ARCADIS Design & Consultancy for natural and built assets

Revitalizing Auto Communities
Environmental Response Trust

INTERIM MEASURES WORK PLAN: PLANT 6 STORM SEWER MODIFICATIONS

Lansing Industrial Land

Lansing, Michigan

October 2019

INTERIM MEASURES WORK PLAN: PLANT 6 STORM SEWER MODIFICATIONS

Lansing Industrial Land

Lansing, Michigan

Jacelyn Saling, P.E.-MI
Principal Engineer

Andrew Lorenz. P.E.-MI
Project Environmental Engineer

Prepared for:

Revitalizing Auto Communities
Environmental Response Trust

Prepared by:

Arcadis of Michigan, LLC
28550 Cabot Drive
Suite 500
Novi
Michigan 48377
Tel 248 994 2240
Fax 248 994 2241

Our Ref.:

30006870.04600

Date:

October 2019

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ACRONYMS AND ABBREVIATIONS

AOI	Area of Interest
bgs	Below Ground Surface
EGLE	Michigan Department of Environment, Great Lakes, and Energy
HNV	Human Non-Cancer Screening Value
IM	Interim Measures
ng/L	Nanograms per Liter
PFAS	Poly- and Perfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic acid
PVC	Polyvinyl chloride
RACER	Revitalizing Auto Communities Environmental Response
Rule 57 Criteria	EGLE Rule 57 Human Non-Cancer Screening Value (HNV) for Surface Water from a Non-Drinking Water Source

1 INTRODUCTION

Arcadis of Michigan, LLC prepared this Interim Measures (IM) Workplan (Work Plan) on behalf of the Revitalizing Auto Communities Environmental Response (RACER) Trust for Plant 6 at the RACER Lansing Industrial Land (Site) located in Lansing, Michigan (**Figure 1**). The purpose of this Work Plan is to provide information to support Michigan Department of Environment, Great Lakes, and Energy (EGLE), and City of Lansing, as applicable, approval of the Plant 6 supplemental storm sewer modifications proposed for implementation at the Site to address per- and polyfluoroalkyl substances (PFAS) discharges to offsite sewers. It is noted that even though this Work Plan is being submitted as an interim measure while other matters related to the Site are being addressed, it is intended that this interim measure will be a part of the final corrective measure to address PFAS.

This IM Work Plan outlines proposed modifications to the Plant 6 storm sewer systems to mitigate the Site's PFAS-impacted storm water discharges to an off-site storm sewer owned by the City of Lansing.

1.1 Site Overview

Groundwater sampling for shallow perched PFAS impacts was completed in areas of interest (AOIs) of the former Plant 6 wastewater treatment plant (AOI 6-83), former paint shop area (AOI 6-81), former paint mixing room (AOI 6-60) and Plant 6 rinse water cistern (AOI 6-11) areas in May 2018 (Arcadis 2018; Arcadis 2019a). Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) were detected along the property boundary at the former paint shop, as well as in central Plant 6, near the former rinse water cistern. The highest PFAS concentrations at Plant 6 were observed at monitoring well P6-SB-07 located near a former rinse water cistern that was associated with a phosphoric acid dip process.

Arcadis conducted additional field investigations to characterize the extent of PFAS impacts in the storm sewer network, which lies at the same approximate elevation as perched groundwater (10 to 18 feet below ground surface, **Figure 2**). Storm sewer manholes on and around Plant 6 were sampled between November 2018 and May 2019. PFOS concentrations above the Rule 57 criteria for surface water were detected in on-site and off-site manholes sampled (**Figure 3**). Samples indicated the highest concentrations are entering the sewers along the north and east borders of Plant 6. This workplan outlines first steps to address PFAS sewer impacts at Plant 6.

1.2 Corrective Action Objectives

The corrective action objective of this IM Work Plan is to eliminate off-site storm sewer discharges exceeding the EGLE Rule 57 Human Non-Cancer Screening Value (HNV) for Surface Water from a Non-Drinking Water Source criteria (Rule 57 criteria). The storm sewer manholes along Verlinden, Osborne, and Michigan adjacent to the Site will be monitored for PFAS to assess performance of the sewer modifications.

2 PLANT 6 STORM SEWER MODIFICATIONS

The majority of the Plant 6 storm sewer system has been decommissioned. Interior sewer lines were abandoned and the majority of on-site catch basins covered or capped. All that remains are laterals and associated manholes and catch basins along the perimeter of the property that drain to the City of Lansing sewers beneath Osborn Street, Verlinden Street, and Michigan Avenue (**Figure 3**). For purposes of this Work Plan, a catch basin is defined as a stormwater collection structure with an open top and a sump. A manhole is an access point along a main with a solid lid and does not receive surface stormwater. Catch basins and manholes are differentiated on **Figures 3 and 4.** Storm sewers in the area ultimately discharge to the Grand River.

A systematic process for identifying, ranking, and addressing PFAS inputs to the storm water system will be utilized to eliminate off-site storm sewer discharges exceeding the Rule 57 criteria of 12 ng/L for PFOS. The process is:

- Identify: Investigate storm sewers to identify distribution of PFAS and incorporate flow conditions to evaluate mass flux.
- Rank: Prioritize inputs based on mass flux.
- Address: Complete storm sewer modifications that reduce mass flux to the off-site storm sewers.

Modifications to address PFAS will be completed in step wise process, repeating the identify → rank → address process, as needed, to reach the objective. The sections below detail the work that has been completed to identify and rank PFAS inputs from Plant 6 into the off-site City storm sewers, as well as the proposed scope of work to address the highest priorities identified.

2.1 Identify – 2018/2019 Storm Sewer Sampling Investigation

Storm sewer water samples collected from 14 manholes were analyzed for 24 PFAS. Sampling was conducted in dry weather to ensure that base flow conditions were evaluated. Results indicated:

- PFOS concentrations exceed the Rule 57 surface water criteria of 12 ng/L for all on-site sewer manholes sampled.
- PFOS concentrations exceed the Rule 57 criteria of 12 ng/L for all off-site sewer manholes sampled to the east of Plant 6 (Osborn-MH-1, Verlinden-MH-1, 2, 3, and 4).
- No PFAS compounds exceed the Rule 57 in the Michigan Ave sewers to the south of Plant 6 (along Michigan Avenue).

Analytical results are summarized on **Table 1** and **Figure 3**. The laboratory reports are included as **Appendix A**.

2.2 Rank

Based on sampling and field observations, the highest concentration impacts with the most substantial flow that may be contributing to Rule 57 PFOS exceedances observed in Verlinden and Osborn are from P6-MH-11 in the northeast corner of Plant 6, P6-MH-13 and P6-MH-14 on the east side of Plant 6e, and

P6-MH-SW in the southwest corner of Plant 6 (**Figure 3**). Although there were no exceedances of Rule 57 criteria observed in Michigan Avenue sewers, P6-MH-SW in the southwest corner has PFOS exceeding Rule 57 criteria and ultimately discharges to Michigan Avenue. Abandoning structures at P6-MH-11, P6-MH-13, P6-MH-14, and the stormceptor ESC-2 downstream of P6-MH-SW achieves the goal of targeting higher-flux impacts discharging to off-site sewers.

2.3 Address – Proposed Modifications

Targeting the on-site property boundary manholes will help achieve the following goals:

1. Cut off the flow of the highest known PFAS-impacted water from reaching the offsite City sewers.
2. Addressing the impacts on-site as close to City sewers as possible
3. Minimize the disruption to the off-site (city-owned) surface water drainage network.

The proposed modifications to the Plant 6 storm sewers are as follows, listed in order of planned implementation:

1. Cap approximately 6 catch basins along the north, east, and south edges of Plant 6 to eliminate inflow after precipitation events to the portion of the storm system to be abandoned, to reduce build-up of hydraulic pressure and the possibility of impacted sewer water daylighting.
2. Fill manhole P6-MH-11 with concrete to eliminate the flow of PFAS-impacted water to the Osborn Ave sewer.
3. Fill manholes P6-MH-13 and P6-MH-14 with concrete to eliminate the flow of PFAS-impacted water to the Verlinden Ave sewer.
4. Fill stormceptor ESC-2 with concrete to eliminate the flow of PFAS-impacted water to the Michigan Ave sewer.

Figure 4 summarizes the proposed storm sewer modifications. All work will be completed per the requirements of the Arcadis Site-Specific Health and Safety Plan (Arcadis 2019b) and industry best practices.

The construction contractor will be required to submit details on materials to be used in the work for review, to minimize the potential that PFAS-containing materials are used. Contractor personnel handling materials will follow appropriate protocols to minimize PFAS contamination of materials. City of Lansing water will be used in the concrete mix to minimize risk of PFAS contamination.

2.3.1 Cap Catch Basins

The majority of catch basins left on Plant 6 will be capped to minimize surface water inflow into the portion of the sewer system to be deactivated (**Figure 4**). Capping catch basins is considered a best practice to reduce the possibility of water from storm sewer lines daylighting to ground surface through open catch basins following large storm events. Approximately 6 catch basins will be capped by removing the existing grate, placing a polyvinyl chloride (PVC) liner with a silicone bead sealant over the opening, followed by placing a galvanized steel plate on top as shown by the detail on **Figure 5**. The steel plate will also be sealed with silicone and covered with gravel to prevent theft **(Figure 5**, **Detail A)**.

2.3.2 Fill P6-MH-11, 13, 14, and ESC-2

Manholes P6-MH-11, P6-MH-13, P6-MH-14 and stormceptor manhole ESC-2 will be filled with concrete (**Figure 5**) to mitigate flow of PFAS-impacted water to the off-site storm sewer system. The manholes will be dewatered and any excess sludge and sediment will be cleaned to the extent practicable prior to filling the manholes with concrete. This will ensure proper setting and sealing of the concrete in the manhole for blocking flow through the sewers off-site. An anticipated volume of 1,000 to 2,000 gallons of sewer water from dewatering will be pumped into dewatering boxes staged on-site, characterized, and disposed of at an appropriate off-site disposal facility. Actual volume removed may vary based on field conditions. The manhole and stormceptor structures will be filled with concrete to ground surface. The concrete utilized will be mixed to cure underwater and eliminate the need to maintain a dry manhole during concrete placement. Concrete placement will follow standard construction practices including but not limited to consolidation (i.e. vibrating) to eliminate air voids and ensure complete placement. The concrete will be allowed to cure for 2 to 3 days while Arcadis monitors for signs of cracking or settling.

2.3.3 Monitoring and Assessment

Because the majority of Plant 6 storm sewers have already been decommissioned and the slabs from the plant have been removed, an increase in ponding related to the proposed work is not expected.

Storm sewer water quality monitoring will be completed following the storm sewer modification activities to evaluate PFAS in the city storm sewers surrounding Plant 6, along Osborn Ave, Verlinden Ave, and Michigan Ave. Sampling for PFAS will be completed at manholes Verlinden-MH-1, Verlinden-MH-4, Osborn-MH-1, and MichAve-MH-4 approximately three months following construction and quarterly thereafter for one year during dry weather.

3 CONTINGENCY

Should water quality samples show PFAS exceedances of Rule 57 criteria, additional characterization, modifications, and/or corrective measures will be evaluated. Specifically, evaluation of the potential for direct groundwater discharge into off-site storm sewers may be completed to identify locations of infiltration that may be contributing PFAS to the sewer.

4 SCHEDULE

Implementation will be initiated after all necessary approvals of this Work Plan are obtained and the weather is acceptable. At this time the identified approvals needed are from EGLE and the City of Lansing. The first step in implementing this Work is to procure a contractor, which could take up to two months after Work Plan approval. After contractor selection a schedule for field implementation will be determined.

5 REFERENCES

Arcadis, 2018. Monitoring Well PFAS Summary – Plants 2 and 6 RACER Trust Site, Lansing, Michigan. September 14.

Arcadis, 2019a. PFAS Investigation Phase 1 Summary – Plant 6 RACER Trust Site, Lansing, Michigan. January 29.

Arcadis, 2019b. Site Specific Health and Safety Plan. RACER Trust, Lansing Plants 2, 3, and 6. June.

Arcadis of Michigan, LLC

28550 Cabot Drive

Suite 500

Novi, Michigan 48377

Tel 248 994 2240

Fax 248 994 2241

www.arcadis.com

TABLES

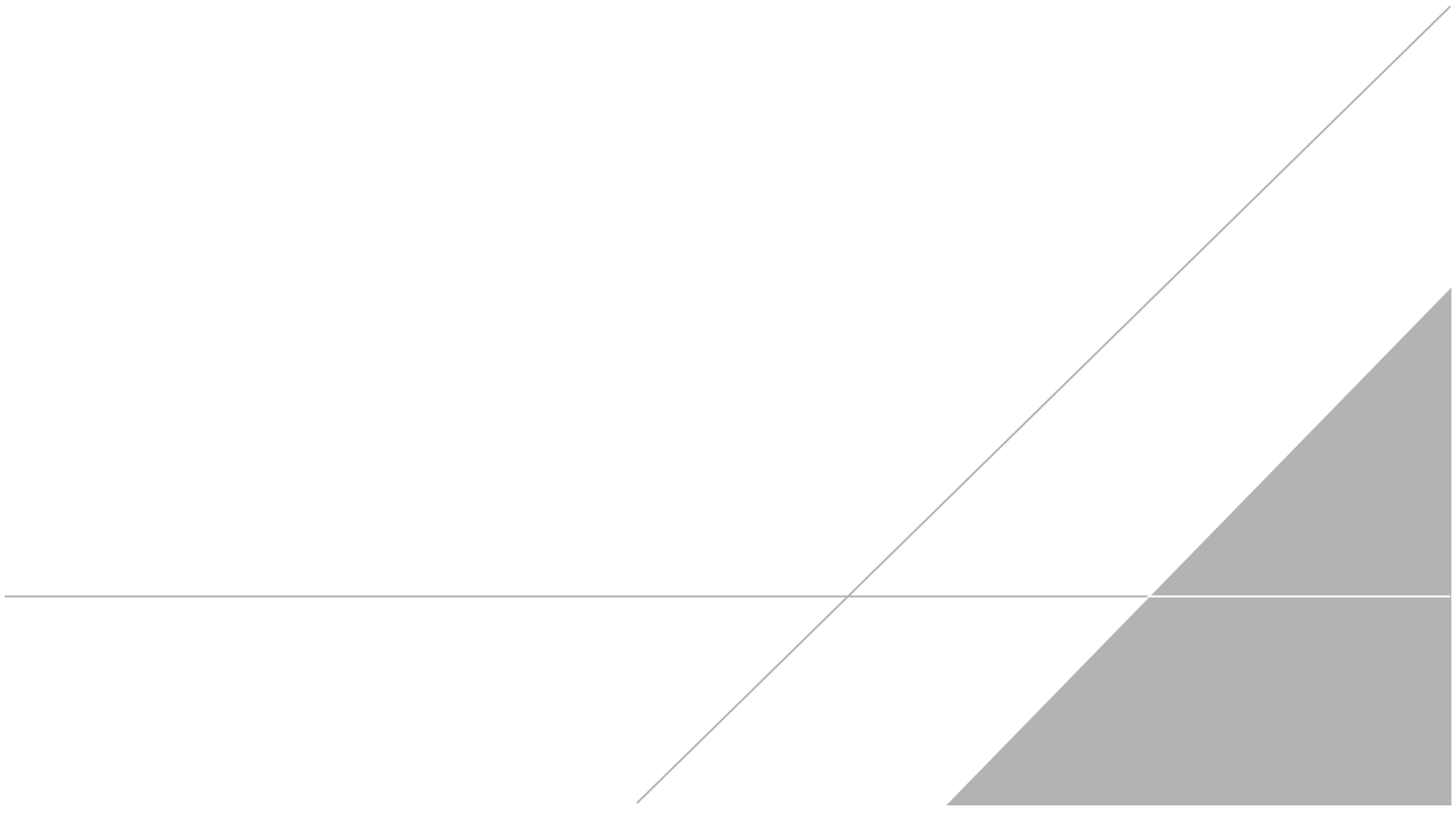


Table 1
Summary of Plant 6 Storm Sewer Sampling Results
Interim Measures Work Plan: Plant 6 Storm Sewer Modifications
RACER Trust - Plant 6 Industrial Land, Lansing, Michigan

Location ID: Date Collected: Sample Name:	Units	MICHIGAN AVE-MH-1 05/06/19 MICHIGAN AVE-MH-1_050619	MICHIGAN AVE-MH-2 05/06/19 MICHIGAN AVE-MH-2_050619	MICHIGAN AVE-MH-3 05/06/19 MICHIGAN AVE-MH-3_050619	MICHIGAN AVE-MH-4 05/06/19 MICHIGAN AVE-MH-4_050619	MICHIGAN AVE-MH-5 05/06/19 VERLINDEN-MH-4_050619	OSBORN-MH-1 11/29/18 OSBORN-MH-1_112918
PFAS							
Perfluorooctane sulfonic acid (DD)	ug/L	0.00546	0.00305 J	0.00617	0.00524	0.0122 [0.0123]	0.047
Perfluorooctanoic acid	ug/L	0.00246 J	0.00384 J	0.00833	0.00587	0.0272 [0.0269]	0.0532
Sum of Other PFAS Compounds	ug/L	0.0043	0.0197	0.0239	0.0000	0.0822	0.1194

Table 1
Summary of Plant 6 Storm Sewer Sampling Results
Interim Measures Work Plan: Plant 6 Storm Sewer Modifications
RACER Trust - Plant 6 Industrial Land, Lansing, Michigan

Location ID: Date Collected: Sample Name:	Units	P6-MH2-SW 12/07/18 P6-MH2-SW_120718	P6-MH-11 01/26/19 P6-MH-11_012619	P6-MH-13 01/26/19 P6-MH-13_012619	P6-MH-14 01/26/19 P6-MH-14_012619	VERLINDEN-MH-1 11/29/18 VERLINDEN-MH-1_112918	VERLINDEN-MH-2 11/29/18 VERLINDEN-MH-2_112918	VERLINDEN-MH-3 11/29/18 VERLINDEN-MH-3_112918
PFAS								
Perfluorooctane sulfonic acid (DD)	ug/L	0.0730 [0.062]	0.0353	0.0253	0.0225	0.0188	0.0227	0.0174
Perfluorooctanoic acid	ug/L	0.0394 [0.0374]	0.0497	0.048	0.0649	0.0487	0.0485	0.0384
Sum of Other PFAS Compounds	ug/L	0.1	0.09382	0.10726	0.15628	0.13731	0.11401	0.10015

Table 1
Summary of Plant 6 Storm Sewer Sampling Results
Interim Measures Work Plan: Plant 6 Storm Sewer Modifications
RACER Trust - Plant 6 Industrial Land, Lansing, Michigan

Location ID: Date Collected: Sample Name:	Units	VERLINDEN-MH-4 11/29/18 VERLINDEN-MH-4_112918
PFAS		
Perfluorooctane sulfonic acid (DD)	ug/L	0.0182
Perfluorooctanoic acid	ug/L	0.0403
Sum of Other PFAS Compounds	ug/L	0.09707

Table 1
Summary of Plant 6 Storm Sewer Sampling Results
Interim Measures Work Plan: Plant 6 Storm Sewer Modifications
RACER Trust - Plant 6 Industrial Land, Lansing, Michigan

Notes:

Shaded	Exceeds Rule 57 Human Non-Cancer Screening Value for Surface Water from a Non-Drinking Water Source

NA = Not analyzed.

NC = No criteria

ug/L = Micrograms per liter

ng/L = Nanograms per liter.

PFAS = Per- and polyfluoroalkyl substances

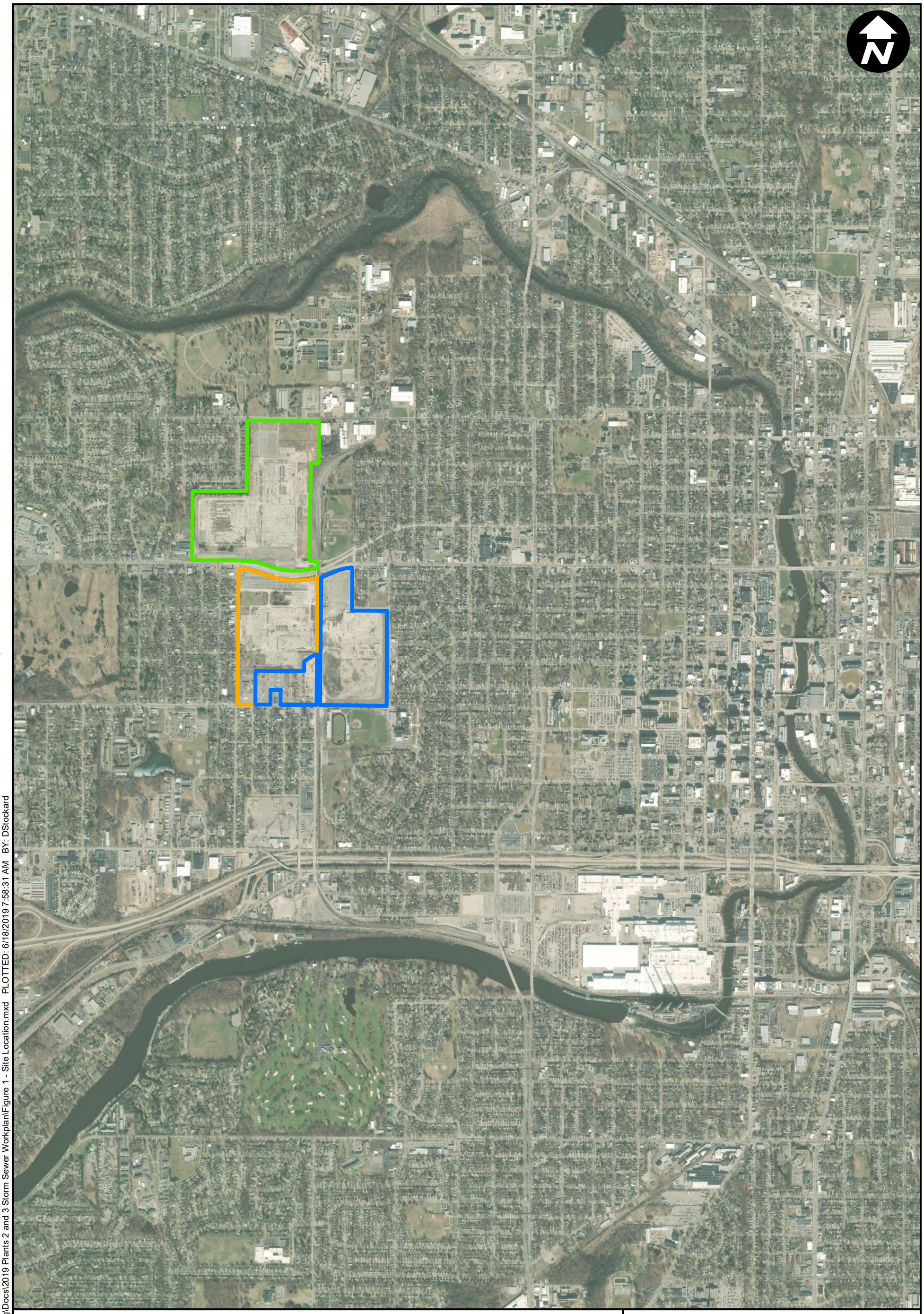
[ ] Indicates duplicate sample

J = Indicates an estimated value below laboratory reporting limit

< = The compound was analyzed for but not detected.

Non-detect values were treated as zeroes for the sum of other PFAS compounds

FIGURES



PLANT BOUNDARIES

- PLANT 2
- PLANT 3
- PLANT 6

0 1,500 3,000

SCALE IN FEET

RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

SITE LOCATION

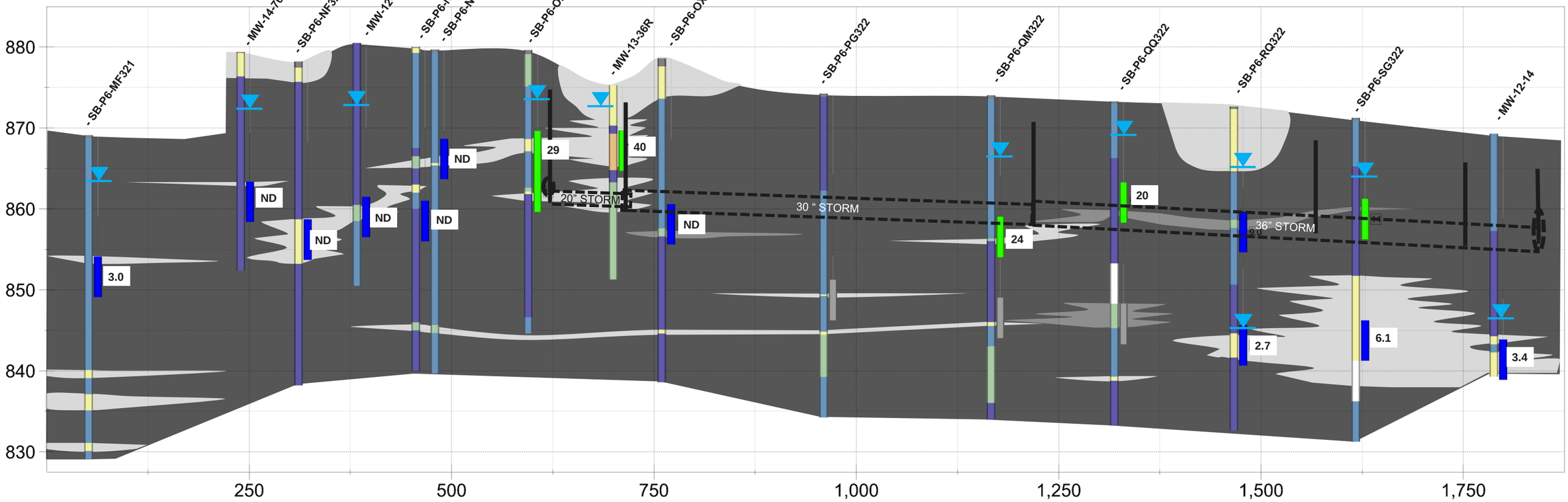
ARCADIS Design & Consultancy for natural and built assets

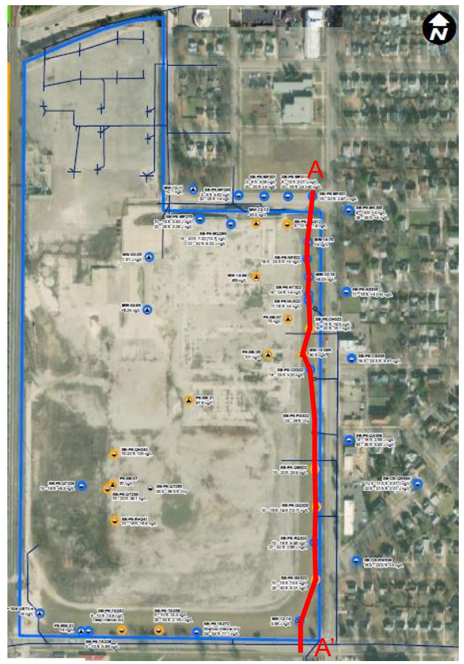
FIGURE
1

CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: J. SALING PROJECT NUMBER: B0064479.2019.03500 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
G:\GIS\Project Files\RACER\Lansing\Docs\2019 Plants 2 and 3 Storm Sewer Workplan\Figure 1 - Site Location.mxd PLOTTED: 6/18/2019 7:58:31 AM BY: DStockard

A

A’





Hydrostratigraphy

- More permeable (sand)
- Less permeable (silt, silty sand)
- Very low permeability (clay)
- Dry Screen Interval
- Groundwater Table

PFOS

- > 12 ng/L
- < 12 ng/L

Material

- Topsoil/Concrete/Asphalt
- Fill
- Gravelly Sand
- Sand
- Sandy Silt/Silt
- Silty/Sandy/Gravelly Clay
- Clay
- Bedrock (Primarily Sandstone)
- No Recovery

Storm Sewer Structure

Storm Sewer

RACER TRUST PLANT 6
LANSING, MICHIGAN

PLANT 6 CROSS SECTION A – A’

