Ms. Christine Matlock
Senior Environmental Engineer
Hazardous Waste Section
Waste Management & Radiological Protection Division
Michigan Department of Environment, Great Lakes and Energy
525 West Allegan Street
Constitution Hall, Atrium North
Lansing, MI 48909

Arcadis of Michigan, LLC
28550 Cabot Drive
Suite 500
Novi
Michigan 48377
Phone: 248 994 2240
Fax: 248 994 2241
www.arcadis.com

Date: May 20, 2021
Our Ref: 30075941

Subject: Plant 6 PFAS Monitoring Well Installation Summary and Off-site Investigation Work Plan
RACER Trust Industrial Land, Plant 6, Lansing, Michigan

Dear Ms. Matlock,

This document has been prepared by Arcadis on behalf of the Revitalizing Auto Communities Environmental Response (RACER) Trust to summarize recent monitoring well installation and groundwater sampling activities for per- and polyfluoroalkyl substances (PFAS) completed at Plant 6 located in Lansing, Michigan (Site), and provide a proposed work plan for additional off-site investigation.

Previous investigation results for Plant 6 PFAS impacts are summarized in the *Plant 6 PFAS Investigation Summary – Phase 2* (Arcadis 2019). The phased investigation at Plant 6 identified concentrations of perfluorooctanoic acid (PFOA) above the current Michigan Department of Environment, Great Lakes and Energy (EGLE) Drinking Water Criteria (EGLE 2020) along the eastern and southern Plant 6 property boundaries, as well as off-site at boring locations within the residential area east of the Site and to the north of Osborn Road. Additionally, as noted in the *2020 Annual Groundwater Monitoring Report* (Arcadis 2021), perfluorononanoic acid (PFNA) has exceeded the DW criterion in two monitoring wells located near the Plant 6 boundary, however PFNA was not detected in any of the adjacent off-site vertical aquifer profile (VAP) borings completed in 2019. The primary PFAS resulting in off-site exceedances is PFOA. **Figure 1** includes the locations of PFOA in groundwater that exceed the Drinking Water (DW) Criteria of 8 nanograms per liter (ng/L). The PFOA at the property boundary and off-site are detected within shallow more permeable sand and silty sand seams encountered at depths ranging from 5 to 35 feet below ground surface (bgs). Cross-sections depicting the geologic conditions at the Plant 6 boundaries are included as part of the *Plant 6 PFAS Investigation Summary – Phase 2* report.

Based on the previous investigation results, six monitoring wells were installed at the perimeter of Plant 6 and within the Michigan Avenue right-of-way (ROW) in accordance with the *Plant 6 Monitoring Well Installation Workplan* (Arcadis 2020). The monitoring wells were installed to verify concentrations of and facilitate monitoring of PFAS impacts. Initial sampling of the new monitoring wells was completed on March 19 and March 22, 2021. Initial analytical results from the new wells confirmed the presence of DW Criteria exceedances near the eastern perimeter of Plant 6 and demonstrates that PFAS impacts do not extend south of Michigan Avenue.

Analytical results from the new monitoring wells, as wells as data from previous investigations, were used to inform the proposed investigation approach. The objective of the proposed off-site investigation is to define the

off-site extent of PFOA in groundwater at concentrations above the DW Criteria. The results of the off-site sampling are anticipated to define a clean perimeter to the east and north of Plant 6 and verify appropriate sentinel monitoring well locations for future monitoring. The area defined will be used to help develop a groundwater use restriction area through a City of Lansing ordinance to be proposed. The work described below will include vertical aquifer profile (VAP) soil borings to be completed within the City of Lansing rights-of-way (ROW) east and north of Plant 6.

Monitoring Well Installation and Sampling Summary

The six new monitoring wells were installed from March 9 through 16, 2021, in accordance with the *Plant 6 Monitoring Well Installation Workplan* (Arcadis 2020). Monitoring well locations are shown on **Figure 1** and boring and well construction logs are provided in **Attachment 1**. Monitoring wells MW-21-133, MW-21-134, and MW-21-135 were installed at the eastern perimeter of Plant 6. Locations and screen intervals were selected based on previous VAP sampling intervals with exceedances. Monitoring wells MW-21-136, MW-21-137, and MW-21-138 were installed in the southern right-of-way (ROW) of Michigan Avenue south of Plant 6 and were located based on the results of VAP sampling completed along the southern perimeter of Plant 6. Following installation, the monitoring wells were developed until reasonably free of fines.

The new monitoring wells were sampled on March 19 and March 22, 2021 using low-flow sampling methods. Additionally, two existing monitoring wells located in the southern ROW of Michigan Avenue (MW-12-15 and MW-12-16) were sampled for PFAS on March 5, 2021, during the first quarter groundwater monitoring event. Samples were submitted to SGS Accutest Laboratory located in Orlando, Florida and analyzed for the 28 PFAS outlined in the EGLE PFAS Minimum Laboratory Analyte List (EGLE, 2020) using modified USEPA Method 537 with isotope dilution (DoD QSM 5.1). Analytical results for the new monitoring wells, as well as MW-12-15 and MW-12-16 are summarized in **Table 1** and compared to EGLE DW and Groundwater Surface Water Interface (GSI) criteria. Laboratory analytical reports are provided as **Attachment 2**. Sample locations and a comparison of PFOA analytical results to DW criteria are shown on **Figure 1**.

PFOA exceeded DW criteria of 8 ng/L at MW-21-133, MW-21-134, and MW-21-135 along the eastern perimeter of Plant 6. PFOA concentrations ranged from 37.6 ng/L to 62.9 ng/L and were consistently lower than results from nearby VAP samples (39.8 ng/L to 189 ng/L). Generally, the on-site monitoring wells were located approximately 10 feet closer to the property boundary than the previous VAP borings.

Samples collected from Michigan Avenue ROW monitoring wells (MW-12-15, MW-12-16, MW-21-136, MW-21-137, and MW-21-138) did not contain any PFAS in excess of EGLE criteria. Detections of PFAS including PFOA and PFOS south of Michigan Avenue were limited to low single digit ng/L concentrations and demonstrate that PFAS exceedances do not extend south across Michigan Avenue.

Proposed Off-Site Investigation

Based on the results summarized above, no further delineation to the south of Plant 6 is necessary, and the proposed off-site PFAS investigation will focus primarily on delineation in areas to the east and north of Plant 6. The scope of work will consist of the advancement of eight (8) VAP soil borings using direct push drilling technology (DPT). Based on geology observed during previous investigations, borings will be advanced to a maximum depth of 40 feet bgs. Proposed boring locations are shown on **Figure 1**. At each boring location:

- Continuous soil cores will be collected at each location and described by an Arcadis geologist.

- Up to 2 vertical aquifer profile (VAP) samples will be collected from permeable zones encountered within each boring.
- Following completion of the boring, the tooling will be withdrawn, and the borehole will be backfilled with bentonite grout to approximately one foot below grade and capped with like material (asphalt, topsoil, etc.)

Utility Clearance

Prior to advancing borings, utility clearance will be completed for all proposed locations. Reliable lines of evidence that will be utilized include: Miss Dig call and mark out, City of Lansing provided maps of utilities, visual site inspection, and hand clearing to a minimum depth of 5 feet bgs.

Laboratory Analysis

Samples will be sent to SGS Accutest Laboratory located in Orlando, Florida and analyzed for the 28 PFAS outlined in the EGLE PFAS Minimum Laboratory Analyte List (EGLE, 2020) using modified USEPA Method 537 with isotope dilution (DoD QSM 5.1). The following field QA/QC samples will be collected and submitted to SGS for analysis:

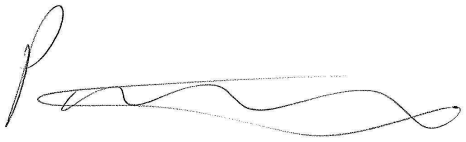
- Field Duplicates – One (1) field duplicate will be submitted blind for every ten (10) samples collected.
- Matrix Spikes/Matrix Spike Duplicates (MS/MSD) – One (1) sample for every twenty (20) samples will be collected in triplicate and submitted for MS/MSD analysis.
- Equipment Blanks – One (1) equipment blank will be collected per sampling device. Equipment blanks will be collected by pouring PFAS free water over the decontaminated sampling device and collecting the rinsate in a laboratory provided container.

Investigation Derived Waste

Soil cuttings and liquid investigation derived waste (IDW) including purge and decon water, will be placed in labeled and sealed 55-gallon steel drums and stored in a secured area at Plant 6, pending disposal. Liquid IDW will include water from decontamination of drilling tooling and purge water from VAP sampling.

Following completion of the off-site investigation activities, RACER will provide a summary of the results to EGLE. Recommendations for any additional investigation and/or groundwater use restrictions will be based on the findings and further discussion with EGLE. If you have any questions regarding the scope of work described above, please contact Patrick Curry (Arcadis) at 810-225-1926 or Dave Favero (RACER Trust) at 734-879-9525.

Sincerely,
Arcadis of Michigan, LLC



Patrick Curry, PG, CPG
Technical Expert

CC. Mr. Dave Favero – RACER

References:

Arcadis. 2019. 2019 Plant 6 Phase 2 PFAS Investigations Memo. RACER Trust Plant 6, Lansing, Michigan. August 23.

Arcadis. 2020. Plant 6 Monitoring Well Installation Workplan. RACER Trust Plant 6, Lansing, Michigan. October 6.

Arcadis. 2021. 2020 Annual Groundwater Monitoring Report. Racer Trust Lansing Industrial Land, Lansing Michigan. May 7.

Enclosures:

Table 1 – Groundwater Analytical Results - PFAS

Figure 1 – Groundwater PFOA Analytical Results and Proposed VAP Locations

Attachment 1 – Boring and Well Construction Logs

Attachment 2 – Laboratory Analytical Reports

Tables

Table 1
Summary of Groundwater Analytical Results
Plant 6 Monitoring Well Summary and VAP Work Plan
RACER Trust Plants 2, 3, and 6 - Lansing, Michigan

Location ID: Date Collected: Sample Name:	P201 Residential Drinking Water (EGLE 2020)	P201 Groundwater Surface Water Interface (EGLE 2018)	Units	MW-12-15 03/05/21 MW-12-15_030521	MW-12-16 03/05/21 MW-12-16_030521	MW-21-133 03/22/21 MW-21-133_032221	MW-21-134 03/19/21 MW-21-134_031921	MW-21-135 03/19/21 MW-21-135_031921	MW-21-136 03/19/21 MW-21-136_031921	MW-21-137 03/19/21 MW-21-137_031921	MW-21-138 03/19/21 MW-21-138_031921
Per- and Polyfluoroalkyl Substances (PFAS) (via EPA Method 537 Modified)											
11Cl-PF3OUdS (F-53B Minor)	- -	- -	ng/L	<36	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1
4:2 FTS	- -	- -	ng/L	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1
6:2 FTS	- -	- -	ng/L	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1
8:2 FTS	- -	- -	ng/L	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1
9Cl-PF3ONS (F-53B Major)	- -	- -	ng/L	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1
ADONA	- -	- -	ng/L	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1
Hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)	370	- -	ng/L	<3.6	<18	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	- -	- -	ng/L	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	- -	- -	ng/L	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6
Perfluorobutanesulfonic acid (PFBS)	420	- -	ng/L	<1.8	<1.8	**2.4**	**2.2**	**2**	<1.8	<1.8	<1.8
Perfluorobutanoic acid (PFBA)	- -	- -	ng/L	**5.9**	**5.5**	**20.2**	**15.6**	**21.1**	**3.1 J**	<3.6	**4.3**
Perfluorodecanesulfonic acid (PFDS)	- -	- -	ng/L	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
Perfluorodecanoic acid (PFDA)	- -	- -	ng/L	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
Perfluorododecanoic acid (PFDoA)	- -	- -	ng/L	<8.9	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
Perfluoroheptanesulfonic Acid (PFHpS)	- -	- -	ng/L	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
Perfluoroheptanoic acid (PFHpA)	- -	- -	ng/L	**1.2 J**	**1.8**	**24.5**	**17.5**	**31.7**	<1.8	<1.8	<1.8
Perfluorohexanesulfonic acid (PFHxS)	51	- -	ng/L	<1.8	<1.8	**2.9**	**3.1**	**2.4**	<1.8	<1.8	<1.8
Perfluorohexanoic acid (PFHxA)	400,000	- -	ng/L	**2.5**	**5.1**	**31.3**	**21.1**	**40.4**	**1.4 J**	<1.8	**1.9**
Perfluorononanesulfonic acid (PFNS)	- -	- -	ng/L	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
Perfluorononanoic acid (PFNA)	6	- -	ng/L	<1.8	<1.8	**1.2 J**	<1.8	**2.7**	<1.8	<1.8	<1.8
Perfluorooctane Sulfonamide (PFOSA)	- -	- -	ng/L	<18	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6
Perfluorooctane sulfonic acid (PFOS)	16	12	ng/L	<1.8	**0.92 J**	**8.7**	**6.7**	**4.1**	**1.8**	<1.8	<1.8
Perfluorooctanoic acid (PFOA)	8	12,000	ng/L	**1.5 J**	**3**	**62.9**	**37.6**	**48.3**	**1.2 J**	<1.8	**1.7 J**
Perfluoropentanesulfonic acid (PFPeS)	- -	- -	ng/L	<1.8	<1.8	**1.4 J**	**1.1 J**	<1.8	<1.8	<1.8	<1.8
Perfluoropentanoic acid (PFPeA)	- -	- -	ng/L	**2.6**	**5.1 J**	**23.7**	**19.8**	**39.4**	**1.1 J**	<1.8	<1.8
Perfluorotetradecanoic acid (PFTeA)	- -	- -	ng/L	<8.9	<8.9	<1.8	<1.8	<8.9	<1.8	<1.8	<1.8
Perfluorotridecanoic Acid (PFTriA)	- -	- -	ng/L	<8.9	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
Perfluoroundecanoic acid (PFUnA)	- -	- -	ng/L	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8

Data Flagging:

Bold font	represents data where detections were noted above the laboratory method detection limit.
Gray shading	represents result exceeding either or both the EGLE Part 201 Generic Cleanup Criteria and Screening Levels (dated January 10, 2018) or the EGLE GSI Criteria (Updated June 25, 2018)

Notes:

1. EGLE Part 201 Residential Drinking Water Criteria and Groundwater Surface Water Interface Criteria from the Generic Cleanup Criteria and Screening Levels (dated January 10, 2018) are used for comparison with all VOC and Inorganic data and revised criteria values (dated December 21, 2020) are used for comparison with all PFAS data.

