RPD	QC Limit
Mercury	0.12 2.9	3	92.7	3.5	20

Associated samples MP34853: FA60391-1F

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits
 (N) Matrix Spike Rec. outside of QC limits
 (anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: FA60391
 Account: ARCMIN - Arcadis
 Project: Racer Saginaw

QC Batch ID: MP34853
 Matrix Type: AQUEOUS

Methods: SW846 7470A
 Units: ug/l

Prep Date: 12/24/18

Metal	BSP Result	Spike lot HGFLWS1	% Rec	QC Limits
Mercury	3.1	3	103.3	80-120

Associated samples MP34853: FA60391-1F

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits
 (anr) Analyte not requested

6.1.3

6

SERIAL DILUTION RESULTS SUMMARY

Login Number: FA60391
Account: ARCMIN - Arcadis
Project: Racer Saginaw

QC Batch ID: MP34853
Matrix Type: AQUEOUS

Methods: SW846 7470A
Units: ug/l

Prep Date: 12/24/18

Metal	FA60406-1		QC	
	Original	SDL 1:5	%DIF	Limits

Mercury	0.121	0.00	100.0(a)	0-10
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Associated samples MP34853: FA60391-1F

Results < IDL are shown as zero for calculation purposes

(*) Outside of QC limits

(anr) Analyte not requested

(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: FA60391
Account: ARCMIN - Arcadis
Project: Racer Saginaw

QC Batch ID: MP34866
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 12/27/18

Metal	RL	IDL	MDL	MB raw	final
Aluminum	200	14	14	12.0	<200
Antimony	6.0	1	1	-1.2	<6.0
Arsenic	10	1.3	1.3	0.70	<10
Barium	200	1	1	-0.10	<200
Beryllium	4.0	.2	.2	0.0	<4.0
Cadmium	5.0	.2	.2	0.0	<5.0
Calcium	1000	50	50	12.1	<1000
Chromium	10	1	1	0.0	<10
Cobalt	50	.2	.2	-0.10	<50
Copper	25	1	1	0.30	<25
Iron	300	17	17	25.5	<300
Lead	5.0	1	1.1	0.0	<5.0
Magnesium	5000	35	35	-7.8	<5000
Manganese	15	.5	1	0.20	<15
Molybdenum	50	.3	.3		
Nickel	40	.4	.4	-0.10	<40
Potassium	10000	200	200	7.5	<10000
Selenium	10	2.4	2.9	-1.6	<10
Silver	10	.7	.7	-0.30	<10
Sodium	10000	500	500	33.8	<10000
Strontium	10	.5	.5		
Thallium	10	1.1	1.4	-0.30	<10
Tin	50	.9	1		
Titanium	10	.5	1		
Vanadium	50	.5	.6	0.0	<50
Zinc	20	3	4.4	1.8	<20

Associated samples MP34866: FA60391-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: FA60391
Account: ARCMIN - Arcadis
Project: Racer Saginaw

QC Batch ID: MP34866
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date:

12/27/18

12/27/18

Metal	FA60398-5 Original DUP		RPD	QC Limits	FA60398-5 Original MS		Spikelot MPFLICP2 % Rec		QC Limits
Aluminum	652	603	7.8	0-20	652	27200	27000	98.3	80-120
Antimony	0.0	1.8	200.0(a)	0-20	0.0	518	500	103.6	80-120
Arsenic	1.6	0.0	200.0(a)	0-20	1.6	1960	2000	97.9	80-120
Barium	143	143	0.0	0-20	143	2170	2000	101.4	80-120
Beryllium	0.0	0.0	NC	0-20	0.0	51.5	50	103.0	80-120
Cadmium	0.0	0.0	NC	0-20	0.0	48.8	50	97.6	80-120
Calcium	30600	30700	0.3	0-20	30600	55000	25000	97.6	80-120
Chromium	1.2	0.0	200.0(a)	0-20	1.2	202	200	100.4	80-120
Cobalt	0.20	0.0	200.0(a)	0-20	0.20	500	500	100.0	80-120
Copper	3.2	2.8	13.3	0-20	3.2	257	250	101.5	80-120
Iron	552	518	6.4	0-20	552	27200	26000	102.5	80-120
Lead	3.8	4.1	7.6	0-20	3.8	477	500	94.6	80-120
Magnesium	3920	3890	0.8	0-20	3920	28400	25000	97.9	80-120
Manganese	21.7	21.6	0.5	0-20	21.7	534	500	102.5	80-120
Molybdenum	anr								
Nickel	2.4	2.5	4.1	0-20	2.4	500	500	99.5	80-120
Potassium	514	502	2.4	0-20	514	25800	25000	101.1	80-120
Selenium	11.8	10.4	12.6	0-20	11.8	1950	2000	96.9	80-120
Silver	0.0	0.0	NC	0-20	0.0	49.4	50	98.8	80-120
Sodium	32000	31800	0.6	0-20	32000	57000	25000	100.0	80-120
Strontium									
Thallium	1.4	0.0	200.0(a)	0-20	1.4	1900	2000	94.9	80-120
Tin	anr								
Titanium									
Vanadium	5.2	5.5	5.6	0-20	5.2	492	500	97.4	80-120
Zinc	4.8	4.9	2.1	0-20	4.8	494	500	97.8	80-120

Associated samples MP34866: FA60391-1F

Results < IDL are shown as zero for calculation purposes

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

(anr) Analyte not requested

(a) RPD acceptable due to low duplicate and sample concentrations.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: FA60391
Account: ARCMIN - Arcadis
Project: Racer Saginaw

QC Batch ID: MP34866
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 12/27/18

Metal	FA60398-5 Original	MSD	Spike lot MPFLICP2	% Rec	MSD RPD	QC Limit
Aluminum	652	27100	27000	98.0	0.4	20
Antimony	0.0	521	500	104.2	0.6	20
Arsenic	1.6	1960	2000	97.9	0.0	20
Barium	143	2150	2000	100.4	0.9	20
Beryllium	0.0	50.8	50	101.6	1.4	20
Cadmium	0.0	48.5	50	97.0	0.6	20
Calcium	30600	54600	25000	96.0	0.7	20
Chromium	1.2	199	200	98.9	1.5	20
Cobalt	0.20	496	500	99.2	0.8	20
Copper	3.2	255	250	100.7	0.8	20
Iron	552	27000	26000	101.7	0.7	20
Lead	3.8	471	500	93.4	1.3	20
Magnesium	3920	28100	25000	96.7	1.1	20
Manganese	21.7	532	500	102.1	0.4	20
Molybdenum	anr					
Nickel	2.4	498	500	99.1	0.4	20
Potassium	514	25500	25000	99.9	1.2	20
Selenium	11.8	1940	2000	96.4	0.5	20
Silver	0.0	50.0	50	100.0	1.2	20
Sodium	32000	56300	25000	97.2	1.2	20
Strontium						
Thallium	1.4	1880	2000	93.9	1.1	20
Tin	anr					
Titanium						
Vanadium	5.2	489	500	96.8	0.6	20
Zinc	4.8	489	500	96.8	1.0	20