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FIGURE
2

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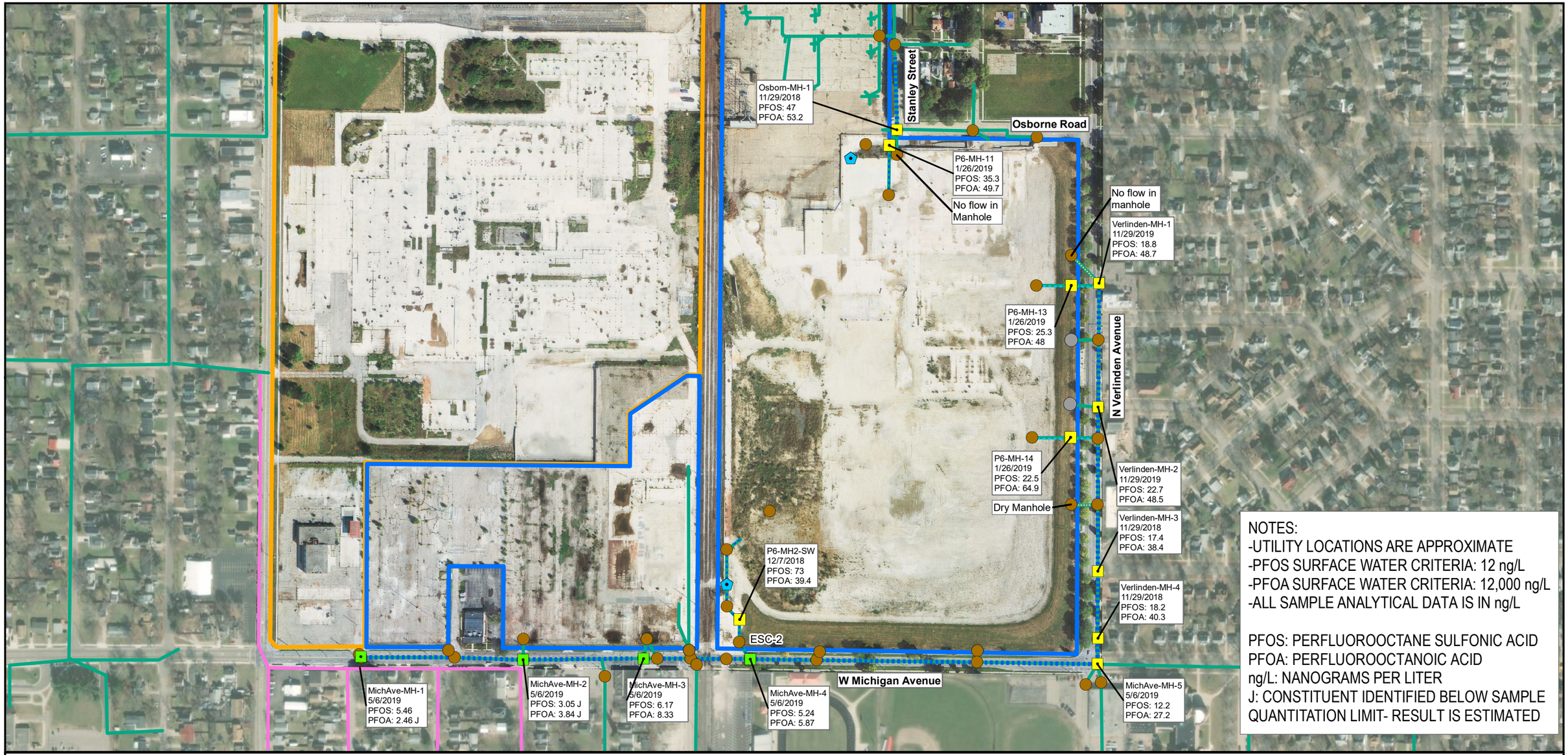


NOTES:
-UTILITY LOCATIONS ARE APPROXIMATE
-PFOS SURFACE WATER CRITERIA: 12 ng/L
-PFOA SURFACE WATER CRITERIA: 12,000 ng/L
-ALL SAMPLE ANALYTICAL DATA IS IN ng/L

PFOS: PERFLUOROOCTANE SULFONIC ACID
PFOA: PERFLUOROOCTANOIC ACID
ng/L: NANOGRAMS PER LITER
J: CONSTITUENT IDENTIFIED BELOW SAMPLE QUANTITATION LIMIT- RESULT IS ESTIMATED

STORM STRUCTURES
- MANHOLE
- CATCH BASIN
- MANHOLE COULD NOT BE ACCESSED
- DOES NOT EXCEED CRITERIA
- EXCEEDS PFOS SURFACE WATER CRITERIA
- STORM LINE
- SEWER LINE

OBSERVED FLOW
- NO FLOW
- TRICKLE
- LITTLE
- MODERATE

PLANT BOUNDARIES
- PLANT 2
- PLANT 6

0 300 600
SCALE IN FEET

RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

PLANT 6 STORM SEWER SAMPLING RESULTS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3

CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: B00644479.2019 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
G:\GIS\Project Files\RACER\Lansing\Docs\2019 Storm Sewer\2019 Plant 6 Workplan\Figure 2 - Storm Sewer Sampling Results.mxd PLOTTED: 10/2/2019 10:16:37 AM BY: SYaqoob

CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: P. CURRY PROJECT NUMBER: B0064479.2019 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
G:\GIS\Project Files\RACER\Lansing\Docs\2019 Storm Sewer\2019 Plant 6 Workplan\Figure 4- Michigan_Ave_Storm_Modification_Plan.mxd PLOTTED: 10/3/2019 9:08:40 AM BY: SYaqoob

STORM STRUCTURES
- STORM SEWER MANHOLE
- CATCH BASIN TO REMAIN OPEN
- MANHOLE COULD NOT BE LOCATED
- DOES NOT EXCEED CRITERIA
- EXCEEDS PFOS SURFACE WATER CRITERIA
- STORM LINE
- SEWER LINE
- FILL MANHOLE
- CAP CATCH BASIN

OBSERVED FLOW
- NO FLOW
- TRICKLE
- LITTLE
- MODERATE

PLANT BOUNDARIES
- PLANT 2
- PLANT 6

Osborn-MH-1
11/29/2018
PFOS: 47
PFOA: 53.2

Retain catch basin

P6-MH-11
1/26/2019
PFOS: 35.3
PFOA: 49.7

P6-MH-11

No flow in manhole

Stanley Street

Osborne Road

No flow in mahole

Verlinden-MH-1
11/29/2019
PFOS: 18.8
PFOA: 48.7

P6-MH-13

P6-MH-13
1/26/2019
PFOS: 25.3
PFOA: 48

N Verlinden Avenue

Verlinden-MH-2
11/29/2019
PFOS: 22.7
PFOA: 48.5

P6-MH14

P6-MH-14
1/26/2019
PFOS: 22.5
PFOA: 64.9

Manhole dry

Verlinden-MH-3
11/29/2018
PFOS: 17.4
PFOA: 38.4

Verlinden-MH-4
11/29/2018
PFOS: 18.2
PFOA: 40.3

Verlinden-MH-5
5/6/2019
PFOS: 12.2
PFOA: 27.2

P6-MH2-SW
12/7/2018
PFOS: 73
PFOA: 39.4

P6-MH2-SW

ESC-2

W Michigan Avenue

MichAve-MH-1
5/6/2019
PFOS: 5.46
PFOA: 2.46

MichAve-MH-2
5/6/2019
PFOS: 3.05 J
PFOA: 3.84 J

MichAve-MH-3
5/6/2019
PFOS: 6.17
PFOA: 8.33

MichAve-MH-4
5/6/2019
PFOS: 5.24
PFOA: 5.87

NOTES:
-UTILITY LOCATIONS ARE APPROXIMATE
-PFAS CONCENTRATIONS SHOWN IN ng/L

-SAMPLE RESULTS FROM INITIAL SAMPLING EVENT IN JANUARY AND CONFIRMATORY/EXPANDED SAMPLING EVENT IN MARCH
PFOS SURFACE WATER CRITERIA: 12 ng/L
PFOA SURFACE WATER CRITERIA: 12,000 ng/L

PFOS: PERFLUOROOCTANE SULFONIC ACID
PFOA: PERFLUOROOCTANOIC ACID
ng/L: NANOGRAMS PER LITER
J: CONSTITUENT IDENTIFIED BELOW SAMPLE

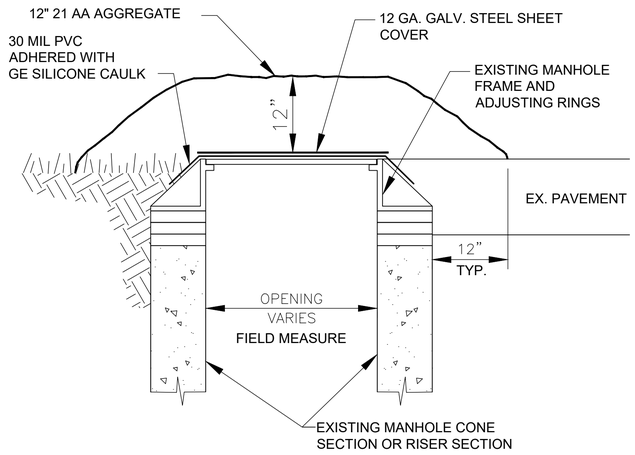
0 150 300
SCALE IN FEET

RACER TRUST
PLANTS 2, 3 & 6
LANSING, MICHIGAN

PLANT 6 MODIFICATIONS FIGURE LAYOUT

ARCADIS Design & Consultancy for natural and built assets

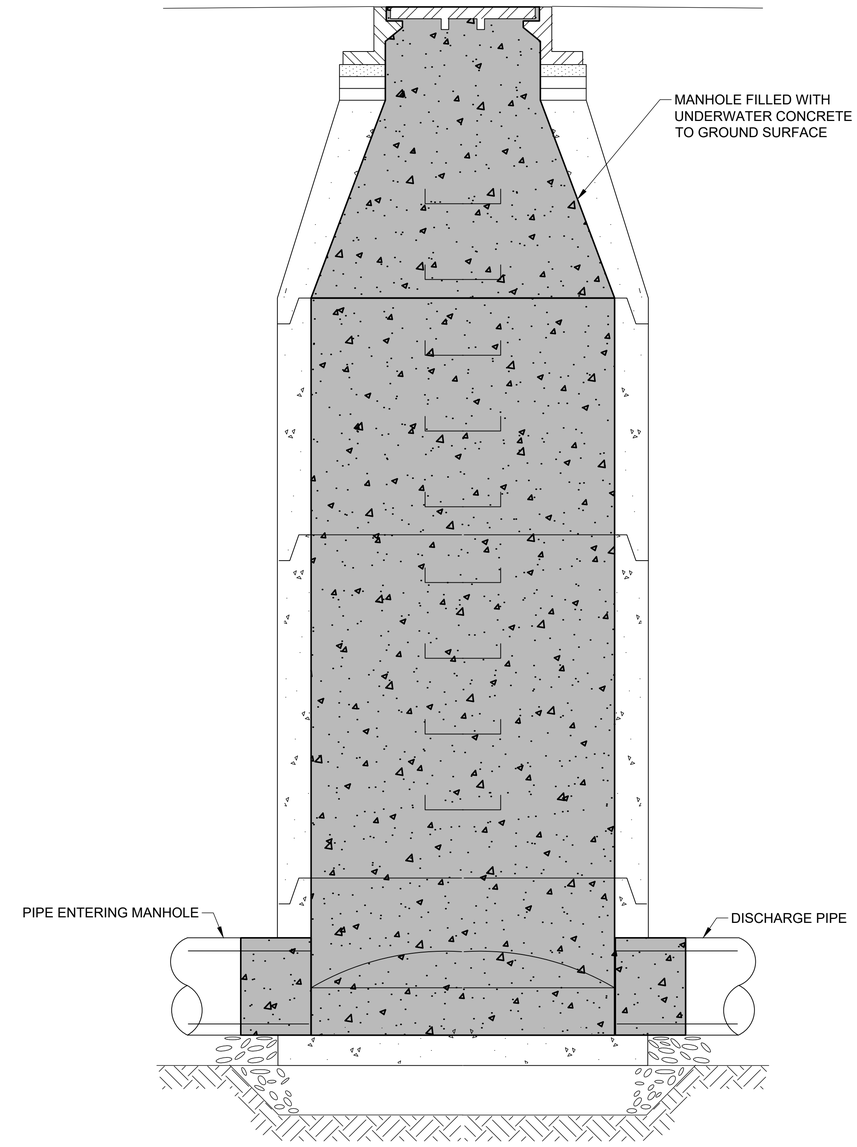
FIGURE
4



PROPOSED

CATCH BASIN CAP DETAIL "A"

1" = 1'-0"



PROPOSED

TYPICAL MANHOLE FILLED WITH UNDERWATER CONCRETE

1" = 1'-0"

CITY: DIV/GROUP- DB: A.SANCHEZ LD: PIC: PM: R.CHRISTENSEN TM: LYR:ON=*;OFF=*REF*
C:\BIM\OneDrive - ARCADIS\BIM 360 Docs\RACER TRUST\RACER LANSING PLANTS 2,3,&6\PFAS IM WORK PLAN\2019\B0064479.2019\01-DWG\RC-LP236-PFASIMWP-CATCH BASIN CAP DETAILS.dwg LAYOUT: 4 SAVED: 6/20/2019 9:57 AM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 8/2/2019 4:10 PM BY: SANCHEZ, ADRIAN
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THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

Professional Engineer's Name

Professional Engineer's No.

State	Date Signed	Project Mgr.
MI		R.CHRISTENSEN
Designed by R.CHRISTENSEN	Drawn by A.SANCHEZ	Checked by

ARCADIS Design & Consultancy for natural and built assets

ARCADIS OF MICHIGAN, LLC.

RACER TRUST • INDUSTRIAL LAND, LANSING, MICHIGAN

FILLING OF UTILITY MANHOLE WITH UNDERWATER CONCRETE AND CATCH BASIN CAP DETAILS

ARCADIS Project No.
B0064479.2019.03500

Date
JUNE 2019

ARCADIS
28550 CABOT DRIVE
SUITE 500
NOVI, MICHIGAN 48377
TEL. 248.994.2240

5

APPENDIX A

Plant 6 Storm Sewer Sampling Laboratory Results

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

B0064479.2018.03100

SGS Job Number: FA59818

Sampling Dates: 11/28/18 - 11/30/18

Report to:

Arcadis
300 S Washington Sq Suite 315
Lansing, MI 48933
alex.villhauer@arcadis.com; christine.gregg@arcadis.com

ATTN: Alex Villhauer

Total number of pages in report: 99

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Caitlin Brice, M.S.
General Manager

Client Service contact: Andrea Colby 407-425-6700

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

Sections: 1 2 3 4 5

Table of Contents

SGS North America Inc.

Sample Summary

Arcadis

Job No: FA59818

Racer Lansing PFAS Delineation; Lansing, MI
Project No: B0064479.2018.03100

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
FA59818-1	11/28/18	09:40	BPAW	12/01/18	AQ	Ground Water	SB-P6-MF321_15-20
FA59818-2	11/28/18	10:20	BPAW	12/01/18	AQ	Ground Water	SB-P6-MF311_20-25
FA59818-3	11/28/18	00:00	BPAW	12/01/18	AQ	Ground Water	DUP-02_112818
FA59818-4	11/28/18	10:45	BPAW	12/01/18	AQ	Ground Water	SB-P6-MF311_8-13
FA59818-5	11/28/18	11:30	BPAW	12/01/18	AQ	Ground Water	SB-P6-MF301_20-25
FA59818-5D	11/28/18	11:30	BPAW	12/01/18	AQ	Water Dup/MSD	SB-P6-MF301_20-25
FA59818-5S	11/28/18	11:30	BPAW	12/01/18	AQ	Water Matrix Spike	SB-P6-MF301_20-25
FA59818-6	11/28/18	12:00	BPAW	12/01/18	AQ	Ground Water	SB-P6-MF301_3-8
FA59818-7	11/28/18	12:45	BPAW	12/01/18	AQ	Ground Water	SB-P6-MF293_20-25
FA59818-8	11/28/18	13:05	BPAW	12/01/18	AQ	Ground Water	SB-P6-MF293_3-8
FA59818-9	11/28/18	14:15	BPAW	12/01/18	AQ	Ground Water	SB-P6-OS335_18.5-23.5
FA59818-10	11/28/18	16:10	BPAW	12/01/18	AQ	Ground Water	SB-P6-OH322_10-15
FA59818-11	11/28/18	16:45	BPAW	12/01/18	AQ	Ground Water	SB-P6-OH322_15-20

Sample Summary
(continued)

Arcadis

Job No: FA59818

Racer Lansing PFAS Delineation; Lansing, MI
Project No: B0064479.2018.03100

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
FA59818-12	11/29/18	09:00	BPAW	12/01/18	AQ	Ground Water	VERLINDEN-MH-2_112918
FA59818-13	11/29/18	09:25	BPAW	12/01/18	AQ	Ground Water	VERLINDEN-MH-3_112918
FA59818-14	11/29/18	12:00	BPAW	12/01/18	AQ	Ground Water	VERLINDEN-MH-4_112918
FA59818-15	11/29/18	00:00	BPAW	12/01/18	AQ	Ground Water	DUP-03_112918
FA59818-16	11/29/18	12:45	BPAW	12/01/18	AQ	Ground Water	VERLINDEN-MH-1_112918
FA59818-17	11/29/18	13:20	BPAW	12/01/18	AQ	Ground Water	OSBORN-MH-1_112918
FA59818-18	11/29/18	14:20	BPAW	12/01/18	AQ	Ground Water	SB-P6-QA336_13-18
FA59818-19	11/29/18	14:30	BPAW	12/01/18	AQ	Ground Water	SB-P6-QA336_30-35
FA59818-20	11/29/18	15:00	BPAW	12/01/18	AQ	Ground Water	SB-P6-NS335_11-16
FA59818-21	11/29/18	00:00	BPAW	12/01/18	AQ	Ground Water	DUP-04_112918
FA59818-22	11/29/18	15:40	BPAW	12/01/18	AQ	Ground Water	SB-P6-MK335_28-33
FA59818-23	11/29/18	15:55	BPAW	12/01/18	AQ	Ground Water	SB-P6-MK335_9-14
FA59818-24	11/30/18	10:00	BPAW	12/01/18	AQ	Ground Water	SB-P6-QH240_15-20

Sample Summary
(continued)

Arcadis

Job No: FA59818

Racer Lansing PFAS Delineation; Lansing, MI
Project No: B0064479.2018.03100

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
FA59818-25	11/30/18	10:35	BPAW	12/01/18	AQ	Ground Water	SB-P6-QT226_13-18
FA59818-26	11/30/18	11:15	BPAW	12/01/18	AQ	Ground Water	SB-P6-RH241_13-18
FA59818-26D	11/30/18	11:15	BPAW	12/01/18	AQ	Water Dup/MSD	SB-P6-RH241_13-18
FA59818-26S	11/30/18	11:15	BPAW	12/01/18	AQ	Water Matrix Spike	SB-P6-RH241_13-18
FA59818-27	11/30/18	11:50	BPAW	12/01/18	AQ	Ground Water	SB-P6-QT239_15-20
FA59818-28	11/30/18	12:35	BPAW	12/01/18	AQ	Ground Water	SB-P6-MQ289_27-32
FA59818-29	11/30/18	13:00	BPAW	12/01/18	AQ	Equipment Blank	EB-02_113018

Summary of Hits

Job Number: FA59818
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 11/28/18 thru 11/30/18

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA59818-1	**SB-P6-MF321_15-20**					
Perfluorobutanoic acid		0.00617 J	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00536	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00557	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00427	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0142	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00138 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00154 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00297 J	0.0040	0.0015	ug/l	EPA 537M BY ID
FA59818-2	**SB-P6-MF311_20-25**					
Perfluorobutanoic acid		0.0251	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0491	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0372	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0133	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00725	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-3	**DUP-02_112818**					
Perfluorobutanoic acid		0.0247	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0480	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0365	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0130	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00624	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-4	**SB-P6-MF311_8-13**					
Perfluorobutanoic acid		0.0233	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0533	0.0042	0.0016	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0476	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0200	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0114	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00123 J	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00121 J	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00301 J	0.0042	0.0016	ug/l	EPA 537M BY ID
FA59818-5	**SB-P6-MF301_20-25**					
Perfluorobutanoic acid		0.0117	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0117	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00715	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00183 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00161 J	0.0040	0.0010	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA59818
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 11/28/18 thru 11/30/18

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA59818-6	**SB-P6-MF301_3-8**					
Perfluorobutanoic acid		0.0183	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0203	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0217	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0141	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0238	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00133 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00178 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00103 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00408	0.0040	0.0015	ug/l	EPA 537M BY ID
FA59818-7	**SB-P6-MF293_20-25**					
Perfluorobutanoic acid		0.0200	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0341	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0410	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0165	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0415	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00140 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00203 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-8	**SB-P6-MF293_3-8**					
Perfluorobutanoic acid		0.0199	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0315	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0381	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0157	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0504	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00264 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00223 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00462	0.0040	0.0015	ug/l	EPA 537M BY ID
FA59818-9	**SB-P6-OS335_18.5-23.5**					
Perfluorobutanoic acid		0.00705 J	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00651	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00579	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00283 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00731	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00154 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00112 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00841	0.0040	0.0015	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA59818
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 11/28/18 thru 11/30/18

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA59818-10	**SB-P6-OH322_10-15**					
Perfluorobutanoic acid		0.0276	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0500	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0467	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0460	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0688	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00720	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00332 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00488	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00554	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0195	0.0040	0.0015	ug/l	EPA 537M BY ID
FA59818-11	**SB-P6-OH322_15-20**					
Perfluorobutanoic acid		0.0211	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0346	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0342	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0293	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0396	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00549	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00536	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00409	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00410	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0161	0.0040	0.0015	ug/l	EPA 537M BY ID
FA59818-12	**VERLINDEN-MH-2_112918**					
Perfluorobutanoic acid		0.0203	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0292	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0299	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0284	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0485	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00621	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00378 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00358 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00239 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0227	0.0040	0.0015	ug/l	EPA 537M BY ID
PFOSA		0.00225 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-13	**VERLINDEN-MH-3_112918**					
Perfluorobutanoic acid		0.0168	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0267	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0244	0.0040	0.0010	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA59818
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 11/28/18 thru 11/30/18

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluoroheptanoic acid		0.0223	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0384	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00447	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00255 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00548	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00244 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0174	0.0040	0.0015	ug/l	EPA 537M BY ID
PFOSA		0.00154 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-14	**VERLINDEN-MH-4_112918**					
Perfluorobutanoic acid		0.0178	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0268	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0252	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0211	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0403	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00446	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00310 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00617	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00303 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0182	0.0040	0.0015	ug/l	EPA 537M BY ID
PFOSA		0.00155 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-15	**DUP-03_112918**					
Perfluorobutanoic acid		0.0199	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0284	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0279	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0255	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0449	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00506	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00272 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00514	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00321 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0206	0.0040	0.0015	ug/l	EPA 537M BY ID
PFOSA		0.00173 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-16	**VERLINDEN-MH-1_112918**					
Perfluorobutanoic acid [a]		0.0263	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0293	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0319	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0327	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0487	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00623	0.0040	0.0010	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA59818
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 11/28/18 thru 11/30/18

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluorodecanoic acid		0.00618	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00470	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00182 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0188	0.0040	0.0015	ug/l	EPA 537M BY ID
PFOSA		0.00270 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-17	**OSBORN-MH-1_112918**					
Perfluorobutanoic acid		0.0219	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0282	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0264	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0270	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0532	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00811	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00775	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00278 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00186 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0470	0.0040	0.0015	ug/l	EPA 537M BY ID
PFOSA		0.00339 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-18	**SB-P6-QA336_13-18**					
Perfluorobutanoic acid		0.00546 J	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00671	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00591	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00343 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00981	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00281 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00477	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00265 J	0.0040	0.0015	ug/l	EPA 537M BY ID
FA59818-19	**SB-P6-QA336_30-35**					
Perfluorobutanoic acid		0.00835 J	0.020	0.0050	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0101	0.010	0.0038	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00678 J	0.010	0.0025	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00476 J	0.010	0.0025	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0111	0.010	0.0025	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00292 J	0.010	0.0025	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00286 J	0.010	0.0025	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00393 J	0.010	0.0038	ug/l	EPA 537M BY ID
FA59818-20	**SB-P6-NS335_11-16**					
Perfluorobutanesulfonic acid		0.00211 J	0.0040	0.0010	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA59818
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 11/28/18 thru 11/30/18

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluorohexanesulfonic acid		0.00118 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-21	**DUP-04_112918**					
Perfluorobutanesulfonic acid		0.00239 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00147 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-22	**SB-P6-MK335_28-33**					
Perfluorooctanoic acid		0.00109 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-23	**SB-P6-MK335_9-14**					
Perfluoropentanoic acid		0.00155 J	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00113 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA59818-24	**SB-P6-QH240_15-20**					
Perfluorobutanoic acid		0.0193	0.015	0.0038	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0209	0.0077	0.0029	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0211	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0247	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0776	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00994	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00785	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.105	0.0077	0.0029	ug/l	EPA 537M BY ID
PFOSA		0.00824	0.0077	0.0019	ug/l	EPA 537M BY ID
FA59818-25	**SB-P6-QT226_13-18**					
Perfluorobutanoic acid		0.0202	0.017	0.0042	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0306	0.0083	0.0031	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0218	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00912	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0122	0.0083	0.0021	ug/l	EPA 537M BY ID
FA59818-26	**SB-P6-RH241_13-18**					
Perfluorobutanoic acid		0.0486	0.017	0.0042	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.108	0.0083	0.0031	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.107	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0793	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.253	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.0181	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00270 J	0.0083	0.0021	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA59818
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 11/28/18 thru 11/30/18

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluorohexanesulfonic acid		0.00449 J	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0169	0.0083	0.0031	ug/l	EPA 537M BY ID
FA59818-27	**SB-P6-QT239_15-20**					
Perfluorobutanoic acid		0.100	0.017	0.0042	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.368	0.0083	0.0031	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.350	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.332	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.449	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.0996	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.0441	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluoroundecanoic acid		0.00294 J	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00260 J	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0391	0.0083	0.0031	ug/l	EPA 537M BY ID
FA59818-28	**SB-P6-MQ289_27-32**					
Perfluorobutanoic acid		0.0154 J	0.017	0.0042	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0195	0.0083	0.0031	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0302	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0126	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0288	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00802 J	0.0083	0.0031	ug/l	EPA 537M BY ID
FA59818-29	**EB-02_113018**					

No hits reported in this sample.