Abbreviations:

- - = Not listed in the EGLE Criteria Tables.
* = Analyzed for low-level 1,4-Dioxane via EPA Method 522
EGLE = Michigan Department of Environment, Great Lakes, and Energy
NA = Not Analyzed
NR = Not Recorded

Lab and Validation Data Qualifiers:

J = The compound was positively identified, however, the associated numerical value is an estimated concentration only.
U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

Figures

MW-12-11
<3.4 ng/L
MW-04-05(5)
23.9 ng/L
SB-P6-MF301
3 - 8 ft: 23.8 ng/L
20 - 25 ft: 1.6 J ng/L
SB-P6-MF311
8 - 13 ft: 11.4 ng/L
20 - 25 ft: 7.3 [6.2] ng/L
SB-P6-MF293
3 - 8 ft: 50.4 ng/L
20 - 25 ft: 41.5 ng/L
SB-P6-MF321
15 - 20 ft: 14.2 ng/L
SB-P6-MK335
9 - 14 ft: 1.1 J ng/L
28 - 33 ft: 1.1 J ng/L
SB-P6-MP275
10 - 15 ft: 14.7 ng/L
20 - 25 ft: 34.1 ng/L
SB-P6-MQ312
5 - 10 ft: 226 ng/L
MW-12-12
91.2 ng/L
SB-P6-MQ289
15 - 20 ft: 94.6 [118] ng/L
27 - 32 ft: 28.8 ng/L
MW-14-70
7.4 ng/L
MW-03-05
49.1 ng/L
SB-P6-NF322
19.5 - 24.5 ft: <4.0 ng/L
MW-14-66
123 ng/L
MW-12-13
1.9 ng/L
SB-P6-NT322
19 - 24 ft: 5.8 ng/L
SB-P6-NS335
11 - 16 ft: <4.0 [<4.0] ng/L
SB-P6-NU322
11-16 ft: <4.0 ng/L
MW-03-06
6.5ng/L
P6-SB-37
35.6 ng/L
SB-P6-OH322
10 - 15 ft: 68.8 ng/L
15 - 20 ft: 39.6 ng/L
P6-SB-35
45.0 ng/L
MW-13-36R
75.2 ng/L
SB-P6-OS335
18.5 - 23.5 ft: 7.3 ng/L
SB-P6-OX322
18 - 23 ft: 65.6 ng/L
P6-SB-21
87.6 ng/L
SB-P6-PG322
23 - 28 ft: Dry
SB-P6-QA336
13 - 18 ft: 9.8 ng/L
30 - 35 ft: 11.1 ng/L
SB-P6-QH240
15-20 ft: 77.6 ng/L
SB-P6-QM322
15 - 20 ft: 189 ng/L
SB-OS-QR364
12.5 - 17.5 ft: 9.4 ng/L
22.5 - 27.5 ft: 8.3 ng/L
P6-SB-07
1,780 ng/L
SB-P6-QT226
13 - 18 ft: 12.2 ng/L
SB-P6-QT255
33.5 - 38.5 ft: Dry
SB-P6-QT239
15 - 20 ft: 449 ng/L
SB-P6-QQ322
10 - 15 ft: 74.1 [52.6] ng/L
SB-P6-RH241
13 - 18 ft: 253 ng/L
MW-21-133
62.9 ng/L
SB-P6-RQ322
13 - 18 ft: 157 ng/L
27 - 32 ft: 60.9 ng/L
MW-21-134
37.6 ng/L
SB-OS-RW339
18.5 - 23.5 ft: 37.0 ng/L
MW-21-135
48.3 ng/L
SB-P6-SG322
10 - 15 ft: 39.8 ng/L
25 - 30 FT: 91.1 ng/LI
MWBP-12A-UST1-4
7.7 ng/L
SB-P6-TA242
8 - 13 ft: 119 ng/L
Deep interval dry
SB-P6-TA258
5 - 10 ft: 74.1 ng/L
25 - 30 ft: 18.7 ng/L
MW-12-14
25-30 ft: 11.5 ng/L
P6-MW-01
25.1 ng/L
SB-P6-TA272
Shallow interval dry
29 - 34 ft: 75.6 ng/L
SB-P6-TA228
5 - 10 ft: 45.1 ng/L
MW-12-16
3.0 ng/L
MW-12-15
1.5 ng/L
MW-21-136
ND
MW-21-137
ND
MW-21-138
1.7 ng/L

LEGEND

- MONITORING WELL
- PROPOSED VAP
- VAP BORING
- PFOA < 8 ng/L
- PFOA > 8 ng/L
- STORM SEWER LOCATION
- ASSUMED/ESTIMATED STORM SEWER LOCATION
- PARCEL OUTLINE

APPROXIMATE PLANT BOUNDARIES

- PLANT 2
- PLANT 3
- PLANT 6

NOTES:

THE ANALYTICAL RESULTS REPRESENT THE PFOA CONCENTRATION IN THE SAMPLE AND ARE PRESENTED IN UNITS OF ng/L.THE MOST RECENT SAMPLING DATA IS SHOWN.

ANALYTICAL RESULTS IN BRACKETS REPRESENT DUPLICATE SAMPLE RESULTS.

THE PFOA MDEQ DRINKING WATER CRITERION IS 8 ng/L.

J - COMPOUND DETECTED ABOVE LABORATORY METHOD DETECTION LIMIT AND BELOW THE QUANITATIVE REPORTING LIMIT

ng/L - NANOGRAMS PER LITER

ALL ANALYSES COMPLETED USING MODIFIED USEPA METHOD 537.

0 215 430

SCALE IN FEET

RACER TRUST
PLANT 6
LANSING, MICHIGAN

PFOA GROUNDWATER ANALYTICAL RESULTS AND PROPOSED VAP LOCATIONS

ARCADIS

FIGURE 1

CITY: Novi DIV: ENV DB: TRY PIC: J.Barrett PM: R.Christensen TM: A.Villhauer TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2021_PFAS\Figure 1 - Proposed VAP Boring Locations rev_041321.mxd PLOTTED: 5/18/2021 12:29:28 PM BY: MJoye

Attachment 1

Boring and Well Construction Logs

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-21-133

Sheet: 1 of 1

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/10/2021
Date Completed: 03/10/2021

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 60° F, Cloudy/Windy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					3.6		(0.0-1.0') GRASS/TOPSOIL.		
2					4.1		(1.0-3.0') CLAY, medium plasticity, no dilatancy; trace silt; trace sand, very fine; trace granules, subrounded; moist; soft; dark brown (10YR 3/3).	(0.0-20.0') 8.0" dia. drilled hole	
3			72		3.3				
4					2.8		(3.0-6.0') CLAY, low to medium plasticity, rapid dilatancy; trace silt; trace sand, very fine; trace granules, subrounded; wet; soft; brown (10YR 5/3).	(0.0-7.0') Quik-Grout Bentonite Slurry	
5					3.0			(0.0-10.0') 2.0" dia. PVC casing	
6					5.1				
7					0.0		(6.0-11.3') CLAY, medium plasticity, no dilatancy; trace silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small, subrounded; dry; stiff; brown (10YR 5/3).	(7.0-8.0') Bentonite Time-Release Coated Pellets	
8			48		0.0				
9					0.0			(8.0-15.0') Filter Pack Sand	
10					0.0				
11					0.0				
12					0.0		(11.3-11.8') SAND, very fine to fine, subrounded; little silt; well sorted; wet; yellowish brown (10YR 5/4).		
13			60	MW-21-133_032221	0.0		(11.8-15.0') CLAY, medium to high plasticity, no dilatancy; trace silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small, subrounded; moist; medium stiff; brown (10YR 5/3).	(10.0-15.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
14					0.0				
15					0.0				
16					0.0		(15.0-20.0') CLAY, high plasticity, no dilatancy; trace silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small, subrounded; moist; medium stiff to stiff; gray (10YR 5/1).		
17					0.0			(15.0-20.0') Backfilled with Bentonite Chips	
18			55		0.0				
19					0.0				
20					0.0		End of boring at 20.0' bgs.		

Drilling Co.: Cascade
Driller: Todd Grossman
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☒ Yes ☐ No
Surface Elev.: NA
North Coor:
East Coor:

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-21-134

Sheet: 1 of 1

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/11/2021
Date Completed: 03/11/2021

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 60° F, Cloudy/Windy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					2.3		(0.0-1.0') GRASS/TOPSOIL.		
2					2.3		(1.0-3.0') CLAY, low to medium plasticity, no dilatancy; trace silt; and SAND, very fine to coarse, subrounded; dry to moist; medium stiff to stiff; dark brown (10YR 3/3).	(0.0-16.0') 8.0" dia. drilled hole	
3			72		1.1		(2.0-10.0') CLAY, medium to high plasticity, no dilatancy; trace silt; trace sand, very fine; trace granules, subrounded; moist; medium stiff; yellowish brown (10YR 5/4).		
4					1.4			(0.0-8.0') Quik-Grout Bentonite Slurry	
5					1.6			(0.0-11.0') 2.0" dia. PVC casing	
6					2.1		Note: Moisture content increases from moist to wet at 5.0' bgs.		
7					0.0				
8			48		0.0			(8.0-9.0') Bentonite Time-Release Coated Pellets	
9					0.0				
10					0.0			(9.0-16.0') Filter Pack Sand	
11					0.0		(10.0-13.0') CLAY, high plasticity, no dilatancy; trace silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small, subrounded; moist; medium stiff to soft; brown (10YR 5/3).		
12					0.0				
13			60		0.0				
14				MW-21-134_031921	0.0		(13.0-13.1') SAND, very fine to fine, subrounded; trace silt; well sorted; wet; brown (10YR 5/3).	(11.0-16.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
15					0.0		(13.1-13.5') CLAY, high plasticity, no dilatancy; trace silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small, subrounded; moist; stiff; brown (10YR 5/3).		
16			12		0.0		(13.5-13.9') SAND, very fine to fine, subrounded; little silt; trace clay; well sorted; wet; brown (10YR 5/3).		
17							(13.9-15.0') CLAY, high plasticity, no dilatancy; trace silt; trace sand, fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; stiff; brown (10YR 5/3).		
18							(15.0-16.0') No lithology recorded.		
19							End of boring at 16.0' bgs.		
20									

Drilling Co.: Cascade
Driller: Todd Grossman
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): 5
Water Level Finish (ft. btoc.): NA
Converted to Well: ☒ Yes ☐ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_040621.GPJ ARCADIS_2013.GDT 4/6/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-21-135

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/11/2021
Date Completed: 03/11/2021

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 58° F, Partly Cloudy/Windy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					2.1		(0.0-1.0') GRASS/TOPSOIL.		
					1.7		(1.0-3.0') CLAY, low plasticity to nonplastic, no dilatancy; little sand, fine, subrounded; trace to little silt; dry to moist; stiff; brown (10YR 4/3).		
2					1.6				
3			72		1.1		(3.0-8.5') CLAY, medium plasticity, no dilatancy; trace silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; dry to moist; medium stiff; dark brown (10YR 3/3).		
4					1.6			(0.0-20.0') 8.0" dia. drilled hole	
5					1.3				
6					0.0				
7					0.0				
8			48		0.0		(8.5-8.9') SAND, very fine to fine, subrounded; little to some silt; well sorted; wet; brown (10YR 5/3).		
9					0.0		(8.9-14.0') CLAY, medium to high plasticity, no dilatancy; little sand, very fine to fine, subrounded; trace silt; trace granules, subrounded; trace pebbles, small, subrounded; moist; medium stiff; brown (10YR 5/3).	(0.0-19.0') Quik-Grout Bentonite Slurry	
10					0.0				
11					0.0		Note: Consistency changes to soft from 11.0-14.0' bgs.	(0.0-22.0') 2.0" dia. PVC casing	
12					0.0				
13			52		0.0		Note: Small sand seam, very fine; well sorted; wet at 12.0' bgs.		
14					0.0				
15					0.0		(14.0-15.0') SAND, very fine to fine, subrounded; trace silt; well sorted; wet; light yellowish brown (10YR 6/4).		
16					0.0		(15.0-17.0') CLAY, high plasticity, no dilatancy; trace silt; moist; medium stiff; brown (10YR 5/3).		
17					0.0				
18			48		0.0		(17.0-22.5') SAND, very fine to fine, subrounded; trace silt; well sorted; dry to moist; brownish yellow (10YR 6/6).		
19					0.0				
20					0.0			(19.0-20.0') Bentonite Time-Release	

Drilling Co.: Cascade
Driller: Todd Grossman
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☒ Yes ☐ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOVI-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_040621.GPJ ARCADIS_2013.GDT 4/6/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-21-135

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/11/2021
Date Completed: 03/11/2021

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 58° F, Partly Cloudy/Windy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21			48	MW-21-135_031921	0.0		(17.0-22.5') SAND, very fine to fine, subrounded; trace silt; well sorted; dry to moist; brownish yellow (10YR 6/6). Note: Moisture content increases to moist at 20.0' bgs.	Coated Pellets (20.0-27.0') Filter Pack Sand	
22					0.0				
23					0.0		(22.5-23.8') SILT, nonplastic, rapid dilatancy; trace sand, very fine; well sorted; wet; light yellowish brown (10YR 6/4).		
24					0.0		(23.8-25.8') SAND, very fine to fine, subrounded; trace silt; well sorted; wet; yellowish brown (10YR 5/4).	(22.0-27.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
25					0.0				
26			54		0.0		(25.8-26.8') SAND, medium to coarse, subrounded; little granules, subrounded; little pebbles, small, subrounded; poorly sorted; wet; yellowish brown (10YR 5/4).		
27					0.0		(26.8-30.0') CLAY, high plasticity, no dilatancy; trace silt; trace sand, very fine to fine, subrounded; moist; medium stiff to stiff; gray (10YR 5/1).		
28					0.0			(27.0-30.0') Backfilled with Bentonite Chips	
29					0.0				
30					0.0		End of boring at 30.0' bgs.		
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									

Remarks:

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-21-136

Sheet: 1 of 1

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/12/2021
Date Completed: 03/12/2021

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 45° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					0.5		(0.0-1.0') GRASS/TOPSOIL.	(0.0-0.8') Concrete Well Pad	
2					0.7		(1.0-4.0') CLAY, medium plasticity, no dilatancy; trace silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; dry; stiff; brown (10YR 5/3).	(0.8-1.5') Filter Pack Sand	
3			72		0.3			(0.0-15.0') 8.0" dia. drilled hole	
4					0.4			(1.5-6.0') Quik-Grout Bentonite Slurry	
5					0.5		(4.0-6.0') SAND, very fine to medium, subrounded; little silt; trace granules, subrounded; poorly sorted; dry to moist; pale brown (10YR 6/3).	(0.0-9.0') 2.0" dia. PVC casing	
6					0.3				
7					0.0		(6.0-15.0') CLAY, medium to high plasticity, no dilatancy; trace to little silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; gray (10YR 5/1).	(6.0-7.0') Bentonite Time-Release Coated Pellets	
8			48		0.0			(7.0-15.0') Filter Pack Sand	
9					0.0				
10					0.0		Note: Small silt lens, wet, present from 9.4-9.5' bgs.		
11					0.0		Note: Small silt lens, wet, present from 10.9-11.0' bgs.	(9.0-14.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
12				MW-21-136_031921	0.0				
13			60		0.0				
14					0.0				
15					0.0				
16							End of boring at 15.0' bgs.		
17									
18									
19									
20									