Associated samples MP34866: FA60391-1F

Results < IDL are shown as zero for calculation purposes

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: FA60391
 Account: ARCMIN - Arcadis
 Project: Racer Saginaw

QC Batch ID: MP34866
 Matrix Type: AQUEOUS

Methods: SW846 6010C
 Units: ug/l

Prep Date: 12/27/18

Metal	BSP Result	Spike lot MPFLICP2	% Rec	QC Limits
Aluminum	27000	27000	100.0	80-120
Antimony	534	500	106.8	80-120
Arsenic	1980	2000	99.0	80-120
Barium	2070	2000	103.5	80-120
Beryllium	52.0	50	104.0	80-120
Cadmium	49.6	50	99.2	80-120
Calcium	25100	25000	100.4	80-120
Chromium	202	200	101.0	80-120
Cobalt	512	500	102.4	80-120
Copper	261	250	104.4	80-120
Iron	27100	26000	104.2	80-120
Lead	476	500	95.2	80-120
Magnesium	24500	25000	98.0	80-120
Manganese	522	500	104.4	80-120
Molybdenum	anr			
Nickel	513	500	102.6	80-120
Potassium	25500	25000	102.0	80-120
Selenium	1970	2000	98.5	80-120
Silver	50.6	50	101.2	80-120
Sodium	25800	25000	103.2	80-120
Strontium				
Thallium	1940	2000	97.0	80-120
Tin	anr			
Titanium				
Vanadium	492	500	98.4	80-120
Zinc	499	500	99.8	80-120

Associated samples MP34866: FA60391-1F

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits
 (anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: FA60391
Account: ARCMIN - Arcadis
Project: Racer Saginaw

QC Batch ID: MP34866
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date: 12/27/18

Metal	FA60398-5 Original	SDL 1:5	%DIF	QC Limits
Aluminum	652	745	14.3 (a)	0-10
Antimony	0.00	0.00	NC	0-10
Arsenic	1.60	0.00	100.0(a)	0-10
Barium	143	153	6.8	0-10
Beryllium	0.00	0.00	NC	0-10
Cadmium	0.00	0.00	NC	0-10
Calcium	30600	33800	10.5*(b)	0-10
Chromium	1.20	0.00	100.0(a)	0-10
Cobalt	0.200	0.00	100.0(a)	0-10
Copper	3.20	0.00	100.0(a)	0-10
Iron	552	608	10.2 (a)	0-10
Lead	3.80	6.00	57.9 (a)	0-10
Magnesium	3920	4280	9.1	0-10
Manganese	21.7	24.0	10.6 (a)	0-10
Molybdenum	anr			
Nickel	2.40	2.10	12.5 (a)	0-10
Potassium	514	0.00	100.0(a)	0-10
Selenium	11.8	0.00	100.0(a)	0-10
Silver	0.00	0.00	NC	0-10
Sodium	32000	34400	7.7	0-10
Strontium				
Thallium	1.40	9.30	564.3(a)	0-10
Tin	anr			
Titanium				
Vanadium	5.20	5.80	11.5 (a)	0-10
Zinc	4.80	0.00	100.0(a)	0-10

Associated samples MP34866: FA60391-1F

Results < IDL are shown as zero for calculation purposes

(*) Outside of QC limits

(anr) Analyte not requested

(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

(b) Serial dilution indicates possible matrix interference.

POST DIGESTATE SPIKE SUMMARY

Login Number: FA60391
Account: ARCMIN - Arcadis
Project: Racer Saginaw

QC Batch ID: MP34866
Matrix Type: AQUEOUS

Methods: SW846 6010C
Units: ug/l

Prep Date:

12/27/18

Metal	Sample ml	Final ml	FA60398-5 Raw	Corr.**	PS ug/l	Spike ml	Spike ug/ml	Spike ug/l	% Rec	QC Limits
Aluminum	9.8	10	651.8	638.764	3012	0.2	125	2500	94.9	80-120
Antimony	9.8	10			103	0.2	5	100	103.0	80-120
Arsenic	9.8	10	1.6	1.568	102.2	0.2	5	100	100.6	80-120
Barium	9.8	10	142.9	140.042	386.3	0.2	12.5	250	98.5	80-120
Beryllium	9.8	10			49.4	0.2	2.5	50	98.8	80-120
Cadmium	9.8	10			48.3	0.2	2.5	50	96.6	80-120
Calcium	9.8	10	30620	30007.6	34590	0.2	250	5000	91.6	80-120
Chromium	9.8	10	1.2	1.176	50.4	0.2	2.5	50	98.4	80-120
Cobalt	9.8	10	.2	.196	49	0.2	2.5	50	97.6	80-120
Copper	9.8	10	3.2	3.136	102.6	0.2	5	100	99.5	80-120
Iron	9.8	10	551.8	540.764	3497	0.2	150	3000	98.5	80-120
Lead	9.8	10	3.8	3.724	47.9	0.2	2.5	50	88.4	80-120
Magnesium	9.8	10	3917	3838.66	8452	0.2	250	5000	92.3	80-120
Manganese	9.8	10	21.7	21.266	72.8	0.2	2.5	50	103.1	80-120
Molybdenum										
Nickel	9.8	10	2.4	2.352	100.7	0.2	5	100	98.3	80-120
Potassium	9.8	10	514.3	504.014	10140	0.2	500	10000	96.4	80-120
Selenium	9.8	10	11.8	11.564	103.3	0.2	5	100	91.7	80-120
Silver	9.8	10			47.2	0.2	2.5	50	94.4	80-120
Sodium	9.8	10	31950	31311	40660	0.2	500	10000	93.5	80-120
Strontium										
Thallium	9.8	10	1.4	1.372	92.3	0.2	5	100	90.9	80-120
Tin										
Titanium										
Vanadium	9.8	10	5.2	5.096	53.8	0.2	2.5	50	97.4	80-120
Zinc	9.8	10	4.8	4.704	244	0.2	12.5	250	95.7	80-120

Associated samples MP34866: FA60391-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(**) Corr. sample result = Raw * (sample volume / final volume)
(anr) Analyte not requested

ATTACHMENT 3

DATA VALIDATION REPORT



RACER Trust

Saginaw

DATA REVIEW

Saginaw, Michigan

Per- and Polyfluoroalkyl Substances (PFAS) and Metals Analysis

SDG #FA60691

Analyses Performed By:
SGS Laboratories
Orlando, Florida

Report #31555R
Review Level: Tier II
Project: B0064434.2018.50001

A large, solid orange geometric shape, resembling a stylized triangle or a section of a larger triangle, is positioned in the lower right quadrant of the page. It is composed of two overlapping triangles, creating a complex, angular form that extends from the bottom edge towards the top right corner.