(a) Associated ID Standard outside control limits.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	SB-P6-MF321_15-20		
Lab Sample ID:	FA59818-1	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24787.D	1	12/10/18 14:21	NG	12/06/18 10:00	OP72913	S2Q385
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00617	0.0080	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00536	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00557	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00427	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0142	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00138	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00154	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00297	0.0040	0.0015	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-MF321_15-20		
Lab Sample ID:	FA59818-1	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	85%		30-140%
	13C5-PFPeA	92%		40-140%
	13C5-PFHxA	95%		50-150%
	13C4-PFHpA	96%		50-150%
	13C8-PFOA	106%		50-150%
	13C9-PFNA	110%		50-150%
	13C6-PFDA	123%		50-150%
	13C7-PFUnDA	103%		50-150%
	13C2-PFDoDA	84%		50-150%
	13C2-PFTeDA	96%		40-150%
	13C3-PFBS	85%		50-150%
	13C3-PFHxS	89%		50-150%
	13C8-PFOS	98%		50-150%
	13C8-FOSA	108%		30-140%
	d3-MeFOSAA	104%		50-150%
	13C2-4:2FTS	92%		50-150%
	13C2-6:2FTS	100%		50-150%
	13C2-8:2FTS	128%		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:	SB-P6-MF311_20-25		
Lab Sample ID:	FA59818-2	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24741.D	1	12/08/18 13:03	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0251	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0491	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0372	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0133	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00725	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
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	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-MF311_20-25		
Lab Sample ID:	FA59818-2	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	80%		30-140%
	13C5-PFPeA	81%		40-140%
	13C5-PFHxA	83%		50-150%
	13C4-PFHpA	88%		50-150%
	13C8-PFOA	97%		50-150%
	13C9-PFNA	89%		50-150%
	13C6-PFDA	81%		50-150%
	13C7-PFUnDA	66%		50-150%
	13C2-PFDoDA	60%		50-150%
	13C2-PFTeDA	66%		40-150%
	13C3-PFBS	81%		50-150%
	13C3-PFHxS	86%		50-150%
	13C8-PFOS	84%		50-150%
	13C8-FOSA	109%		30-140%
	d3-MeFOSAA	92%		50-150%
	13C2-4:2FTS	85%		50-150%
	13C2-6:2FTS	98%		50-150%
	13C2-8:2FTS	84%		50-150%

(a) Associated BS recovery 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:	DUP-02_112818		
Lab Sample ID:	FA59818-3	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24742.D	1	12/08/18 13:19	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0247	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0480	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0365	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0130	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00624	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
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	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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-02_112818		
Lab Sample ID:	FA59818-3	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	76%		30-140%
	13C5-PFPeA	77%		40-140%
	13C5-PFHxA	79%		50-150%
	13C4-PFHpA	84%		50-150%
	13C8-PFOA	90%		50-150%
	13C9-PFNA	88%		50-150%
	13C6-PFDA	86%		50-150%
	13C7-PFUnDA	73%		50-150%
	13C2-PFDoDA	67%		50-150%
	13C2-PFTeDA	71%		40-150%
	13C3-PFBS	78%		50-150%
	13C3-PFHxS	81%		50-150%
	13C8-PFOS	85%		50-150%
	13C8-FOSA	112%		30-140%
	d3-MeFOSAA	100%		50-150%
	13C2-4:2FTS	81%		50-150%
	13C2-6:2FTS	93%		50-150%
	13C2-8:2FTS	89%		50-150%

(a) Associated BS recovery 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:	SB-P6-MF311_8-13		
Lab Sample ID:	FA59818-4	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24743.D	1	12/08/18 13:36	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

	Initial Volume	Final Volume
Run #1	240 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0233	0.0083	0.0021	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0533	0.0042	0.0016	ug/l	
307-24-4	Perfluorohexanoic acid	0.0476	0.0042	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0200	0.0042	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0114	0.0042	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0042	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0042	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0042	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0042	0.0016	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0042	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0042	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00123	0.0042	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0042	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00121	0.0042	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0042	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00301	0.0042	0.0016	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0042	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0042	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0042	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.021	0.0042	ug/l	
2991-50-6	EtFOSAA	ND	0.021	0.0042	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0083	0.0021	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0083	0.0021	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:	SB-P6-MF311_8-13		
Lab Sample ID:	FA59818-4	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0083	0.0021	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	87%		30-140%
	13C5-PFPeA	88%		40-140%
	13C5-PFHxA	91%		50-150%
	13C4-PFHpA	97%		50-150%
	13C8-PFOA	101%		50-150%
	13C9-PFNA	99%		50-150%
	13C6-PFDA	94%		50-150%
	13C7-PFUnDA	83%		50-150%
	13C2-PFDoDA	74%		50-150%
	13C2-PFTeDA	80%		40-150%
	13C3-PFBS	88%		50-150%
	13C3-PFHxS	93%		50-150%
	13C8-PFOS	95%		50-150%
	13C8-FOSA	125%		30-140%
	d3-MeFOSAA	112%		50-150%
	13C2-4:2FTS	93%		50-150%
	13C2-6:2FTS	104%		50-150%
	13C2-8:2FTS	99%		50-150%

(a) Associated BS recovery 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:	SB-P6-MF301_20-25		
Lab Sample ID:	FA59818-5	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24744.D	1	12/08/18 13:52	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0117	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0117	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00715	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00183	0.0040	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00161	0.0040	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
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	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-MF301_20-25		
Lab Sample ID:	FA59818-5	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	82%		30-140%
	13C5-PFPeA	84%		40-140%
	13C5-PFHxA	88%		50-150%
	13C4-PFHpA	92%		50-150%
	13C8-PFOA	98%		50-150%
	13C9-PFNA	97%		50-150%
	13C6-PFDA	91%		50-150%
	13C7-PFUnDA	75%		50-150%
	13C2-PFDoDA	66%		50-150%
	13C2-PFTeDA	72%		40-150%
	13C3-PFBS	83%		50-150%
	13C3-PFHxS	89%		50-150%
	13C8-PFOS	91%		50-150%
	13C8-FOSA	118%		30-140%
	d3-MeFOSAA	110%		50-150%
	13C2-4:2FTS	88%		50-150%
	13C2-6:2FTS	102%		50-150%
	13C2-8:2FTS	95%		50-150%

(a) Associated BS recovery 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:	SB-P6-MF301_3-8		
Lab Sample ID:	FA59818-6	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24747.D	1	12/08/18 14:41	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0183	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0203	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0217	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0141	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0238	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00133	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00178	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00103	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00408	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-MF301_3-8		
Lab Sample ID:	FA59818-6	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	87%		30-140%
	13C5-PFPeA	89%		40-140%
	13C5-PFHxA	92%		50-150%
	13C4-PFHpA	97%		50-150%
	13C8-PFOA	102%		50-150%
	13C9-PFNA	105%		50-150%
	13C6-PFDA	100%		50-150%
	13C7-PFUnDA	83%		50-150%
	13C2-PFDoDA	71%		50-150%
	13C2-PFTeDA	73%		40-150%
	13C3-PFBS	88%		50-150%
	13C3-PFHxS	94%		50-150%
	13C8-PFOS	95%		50-150%
	13C8-FOSA	123%		30-140%
	d3-MeFOSAA	110%		50-150%
	13C2-4:2FTS	94%		50-150%
	13C2-6:2FTS	106%		50-150%
	13C2-8:2FTS	101%		50-150%

(a) Associated BS recovery 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:	SB-P6-MF293_20-25		
Lab Sample ID:	FA59818-7	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24750.D	1	12/08/18 15:29	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0200	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0341	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0410	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0165	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0415	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00140	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00203	0.0040	0.0010	ug/l	J
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	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-MF293_20-25		
Lab Sample ID:	FA59818-7	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	85%		30-140%
	13C5-PFPeA	89%		40-140%
	13C5-PFHxA	91%		50-150%
	13C4-PFHpA	99%		50-150%
	13C8-PFOA	102%		50-150%
	13C9-PFNA	105%		50-150%
	13C6-PFDA	106%		50-150%
	13C7-PFUnDA	90%		50-150%
	13C2-PFDoDA	73%		50-150%
	13C2-PFTeDA	76%		40-150%
	13C3-PFBS	88%		50-150%
	13C3-PFHxS	94%		50-150%
	13C8-PFOS	101%		50-150%
	13C8-FOSA	128%		30-140%
	d3-MeFOSAA	118%		50-150%
	13C2-4:2FTS	93%		50-150%
	13C2-6:2FTS	108%		50-150%
	13C2-8:2FTS	106%		50-150%

(a) Associated BS recovery 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:	SB-P6-MF293_3-8		
Lab Sample ID:	FA59818-8	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24751.D	1	12/08/18 15:45	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0199	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0315	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0381	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0157	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0504	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00264	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00223	0.0040	0.0010	ug/l	J
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	0.00462	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-MF293_3-8		
Lab Sample ID:	FA59818-8	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	78%		30-140%
	13C5-PFPeA	81%		40-140%
	13C5-PFHxA	85%		50-150%
	13C4-PFHpA	91%		50-150%
	13C8-PFOA	98%		50-150%
	13C9-PFNA	101%		50-150%
	13C6-PFDA	98%		50-150%
	13C7-PFUnDA	87%		50-150%
	13C2-PFDoDA	71%		50-150%
	13C2-PFTeDA	69%		40-150%
	13C3-PFBS	82%		50-150%
	13C3-PFHxS	88%		50-150%
	13C8-PFOS	91%		50-150%
	13C8-FOSA	119%		30-140%
	d3-MeFOSAA	108%		50-150%
	13C2-4:2FTS	88%		50-150%
	13C2-6:2FTS	102%		50-150%
	13C2-8:2FTS	99%		50-150%

(a) Associated BS recovery 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:	SB-P6-OS335_18.5-23.5		
Lab Sample ID:	FA59818-9	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24752.D	1	12/08/18 16:02	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00705	0.0080	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00651	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00579	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00283	0.0040	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00731	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00154	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00112	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00841	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-OS335_18.5-23.5		
Lab Sample ID:	FA59818-9	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	91%		30-140%
	13C5-PFPeA	92%		40-140%
	13C5-PFHxA	95%		50-150%
	13C4-PFHpA	100%		50-150%
	13C8-PFOA	108%		50-150%
	13C9-PFNA	102%		50-150%
	13C6-PFDA	89%		50-150%
	13C7-PFUnDA	67%		50-150%
	13C2-PFDoDA	55%		50-150%
	13C2-PFTeDA	58%		40-150%
	13C3-PFBS	92%		50-150%
	13C3-PFHxS	95%		50-150%
	13C8-PFOS	90%		50-150%
	13C8-FOSA	122%		30-140%
	d3-MeFOSAA	95%		50-150%
	13C2-4:2FTS	97%		50-150%
	13C2-6:2FTS	109%		50-150%
	13C2-8:2FTS	94%		50-150%

(a) Associated BS recovery 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:	SB-P6-OH322_10-15		
Lab Sample ID:	FA59818-10	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24753.D	1	12/08/18 16:18	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0276	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0500	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0467	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0460	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0688	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00720	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00332	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00488	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00554	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0195	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-OH322_10-15		
Lab Sample ID:	FA59818-10	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	68%		30-140%
	13C5-PFPeA	73%		40-140%
	13C5-PFHxA	73%		50-150%
	13C4-PFHpA	78%		50-150%
	13C8-PFOA	87%		50-150%
	13C9-PFNA	91%		50-150%
	13C6-PFDA	88%		50-150%
	13C7-PFUnDA	81%		50-150%
	13C2-PFDoDA	63%		50-150%
	13C2-PFTeDA	66%		40-150%
	13C3-PFBS	76%		50-150%
	13C3-PFHxS	80%		50-150%
	13C8-PFOS	85%		50-150%
	13C8-FOSA	59%		30-140%
	d3-MeFOSAA	104%		50-150%
	13C2-4:2FTS	87%		50-150%
	13C2-6:2FTS	97%		50-150%
	13C2-8:2FTS	90%		50-150%

(a) Associated BS recovery 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:	SB-P6-OH322_15-20		
Lab Sample ID:	FA59818-11	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24754.D	1	12/08/18 16:34	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0211	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0346	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0342	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0293	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0396	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00549	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00536	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00409	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00410	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0161	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-OH322_15-20		
Lab Sample ID:	FA59818-11	**Date Sampled:**	11/28/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	69%		30-140%
	13C5-PFPeA	74%		40-140%
	13C5-PFHxA	75%		50-150%
	13C4-PFHpA	79%		50-150%
	13C8-PFOA	87%		50-150%
	13C9-PFNA	93%		50-150%
	13C6-PFDA	89%		50-150%
	13C7-PFUnDA	77%		50-150%
	13C2-PFDoDA	67%		50-150%
	13C2-PFTeDA	61%		40-150%
	13C3-PFBS	75%		50-150%
	13C3-PFHxS	81%		50-150%
	13C8-PFOS	84%		50-150%
	13C8-FOSA	67%		30-140%
	d3-MeFOSAA	97%		50-150%
	13C2-4:2FTS	87%		50-150%
	13C2-6:2FTS	97%		50-150%
	13C2-8:2FTS	89%		50-150%

(a) Associated BS recovery 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:	VERLINDEN-MH-2_112918		
Lab Sample ID:	FA59818-12	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24755.D	1	12/08/18 16:50	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0203	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0292	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0299	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0284	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0485	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00621	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00378	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00358	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00239	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0227	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.00225	0.0040	0.0010	ug/l	J
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	VERLINDEN-MH-2_112918		
Lab Sample ID:	FA59818-12	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	80%		30-140%
	13C5-PFPeA	83%		40-140%
	13C5-PFHxA	83%		50-150%
	13C4-PFHpA	87%		50-150%
	13C8-PFOA	94%		50-150%
	13C9-PFNA	95%		50-150%
	13C6-PFDA	97%		50-150%
	13C7-PFUnDA	80%		50-150%
	13C2-PFDoDA	80%		50-150%
	13C2-PFTeDA	85%		40-150%
	13C3-PFBS	82%		50-150%
	13C3-PFHxS	85%		50-150%
	13C8-PFOS	91%		50-150%
	13C8-FOSA	71%		30-140%
	d3-MeFOSAA	121%		50-150%
	13C2-4:2FTS	92%		50-150%
	13C2-6:2FTS	102%		50-150%
	13C2-8:2FTS	97%		50-150%

(a) Associated BS recovery 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:	VERLINDEN-MH-3_112918		
Lab Sample ID:	FA59818-13	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24756.D	1	12/08/18 17:07	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0168	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0267	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0244	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0223	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0384	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00447	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00255	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00548	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00244	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0174	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.00154	0.0040	0.0010	ug/l	J
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	VERLINDEN-MH-3_112918		
Lab Sample ID:	FA59818-13	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	83%		30-140%
	13C5-PFPeA	85%		40-140%
	13C5-PFHxA	86%		50-150%
	13C4-PFHpA	89%		50-150%
	13C8-PFOA	94%		50-150%
	13C9-PFNA	97%		50-150%
	13C6-PFDA	92%		50-150%
	13C7-PFUnDA	73%		50-150%
	13C2-PFDoDA	63%		50-150%
	13C2-PFTeDA	69%		40-150%
	13C3-PFBS	85%		50-150%
	13C3-PFHxS	86%		50-150%
	13C8-PFOS	88%		50-150%
	13C8-FOSA	78%		30-140%
	d3-MeFOSAA	104%		50-150%
	13C2-4:2FTS	92%		50-150%
	13C2-6:2FTS	102%		50-150%
	13C2-8:2FTS	92%		50-150%

(a) Associated BS recovery 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:	VERLINDEN-MH-4_112918		
Lab Sample ID:	FA59818-14	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24788.D	1	12/10/18 14:36	NG	12/06/18 10:00	OP72913	S2Q385
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0178	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0268	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0252	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0211	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0403	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00446	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00310	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00617	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00303	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0182	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.00155	0.0040	0.0010	ug/l	J
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	VERLINDEN-MH-4_112918		
Lab Sample ID:	FA59818-14	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	90%		30-140%
	13C5-PFPeA	97%		40-140%
	13C5-PFHxA	101%		50-150%
	13C4-PFHpA	105%		50-150%
	13C8-PFOA	116%		50-150%
	13C9-PFNA	123%		50-150%
	13C6-PFDA	113%		50-150%
	13C7-PFUnDA	90%		50-150%
	13C2-PFDoDA	71%		50-150%
	13C2-PFTeDA	62%		40-150%
	13C3-PFBS	90%		50-150%
	13C3-PFHxS	93%		50-150%
	13C8-PFOS	102%		50-150%
	13C8-FOSA	114%		30-140%
	d3-MeFOSAA	86%		50-150%
	13C2-4:2FTS	99%		50-150%
	13C2-6:2FTS	116%		50-150%
	13C2-8:2FTS	112%		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-03_112918		
Lab Sample ID:	FA59818-15	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24989.D	1	12/13/18 15:52	NAF	12/12/18 11:00	OP73004	S2Q388
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0199	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0284	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0279	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0255	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0449	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00506	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00272	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00514	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00321	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0206	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.00173	0.0040	0.0010	ug/l	J
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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-03_112918		
Lab Sample ID:	FA59818-15	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	78%		30-140%
	13C5-PFPeA	75%		40-140%
	13C5-PFHxA	79%		50-150%
	13C4-PFHpA	84%		50-150%
	13C8-PFOA	98%		50-150%
	13C9-PFNA	99%		50-150%
	13C6-PFDA	100%		50-150%
	13C7-PFUnDA	94%		50-150%
	13C2-PFDoDA	90%		50-150%
	13C2-PFTeDA	90%		40-150%
	13C3-PFBS	76%		50-150%
	13C3-PFHxS	81%		50-150%
	13C8-PFOS	83%		50-150%
	13C8-FOSA	60%		30-140%
	d3-MeFOSAA	93%		50-150%
	13C2-4:2FTS	78%		50-150%
	13C2-6:2FTS	102%		50-150%
	13C2-8:2FTS	110%		50-150%

(a) Associated BS recovery outside DOD QSM 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:	VERLINDEN-MH-1_112918		
Lab Sample ID:	FA59818-16	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24759.D	1	12/08/18 17:55	NG	12/06/18 10:00	OP72913	S2Q384
Run #2 [a]	2Q24990.D	1	12/13/18 16:08	NAF	12/12/18 11:00	OP73004	S2Q388

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid [b]	0.0263	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0293	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0319	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0327	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0487	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00623	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00618	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00470	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00182	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0188	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [c]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.00270	0.0040	0.0010	ug/l	J
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	VERLINDEN-MH-1_112918		
Lab Sample ID:	FA59818-16	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	29% e	23% d	30-140%
	13C5-PFPeA	72%	70%	40-140%
	13C5-PFHxA	70%	70%	50-150%
	13C4-PFHpA	75%	74%	50-150%
	13C8-PFOA	79%	99%	50-150%
	13C9-PFNA	83%	91%	50-150%
	13C6-PFDA	72%	83%	50-150%
	13C7-PFUnDA	56%	101%	50-150%
	13C2-PFDoDA	54%	94%	50-150%
	13C2-PFTeDA	58%	30% d	40-150%
	13C3-PFBS	72%	71%	50-150%
	13C3-PFHxS	73%	73%	50-150%
	13C8-PFOS	72%	70%	50-150%
	13C8-FOSA	50%	30%	30-140%
	d3-MeFOSAA	96%	75%	50-150%
	13C2-4:2FTS	81%	73%	50-150%
	13C2-6:2FTS	91%	124%	50-150%
	13C2-8:2FTS	75%	87%	50-150%

(a) Confirmation run for internal standard areas.
(b) Associated ID Standard outside control limits.
(c) Associated BS recovery outside control limits.
(d) Outside control limits.
(e) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

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:	OSBORN-MH-1_112918		
Lab Sample ID:	FA59818-17	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24762.D	1	12/08/18 18:44	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0219	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0282	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0264	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0270	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0532	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00811	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00775	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00278	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00186	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0470	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.00339	0.0040	0.0010	ug/l	J
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	OSBORN-MH-1_112918		
Lab Sample ID:	FA59818-17	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	79%		30-140%
	13C5-PFPeA	83%		40-140%
	13C5-PFHxA	84%		50-150%
	13C4-PFHpA	87%		50-150%
	13C8-PFOA	91%		50-150%
	13C9-PFNA	95%		50-150%
	13C6-PFDA	90%		50-150%
	13C7-PFUnDA	69%		50-150%
	13C2-PFDoDA	59%		50-150%
	13C2-PFTeDA	62%		40-150%
	13C3-PFBS	83%		50-150%
	13C3-PFHxS	87%		50-150%
	13C8-PFOS	85%		50-150%
	13C8-FOSA	68%		30-140%
	d3-MeFOSAA	110%		50-150%
	13C2-4:2FTS	94%		50-150%
	13C2-6:2FTS	102%		50-150%
	13C2-8:2FTS	91%		50-150%

(a) Associated BS recovery 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:	SB-P6-QA336_13-18		
Lab Sample ID:	FA59818-18	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24763.D	1	12/08/18 19:00	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00546	0.0080	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00671	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00591	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00343	0.0040	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00981	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00281	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00477	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00265	0.0040	0.0015	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-QA336_13-18		
Lab Sample ID:	FA59818-18	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	84%		30-140%
	13C5-PFPeA	85%		40-140%
	13C5-PFHxA	88%		50-150%
	13C4-PFHpA	93%		50-150%
	13C8-PFOA	96%		50-150%
	13C9-PFNA	95%		50-150%
	13C6-PFDA	94%		50-150%
	13C7-PFUnDA	82%		50-150%
	13C2-PFDoDA	70%		50-150%
	13C2-PFTeDA	76%		40-150%
	13C3-PFBS	85%		50-150%
	13C3-PFHxS	90%		50-150%
	13C8-PFOS	93%		50-150%
	13C8-FOSA	115%		30-140%
	d3-MeFOSAA	114%		50-150%
	13C2-4:2FTS	90%		50-150%
	13C2-6:2FTS	101%		50-150%
	13C2-8:2FTS	97%		50-150%

(a) Associated BS recovery 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:	SB-P6-QA336_30-35		
Lab Sample ID:	FA59818-19	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24764.D	1	12/08/18 19:16	NG	12/06/18 10:00	OP72913	S2Q384
Run #2							

	Initial Volume	Final Volume
Run #1	100 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00835	0.020	0.0050	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.0101	0.010	0.0038	ug/l	
307-24-4	Perfluorohexanoic acid	0.00678	0.010	0.0025	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00476	0.010	0.0025	ug/l	J
335-67-1	Perfluorooctanoic acid	0.0111	0.010	0.0025	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.010	0.0025	ug/l	
335-76-2	Perfluorodecanoic acid	0.00292	0.010	0.0025	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.010	0.0025	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.010	0.0038	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.010	0.0025	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.010	0.0025	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	ND	0.010	0.0025	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.010	0.0025	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00286	0.010	0.0025	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.010	0.0025	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00393	0.010	0.0038	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.010	0.0025	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.010	0.0025	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.010	0.0025	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.050	0.010	ug/l	
2991-50-6	EtFOSAA	ND	0.050	0.010	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.020	0.0050	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.020	0.0050	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:	SB-P6-QA336_30-35		
Lab Sample ID:	FA59818-19	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.020	0.0050	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	90%		30-140%
	13C5-PFPeA	89%		40-140%
	13C5-PFHxA	91%		50-150%
	13C4-PFHpA	94%		50-150%
	13C8-PFOA	99%		50-150%
	13C9-PFNA	98%		50-150%
	13C6-PFDA	94%		50-150%
	13C7-PFUnDA	74%		50-150%
	13C2-PFDoDA	62%		50-150%
	13C2-PFTeDA	71%		40-150%
	13C3-PFBS	89%		50-150%
	13C3-PFHxS	92%		50-150%
	13C8-PFOS	89%		50-150%
	13C8-FOSA	124%		30-140%
	d3-MeFOSAA	104%		50-150%
	13C2-4:2FTS	94%		50-150%
	13C2-6:2FTS	98%		50-150%
	13C2-8:2FTS	97%		50-150%

(a) Associated BS recovery 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:	SB-P6-NS335_11-16		
Lab Sample ID:	FA59818-20	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24713.D	1	12/08/18 05:29	NG	12/05/18 10:00	OP72896	S2Q384
Run #2 [a]	2Q24991.D	1	12/13/18 16:24	NAF	12/12/18 11:00	OP73004	S2Q388

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid [b]	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid [b]	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00211	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00118	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [c]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-NS335_11-16		
Lab Sample ID:	FA59818-20	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	72%	71%	30-140%
	13C5-PFPeA	73%	68%	40-140%
	13C5-PFHxA	77%	77%	50-150%
	13C4-PFHpA	81%	84%	50-150%
	13C8-PFOA	86%	103%	50-150%
	13C9-PFNA	88%	106%	50-150%
	13C6-PFDA	73%	84%	50-150%
	13C7-PFUnDA	59%	92%	50-150%
	13C2-PFDoDA	51%	82%	50-150%
	13C2-PFTeDA	30% e	32% d	40-150%
	13C3-PFBS	74%	68%	50-150%
	13C3-PFHxS	78%	77%	50-150%
	13C8-PFOS	69%	73%	50-150%
	13C8-FOSA	94%	78%	30-140%
	d3-MeFOSAA	78%	66%	50-150%
	13C2-4:2FTS	80%	68%	50-150%
	13C2-6:2FTS	113%	184% d	50-150%
	13C2-8:2FTS	78%	101%	50-150%

(a) Confirmation run for internal standard areas.
(b) Associated ID Standard outside control limits.
(c) Associated BS recovery outside control limits.
(d) Outside control limits.
(e) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

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-04_112918		
Lab Sample ID:	FA59818-21	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24992.D	1	12/13/18 16:39	NAF	12/12/18 11:00	OP73004	S2Q388
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00239	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00147	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate [b]	ND	0.0080	0.0020	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:	DUP-04_112918		
Lab Sample ID:	FA59818-21	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	74%		30-140%
	13C5-PFPeA	73%		40-140%
	13C5-PFHxA	81%		50-150%
	13C4-PFHpA	88%		50-150%
	13C8-PFOA	113%		50-150%
	13C9-PFNA	112%		50-150%
	13C6-PFDA	96%		50-150%
	13C7-PFUnDA	105%		50-150%
	13C2-PFDoDA	90%		50-150%
	13C2-PFTeDA	40%		40-150%
	13C3-PFBS	76%		50-150%
	13C3-PFHxS	85%		50-150%
	13C8-PFOS	81%		50-150%
	13C8-FOSA	88%		30-140%
	d3-MeFOSAA	71%		50-150%
	13C2-4:2FTS	74%		50-150%
	13C2-6:2FTS	181% [c]		50-150%
	13C2-8:2FTS	107%		50-150%

(a) Associated BS recovery outside DOD QSM control limits.
(b) Associated ID Standard outside control limits high, however sample is ND.
(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:	SB-P6-MK335_28-33		
Lab Sample ID:	FA59818-22	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24715.D	1	12/08/18 06:01	NG	12/05/18 10:00	OP72896	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00109	0.0040	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
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	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-MK335_28-33		
Lab Sample ID:	FA59818-22	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	90%		30-140%
	13C5-PFPeA	92%		40-140%
	13C5-PFHxA	92%		50-150%
	13C4-PFHpA	91%		50-150%
	13C8-PFOA	87%		50-150%
	13C9-PFNA	81%		50-150%
	13C6-PFDA	69%		50-150%
	13C7-PFUnDA	62%		50-150%
	13C2-PFDoDA	60%		50-150%
	13C2-PFTeDA	69%		40-150%
	13C3-PFBS	89%		50-150%
	13C3-PFHxS	82%		50-150%
	13C8-PFOS	64%		50-150%
	13C8-FOSA	84%		30-140%
	d3-MeFOSAA	84%		50-150%
	13C2-4:2FTS	95%		50-150%
	13C2-6:2FTS	86%		50-150%
	13C2-8:2FTS	72%		50-150%

(a) Associated BS recovery 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:	SB-P6-MK335_9-14		
Lab Sample ID:	FA59818-23	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24716.D	1	12/08/18 06:17	NG	12/05/18 10:00	OP72896	S2Q384
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.00155	0.0040	0.0015	ug/l	J
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	0.00113	0.0040	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
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	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	SB-P6-MK335_9-14		
Lab Sample ID:	FA59818-23	**Date Sampled:**	11/29/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	87%		30-140%
	13C5-PFPeA	91%		40-140%
	13C5-PFHxA	94%		50-150%
	13C4-PFHpA	96%		50-150%
	13C8-PFOA	98%		50-150%
	13C9-PFNA	98%		50-150%
	13C6-PFDA	86%		50-150%
	13C7-PFUnDA	73%		50-150%
	13C2-PFDoDA	65%		50-150%
	13C2-PFTeDA	46%		40-150%
	13C3-PFBS	91%		50-150%
	13C3-PFHxS	84%		50-150%
	13C8-PFOS	85%		50-150%
	13C8-FOSA	121%		30-140%
	d3-MeFOSAA	98%		50-150%
	13C2-4:2FTS	97%		50-150%
	13C2-6:2FTS	117%		50-150%
	13C2-8:2FTS	94%		50-150%

(a) Associated BS recovery 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:	SB-P6-QH240_15-20		
Lab Sample ID:	FA59818-24	**Date Sampled:**	11/30/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24993.D	1	12/13/18 16:55	NAF	12/12/18 11:00	OP73004	S2Q388
Run #2							

	Initial Volume	Final Volume
Run #1	130 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0193	0.015	0.0038	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0209	0.0077	0.0029	ug/l	
307-24-4	Perfluorohexanoic acid	0.0211	0.0077	0.0019	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0247	0.0077	0.0019	ug/l	
335-67-1	Perfluorooctanoic acid	0.0776	0.0077	0.0019	ug/l	
375-95-1	Perfluorononanoic acid	0.00994	0.0077	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	0.00785	0.0077	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0077	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0077	0.0029	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0077	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0077	0.0019	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0077	0.0019	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0077	0.0019	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0077	0.0019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0077	0.0019	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.105	0.0077	0.0029	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0077	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0077	0.0019	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.00824	0.0077	0.0019	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.038	0.0077	ug/l	
2991-50-6	EtFOSAA	ND	0.038	0.0077	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.015	0.0038	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:	SB-P6-QH240_15-20		
Lab Sample ID:	FA59818-24	**Date Sampled:**	11/30/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	81%		30-140%
	13C5-PFPeA	76%		40-140%
	13C5-PFHxA	82%		50-150%
	13C4-PFHpA	89%		50-150%
	13C8-PFOA	107%		50-150%
	13C9-PFNA	113%		50-150%
	13C6-PFDA	116%		50-150%
	13C7-PFUnDA	111%		50-150%
	13C2-PFDoDA	100%		50-150%
	13C2-PFTeDA	106%		40-150%
	13C3-PFBS	78%		50-150%
	13C3-PFHxS	88%		50-150%
	13C8-PFOS	97%		50-150%
	13C8-FOSA	97%		30-140%
	d3-MeFOSAA	102%		50-150%
	13C2-4:2FTS	77%		50-150%
	13C2-6:2FTS	114%		50-150%
	13C2-8:2FTS	121%		50-150%

(a) Associated BS recovery outside DOD QSM 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:	SB-P6-QT226_13-18		
Lab Sample ID:	FA59818-25	**Date Sampled:**	11/30/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24720.D	1	12/08/18 07:22	NG	12/05/18 10:00	OP72896	S2Q384
Run #2							