Drilling Co.: Cascade
Driller: Todd Grossman
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☒ Yes ☐ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_040621.GPJ ARCADIS_2013.GDT 4/6/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-21-137

Sheet: 1 of 1

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/12/2021
Date Completed: 03/12/2021

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 45° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					1.3		(0.0-1.0') GRASS/TOPSOIL.	(0.0-0.8') Concrete Well Pad (0.8-1.5') Filter Pack Sand (0.0-15.0') 8.0" dia. drilled hole (1.5-4.0') Quik-Grout Bentonite Slurry (0.0-7.0') 2.0" dia. PVC casing (4.0-5.0') Bentonite Time-Release Coated Pellets (5.0-15.0') Filter Pack Sand (7.0-12.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen (12.0-15.0') Backfilled with Bentonite Chips	
2					1.6		(1.0-3.0') SAND, very fine to fine, subrounded; little to some silt; trace granules, subrounded; poorly sorted; dry to moist; brown (10YR 5/3).		
3			72		0.9				
4					1.3		(3.0-7.5') CLAY, medium plasticity, no dilatancy; some silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small, subrounded; moist; stiff; yellowish brown (10YR 5/6).		
5					1.1				
6					1.1				
7					0.0				
8			48		0.0		(7.5-10.0') SILT, low plasticity to nonplastic, slow dilatancy; trace to little clay; trace to little sand, very fine; wet; stiff; yellowish brown (10YR 5/6).		
9					0.0		Note: Sand lens, very fine, wet, present at 9.0' bgs.		
10				MW-21-137_031921	0.0		Note: Sand lens, medium to coarse, wet present from 9.5-9.7' bgs.		
11					0.0		(10.0-11.0') SAND, very fine to coarse, subangular; little silt; poorly sorted; wet; yellowish brown (10YR 5/6).		
12					0.0		(11.0-15.0') CLAY, medium to high plasticity, no dilatancy; trace to little silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; gray (10YR 5/1).		
13			60		0.0				
14					0.0				
15					0.0				
16							End of boring at 15.0' bgs.		
17									
18									
19									
20									

Drilling Co.: Cascade
Driller: Todd Grossman
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☒ Yes ☐ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_040621.GPJ ARCADIS_2013.GDT 4/6/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-21-138

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/15/2021
Date Completed: 03/15/2021

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 25° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1			72		0.2		(0.0-1.0') GRASS/TOPSOIL.	(0.0-0.8') Concrete Well Pad	
2					0.2		(1.0-3.0') SAND, very fine to fine, subrounded; little to some silt; trace granules, subrounded; poorly sorted; dry to moist; brown (10YR 5/3).	(0.8-1.5') Filter Pack Sand	
3					0.3				
4					0.1		(3.0-7.5') CLAY, medium plasticity, no dilatancy; some silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small, subrounded; moist; stiff; yellowish brown (10YR 5/6).		
5					0.1				
6					0.2				
7			48		0.0				
8					0.0		(7.5-10.0') SILT, low plasticity, no dilatancy; trace to little clay; trace to little sand, very fine; moist to wet; stiff; yellowish brown (10YR 5/6).	(0.0-35.0') 8.0" dia. drilled hole	
9					0.0		Note: Sand lens, very fine, wet, present at 9.0' bgs.		
10					0.0		Note: Sand lens, medium to coarse, wet present from 9.5-9.7' bgs.		
11			60		0.0		(10.0-11.0') SAND, very fine to coarse; trace to little silt; poorly sorted; wet; yellowish brown (10YR 5/6).	(1.5-21.0') Quik-Grout Bentonite Slurry	
12					0.0		(11.0-21.0') CLAY, medium to high plasticity, no dilatancy; trace to little silt; trace sand, very fine; trace granules, subrounded; dry to moist; stiff; gray (10YR 5/1).	(0.0-24.0') 2.0" dia. PVC casing	
13					0.0				
14					0.0				
15					0.0				
16			60		0.0				
17					0.0				
18					0.0				
19					0.0				
20					0.0				

Drilling Co.: Cascade
Driller: Todd Grossman
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☒ Yes ☐ No
Surface Elev.: NA
North Coor:
East Coor:

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: MW-21-138

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 03/15/2021
Date Completed: 03/15/2021

Logger: A.Westhuis
Editor: C. Cisco
Weather Conditions: 25° F, Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					0.0		(11.0-21.0') CLAY, medium to high plasticity, no dilatancy; trace to little silt; trace sand, very fine; trace granules, subrounded; dry to moist; stiff; gray (10YR 5/1).		
22					0.0		(21.0-27.0') CLAY, medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).	(21.0-22.0') Bentonite Time-Release Coated Pellets	
23			54		0.0			(22.0-29.0') Filter Pack Sand	
24					0.0				
25					0.0		Note: Small sand lens, very fine to medium, wet present at 24.5' bgs.		
26					0.0				
27				MW-21-138_031921	0.0			(24.0-29.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
28			60		0.0		(27.0-35.0') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; medium stiff; grayish brown (10YR 5/2).		
29					0.0				
30					0.0				
31					0.0		Note: Consistency changes to soft from 30.0-34.0' bgs.		
32					0.0			(29.0-35.0') Backfilled with Bentonite Chips	
33			48		0.0				
34					0.0				
35					0.0				
36							End of boring at 35.0' bgs.		
37									
38									
39									
40									
41									

Remarks:

Attachment 2

Laboratory Analytical Reports

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

e-Hardcopy 2.0
Automated Report

Technical Report for

Arcadis

Racer Lansing PFAS Delineation; Lansing, MI

30075941

SGS Job Number: FA83700

Sampling Dates: 03/04/21 - 03/05/21

Report to:

Arcadis
300 S Washington Sq Suite 315
Lansing, MI 48933
andrew.lorenz@arcadis.com; marina.samp@arcadis.com;
alex.villhauer@arcadis.com; kaitlyn.voet@arcadis.com;
ATTN: Alex Villhauer

Total number of pages in report: 44

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.

Norm Farmer
Technical Director

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

Table of Contents

SGS North America Inc.

Sample Summary

Arcadis

Job No: FA83700

Racer Lansing PFAS Delineation; Lansing, MI
Project No: 30075941

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
This report contains results reported as ND = Not detected. The following applies:							
Organics ND = Not detected above the MDL							
FA83700-1	03/04/21	10:50	DR	03/06/21	AQ	Ground Water	MW-12-12_030421
FA83700-2	03/04/21	12:05	DR	03/06/21	AQ	Ground Water	MW-14-70_030421
FA83700-3	03/04/21	13:10	DR	03/06/21	AQ	Ground Water	MW-12-13_030421
FA83700-4	03/04/21	14:05	DR	03/06/21	AQ	Ground Water	MW-14-67_030421
FA83700-5	03/04/21	15:05	DR	03/06/21	AQ	Ground Water	MW-13-36R_030421
FA83700-6	03/04/21	16:50	DR	03/06/21	AQ	Ground Water	P6-SB-07_030421
FA83700-7	03/05/21	09:25	DR	03/06/21	AQ	Ground Water	MW-12-15_030521
FA83700-8	03/05/21	10:50	DR	03/06/21	AQ	Ground Water	MW-12-16_030521
FA83700-9	03/05/21	09:35	DR	03/06/21	AQ	Equipment Blank	EB-01_030521
FA83700-10	03/04/21	00:00	DR	03/06/21	AQ	Ground Water	DUP-05_030421

Summary of Hits

Job Number: FA83700
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 03/04/21 thru 03/05/21

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA83700-1	**MW-12-12_030421**					
Perfluorobutanoic acid		0.0398	0.0036	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid [a]		0.0691	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0779	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0384	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0787	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.0093	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.0142	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0034	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0469	0.0018	0.00089	ug/l	EPA 537M BY ID
FA83700-2	**MW-14-70_030421**					
Perfluorobutanoic acid		0.0573	0.0036	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid [b]		0.154	0.0089	0.0045	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.124	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0733	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0519	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid [b]		0.0056 J	0.0089	0.0045	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid [b]		0.0064 J	0.0089	0.0045	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0108	0.0018	0.00089	ug/l	EPA 537M BY ID
FA83700-3	**MW-12-13_030421**					
Perfluorobutanoic acid		0.0373	0.0036	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0469	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0709	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0166	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0028	0.0018	0.00089	ug/l	EPA 537M BY ID
FA83700-4	**MW-14-67_030421**					
Perfluorobutanoic acid		0.0605	0.0036	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid [b]		0.0785	0.0089	0.0045	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.106	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0391	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0259	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.0017 J	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.0038	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.0016 J	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0052	0.0018	0.00089	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA83700
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 03/04/21 thru 03/05/21

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA83700-5	**MW-13-36R_030421**					
Perfluorobutanoic acid [c]		0.0309	0.0036	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid [c]		0.0344	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0386	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0417	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0811	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.0165	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.0209	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0036	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0022	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0479	0.0018	0.00089	ug/l	EPA 537M BY ID
PFOSA		0.0066	0.0036	0.0018	ug/l	EPA 537M BY ID
MeFOSAA		0.0029 J	0.0036	0.0018	ug/l	EPA 537M BY ID
EtFOSAA		0.0046	0.0036	0.0018	ug/l	EPA 537M BY ID
FA83700-6	**P6-SB-07_030421**					
Perfluorobutanoic acid		0.417	0.036	0.018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		1.59	0.018	0.0089	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		1.55	0.018	0.0089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		1.21	0.018	0.0089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		1.93	0.018	0.0089	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.208	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.0455	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0113	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.0022	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.103	0.0018	0.00089	ug/l	EPA 537M BY ID
FA83700-7	**MW-12-15_030521**					
Perfluorobutanoic acid		0.0059	0.0036	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid [d]		0.0026	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0025	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0012 J	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0015 J	0.0018	0.00089	ug/l	EPA 537M BY ID
FA83700-8	**MW-12-16_030521**					
Perfluorobutanoic acid		0.0055	0.0036	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid [b]		0.0051 J	0.0089	0.0045	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0051	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0018	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0030	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00092 J	0.0018	0.00089	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA83700
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 03/04/21 thru 03/05/21

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA83700-9	**EB-01_030521**					
No hits reported in this sample.						
FA83700-10	**DUP-05_030421**					
Perfluorobutanoic acid [a]		0.0303	0.0036	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid [a]		0.0339	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0375	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0432	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0796	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.0156	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.0204	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroundecanoic acid		0.0010 J	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0029	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0055	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0447	0.0018	0.00089	ug/l	EPA 537M BY ID
PFOSA		0.0061	0.0036	0.0018	ug/l	EPA 537M BY ID
MeFOSAA		0.0028 J	0.0036	0.0018	ug/l	EPA 537M BY ID
EtFOSAA		0.0050	0.0036	0.0018	ug/l	EPA 537M BY ID

(a) Associated ID Standard outside control limits, Confirmed by batch QC.
(b) Dilution required due to matrix interference (ID recovery standard failure).
(c) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.
(d) Associated ID Standard outside control limits.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	MW-12-12_030421		
Lab Sample ID:	FA83700-1	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12150.D	1	03/10/21 19:33	NAF	03/09/21 13:30	OP84430	S4Q165
Run #2							

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0398	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid [a]	0.0691	0.0018	0.00089	ug/l	
307-24-4	Perfluorohexanoic acid	0.0779	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0384	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0787	0.0018	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0093	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	0.0142	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0018	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0034	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0469	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA [a]	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-12-12_030421		
Lab Sample ID:	FA83700-1	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	48%		35-135%
	13C5-PFPeA	47% [b]		50-150%
	13C5-PFHxA	66%		50-150%
	13C4-PFHpA	83%		50-150%
	13C8-PFOA	82%		50-150%
	13C9-PFNA	78%		50-150%
	13C6-PFDA	87%		50-150%
	13C7-PFUnDA	77%		40-140%
	13C2-PFDoDA	76%		40-140%
	13C2-PFTeDA	78%		30-130%
	13C3-PFBS	51%		50-150%
	13C3-PFHxS	97%		50-150%
	13C8-PFOS	88%		50-150%
	13C8-FOSA	27% [b]		30-130%
	d3-MeFOSAA	84%		40-140%
	d5-EtFOSAA	99%		40-140%
	13C2-4:2FTS	72%		50-150%
	13C2-6:2FTS	86%		50-150%
	13C2-8:2FTS	91%		50-150%
	13C3-HFPO-DA	53%		50-150%

(a) Associated ID Standard outside control limits, Confirmed by batch QC.
(b) Outside control limits.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-14-70_030421		
Lab Sample ID:	FA83700-2	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12152.D	1	03/10/21 20:03	NAF	03/09/21 13:30	OP84430	S4Q165
Run #2 [a]	4Q12191.D	5	03/11/21 12:43	NAF	03/09/21 13:30	OP84430	S4Q166

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2	280 ml	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0573	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.154 [b]	0.0089	0.0045	ug/l	
307-24-4	Perfluorohexanoic acid	0.124	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0733	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0519	0.0018	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	0.0056 [b]	0.0089	0.0045	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0064 [b]	0.0089	0.0045	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0108	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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-14-70_030421		
Lab Sample ID:	FA83700-2	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND [b]	0.018	0.0089	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	38%	56%	35-135%
	13C5-PFPeA	38% [c]	67%	50-150%
	13C5-PFHxA	61%	76%	50-150%
	13C4-PFHpA	84%	80%	50-150%
	13C8-PFOA	86%	81%	50-150%
	13C9-PFNA	89%	87%	50-150%
	13C6-PFDA	95%	91%	50-150%
	13C7-PFUnDA	90%	85%	40-140%
	13C2-PFDoDA	91%	84%	40-140%
	13C2-PFTeDA	94%	82%	30-130%
	13C3-PFBS	49% [c]	71%	50-150%
	13C3-PFHxS	93%	81%	50-150%
	13C8-PFOS	91%	88%	50-150%
	13C8-FOSA	56%	85%	30-130%
	d3-MeFOSAA	129%	91%	40-140%
	d5-EtFOSAA	119%	91%	40-140%
	13C2-4:2FTS	66%	76%	50-150%
	13C2-6:2FTS	89%	88%	50-150%
	13C2-8:2FTS	102%	89%	50-150%
	13C3-HFPO-DA	49% [c]	73%	50-150%