DATA REVIEW REPORT

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # FA60691 for samples collected in association with the Saginaw Site. The review was conducted as a Tier II evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis			
					PFCs	SVOC	MET	MISC
MW-118S1 (121818)	FA60391-1	Water	12/18/2018		X		X	
MW-118S1 (121818)	FA60391-1F	Water	12/18/2018		X			
X-10AR2 (121818)	FA60391-2	Water	12/18/2018		X			
MW97-105WT (121818)	FA60391-3	Water	12/18/2018		X			
TW98-11WT (121818)	FA60391-4	Water	12/18/2018		X			
B-3R (121818)	FA60391-5	Water	12/18/2018		X			
QPTW-13R (121818)	FA60391-6	Water	12/18/2018		X			
X-2A_121818	FA60391-7	Water	12/18/2018		X			
EB-01_121818	FA60391-8	Water	12/18/2018		X			
MW-131WT_121818	FA60391-9	Water	12/18/2018		X			
MW-134WT_121818	FA60391-10	Water	12/18/2018		X			
MW-108WT_121818	FA60391-11	Water	12/18/2018		X			
DUP-01_121818	FA60391-12	Water	12/18/2018	B-3R	X			
X-9AR_121918	FA60391-13	Water	12/19/2018		X			
MW-183WT_121918	FA60391-14	Water	12/19/2018		X			

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:

QA - Quality Assurance

DATA REVIEW REPORT

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) Modified Method 537. Data were reviewed in accordance with USEPA Method 537, SGS SOP SOP_ms019.2-PFAS (Analysis of Per- and polyfluorinated Alkyl Substances By LC/MS/MS And Isotope Dilution), EPA Technical Brief – PFAS Methods and guidance for sampling and analyzing water and other environmental media, and USEPA National Functional Guidelines for Organic Superfund Methods Data Review, EPA 540-R-2017-002, January 2017 (with reference to the historical USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999, as appropriate) were followed for qualification purposes.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

- U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
- B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

- E The compound was quantitated above the calibration range.
- D Concentration is based on a diluted sample analysis.

- Validation Qualifiers

- J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
- UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
- JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
- UB Compound considered non-detect at the listed value due to associated blank contamination.
- N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
- R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and

DATA REVIEW REPORT

provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

POLYFLUORINATED COMPOUND (PFC) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
USEPA modified Method 537	Water	14 days from collection to extraction and 28 days from extraction to analysis	Cool to <6 °C; preserved with Trizma buffer

All samples were initially analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method, field, and equipment blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Equipment blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Extracted Internal Standard (EIS)

Labeled standards must be added to all field samples and QC samples prior to extraction. For aqueous samples prepared by serial dilution instead of solid phase extraction (SPE), they must be added to samples prior to analysis. EIS recoveries must be within DoD QSM 5.1 specified limits of 50% to 150%. The DOD guidance is currently the only guidance available for the evaluation of EIS.

Sample locations associated with EIS standards exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	EIS	Associated Compound	Recovery
MW97-105WT (121818)	13C8-FOSA	PFOSA	< 50% but > 25%
TW98-111WT (121818)	13C4-PFBA	Perfluorobutanoic acid	< 50% but > 10%
	13C8-FOSA	PFOSA	< 50% but > 10%
	13C2-6:2FTS	6:2 Fluorotelomer sulfonate	> 150%
	13C2-8:2FTS	8:2 Fluorotelomer sulfonate	> 150%
QPTW-13R (121818)	13C8-FOSA	PFOSA	< 50% but > 25%
	13C2-8:2FTS	8:2 Fluorotelomer sulfonate	> 150%
X-2A_121818	13C4-PFBA	Perfluorobutanoic acid	< 50% but > 10%
	13C8-FOSA	PFOSA	< 50% but > 25%
DUP-01_121818	13C4-PFBA	Perfluorobutanoic acid	< 50% but > 25%

DATA REVIEW REPORT

Sample Locations	EIS	Associated Compound	Recovery
	13C8-FOSA	PFOSA	< 50% but > 25%

The criteria used to evaluate the EIS recoveries are presented in the following table. In the case of an EIS deviation, the sample results associated with the EIS are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> 150%	Non-detect	No Action
	Detect	
< 50% but > 25%	Non-detect	
	Detect	
< 25% but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

As part of the isotope dilution analysis, the EIS are used for quantitation of the sample results, therefore the calculation of sample concentrations is adjusted for EIS recoveries. The data will not be qualified unless EIS recoveries are less than 25%.

Please note the laboratory issued a revised report which affected results associated with sample TW98-111WT (121818).

4. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within 50-150%. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within 30%.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD exhibited acceptable recoveries and RPD between the MS/MSD recoveries.

5. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

6. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 35% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for water matrices.

DATA REVIEW REPORT

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
B-3R (121818)/DUP-01_121818	Perfluorobutanoic acid	0.00230 J	0.0263	NC
	Perfluoropentanoic acid	0.00168 J	0.0144	NC
	Perfluorohexanoic acid	0.00126 J	0.00532	AC
	Perfluoroheptanoic acid	0.0020 U	0.00515	AC
	Perfluorooctanoic acid	0.00558	0.0465	NC
	Perfluorobutanesulfonic acid	0.0020 U	0.00491	AC
	Perfluorohexanesulfonic acid	0.00113 J	0.00589	AC
	Perfluorooctanesulfonic acid	0.0156	0.0146	AC

Notes:

AC Acceptable

NC Not compliant

The compounds Perfluorobutanoic acid, Perfluoropentanoic acid and Perfluorooctanoic acid associated with sample locations B-3R (121818) and DUP-1(08292018) exhibited a field duplicate RPD greater than the control limit. The associated sample results for the listed analytes were qualified as estimated.