	Initial Volume	Final Volume
Run #1	120 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0202	0.017	0.0042	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0306	0.0083	0.0031	ug/l	
307-24-4	Perfluorohexanoic acid	0.0218	0.0083	0.0021	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00912	0.0083	0.0021	ug/l	
335-67-1	Perfluorooctanoic acid	0.0122	0.0083	0.0021	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0083	0.0021	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0083	0.0021	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0083	0.0021	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0083	0.0031	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0083	0.0021	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0083	0.0021	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0083	0.0021	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0083	0.0021	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0083	0.0021	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0083	0.0021	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0083	0.0031	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0083	0.0021	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0083	0.0021	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0083	0.0021	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.042	0.0083	ug/l	
2991-50-6	EtFOSAA	ND	0.042	0.0083	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.017	0.0042	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:	SB-P6-QT226_13-18		
Lab Sample ID:	FA59818-25	**Date Sampled:**	11/30/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	76%		30-140%
	13C5-PFPeA	75%		40-140%
	13C5-PFHxA	77%		50-150%
	13C4-PFHpA	81%		50-150%
	13C8-PFOA	83%		50-150%
	13C9-PFNA	85%		50-150%
	13C6-PFDA	84%		50-150%
	13C7-PFUnDA	61%		50-150%
	13C2-PFDoDA	51%		50-150%
	13C2-PFTeDA	75%		40-150%
	13C3-PFBS	78%		50-150%
	13C3-PFHxS	80%		50-150%
	13C8-PFOS	83%		50-150%
	13C8-FOSA	82%		30-140%
	d3-MeFOSAA	99%		50-150%
	13C2-4:2FTS	82%		50-150%
	13C2-6:2FTS	89%		50-150%
	13C2-8:2FTS	87%		50-150%

(a) Associated BS recovery 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:	SB-P6-RH241_13-18		
Lab Sample ID:	FA59818-26	**Date Sampled:**	11/30/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24721.D	1	12/08/18 07:38	NG	12/05/18 10:00	OP72896	S2Q384
Run #2							

	Initial Volume	Final Volume
Run #1	120 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0486	0.017	0.0042	ug/l	
2706-90-3	Perfluoropentanoic acid	0.108	0.0083	0.0031	ug/l	
307-24-4	Perfluorohexanoic acid	0.107	0.0083	0.0021	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0793	0.0083	0.0021	ug/l	
335-67-1	Perfluorooctanoic acid	0.253	0.0083	0.0021	ug/l	
375-95-1	Perfluorononanoic acid	0.0181	0.0083	0.0021	ug/l	
335-76-2	Perfluorodecanoic acid	0.00270	0.0083	0.0021	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0083	0.0021	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0083	0.0031	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0083	0.0021	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0083	0.0021	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0083	0.0021	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0083	0.0021	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00449	0.0083	0.0021	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0083	0.0021	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0169	0.0083	0.0031	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0083	0.0021	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0083	0.0021	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0083	0.0021	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.042	0.0083	ug/l	
2991-50-6	EtFOSAA	ND	0.042	0.0083	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.017	0.0042	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:	SB-P6-RH241_13-18		
Lab Sample ID:	FA59818-26	**Date Sampled:**	11/30/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	75%		30-140%
	13C5-PFPeA	76%		40-140%
	13C5-PFHxA	77%		50-150%
	13C4-PFHpA	79%		50-150%
	13C8-PFOA	81%		50-150%
	13C9-PFNA	81%		50-150%
	13C6-PFDA	74%		50-150%
	13C7-PFUnDA	66%		50-150%
	13C2-PFDoDA	59%		50-150%
	13C2-PFTeDA	71%		40-150%
	13C3-PFBS	77%		50-150%
	13C3-PFHxS	76%		50-150%
	13C8-PFOS	70%		50-150%
	13C8-FOSA	59%		30-140%
	d3-MeFOSAA	84%		50-150%
	13C2-4:2FTS	81%		50-150%
	13C2-6:2FTS	87%		50-150%
	13C2-8:2FTS	77%		50-150%

(a) Associated BS recovery 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:	SB-P6-QT239_15-20		
Lab Sample ID:	FA59818-27	**Date Sampled:**	11/30/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24724.D	1	12/08/18 08:27	NG	12/05/18 10:00	OP72896	S2Q384
Run #2							

	Initial Volume	Final Volume
Run #1	120 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.100	0.017	0.0042	ug/l	
2706-90-3	Perfluoropentanoic acid	0.368	0.0083	0.0031	ug/l	
307-24-4	Perfluorohexanoic acid	0.350	0.0083	0.0021	ug/l	
375-85-9	Perfluoroheptanoic acid	0.332	0.0083	0.0021	ug/l	
335-67-1	Perfluorooctanoic acid	0.449	0.0083	0.0021	ug/l	
375-95-1	Perfluorononanoic acid	0.0996	0.0083	0.0021	ug/l	
335-76-2	Perfluorodecanoic acid	0.0441	0.0083	0.0021	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.00294	0.0083	0.0021	ug/l	J
307-55-1	Perfluorododecanoic acid	ND	0.0083	0.0031	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0083	0.0021	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0083	0.0021	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00260	0.0083	0.0021	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0083	0.0021	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0083	0.0021	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0083	0.0021	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0391	0.0083	0.0031	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0083	0.0021	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0083	0.0021	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0083	0.0021	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.042	0.0083	ug/l	
2991-50-6	EtFOSAA	ND	0.042	0.0083	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.017	0.0042	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:	SB-P6-QT239_15-20		
Lab Sample ID:	FA59818-27	**Date Sampled:**	11/30/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	81%		30-140%
	13C5-PFPeA	80%		40-140%
	13C5-PFHxA	82%		50-150%
	13C4-PFHpA	84%		50-150%
	13C8-PFOA	89%		50-150%
	13C9-PFNA	84%		50-150%
	13C6-PFDA	79%		50-150%
	13C7-PFUnDA	64%		50-150%
	13C2-PFDoDA	59%		50-150%
	13C2-PFTeDA	69%		40-150%
	13C3-PFBS	83%		50-150%
	13C3-PFHxS	82%		50-150%
	13C8-PFOS	75%		50-150%
	13C8-FOSA	63%		30-140%
	d3-MeFOSAA	90%		50-150%
	13C2-4:2FTS	87%		50-150%
	13C2-6:2FTS	93%		50-150%
	13C2-8:2FTS	82%		50-150%

(a) Associated BS recovery 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:	SB-P6-MQ289_27-32		
Lab Sample ID:	FA59818-28	**Date Sampled:**	11/30/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
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	2Q24725.D	1	12/08/18 08:43	NG	12/05/18 10:00	OP72896	S2Q384
Run #2							

	Initial Volume	Final Volume
Run #1	120 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0154	0.017	0.0042	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.0195	0.0083	0.0031	ug/l	
307-24-4	Perfluorohexanoic acid	0.0302	0.0083	0.0021	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0126	0.0083	0.0021	ug/l	
335-67-1	Perfluorooctanoic acid	0.0288	0.0083	0.0021	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0083	0.0021	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0083	0.0021	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0083	0.0021	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0083	0.0031	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0083	0.0021	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0083	0.0021	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0083	0.0021	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0083	0.0021	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0083	0.0021	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0083	0.0021	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00802	0.0083	0.0031	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0083	0.0021	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0083	0.0021	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0083	0.0021	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.042	0.0083	ug/l	
2991-50-6	EtFOSAA	ND	0.042	0.0083	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.017	0.0042	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:	SB-P6-MQ289_27-32		
Lab Sample ID:	FA59818-28	**Date Sampled:**	11/30/18
Matrix:	AQ - Ground Water	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	76%		30-140%
	13C5-PFPeA	78%		40-140%
	13C5-PFHxA	78%		50-150%
	13C4-PFHpA	81%		50-150%
	13C8-PFOA	74%		50-150%
	13C9-PFNA	80%		50-150%
	13C6-PFDA	71%		50-150%
	13C7-PFUnDA	60%		50-150%
	13C2-PFDoDA	56%		50-150%
	13C2-PFTeDA	64%		40-150%
	13C3-PFBS	77%		50-150%
	13C3-PFHxS	73%		50-150%
	13C8-PFOS	62%		50-150%
	13C8-FOSA	77%		30-140%
	d3-MeFOSAA	83%		50-150%
	13C2-4:2FTS	81%		50-150%
	13C2-6:2FTS	77%		50-150%
	13C2-8:2FTS	73%		50-150%

(a) Associated BS recovery 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:	EB-02_113018		
Lab Sample ID:	FA59818-29	**Date Sampled:**	11/30/18
Matrix:	AQ - Equipment Blank	**Date Received:**	12/01/18
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	2Q24726.D	1	12/08/18 09:00	NG	12/05/18 10:00	OP72896	S2Q384
Run #2							

	Initial Volume	Final Volume
Run #1	120 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	ND	0.017	0.0042	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0083	0.0031	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0083	0.0021	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0083	0.0021	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0083	0.0021	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0083	0.0021	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0083	0.0021	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0083	0.0021	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0083	0.0031	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0083	0.0021	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0083	0.0021	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0083	0.0021	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0083	0.0021	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0083	0.0021	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0083	0.0021	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0083	0.0031	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0083	0.0021	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0083	0.0021	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0083	0.0021	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.042	0.0083	ug/l	
2991-50-6	EtFOSAA	ND	0.042	0.0083	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.017	0.0042	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-02_113018		
Lab Sample ID:	FA59818-29	**Date Sampled:**	11/30/18
Matrix:	AQ - Equipment Blank	**Date Received:**	12/01/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	84%		30-140%
	13C5-PFPeA	84%		40-140%
	13C5-PFHxA	86%		50-150%
	13C4-PFHpA	85%		50-150%
	13C8-PFOA	88%		50-150%
	13C9-PFNA	84%		50-150%
	13C6-PFDA	78%		50-150%
	13C7-PFUnDA	62%		50-150%
	13C2-PFDoDA	53%		50-150%
	13C2-PFTeDA	54%		40-150%
	13C3-PFBS	84%		50-150%
	13C3-PFHxS	83%		50-150%
	13C8-PFOS	76%		50-150%
	13C8-FOSA	85%		30-140%
	d3-MeFOSAA	90%		50-150%
	13C2-4:2FTS	88%		50-150%
	13C2-6:2FTS	91%		50-150%
	13C2-8:2FTS	84%		50-150%

(a) Associated BS recovery 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

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

FA59818

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

SGS - ORLANDO JOB # : PAGE 1 OF 3

SGS - ORLANDO Quote # | SKIFF #

Client / Reporting Information

Company Name: Arcadis of Michigan, LLC
Address: 300 South Washington Square, Suite 315
City: Lansing State: MI Zip: 48933
Project Contact: Alex Villhauer Email: Alex.Villhauer@arcadis.com
Phone #: 616-780-3277
Sampler(s) Name(s) (Printed)
Sampler 1: Austin Westhuis Sampler 2: Brett Pertunen

Project Information

Project Name: RACER Lansing Plant 6
Street
City Lansing State MI
Project # B006447 9.2018.03100
Fax #
Client Purchase Order # B006447 9.2018.03100

Analytical Information

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	D.I WATER	MEOH	* Michigan 24 PFAS	LAB USE ONLY
1	SB-P6-MF321_15-20	11/20/18	0940	BP	GW	2		2								X	
2	SB-P6-MF311_20-25	11/28/18	1030	BP	GW	2		2								X	
3	Dup-02_112818	11/28/18	—	BP	GW	2		2								X	
4	SB-P6-MF311_8-13	11/28/18	1045	BP	GW	2		2								X	
5	SB-P6-MF301_20-25 MS/MSD	11/28/18	1130	BP	GW	6		6								X	
6	SB-P6-MF301_3-8	11/28/18	1200	BP	GW	2		2								X	
7	SB-P6-MF293_20-25	11/28/18	1245	BP	GW	2		2								X	
8	SB-P6-MF293_3-8	11/28/18	1305	BP	GW	2		2								X	
9	SB-P6-OS335_18.5-23.5	11/28/18	1415	BP	GW	2		2								X	
10	SB-P6-OH322_10-15	11/28/18	1610	BP	GW	2		2								X	
11	SB-P6-OH302_15-20	11/28/18	1645	BP	GW	2		2								X	
12	Verlinden-MH-2_112918	11/29/18	0900	AW	GW	2		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

* PFAS by modified method 537 with isotope dilution for MDEQ 24 Compound list

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler/Affiliation	Date Time:	Received By/Affiliation	Relinquished By/Affiliation	Date Time:	Received By/Affiliation
1 Arcadis	11/30/18 1545	2 FedEx	3 FX		4 12/1/18 1060
5		6	7		8

Lab Use Only: Cooler Temperature (s) Celsius (corrected): 1.2, 3.8

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

ORLD-SMT-0001-03-FORM-COC (1) Rev 031318

FA59818: Chain of Custody
Page 1 of 4

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

FAS9818

SGS - ORLANDO JOB # : PAGE 2 OF 3

SGS - ORLANDO Quote # | SKIFF #

Client / Reporting Information

Company Name: Arcadis of Michigan, LLC
Address: 300 South Washington Square, Suite 315
City: Lansing State: MI Zip: 48933
Project Contact: Alex Villhauer Email: Alex.Villhauer@arcadis.com
Phone #: 616-780-3277
Sampler(s) Name(s) (Printed)
Sampler 1: Austin Westhuis Sampler 2: Brett Pertunen

Project Information

Project Name: RACER Lansing Plant 6
Street
City: Lansing State: MI
Project #: B0064479.2018.03100
Fax #
Client Purchase Order #: B0064479.2018.03100

Analytical Information

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	NACH+ZNAC	DI WATER	MEOH	* Michigan 24 PFAS	LAB USE ONLY
13	Verlinden-MH-3_112918	11/29/18	0825	AW	GW	2		2								X	
14	Verlinden-MH-4_112918	11/29/18	1200	AW	GW	2		2								X	
15	Dup-03_112918	11/29/18	—	AW	GW	2		2								X	
16	Verlinden-MH-1_112918	11/29/18	1245	AW	GW	2		2								X	
17	Osborn-MH-1_112918	11/29/18	1320	AW	GW	2		2								X	
18	SB-P6-QA336_13-18	11/29/18	1420	BP	GW	2		2								X	
19	SB-P6-QA336_30-35	11/29/18	1430	BP	GW	2		2								X	
20	SB-P6-NS335_11-16	11/29/18	1500	BP	GW	2		2								X	
21	Dup-04_112918	11/29/18	—	BP	GW	2		2								X	
22	SB-P6-MK335_28-33	11/29/18	1540	BP	GW	2		2								X	
23	SB-P6-MK335_9-14	11/29/18	1555	BP	GW	2		2								X	
24	SB-P6-QH240_15-20	11/30/18	1000	BP	GW	4		4								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)
- [x] EDD'S

Comments / Remarks

* PFAS by modified method 537 with isotope dilution for MDEQ 24 compound list

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	[signature] Arcadis	11/30/18 1545	2 FedEx	3 FX		4 [signature] 12/1/18 1000
5	Relinquished by/Affiliation	Date Time:	6 Received By/Affiliation	7 Relinquished By/Affiliation	Date Time:	8 Received By/Affiliation

Lab Use Only: Cooler Temperature (s) Celsius (corrected):

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

ORLD-SMT-0001-03-FORM-COC (1) Rev 031318

FA59818

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

SGS - ORLANDO JOB # : FA59818 PAGE 3 OF 3

SGS - ORLANDO Quote # | SKIFF #

Client / Reporting Information

Company Name: Arcadis of Michigan, LLC
Address: 300 South Washington Square, Suite 315
City: Lansing State: MI Zip: 48933
Project Contact: Alex Villhauer Email: Alex.Villhauer@arcadis.com
Phone #: 616-780-3277

Project Information

Project Name: RACER Lansing Plant 6
Street
City: Lansing State: MI
Project #: B0064479.2018.03100
Fax #: B0064479.2018.0300
Client Purchase Order #

Sampler(s) Name(s) (Printed)
Sampler 1: Austin Westhuis Sampler 2: Brett Perkunen

Analytical Information

Michigan 24 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:	MATRIX	TOTAL # OF BOTTLES	CONTAINER INFORMATION OTHER	NONE	HCl	NaOH	HNO3	H2SO4	NAOH+ZNAI	DI WATER	MEOH	LAB USE ONLY
25	SB-P6-GT226_13-18	11/30/18	1035	BP	GW	4		4							X	
26	SB-P6-RH241_13-18 MS/MSD	11/30/18	1115	BP	GW	6		6							X	
27	SB-P6-GT239_15-20	11/30/18	1150	BP	GW	4		4							X	
28	SB-P6-MQ289_27-32	11/30/18	1235	BP	GW	4		4							X	
29	EB-02_113018	11/30/18	1300	BP	GW	2		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)
- [x] EDD'S

Comments / Remarks

*PFAS by modified method 537 with isotope dilution for MBEQ 24 compound list

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	[signature] Arcadis	11/30/18 1545	2 FedEx	3 FX		4 [signature] 12/1/18 1000
	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):

SGS Sample Receipt Summary

Job Number: FA59818 **Client:** ARCAIS OF MICHIGAN **Project:** RACER LANSING PLANT

Date / Time Received: 12/1/2018 10:00:00 AM **Delivery Method:** FX **Airbill #'s:** 1002241174510003281100813921970933

Therm ID: IR 1; **Therm CF:** -0.2; **# of Coolers:** 2

Cooler Temps (Raw Measured) °C: Cooler 1: (1.4); Cooler 2: (4.0);

Cooler Temps (Corrected) °C: Cooler 1: (1.2); Cooler 2: (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: 12/1/2018 10:00:00 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: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72896-MB	2Q24708.D	1	12/08/18	NG	12/05/18	OP72896	S2Q384

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

FA59818-20, FA59818-22, FA59818-23, FA59818-25, FA59818-26, FA59818-27, FA59818-28, FA59818-29

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	92%	30-140%
	13C5-PFPeA	92%	40-140%
	13C5-PFHxA	94%	50-150%
	13C4-PFHpA	94%	50-150%
	13C8-PFOA	96%	50-150%
	13C9-PFNA	93%	50-150%
	13C6-PFDA	86%	50-150%
	13C7-PFUnDA	66%	50-150%

Method Blank Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72896-MB	2Q24708.D	1	12/08/18	NG	12/05/18	OP72896	S2Q384

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

FA59818-20, FA59818-22, FA59818-23, FA59818-25, FA59818-26, FA59818-27, FA59818-28, FA59818-29

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	59%	50-150%
	13C2-PFTeDA	63%	40-150%
	13C3-PFBS	92%	50-150%
	13C3-PFHxS	92%	50-150%
	13C8-PFOS	87%	50-150%
	13C8-FOSA	115%	30-140%
	d3-MeFOSAA	95%	50-150%
	13C2-4:2FTS	96%	50-150%
	13C2-6:2FTS	100%	50-150%
	13C2-8:2FTS	87%	50-150%

Method Blank Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72913-MB	2Q24739.D	1	12/08/18	NG	12/06/18	OP72913	S2Q384

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

FA59818-1, FA59818-2, FA59818-3, FA59818-4, FA59818-5, FA59818-6, FA59818-7, FA59818-8, FA59818-9, FA59818-10, FA59818-11, FA59818-12, FA59818-13, FA59818-14, FA59818-16, FA59818-17, FA59818-18, FA59818-19

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	87%	30-140%
	13C5-PFPeA	86%	40-140%
	13C5-PFHxA	88%	50-150%
	13C4-PFHpA	89%	50-150%
	13C8-PFOA	93%	50-150%
	13C9-PFNA	89%	50-150%
	13C6-PFDA	83%	50-150%
	13C7-PFUnDA	61%	50-150%

Method Blank Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72913-MB	2Q24739.D	1	12/08/18	NG	12/06/18	OP72913	S2Q384

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

FA59818-1, FA59818-2, FA59818-3, FA59818-4, FA59818-5, FA59818-6, FA59818-7, FA59818-8, FA59818-9, FA59818-10, FA59818-11, FA59818-12, FA59818-13, FA59818-14, FA59818-16, FA59818-17, FA59818-18, FA59818-19

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	51%	50-150%
	13C2-PFTeDA	54%	40-150%
	13C3-PFBS	86%	50-150%
	13C3-PFHxS	87%	50-150%
	13C8-PFOS	83%	50-150%
	13C8-FOSA	109%	30-140%
	d3-MeFOSAA	90%	50-150%
	13C2-4:2FTS	91%	50-150%
	13C2-6:2FTS	95%	50-150%
	13C2-8:2FTS	83%	50-150%

Method Blank Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73004-MB	2Q24988.D	1	12/13/18	NAF	12/12/18	OP73004	S2Q388

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

FA59818-15, FA59818-21, FA59818-24

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	92%	30-140%
	13C5-PFPeA	90%	40-140%
	13C5-PFHxA	97%	50-150%
	13C4-PFHpA	96%	50-150%
	13C8-PFOA	108%	50-150%
	13C9-PFNA	100%	50-150%
	13C6-PFDA	102%	50-150%
	13C7-PFUnDA	97%	50-150%

Method Blank Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73004-MB	2Q24988.D	1	12/13/18	NAF	12/12/18	OP73004	S2Q388

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

FA59818-15, FA59818-21, FA59818-24

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	79%	50-150%
	13C2-PFTeDA	71%	40-150%
	13C3-PFBS	93%	50-150%
	13C3-PFHxS	97%	50-150%
	13C8-PFOS	96%	50-150%
	13C8-FOSA	94%	30-140%
	d3-MeFOSAA	88%	50-150%
	13C2-4:2FTS	96%	50-150%
	13C2-6:2FTS	108%	50-150%
	13C2-8:2FTS	100%	50-150%

Instrument Blank

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q384-IBLK	2Q24659.D	1	12/07/18	NG	n/a	n/a	S2Q384

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

FA59818-2, FA59818-3, FA59818-4, FA59818-5, FA59818-6, FA59818-7, FA59818-8, FA59818-9, FA59818-10, FA59818-11, FA59818-12, FA59818-13, FA59818-16, FA59818-17, FA59818-18, FA59818-19, FA59818-20, FA59818-22, FA59818-23, FA59818-25, FA59818-26, FA59818-27, FA59818-28, FA59818-29

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0080	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	96%	50-150%
	13C5-PFPeA	96%	50-150%
	13C5-PFHxA	96%	50-150%
	13C4-PFHpA	97%	50-150%
	13C8-PFOA	95%	50-150%
	13C9-PFNA	94%	50-150%
	13C6-PFDA	95%	50-150%
	13C7-PFUnDA	84%	50-150%

Instrument Blank

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q384-IBLK	2Q24659.D	1	12/07/18	NG	n/a	n/a	S2Q384

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

FA59818-2, FA59818-3, FA59818-4, FA59818-5, FA59818-6, FA59818-7, FA59818-8, FA59818-9, FA59818-10, FA59818-11, FA59818-12, FA59818-13, FA59818-16, FA59818-17, FA59818-18, FA59818-19, FA59818-20, FA59818-22, FA59818-23, FA59818-25, FA59818-26, FA59818-27, FA59818-28, FA59818-29

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	87%	50-150%
	13C2-PFTeDA	93%	50-150%
	13C3-PFBS	99%	50-150%
	13C3-PFHxS	101%	50-150%
	13C8-PFOS	99%	50-150%
	13C8-FOSA	125%	50-150%
	d3-MeFOSAA	113%	50-150%
	13C2-4:2FTS	98%	50-150%
	13C2-6:2FTS	97%	50-150%
	13C2-8:2FTS	93%	50-150%

Instrument Blank

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q385-IBLK	2Q24780.D	1	12/10/18	NG	n/a	n/a	S2Q385

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

FA59818-1, FA59818-14

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0080	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	101%	50-150%
	13C5-PFPeA	100%	50-150%
	13C5-PFHxA	103%	50-150%
	13C4-PFHpA	102%	50-150%
	13C8-PFOA	103%	50-150%
	13C9-PFNA	106%	50-150%
	13C6-PFDA	110%	50-150%
	13C7-PFUnDA	109%	50-150%

Instrument Blank

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q385-IBLK	2Q24780.D	1	12/10/18	NG	n/a	n/a	S2Q385

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

FA59818-1, FA59818-14

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	108%	50-150%
	13C2-PFTeDA	106%	50-150%
	13C3-PFBS	101%	50-150%
	13C3-PFHxS	103%	50-150%
	13C8-PFOS	103%	50-150%
	13C8-FOSA	111%	50-150%
	d3-MeFOSAA	103%	50-150%
	13C2-4:2FTS	95%	50-150%
	13C2-6:2FTS	98%	50-150%
	13C2-8:2FTS	101%	50-150%

Instrument Blank

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q388-IBLK	2Q24965.D	1	12/13/18	NAF	n/a	n/a	S2Q388

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

FA59818-15, FA59818-21, FA59818-24

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0080	0.0020	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	99%	50-150%
	13C5-PFPeA	88%	50-150%
	13C5-PFHxA	88%	50-150%
	13C4-PFHpA	85%	50-150%
	13C8-PFOA	84%	50-150%
	13C9-PFNA	84%	50-150%
	13C6-PFDA	86%	50-150%
	13C7-PFUnDA	85%	50-150%

Instrument Blank

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q388-IBLK	2Q24965.D	1	12/13/18	NAF	n/a	n/a	S2Q388

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

FA59818-15, FA59818-21, FA59818-24

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	79%	50-150%
	13C2-PFTeDA	82%	50-150%
	13C3-PFBS	96%	50-150%
	13C3-PFHxS	99%	50-150%
	13C8-PFOS	96%	50-150%
	13C8-FOSA	91%	50-150%
	d3-MeFOSAA	94%	50-150%
	13C2-4:2FTS	84%	50-150%
	13C2-6:2FTS	90%	50-150%
	13C2-8:2FTS	87%	50-150%

Blank Spike Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72896-BS	2Q24707.D	1	12/08/18	NG	12/05/18	OP72896	S2Q384

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

FA59818-20, FA59818-22, FA59818-23, FA59818-25, FA59818-26, FA59818-27, FA59818-28, FA59818-29

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0742	93	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0752	94	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0673	84	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0746	93	71-130
335-67-1	Perfluorooctanoic acid	0.08	0.0753	94	74-130
375-95-1	Perfluorononanoic acid	0.08	0.0709	89	76-130
335-76-2	Perfluorodecanoic acid	0.08	0.0672	84	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0791	99	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0753	94	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0753	94	70-139
376-06-7	Perfluorotetradecanoic acid	0.08	0.0703	88	70-130
375-73-5	Perfluorobutanesulfonic acid	0.0708	0.0647	91	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.0752	0.0711	95	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0728	0.0642	88	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.076	0.0735	97	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.074	0.0704	95	70-130
68259-12-1	Perfluorononanesulfonic acid	0.0768	0.0640	83	70-130
335-77-3	Perfluorodecanesulfonic acid	0.0772	0.0491	64* [a]	70-130
754-91-6	PFOSA	0.08	0.0760	95	70-131
2355-31-9	MeFOSAA	0.08	0.0757	95	70-130
2991-50-6	EtFOSAA	0.08	0.0742	93	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.0748	0.0739	99	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.076	0.0742	98	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.0768	0.0710	92	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	86%	30-140%
	13C5-PFPeA	87%	40-140%
	13C5-PFHxA	90%	50-150%
	13C4-PFHpA	89%	50-150%
	13C8-PFOA	91%	50-150%
	13C9-PFNA	91%	50-150%
	13C6-PFDA	85%	50-150%
	13C7-PFUnDA	71%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72896-BS	2Q24707.D	1	12/08/18	NG	12/05/18	OP72896	S2Q384

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

FA59818-20, FA59818-22, FA59818-23, FA59818-25, FA59818-26, FA59818-27, FA59818-28, FA59818-29

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	66%	50-150%
	13C2-PFTeDA	71%	40-150%
	13C3-PFBS	88%	50-150%
	13C3-PFHxS	90%	50-150%
	13C8-PFOS	88%	50-150%
	13C8-FOSA	64%	30-140%
	d3-MeFOSAA	101%	50-150%
	13C2-4:2FTS	95%	50-150%
	13C2-6:2FTS	102%	50-150%
	13C2-8:2FTS	94%	50-150%

(a) Sporadic marginal failure.