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

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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-12-13_030421		
Lab Sample ID:	FA83700-3	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12153.D	1	03/10/21 20:18	NAF	03/09/21 13:30	OP84430	S4Q165
Run #2							

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0373	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0469	0.0018	0.00089	ug/l	
307-24-4	Perfluorohexanoic acid	0.0709	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0166	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0028	0.0018	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0018	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-12-13_030421		
Lab Sample ID:	FA83700-3	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	54%		35-135%
	13C5-PFPeA	59%		50-150%
	13C5-PFHxA	84%		50-150%
	13C4-PFHpA	102%		50-150%
	13C8-PFOA	100%		50-150%
	13C9-PFNA	101%		50-150%
	13C6-PFDA	108%		50-150%
	13C7-PFUnDA	95%		40-140%
	13C2-PFDoDA	93%		40-140%
	13C2-PFTeDA	101%		30-130%
	13C3-PFBS	57%		50-150%
	13C3-PFHxS	103%		50-150%
	13C8-PFOS	103%		50-150%
	13C8-FOSA	87%		30-130%
	d3-MeFOSAA	118%		40-140%
	d5-EtFOSAA	113%		40-140%
	13C2-4:2FTS	90%		50-150%
	13C2-6:2FTS	103%		50-150%
	13C2-8:2FTS	104%		50-150%
	13C3-HFPO-DA	69%		50-150%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-14-67_030421		
Lab Sample ID:	FA83700-4	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12154.D	1	03/10/21 20:33	NAF	03/09/21 13:30	OP84430	S4Q165
Run #2 [a]	4Q12192.D	5	03/11/21 12:57	NAF	03/09/21 13:30	OP84430	S4Q166

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2	280 ml	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0605	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0785 [b]	0.0089	0.0045	ug/l	
307-24-4	Perfluorohexanoic acid	0.106	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0391	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0259	0.0018	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0017	0.0018	0.00089	ug/l	J
335-76-2	Perfluorodecanoic acid	0.0038	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND [b]	0.0089	0.0045	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND [b]	0.0089	0.0045	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0016	0.0018	0.00089	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.0052	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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-14-67_030421		
Lab Sample ID:	FA83700-4	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND [b]	0.018	0.0089	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	37%	56%	35-135%
	13C5-PFPeA	37% [c]	71%	50-150%
	13C5-PFHxA	58%	79%	50-150%
	13C4-PFHpA	82%	87%	50-150%
	13C8-PFOA	86%	90%	50-150%
	13C9-PFNA	86%	92%	50-150%
	13C6-PFDA	95%	96%	50-150%
	13C7-PFUnDA	90%	91%	40-140%
	13C2-PFDoDA	90%	89%	40-140%
	13C2-PFTeDA	83%	86%	30-130%
	13C3-PFBS	48% [c]	74%	50-150%
	13C3-PFHxS	99%	97%	50-150%
	13C8-PFOS	96%	89%	50-150%
	13C8-FOSA	37%	69%	30-130%
	d3-MeFOSAA	133%	100%	40-140%
	d5-EtFOSAA	130%	96%	40-140%
	13C2-4:2FTS	63%	82%	50-150%
	13C2-6:2FTS	89%	94%	50-150%
	13C2-8:2FTS	101%	99%	50-150%
	13C3-HFPO-DA	46% [c]	84%	50-150%

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

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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-13-36R_030421		
Lab Sample ID:	FA83700-5	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12155.D	1	03/10/21 20:48	NAF	03/09/21 13:30	OP84430	S4Q165
Run #2 [a]	3Q35204.D	1	03/15/21 20:22	NG	03/13/21 08:45	OP84486	S3Q518

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2	280 ml	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid [b]	0.0309	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid [b]	0.0344	0.0018	0.00089	ug/l	
307-24-4	Perfluorohexanoic acid	0.0386	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0417	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0811	0.0018	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0165	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	0.0209	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	0.0036	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0018	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0022	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0479	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.0066	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	0.0029	0.0036	0.0018	ug/l	J
2991-50-6	EtFOSAA	0.0046	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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-13-36R_030421		
Lab Sample ID:	FA83700-5	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	2% [c]	1% [c]	35-135%
	13C5-PFPeA	30% [c]	27% [c]	50-150%
	13C5-PFHxA	84%	63%	50-150%
	13C4-PFHpA	93%	62%	50-150%
	13C8-PFOA	86%	62%	50-150%
	13C9-PFNA	83%	61%	50-150%
	13C6-PFDA	85%	60%	50-150%
	13C7-PFUnDA	77%	56%	40-140%
	13C2-PFDoDA	80%	56%	40-140%
	13C2-PFTeDA	90%	64%	30-130%
	13C3-PFBS	73%	65%	50-150%
	13C3-PFHxS	103%	60%	50-150%
	13C8-PFOS	92%	58%	50-150%
	13C8-FOSA	31%	22% [c]	30-130%
	d3-MeFOSAA	79%	98%	40-140%
	d5-EtFOSAA	101%	105%	40-140%
	13C2-4:2FTS	90%	67%	50-150%
	13C2-6:2FTS	89%	67%	50-150%
	13C2-8:2FTS	90%	69%	50-150%
	13C3-HFPO-DA	65%	55%	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.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	P6-SB-07_030421		
Lab Sample ID:	FA83700-6	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12158.D	1	03/10/21 21:33	NAF	03/09/21 13:30	OP84430	S4Q165
Run #2	4Q12194.D	10	03/11/21 13:27	NAF	03/09/21 13:30	OP84430	S4Q166

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2	280 ml	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.417 [a]	0.036	0.018	ug/l	
2706-90-3	Perfluoropentanoic acid	1.59 [a]	0.018	0.0089	ug/l	
307-24-4	Perfluorohexanoic acid	1.55 [a]	0.018	0.0089	ug/l	
375-85-9	Perfluoroheptanoic acid	1.21 [a]	0.018	0.0089	ug/l	
335-67-1	Perfluorooctanoic acid	1.93 [a]	0.018	0.0089	ug/l	
375-95-1	Perfluorononanoic acid	0.208	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	0.0455	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND [a]	0.018	0.0089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND [a]	0.018	0.0089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0113	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0022	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.103	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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:	P6-SB-07_030421		
Lab Sample ID:	FA83700-6	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	44%	62%	35-135%
	13C5-PFPeA	43% [b]	81%	50-150%
	13C5-PFHxA	61%	80%	50-150%
	13C4-PFHpA	74%	85%	50-150%
	13C8-PFOA	72%	85%	50-150%
	13C9-PFNA	81%	87%	50-150%
	13C6-PFDA	89%	90%	50-150%
	13C7-PFUnDA	81%	87%	40-140%
	13C2-PFDoDA	79%	85%	40-140%
	13C2-PFTeDA	94%	81%	30-130%
	13C3-PFBS	49% [b]	89%	50-150%
	13C3-PFHxS	95%	88%	50-150%
	13C8-PFOS	86%	83%	50-150%
	13C8-FOSA	31%	70%	30-130%
	d3-MeFOSAA	104%	104%	40-140%
	d5-EtFOSAA	126%	96%	40-140%
	13C2-4:2FTS	73%	85%	50-150%
	13C2-6:2FTS	74%	88%	50-150%
	13C2-8:2FTS	95%	94%	50-150%
	13C3-HFPO-DA	52%	84%	50-150%

(a) Result is from Run# 2
(b) Outside control limits.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-12-15_030521		
Lab Sample ID:	FA83700-7	**Date Sampled:**	03/05/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12195.D	1	03/11/21 13:44	NAF	03/09/21 13:30	OP84430	S4Q166
Run #2 [a]	4Q12160.D	5	03/10/21 22:03	NAF	03/09/21 13:30	OP84430	S4Q165

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2	280 ml	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0059	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid [b]	0.0026	0.0018	0.00089	ug/l	
307-24-4	Perfluorohexanoic acid	0.0025	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0012	0.0018	0.00089	ug/l	J
335-67-1	Perfluorooctanoic acid	0.0015	0.0018	0.00089	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND [c]	0.0089	0.0045	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND [c]	0.0089	0.0045	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND [c]	0.0089	0.0045	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0018	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND [c]	0.018	0.0089	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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-12-15_030521		
Lab Sample ID:	FA83700-7	**Date Sampled:**	03/05/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND [c]	0.036	0.0089	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	36%	73%	35-135%
	13C5-PFPeA	47% [d]	74%	50-150%
	13C5-PFHxA	57%	90%	50-150%
	13C4-PFHpA	66%	101%	50-150%
	13C8-PFOA	74%	95%	50-150%
	13C9-PFNA	78%	98%	50-150%
	13C6-PFDA	76%	92%	50-150%
	13C7-PFUnDA	58%	72%	40-140%
	13C2-PFDoDA	29% [d]	49%	40-140%
	13C2-PFTeDA	4% [d]	31%	30-130%
	13C3-PFBS	56%	76%	50-150%
	13C3-PFHxS	74%	105%	50-150%
	13C8-PFOS	75%	93%	50-150%
	13C8-FOSA	12% [d]	33%	30-130%
	d3-MeFOSAA	92%	110%	40-140%
	d5-EtFOSAA	79%	96%	40-140%
	13C2-4:2FTS	54%	96%	50-150%
	13C2-6:2FTS	75%	104%	50-150%
	13C2-8:2FTS	85%	96%	50-150%
	13C3-HFPO-DA	58%	70%	50-150%

(a) Dilution required due to matrix interference (ID recovery standard failure).
(b) Associated ID Standard outside control limits.
(c) Result is from Run# 2
(d) Outside control limits.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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-12-16_030521		
Lab Sample ID:	FA83700-8	**Date Sampled:**	03/05/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12161.D	1	03/10/21 22:18	NAF	03/09/21 13:30	OP84430	S4Q165
Run #2 [a]	4Q12162.D	5	03/10/21 22:33	NAF	03/09/21 13:30	OP84430	S4Q165

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2	280 ml	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0055	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0051 [b]	0.0089	0.0045	ug/l	J
307-24-4	Perfluorohexanoic acid	0.0051	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0018	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0030	0.0018	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND [b]	0.0089	0.0045	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0018	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00092	0.0018	0.00089	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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-12-16_030521		
Lab Sample ID:	FA83700-8	**Date Sampled:**	03/05/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND [b]	0.018	0.0089	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	42%	68%	35-135%
	13C5-PFPeA	45% [c]	68%	50-150%
	13C5-PFHxA	61%	82%	50-150%
	13C4-PFHpA	76%	88%	50-150%
	13C8-PFOA	79%	81%	50-150%
	13C9-PFNA	84%	81%	50-150%
	13C6-PFDA	87%	87%	50-150%
	13C7-PFUnDA	71%	73%	40-140%
	13C2-PFDoDA	54%	60%	40-140%
	13C2-PFTeDA	14% [c]	33%	30-130%
	13C3-PFBS	53%	70%	50-150%
	13C3-PFHxS	80%	91%	50-150%
	13C8-PFOS	81%	84%	50-150%
	13C8-FOSA	33%	53%	30-130%
	d3-MeFOSAA	107%	100%	40-140%
	d5-EtFOSAA	99%	87%	40-140%
	13C2-4:2FTS	63%	83%	50-150%
	13C2-6:2FTS	83%	91%	50-150%
	13C2-8:2FTS	90%	84%	50-150%
	13C3-HFPO-DA	49% [c]	66%	50-150%

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

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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_030521		
Lab Sample ID:	FA83700-9	**Date Sampled:**	03/05/21
Matrix:	AQ - Equipment Blank	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12163.D	1	03/10/21 22:48	NAF	03/09/21 13:30	OP84430	S4Q165
Run #2							

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	ND	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0018	0.00089	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0018	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0018	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EB-01_030521		
Lab Sample ID:	FA83700-9	**Date Sampled:**	03/05/21
Matrix:	AQ - Equipment Blank	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	103%		35-135%
	13C5-PFPeA	111%		50-150%
	13C5-PFHxA	111%		50-150%
	13C4-PFHpA	109%		50-150%
	13C8-PFOA	101%		50-150%
	13C9-PFNA	101%		50-150%
	13C6-PFDA	107%		50-150%
	13C7-PFUnDA	102%		40-140%
	13C2-PFDoDA	103%		40-140%
	13C2-PFTeDA	105%		30-130%
	13C3-PFBS	107%		50-150%
	13C3-PFHxS	106%		50-150%
	13C8-PFOS	100%		50-150%
	13C8-FOSA	113%		30-130%
	d3-MeFOSAA	128%		40-140%
	d5-EtFOSAA	127%		40-140%
	13C2-4:2FTS	104%		50-150%
	13C2-6:2FTS	97%		50-150%
	13C2-8:2FTS	102%		50-150%
	13C3-HFPO-DA	96%		50-150%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	DUP-05_030421		
Lab Sample ID:	FA83700-10	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12164.D	1	03/10/21 23:02	NAF	03/09/21 13:30	OP84430	S4Q165
Run #2 [a]	4Q12198.D	5	03/11/21 14:30	NAF	03/09/21 13:30	OP84430	S4Q166

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2	280 ml	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid [b]	0.0303	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid [b]	0.0339	0.0018	0.00089	ug/l	
307-24-4	Perfluorohexanoic acid	0.0375	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0432	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0796	0.0018	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0156	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	0.0204	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0010	0.0018	0.00089	ug/l	J
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	0.0029	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0018	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0055	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0447	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.0061	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	0.0028	0.0036	0.0018	ug/l	J
2991-50-6	EtFOSAA	0.0050	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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:	DUP-05_030421		
Lab Sample ID:	FA83700-10	**Date Sampled:**	03/04/21
Matrix:	AQ - Ground Water	**Date Received:**	03/06/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	3% [c]	3% [c]	35-135%
	13C5-PFPeA	31% [c]	40% [c]	50-150%
	13C5-PFHxA	82%	88%	50-150%
	13C4-PFHpA	91%	87%	50-150%
	13C8-PFOA	85%	89%	50-150%
	13C9-PFNA	79%	91%	50-150%
	13C6-PFDA	85%	91%	50-150%
	13C7-PFUnDA	78%	85%	40-140%
	13C2-PFDoDA	75%	81%	40-140%
	13C2-PFTeDA	71%	89%	30-130%
	13C3-PFBS	73%	89%	50-150%
	13C3-PFHxS	100%	91%	50-150%
	13C8-PFOS	88%	91%	50-150%
	13C8-FOSA	31%	54%	30-130%
	d3-MeFOSAA	84%	122%	40-140%
	d5-EtFOSAA	107%	129%	40-140%
	13C2-4:2FTS	87%	85%	50-150%
	13C2-6:2FTS	89%	92%	50-150%
	13C2-8:2FTS	89%	101%	50-150%
	13C3-HFPO-DA	63%	92%	50-150%