7. Compound Identification

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR PFAs

PFAs: USEPA modified Method 537 per DoD QSM 5.1 Table B-15	Reported		Performance Acceptable		Not Required	
	No	Yes	No	Yes		
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)						
Tier II Validation						
Holding times		X		X		
Reporting limits (units)		X		X		
Blanks						
A. Method blanks		X		X		
B. Equipment blanks		X		X		
C. Field blanks		X		X		
Laboratory Control Sample (LCS) %R		X		X		
Laboratory Control Sample Duplicate(LCSD) %R					X	
LCS/LCSD Precision (RPD)					X	
Matrix Spike (MS) %R		X		X		
Matrix Spike Duplicate (MSD) %R		X		X		
MS/MSD Precision (RPD)		X		X		
Field Duplicate (RPD)		X	X			
Extracted Internal Standards (EIS) Recoveries		X	X			
Dilution Factor		X		X		
Moisture Content					X	

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

DATA REVIEW REPORT

INORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Methods 6010 and 7470. Data were reviewed in accordance with USEPA National Functional Guidelines for Inorganic Data Review (October 2004).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
 - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
 - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
 - E The reported value is estimated due to the presence of interference.
 - N Spiked sample recovery is not within control limits.
 - * Duplicate analysis is not within control limits.
- Validation Qualifiers
 - J The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
 - UJ The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
 - UB Analyte considered non-detect at the listed value due to associated blank contamination.
 - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
 - R The sample results are rejected; the analyte may or may not be present in the sample.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

DATA REVIEW REPORT

METALS ANALYSIS

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 6010	Water	180 days from collection to analysis	Cool to < 6 °C; pH < 2 with HNO ₃
SW-846 7470	Water	28 days from collection to analysis	Cool to < 6 °C; pH < 2 with HNO ₃

All samples were analyzed within the specified holding time criteria.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of ten times the concentration of a detected compound in an associated blank is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Target analytes were not detected above the MDL in the associated blanks; therefore, detected sample results are not associated with blank contamination.

3. Matrix Spike/Matrix Spike Duplicate (MS/MSD)/Laboratory Duplicate Sample Analysis

MS/MSD and laboratory duplicate sample data are used to assess the precision and accuracy of the analytical method.

3.1 MS/MSD Analysis

All metal analytes must exhibit recoveries within the established acceptance limits of 75% to 125%. The relative percent difference (RPD) between the MS and MSD results must be no greater than the established acceptance limit of 20%. The MS/MSD control limits do not apply for MS/MSDs performed on sample locations where the analyte's concentration detected in the parent sample exceeds the MS/MSD spiking concentration by a factor of four or greater. In instance where this is true, the data will not be qualified and the laboratory qualifier will be removed. Sample results associated with MS/MSD exceedances where the parent samples are not site-specific are not qualified.

The MS/MSD analysis was not performed on a sample location within this SDG.

3.2 Laboratory Duplicate Sample Analysis

The laboratory duplicate sample relative percent difference (RPD) criterion is applied when both the parent and duplicate sample concentrations are greater than or equal to five times the reporting limit (RL). A control limit of 20% for water matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to five times the detection limit, a control limit of two times the reporting limit (RL) for water matrices.

DATA REVIEW REPORT

The laboratory duplicate analysis was not performed on a sample location within this SDG.

4. Field Duplicate Sample Analysis

The field duplicate sample analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to five times the RL, a control limit of two times the RL is applied to the difference between the results for water matrices.

A field duplicate was not included for this parameter.

5. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The analytes associated with the LCS analysis must exhibit recoveries between the control limits of 80% and 120%.

All analytes associated with the LCS analyses exhibited recoveries within the control limits.

6. Serial Dilution

The serial dilution analysis is used to assess if a significant physical or chemical interference exists due to sample matrix. Analytes exhibiting concentrations greater than 50 times the MDL in the undiluted sample are evaluated to determine if matrix interference exists. These analytes are required to have less than a 10% difference (%D) between sample results from the undiluted (parent) sample and results associated with the same sample analyzed with a five-fold dilution.

The serial dilution analysis was not performed on a sample location within this SDG.

7. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA REVIEW REPORT

DATA VALIDATION CHECKLIST FOR METALS

METALS: SW-846 6010 and 7470	Reported		Performance Acceptable		Not Required	
	No	Yes	No	Yes		
Inductively Coupled Plasma – Atomic Emission Spectrometry (ICP), Atomic Absorption – Manual Cold Vapor (CV)						
Tier II Validation						
Holding Times		X		X		
Reporting limits (units)		X		X		
Blanks						
A. Instrument Blanks		X		X		
B. Method Blanks		X		X		
C. Equipment/Field Blanks		X		X		
Laboratory Control Sample (LCS)		X		X		
Laboratory Control Sample Duplicate (LCSD)					X	
LCS/LCSD Precision (RPD)					X	
Matrix Spike (MS) %R					X	
Matrix Spike Duplicate (MSD) %R					X	
MS/MSD Precision (RPD)					X	
Laboratory Duplicate (RPD)					X	
Field Duplicate (RPD)					X	
ICP Serial Dilution %D					X	
Total vs. Dissolved					X	
Reporting Limit Verification		X		X		
Moisture Content					X	

Notes:

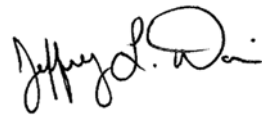
%R Percent recovery

RPD Relative percent difference

DATA REVIEW REPORT

VALIDATION PERFORMED BY: Jeffrey L. Davin

SIGNATURE:



DATE: January 21, 2019

PEER REVIEW: Dennis Capria

DATE: February 6, 2019

**CHAIN OF CUSTODY
CORRECTED SAMPLE ANALYSIS DATA
SHEETS**



FA60391

[illegible]

4.1

3.

FA60391: Chain of Custody

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SGS North America Inc - Orlando
Chain of Custody

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TEL: 407-425-6700 FAX: 407-425-0707
www.sgs.com

FA60391

SGS - ORLANDO JOB #:

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Client / Reporting Information				Project Information				Analytical Information												Matrix Codes	
Company Name: ARCADIS				Project Name: RACON SAGINAW																DW - Drinking Water	
Address: 28550 CABOT DR				Street: 77-79 WEST LENOX ST.																GW - Ground Water	
City: NOVI State: MI Zip: 48371				City: SAGINAW State: MI																WW - Water	
Project Contact: SCOTT CECAMMER Email: SCOTT.CECAMMER@ARCADIS.COM				Project # 80064434.2018.00011																SW - Surface Water	
Phone #: 248.994.2240				Fax #: 248.994.2241																SO - Soil	
Sampler(s) Name(s) (Printed)				Client Purchase Order #																SL - Sludge	
Sampler 1: BK C-565 Sampler 2:																				OI - Oil	
SGS Orlando Sample #				COLLECTION				CONTAINER INFORMATION												LAB USE ONLY	
Field ID / Point of Collection				DATE	TIME	SAMPLED BY:	MATRIX	TOTAL # OF BOTTLES	OTHER	NO3	HCl	NaOH	INOS	H2SO4	NACH2N3	DI WATER	MECH				
7	X-2A-121818			4/18/18	14:40	BC	GW	2		X											
8	EA-01-121818			4/18/18	14:30	BC	WW	2		X											
9	MW-131WT-121818			4/18/18	15:20	BC	GW	2		X											
10	MW-134WT-121818			4/18/18	16:15	BC	GW	2		X											
11	MW-108WT-121818			4/18/18	17:10	BC	GW	2		X											
12	DUP-01-121818			4/18/18	-	BC	GW	2		X											
13	X-9AR-121918			4/19/18	9:40	BC	GW	2		X											
14	MW-183WT-121918			4/19/18	10:40	BC	GW	2		X											
Turnaround Time (Business days)				Data Deliverable Information				Comments / Remarks													
10 Day (Business) Approved By: / Date:				☐ COMMERCIAL "A" (RESULTS ONLY)				ANALYSIS PER LOG-IN LOG LCQSM5370 ODFL													
7 Day				☐ COMMERCIAL "B" (RESULTS PLUS QC)																	
5 Day				☐ REDT1 (EPA LEVEL 3)																	
3 Day RUSH				☐ FULLT1 (EPA LEVEL 4)																	
2 Day RUSH				☐ EDD'S																	
1 Day RUSH																					
Other																					
Rush T/A Data Available VIA Email or Lablink				Sample Custody must be documented below each time samples change possession, including courier delivery.																	
Relinquished by Sampler/Affiliation		Date Time:		Received By/Affiliation		Relinquished By/Affiliation		Date Time:		Received By/Affiliation											
1 ARCADIS		4/19/18 15:45		2 Fed Ex		3 Fed Ex		4/19/18 15:45		4 JLC 12/20/18											
Relinquished by/Affiliation		Date Time:		Received By/Affiliation		Relinquished By/Affiliation		Date Time:		Received By/Affiliation											
5				6		7		8													
Lab Use Only : Cooler Temperature (s) Celsius (corrected):																		http://www.sgs.com/en/terms-and-conditions			

ORLD-SMT-0001-03-FORM-COC (4).xls Rev 031318

3.1

FA60391: Chain of Custody

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Report of Analysis

Page 1 of 2

Client Sample ID:	MW-118S1 (121818)		
Lab Sample ID:	FA60391-1	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26026.D	1	01/03/19 02:51	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00971	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.00437	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00177	0.0040	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00193	0.0040	0.0020	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00195	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	MW-118S1 (121818)	Date Sampled:	12/18/18
Lab Sample ID:	FA60391-1	Date Received:	12/20/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	92%		50-150%
	13C5-PFPeA	106%		50-150%
	13C5-PFHxA	115%		50-150%
	13C4-PFHpA	116%		50-150%
	13C8-PFOA	135%		50-150%
	13C9-PFNA	133%		50-150%
	13C6-PFDA	134%		50-150%
	13C7-PFUnDA	103%		50-150%
	13C2-PFDoDA	112%		50-150%
	13C2-PFTeDA	68%		50-150%
	13C3-PFBS	96%		50-150%
	13C3-PFHxS	101%		50-150%
	13C8-PFOS	101%		50-150%
	13C8-FOSA	104%		50-150%
	d3-MeFOSAA	118%		50-150%
	13C2-4:2FTS	110%		50-150%
	13C2-6:2FTS	130%		50-150%
	13C2-8:2FTS	137%		50-150%

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

Page 1 of 1

Client Sample ID: MW-118S1 (121818)
Lab Sample ID: FA60391-1F
Matrix: AQ - Groundwater Filtered
Project: Racer Saginaw

Date Sampled: 12/18/18**Date Received:** 12/20/18**Percent Solids:** n/a

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed By	Method	Prep Method
Aluminum	15.0 J	200	25	14	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Antimony	5.0 U	6.0	5.0	1.0	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Arsenic	5.0 U	10	5.0	1.3	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Barium	47.3 J	200	5.0	1.0	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Beryllium	1.0 U	4.0	1.0	0.20	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Cadmium	1.0 U	5.0	1.0	0.20	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Calcium	49500	1000	100	50	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Chromium	5.0 U	10	5.0	1.0	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Cobalt	1.0 U	50	1.0	0.20	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Copper	7.6 J	25	2.0	1.0	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Iron	5590	300	50	17	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Lead	6.8	5.0	2.0	1.1	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Magnesium	13000	5000	100	35	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Manganese	487	15	2.0	1.0	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Mercury	0.10 U	0.50	0.10	0.030	ug/l	1	12/24/18	12/24/18 JC	SW846 7470A	¹ SW846 7470A ³
Nickel	1.0 U	40	1.0	0.40	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Potassium	6720 J	10000	500	200	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Selenium	5.0 U	10	5.0	2.9	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Silver	2.0 U	10	2.0	0.70	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Sodium	13000	10000	2000	500	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Thallium	2.0 U	10	2.0	1.4	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Vanadium	2.0 U	50	2.0	0.60	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴
Zinc	35.1	20	5.0	4.4	ug/l	1	12/27/18	12/27/18 LM	SW846 6010C	² SW846 3010A ⁴

(1) Instrument QC Batch: MA15490

(2) Instrument QC Batch: MA15498

(3) Prep QC Batch: MP34853

(4) Prep QC Batch: MP34866

LOQ = Limit of Quantitation

DL = Detection Limit

U = Indicates a result < LOD

LOD = Limit of Detection

B = Analyte found in associated blank

J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

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Client Sample ID:	X-10AR2 (121818)			Date Sampled:	12/18/18
Lab Sample ID:	FA60391-2			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26027.D	1	01/03/19 03:07	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00213	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	X-10AR2 (121818)			Date Sampled:	12/18/18
Lab Sample ID:	FA60391-2			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	95%		50-150%
	13C5-PFPeA	106%		50-150%
	13C5-PFHxA	110%		50-150%
	13C4-PFHpA	111%		50-150%
	13C8-PFOA	134%		50-150%
	13C9-PFNA	118%		50-150%
	13C6-PFDA	110%		50-150%
	13C7-PFUnDA	99%		50-150%
	13C2-PFDoDA	98%		50-150%
	13C2-PFTeDA	89%		50-150%
	13C3-PFBS	98%		50-150%
	13C3-PFHxS	99%		50-150%
	13C8-PFOS	84%		50-150%
	13C8-FOSA	115%		50-150%
	d3-MeFOSAA	92%		50-150%
	13C2-4:2FTS	109%		50-150%
	13C2-6:2FTS	127%		50-150%
	13C2-8:2FTS	103%		50-150%