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72913-BS	2Q24738.D	1	12/08/18	NG	12/06/18	OP72913	S2Q384

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

FA59818-1, FA59818-2, FA59818-3, FA59818-4, FA59818-5, FA59818-6, FA59818-7, FA59818-8, FA59818-9, FA59818-10, FA59818-11, FA59818-12, FA59818-13, FA59818-14, FA59818-16, FA59818-17, FA59818-18, FA59818-19

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0758	95	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0770	96	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0693	87	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0751	94	71-130
335-67-1	Perfluorooctanoic acid	0.08	0.0730	91	74-130
375-95-1	Perfluorononanoic acid	0.08	0.0745	93	76-130
335-76-2	Perfluorodecanoic acid	0.08	0.0716	90	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0791	99	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0770	96	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0787	98	70-139
376-06-7	Perfluorotetradecanoic acid	0.08	0.0710	89	70-130
375-73-5	Perfluorobutanesulfonic acid	0.0708	0.0660	93	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.0752	0.0727	97	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0728	0.0650	89	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.076	0.0751	99	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.074	0.0749	101	70-130
68259-12-1	Perfluorononanesulfonic acid	0.0768	0.0698	91	70-130
335-77-3	Perfluorodecanesulfonic acid	0.0772	0.0507	66* [a]	70-130
754-91-6	PFOSA	0.08	0.0779	97	70-131
2355-31-9	MeFOSAA	0.08	0.0769	96	70-130
2991-50-6	EtFOSAA	0.08	0.0747	93	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.0748	0.0751	100	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.076	0.0762	100	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.0768	0.0732	95	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	90%	30-140%
	13C5-PFPeA	90%	40-140%
	13C5-PFHxA	91%	50-150%
	13C4-PFHpA	92%	50-150%
	13C8-PFOA	95%	50-150%
	13C9-PFNA	92%	50-150%
	13C6-PFDA	86%	50-150%
	13C7-PFUnDA	75%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72913-BS	2Q24738.D	1	12/08/18	NG	12/06/18	OP72913	S2Q384

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

FA59818-1, FA59818-2, FA59818-3, FA59818-4, FA59818-5, FA59818-6, FA59818-7, FA59818-8, FA59818-9, FA59818-10, FA59818-11, FA59818-12, FA59818-13, FA59818-14, FA59818-16, FA59818-17, FA59818-18, FA59818-19

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	59%	50-150%
	13C2-PFTeDA	64%	40-150%
	13C3-PFBS	90%	50-150%
	13C3-PFHxS	90%	50-150%
	13C8-PFOS	90%	50-150%
	13C8-FOSA	111%	30-140%
	d3-MeFOSAA	107%	50-150%
	13C2-4:2FTS	98%	50-150%
	13C2-6:2FTS	102%	50-150%
	13C2-8:2FTS	97%	50-150%

(a) Sporadic marginal failure.

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73004-BS	2Q24987.D	1	12/13/18	NAF	12/12/18	OP73004	S2Q388

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

FA59818-15, FA59818-21, FA59818-24

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0682	85	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0628	79	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0587	73	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0659	82	71-130
335-67-1	Perfluorooctanoic acid	0.08	0.0673	84	74-130
375-95-1	Perfluorononanoic acid	0.08	0.0619	77	76-130
335-76-2	Perfluorodecanoic acid	0.08	0.0648	81	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0641	80	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0649	81	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0801	100	70-139
376-06-7	Perfluorotetradecanoic acid	0.08	0.0611	76	70-130
375-73-5	Perfluorobutanesulfonic acid	0.0708	0.0558	79	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.0752	0.0609	81	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0728	0.0554	76	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.076	0.0627	83	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.074	0.0622	84	70-130
68259-12-1	Perfluorononanesulfonic acid	0.0768	0.0588	77	70-130
335-77-3	Perfluorodecanesulfonic acid	0.0772	0.0485	63* [a]	70-130
754-91-6	PFOSA	0.08	0.0653	82	70-131
2355-31-9	MeFOSAA	0.08	0.0642	80	70-130
2991-50-6	EtFOSAA	0.08	0.0668	84	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.0748	0.0620	83	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.076	0.0612	81	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.0768	0.0603	79	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	96%	30-140%
	13C5-PFPeA	93%	40-140%
	13C5-PFHxA	98%	50-150%
	13C4-PFHpA	96%	50-150%
	13C8-PFOA	102%	50-150%
	13C9-PFNA	99%	50-150%
	13C6-PFDA	98%	50-150%
	13C7-PFUnDA	93%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73004-BS	2Q24987.D	1	12/13/18	NAF	12/12/18	OP73004	S2Q388

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

FA59818-15, FA59818-21, FA59818-24

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	87%	50-150%
	13C2-PFTeDA	79%	40-150%
	13C3-PFBS	96%	50-150%
	13C3-PFHxS	98%	50-150%
	13C8-PFOS	95%	50-150%
	13C8-FOSA	97%	30-140%
	d3-MeFOSAA	91%	50-150%
	13C2-4:2FTS	102%	50-150%
	13C2-6:2FTS	108%	50-150%
	13C2-8:2FTS	103%	50-150%

(a) Sporadic marginal failure.

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72896-MS	2Q24722.D	1	12/08/18	NG	12/05/18	OP72896	S2Q384
OP72896-MSD	2Q24723.D	1	12/08/18	NG	12/05/18	OP72896	S2Q384
FA59818-26	2Q24721.D	1	12/08/18	NG	12/05/18	OP72896	S2Q384

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

FA59818-20, FA59818-22, FA59818-23, FA59818-25, FA59818-26, FA59818-27, FA59818-28, FA59818-29

CAS No.	Compound	FA59818-26 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
375-22-4	Perfluorobutanoic acid	0.0486		0.167	0.202	92	0.167	0.188	84	7	70-130/30
2706-90-3	Perfluoropentanoic acid	0.108		0.167	0.253	87	0.167	0.241	80	5	70-130/30
307-24-4	Perfluorohexanoic acid	0.107		0.167	0.215	65*	0.167	0.230	74	7	70-130/30
375-85-9	Perfluoroheptanoic acid	0.0793		0.167	0.176	58*	0.167	0.216	82	20	71-130/30
335-67-1	Perfluorooctanoic acid	0.253		0.167	0.182	-43*	0.167	0.378	75	70*	74-130/30
375-95-1	Perfluorononanoic acid	0.0181		0.167	0.162	86	0.167	0.154	82	5	76-130/30
335-76-2	Perfluorodecanoic acid	0.00270	J	0.167	0.140	82	0.167	0.141	83	1	70-130/30
2058-94-8	Perfluoroundecanoic acid	ND		0.167	0.174	104	0.167	0.146	88	18	70-130/30
307-55-1	Perfluorododecanoic acid	ND		0.167	0.178	107	0.167	0.149	89	18	70-130/30
72629-94-8	Perfluorotridecanoic acid	ND		0.167	0.163	98	0.167	0.142	85	14	70-139/30
376-06-7	Perfluorotetradecanoic acid	ND		0.167	0.162	97	0.167	0.143	86	12	70-130/30
375-73-5	Perfluorobutanesulfonic acid	ND		0.147	0.134	91	0.147	0.125	85	7	73-130/30
2706-91-4	Perfluoropentanesulfonic acid	ND		0.157	0.147	94	0.157	0.137	87	7	70-130/30
355-46-4	Perfluorohexanesulfonic acid	0.00449	J	0.152	0.133	85	0.152	0.127	81	5	74-130/30
375-92-8	Perfluoroheptanesulfonic acid	ND		0.158	0.156	99	0.158	0.140	88	11	74-130/30
1763-23-1	Perfluorooctanesulfonic acid	0.0169		0.154	0.155	90	0.154	0.152	88	2	70-130/30
68259-12-1	Perfluorononanesulfonic acid	ND		0.16	0.139	87	0.16	0.116	73	18	70-130/30
335-77-3	Perfluorodecanesulfonic acid	ND		0.161	0.111	69*	0.161	0.105	65*	6	70-130/30
754-91-6	PFOSA	ND		0.167	0.162	97	0.167	0.146	88	10	70-131/30
2355-31-9	MeFOSAA	ND		0.167	0.169	101	0.167	0.145	87	15	70-130/30
2991-50-6	EtFOSAA	ND		0.167	0.176	106	0.167	0.148	89	17	70-130/30
757124-72-4	4:2 Fluorotelomer sulfonate	ND		0.156	0.153	98	0.156	0.142	91	7	70-130/30
27619-97-2	6:2 Fluorotelomer sulfonate	ND		0.158	0.156	99	0.158	0.145	92	7	70-133/30
39108-34-4	8:2 Fluorotelomer sulfonate	ND		0.16	0.156	98	0.16	0.136	85	14	70-130/30

CAS No.	ID Standard Recoveries	MS	MSD	FA59818-26	Limits
	13C4-PFBA	77%	87%	75%	30-140%
	13C5-PFPeA	78%	88%	76%	40-140%
	13C5-PFHxA	79%	89%	77%	50-150%
	13C4-PFHpA	82%	90%	79%	50-150%
	13C8-PFOA	86%	92%	81%	50-150%
	13C9-PFNA	82%	91%	81%	50-150%
	13C6-PFDA	77%	80%	74%	50-150%
	13C7-PFUnDA	63%	69%	66%	50-150%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72896-MS	2Q24722.D	1	12/08/18	NG	12/05/18	OP72896	S2Q384
OP72896-MSD	2Q24723.D	1	12/08/18	NG	12/05/18	OP72896	S2Q384
FA59818-26	2Q24721.D	1	12/08/18	NG	12/05/18	OP72896	S2Q384

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

FA59818-20, FA59818-22, FA59818-23, FA59818-25, FA59818-26, FA59818-27, FA59818-28, FA59818-29

CAS No.	ID Standard Recoveries	MS	MSD	FA59818-26	Limits
	13C2-PFDoDA	53%	60%	59%	50-150%
	13C2-PFTeDA	64%	78%	71%	40-150%
	13C3-PFBS	79%	88%	77%	50-150%
	13C3-PFHxS	81%	88%	76%	50-150%
	13C8-PFOS	79%	82%	70%	50-150%
	13C8-FOSA	87%	90%	59%	30-140%
	d3-MeFOSAA	88%	91%	84%	50-150%
	13C2-4:2FTS	86%	97%	81%	50-150%
	13C2-6:2FTS	93%	102%	87%	50-150%
	13C2-8:2FTS	85%	91%	77%	50-150%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72913-MS	2Q24745.D	1	12/08/18	NG	12/06/18	OP72913	S2Q384
OP72913-MSD	2Q24746.D	1	12/08/18	NG	12/06/18	OP72913	S2Q384
FA59818-5	2Q24744.D	1	12/08/18	NG	12/06/18	OP72913	S2Q384

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

FA59818-1, FA59818-2, FA59818-3, FA59818-4, FA59818-5, FA59818-6, FA59818-7, FA59818-8, FA59818-9, FA59818-10, FA59818-11, FA59818-12, FA59818-13, FA59818-14, FA59818-16, FA59818-17, FA59818-18, FA59818-19

CAS No.	Compound	FA59818-5 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
375-22-4	Perfluorobutanoic acid	0.0117		0.08	0.0806	86	0.08	0.0905	99	12	70-130/30
2706-90-3	Perfluoropentanoic acid	0.0117		0.08	0.0813	87	0.08	0.0917	100	12	70-130/30
307-24-4	Perfluorohexanoic acid	0.00715		0.08	0.0697	78	0.08	0.0788	90	12	70-130/30
375-85-9	Perfluoroheptanoic acid	0.00183	J	0.08	0.0712	87	0.08	0.0781	95	9	71-130/30
335-67-1	Perfluorooctanoic acid	0.00161	J	0.08	0.0696	85	0.08	0.0785	96	12	74-130/30
375-95-1	Perfluorononanoic acid	ND		0.08	0.0683	85	0.08	0.0718	90	5	76-130/30
335-76-2	Perfluorodecanoic acid	ND		0.08	0.0637	80	0.08	0.0756	95	17	70-130/30
2058-94-8	Perfluoroundecanoic acid	ND		0.08	0.0723	90	0.08	0.0815	102	12	70-130/30
307-55-1	Perfluorododecanoic acid	ND		0.08	0.0708	89	0.08	0.0802	100	12	70-130/30
72629-94-8	Perfluorotridecanoic acid	ND		0.08	0.0732	92	0.08	0.0844	106	14	70-139/30
376-06-7	Perfluorotetradecanoic acid	ND		0.08	0.0656	82	0.08	0.0704	88	7	70-130/30
375-73-5	Perfluorobutanesulfonic acid	ND		0.0708	0.0610	86	0.0708	0.0684	97	11	73-130/30
2706-91-4	Perfluoropentanesulfonic acid	ND		0.0752	0.0692	92	0.0752	0.0772	103	11	70-130/30
355-46-4	Perfluorohexanesulfonic acid	ND		0.0728	0.0597	82	0.0728	0.0663	91	10	74-130/30
375-92-8	Perfluoroheptanesulfonic acid	ND		0.076	0.0701	92	0.076	0.0779	103	11	74-130/30
1763-23-1	Perfluorooctanesulfonic acid	ND		0.074	0.0675	91	0.074	0.0750	101	11	70-130/30
68259-12-1	Perfluorononanesulfonic acid	ND		0.0768	0.0623	81	0.0768	0.0688	90	10	70-130/30
335-77-3	Perfluorodecanesulfonic acid	ND		0.0772	0.0437	57*	0.0772	0.0520	67*	17	70-130/30
754-91-6	PFOSA	ND		0.08	0.0697	87	0.08	0.0785	98	12	70-131/30
2355-31-9	MeFOSAA	ND		0.08	0.0726	91	0.08	0.0805	101	10	70-130/30
2991-50-6	EtFOSAA	ND		0.08	0.0698	87	0.08	0.0785	98	12	70-130/30
757124-72-4	4:2 Fluorotelomer sulfonate	ND		0.0748	0.0689	92	0.0748	0.0775	104	12	70-130/30
27619-97-2	6:2 Fluorotelomer sulfonate	ND		0.076	0.0703	93	0.076	0.0777	102	10	70-133/30
39108-34-4	8:2 Fluorotelomer sulfonate	ND		0.0768	0.0667	87	0.0768	0.0739	96	10	70-130/30

CAS No.	ID Standard Recoveries	MS	MSD	FA59818-5	Limits
	13C4-PFBA	89%	83%	82%	30-140%
	13C5-PFPeA	91%	84%	84%	40-140%
	13C5-PFHxA	93%	86%	88%	50-150%
	13C4-PFHpA	97%	93%	92%	50-150%
	13C8-PFOA	103%	95%	98%	50-150%
	13C9-PFNA	104%	94%	97%	50-150%
	13C6-PFDA	99%	90%	91%	50-150%
	13C7-PFUnDA	78%	78%	75%	50-150%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA59818
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP72913-MS	2Q24745.D	1	12/08/18	NG	12/06/18	OP72913	S2Q384
OP72913-MSD	2Q24746.D	1	12/08/18	NG	12/06/18	OP72913	S2Q384
FA59818-5	2Q24744.D	1	12/08/18	NG	12/06/18	OP72913	S2Q384

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

FA59818-1, FA59818-2, FA59818-3, FA59818-4, FA59818-5, FA59818-6, FA59818-7, FA59818-8, FA59818-9, FA59818-10, FA59818-11, FA59818-12, FA59818-13, FA59818-14, FA59818-16, FA59818-17, FA59818-18, FA59818-19

CAS No.	ID Standard Recoveries	MS	MSD	FA59818-5	Limits
	13C2-PFDoDA	68%	67%	66%	50-150%
	13C2-PFTeDA	76%	71%	72%	40-150%
	13C3-PFBS	90%	84%	83%	50-150%
	13C3-PFHxS	95%	90%	89%	50-150%
	13C8-PFOS	97%	93%	91%	50-150%
	13C8-FOSA	123%	111%	118%	30-140%
	d3-MeFOSAA	114%	112%	110%	50-150%
	13C2-4:2FTS	99%	93%	88%	50-150%
	13C2-6:2FTS	112%	106%	102%	50-150%
	13C2-8:2FTS	107%	102%	95%	50-150%

* = 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

B0064479.2018.03700

SGS Job Number: FA60008

Sampling Dates: 12/04/18 - 12/07/18

Report to:

Arcadis
300 S Washington Sq Suite 315
Lansing, MI 48933
alex.villhauer@arcadis.com; christine.gregg@arcadis.com

ATTN: Alex Villhauer

Total number of pages in report: **68**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Caitlin Brice, M.S.
General Manager

Client Service contact: Andrea Colby 407-425-6700

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

Sections: 1 2 3 4 5

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SGS North America Inc.

Sample Summary

Arcadis

Job No: FA60008

Racer Lansing PFAS Delineation; Lansing, MI
Project No: B0064479.2018.03700

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
FA60008-1	12/04/18	14:35	AWDA	12/08/18	AQ	Ground Water	MW-91-2_120418
FA60008-2	12/05/18	10:45	AWDA	12/08/18	AQ	Ground Water	MW-02-04(3)_120518
FA60008-3	12/05/18	12:20	AWDA	12/08/18	AQ	Ground Water	MW-18-92_120518
FA60008-4	12/05/18	13:40	AWDA	12/08/18	AQ	Ground Water	MW-18-88_120518
FA60008-5	12/05/18	15:15	AWDA	12/08/18	AQ	Ground Water	MW-18-89_120518
FA60008-6	12/06/18	10:45	AWDA	12/08/18	AQ	Ground Water	MW-18-90_120618
FA60008-7	12/06/18	12:15	AWDA	12/08/18	AQ	Ground Water	MW-18-91_120618
FA60008-8	12/06/18	14:40	AWDA	12/08/18	AQ	Ground Water	CH-14-RO_120618
FA60008-9	12/06/18	00:00	AWDA	12/08/18	AQ	Ground Water	DUP-04
FA60008-10	12/07/18	11:40	AWDA	12/08/18	AQ	Ground Water	AS-17-05_120718
FA60008-11	12/07/18	12:50	AWDA	12/08/18	AQ	Ground Water	AS-17-04_120718
FA60008-12	12/07/18	14:20	AWDA	12/08/18	AQ	Ground Water	P6-MH2-SW_120718
FA60008-13	12/07/18	15:10	AWDA	12/08/18	AQ	Ground Water	P3-MH-NE_120718

Sample Summary
(continued)

Arcadis

Job No: FA60008

Racer Lansing PFAS Delineation; Lansing, MI
Project No: B0064479.2018.03700

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
FA60008-14	12/07/18	15:40	AWDA	12/08/18	AQ	Ground Water	P2-MH-NW_120718
FA60008-15	12/07/18	00:00	AWDA	12/08/18	AQ	Ground Water	DUP-08_120718

Summary of Hits

Job Number: FA60008
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 12/04/18 thru 12/07/18

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA60008-1	**MW-91-2_120418**					
Perfluoropentanoic acid		0.00157 J	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00156 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00145 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00582	0.0040	0.0015	ug/l	EPA 537M BY ID
FA60008-2	**MW-02-04(3)_120518**					
Perfluorobutanoic acid		0.00266 J	0.0077	0.0019	ug/l	EPA 537M BY ID
FA60008-3	**MW-18-92_120518**					
Perfluorobutanoic acid		0.00267 J	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00156 J	0.0038	0.0014	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00105 J	0.0038	0.00096	ug/l	EPA 537M BY ID
FA60008-4	**MW-18-88_120518**					
Perfluorobutanoic acid		0.00596 J	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00322 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00179 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00135 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.106	0.0038	0.0014	ug/l	EPA 537M BY ID
FA60008-5	**MW-18-89_120518**					
Perfluorobutanoic acid		0.0126	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0145	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0102	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00778	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0214	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00229 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00297 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00223 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00128 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00848	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00705	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.289	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorodecanesulfonic acid [a]		0.00248 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA60008-6	**MW-18-90_120618**					
Perfluoropentanoic acid [b]		0.00618	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid [c]		0.00614	0.0040	0.0010	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA60008
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 12/04/18 thru 12/07/18

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluoroheptanoic acid [c]		0.00516	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid [c]		0.0191	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid [d]		0.00155 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid [c]		0.00111 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid [c]		0.00273 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid [c]		0.00512	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid [c]		0.0360	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid [c]		0.0549	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid [c]		0.940	0.040	0.015	ug/l	EPA 537M BY ID
FA60008-7	**MW-18-91_120618**					
Perfluorobutanoic acid		0.0105	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00649	0.0038	0.0014	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00435	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00401	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00899	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00133 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00176 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00182 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00177 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0760	0.0038	0.0014	ug/l	EPA 537M BY ID
Perfluorodecanesulfonic acid [a]		0.00529	0.0038	0.00096	ug/l	EPA 537M BY ID
PFOSA		0.00212 J	0.0038	0.00096	ug/l	EPA 537M BY ID
FA60008-8	**CH-14-RO_120618**					
Perfluorooctanoic acid		0.126 J	0.38	0.096	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.102 J	0.38	0.096	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.290 J	0.38	0.096	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		1.54	0.38	0.096	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.651	0.38	0.096	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		10.1	0.38	0.14	ug/l	EPA 537M BY ID
FA60008-9	**DUP-04**					
Perfluorooctanoic acid		0.108 J	0.38	0.096	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.120 J	0.38	0.096	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.336 J	0.38	0.096	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		1.78	0.38	0.096	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.758	0.38	0.096	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		11.0	0.38	0.14	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA60008
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 12/04/18 thru 12/07/18

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA60008-10	**AS-17-05_120718**					
Perfluorobutanoic acid		0.00549 J	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00256 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00473	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00114 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA60008-11	**AS-17-04_120718**					
Perfluorobutanoic acid		0.00655 J	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00640	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00113 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00103 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA60008-12	**P6-MH2-SW_120718**					
Perfluorobutanoic acid		0.0167	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0253	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0232	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0207	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0394	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00303 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00217 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00186 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00126 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0730	0.0040	0.0015	ug/l	EPA 537M BY ID
PFOSA		0.0141	0.0040	0.0010	ug/l	EPA 537M BY ID
FA60008-13	**P3-MH-NE_120718**					
Perfluorobutanoic acid [c]		0.00289 J	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluorooctanoic acid [c]		0.00163 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid [c]		0.00148 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid [c]		0.00161 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid [c]		0.0219 B	0.0040	0.0015	ug/l	EPA 537M BY ID
FA60008-14	**P2-MH-NW_120718**					
Perfluorobutanoic acid		0.0136	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0182	0.0038	0.0014	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0177	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0161	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0312	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00360 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00453	0.0038	0.00096	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA60008
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 12/04/18 thru 12/07/18

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluorobutanesulfonic acid		0.00807	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00331 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0220	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00196 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.176	0.0038	0.0014	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate		0.00221 J	0.0077	0.0019	ug/l	EPA 537M BY ID
FA60008-15	**DUP-08_120718**					
Perfluorobutanoic acid		0.0162	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0243	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0216	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0193	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0374	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00304 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00205 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00200 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00103 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0620	0.0040	0.0015	ug/l	EPA 537M BY ID
PFOSA		0.0133	0.0040	0.0010	ug/l	EPA 537M BY ID

(a) Associated BS recovery outside control limits.
(b) Insufficient sample for re-extraction. Associated ID Standard outside control limits.
(c) Insufficient sample for re-extraction.
(d) Insufficient sample for re-extraction. Associated BS recovery outside control limits.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	MW-91-2_120418		
Lab Sample ID:	FA60008-1	**Date Sampled:**	12/04/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25389.D	1	12/21/18 14:01	NAF	12/19/18 09:00	OP73096	S2Q394
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.00157	0.0040	0.0015	ug/l	J
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 [a]	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.00156	0.0040	0.0010	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.00145	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00582	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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-91-2_120418		
Lab Sample ID:	FA60008-1	**Date Sampled:**	12/04/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	94%		30-140%
	13C5-PFPeA	99%		40-140%
	13C5-PFHxA	103%		50-150%
	13C4-PFHpA	107%		50-150%
	13C8-PFOA	126%		50-150%
	13C9-PFNA	111%		50-150%
	13C6-PFDA	103%		50-150%
	13C7-PFUnDA	102%		50-150%
	13C2-PFDoDA	77%		50-150%
	13C2-PFTeDA	84%		40-150%
	13C3-PFBS	95%		50-150%
	13C3-PFHxS	100%		50-150%
	13C8-PFOS	83%		50-150%
	13C8-FOSA	95%		30-140%
	d3-MeFOSAA	84%		50-150%
	13C2-4:2FTS	110%		50-150%
	13C2-6:2FTS	119%		50-150%
	13C2-8:2FTS	94%		50-150%

(a) Associated BS recovery 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-02-04(3)_120518		
Lab Sample ID:	FA60008-2	**Date Sampled:**	12/05/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25514.D	1	12/24/18 18:41	NAF	12/19/18 09:00	OP73096	S2Q395
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00266	0.0077	0.0019	ug/l	J
2706-90-3	Perfluoropentanoic acid	ND	0.0038	0.0014	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0038	0.00096	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0038	0.00096	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0038	0.00096	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0038	0.00096	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0038	0.00096	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0038	0.00096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0038	0.0014	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0038	0.00096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0038	0.00096	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0038	0.00096	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0038	0.00096	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0038	0.00096	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0038	0.0014	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0038	0.00096	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.019	0.0038	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0038	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	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-02-04(3)_120518		
Lab Sample ID:	FA60008-2	**Date Sampled:**	12/05/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	100%		30-140%
	13C5-PFPeA	107%		40-140%
	13C5-PFHxA	115%		50-150%
	13C4-PFHpA	115%		50-150%
	13C8-PFOA	121%		50-150%
	13C9-PFNA	107%		50-150%
	13C6-PFDA	106%		50-150%
	13C7-PFUnDA	103%		50-150%
	13C2-PFDoDA	94%		50-150%
	13C2-PFTeDA	91%		40-150%
	13C3-PFBS	105%		50-150%
	13C3-PFHxS	105%		50-150%
	13C8-PFOS	90%		50-150%
	13C8-FOSA	100%		30-140%
	d3-MeFOSAA	92%		50-150%
	13C2-4:2FTS	109%		50-150%
	13C2-6:2FTS	112%		50-150%
	13C2-8:2FTS	90%		50-150%

(a) Associated BS recovery 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-18-92_120518		
Lab Sample ID:	FA60008-3	**Date Sampled:**	12/05/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25391.D	1	12/21/18 14:33	NAF	12/19/18 09:00	OP73096	S2Q394
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00267	0.0077	0.0019	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00156	0.0038	0.0014	ug/l	J
307-24-4	Perfluorohexanoic acid	ND	0.0038	0.00096	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0038	0.00096	ug/l	
335-67-1	Perfluorooctanoic acid	0.00105	0.0038	0.00096	ug/l	J
375-95-1	Perfluorononanoic acid [a]	ND	0.0038	0.00096	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0038	0.00096	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0038	0.00096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0038	0.0014	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0038	0.00096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	ND	0.0038	0.00096	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0038	0.00096	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0038	0.00096	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0038	0.00096	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0038	0.0014	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0038	0.00096	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.019	0.0038	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0038	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	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-18-92_120518		
Lab Sample ID:	FA60008-3	**Date Sampled:**	12/05/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	76%		30-140%
	13C5-PFPeA	83%		40-140%
	13C5-PFHxA	91%		50-150%
	13C4-PFHpA	92%		50-150%
	13C8-PFOA	105%		50-150%
	13C9-PFNA	98%		50-150%
	13C6-PFDA	88%		50-150%
	13C7-PFUnDA	95%		50-150%
	13C2-PFDoDA	68%		50-150%
	13C2-PFTeDA	74%		40-150%
	13C3-PFBS	79%		50-150%
	13C3-PFHxS	84%		50-150%
	13C8-PFOS	78%		50-150%
	13C8-FOSA	94%		30-140%
	d3-MeFOSAA	79%		50-150%
	13C2-4:2FTS	90%		50-150%
	13C2-6:2FTS	102%		50-150%
	13C2-8:2FTS	84%		50-150%

(a) Associated BS recovery 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-18-88_120518		
Lab Sample ID:	FA60008-4	**Date Sampled:**	12/05/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25392.D	1	12/21/18 14:50	NAF	12/19/18 09:00	OP73096	S2Q394
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00596	0.0077	0.0019	ug/l	J
2706-90-3	Perfluoropentanoic acid	ND	0.0038	0.0014	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0038	0.00096	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0038	0.00096	ug/l	
335-67-1	Perfluorooctanoic acid	0.00322	0.0038	0.00096	ug/l	J
375-95-1	Perfluorononanoic acid [a]	ND	0.0038	0.00096	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0038	0.00096	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0038	0.00096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0038	0.0014	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0038	0.00096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00179	0.0038	0.00096	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0038	0.00096	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00135	0.0038	0.00096	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0038	0.00096	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.106	0.0038	0.0014	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0038	0.00096	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.019	0.0038	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0038	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	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-18-88_120518		
Lab Sample ID:	FA60008-4	**Date Sampled:**	12/05/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	98%		30-140%
	13C5-PFPeA	101%		40-140%
	13C5-PFHxA	104%		50-150%
	13C4-PFHpA	109%		50-150%
	13C8-PFOA	125%		50-150%
	13C9-PFNA	109%		50-150%
	13C6-PFDA	97%		50-150%
	13C7-PFUnDA	97%		50-150%
	13C2-PFDoDA	71%		50-150%
	13C2-PFTeDA	74%		40-150%
	13C3-PFBS	98%		50-150%
	13C3-PFHxS	101%		50-150%
	13C8-PFOS	86%		50-150%
	13C8-FOSA	94%		30-140%
	d3-MeFOSAA	77%		50-150%
	13C2-4:2FTS	103%		50-150%
	13C2-6:2FTS	119%		50-150%
	13C2-8:2FTS	94%		50-150%