(a) Confirmation run.
(b) Associated ID Standard outside control limits, Confirmed by batch QC.
(c) Outside control limits.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Certification Exceptions
- Chain of Custody

Parameter Certification Exceptions

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

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

Parameter	CAS#	Method	Mat	Certification Status
4:2 Fluorotelomer sulfonate	757124-72-4	EPA 537M BY ID	AQ	Certified by SOP MS014
6:2 Fluorotelomer sulfonate	27619-97-2	EPA 537M BY ID	AQ	Certified by SOP MS014
8:2 Fluorotelomer sulfonate	39108-34-4	EPA 537M BY ID	AQ	Certified by SOP MS014
ADONA	919005-14-4	EPA 537M BY ID	AQ	Certified by SOP MS014
11Cl-PF3OUdS (F-53B Minor)	763051-92-9	EPA 537M BY ID	AQ	Certified by SOP MS014
9Cl-PF3ONS (F-53B Major)	756426-58-1	EPA 537M BY ID	AQ	Certified by SOP MS014
EtFOSAA	2991-50-6	EPA 537M BY ID	AQ	Certified by SOP MS014
HFPO-DA (GenX)	13252-13-6	EPA 537M BY ID	AQ	Certified by SOP MS014
MeFOSAA	2355-31-9	EPA 537M BY ID	AQ	Certified by SOP MS014
PFOSA	754-91-6	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorobutanesulfonic acid	375-73-5	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorobutanoic acid	375-22-4	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorodecanesulfonic acid	335-77-3	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorodecanoic acid	335-76-2	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorododecanoic acid	307-55-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoroheptanesulfonic acid	375-92-8	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoroheptanoic acid	375-85-9	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorohexanesulfonic acid	355-46-4	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorohexanoic acid	307-24-4	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorononanesulfonic acid	68259-12-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorononanoic acid	375-95-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorooctanesulfonic acid	1763-23-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorooctanoic acid	335-67-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoropentanesulfonic acid	2706-91-4	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoropentanoic acid	2706-90-3	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorotetradecanoic acid	376-06-7	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorotridecanoic acid	72629-94-8	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoroundecanoic acid	2058-94-8	EPA 537M BY ID	AQ	Certified by SOP MS014

SGS North America Inc - Orlando

Chain of Custody

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

FA83700

SGS - ORLANDO JOB # :

PAGE 1 OF 1

Plant 6

SGS - ORLANDO Quote #	SKIFF #

Client / Reporting Information

Company Name: Arcadis
Address: 28550 Cabot Dr Suite 500
City: Novi State: MI Zip: 48377
Project Contact: Tiffany Linder Email: Tiffany.Linder@arcadis.com
Phone #: 517 861 0138
Sampler(s) Name(s) (Printed) Sampler 1: Donna Richmond Sampler 2:

Project Information

Project Name: Racer Lansing
Street
City Lansing State MI
Project # 30075941
Fax #
Client Purchase Order #

Analytical Information

PFAS via method 537 modified w/ isotope dilution per QSM 5.1

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL- Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid

SGS Orlando Sample #	Field ID / Point of Collection	COLLECTION DATE	TIME	SAMPLED BY:	MATRIX	TOTAL # OF BOTTLES	CONTAINER INFORMATION OTHER	NONE	HCl	NaOH	HNO3	H2SO4	NAOH+ZNAC	DI WATER	MECH	LAB USE ONLY
1	MW-12-12_030421	3/4/21	1050	DRR	GW	2		X							X	
2	MW-14-70_030421	3/4/21	1205	DRR	GW	2		X							X	
3	MW-12-13_030421	3/4/21	1310	DRR	GW	2		X							X	
4	MW-14-67_030421	3/4/21	1405	DRR	GW	2		X							X	
5	MW-13-36R_030421	3/4/21	1505	DRR	GW	2		X							X	
6	PC-SB-07_030421	3/4/21	1450	DRR	GW	2		X							X	
7	MW-12-15_030521	3/5/21	0925	DRR	GW	2		X							X	
8	MW-12-16_030521	3/5/21	1050	DRR	GW	2		X							X	
9	EB-01_030521	3/5/21	0935	DRR	GW	2		X							X	
10	Dup-05_[redacted]030421	3/4/21	—	DRR	GW	2		X							X	

INITIAL ASSESSMENT BLO
LABEL VERIFICATION

Turnaround Time (Business days)

10 Day (Business) Approved By: / Date:
7 Day
5 Day
3 Day *RUSH*
2 Day *RUSH*
1 Day *RUSH*
Other Standard

Rush T/A Data Available VIA Email or Lablink

Data Deliverable Information

- [ ] COMMERCIAL "A" (RESULTS ONLY)
- [ ] COMMERCIAL "B" (RESULTS PLUS QC)
- [ ] REDT1 (EPA LEVEL 3)
- [ ] FULLT1 (EPA LEVEL 4)
- [ ] EDD'S

Comments / Remarks

* Report EGLE 28 compounds

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	Donna Richmond/Arcadis	3/5/21	2 FedEx	3 FedEx		4 [illegible] 3/6/21 1040
	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): 0.6 IR#4

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

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

FA83700: Chain of Custody
Page 1 of 2

SGS Sample Receipt Summary

Job Number: FA83700 **Client:** ARCADIS **Project:** RACER LANSING

Date / Time Received: 3/6/2021 10:40:00 AM **Delivery Method:** FX **Airbill #'s:** 9231 5384 8167

Therm ID: IR 1; **Therm CF:** -1.8; **# of Coolers:** 1

Cooler Temps (Raw Measured) °C: Cooler 1: (2.4);

Cooler Temps (Corrected) °C: Cooler 1: (0.6);

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 _____ Number of 5035 Field Kits: _____ Number of Lab Filtered Metals: _____

Test Strip Lot #s: pH 0-3 230315 pH 10-12 219813A Other: (Specify) _____ _____

Residual Chlorine Test Strip Lot #: _____

Comments

SM001
Rev. Date 05/24/17

Technician: PETERH Date: 3/6/2021 10:40:00 AM Reviewer: _____ Date: _____

FA83700: Chain of Custody
Page 2 of 2

MS Semi-volatiles

QC Data Summaries

Includes the following where applicable:

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

Method Blank Summary

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84430-MB	4Q12147.D	1	03/10/21	NAF	03/09/21	OP84430	S4Q165

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

FA83700-1, FA83700-2, FA83700-3, FA83700-4, FA83700-5, FA83700-6, FA83700-7, FA83700-8, FA83700-9, FA83700-10

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0020	0.0010	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0020	0.0010	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0020	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0020	0.0010	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0020	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0020	ug/l	
2355-31-9	MeFOSAA	ND	0.0040	0.0020	ug/l	
2991-50-6	EtFOSAA	ND	0.0040	0.0020	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
13252-13-6	HFPO-DA (GenX)	ND	0.0040	0.0020	ug/l	
919005-14-4	ADONA	ND	0.0080	0.0020	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0080	0.0020	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	94%	35-135%
	13C5-PFPeA	99%	50-150%
	13C5-PFHxA	98%	50-150%
	13C4-PFHpA	97%	50-150%

Method Blank Summary

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84430-MB	4Q12147.D	1	03/10/21	NAF	03/09/21	OP84430	S4Q165

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

FA83700-1, FA83700-2, FA83700-3, FA83700-4, FA83700-5, FA83700-6, FA83700-7, FA83700-8, FA83700-9, FA83700-10

CAS No.	ID Standard Recoveries		Limits
	13C8-PFOA	96%	50-150%
	13C9-PFNA	97%	50-150%
	13C6-PFDA	102%	50-150%
	13C7-PFUnDA	95%	40-140%
	13C2-PFDoDA	91%	40-140%
	13C2-PFTeDA	91%	30-130%
	13C3-PFBS	99%	50-150%
	13C3-PFHxS	96%	50-150%
	13C8-PFOS	93%	50-150%
	13C8-FOSA	92%	30-130%
	d3-MeFOSAA	104%	40-140%
	d5-EtFOSAA	97%	40-140%
	13C2-4:2FTS	93%	50-150%
	13C2-6:2FTS	90%	50-150%
	13C2-8:2FTS	91%	50-150%
	13C3-HFPO-DA	91%	50-150%

Instrument Blank

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S4Q165-IBLK	4Q12110.D	1	03/10/21	NAF	n/a	n/a	S4Q165

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

FA83700-1, FA83700-2, FA83700-3, FA83700-4, FA83700-5, FA83700-6, FA83700-7, FA83700-8, FA83700-9, FA83700-10

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0010	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0010	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0010	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.0080	0.0020	ug/l	
2991-50-6	EtFOSAA	ND	0.0080	0.0020	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
13252-13-6	HFPO-DA (GenX)	ND	0.0080	0.0020	ug/l	
919005-14-4	ADONA	ND	0.0080	0.0020	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0080	0.0020	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C5-PFHxA	110%	50-150%
	13C4-PFHpA	112%	50-150%
	13C8-PFOA	112%	50-150%
	13C9-PFNA	111%	50-150%

Instrument Blank

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S4Q165-IBLK	4Q12110.D	1	03/10/21	NAF	n/a	n/a	S4Q165

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

FA83700-1, FA83700-2, FA83700-3, FA83700-4, FA83700-5, FA83700-6, FA83700-7, FA83700-8, FA83700-9, FA83700-10

CAS No.	ID Standard Recoveries		Limits
	13C6-PFDA	117%	50-150%
	13C7-PFUnDA	114%	50-150%
	13C2-PFDoDA	112%	50-150%
	13C2-PFTeDA	111%	50-150%
	13C3-PFBS	107%	50-150%
	13C3-PFHxS	110%	50-150%
	13C8-PFOS	104%	50-150%
	d3-MeFOSAA	123%	50-150%
	d5-EtFOSAA	120%	50-150%

Instrument Blank

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S4Q166-IBLK	4Q12182.D	1	03/11/21	NAF	n/a	n/a	S4Q166

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

FA83700-2, FA83700-4, FA83700-6, FA83700-7

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0010	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0010	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.0080	0.0020	ug/l	
2991-50-6	EtFOSAA	ND	0.0080	0.0020	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
13252-13-6	HFPO-DA (GenX)	ND	0.0080	0.0020	ug/l	
919005-14-4	ADONA	ND	0.0080	0.0020	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C5-PFHxA	102%	50-150%
	13C4-PFHpA	103%	50-150%
	13C8-PFOA	103%	50-150%
	13C9-PFNA	103%	50-150%
	13C6-PFDA	107%	50-150%
	13C7-PFUnDA	105%	50-150%
	13C2-PFDoDA	103%	50-150%
	13C2-PFTeDA	104%	50-150%
	13C3-PFBS	103%	50-150%

Instrument Blank

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S4Q166-IBLK	4Q12182.D	1	03/11/21	NAF	n/a	n/a	S4Q166

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

FA83700-2, FA83700-4, FA83700-6, FA83700-7

CAS No.	ID Standard Recoveries		Limits
	13C3-PFHxS	99%	50-150%
	13C8-PFOS	101%	50-150%
	d3-MeFOSAA	107%	50-150%
	d5-EtFOSAA	106%	50-150%

Blank Spike Summary

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84430-BS	4Q12146.D	1	03/10/21	NAF	03/09/21	OP84430	S4Q165

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

FA83700-1, FA83700-2, FA83700-3, FA83700-4, FA83700-5, FA83700-6, FA83700-7, FA83700-8, FA83700-9, FA83700-10

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0821	103	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0795	99	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0835	104	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0804	101	70-130
335-67-1	Perfluorooctanoic acid	0.08	0.0797	100	70-130
375-95-1	Perfluorononanoic acid	0.08	0.0799	100	70-130
335-76-2	Perfluorodecanoic acid	0.08	0.0793	99	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0824	103	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0812	102	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0776	97	60-140
376-06-7	Perfluorotetradecanoic acid	0.08	0.0807	101	70-130
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0825	103	70-130
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0757	95	70-130
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0887	111	70-130
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0857	107	70-130
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0840	105	70-130
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0874	109	65-130
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0772	97	60-130
754-91-6	PFOSA	0.08	0.0869	109	70-130
2355-31-9	MeFOSAA	0.08	0.0820	103	70-130
2991-50-6	EtFOSAA	0.08	0.0848	106	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.08	0.0828	104	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.0810	101	70-130
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0853	107	70-130
13252-13-6	HFPO-DA (GenX)	0.08	0.0832	104	70-130
919005-14-4	ADONA	0.08	0.0815	102	60-140
756426-58-1	9Cl-PF3ONS (F-53B Major)	0.08	0.0727	91	60-140
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	0.08	0.0774	97	60-140

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	92%	35-135%
	13C5-PFPeA	104%	50-150%
	13C5-PFHxA	103%	50-150%
	13C4-PFHpA	103%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84430-BS	4Q12146.D	1	03/10/21	NAF	03/09/21	OP84430	S4Q165

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

FA83700-1, FA83700-2, FA83700-3, FA83700-4, FA83700-5, FA83700-6, FA83700-7, FA83700-8, FA83700-9, FA83700-10

CAS No.	ID Standard Recoveries	BSP	Limits
	13C8-PFOA	101%	50-150%
	13C9-PFNA	103%	50-150%
	13C6-PFDA	106%	50-150%
	13C7-PFUnDA	100%	40-140%
	13C2-PFDoDA	95%	40-140%
	13C2-PFTeDA	95%	30-130%
	13C3-PFBS	101%	50-150%
	13C3-PFHxS	96%	50-150%
	13C8-PFOS	103%	50-150%
	13C8-FOSA	81%	30-130%
	d3-MeFOSAA	110%	40-140%
	d5-EtFOSAA	106%	40-140%
	13C2-4:2FTS	101%	50-150%
	13C2-6:2FTS	101%	50-150%
	13C2-8:2FTS	102%	50-150%
	13C3-HFPO-DA	97%	50-150%

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84430-MS	4Q12151.D	1	03/10/21	NAF	03/09/21	OP84430	S4Q165
FA83700-1	4Q12150.D	1	03/10/21	NAF	03/09/21	OP84430	S4Q165