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

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Client Sample ID:	MW97-105WT (121818)			Date Sampled:	12/18/18
Lab Sample ID:	FA60391-3			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26028.D	1	01/03/19 03:23	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2 ^a	2Q26174.D	1	01/08/19 15:15	NAF	01/04/19 09:00	OP73281	S2Q403

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	260 ml	1.0 ml

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0657	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0208	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0335	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0175	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0221	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00929	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00412	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00970	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA ^b	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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

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Client Sample ID: MW97-105WT (121818)**Lab Sample ID:** FA60391-3**Date Sampled:** 12/18/18**Matrix:** AQ - Ground Water**Date Received:** 12/20/18**Method:** EPA 537M QSM5.1 B-15 EPA 537 MOD**Percent Solids:** n/a**Project:** Racer Saginaw

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	66%	60%	50-150%
	13C5-PFPeA	81%	71%	50-150%
	13C5-PFHxA	85%	70%	50-150%
	13C4-PFHpA	87%	72%	50-150%
	13C8-PFOA	105%	72%	50-150%
	13C9-PFNA	89%	62%	50-150%
	13C6-PFDA	91%	59%	50-150%
	13C7-PFUnDA	81%	41%	50-150%
	13C2-PFDoDA	82%	45%	50-150%
	13C2-PFTeDA	67%	27%	50-150%
	13C3-PFBS	72%	69%	50-150%
	13C3-PFHxS	71%	65%	50-150%
	13C8-PFOS	69%	62%	50-150%
	13C8-FOSA	48% ^C	34%	50-150%
	d3-MeFOSAA	75%	46%	50-150%
	13C2-4:2FTS	92%	77%	50-150%
	13C2-6:2FTS	114%	86%	50-150%
	13C2-8:2FTS	99%	65%	50-150%

(a) Confirmation run.

(b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(c) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

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

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Client Sample ID:	TW98-111WT (121818)			Date Sampled:	12/18/18
Lab Sample ID:	FA60391-4			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26029.D	1	01/03/19 03:38	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2 ^a	2Q26175.D	1	01/08/19 15:30	NAF	01/04/19 09:00	OP73281	S2Q403
Run #3	2Q26059.D	2	01/03/19 11:33	NAF	12/27/18 08:30	OP73201	S2Q400

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	260 ml	1.0 ml
Run #3	250 ml	1.0 ml

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid ^b	0.0399 J	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00210	0.0040	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00636	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0040 U ^c	0.0080	0.0040	0.0020	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0040 U ^c	0.0080	0.0040	0.0020	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00476	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0180	0.0040	0.0020	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA ^b	0.0020 U J	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

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

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Client Sample ID:	TW98-111WT (121818)		
Lab Sample ID:	FA60391-4	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate ^d	0.0040 U	0.0080	0.0040	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	0.0080 U ^c	0.016	0.0080	0.0040	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C4-PFBA	22% ^e	19%	27%	50-150%
	13C5-PFPeA	56%	45%	68%	50-150%
	13C5-PFHxA	61%	46%	84%	50-150%
	13C4-PFHpA	66%	51%	93%	50-150%
	13C8-PFOA	87%	60%	120%	50-150%
	13C9-PFNA	108%	76%	129%	50-150%
	13C6-PFDA	119%	85%	107%	50-150%
	13C7-PFUnDA	76%	46%	61%	50-150%
	13C2-PFDoDA	115%	41%	104%	50-150%
	13C2-PFTeDA	49%	24%	51%	50-150%
	13C3-PFBS	71%	64%	78%	50-150%
	13C3-PFHxS	73%	65%	82%	50-150%
	13C8-PFOS	74%	71%	85%	50-150%
	13C8-FOSA	11% ^e	9%	21%	50-150%
	d3-MeFOSAA	122%	80%	137%	50-150%
	13C2-4:2FTS	97%	74%	97%	50-150%
	13C2-6:2FTS	158% ^f	116%	155% ^f	50-150%
	13C2-8:2FTS	171%	119%	129%	50-150%

(a) Confirmation Run.

(b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(c) Result is from Run# 3

(d) Associated ID Standard outside control limits high, however sample is ND. Confirmed by re-extraction and reanalysis.

(e) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(f) 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

Report of Analysis

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Client Sample ID:	B-3R (121818)		
Lab Sample ID:	FA60391-5	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26030.D	1	01/03/19 03:54	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00230	0.0080	0.0040	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00168	0.0040	0.0020	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.00126	0.0040	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00558 J	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00113	0.0040	0.0020	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0156	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	B-3R (121818)	Date Sampled:	12/18/18
Lab Sample ID:	FA60391-5	Date Received:	12/20/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID	Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA		71%		50-150%
	13C5-PFPeA		88%		50-150%
	13C5-PFHxA		94%		50-150%
	13C4-PFHpA		95%		50-150%
	13C8-PFOA		113%		50-150%
	13C9-PFNA		102%		50-150%
	13C6-PFDA		88%		50-150%
	13C7-PFUnDA		84%		50-150%
	13C2-PFDoDA		115%		50-150%
	13C2-PFTeDA		137%		50-150%
	13C3-PFBS		81%		50-150%
	13C3-PFHxS		80%		50-150%
	13C8-PFOS		78%		50-150%
	13C8-FOSA		62%		50-150%
	d3-MeFOSAA		78%		50-150%
	13C2-4:2FTS		109%		50-150%
	13C2-6:2FTS		129%		50-150%
	13C2-8:2FTS		93%		50-150%

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

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Client Sample ID:	QPTW-13R (121818)			Date Sampled:	12/18/18
Lab Sample ID:	FA60391-6			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26031.D	1	01/03/19 04:10	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2 ^a	2Q26176.D	1	01/08/19 15:46	NAF	01/04/19 09:00	OP73281	S2Q403

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	260 ml	1.0 ml

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0170	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0164	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00291	0.0040	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00838	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00354	0.0040	0.0020	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00192	0.0040	0.0020	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00847	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA ^b	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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

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Client Sample ID: QPTW-13R (121818)**Lab Sample ID:** FA60391-6**Date Sampled:** 12/18/18**Matrix:** AQ - Ground Water**Date Received:** 12/20/18**Method:** EPA 537M QSM5.1 B-15 EPA 537 MOD**Percent Solids:** n/a**Project:** Racer Saginaw