(a) Associated BS recovery 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-18-89_120518		
Lab Sample ID:	FA60008-5	**Date Sampled:**	12/05/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25515.D	1	12/24/18 18:57	NAF	12/19/18 09:00	OP73096	S2Q395
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0126	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0145	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0102	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00778	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0214	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00229	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00297	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00223	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.00128	0.0040	0.0010	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.00848	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00705	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.289	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	0.00248	0.0040	0.0010	ug/l	J
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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-18-89_120518		
Lab Sample ID:	FA60008-5	**Date Sampled:**	12/05/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	86%		30-140%
	13C5-PFPeA	94%		40-140%
	13C5-PFHxA	98%		50-150%
	13C4-PFHpA	103%		50-150%
	13C8-PFOA	114%		50-150%
	13C9-PFNA	114%		50-150%
	13C6-PFDA	109%		50-150%
	13C7-PFUnDA	113%		50-150%
	13C2-PFDoDA	102%		50-150%
	13C2-PFTeDA	93%		40-150%
	13C3-PFBS	94%		50-150%
	13C3-PFHxS	95%		50-150%
	13C8-PFOS	98%		50-150%
	13C8-FOSA	64%		30-140%
	d3-MeFOSAA	105%		50-150%
	13C2-4:2FTS	102%		50-150%
	13C2-6:2FTS	115%		50-150%
	13C2-8:2FTS	112%		50-150%

(a) Associated BS recovery 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-18-90_120618		
Lab Sample ID:	FA60008-6	**Date Sampled:**	12/06/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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 [a]	2Q25394.D	1	12/21/18 15:21	NAF	12/19/18 09:00	OP73096	S2Q394
Run #2 [a]	2Q25517.D	10	12/24/18 19:28	NAF	12/19/18 09:00	OP73096	S2Q395
Run #3 [b]	2Q25516.D	1	12/24/18 19:12	NAF	12/19/18 09:00	OP73096	S2Q395

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid [c]	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid [c]	0.00618	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00614	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00516	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0191	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid [d]	0.00155	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00111	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00273	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.00512	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0360	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0549	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.940 [e]	0.040	0.015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						

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-18-90_120618		
Lab Sample ID:	FA60008-6	**Date Sampled:**	12/06/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C4-PFBA	3% [f]	3% [f]	3% [f]	30-140%
	13C5-PFPeA	35% [f]	37% [f]	36% [f]	40-140%
	13C5-PFHxA	91%	104%	97%	50-150%
	13C4-PFHpA	93%	109%	102%	50-150%
	13C8-PFOA	94%	107%	102%	50-150%
	13C9-PFNA	86%	107%	92%	50-150%
	13C6-PFDA	73%	94%	77%	50-150%
	13C7-PFUnDA	63%	91%	63%	50-150%
	13C2-PFDoDA	70%	85%	77%	50-150%
	13C2-PFTeDA	81%	78%	80%	40-150%
	13C3-PFBS	91%	102%	98%	50-150%
	13C3-PFHxS	85%	102%	92%	50-150%
	13C8-PFOS	72%	89%	78%	50-150%
	13C8-FOSA	62%	113%	52%	30-140%
	d3-MeFOSAA	68%	82%	74%	50-150%
	13C2-4:2FTS	91%	97%	96%	50-150%
	13C2-6:2FTS	98%	103%	100%	50-150%
	13C2-8:2FTS	72%	93%	76%	50-150%

(a) Insufficient sample for re-extraction.
(b) Confirmation run for internal standard areas.
(c) Associated ID Standard outside control limits.
(d) Associated BS recovery outside control limits.
(e) Result is from Run# 2
(f) 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-18-91_120618		
Lab Sample ID:	FA60008-7	**Date Sampled:**	12/06/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25518.D	1	12/24/18 19:44	NAF	12/19/18 09:00	OP73096	S2Q395
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0105	0.0077	0.0019	ug/l	
2706-90-3	Perfluoropentanoic acid	0.00649	0.0038	0.0014	ug/l	
307-24-4	Perfluorohexanoic acid	0.00435	0.0038	0.00096	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00401	0.0038	0.00096	ug/l	
335-67-1	Perfluorooctanoic acid	0.00899	0.0038	0.00096	ug/l	
375-95-1	Perfluorononanoic acid	0.00133	0.0038	0.00096	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00176	0.0038	0.00096	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0038	0.00096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0038	0.0014	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0038	0.00096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00182	0.0038	0.00096	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0038	0.00096	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00177	0.0038	0.00096	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0038	0.00096	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0760	0.0038	0.0014	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0038	0.00096	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	0.00529	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.00212	0.0038	0.00096	ug/l	J
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.019	0.0038	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0038	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	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-18-91_120618		
Lab Sample ID:	FA60008-7	**Date Sampled:**	12/06/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	81%		30-140%
	13C5-PFPeA	86%		40-140%
	13C5-PFHxA	90%		50-150%
	13C4-PFHpA	93%		50-150%
	13C8-PFOA	106%		50-150%
	13C9-PFNA	107%		50-150%
	13C6-PFDA	101%		50-150%
	13C7-PFUnDA	83%		50-150%
	13C2-PFDoDA	73%		50-150%
	13C2-PFTeDA	78%		40-150%
	13C3-PFBS	85%		50-150%
	13C3-PFHxS	87%		50-150%
	13C8-PFOS	90%		50-150%
	13C8-FOSA	56%		30-140%
	d3-MeFOSAA	101%		50-150%
	13C2-4:2FTS	93%		50-150%
	13C2-6:2FTS	108%		50-150%
	13C2-8:2FTS	103%		50-150%

(a) Associated BS recovery 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:	CH-14-RO_120618		
Lab Sample ID:	FA60008-8	**Date Sampled:**	12/06/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25519.D	100	12/24/18 20:00	NAF	12/19/18 09:00	OP73096	S2Q395
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	ND	0.77	0.19	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.38	0.14	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.38	0.096	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.38	0.096	ug/l	
335-67-1	Perfluorooctanoic acid	0.126	0.38	0.096	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.38	0.096	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.38	0.096	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.38	0.096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.38	0.14	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.38	0.096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.38	0.096	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.102	0.38	0.096	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.290	0.38	0.096	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	1.54	0.38	0.096	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.651	0.38	0.096	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	10.1	0.38	0.14	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.38	0.096	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.38	0.096	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.38	0.096	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	1.9	0.38	ug/l	
2991-50-6	EtFOSAA	ND	1.9	0.38	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.77	0.19	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.77	0.19	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:	CH-14-RO_120618		
Lab Sample ID:	FA60008-8	**Date Sampled:**	12/06/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.77	0.19	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	98%		30-140%
	13C5-PFPeA	104%		40-140%
	13C5-PFHxA	108%		50-150%
	13C4-PFHpA	105%		50-150%
	13C8-PFOA	107%		50-150%
	13C9-PFNA	110%		50-150%
	13C6-PFDA	117%		50-150%
	13C7-PFUnDA	110%		50-150%
	13C2-PFDoDA	110%		50-150%
	13C2-PFTeDA	107%		40-150%
	13C3-PFBS	102%		50-150%
	13C3-PFHxS	103%		50-150%
	13C8-PFOS	106%		50-150%
	13C8-FOSA	117%		30-140%
	d3-MeFOSAA	104%		50-150%
	13C2-4:2FTS	99%		50-150%
	13C2-6:2FTS	100%		50-150%
	13C2-8:2FTS	102%		50-150%

(a) Associated BS recovery 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:	DUP-04		
Lab Sample ID:	FA60008-9	**Date Sampled:**	12/06/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25520.D	100	12/24/18 20:15	NAF	12/19/18 09:00	OP73096	S2Q395
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	ND	0.77	0.19	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.38	0.14	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.38	0.096	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.38	0.096	ug/l	
335-67-1	Perfluorooctanoic acid	0.108	0.38	0.096	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.38	0.096	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.38	0.096	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.38	0.096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.38	0.14	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.38	0.096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.38	0.096	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.120	0.38	0.096	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.336	0.38	0.096	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	1.78	0.38	0.096	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.758	0.38	0.096	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	11.0	0.38	0.14	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.38	0.096	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.38	0.096	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.38	0.096	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	1.9	0.38	ug/l	
2991-50-6	EtFOSAA	ND	1.9	0.38	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.77	0.19	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.77	0.19	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:	DUP-04		
Lab Sample ID:	FA60008-9	**Date Sampled:**	12/06/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.77	0.19	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	95%		30-140%
	13C5-PFPeA	99%		40-140%
	13C5-PFHxA	103%		50-150%
	13C4-PFHpA	102%		50-150%
	13C8-PFOA	103%		50-150%
	13C9-PFNA	105%		50-150%
	13C6-PFDA	112%		50-150%
	13C7-PFUnDA	109%		50-150%
	13C2-PFDoDA	107%		50-150%
	13C2-PFTeDA	100%		40-150%
	13C3-PFBS	98%		50-150%
	13C3-PFHxS	98%		50-150%
	13C8-PFOS	101%		50-150%
	13C8-FOSA	112%		30-140%
	d3-MeFOSAA	97%		50-150%
	13C2-4:2FTS	95%		50-150%
	13C2-6:2FTS	95%		50-150%
	13C2-8:2FTS	99%		50-150%

(a) Associated BS recovery 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:	AS-17-05_120718		
Lab Sample ID:	FA60008-10	**Date Sampled:**	12/07/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25523.D	1	12/24/18 21:02	NAF	12/19/18 09:00	OP73096	S2Q395
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00549	0.0080	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00256	0.0040	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00473	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	0.00114	0.0040	0.0010	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	AS-17-05_120718		
Lab Sample ID:	FA60008-10	**Date Sampled:**	12/07/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	71%		30-140%
	13C5-PFPeA	80%		40-140%
	13C5-PFHxA	91%		50-150%
	13C4-PFHpA	89%		50-150%
	13C8-PFOA	98%		50-150%
	13C9-PFNA	97%		50-150%
	13C6-PFDA	91%		50-150%
	13C7-PFUnDA	86%		50-150%
	13C2-PFDoDA	59%		50-150%
	13C2-PFTeDA	56%		40-150%
	13C3-PFBS	86%		50-150%
	13C3-PFHxS	94%		50-150%
	13C8-PFOS	90%		50-150%
	13C8-FOSA	41%		30-140%
	d3-MeFOSAA	74%		50-150%
	13C2-4:2FTS	93%		50-150%
	13C2-6:2FTS	99%		50-150%
	13C2-8:2FTS	97%		50-150%

(a) Associated BS recovery 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:	AS-17-04_120718		
Lab Sample ID:	FA60008-11	**Date Sampled:**	12/07/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25525.D	1	12/24/18 21:34	NAF	12/19/18 09:00	OP73096	S2Q395
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00655	0.0080	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00640	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00113	0.0040	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00103	0.0040	0.0010	ug/l	J
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	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [a]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	AS-17-04_120718		
Lab Sample ID:	FA60008-11	**Date Sampled:**	12/07/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	77%		30-140%
	13C5-PFPeA	83%		40-140%
	13C5-PFHxA	94%		50-150%
	13C4-PFHpA	98%		50-150%
	13C8-PFOA	104%		50-150%
	13C9-PFNA	108%		50-150%
	13C6-PFDA	101%		50-150%
	13C7-PFUnDA	88%		50-150%
	13C2-PFDoDA	67%		50-150%
	13C2-PFTeDA	57%		40-150%
	13C3-PFBS	85%		50-150%
	13C3-PFHxS	93%		50-150%
	13C8-PFOS	89%		50-150%
	13C8-FOSA	49%		30-140%
	d3-MeFOSAA	75%		50-150%
	13C2-4:2FTS	91%		50-150%
	13C2-6:2FTS	105%		50-150%
	13C2-8:2FTS	120%		50-150%

(a) Associated BS recovery 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-MH2-SW_120718		
Lab Sample ID:	FA60008-12	**Date Sampled:**	12/07/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25403.D	1	12/21/18 17:43	NAF	12/19/18 09:00	OP73096	S2Q394
Run #2	2Q25526.D	1	12/24/18 21:50	NAF	12/19/18 09:00	OP73096	S2Q395

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0167	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0253	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0232	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0207	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0394	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00303 [a]	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00217	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00186	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00126	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0730	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.0141	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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-MH2-SW_120718		
Lab Sample ID:	FA60008-12	**Date Sampled:**	12/07/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	86%	92%	30-140%
	13C5-PFPeA	89%	96%	40-140%
	13C5-PFHxA	93%	102%	50-150%
	13C4-PFHpA	96%	107%	50-150%
	13C8-PFOA	110%	116%	50-150%
	13C9-PFNA	105%	115%	50-150%
	13C6-PFDA	91%	94%	50-150%
	13C7-PFUnDA	90%	92%	50-150%
	13C2-PFDoDA	65%	78%	50-150%
	13C2-PFTeDA	73%	74%	40-150%
	13C3-PFBS	86%	94%	50-150%
	13C3-PFHxS	91%	97%	50-150%
	13C8-PFOS	82%	88%	50-150%
	13C8-FOSA	96%	100%	30-140%
	d3-MeFOSAA	73%	79%	50-150%
	13C2-4:2FTS	95%	97%	50-150%
	13C2-6:2FTS	113%	114%	50-150%
	13C2-8:2FTS	91%	94%	50-150%

(a) Result is from Run# 2

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:	P3-MH-NE_120718		
Lab Sample ID:	FA60008-13	**Date Sampled:**	12/07/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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 [a]	2Q25693.D	1	12/27/18 18:03	NAF	12/26/18 12:00	OP73191	S2Q397
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00289	0.0080	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00163	0.0040	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00148	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00161	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0219	0.0040	0.0015	ug/l	B
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid [b]	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	P3-MH-NE_120718		
Lab Sample ID:	FA60008-13	**Date Sampled:**	12/07/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	90%		30-140%
	13C5-PFPeA	91%		40-140%
	13C5-PFHxA	98%		50-150%
	13C4-PFHpA	101%		50-150%
	13C8-PFOA	112%		50-150%
	13C9-PFNA	105%		50-150%
	13C6-PFDA	90%		50-150%
	13C7-PFUnDA	80%		50-150%
	13C2-PFDoDA	75%		50-150%
	13C2-PFTeDA	81%		40-150%
	13C3-PFBS	90%		50-150%
	13C3-PFHxS	90%		50-150%
	13C8-PFOS	72%		50-150%
	13C8-FOSA	91%		30-140%
	d3-MeFOSAA	68%		50-150%
	13C2-4:2FTS	90%		50-150%
	13C2-6:2FTS	99%		50-150%
	13C2-8:2FTS	83%		50-150%

(a) Insufficient sample for re-extraction.
(b) Associated BS recovery 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:	P2-MH-NW_120718		
Lab Sample ID:	FA60008-14	**Date Sampled:**	12/07/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25405.D	1	12/21/18 18:14	NAF	12/19/18 09:00	OP73096	S2Q394
Run #2	2Q25527.D	1	12/24/18 22:05	NAF	12/19/18 09:00	OP73096	S2Q395

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0136	0.0077	0.0019	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0182	0.0038	0.0014	ug/l	
307-24-4	Perfluorohexanoic acid	0.0177	0.0038	0.00096	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0161	0.0038	0.00096	ug/l	
335-67-1	Perfluorooctanoic acid	0.0312	0.0038	0.00096	ug/l	
375-95-1	Perfluorononanoic acid	0.00360 [a]	0.0038	0.00096	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00453	0.0038	0.00096	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0038	0.00096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0038	0.0014	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0038	0.00096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00807	0.0038	0.00096	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.00331	0.0038	0.00096	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0220	0.0038	0.00096	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00196	0.0038	0.00096	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.176	0.0038	0.0014	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0038	0.00096	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.019	0.0038	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0038	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.00221	0.0077	0.0019	ug/l	J

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:	P2-MH-NW_120718		
Lab Sample ID:	FA60008-14	**Date Sampled:**	12/07/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	74%	80%	30-140%
	13C5-PFPeA	77%	84%	40-140%
	13C5-PFHxA	78%	87%	50-150%
	13C4-PFHpA	80%	91%	50-150%
	13C8-PFOA	89%	100%	50-150%
	13C9-PFNA	85%	99%	50-150%
	13C6-PFDA	80%	84%	50-150%
	13C7-PFUnDA	71%	75%	50-150%
	13C2-PFDoDA	59%	69%	50-150%
	13C2-PFTeDA	66%	71%	40-150%
	13C3-PFBS	73%	81%	50-150%
	13C3-PFHxS	73%	82%	50-150%
	13C8-PFOS	73%	79%	50-150%
	13C8-FOSA	69%	61%	30-140%
	d3-MeFOSAA	67%	74%	50-150%
	13C2-4:2FTS	81%	87%	50-150%
	13C2-6:2FTS	95%	101%	50-150%
	13C2-8:2FTS	79%	83%	50-150%

(a) Result is from Run# 2

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-08_120718		
Lab Sample ID:	FA60008-15	**Date Sampled:**	12/07/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
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	2Q25407.D	1	12/21/18 18:46	NAF	12/19/18 09:00	OP73096	S2Q394
Run #2	2Q25528.D	1	12/24/18 22:21	NAF	12/19/18 09:00	OP73096	S2Q395

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0162	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0243	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0216	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0193	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0374	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00304 [a]	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00205	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00200	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00103	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0620	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.0133	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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-08_120718		
Lab Sample ID:	FA60008-15	**Date Sampled:**	12/07/18
Matrix:	AQ - Ground Water	**Date Received:**	12/08/18
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	84%	89%	30-140%
	13C5-PFPeA	87%	93%	40-140%
	13C5-PFHxA	88%	98%	50-150%
	13C4-PFHpA	94%	103%	50-150%
	13C8-PFOA	99%	113%	50-150%
	13C9-PFNA	102%	111%	50-150%
	13C6-PFDA	96%	101%	50-150%
	13C7-PFUnDA	108%	107%	50-150%
	13C2-PFDoDA	81%	91%	50-150%
	13C2-PFTeDA	84%	89%	40-150%
	13C3-PFBS	83%	91%	50-150%
	13C3-PFHxS	88%	94%	50-150%
	13C8-PFOS	95%	100%	50-150%
	13C8-FOSA	82%	89%	30-140%
	d3-MeFOSAA	88%	96%	50-150%
	13C2-4:2FTS	92%	94%	50-150%
	13C2-6:2FTS	105%	111%	50-150%
	13C2-8:2FTS	98%	104%	50-150%

(a) Result is from Run# 2

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:

- Chain of Custody

FA60008

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

SGS - ORLANDO JOB # : PAGE 1 OF 2

SGS - ORLANDO Quote # | SKIFF #

Client / Reporting Information

Company Name: Arcadis of Michigan, LLC
Address: 28550 Cabot Drive, Suite 500
City: Novi State: MI Zip: 48377
Project Contact: Christine Gregg Email: Christine.Gregg@arcadis.com
Phone #: 248-483-6634
Sampler(s) Name(s) (Printed) Sampler 1: Austin Westhuis Sampler 2: Dale Arent

Project Information

Project Name: RACER Lansing
Street
City Lansing State MI
Project # B0064479.2018.03700
Fax # 248-994-2241
Client Purchase Order # B0064479.2018.03700

Analytical Information

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	OTHER	CONTAINER INFORMATION: NONE	HCl	NaOH	HNO3	H2SO4	NAOH+ZNAA	DI WATER	MEOH	PFAS *	LAB USE ONLY
1	MW-91-2_120418	12/4/18	1435	AW	GW	2		2								X	
2	MW-02-04(3)_120518	12/5/18	1045	AW	GW	2		2								X	
3	MW-18-92_120518	12/5/18	1220	AW	GW	2		2								X	
4	MW-18-88_120518	12/5/18	1340	AW	GW	2		2								X	
5	MW-18-89_120518	12/5/18	1515	AW	GW	2		2								X	
6	MW-18-90_120618	12/6/18	1045	AW	GW	2		2								X	
7	MW-18-91_120618	12/6/18	1215	AW	GW	2		2								X	
8	CH-14-RO-120618	12/6/18	1440	AW	GW	2		2								X	
9	Dup-04	12/6/18	—	AW	GW	2		2								X	
10	AS-17-05_120718	12/7/18	1140	DA	GW	2		2								X	
11	AS-17-07_120718	12/7/18	1350	DA	GW	2		2								X	
12	PB-MW2-SW_120718	12/7/18	1420	DA	GW	2		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

* PFAS method 537 mod. with isotope dilution per QSM 5.1. MDEQ 24-Compound list.

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 Dale Arent / Arcadis	12/7/18 1700	2 Fedex / Fedex	3 FF		4 [signature] 12/8/18 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): 1.2

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

ORLD-SMT-0001-03-FORM-COC (1) Rev 031318

FA60008: Chain of Custody
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FA60008

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

SGS - ORLANDO JOB # : PAGE 2 OF 2

SGS - ORLANDO Quote # | SKIFF #

Client / Reporting Information	Project Information	Analytical Information	Matrix Codes
Company Name: ARCADIS of Michigan LLC	Project Name: Racer Landfill		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
Address: 28550 Cabot Dr. Ste 500	Street		
City: Novi State: MI Zip: 48377	City Lansing State MI		
Project Contact: Christine Boggs Email: Christine.Boggs@arcadis.com	Project # B006474.2018.03700		
Phone #: 248-483-6634	Fax # 248-994-2241		
Sampler(s) Name(s) (Printed) Sampler 1: Avash Westhuis Sampler 2: Dale Alamy	Client Purchase Order # B006474.2018.03700		

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	MEOH	PFAS *	LAB USE ONLY
13	P3-MH-NE_120718	12/7/18	1510	DA	GW	2		2								X	
14	P2-MH-NW_120718	12/7/18	1540	DA	GW	2		2								X	
15	Dup-08_120718	12/7/18	—	DA	GW	2		2								X	

Turnaround Time (Business days)	Data Deliverable Information	Comments / Remarks
10 Day (Business) Approved By: / Date:	COMMERCIAL "A" (RESULTS ONLY)	*PFAS Method 537 mod. w/ isotope dilution per QSM 5.1 MDEQ
7 Day	COMMERCIAL "B" (RESULTS PLUS QC)	
5 Day	REDT1 (EPA LEVEL 3)	24-Comp and list
3 Day *RUSH*	FULLT1 (EPA LEVEL 4)	
2 Day *RUSH*	EDD'S	
1 Day *RUSH*		
Other		
Rush T/A Data Available VIA Email or Lablink		

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler/Affiliation	Date Time:	Received By/Affiliation	Relinquished By/Affiliation	Date Time:	Received By/Affiliation
1 DAlamy / ARCADIS	12/7/18 1700	2 FedEx	3 FX		4 [illegible] 12/8/18 1000
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): 1c2

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

ORLD-SMT-0001-03-FORM-COC (1) Rev 031318

FA60008: Chain of Custody
Page 2 of 3

SGS Sample Receipt Summary

Job Number: FA60008 **Client:** ARCADIS OF MICHIGAN **Project:** RACER LANSING

Date / Time Received: 12/8/2018 10:00:00 AM **Delivery Method:** FX **Airbill #'s:** 1002241571060003281100813921966404

Therm ID: IR 1; **Therm CF:** -0.2; **# of Coolers:** 1

Cooler Temps (Raw Measured) °C: Cooler 1: (1.4);

Cooler Temps (Corrected) °C: Cooler 1: (1.2);

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: 12/8/2018 10:00:00 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: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73096-MB	2Q25388.D	1	12/21/18	NAF	12/19/18	OP73096	S2Q394

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

FA60008-1, FA60008-2, FA60008-3, FA60008-4, FA60008-5, FA60008-6, FA60008-7, FA60008-8, FA60008-9, FA60008-10, FA60008-11, FA60008-12, FA60008-14, FA60008-15

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	98%	30-140%
	13C5-PFPeA	97%	40-140%
	13C5-PFHxA	99%	50-150%
	13C4-PFHpA	101%	50-150%
	13C8-PFOA	117%	50-150%
	13C9-PFNA	106%	50-150%
	13C6-PFDA	90%	50-150%
	13C7-PFUnDA	88%	50-150%

Method Blank Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73096-MB	2Q25388.D	1	12/21/18	NAF	12/19/18	OP73096	S2Q394

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

FA60008-1, FA60008-2, FA60008-3, FA60008-4, FA60008-5, FA60008-6, FA60008-7, FA60008-8, FA60008-9, FA60008-10, FA60008-11, FA60008-12, FA60008-14, FA60008-15

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	62%	50-150%
	13C2-PFTeDA	66%	40-150%
	13C3-PFBS	95%	50-150%
	13C3-PFHxS	96%	50-150%
	13C8-PFOS	79%	50-150%
	13C8-FOSA	99%	30-140%
	d3-MeFOSAA	72%	50-150%
	13C2-4:2FTS	94%	50-150%
	13C2-6:2FTS	112%	50-150%
	13C2-8:2FTS	81%	50-150%

Method Blank Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73191-MB	2Q25692.D	1	12/27/18	NAF	12/26/18	OP73191	S2Q397

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

FA60008-13

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.015	0.0038	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0077	0.0029	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0077	0.0019	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0077	0.0019	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0077	0.0019	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0077	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0077	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0077	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0077	0.0029	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0077	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0077	0.0019	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0077	0.0019	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0077	0.0019	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0077	0.0019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0077	0.0019	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00546	0.0077	0.0029	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0077	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0077	0.0019	ug/l	
754-91-6	PFOSA	ND	0.0077	0.0019	ug/l	
2355-31-9	MeFOSAA	ND	0.038	0.0077	ug/l	
2991-50-6	EtFOSAA	ND	0.038	0.0077	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	102%	30-140%
	13C5-PFPeA	107%	40-140%
	13C5-PFHxA	111%	50-150%
	13C4-PFHpA	110%	50-150%
	13C8-PFOA	116%	50-150%
	13C9-PFNA	114%	50-150%
	13C6-PFDA	109%	50-150%
	13C7-PFUnDA	101%	50-150%

Method Blank Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73191-MB	2Q25692.D	1	12/27/18	NAF	12/26/18	OP73191	S2Q397

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

FA60008-13

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	84%	50-150%
	13C2-PFTeDA	80%	40-150%
	13C3-PFBS	102%	50-150%
	13C3-PFHxS	104%	50-150%
	13C8-PFOS	102%	50-150%
	13C8-FOSA	108%	30-140%
	d3-MeFOSAA	86%	50-150%
	13C2-4:2FTS	103%	50-150%
	13C2-6:2FTS	107%	50-150%
	13C2-8:2FTS	96%	50-150%

Method Blank Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73191-MB	2Q25757.D	1	12/28/18	NAF	12/26/18	OP73191	S2Q397

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

FA60008-13

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.015	0.0038	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0077	0.0029	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0077	0.0019	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0077	0.0019	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0077	0.0019	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0077	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0077	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0077	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0077	0.0029	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0077	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0077	0.0019	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0077	0.0019	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0077	0.0019	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0077	0.0019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0077	0.0019	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00578	0.0077	0.0029	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0077	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0077	0.0019	ug/l	
754-91-6	PFOSA	ND	0.0077	0.0019	ug/l	
2355-31-9	MeFOSAA	ND	0.038	0.0077	ug/l	
2991-50-6	EtFOSAA	ND	0.038	0.0077	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	104%	30-140%
	13C5-PFPeA	110%	40-140%
	13C5-PFHxA	114%	50-150%
	13C4-PFHpA	111%	50-150%
	13C8-PFOA	120%	50-150%
	13C9-PFNA	120%	50-150%
	13C6-PFDA	118%	50-150%
	13C7-PFUnDA	101%	50-150%

Method Blank Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73191-MB	2Q25757.D	1	12/28/18	NAF	12/26/18	OP73191	S2Q397

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

FA60008-13

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	86%	50-150%
	13C2-PFTeDA	87%	40-150%
	13C3-PFBS	106%	50-150%
	13C3-PFHxS	107%	50-150%
	13C8-PFOS	104%	50-150%
	13C8-FOSA	113%	30-140%
	d3-MeFOSAA	99%	50-150%
	13C2-4:2FTS	108%	50-150%
	13C2-6:2FTS	115%	50-150%
	13C2-8:2FTS	103%	50-150%

Instrument Blank

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q394-IBLK	2Q25384.D	1	12/21/18	NAF	n/a	n/a	S2Q394

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

FA60008-1, FA60008-3, FA60008-4, FA60008-6, FA60008-12, FA60008-14, FA60008-15

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

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	97%	50-150%
	13C5-PFPeA	98%	50-150%
	13C5-PFHxA	100%	50-150%
	13C4-PFHpA	100%	50-150%
	13C8-PFOA	101%	50-150%
	13C9-PFNA	105%	50-150%
	13C6-PFDA	110%	50-150%
	13C7-PFUnDA	107%	50-150%

Instrument Blank

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q394-IBLK	2Q25384.D	1	12/21/18	NAF	n/a	n/a	S2Q394