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

FA83700-1, FA83700-2, FA83700-3, FA83700-4, FA83700-5, FA83700-6, FA83700-7, FA83700-8, FA83700-9, FA83700-10

CAS No.	Compound	FA83700-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
375-22-4	Perfluorobutanoic acid	0.0398		0.0714	0.113	102	70-130
2706-90-3	Perfluoropentanoic acid	0.0691		0.0714	0.144	105	70-130
307-24-4	Perfluorohexanoic acid	0.0779		0.0714	0.151	102	70-130
375-85-9	Perfluoroheptanoic acid	0.0384		0.0714	0.108	97	70-130
335-67-1	Perfluorooctanoic acid	0.0787		0.0714	0.150	100	70-130
375-95-1	Perfluorononanoic acid	0.0093		0.0714	0.0812	101	70-130
335-76-2	Perfluorodecanoic acid	0.0142		0.0714	0.0842	98	70-130
2058-94-8	Perfluoroundecanoic acid	ND		0.0714	0.0726	102	70-130
307-55-1	Perfluorododecanoic acid	ND		0.0714	0.0727	102	70-130
72629-94-8	Perfluorotridecanoic acid	ND		0.0714	0.0759	106	60-140
376-06-7	Perfluorotetradecanoic acid	ND		0.0714	0.0713	100	70-130
375-73-5	Perfluorobutanesulfonic acid	ND		0.0714	0.0740	104	70-130
2706-91-4	Perfluoropentanesulfonic acid	ND		0.0714	0.128	179*	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0034		0.0714	0.0716	95	70-130
375-92-8	Perfluoroheptanesulfonic acid	ND		0.0714	0.0644	90	70-130
1763-23-1	Perfluorooctanesulfonic acid	0.0469		0.0714	0.122	105	70-130
68259-12-1	Perfluorononanesulfonic acid	ND		0.0714	0.0788	110	65-130
335-77-3	Perfluorodecanesulfonic acid	ND		0.0714	0.0768	108	60-130
754-91-6	PFOSA	ND		0.0714	0.0703	98	70-130
2355-31-9	MeFOSAA	ND		0.0714	0.0671	94	70-130
2991-50-6	EtFOSAA	ND		0.0714	0.0678	95	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	ND		0.0714	0.0705	99	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	ND		0.0714	0.0742	104	70-130
39108-34-4	8:2 Fluorotelomer sulfonate	ND		0.0714	0.0738	103	70-130
13252-13-6	HFPO-DA (GenX)	ND		0.0714	0.0977	137*	70-130
919005-14-4	ADONA	ND		0.0714	0.0725	101	60-140
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND		0.0714	0.0658	92	60-140
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND		0.0714	0.0693	97	60-140

CAS No.	ID Standard Recoveries	MS	FA83700-1	Limits
	13C4-PFBA	47%	48%	35-135%
	13C5-PFPeA	46%* [a]	47%* [a]	50-150%
	13C5-PFHxA	65%	66%	50-150%
	13C4-PFHpA	82%	83%	50-150%

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84430-MS	4Q12151.D	1	03/10/21	NAF	03/09/21	OP84430	S4Q165
FA83700-1	4Q12150.D	1	03/10/21	NAF	03/09/21	OP84430	S4Q165

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

FA83700-1, FA83700-2, FA83700-3, FA83700-4, FA83700-5, FA83700-6, FA83700-7, FA83700-8, FA83700-9, FA83700-10

CAS No.	ID Standard Recoveries	MS	FA83700-1	Limits
	13C8-PFOA	80%	82%	50-150%
	13C9-PFNA	79%	78%	50-150%
	13C6-PFDA	84%	87%	50-150%
	13C7-PFUnDA	79%	77%	40-140%
	13C2-PFDoDA	80%	76%	40-140%
	13C2-PFTeDA	87%	78%	30-130%
	13C3-PFBS	49%* [a]	51%	50-150%
	13C3-PFHxS	91%	97%	50-150%
	13C8-PFOS	82%	88%	50-150%
	13C8-FOSA	28%* [a]	27%* [a]	30-130%
	d3-MeFOSAA	86%	84%	40-140%
	d5-EtFOSAA	102%	99%	40-140%
	13C2-4:2FTS	73%	72%	50-150%
	13C2-6:2FTS	86%	86%	50-150%
	13C2-8:2FTS	94%	91%	50-150%
	13C3-HFPO-DA	54%	53%	50-150%

(a) Outside control limits.

* = Outside of Control Limits.

Duplicate Summary

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84430-DUP	4Q12165.D	1	03/10/21	NAF	03/09/21	OP84430	S4Q165
FA83700-10	4Q12164.D	1	03/10/21	NAF	03/09/21	OP84430	S4Q165
FA83700-10 [a]	4Q12198.D	5	03/11/21	NAF	03/09/21	OP84430	S4Q166

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

FA83700-1, FA83700-2, FA83700-3, FA83700-4, FA83700-5, FA83700-6, FA83700-7, FA83700-8, FA83700-9, FA83700-10

CAS No.	Compound	FA83700-10 ug/l	Q	DUP ug/l	Q	RPD	Limits
375-22-4	Perfluorobutanoic acid	0.0303		0.0331		9	30
2706-90-3	Perfluoropentanoic acid	0.0339		0.0344		1	30
307-24-4	Perfluorohexanoic acid	0.0375		0.0380		1	30
375-85-9	Perfluoroheptanoic acid	0.0432		0.0397		8	30
335-67-1	Perfluorooctanoic acid	0.0796		0.0793		0	30
375-95-1	Perfluorononanoic acid	0.0156		0.0157		1	30
335-76-2	Perfluorodecanoic acid	0.0204		0.0206		1	30
2058-94-8	Perfluoroundecanoic acid	0.0010	J	0.0010	J	0	30
307-55-1	Perfluorododecanoic acid	ND		ND		nc	30
72629-94-8	Perfluorotridecanoic acid	ND		ND		nc	30
376-06-7	Perfluorotetradecanoic acid	ND		ND		nc	30
375-73-5	Perfluorobutanesulfonic acid	0.0029		0.0035		19	30
2706-91-4	Perfluoropentanesulfonic acid	ND		ND		nc	30
355-46-4	Perfluorohexanesulfonic acid	0.0055		0.0069		23	30
375-92-8	Perfluoroheptanesulfonic acid	ND		ND		nc	30
1763-23-1	Perfluorooctanesulfonic acid	0.0447		0.0424		5	30
68259-12-1	Perfluorononanesulfonic acid	ND		ND		nc	30
335-77-3	Perfluorodecanesulfonic acid	ND		ND		nc	30
754-91-6	PFOSA	0.0061		0.0057		7	30
2355-31-9	MeFOSAA	0.0028	J	0.0030	J	7	30
2991-50-6	EtFOSAA	0.0050		0.0051		2	30
757124-72-4	4:2 Fluorotelomer sulfonate	ND		ND		nc	30
27619-97-2	6:2 Fluorotelomer sulfonate	ND		ND		nc	30
39108-34-4	8:2 Fluorotelomer sulfonate	ND		ND		nc	30
13252-13-6	HFPO-DA (GenX)	ND		ND		nc	30
919005-14-4	ADONA	ND		ND		nc	30
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND		ND		nc	30
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND		ND		nc	30

CAS No.	ID Standard Recoveries	DUP	FA83700-10	FA83700-10	Limits
	13C4-PFBA	3%* [b]	3%* [b]	3%* [b]	35-135%
	13C5-PFPeA	30%* [b]	31%* [b]	40%* [b]	50-150%
	13C5-PFHxA	83%	82%	88%	50-150%
	13C4-PFHpA	92%	91%	87%	50-150%

* = Outside of Control Limits.

Duplicate Summary

Job Number: FA83700
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84430-DUP	4Q12165.D	1	03/10/21	NAF	03/09/21	OP84430	S4Q165
FA83700-10	4Q12164.D	1	03/10/21	NAF	03/09/21	OP84430	S4Q165
FA83700-10 [a]	4Q12198.D	5	03/11/21	NAF	03/09/21	OP84430	S4Q166

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

FA83700-1, FA83700-2, FA83700-3, FA83700-4, FA83700-5, FA83700-6, FA83700-7, FA83700-8, FA83700-9, FA83700-10

CAS No.	ID Standard Recoveries	DUP	FA83700-10	FA83700-10	Limits
	13C8-PFOA	88%	85%	89%	50-150%
	13C9-PFNA	82%	79%	91%	50-150%
	13C6-PFDA	88%	85%	91%	50-150%
	13C7-PFUnDA	83%	78%	85%	40-140%
	13C2-PFDoDA	85%	75%	81%	40-140%
	13C2-PFTeDA	62%	71%	89%	30-130%
	13C3-PFBS	72%	73%	89%	50-150%
	13C3-PFHxS	99%	100%	91%	50-150%
	13C8-PFOS	92%	88%	91%	50-150%
	13C8-FOSA	30%	31%	54%	30-130%
	d3-MeFOSAA	86%	84%	122%	40-140%
	d5-EtFOSAA	110%	107%	129%	40-140%
	13C2-4:2FTS	89%	87%	85%	50-150%
	13C2-6:2FTS	92%	89%	92%	50-150%
	13C2-8:2FTS	93%	89%	101%	50-150%
	13C3-HFPO-DA	64%	63%	92%	50-150%

(a) Confirmation run.
(b) Outside control limits.

* = Outside of Control Limits.

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

e-Hardcopy 2.0
Automated Report

Technical Report for

Arcadis

Racer Lansing PFAS Delineation; Lansing, MI

30075941.03700

SGS Job Number: FA84085

Sampling Dates: 03/19/21 - 03/22/21

Report to:

Arcadis
300 S Washington Sq Suite 315
Lansing, MI 48933
andrew.lorenz@arcadis.com; marina.samp@arcadis.com;
alex.villhauer@arcadis.com; kaitlyn.voet@arcadis.com;
ATTN: Alex Villhauer

Total number of pages in report: 34

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.

Norm Farmer
Technical Director

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

Sections: 1 2 3 4 5

Table of Contents

SGS North America Inc.

Sample Summary

Arcadis

Job No: FA84085

Racer Lansing PFAS Delineation; Lansing, MI
Project No: 30075941.03700

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
This report contains results reported as ND = Not detected. The following applies: Organics ND = Not detected above the MDL							
FA84085-1	03/19/21	11:20	DR	03/23/21	AQ	Ground Water	MW-21-136_031921
FA84085-2	03/19/21	12:35	DR	03/23/21	AQ	Ground Water	MW-21-137_031921
FA84085-3	03/19/21	14:05	DR	03/23/21	AQ	Ground Water	MW-21-138_031921
FA84085-4	03/19/21	15:45	DR	03/23/21	AQ	Ground Water	MW-21-135_031921
FA84085-5	03/19/21	16:40	DR	03/23/21	AQ	Ground Water	MW-21-134_031921
FA84085-6	03/22/21	13:50	DR	03/23/21	AQ	Ground Water	MW-21-133_032221

Summary of Hits

Job Number: FA84085
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 03/19/21 thru 03/22/21

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA84085-1	**MW-21-136_031921**					
Perfluorobutanoic acid		0.0031 J	0.0036	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0011 J	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0014 J	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0012 J	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0018	0.0018	0.00089	ug/l	EPA 537M BY ID
FA84085-2	**MW-21-137_031921**					
No hits reported in this sample.						
FA84085-3	**MW-21-138_031921**					
Perfluorobutanoic acid		0.0043	0.0036	0.0018	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0019	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0017 J	0.0018	0.00089	ug/l	EPA 537M BY ID
FA84085-4	**MW-21-135_031921**					
Perfluorobutanoic acid		0.0211	0.0036	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0394	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0404	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0317	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0483	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.0027	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0020	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0024	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0041	0.0018	0.00089	ug/l	EPA 537M BY ID
FA84085-5	**MW-21-134_031921**					
Perfluorobutanoic acid		0.0156	0.0036	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0198	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0211	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0175	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0376	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0022	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.0011 J	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0031	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0067	0.0018	0.00089	ug/l	EPA 537M BY ID
FA84085-6	**MW-21-133_032221**					
Perfluorobutanoic acid		0.0202	0.0036	0.0018	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA84085
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 03/19/21 thru 03/22/21

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluoropentanoic acid		0.0237	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0313	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0245	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0629	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.0012 J	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0024	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.0014 J	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0029	0.0018	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0087	0.0018	0.00089	ug/l	EPA 537M BY ID

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	MW-21-136_031921		
Lab Sample ID:	FA84085-1	**Date Sampled:**	03/19/21
Matrix:	AQ - Ground Water	**Date Received:**	03/23/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12557.D	1	03/30/21 20:07	NG	03/25/21 09:00	OP84643	S4Q174
Run #2							

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0031	0.0036	0.0018	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.0011	0.0018	0.00089	ug/l	J
307-24-4	Perfluorohexanoic acid	0.0014	0.0018	0.00089	ug/l	J
375-85-9	Perfluoroheptanoic acid	ND	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0012	0.0018	0.00089	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0018	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0018	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-21-136_031921		
Lab Sample ID:	FA84085-1	**Date Sampled:**	03/19/21
Matrix:	AQ - Ground Water	**Date Received:**	03/23/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	60%		35-135%
	13C5-PFPeA	73%		50-150%
	13C5-PFHxA	78%		50-150%
	13C4-PFHpA	85%		50-150%
	13C8-PFOA	88%		50-150%
	13C9-PFNA	87%		50-150%
	13C6-PFDA	93%		50-150%
	13C7-PFUnDA	79%		40-140%
	13C2-PFDoDA	72%		40-140%
	13C2-PFTeDA	60%		30-130%
	13C3-PFBS	75%		50-150%
	13C3-PFHxS	85%		50-150%
	13C8-PFOS	83%		50-150%
	13C8-FOSA	72%		30-130%
	d3-MeFOSAA	109%		40-140%
	d5-EtFOSAA	102%		40-140%
	13C2-4:2FTS	79%		50-150%
	13C2-6:2FTS	88%		50-150%
	13C2-8:2FTS	91%		50-150%
	13C3-HFPO-DA	73%		50-150%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-21-137_031921		
Lab Sample ID:	FA84085-2	**Date Sampled:**	03/19/21
Matrix:	AQ - Ground Water	**Date Received:**	03/23/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12558.D	1	03/30/21 20:22	NG	03/25/21 09:00	OP84643	S4Q174
Run #2							