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate ^c	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	56%	53%	50-150%
	13C5-PFPeA	64%	57%	50-150%
	13C5-PFHxA	61%	51%	50-150%
	13C4-PFHpA	67%	59%	50-150%
	13C8-PFOA	86%	68%	50-150%
	13C9-PFNA	102%	84%	50-150%
	13C6-PFDA	114%	77%	50-150%
	13C7-PFUnDA	75%	28%	50-150%
	13C2-PFDoDA	94%	18%	50-150%
	13C2-PFTeDA	118%	19%	50-150%
	13C3-PFBS	69%	67%	50-150%
	13C3-PFHxS	65%	65%	50-150%
	13C8-PFOS	69%	66%	50-150%
	13C8-FOSA	14% ^d	10%	50-150%
	d3-MeFOSAA	122%	63%	50-150%
	13C2-4:2FTS	105%	0%	50-150%
	13C2-6:2FTS	150%	114%	50-150%
	13C2-8:2FTS	153% ^e	96%	50-150%

(a) Confirmation run.

(b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(c) Associated ID Standard outside control limits high, however sample is ND.

(d) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(e) Outside control limits. However, sample was ND.

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

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Client Sample ID:	X-2A_121818				
Lab Sample ID:	FA60391-7			Date Sampled:	12/18/18
Matrix:	AQ - Ground Water			Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD			Percent Solids:	n/a
Project:	Racer Saginaw				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26032.D	1	01/03/19 04:25	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2 ^a	2Q26177.D	1	01/08/19 16:02	NAF	01/04/19 09:00	OP73281	S2Q403

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	260 ml	1.0 ml

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid ^b	0.0341 J	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0181	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00646	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00493	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0506	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00773	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0165	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCTANESULFONAMIDES

754-91-6	PFOSA ^b	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCTANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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

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Client Sample ID:	X-2A_121818			Date Sampled:	12/18/18
Lab Sample ID:	FA60391-7			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	23% ^C	20%	50-150%
	13C5-PFPeA	79%	76%	50-150%
	13C5-PFHxA	78%	68%	50-150%
	13C4-PFHpA	86%	71%	50-150%
	13C8-PFOA	96%	67%	50-150%
	13C9-PFNA	80%	61%	50-150%
	13C6-PFDA	93%	61%	50-150%
	13C7-PFUnDA	104%	64%	50-150%
	13C2-PFDoDA	83%	64%	50-150%
	13C2-PFTeDA	80%	47%	50-150%
	13C3-PFBS	71%	72%	50-150%
	13C3-PFHxS	70%	67%	50-150%
	13C8-PFOS	66%	60%	50-150%
	13C8-FOSA	33% ^C	29%	50-150%
	d3-MeFOSAA	95%	62%	50-150%
	13C2-4:2FTS	97%	82%	50-150%
	13C2-6:2FTS	107%	80%	50-150%
	13C2-8:2FTS	88%	62%	50-150%

(a) Confirmation run.

(b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(c) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

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

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Client Sample ID:	EB-01_121818		
Lab Sample ID:	FA60391-8	Date Sampled:	12/18/18
Matrix:	AQ - Equipment Blank	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26025.D	1	01/03/19 02:35	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCTANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCTANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	EB-01_121818		
Lab Sample ID:	FA60391-8	Date Sampled:	12/18/18
Matrix:	AQ - Equipment Blank	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	115%		50-150%
	13C5-PFPeA	111%		50-150%
	13C5-PFHxA	114%		50-150%
	13C4-PFHpA	113%		50-150%
	13C8-PFOA	146%		50-150%
	13C9-PFNA	121%		50-150%
	13C6-PFDA	128%		50-150%
	13C7-PFUnDA	116%		50-150%
	13C2-PFDoDA	116%		50-150%
	13C2-PFTeDA	93%		50-150%
	13C3-PFBS	106%		50-150%
	13C3-PFHxS	102%		50-150%
	13C8-PFOS	97%		50-150%
	13C8-FOSA	128%		50-150%
	d3-MeFOSAA	106%		50-150%
	13C2-4:2FTS	107%		50-150%
	13C2-6:2FTS	127%		50-150%
	13C2-8:2FTS	113%		50-150%

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

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Client Sample ID:	MW-131WT_121818		
Lab Sample ID:	FA60391-9	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26035.D	1	01/03/19 05:13	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00414	0.0080	0.0040	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00224	0.0040	0.0020	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.00114	0.0040	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00120	0.0040	0.0020	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00238	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00172	0.0040	0.0020	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00421	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00488	0.0080	0.0040	0.0020	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	MW-131WT_121818	Date Sampled:	12/18/18
Lab Sample ID:	FA60391-9	Date Received:	12/20/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	76%		50-150%
	13C5-PFPeA	83%		50-150%
	13C5-PFHxA	91%		50-150%
	13C4-PFHpA	94%		50-150%
	13C8-PFOA	114%		50-150%
	13C9-PFNA	112%		50-150%
	13C6-PFDA	112%		50-150%
	13C7-PFUnDA	100%		50-150%
	13C2-PFDoDA	103%		50-150%
	13C2-PFTeDA	95%		50-150%
	13C3-PFBS	76%		50-150%
	13C3-PFHxS	84%		50-150%
	13C8-PFOS	93%		50-150%
	13C8-FOSA	111%		50-150%
	d3-MeFOSAA	92%		50-150%
	13C2-4:2FTS	93%		50-150%
	13C2-6:2FTS	115%		50-150%
	13C2-8:2FTS	109%		50-150%

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

Page 1 of 2

Client Sample ID:	MW-134WT_121818		
Lab Sample ID:	FA60391-10	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26037.D	1	01/03/19 05:44	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00564	0.0080	0.0040	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00354	0.0040	0.0020	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.00166	0.0040	0.0020	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00128	0.0040	0.0020	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00300	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00199	0.0040	0.0020	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	MW-134WT_121818	Date Sampled:	12/18/18
Lab Sample ID:	FA60391-10	Date Received:	12/20/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	88%		50-150%
	13C5-PFPeA	95%		50-150%
	13C5-PFHxA	102%		50-150%
	13C4-PFHpA	107%		50-150%
	13C8-PFOA	124%		50-150%
	13C9-PFNA	121%		50-150%
	13C6-PFDA	115%		50-150%
	13C7-PFUnDA	118%		50-150%
	13C2-PFDoDA	136%		50-150%
	13C2-PFTeDA	116%		50-150%
	13C3-PFBS	86%		50-150%
	13C3-PFHxS	92%		50-150%
	13C8-PFOS	100%		50-150%
	13C8-FOSA	91%		50-150%
	d3-MeFOSAA	107%		50-150%
	13C2-4:2FTS	104%		50-150%
	13C2-6:2FTS	125%		50-150%
	13C2-8:2FTS	119%		50-150%