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

FA60008-1, FA60008-3, FA60008-4, FA60008-6, FA60008-12, FA60008-14, FA60008-15

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	105%	50-150%
	13C2-PFTeDA	105%	50-150%
	13C3-PFBS	97%	50-150%
	13C3-PFHxS	97%	50-150%
	13C8-PFOS	101%	50-150%
	13C8-FOSA	109%	50-150%
	d3-MeFOSAA	105%	50-150%
	13C2-4:2FTS	93%	50-150%
	13C2-6:2FTS	95%	50-150%
	13C2-8:2FTS	99%	50-150%

Instrument Blank

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q395-IBLK	2Q25509.D	1	12/24/18	NAF	n/a	n/a	S2Q395

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

FA60008-2, FA60008-5, FA60008-6, FA60008-7, FA60008-8, FA60008-9, FA60008-10, FA60008-11, FA60008-12, FA60008-14, FA60008-15

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

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	98%	50-150%
	13C5-PFPeA	99%	50-150%
	13C5-PFHxA	102%	50-150%
	13C4-PFHpA	102%	50-150%
	13C8-PFOA	102%	50-150%
	13C9-PFNA	100%	50-150%
	13C6-PFDA	109%	50-150%
	13C7-PFUnDA	105%	50-150%

Instrument Blank

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q395-IBLK	2Q25509.D	1	12/24/18	NAF	n/a	n/a	S2Q395

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

FA60008-2, FA60008-5, FA60008-6, FA60008-7, FA60008-8, FA60008-9, FA60008-10, FA60008-11, FA60008-12, FA60008-14, FA60008-15

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	102%	50-150%
	13C2-PFTeDA	100%	50-150%
	13C3-PFBS	99%	50-150%
	13C3-PFHxS	100%	50-150%
	13C8-PFOS	99%	50-150%
	13C8-FOSA	108%	50-150%
	d3-MeFOSAA	99%	50-150%
	13C2-4:2FTS	93%	50-150%
	13C2-6:2FTS	95%	50-150%
	13C2-8:2FTS	97%	50-150%

Instrument Blank

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q397-IBLK	2Q25674.D	1	12/27/18	NAF	n/a	n/a	S2Q397

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

FA60008-13

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

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	105%	50-150%
	13C5-PFPeA	104%	50-150%
	13C5-PFHxA	107%	50-150%
	13C4-PFHpA	105%	50-150%
	13C8-PFOA	108%	50-150%
	13C9-PFNA	107%	50-150%
	13C6-PFDA	113%	50-150%
	13C7-PFUnDA	114%	50-150%

Instrument Blank

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q397-IBLK	2Q25674.D	1	12/27/18	NAF	n/a	n/a	S2Q397

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

FA60008-13

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	111%	50-150%
	13C2-PFTeDA	103%	50-150%
	13C3-PFBS	104%	50-150%
	13C3-PFHxS	104%	50-150%
	13C8-PFOS	106%	50-150%
	13C8-FOSA	112%	50-150%
	d3-MeFOSAA	109%	50-150%
	13C2-4:2FTS	99%	50-150%
	13C2-6:2FTS	102%	50-150%
	13C2-8:2FTS	101%	50-150%

Blank Spike Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73096-BS	2Q25387.D	1	12/21/18	NAF	12/19/18	OP73096	S2Q394

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

FA60008-1, FA60008-2, FA60008-3, FA60008-4, FA60008-5, FA60008-6, FA60008-7, FA60008-8, FA60008-9, FA60008-10, FA60008-11, FA60008-12, FA60008-14, FA60008-15

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0692	87	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0689	86	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0609	76	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0682	85	71-130
335-67-1	Perfluorooctanoic acid	0.08	0.0661	83	74-130
375-95-1	Perfluorononanoic acid	0.08	0.0571	71* [a]	76-130
335-76-2	Perfluorodecanoic acid	0.08	0.0601	75	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0653	82	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0722	90	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0787	98	70-139
376-06-7	Perfluorotetradecanoic acid	0.08	0.0654	82	70-130
375-73-5	Perfluorobutanesulfonic acid	0.0708	0.0593	84	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.0752	0.0630	84	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0728	0.0587	81	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.076	0.0657	86	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.074	0.0669	90	70-130
68259-12-1	Perfluorononanesulfonic acid	0.0768	0.0594	77	70-130
335-77-3	Perfluorodecanesulfonic acid	0.0772	0.0568	74	70-130
754-91-6	PFOSA	0.08	0.0699	87	70-131
2355-31-9	MeFOSAA	0.08	0.0681	85	70-130
2991-50-6	EtFOSAA	0.08	0.0686	86	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.0748	0.0659	88	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.076	0.0682	90	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.0768	0.0658	86	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	114%	30-140%
	13C5-PFPeA	113%	40-140%
	13C5-PFHxA	115%	50-150%
	13C4-PFHpA	113%	50-150%
	13C8-PFOA	126%	50-150%
	13C9-PFNA	114%	50-150%
	13C6-PFDA	106%	50-150%
	13C7-PFUnDA	117%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73096-BS	2Q25387.D	1	12/21/18	NAF	12/19/18	OP73096	S2Q394

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

FA60008-1, FA60008-2, FA60008-3, FA60008-4, FA60008-5, FA60008-6, FA60008-7, FA60008-8, FA60008-9, FA60008-10, FA60008-11, FA60008-12, FA60008-14, FA60008-15

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	85%	50-150%
	13C2-PFTeDA	90%	40-150%
	13C3-PFBS	110%	50-150%
	13C3-PFHxS	106%	50-150%
	13C8-PFOS	94%	50-150%
	13C8-FOSA	107%	30-140%
	d3-MeFOSAA	94%	50-150%
	13C2-4:2FTS	114%	50-150%
	13C2-6:2FTS	126%	50-150%
	13C2-8:2FTS	102%	50-150%

(a) Sporadic marginal failure.

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73096-BS	2Q25512.D	1	12/24/18	NAF	12/19/18	OP73096	S2Q395

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

FA60008-1, FA60008-2, FA60008-3, FA60008-4, FA60008-5, FA60008-6, FA60008-7, FA60008-8, FA60008-9, FA60008-10, FA60008-11, FA60008-12, FA60008-14, FA60008-15

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0666	83	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0665	83	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0605	76	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0659	82	71-130
335-67-1	Perfluorooctanoic acid	0.08	0.0694	87	74-130
375-95-1	Perfluorononanoic acid	0.08	0.0618	77	76-130
335-76-2	Perfluorodecanoic acid	0.08	0.0612	77	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0697	87	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0650	81	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0724	91	70-139
376-06-7	Perfluorotetradecanoic acid	0.08	0.0662	83	70-130
375-73-5	Perfluorobutanesulfonic acid	0.0708	0.0580	82	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.0752	0.0628	84	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0728	0.0567	78	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.076	0.0642	84	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.074	0.0660	89	70-130
68259-12-1	Perfluorononanesulfonic acid	0.0768	0.0577	75	70-130
335-77-3	Perfluorodecanesulfonic acid	0.0772	0.0520	67* [a]	70-130
754-91-6	PFOSA	0.08	0.0681	85	70-131
2355-31-9	MeFOSAA	0.08	0.0661	83	70-130
2991-50-6	EtFOSAA	0.08	0.0673	84	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.0748	0.0638	85	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.076	0.0651	86	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.0768	0.0617	80	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	113%	30-140%
	13C5-PFPeA	116%	40-140%
	13C5-PFHxA	118%	50-150%
	13C4-PFHpA	118%	50-150%
	13C8-PFOA	123%	50-150%
	13C9-PFNA	116%	50-150%
	13C6-PFDA	101%	50-150%
	13C7-PFUnDA	99%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73096-BS	2Q25512.D	1	12/24/18	NAF	12/19/18	OP73096	S2Q395

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

FA60008-1, FA60008-2, FA60008-3, FA60008-4, FA60008-5, FA60008-6, FA60008-7, FA60008-8, FA60008-9, FA60008-10, FA60008-11, FA60008-12, FA60008-14, FA60008-15

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	91%	50-150%
	13C2-PFTeDA	89%	40-150%
	13C3-PFBS	115%	50-150%
	13C3-PFHxS	111%	50-150%
	13C8-PFOS	96%	50-150%
	13C8-FOSA	108%	30-140%
	d3-MeFOSAA	92%	50-150%
	13C2-4:2FTS	118%	50-150%
	13C2-6:2FTS	121%	50-150%
	13C2-8:2FTS	99%	50-150%

(a) Sporadic marginal failure.

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73191-BS	2Q25691.D	1	12/27/18	NAF	12/26/18	OP73191	S2Q397

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

FA60008-13

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.154	0.134	87	70-130
2706-90-3	Perfluoropentanoic acid	0.154	0.126	82	70-130
307-24-4	Perfluorohexanoic acid	0.154	0.117	76	70-130
375-85-9	Perfluoroheptanoic acid	0.154	0.127	83	71-130
335-67-1	Perfluorooctanoic acid	0.154	0.137	89	74-130
375-95-1	Perfluorononanoic acid	0.154	0.118	77	76-130
335-76-2	Perfluorodecanoic acid	0.154	0.122	79	70-130
2058-94-8	Perfluoroundecanoic acid	0.154	0.131	85	70-130
307-55-1	Perfluorododecanoic acid	0.154	0.140	91	70-130
72629-94-8	Perfluorotridecanoic acid	0.154	0.142	92	70-139
376-06-7	Perfluorotetradecanoic acid	0.154	0.123	80	70-130
375-73-5	Perfluorobutanesulfonic acid	0.136	0.113	83	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.145	0.122	84	70-130
355-46-4	Perfluorohexanesulfonic acid	0.14	0.114	81	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.146	0.126	86	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.142	0.141	99	70-130
68259-12-1	Perfluorononanesulfonic acid	0.148	0.116	79	70-130
335-77-3	Perfluorodecanesulfonic acid	0.148	0.103	69* [a]	70-130
754-91-6	PFOSA	0.154	0.135	88	70-131
2355-31-9	MeFOSAA	0.154	0.133	86	70-130
2991-50-6	EtFOSAA	0.154	0.136	88	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.144	0.125	87	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.146	0.128	88	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.148	0.122	83	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	94%	30-140%
	13C5-PFPeA	98%	40-140%
	13C5-PFHxA	102%	50-150%
	13C4-PFHpA	102%	50-150%
	13C8-PFOA	100%	50-150%
	13C9-PFNA	104%	50-150%
	13C6-PFDA	102%	50-150%
	13C7-PFUnDA	99%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73191-BS	2Q25691.D	1	12/27/18	NAF	12/26/18	OP73191	S2Q397

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

FA60008-13

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	88%	50-150%
	13C2-PFTeDA	91%	40-150%
	13C3-PFBS	96%	50-150%
	13C3-PFHxS	98%	50-150%
	13C8-PFOS	95%	50-150%
	13C8-FOSA	80%	30-140%
	d3-MeFOSAA	88%	50-150%
	13C2-4:2FTS	101%	50-150%
	13C2-6:2FTS	101%	50-150%
	13C2-8:2FTS	95%	50-150%

(a) Sporadic marginal failure.

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73096-MS	2Q25524.D	1	12/24/18	NAF	12/19/18	OP73096	S2Q395
FA60008-10	2Q25523.D	1	12/24/18	NAF	12/19/18	OP73096	S2Q395

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

FA60008-1, FA60008-2, FA60008-3, FA60008-4, FA60008-5, FA60008-6, FA60008-7, FA60008-8, FA60008-9, FA60008-10, FA60008-11, FA60008-12, FA60008-14, FA60008-15

CAS No.	Compound	FA60008-10 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
375-22-4	Perfluorobutanoic acid	0.00549	J	0.08	0.0791	92	70-130
2706-90-3	Perfluoropentanoic acid	ND		0.08	0.0773	97	70-130
307-24-4	Perfluorohexanoic acid	ND		0.08	0.0672	84	70-130
375-85-9	Perfluoroheptanoic acid	ND		0.08	0.0742	93	71-130
335-67-1	Perfluorooctanoic acid	0.00256	J	0.08	0.0767	93	74-130
375-95-1	Perfluorononanoic acid	ND		0.08	0.0662	83	76-130
335-76-2	Perfluorodecanoic acid	ND		0.08	0.0728	91	70-130
2058-94-8	Perfluoroundecanoic acid	ND		0.08	0.0810	101	70-130
307-55-1	Perfluorododecanoic acid	ND		0.08	0.0830	104	70-130
72629-94-8	Perfluorotridecanoic acid	ND		0.08	0.0736	92	70-139
376-06-7	Perfluorotetradecanoic acid	ND		0.08	0.0757	95	70-130
375-73-5	Perfluorobutanesulfonic acid	0.00473		0.0708	0.0677	89	73-130
2706-91-4	Perfluoropentanesulfonic acid	ND		0.0752	0.0739	98	70-130
355-46-4	Perfluorohexanesulfonic acid	ND		0.0728	0.0635	87	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.00114	J	0.076	0.0766	99	74-130
1763-23-1	Perfluorooctanesulfonic acid	ND		0.074	0.0728	98	70-130
68259-12-1	Perfluorononanesulfonic acid	ND		0.0768	0.0564	73	70-130
335-77-3	Perfluorodecanesulfonic acid	ND		0.0772	0.0420	54*	70-130
754-91-6	PFOSA	ND		0.08	0.0797	100	70-131
2355-31-9	MeFOSAA	ND		0.08	0.0772	97	70-130
2991-50-6	EtFOSAA	ND		0.08	0.0796	100	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	ND		0.0748	0.0700	94	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	ND		0.076	0.0709	93	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	ND		0.0768	0.0692	90	70-130

CAS No.	ID Standard Recoveries	MS	FA60008-10	Limits
	13C4-PFBA	75%	71%	30-140%
	13C5-PFPeA	83%	80%	40-140%
	13C5-PFHxA	94%	91%	50-150%
	13C4-PFHpA	93%	89%	50-150%
	13C8-PFOA	98%	98%	50-150%
	13C9-PFNA	103%	97%	50-150%
	13C6-PFDA	93%	91%	50-150%
	13C7-PFUnDA	82%	86%	50-150%

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73096-MS	2Q25524.D	1	12/24/18	NAF	12/19/18	OP73096	S2Q395
FA60008-10	2Q25523.D	1	12/24/18	NAF	12/19/18	OP73096	S2Q395

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

FA60008-1, FA60008-2, FA60008-3, FA60008-4, FA60008-5, FA60008-6, FA60008-7, FA60008-8, FA60008-9, FA60008-10, FA60008-11, FA60008-12, FA60008-14, FA60008-15

CAS No.	ID Standard Recoveries	MS	FA60008-10	Limits
	13C2-PFDoDA	52%	59%	50-150%
	13C2-PFTeDA	38%* [a]	56%	40-150%
	13C3-PFBS	89%	86%	50-150%
	13C3-PFHxS	97%	94%	50-150%
	13C8-PFOS	92%	90%	50-150%
	13C8-FOSA	51%	41%	30-140%
	d3-MeFOSAA	74%	74%	50-150%
	13C2-4:2FTS	99%	93%	50-150%
	13C2-6:2FTS	105%	99%	50-150%
	13C2-8:2FTS	120%	97%	50-150%

(a) Outside control limits.

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73191-MS	2Q25695.D	1	12/27/18	NAF	12/26/18	OP73191	S2Q397
JC80150-21 [a]	2Q25694.D	1	12/27/18	NAF	12/26/18	OP73191	S2Q397

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

FA60008-13

CAS No.	Compound	JC80150-21 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
375-22-4	Perfluorobutanoic acid	ND		0.16	0.132	83	70-130
2706-90-3	Perfluoropentanoic acid	0.00339	J	0.16	0.129	79	70-130
307-24-4	Perfluorohexanoic acid	0.00585	J	0.16	0.119	71	70-130
375-85-9	Perfluoroheptanoic acid	0.0450		0.16	0.173	80	71-130
335-67-1	Perfluorooctanoic acid	0.0630		0.16	0.194	82	74-130
375-95-1	Perfluorononanoic acid	0.614		0.16	0.723	68* [b]	76-130
335-76-2	Perfluorodecanoic acid	ND		0.16	0.125	78	70-130
2058-94-8	Perfluoroundecanoic acid	ND		0.16	0.130	81	70-130
307-55-1	Perfluorododecanoic acid	ND		0.16	0.134	84	70-130
72629-94-8	Perfluorotridecanoic acid	ND		0.16	0.152	95	70-139
376-06-7	Perfluorotetradecanoic acid	ND		0.16	0.128	80	70-130
375-73-5	Perfluorobutanesulfonic acid	ND		0.142	0.112	79	73-130
2706-91-4	Perfluoropentanesulfonic acid	ND		0.15	0.119	79	70-130
355-46-4	Perfluorohexanesulfonic acid	0.00210	J	0.146	0.112	75	74-130
375-92-8	Perfluoroheptanesulfonic acid	ND		0.152	0.128	84	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.00966	B	0.148	0.134	84	70-130
68259-12-1	Perfluorononanesulfonic acid	ND		0.154	0.116	76	70-130
335-77-3	Perfluorodecanesulfonic acid	ND		0.154	0.0989	64*	70-130
754-91-6	PFOSA	ND		0.16	0.131	82	70-131
2355-31-9	MeFOSAA	ND		0.16	0.133	83	70-130
2991-50-6	EtFOSAA	ND		0.16	0.129	81	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	ND		0.15	0.123	82	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	ND		0.152	0.127	84	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	ND		0.154	0.121	79	70-130

CAS No.	ID Standard Recoveries	MS	JC80150-21	Limits
	13C4-PFBA	38%		30-140%
	13C5-PFPeA	112%		40-140%
	13C5-PFHxA	120%	107%	50-150%
	13C4-PFHpA	116%	106%	50-150%
	13C8-PFOA	121%	113%	50-150%
	13C9-PFNA	114%	105%	50-150%
	13C6-PFDA	111%	112%	50-150%
	13C7-PFUnDA	113%	103%	50-150%

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73191-MS	2Q25695.D	1	12/27/18	NAF	12/26/18	OP73191	S2Q397
JC80150-21 [a]	2Q25694.D	1	12/27/18	NAF	12/26/18	OP73191	S2Q397

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

FA60008-13

CAS No.	ID Standard Recoveries	MS	JC80150-21	Limits
	13C2-PFDoDA	100%	95%	50-150%
	13C2-PFTeDA	97%	90%	40-150%
	13C3-PFBS	112%	100%	50-150%
	13C3-PFHxS	109%	101%	50-150%
	13C8-PFOS	107%	99%	50-150%
	13C8-FOSA	120%		30-140%
	d3-MeFOSAA	102%		50-150%
	13C2-4:2FTS	115%		50-150%
	13C2-6:2FTS	118%		50-150%
	13C2-8:2FTS	109%		50-150%

(a) Insufficient sample for re-extraction.
(b) Outside control limits due to high level in sample relative to spike amount.

* = Outside of Control Limits.

Duplicate Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73096-DUP	2Q25406.D	1	12/21/18	NAF	12/19/18	OP73096	S2Q394
FA60008-14	2Q25405.D	1	12/21/18	NAF	12/19/18	OP73096	S2Q394
FA60008-14	2Q25527.D	1	12/24/18	NAF	12/19/18	OP73096	S2Q395

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

FA60008-1, FA60008-2, FA60008-3, FA60008-4, FA60008-5, FA60008-6, FA60008-7, FA60008-8, FA60008-9, FA60008-10, FA60008-11, FA60008-12, FA60008-14, FA60008-15

CAS No.	Compound	FA60008-14 ug/l	Q	DUP ug/l	Q	RPD	Limits
375-22-4	Perfluorobutanoic acid	0.0136		0.0143		5	30
2706-90-3	Perfluoropentanoic acid	0.0182		0.0207		13	30
307-24-4	Perfluorohexanoic acid	0.0177		0.0185		4	30
375-85-9	Perfluoroheptanoic acid	0.0161		0.0176		9	30
335-67-1	Perfluorooctanoic acid	0.0312		0.0341		9	30
375-95-1	Perfluorononanoic acid	0.00360	aJ	0.00437		19	30
335-76-2	Perfluorodecanoic acid	0.00453		0.00444		2	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	0.00807		0.0128		45*	30
2706-91-4	Perfluoropentanesulfonic acid	0.00331	J	0.00337	J	2	30
355-46-4	Perfluorohexanesulfonic acid	0.0220		0.0233		6	30
375-92-8	Perfluoroheptanesulfonic acid	0.00196	J	0.00199	J	2	30
1763-23-1	Perfluorooctanesulfonic acid	0.176		0.192		9	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	0.00221	J	0.00233	J	5	30
39108-34-4	8:2 Fluorotelomer sulfonate	ND		ND		nc	30

CAS No.	ID Standard Recoveries	DUP	FA60008-14	FA60008-14	Limits
	13C4-PFBA	83%	74%	80%	30-140%
	13C5-PFPeA	86%	77%	84%	40-140%
	13C5-PFHxA	88%	78%	87%	50-150%
	13C4-PFHpA	89%	80%	91%	50-150%
	13C8-PFOA	99%	89%	100%	50-150%
	13C9-PFNA	99%	85%	99%	50-150%
	13C6-PFDA	87%	80%	84%	50-150%
	13C7-PFUnDA	82%	71%	75%	50-150%

* = Outside of Control Limits.

Duplicate Summary

Job Number: FA60008
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73096-DUP	2Q25406.D	1	12/21/18	NAF	12/19/18	OP73096	S2Q394
FA60008-14	2Q25405.D	1	12/21/18	NAF	12/19/18	OP73096	S2Q394
FA60008-14	2Q25527.D	1	12/24/18	NAF	12/19/18	OP73096	S2Q395

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

FA60008-1, FA60008-2, FA60008-3, FA60008-4, FA60008-5, FA60008-6, FA60008-7, FA60008-8, FA60008-9, FA60008-10, FA60008-11, FA60008-12, FA60008-14, FA60008-15

CAS No.	ID Standard Recoveries	DUP	FA60008-14	FA60008-14	Limits
	13C2-PFDoDA	72%	59%	69%	50-150%
	13C2-PFTeDA	79%	66%	71%	40-150%
	13C3-PFBS	83%	73%	81%	50-150%
	13C3-PFHxS	83%	73%	82%	50-150%
	13C8-PFOS	81%	73%	79%	50-150%
	13C8-FOSA	77%	69%	61%	30-140%
	d3-MeFOSAA	79%	67%	74%	50-150%
	13C2-4:2FTS	93%	81%	87%	50-150%
	13C2-6:2FTS	109%	95%	101%	50-150%
	13C2-8:2FTS	90%	79%	83%	50-150%

(a) Result is from Run #2.

* = 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

B0064479.2018

SGS Job Number: FA61190

Sampling Date: 01/26/19

Report to:

Arcadis
300 S Washington Sq Suite 315
Lansing, MI 48933
alex.villhauer@arcadis.com; christine.gregg@arcadis.com;
daniel.stockard@arcadis.com
ATTN: Alex Villhauer

Total number of pages in report: 51

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Caitlin Brice, M.S.
General Manager

Client Service contact: Andrea Colby 407-425-6700

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

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SGS North America Inc.

Sample Summary

Arcadis

Job No: FA61190

Racer Lansing PFAS Delineation; Lansing, MI
Project No: B0064479.2018

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
FA61190-1	01/26/19	10:15	DSMS	01/29/19	AQ	Ground Water	P3-MH-NW_012619
FA61190-2	01/26/19	11:00	DSMS	01/29/19	AQ	Ground Water	P2-MH-2_012619
FA61190-3	01/26/19	11:20	DSMS	01/29/19	AQ	Ground Water	P2-MH-37_012619
FA61190-4	01/26/19	11:35	DSMS	01/29/19	AQ	Ground Water	P2-MH-26_012619
FA61190-5	01/26/19	12:10	DSMS	01/29/19	AQ	Ground Water	P2-MH-25_012619
FA61190-6	01/26/19	13:35	DSMS	01/29/19	AQ	Ground Water	P2-MH-79_012619
FA61190-7	01/26/19	14:25	DSMS	01/29/19	AQ	Ground Water	P2-MH-9_012619
FA61190-8	01/26/19	14:45	DSMS	01/29/19	AQ	Ground Water	P2-MH-97_012619
FA61190-9	01/26/19	15:35	DSMS	01/29/19	AQ	Ground Water	P6-MH-13_012619
FA61190-10	01/26/19	15:50	DSMS	01/29/19	AQ	Ground Water	P6-MH-14_012619
FA61190-11	01/26/19	16:10	DSMS	01/29/19	AQ	Ground Water	P6-MH-11_012619
FA61190-12	01/26/19	00:00	DSMS	01/29/19	AQ	Ground Water	DUP-01

2

Summary of Hits

Job Number: FA61190
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 01/26/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA61190-1	**P3-MH-NW_012619**					
Perfluorobutanoic acid		0.0120	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00156 J	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00149 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00139 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00261 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00195 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00133 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0347	0.0040	0.0015	ug/l	EPA 537M BY ID
FA61190-2	**P2-MH-2_012619**					
Perfluorobutanoic acid		0.0142	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0151	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0149	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0139	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0292	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00317 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00340 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0131	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00237 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0193	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00217 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.161	0.0040	0.0015	ug/l	EPA 537M BY ID
FA61190-3	**P2-MH-37_012619**					
Perfluorobutanoic acid		0.00445 J	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00133 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00254 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00114 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00242 J	0.0040	0.0015	ug/l	EPA 537M BY ID
FA61190-4	**P2-MH-26_012619**					
Perfluorobutanoic acid		0.0130	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0136	0.0038	0.0014	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0139	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0126	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0275	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00268 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00253 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00272 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00346 J	0.0038	0.00096	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA61190
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 01/26/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluorohexanesulfonic acid		0.0176	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00241 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.104	0.0038	0.0014	ug/l	EPA 537M BY ID
FA61190-5	**P2-MH-25_012619**					
Perfluorobutanoic acid		0.0207	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0260	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0269	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0256	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0501	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00474	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00321 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00639	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00353 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0320	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00305 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.207	0.0040	0.0015	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate		0.00326 J	0.0080	0.0020	ug/l	EPA 537M BY ID
FA61190-6	**P2-MH-79_012619**					
Perfluorobutanoic acid		0.0161	0.0083	0.0021	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0173	0.0042	0.0016	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0175	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0166	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0370	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00392 J	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00431	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0124	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00460	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0250	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00348 J	0.0042	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.147	0.0042	0.0016	ug/l	EPA 537M BY ID
FA61190-7	**P2-MH-9_012619**					
Perfluorobutanoic acid		0.0142	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0121	0.0038	0.0014	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00952	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00753	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0158	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00109 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00133 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00252 J	0.0038	0.00096	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA61190
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 01/26/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluorooctanesulfonic acid		0.0266	0.0038	0.0014	ug/l	EPA 537M BY ID
FA61190-8	**P2-MH-97_012619**					
Perfluorobutanoic acid		0.0275	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0394	0.0038	0.0014	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0413	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0412	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0847	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00977	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.0140	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00730	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00685	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0596	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00647	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.656	0.0077	0.0029	ug/l	EPA 537M BY ID
PFOSA		0.00208 J	0.0038	0.00096	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate		0.00820	0.0077	0.0019	ug/l	EPA 537M BY ID
8:2 Fluorotelomer sulfonate		0.00437 J	0.0077	0.0019	ug/l	EPA 537M BY ID
FA61190-9	**P6-MH-13_012619**					
Perfluorobutanoic acid		0.0197	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0244	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0242	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0232	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0480	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00637	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00746	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00260 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00115 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00193 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0253	0.0040	0.0015	ug/l	EPA 537M BY ID
PFOSA		0.00278 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA61190-10	**P6-MH-14_012619**					
Perfluorobutanoic acid		0.0246	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0420	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0432	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0308	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0649	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00842	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00726	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00215 J	0.0040	0.0010	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA61190
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 01/26/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluoropentanesulfonic acid		0.00119 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00197 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00198 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0225	0.0040	0.0015	ug/l	EPA 537M BY ID
FA61190-11	**P6-MH-11_012619**					
Perfluorobutanoic acid		0.0215	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0202	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0208	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0204	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0497	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00580	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00512	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00181 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00169 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0353	0.0040	0.0015	ug/l	EPA 537M BY ID
PFOSA		0.00312 J	0.0040	0.0010	ug/l	EPA 537M BY ID
FA61190-12	**DUP-01**					
Perfluorobutanoic acid		0.0140	0.0077	0.0019	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0147	0.0038	0.0014	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0158	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0144	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0328	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00336 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00408	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0114	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00461	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0224	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00240 J	0.0038	0.00096	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.135	0.0038	0.0014	ug/l	EPA 537M BY ID