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	ND	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0018	0.00089	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0018	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0018	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-21-137_031921		
Lab Sample ID:	FA84085-2	**Date Sampled:**	03/19/21
Matrix:	AQ - Ground Water	**Date Received:**	03/23/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	65%		35-135%
	13C5-PFPeA	67%		50-150%
	13C5-PFHxA	72%		50-150%
	13C4-PFHpA	79%		50-150%
	13C8-PFOA	85%		50-150%
	13C9-PFNA	86%		50-150%
	13C6-PFDA	91%		50-150%
	13C7-PFUnDA	79%		40-140%
	13C2-PFDoDA	69%		40-140%
	13C2-PFTeDA	56%		30-130%
	13C3-PFBS	72%		50-150%
	13C3-PFHxS	79%		50-150%
	13C8-PFOS	82%		50-150%
	13C8-FOSA	68%		30-130%
	d3-MeFOSAA	98%		40-140%
	d5-EtFOSAA	91%		40-140%
	13C2-4:2FTS	71%		50-150%
	13C2-6:2FTS	84%		50-150%
	13C2-8:2FTS	83%		50-150%
	13C3-HFPO-DA	65%		50-150%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-21-138_031921		
Lab Sample ID:	FA84085-3	**Date Sampled:**	03/19/21
Matrix:	AQ - Ground Water	**Date Received:**	03/23/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12559.D	1	03/30/21 20:37	NG	03/25/21 09:00	OP84643	S4Q174
Run #2							

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0043	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0018	0.00089	ug/l	
307-24-4	Perfluorohexanoic acid	0.0019	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0017	0.0018	0.00089	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0018	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-21-138_031921		
Lab Sample ID:	FA84085-3	**Date Sampled:**	03/19/21
Matrix:	AQ - Ground Water	**Date Received:**	03/23/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	48%		35-135%
	13C5-PFPeA	62%		50-150%
	13C5-PFHxA	70%		50-150%
	13C4-PFHpA	77%		50-150%
	13C8-PFOA	84%		50-150%
	13C9-PFNA	83%		50-150%
	13C6-PFDA	88%		50-150%
	13C7-PFUnDA	73%		40-140%
	13C2-PFDoDA	60%		40-140%
	13C2-PFTeDA	50%		30-130%
	13C3-PFBS	68%		50-150%
	13C3-PFHxS	81%		50-150%
	13C8-PFOS	80%		50-150%
	13C8-FOSA	63%		30-130%
	d3-MeFOSAA	96%		40-140%
	d5-EtFOSAA	90%		40-140%
	13C2-4:2FTS	72%		50-150%
	13C2-6:2FTS	85%		50-150%
	13C2-8:2FTS	86%		50-150%
	13C3-HFPO-DA	66%		50-150%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-21-135_031921		
Lab Sample ID:	FA84085-4	**Date Sampled:**	03/19/21
Matrix:	AQ - Ground Water	**Date Received:**	03/23/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12560.D	1	03/30/21 20:52	NG	03/25/21 09:00	OP84643	S4Q174
Run #2 [a]	4Q12619.D	5	03/31/21 14:50	NG	03/25/21 09:00	OP84643	S4Q175

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2	280 ml	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0211	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0394	0.0018	0.00089	ug/l	
307-24-4	Perfluorohexanoic acid	0.0404	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0317	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0483	0.0018	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0027	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND [b]	0.0089	0.0045	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	0.0020	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0018	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0024	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0041	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-21-135_031921		
Lab Sample ID:	FA84085-4	**Date Sampled:**	03/19/21
Matrix:	AQ - Ground Water	**Date Received:**	03/23/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	50%	79%	35-135%
	13C5-PFPeA	65%	87%	50-150%
	13C5-PFHxA	73%	91%	50-150%
	13C4-PFHpA	78%	90%	50-150%
	13C8-PFOA	82%	90%	50-150%
	13C9-PFNA	81%	91%	50-150%
	13C6-PFDA	85%	89%	50-150%
	13C7-PFUnDA	68%	79%	40-140%
	13C2-PFDoDA	44%	68%	40-140%
	13C2-PFTeDA	8% [c]	44%	30-130%
	13C3-PFBS	72%	90%	50-150%
	13C3-PFHxS	81%	93%	50-150%
	13C8-PFOS	79%	88%	50-150%
	13C8-FOSA	47%	75%	30-130%
	d3-MeFOSAA	105%	86%	40-140%
	d5-EtFOSAA	92%	82%	40-140%
	13C2-4:2FTS	75%	87%	50-150%
	13C2-6:2FTS	86%	89%	50-150%
	13C2-8:2FTS	94%	88%	50-150%
	13C3-HFPO-DA	66%	85%	50-150%

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

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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-21-134_031921		
Lab Sample ID:	FA84085-5	**Date Sampled:**	03/19/21
Matrix:	AQ - Ground Water	**Date Received:**	03/23/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12561.D	1	03/30/21 21:07	NG	03/25/21 09:00	OP84643	S4Q174
Run #2							

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0156	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0198	0.0018	0.00089	ug/l	
307-24-4	Perfluorohexanoic acid	0.0211	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0175	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0376	0.0018	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0018	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	0.0022	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0011	0.0018	0.00089	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0031	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0067	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-21-134_031921		
Lab Sample ID:	FA84085-5	**Date Sampled:**	03/19/21
Matrix:	AQ - Ground Water	**Date Received:**	03/23/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	57%		35-135%
	13C5-PFPeA	67%		50-150%
	13C5-PFHxA	72%		50-150%
	13C4-PFHpA	77%		50-150%
	13C8-PFOA	81%		50-150%
	13C9-PFNA	82%		50-150%
	13C6-PFDA	86%		50-150%
	13C7-PFUnDA	73%		40-140%
	13C2-PFDoDA	62%		40-140%
	13C2-PFTeDA	60%		30-130%
	13C3-PFBS	72%		50-150%
	13C3-PFHxS	78%		50-150%
	13C8-PFOS	77%		50-150%
	13C8-FOSA	45%		30-130%
	d3-MeFOSAA	91%		40-140%
	d5-EtFOSAA	82%		40-140%
	13C2-4:2FTS	73%		50-150%
	13C2-6:2FTS	82%		50-150%
	13C2-8:2FTS	84%		50-150%
	13C3-HFPO-DA	67%		50-150%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-21-133_032221		
Lab Sample ID:	FA84085-6	**Date Sampled:**	03/22/21
Matrix:	AQ - Ground Water	**Date Received:**	03/23/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q12562.D	1	03/30/21 21:21	NG	03/25/21 09:00	OP84643	S4Q174
Run #2							

	Initial Volume	Final Volume
Run #1	280 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0202	0.0036	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0237	0.0018	0.00089	ug/l	
307-24-4	Perfluorohexanoic acid	0.0313	0.0018	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0245	0.0018	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0629	0.0018	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0012	0.0018	0.00089	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0018	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0018	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0018	0.00089	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0018	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROALKYLSULFONIC ACIDS						
375-73-5	Perfluorobutanesulfonic acid	0.0024	0.0018	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0014	0.0018	0.00089	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0029	0.0018	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0018	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0087	0.0018	0.00089	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0018	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0018	0.00089	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0036	0.0018	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.0036	0.0018	ug/l	
2991-50-6	EtFOSAA	ND	0.0036	0.0018	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting 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-21-133_032221		
Lab Sample ID:	FA84085-6	**Date Sampled:**	03/22/21
Matrix:	AQ - Ground Water	**Date Received:**	03/23/21
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
NEXT GENERATION PFAS ANALYTES						
13252-13-6	HFPO-DA (GenX)	ND	0.0036	0.0018	ug/l	
919005-14-4	ADONA	ND	0.0071	0.0018	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0071	0.0018	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	53%		35-135%
	13C5-PFPeA	65%		50-150%
	13C5-PFHxA	73%		50-150%
	13C4-PFHpA	79%		50-150%
	13C8-PFOA	83%		50-150%
	13C9-PFNA	84%		50-150%
	13C6-PFDA	90%		50-150%
	13C7-PFUnDA	80%		40-140%
	13C2-PFDoDA	66%		40-140%
	13C2-PFTeDA	44%		30-130%
	13C3-PFBS	71%		50-150%
	13C3-PFHxS	83%		50-150%
	13C8-PFOS	83%		50-150%
	13C8-FOSA	54%		30-130%
	d3-MeFOSAA	112%		40-140%
	d5-EtFOSAA	101%		40-140%
	13C2-4:2FTS	75%		50-150%
	13C2-6:2FTS	88%		50-150%
	13C2-8:2FTS	97%		50-150%
	13C3-HFPO-DA	67%		50-150%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Certification Exceptions
- Chain of Custody

Parameter Certification Exceptions

Job Number: FA84085
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

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

Parameter	CAS#	Method	Mat	Certification Status
4:2 Fluorotelomer sulfonate	757124-72-4	EPA 537M BY ID	AQ	Certified by SOP MS014
6:2 Fluorotelomer sulfonate	27619-97-2	EPA 537M BY ID	AQ	Certified by SOP MS014
8:2 Fluorotelomer sulfonate	39108-34-4	EPA 537M BY ID	AQ	Certified by SOP MS014
ADONA	919005-14-4	EPA 537M BY ID	AQ	Certified by SOP MS014
11Cl-PF3OUdS (F-53B Minor)	763051-92-9	EPA 537M BY ID	AQ	Certified by SOP MS014
9Cl-PF3ONS (F-53B Major)	756426-58-1	EPA 537M BY ID	AQ	Certified by SOP MS014
EtFOSAA	2991-50-6	EPA 537M BY ID	AQ	Certified by SOP MS014
HFPO-DA (GenX)	13252-13-6	EPA 537M BY ID	AQ	Certified by SOP MS014
MeFOSAA	2355-31-9	EPA 537M BY ID	AQ	Certified by SOP MS014
PFOSA	754-91-6	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorobutanesulfonic acid	375-73-5	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorobutanoic acid	375-22-4	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorodecanesulfonic acid	335-77-3	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorodecanoic acid	335-76-2	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorododecanoic acid	307-55-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoroheptanesulfonic acid	375-92-8	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoroheptanoic acid	375-85-9	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorohexanesulfonic acid	355-46-4	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorohexanoic acid	307-24-4	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorononanesulfonic acid	68259-12-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorononanoic acid	375-95-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorooctanesulfonic acid	1763-23-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorooctanoic acid	335-67-1	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoropentanesulfonic acid	2706-91-4	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoropentanoic acid	2706-90-3	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorotetradecanoic acid	376-06-7	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluorotridecanoic acid	72629-94-8	EPA 537M BY ID	AQ	Certified by SOP MS014
Perfluoroundecanoic acid	2058-94-8	EPA 537M BY ID	AQ	Certified by SOP MS014

SGS North America Inc - Orlando

Chain of Custody

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

FA84085

SGS - ORLANDO JOB# : PAGE 1 OF 1

SGS - ORLANDO Quote # | SKIFF #

Client / Reporting Information

Company Name: Arcadis
Address: 28550 Cabot Dr Suite 500
City: Novi State: MI Zip: 48377
Project Contact: Tiffany Linder Email: Tiffany.Linder@arcadis.com
Phone #: 517861 0138
Sampler(s) Name(s) (Printed)
Sampler 1: D. Richmond Sampler 2:

Project Information

Project Name: Racer Lansing
Street
City State
Project # 30075941 - Task 37
Fax #
Client Purchase Order #

Analytical Information

PFAS

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL- Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid

SGS Orlando Sample #	Field ID / Point of Collection	COLLECTION DATE	TIME	SAMPLED BY:	CONTAINER INFORMATION MATRIX	TOTAL # OF BOTTLES	OTHER	NONE	HCl	NaOH	HNO3	H2SO4	NAOH+ZNA	DI WATER	MEOH	LAB USE ONLY
1	MW-21-136_031921	3/19/21	1120	DRR	GW	2		X								
2	MW-21-137_031921	3/19/21	1235	DRR	GW	2		X								
3	MW-21-138_031921	3/19/21	1405	DRR	GW	2		X								
4	MW-21-135_031921	3/19/21	1545	DRR	GW	2		X								
5	MW-21-134_031921	3/19/21	1648	DRR	GW	2		X								
6	MW-21-133_032221	3/22/21	1350	DRR	GW	2		X								

Turnaround Time (Business days)

10 Day (Business) Approved By: / Date:
7 Day
5 Day
3 Day *RUSH*
2 Day *RUSH*
1 Day *RUSH*
Other
Rush T/A Data Available VIA Email or Lablink

Data Deliverable Information

- [ ] COMMERCIAL "A" (RESULTS ONLY)
- [ ] COMMERCIAL "B" (RESULTS PLUS QC)
- [ ] REDT1 (EPA LEVEL 3)
- [ ] FULLT1 (EPA LEVEL 4)
- [ ] EDD'S

Comments / Remarks

INITIAL ASSESSMENT NB
LABEL VERIFICATION CM

1030

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 David Richmond/Arcadis	3/22/21/1530	2 FX	3 FX		4 3/23/21 1018
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): 3.5 | IR#4

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

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

FA84085: Chain of Custody
Page 1 of 2

SGS Sample Receipt Summary

Job Number: FA84085 **Client:** ARCADIS **Project:** RACER LANSING

Date / Time Received: 3/23/2021 10:30:00 AM **Delivery Method:** FX **Airbill #'s:**

Therm ID: IR 1; **Therm CF:** -1.8; **# of Coolers:** 1

Cooler Temps (Raw Measured) °C: Cooler 1: (5.6);

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

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

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

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

Sample Information	Y	or	N	N/A
1. Sample labels present on bottles	☑		☐	
2. Samples 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 _____ Number of 5035 Field Kits: _____ Number of Lab Filtered Metals: _____

Test Strip Lot #s: pH 0-3 230315 pH 10-12 219813A Other: (Specify) _____ _____

Residual Chlorine Test Strip Lot #: _____

Comments

SM001
Rev. Date 05/24/17

Technician: PETERH Date: 3/23/2021 10:30:00 A Reviewer: _____ Date: _____

MS Semi-volatiles

QC Data Summaries

Includes the following where applicable:

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

Method Blank Summary

Job Number: FA84085
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84643-MB	4Q12545.D	1	03/30/21	NG	03/25/21	OP84643	S4Q174

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

FA84085-1, FA84085-2, FA84085-3, FA84085-4, FA84085-5, FA84085-6

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0020	0.0010	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0020	0.0010	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0020	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0020	0.0010	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0020	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0020	ug/l	
2355-31-9	MeFOSAA	ND	0.0040	0.0020	ug/l	
2991-50-6	EtFOSAA	ND	0.0040	0.0020	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
13252-13-6	HFPO-DA (GenX)	ND	0.0040	0.0020	ug/l	
919005-14-4	ADONA	ND	0.0080	0.0020	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0080	0.0020	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	77%	35-135%
	13C5-PFPeA	79%	50-150%
	13C5-PFHxA	77%	50-150%
	13C4-PFHpA	80%	50-150%

Method Blank Summary

Job Number: FA84085
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84643-MB	4Q12545.D	1	03/30/21	NG	03/25/21	OP84643	S4Q174