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

Page 1 of 2

Client Sample ID:	MW-108WT_121818		
Lab Sample ID:	FA60391-11	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26038.D	1	01/03/19 06:00	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00302	0.0080	0.0040	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00177	0.0040	0.0020	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00366	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00192	0.0040	0.0020	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00263	0.0080	0.0040	0.0020	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	MW-108WT_121818	Date Sampled:	12/18/18
Lab Sample ID:	FA60391-11	Date Received:	12/20/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	85%		50-150%
	13C5-PFPeA	92%		50-150%
	13C5-PFHxA	100%		50-150%
	13C4-PFHpA	105%		50-150%
	13C8-PFOA	121%		50-150%
	13C9-PFNA	125%		50-150%
	13C6-PFDA	126%		50-150%
	13C7-PFUnDA	118%		50-150%
	13C2-PFDoDA	137%		50-150%
	13C2-PFTeDA	119%		50-150%
	13C3-PFBS	83%		50-150%
	13C3-PFHxS	93%		50-150%
	13C8-PFOS	103%		50-150%
	13C8-FOSA	121%		50-150%
	d3-MeFOSAA	102%		50-150%
	13C2-4:2FTS	102%		50-150%
	13C2-6:2FTS	124%		50-150%
	13C2-8:2FTS	116%		50-150%

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

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Client Sample ID:	DUP-01_121818		
Lab Sample ID:	FA60391-12	Date Sampled:	12/18/18
Matrix:	AQ - Ground Water	Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD	Percent Solids:	n/a
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26040.D	1	01/03/19 06:31	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2 ^a	2Q26178.D	1	01/08/19 16:18	NAF	01/04/19 09:00	OP73281	S2Q403

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	260 ml	1.0 ml

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid ^b	0.0263 J	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0144 J	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00532	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00515	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0465 J	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00491	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00589	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0146	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA ^b	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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

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Client Sample ID: DUP-01_121818

Lab Sample ID: FA60391-12

Date Sampled: 12/18/18

Matrix: AQ - Ground Water

Date Received: 12/20/18

Method: EPA 537M QSM5.1 B-15 EPA 537 MOD

Percent Solids: n/a

Project: Racer Saginaw

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	32% ^C	22%	50-150%
	13C5-PFPeA	88%	73%	50-150%
	13C5-PFHxA	90%	68%	50-150%
	13C4-PFHpA	92%	71%	50-150%
	13C8-PFOA	105%	68%	50-150%
	13C9-PFNA	92%	59%	50-150%
	13C6-PFDA	104%	54%	50-150%
	13C7-PFUnDA	89%	57%	50-150%
	13C2-PFDoDA	103%	70%	50-150%
	13C2-PFTeDA	93%	51%	50-150%
	13C3-PFBS	80%	71%	50-150%
	13C3-PFHxS	78%	66%	50-150%
	13C8-PFOS	75%	54%	50-150%
	13C8-FOSA	37% ^C	27%	50-150%
	d3-MeFOSAA	110%	60%	50-150%
	13C2-4:2FTS	107%	83%	50-150%
	13C2-6:2FTS	118%	81%	50-150%
	13C2-8:2FTS	99%	59%	50-150%

(a) Confirmation run.

(b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

(c) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

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

Page 1 of 2

Client Sample ID:	X-9AR_121918				
Lab Sample ID:	FA60391-13			Date Sampled:	12/19/18
Matrix:	AQ - Ground Water			Date Received:	12/20/18
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD			Percent Solids:	n/a
Project:	Racer Saginaw				

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26041.D	1	01/03/19 06:47	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00598	0.0080	0.0040	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	X-9AR_121918			Date Sampled:	12/19/18
Lab Sample ID:	FA60391-13			Date Received:	12/20/18
Matrix:	AQ - Ground Water			Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD				
Project:	Racer Saginaw				

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID	Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA		93%		50-150%
	13C5-PFPeA		103%		50-150%
	13C5-PFHxA		111%		50-150%
	13C4-PFHpA		112%		50-150%
	13C8-PFOA		138%		50-150%
	13C9-PFNA		125%		50-150%
	13C6-PFDA		142%		50-150%
	13C7-PFUnDA		142%		50-150%
	13C2-PFDoDA		130%		50-150%
	13C2-PFTeDA		99%		50-150%
	13C3-PFBS		97%		50-150%
	13C3-PFHxS		104%		50-150%
	13C8-PFOS		104%		50-150%
	13C8-FOSA		125%		50-150%
	d3-MeFOSAA		119%		50-150%
	13C2-4:2FTS		107%		50-150%
	13C2-6:2FTS		132%		50-150%
	13C2-8:2FTS		137%		50-150%

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

Page 1 of 2

Client Sample ID:	MW-183WT_121918	Date Sampled:	12/19/18
Lab Sample ID:	FA60391-14	Date Received:	12/20/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q26042.D	1	01/03/19 07:03	NAF	12/27/18 08:30	OP73201	S2Q400
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0114	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00207	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00166	0.0040	0.0020	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00150	0.0040	0.0020	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	

PERFLUOROOCETANESULFONAMIDES

754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
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PERFLUOROOCETANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	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:	MW-183WT_121918	Date Sampled:	12/19/18
Lab Sample ID:	FA60391-14	Date Received:	12/20/18
Matrix:	AQ - Ground Water	Percent Solids:	n/a
Method:	EPA 537M QSM5.1 B-15 EPA 537 MOD		
Project:	Racer Saginaw		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	80%		50-150%
	13C5-PFPeA	87%		50-150%
	13C5-PFHxA	94%		50-150%
	13C4-PFHpA	96%		50-150%
	13C8-PFOA	122%		50-150%
	13C9-PFNA	107%		50-150%
	13C6-PFDA	114%		50-150%
	13C7-PFUnDA	101%		50-150%
	13C2-PFDoDA	100%		50-150%
	13C2-PFTeDA	82%		50-150%
	13C3-PFBS	82%		50-150%
	13C3-PFHxS	87%		50-150%
	13C8-PFOS	85%		50-150%
	13C8-FOSA	111%		50-150%
	d3-MeFOSAA	90%		50-150%
	13C2-4:2FTS	90%		50-150%
	13C2-6:2FTS	114%		50-150%
	13C2-8:2FTS	109%		50-150%

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