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

FA84085-1, FA84085-2, FA84085-3, FA84085-4, FA84085-5, FA84085-6

CAS No.	ID Standard Recoveries		Limits
	13C8-PFOA	82%	50-150%
	13C9-PFNA	81%	50-150%
	13C6-PFDA	85%	50-150%
	13C7-PFUnDA	73%	40-140%
	13C2-PFDoDA	63%	40-140%
	13C2-PFTeDA	56%	30-130%
	13C3-PFBS	79%	50-150%
	13C3-PFHxS	78%	50-150%
	13C8-PFOS	78%	50-150%
	13C8-FOSA	81%	30-130%
	d3-MeFOSAA	88%	40-140%
	d5-EtFOSAA	82%	40-140%
	13C2-6:2FTS	75%	50-150%
	13C2-8:2FTS	78%	50-150%

Instrument Blank

Job Number: FA84085
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S4Q174-IBLK	4Q12512.D	1	03/30/21	NG	n/a	n/a	S4Q174

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

FA84085-1, FA84085-2, FA84085-3, FA84085-4, FA84085-5, FA84085-6

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0010	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0010	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0010	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.0080	0.0020	ug/l	
2991-50-6	EtFOSAA	ND	0.0080	0.0020	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
13252-13-6	HFPO-DA (GenX)	ND	0.0080	0.0020	ug/l	
919005-14-4	ADONA	ND	0.0080	0.0020	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0080	0.0020	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	90%	50-150%
	13C5-PFPeA	90%	50-150%
	13C5-PFHxA	88%	50-150%
	13C4-PFHpA	90%	50-150%

Instrument Blank

Job Number: FA84085
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S4Q174-IBLK	4Q12512.D	1	03/30/21	NG	n/a	n/a	S4Q174

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

FA84085-1, FA84085-2, FA84085-3, FA84085-4, FA84085-5, FA84085-6

CAS No.	ID Standard Recoveries		Limits
	13C8-PFOA	93%	50-150%
	13C9-PFNA	93%	50-150%
	13C6-PFDA	99%	50-150%
	13C7-PFUnDA	93%	50-150%
	13C2-PFDoDA	92%	50-150%
	13C2-PFTeDA	93%	50-150%
	13C3-PFBS	90%	50-150%
	13C3-PFHxS	89%	50-150%
	13C8-PFOS	93%	50-150%
	13C8-FOSA	99%	50-150%
	d3-MeFOSAA	111%	50-150%
	d5-EtFOSAA	112%	50-150%
	13C2-4:2FTS	83%	50-150%
	13C2-6:2FTS	85%	50-150%
	13C2-8:2FTS	91%	50-150%

Instrument Blank

Job Number: FA84085
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S4Q175-IBLK	4Q12609.D	1	03/31/21	NG	n/a	n/a	S4Q175

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

FA84085-4

CAS No.	Compound	Result	RL	MDL	Units	Q
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	87%	50-150%
	13C5-PFPeA	86%	50-150%
	13C5-PFHxA	86%	50-150%
	13C4-PFHpA	87%	50-150%
	13C8-PFOA	88%	50-150%
	13C9-PFNA	88%	50-150%
	13C6-PFDA	91%	50-150%
	13C7-PFUnDA	90%	50-150%
	13C2-PFDoDA	87%	50-150%
	13C2-PFTeDA	88%	50-150%
	13C3-PFBS	87%	50-150%
	13C3-PFHxS	83%	50-150%
	13C8-PFOS	86%	50-150%
	13C8-FOSA	93%	50-150%
	d3-MeFOSAA	91%	50-150%
	d5-EtFOSAA	88%	50-150%
	13C2-4:2FTS	81%	50-150%
	13C2-6:2FTS	81%	50-150%
	13C2-8:2FTS	83%	50-150%

Blank Spike Summary

Job Number: FA84085
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84643-BS	4Q12544.D	1	03/30/21	NG	03/25/21	OP84643	S4Q174

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

FA84085-1, FA84085-2, FA84085-3, FA84085-4, FA84085-5, FA84085-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0789	99	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0803	100	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0777	97	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0751	94	70-130
335-67-1	Perfluorooctanoic acid	0.08	0.0768	96	70-130
375-95-1	Perfluorononanoic acid	0.08	0.0758	95	70-130
335-76-2	Perfluorodecanoic acid	0.08	0.0758	95	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0794	99	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0773	97	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0643	80	60-140
376-06-7	Perfluorotetradecanoic acid	0.08	0.0788	99	70-130
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0794	99	70-130
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0768	96	70-130
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0730	91	70-130
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0749	94	70-130
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0756	95	70-130
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0790	99	65-130
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0674	84	60-130
754-91-6	PFOSA	0.08	0.0766	96	70-130
2355-31-9	MeFOSAA	0.08	0.0745	93	70-130
2991-50-6	EtFOSAA	0.08	0.0781	98	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.08	0.0762	95	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.0784	98	70-130
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0754	94	70-130
13252-13-6	HFPO-DA (GenX)	0.08	0.0797	100	70-130
919005-14-4	ADONA	0.08	0.0729	91	60-140
756426-58-1	9Cl-PF3ONS (F-53B Major)	0.08	0.0645	81	60-140
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	0.08	0.0722	90	60-140

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	87%	35-135%
	13C5-PFPeA	92%	50-150%
	13C5-PFHxA	90%	50-150%
	13C4-PFHpA	92%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA84085
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84643-BS	4Q12544.D	1	03/30/21	NG	03/25/21	OP84643	S4Q174

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

FA84085-1, FA84085-2, FA84085-3, FA84085-4, FA84085-5, FA84085-6

CAS No.	ID Standard Recoveries	BSP	Limits
	13C8-PFOA	95%	50-150%
	13C9-PFNA	93%	50-150%
	13C6-PFDA	99%	50-150%
	13C7-PFUnDA	91%	40-140%
	13C2-PFDoDA	84%	40-140%
	13C2-PFTeDA	55%	30-130%
	13C3-PFBS	91%	50-150%
	13C3-PFHxS	93%	50-150%
	13C8-PFOS	93%	50-150%
	13C8-FOSA	85%	30-130%
	d3-MeFOSAA	108%	40-140%
	d5-EtFOSAA	105%	40-140%
	13C2-6:2FTS	93%	50-150%
	13C2-8:2FTS	96%	50-150%

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FA84085
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84643-MS	4Q12550.D	1	03/30/21	NG	03/25/21	OP84643	S4Q174
FA84080-3	4Q12549.D	1	03/30/21	NG	03/25/21	OP84643	S4Q174

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

FA84085-1, FA84085-2, FA84085-3, FA84085-4, FA84085-5, FA84085-6

CAS No.	Compound	FA84080-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
375-22-4	Perfluorobutanoic acid	ND		0.087	0.0912	105	70-130
2706-90-3	Perfluoropentanoic acid	ND		0.087	0.0923	106	70-130
307-24-4	Perfluorohexanoic acid	ND		0.087	0.0899	103	70-130
375-85-9	Perfluoroheptanoic acid	ND		0.087	0.0853	98	70-130
335-67-1	Perfluorooctanoic acid	ND		0.087	0.0879	101	70-130
375-95-1	Perfluorononanoic acid	ND		0.087	0.0869	100	70-130
335-76-2	Perfluorodecanoic acid	ND		0.087	0.0881	101	70-130
2058-94-8	Perfluoroundecanoic acid	ND		0.087	0.0920	106	70-130
307-55-1	Perfluorododecanoic acid	ND		0.087	0.0889	102	70-130
72629-94-8	Perfluorotridecanoic acid	ND		0.087	0.0863	99	60-140
376-06-7	Perfluorotetradecanoic acid	ND		0.087	0.0911	105	70-130
375-73-5	Perfluorobutanesulfonic acid	ND		0.087	0.0884	102	70-130
2706-91-4	Perfluoropentanesulfonic acid	ND		0.087	0.0891	102	70-130
355-46-4	Perfluorohexanesulfonic acid	ND		0.087	0.0838	96	70-130
375-92-8	Perfluoroheptanesulfonic acid	ND		0.087	0.0868	100	70-130
1763-23-1	Perfluorooctanesulfonic acid	ND		0.087	0.0857	99	70-130
68259-12-1	Perfluorononanesulfonic acid	ND		0.087	0.0856	98	65-130
335-77-3	Perfluorodecanesulfonic acid	ND		0.087	0.0738	85	60-130
754-91-6	PFOSA	ND		0.087	0.0874	101	70-130
2355-31-9	MeFOSAA	ND		0.087	0.0873	100	70-130
2991-50-6	EtFOSAA	ND		0.087	0.0915	105	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	ND		0.087	0.0863	99	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	ND		0.087	0.0899	103	70-130
39108-34-4	8:2 Fluorotelomer sulfonate	ND		0.087	0.0872	100	70-130
13252-13-6	HFPO-DA (GenX)	ND		0.087	0.0894	103	70-130
919005-14-4	ADONA	ND		0.087	0.0838	96	60-140
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND		0.087	0.0744	86	60-140
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND		0.087	0.0856	98	60-140

CAS No.	ID Standard Recoveries	MS	FA84080-3	Limits
	13C4-PFBA	73%	78%	35-135%
	13C5-PFPeA	83%	87%	50-150%
	13C5-PFHxA	83%	86%	50-150%
	13C4-PFHpA	85%	90%	50-150%

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FA84085
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84643-MS	4Q12550.D	1	03/30/21	NG	03/25/21	OP84643	S4Q174
FA84080-3	4Q12549.D	1	03/30/21	NG	03/25/21	OP84643	S4Q174

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

FA84085-1, FA84085-2, FA84085-3, FA84085-4, FA84085-5, FA84085-6

CAS No.	ID Standard Recoveries	MS	FA84080-3	Limits
	13C8-PFOA	89%	93%	50-150%
	13C9-PFNA	87%	92%	50-150%
	13C6-PFDA	91%	95%	50-150%
	13C7-PFUnDA	80%	81%	40-140%
	13C2-PFDoDA	72%	75%	40-140%
	13C2-PFTeDA	70%	74%	30-130%
	13C3-PFBS	84%	87%	50-150%
	13C3-PFHxS	87%	87%	50-150%
	13C8-PFOS	87%	82%	50-150%
	13C8-FOSA	79%	90%	30-130%
	d3-MeFOSAA	96%	100%	40-140%
	d5-EtFOSAA	89%	96%	40-140%
	13C2-4:2FTS		82%	50-150%
	13C2-6:2FTS	85%	85%	50-150%
	13C2-8:2FTS	87%	87%	50-150%
	13C3-HFPO-DA		83%	50-150%

* = Outside of Control Limits.

Duplicate Summary

Job Number: FA84085
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84643-DUP	4Q12548.D	1	03/30/21	NG	03/25/21	OP84643	S4Q174
FA84080-2	4Q12547.D	1	03/30/21	NG	03/25/21	OP84643	S4Q174

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

FA84085-1, FA84085-2, FA84085-3, FA84085-4, FA84085-5, FA84085-6

CAS No.	Compound	FA84080-2 ug/l	Q	DUP ug/l	Q	RPD	Limits
375-22-4	Perfluorobutanoic acid	ND		ND		nc	30
2706-90-3	Perfluoropentanoic acid	ND		ND		nc	30
307-24-4	Perfluorohexanoic acid	ND		ND		nc	30
375-85-9	Perfluoroheptanoic acid	ND		ND		nc	30
335-67-1	Perfluorooctanoic acid	ND		ND		nc	30
375-95-1	Perfluorononanoic acid	ND		ND		nc	30
335-76-2	Perfluorodecanoic acid	ND		ND		nc	30
2058-94-8	Perfluoroundecanoic acid	ND		ND		nc	30
307-55-1	Perfluorododecanoic acid	ND		ND		nc	30
72629-94-8	Perfluorotridecanoic acid	ND		ND		nc	30
376-06-7	Perfluorotetradecanoic acid	ND		ND		nc	30
375-73-5	Perfluorobutanesulfonic acid	ND		ND		nc	30
2706-91-4	Perfluoropentanesulfonic acid	ND		ND		nc	30
355-46-4	Perfluorohexanesulfonic acid	ND		ND		nc	30
375-92-8	Perfluoroheptanesulfonic acid	ND		ND		nc	30
1763-23-1	Perfluorooctanesulfonic acid	ND		ND		nc	30
68259-12-1	Perfluorononanesulfonic acid	ND		ND		nc	30
335-77-3	Perfluorodecanesulfonic acid	ND		ND		nc	30
754-91-6	PFOSA	ND		ND		nc	30
2355-31-9	MeFOSAA	ND		ND		nc	30
2991-50-6	EtFOSAA	ND		ND		nc	30
757124-72-4	4:2 Fluorotelomer sulfonate	ND		ND		nc	30
27619-97-2	6:2 Fluorotelomer sulfonate	ND		ND		nc	30
39108-34-4	8:2 Fluorotelomer sulfonate	ND		ND		nc	30
13252-13-6	HFPO-DA (GenX)	ND		ND		nc	30
919005-14-4	ADONA	ND		ND		nc	30
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND		ND		nc	30
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND		ND		nc	30

CAS No.	ID Standard Recoveries	DUP	FA84080-2	Limits
	13C4-PFBA	77%	78%	35-135%
	13C5-PFPeA	86%	88%	50-150%
	13C5-PFHxA	86%	88%	50-150%
	13C4-PFHpA	90%	90%	50-150%

* = Outside of Control Limits.

Duplicate Summary

Job Number: FA84085
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP84643-DUP	4Q12548.D	1	03/30/21	NG	03/25/21	OP84643	S4Q174
FA84080-2	4Q12547.D	1	03/30/21	NG	03/25/21	OP84643	S4Q174

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

FA84085-1, FA84085-2, FA84085-3, FA84085-4, FA84085-5, FA84085-6

CAS No.	ID Standard Recoveries	DUP	FA84080-2	Limits
	13C8-PFOA	92%	92%	50-150%
	13C9-PFNA	92%	92%	50-150%
	13C6-PFDA	95%	98%	50-150%
	13C7-PFUnDA	81%	87%	40-140%
	13C2-PFDoDA	75%	79%	40-140%
	13C2-PFTeDA	70%	78%	30-130%
	13C3-PFBS	87%	89%	50-150%
	13C3-PFHxS	88%	93%	50-150%
	13C8-PFOS	84%	87%	50-150%
	13C8-FOSA	87%	87%	30-130%
	d3-MeFOSAA	98%	106%	40-140%
	d5-EtFOSAA	95%	101%	40-140%
	13C2-4:2FTS		83%	50-150%
	13C2-6:2FTS	84%	86%	50-150%
	13C2-8:2FTS	84%	88%	50-150%
	13C3-HFPO-DA		84%	50-150%

* = Outside of Control Limits.