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	P3-MH-NW_012619		
Lab Sample ID:	FA61190-1	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
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	2Q27034.D	1	02/06/19 12:51	NG	02/05/19 09:30	OP73679	S2Q424
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0120	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.00156	0.0040	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.00149	0.0040	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00139	0.0040	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00261	0.0040	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
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	0.00195	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	0.00133	0.0040	0.0010	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.0347	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	P3-MH-NW_012619		
Lab Sample ID:	FA61190-1	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	107%		30-140%
	13C5-PFPeA	107%		40-140%
	13C5-PFHxA	106%		50-150%
	13C4-PFHpA	108%		50-150%
	13C8-PFOA	118%		50-150%
	13C9-PFNA	111%		50-150%
	13C6-PFDA	104%		50-150%
	13C7-PFUnDA	94%		50-150%
	13C2-PFDoDA	85%		50-150%
	13C2-PFTeDA	82%		40-150%
	13C3-PFBS	102%		50-150%
	13C3-PFHxS	99%		50-150%
	13C8-PFOS	87%		50-150%
	13C8-FOSA	95%		30-140%
	d3-MeFOSAA	94%		50-150%
	13C2-4:2FTS	104%		50-150%
	13C2-6:2FTS	116%		50-150%
	13C2-8:2FTS	98%		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:	P2-MH-2_012619		
Lab Sample ID:	FA61190-2	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
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	2Q27035.D	1	02/06/19 13:07	NG	02/05/19 09:30	OP73679	S2Q424
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0142	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0151	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0149	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0139	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0292	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00317	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00340	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.0131	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.00237	0.0040	0.0010	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0193	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00217	0.0040	0.0010	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.161	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	P2-MH-2_012619		
Lab Sample ID:	FA61190-2	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	95%		30-140%
	13C5-PFPeA	96%		40-140%
	13C5-PFHxA	94%		50-150%
	13C4-PFHpA	96%		50-150%
	13C8-PFOA	106%		50-150%
	13C9-PFNA	108%		50-150%
	13C6-PFDA	111%		50-150%
	13C7-PFUnDA	116%		50-150%
	13C2-PFDoDA	103%		50-150%
	13C2-PFTeDA	92%		40-150%
	13C3-PFBS	92%		50-150%
	13C3-PFHxS	91%		50-150%
	13C8-PFOS	84%		50-150%
	13C8-FOSA	75%		30-140%
	d3-MeFOSAA	116%		50-150%
	13C2-4:2FTS	99%		50-150%
	13C2-6:2FTS	117%		50-150%
	13C2-8:2FTS	120%		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:	P2-MH-37_012619		
Lab Sample ID:	FA61190-3	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
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	2Q27095.D	1	02/11/19 13:28	NAF	02/08/19 11:00	OP73738	S2Q426
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00445	0.0080	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00133	0.0040	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00254	0.0040	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00114	0.0040	0.0010	ug/l	J
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	0.00242	0.0040	0.0015	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	P2-MH-37_012619		
Lab Sample ID:	FA61190-3	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	79%		30-140%
	13C5-PFPeA	82%		40-140%
	13C5-PFHxA	84%		50-150%
	13C4-PFHpA	85%		50-150%
	13C8-PFOA	90%		50-150%
	13C9-PFNA	86%		50-150%
	13C6-PFDA	82%		50-150%
	13C7-PFUnDA	67%		50-150%
	13C2-PFDoDA	59%		50-150%
	13C2-PFTeDA	51%		40-150%
	13C3-PFBS	79%		50-150%
	13C3-PFHxS	73%		50-150%
	13C8-PFOS	61%		50-150%
	13C8-FOSA	71%		30-140%
	d3-MeFOSAA	81%		50-150%
	13C2-4:2FTS	84%		50-150%
	13C2-6:2FTS	94%		50-150%
	13C2-8:2FTS	78%		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:	P2-MH-26_012619		
Lab Sample ID:	FA61190-4	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
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	2Q27037.D	1	02/06/19 13:38	NG	02/05/19 09:30	OP73679	S2Q424
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0130	0.0077	0.0019	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0136	0.0038	0.0014	ug/l	
307-24-4	Perfluorohexanoic acid	0.0139	0.0038	0.00096	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0126	0.0038	0.00096	ug/l	
335-67-1	Perfluorooctanoic acid	0.0275	0.0038	0.00096	ug/l	
375-95-1	Perfluorononanoic acid	0.00268	0.0038	0.00096	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00253	0.0038	0.00096	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0038	0.00096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0038	0.0014	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0038	0.00096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00272	0.0038	0.00096	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.00346	0.0038	0.00096	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0176	0.0038	0.00096	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00241	0.0038	0.00096	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.104	0.0038	0.0014	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0038	0.00096	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.019	0.0038	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0038	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	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:	P2-MH-26_012619		
Lab Sample ID:	FA61190-4	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	98%		30-140%
	13C5-PFPeA	96%		40-140%
	13C5-PFHxA	94%		50-150%
	13C4-PFHpA	94%		50-150%
	13C8-PFOA	105%		50-150%
	13C9-PFNA	105%		50-150%
	13C6-PFDA	102%		50-150%
	13C7-PFUnDA	107%		50-150%
	13C2-PFDoDA	104%		50-150%
	13C2-PFTeDA	90%		40-150%
	13C3-PFBS	94%		50-150%
	13C3-PFHxS	91%		50-150%
	13C8-PFOS	81%		50-150%
	13C8-FOSA	57%		30-140%
	d3-MeFOSAA	113%		50-150%
	13C2-4:2FTS	101%		50-150%
	13C2-6:2FTS	120%		50-150%
	13C2-8:2FTS	119%		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:	P2-MH-25_012619		
Lab Sample ID:	FA61190-5	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
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	2Q27038.D	1	02/06/19 13:54	NG	02/05/19 09:30	OP73679	S2Q424
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0207	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0260	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0269	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0256	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0501	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00474	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00321	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00639	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.00353	0.0040	0.0010	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0320	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00305	0.0040	0.0010	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.207	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.00326	0.0080	0.0020	ug/l	J

ND = Not detected MDL = Method Detection Limit
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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:	P2-MH-25_012619		
Lab Sample ID:	FA61190-5	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	103%		30-140%
	13C5-PFPeA	103%		40-140%
	13C5-PFHxA	102%		50-150%
	13C4-PFHpA	101%		50-150%
	13C8-PFOA	115%		50-150%
	13C9-PFNA	116%		50-150%
	13C6-PFDA	116%		50-150%
	13C7-PFUnDA	109%		50-150%
	13C2-PFDoDA	97%		50-150%
	13C2-PFTeDA	86%		40-150%
	13C3-PFBS	98%		50-150%
	13C3-PFHxS	96%		50-150%
	13C8-PFOS	91%		50-150%
	13C8-FOSA	91%		30-140%
	d3-MeFOSAA	117%		50-150%
	13C2-4:2FTS	104%		50-150%
	13C2-6:2FTS	125%		50-150%
	13C2-8:2FTS	122%		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:	P2-MH-79_012619		
Lab Sample ID:	FA61190-6	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
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	2Q27039.D	1	02/06/19 14:10	NG	02/05/19 09:30	OP73679	S2Q424
Run #2							

	Initial Volume	Final Volume
Run #1	240 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0161	0.0083	0.0021	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0173	0.0042	0.0016	ug/l	
307-24-4	Perfluorohexanoic acid	0.0175	0.0042	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0166	0.0042	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0370	0.0042	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00392	0.0042	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00431	0.0042	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0042	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0042	0.0016	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0042	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0042	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.0124	0.0042	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.00460	0.0042	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0250	0.0042	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00348	0.0042	0.0010	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.147	0.0042	0.0016	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0042	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0042	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0042	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.021	0.0042	ug/l	
2991-50-6	EtFOSAA	ND	0.021	0.0042	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0083	0.0021	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0083	0.0021	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:	P2-MH-79_012619		
Lab Sample ID:	FA61190-6	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0083	0.0021	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	89%		30-140%
	13C5-PFPeA	89%		40-140%
	13C5-PFHxA	86%		50-150%
	13C4-PFHpA	86%		50-150%
	13C8-PFOA	96%		50-150%
	13C9-PFNA	95%		50-150%
	13C6-PFDA	97%		50-150%
	13C7-PFUnDA	103%		50-150%
	13C2-PFDoDA	98%		50-150%
	13C2-PFTeDA	82%		40-150%
	13C3-PFBS	87%		50-150%
	13C3-PFHxS	84%		50-150%
	13C8-PFOS	80%		50-150%
	13C8-FOSA	46%		30-140%
	d3-MeFOSAA	110%		50-150%
	13C2-4:2FTS	94%		50-150%
	13C2-6:2FTS	113%		50-150%
	13C2-8:2FTS	120%		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:	P2-MH-9_012619		
Lab Sample ID:	FA61190-7	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
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	2Q27040.D	1	02/06/19 14:26	NG	02/05/19 09:30	OP73679	S2Q424
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0142	0.0077	0.0019	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0121	0.0038	0.0014	ug/l	
307-24-4	Perfluorohexanoic acid	0.00952	0.0038	0.00096	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00753	0.0038	0.00096	ug/l	
335-67-1	Perfluorooctanoic acid	0.0158	0.0038	0.00096	ug/l	
375-95-1	Perfluorononanoic acid	0.00109	0.0038	0.00096	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0038	0.00096	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0038	0.00096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0038	0.0014	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0038	0.00096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00133	0.0038	0.00096	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0038	0.00096	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00252	0.0038	0.00096	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0038	0.00096	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0266	0.0038	0.0014	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0038	0.00096	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.019	0.0038	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0038	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	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:	P2-MH-9_012619		
Lab Sample ID:	FA61190-7	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	109%		30-140%
	13C5-PFPeA	110%		40-140%
	13C5-PFHxA	111%		50-150%
	13C4-PFHpA	112%		50-150%
	13C8-PFOA	123%		50-150%
	13C9-PFNA	122%		50-150%
	13C6-PFDA	116%		50-150%
	13C7-PFUnDA	106%		50-150%
	13C2-PFDoDA	97%		50-150%
	13C2-PFTeDA	90%		40-150%
	13C3-PFBS	103%		50-150%
	13C3-PFHxS	105%		50-150%
	13C8-PFOS	99%		50-150%
	13C8-FOSA	104%		30-140%
	d3-MeFOSAA	99%		50-150%
	13C2-4:2FTS	108%		50-150%
	13C2-6:2FTS	122%		50-150%
	13C2-8:2FTS	105%		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:	P2-MH-97_012619		
Lab Sample ID:	FA61190-8	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
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	2Q27041.D	1	02/06/19 14:41	NG	02/05/19 09:30	OP73679	S2Q424
Run #2	2Q27075.D	2	02/07/19 13:31	NAF	02/05/19 09:30	OP73679	S2Q425

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0275	0.0077	0.0019	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0394	0.0038	0.0014	ug/l	
307-24-4	Perfluorohexanoic acid	0.0413	0.0038	0.00096	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0412	0.0038	0.00096	ug/l	
335-67-1	Perfluorooctanoic acid	0.0847	0.0038	0.00096	ug/l	
375-95-1	Perfluorononanoic acid	0.00977	0.0038	0.00096	ug/l	
335-76-2	Perfluorodecanoic acid	0.0140	0.0038	0.00096	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0038	0.00096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0038	0.0014	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0038	0.00096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00730	0.0038	0.00096	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.00685	0.0038	0.00096	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0596	0.0038	0.00096	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00647	0.0038	0.00096	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.656 [a]	0.0077	0.0029	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0038	0.00096	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.00208	0.0038	0.00096	ug/l	J
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.019	0.0038	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0038	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.00820	0.0077	0.0019	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:	P2-MH-97_012619		
Lab Sample ID:	FA61190-8	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.00437	0.0077	0.0019	ug/l	J

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	104%	97%	30-140%
	13C5-PFPeA	104%	97%	40-140%
	13C5-PFHxA	101%	95%	50-150%
	13C4-PFHpA	101%	95%	50-150%
	13C8-PFOA	114%	103%	50-150%
	13C9-PFNA	112%	102%	50-150%
	13C6-PFDA	115%	99%	50-150%
	13C7-PFUnDA	107%	93%	50-150%
	13C2-PFDoDA	100%	78%	50-150%
	13C2-PFTeDA	90%	62%	40-150%
	13C3-PFBS	99%	94%	50-150%
	13C3-PFHxS	96%	91%	50-150%
	13C8-PFOS	87%	85%	50-150%
	13C8-FOSA	69%	70%	30-140%
	d3-MeFOSAA	119%	103%	50-150%
	13C2-4:2FTS	104%	94%	50-150%
	13C2-6:2FTS	125%	107%	50-150%
	13C2-8:2FTS	125%	104%	50-150%

(a) Result is from Run# 2

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-MH-13_012619		
Lab Sample ID:	FA61190-9	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
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	2Q27044.D	1	02/06/19 15:29	NG	02/05/19 09:30	OP73679	S2Q424
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0197	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0244	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0242	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0232	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0480	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00637	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00746	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00260	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.00115	0.0040	0.0010	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.00193	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0253	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.00278	0.0040	0.0010	ug/l	J
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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-MH-13_012619		
Lab Sample ID:	FA61190-9	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	86%		30-140%
	13C5-PFPeA	88%		40-140%
	13C5-PFHxA	89%		50-150%
	13C4-PFHpA	93%		50-150%
	13C8-PFOA	106%		50-150%
	13C9-PFNA	113%		50-150%
	13C6-PFDA	114%		50-150%
	13C7-PFUnDA	108%		50-150%
	13C2-PFDoDA	96%		50-150%
	13C2-PFTeDA	93%		40-150%
	13C3-PFBS	88%		50-150%
	13C3-PFHxS	90%		50-150%
	13C8-PFOS	91%		50-150%
	13C8-FOSA	57%		30-140%
	d3-MeFOSAA	112%		50-150%
	13C2-4:2FTS	94%		50-150%
	13C2-6:2FTS	115%		50-150%
	13C2-8:2FTS	120%		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:	P6-MH-14_012619		
Lab Sample ID:	FA61190-10	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
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	2Q27045.D	1	02/06/19 15:44	NG	02/05/19 09:30	OP73679	S2Q424
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0246	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0420	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0432	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0308	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0649	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00842	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00726	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00215	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.00119	0.0040	0.0010	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.00197	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	0.00198	0.0040	0.0010	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.0225	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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-MH-14_012619		
Lab Sample ID:	FA61190-10	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	99%		30-140%
	13C5-PFPeA	104%		40-140%
	13C5-PFHxA	105%		50-150%
	13C4-PFHpA	108%		50-150%
	13C8-PFOA	123%		50-150%
	13C9-PFNA	124%		50-150%
	13C6-PFDA	123%		50-150%
	13C7-PFUnDA	116%		50-150%
	13C2-PFDoDA	108%		50-150%
	13C2-PFTeDA	101%		40-150%
	13C3-PFBS	99%		50-150%
	13C3-PFHxS	100%		50-150%
	13C8-PFOS	98%		50-150%
	13C8-FOSA	97%		30-140%
	d3-MeFOSAA	108%		50-150%
	13C2-4:2FTS	106%		50-150%
	13C2-6:2FTS	129%		50-150%
	13C2-8:2FTS	123%		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:	P6-MH-11_012619		
Lab Sample ID:	FA61190-11	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
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	2Q27046.D	1	02/06/19 16:00	NG	02/05/19 09:30	OP73679	S2Q424
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0215	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0202	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0208	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0204	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0497	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00580	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00512	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00181	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00169	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0353	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	0.00312	0.0040	0.0010	ug/l	J
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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-MH-11_012619		
Lab Sample ID:	FA61190-11	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	92%		30-140%
	13C5-PFPeA	95%		40-140%
	13C5-PFHxA	94%		50-150%
	13C4-PFHpA	96%		50-150%
	13C8-PFOA	110%		50-150%
	13C9-PFNA	114%		50-150%
	13C6-PFDA	111%		50-150%
	13C7-PFUnDA	102%		50-150%
	13C2-PFDoDA	91%		50-150%
	13C2-PFTeDA	86%		40-150%
	13C3-PFBS	91%		50-150%
	13C3-PFHxS	89%		50-150%
	13C8-PFOS	85%		50-150%
	13C8-FOSA	68%		30-140%
	d3-MeFOSAA	112%		50-150%
	13C2-4:2FTS	96%		50-150%
	13C2-6:2FTS	119%		50-150%
	13C2-8:2FTS	119%		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-01		
Lab Sample ID:	FA61190-12	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
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	2Q27047.D	1	02/06/19 16:16	NG	02/05/19 09:30	OP73679	S2Q424
Run #2							

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

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0140	0.0077	0.0019	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0147	0.0038	0.0014	ug/l	
307-24-4	Perfluorohexanoic acid	0.0158	0.0038	0.00096	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0144	0.0038	0.00096	ug/l	
335-67-1	Perfluorooctanoic acid	0.0328	0.0038	0.00096	ug/l	
375-95-1	Perfluorononanoic acid	0.00336	0.0038	0.00096	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00408	0.0038	0.00096	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0038	0.00096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0038	0.0014	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0038	0.00096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.0114	0.0038	0.00096	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.00461	0.0038	0.00096	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0224	0.0038	0.00096	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00240	0.0038	0.00096	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.135	0.0038	0.0014	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0038	0.00096	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0038	0.00096	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.019	0.0038	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0038	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	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:	DUP-01		
Lab Sample ID:	FA61190-12	**Date Sampled:**	01/26/19
Matrix:	AQ - Ground Water	**Date Received:**	01/29/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Lansing PFAS Delineation; Lansing, MI		

PFAS List

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	95%		30-140%
	13C5-PFPeA	95%		40-140%
	13C5-PFHxA	92%		50-150%
	13C4-PFHpA	92%		50-150%
	13C8-PFOA	103%		50-150%
	13C9-PFNA	103%		50-150%
	13C6-PFDA	103%		50-150%
	13C7-PFUnDA	103%		50-150%
	13C2-PFDoDA	104%		50-150%
	13C2-PFTeDA	93%		40-150%
	13C3-PFBS	92%		50-150%
	13C3-PFHxS	90%		50-150%
	13C8-PFOS	84%		50-150%
	13C8-FOSA	52%		30-140%
	d3-MeFOSAA	113%		50-150%
	13C2-4:2FTS	99%		50-150%
	13C2-6:2FTS	120%		50-150%
	13C2-8:2FTS	129%		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:

- Chain of Custody

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

FA61190

SGS - ORLANDO JOB # : PAGE 1 OF 1

SGS - ORLANDO Quote # | SKIFF #

Client / Reporting Information

Company Name: Arcadis
Address: 2855D Cabot Dr Ste 500
City: Novi State: MI Zip: 48377
Project Contact: Christine.Gregg@arcadis.com Email:
Phone #:
Sampler(s) Name(s) (Printed)
Sampler 1: D. Stockard Sampler 2: M. Samp

Project Information

Project Name: RACER Landing
Street
City State
Project # B006447.91.2018
Fax #
Client Purchase Order #

Analytical Information

LCID 537005FL

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	CONTAINER INFORMATION TOTAL # OF BOTTLES	OTHER	NONE	HCl	NaOH	HNO3	H2SO4	NAOH+ZNAC	DI WATER	MEOH	LAB USE ONLY
1	P3-MH-UW-012619	1/26/19	1015	DS/MS	WW	2		X								
2	P2-MH-2-012619		1100													
3	P2-MH-37-012619		1120													
4	P2-MH-26-012619		1135													
5	P2-MH-25-012619		1210													
6	P2-MH-79-012619		1335													
7	P2-MH-9-012619		1425													
8	P2-MH-97-012619		1445													
9	P6-MH-13-012619		1535													
10	P6-MH-14-012619		1550													
11	P6-MH-11-012619		1610													
12	Dup-01	1/26/19														

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

Comments / Remarks

CC. Daniel Stockard on results: daniel.stockard@arcadis.com

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler/Affiliation	Date Time:	Received By/Affiliation
1	[signature] Arcadis	1/28/19 1230	2 [signature]
3	Relinquished By/Affiliation	Date Time:	Received By/Affiliation 11/29/19
4			[signature] 930
5	Relinquished by/Affiliation	Date Time:	Received By/Affiliation
6			
7	Relinquished By/Affiliation	Date Time:	Received By/Affiliation
8			

Lab Use Only : Cooler Temperature (s) Celsius (corrected): 4.2

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

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

FA61190: Chain of Custody
Page 1 of 2

SGS Sample Receipt Summary

Job Number: FA61190 **Client:** ARCADIS **Project:** RACER LANSING

Date / Time Received: 1/29/2019 9:30:00 AM **Delivery Method:** FX **Airbill #'s:** 1002239914210003281100813939291555

Therm ID: IR 1; **Therm CF:** -0.2; **# of Coolers:** 1

Cooler Temps (Raw Measured) °C: Cooler 1: (4.4);

Cooler Temps (Corrected) °C: Cooler 1: (4.2);

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: 1/29/2019 9:30:00 AM 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: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73679-MB	2Q27033.D	1	02/06/19	NG	02/05/19	OP73679	S2Q424

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

FA61190-1, FA61190-2, FA61190-4, FA61190-5, FA61190-6, FA61190-7, FA61190-8, FA61190-9, FA61190-10, FA61190-11, FA61190-12

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0077	0.0019	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0038	0.0014	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0038	0.00096	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0038	0.00096	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0038	0.00096	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0038	0.00096	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0038	0.00096	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0038	0.00096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0038	0.0014	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0038	0.00096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0038	0.00096	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0038	0.00096	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0038	0.00096	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0038	0.00096	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0038	0.00096	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0038	0.0014	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0038	0.00096	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0038	0.00096	ug/l	
754-91-6	PFOSA	ND	0.0038	0.00096	ug/l	
2355-31-9	MeFOSAA	ND	0.019	0.0038	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0038	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	114%	30-140%
	13C5-PFPeA	110%	40-140%
	13C5-PFHxA	110%	50-150%
	13C4-PFHpA	110%	50-150%
	13C8-PFOA	116%	50-150%
	13C9-PFNA	114%	50-150%
	13C6-PFDA	112%	50-150%
	13C7-PFUnDA	98%	50-150%

Method Blank Summary

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73679-MB	2Q27033.D	1	02/06/19	NG	02/05/19	OP73679	S2Q424

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

FA61190-1, FA61190-2, FA61190-4, FA61190-5, FA61190-6, FA61190-7, FA61190-8, FA61190-9, FA61190-10, FA61190-11, FA61190-12

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	87%	50-150%
	13C2-PFTeDA	85%	40-150%
	13C3-PFBS	106%	50-150%
	13C3-PFHxS	103%	50-150%
	13C8-PFOS	106%	50-150%
	13C8-FOSA	98%	30-140%
	d3-MeFOSAA	99%	50-150%
	13C2-4:2FTS	105%	50-150%
	13C2-6:2FTS	111%	50-150%
	13C2-8:2FTS	100%	50-150%

Method Blank Summary

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73738-MB	2Q27094.D	1	02/11/19	NAF	02/08/19	OP73738	S2Q426

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

FA61190-3

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0077	0.0019	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0038	0.0014	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0038	0.00096	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0038	0.00096	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0038	0.00096	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0038	0.00096	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0038	0.00096	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0038	0.00096	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0038	0.0014	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0038	0.00096	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0038	0.00096	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0038	0.00096	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0038	0.00096	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0038	0.00096	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0038	0.00096	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0038	0.0014	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0038	0.00096	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0038	0.00096	ug/l	
754-91-6	PFOSA	ND	0.0038	0.00096	ug/l	
2355-31-9	MeFOSAA	ND	0.019	0.0038	ug/l	
2991-50-6	EtFOSAA	ND	0.019	0.0038	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0077	0.0019	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	96%	30-140%
	13C5-PFPeA	95%	40-140%
	13C5-PFHxA	97%	50-150%
	13C4-PFHpA	96%	50-150%
	13C8-PFOA	98%	50-150%
	13C9-PFNA	95%	50-150%
	13C6-PFDA	92%	50-150%
	13C7-PFUnDA	83%	50-150%

Method Blank Summary

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73738-MB	2Q27094.D	1	02/11/19	NAF	02/08/19	OP73738	S2Q426

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

FA61190-3

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	71%	50-150%
	13C2-PFTeDA	56%	40-150%
	13C3-PFBS	91%	50-150%
	13C3-PFHxS	89%	50-150%
	13C8-PFOS	78%	50-150%
	13C8-FOSA	87%	30-140%
	d3-MeFOSAA	94%	50-150%
	13C2-4:2FTS	90%	50-150%
	13C2-6:2FTS	89%	50-150%
	13C2-8:2FTS	84%	50-150%

Instrument Blank

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q424-IBLK	2Q27024.D	1	02/06/19	NG	n/a	n/a	S2Q424

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

FA61190-1, FA61190-2, FA61190-4, FA61190-5, FA61190-6, FA61190-7, FA61190-8, FA61190-9, FA61190-10, FA61190-11, FA61190-12

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	108%	50-150%
	13C5-PFPeA	108%	50-150%
	13C5-PFHxA	106%	50-150%
	13C4-PFHpA	107%	50-150%
	13C8-PFOA	108%	50-150%
	13C9-PFNA	109%	50-150%
	13C6-PFDA	110%	50-150%
	13C7-PFUnDA	110%	50-150%

Instrument Blank

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q424-IBLK	2Q27024.D	1	02/06/19	NG	n/a	n/a	S2Q424

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

FA61190-1, FA61190-2, FA61190-4, FA61190-5, FA61190-6, FA61190-7, FA61190-8, FA61190-9, FA61190-10, FA61190-11, FA61190-12

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	105%	50-150%
	13C2-PFTeDA	102%	50-150%
	13C3-PFBS	105%	50-150%
	13C3-PFHxS	107%	50-150%
	13C8-PFOS	103%	50-150%
	13C8-FOSA	112%	50-150%
	d3-MeFOSAA	107%	50-150%
	13C2-4:2FTS	99%	50-150%
	13C2-6:2FTS	98%	50-150%
	13C2-8:2FTS	96%	50-150%

Instrument Blank

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q425-IBLK	2Q27070.D	1	02/07/19	NAF	n/a	n/a	S2Q425

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

FA61190-8

CAS No.	Compound	Result	RL	MDL	Units	Q
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	97%	50-150%
	13C5-PFPeA	97%	50-150%
	13C5-PFHxA	99%	50-150%
	13C4-PFHpA	99%	50-150%
	13C8-PFOA	101%	50-150%
	13C9-PFNA	100%	50-150%
	13C6-PFDA	102%	50-150%
	13C7-PFUnDA	100%	50-150%
	13C2-PFDoDA	98%	50-150%
	13C2-PFTeDA	88%	50-150%
	13C3-PFBS	96%	50-150%
	13C3-PFHxS	97%	50-150%
	13C8-PFOS	97%	50-150%
	13C8-FOSA	104%	50-150%
	d3-MeFOSAA	100%	50-150%
	13C2-4:2FTS	93%	50-150%
	13C2-6:2FTS	96%	50-150%
	13C2-8:2FTS	91%	50-150%

Instrument Blank

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q426-IBLK	2Q27089.D	1	02/11/19	NAF	n/a	n/a	S2Q426

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

FA61190-3

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	96%	50-150%
	13C5-PFPeA	96%	50-150%
	13C5-PFHxA	97%	50-150%
	13C4-PFHpA	97%	50-150%
	13C8-PFOA	97%	50-150%
	13C9-PFNA	96%	50-150%
	13C6-PFDA	95%	50-150%
	13C7-PFUnDA	96%	50-150%

Instrument Blank

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q426-IBLK	2Q27089.D	1	02/11/19	NAF	n/a	n/a	S2Q426

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

FA61190-3

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	91%	50-150%
	13C2-PFTeDA	77%	50-150%
	13C3-PFBS	93%	50-150%
	13C3-PFHxS	93%	50-150%
	13C8-PFOS	92%	50-150%
	13C8-FOSA	96%	50-150%
	d3-MeFOSAA	99%	50-150%
	13C2-4:2FTS	91%	50-150%
	13C2-6:2FTS	87%	50-150%
	13C2-8:2FTS	85%	50-150%

Blank Spike Summary

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73679-BS	2Q27032.D	1	02/06/19	NG	02/05/19	OP73679	S2Q424

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

FA61190-1, FA61190-2, FA61190-4, FA61190-5, FA61190-6, FA61190-7, FA61190-8, FA61190-9, FA61190-10, FA61190-11, FA61190-12

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.0769	0.0744	97	70-130
2706-90-3	Perfluoropentanoic acid	0.0769	0.0771	100	70-130
307-24-4	Perfluorohexanoic acid	0.0769	0.0734	95	70-130
375-85-9	Perfluoroheptanoic acid	0.0769	0.0729	95	71-130
335-67-1	Perfluorooctanoic acid	0.0769	0.0742	96	74-130
375-95-1	Perfluorononanoic acid	0.0769	0.0749	97	76-130
335-76-2	Perfluorodecanoic acid	0.0769	0.0743	97	70-130
2058-94-8	Perfluoroundecanoic acid	0.0769	0.0746	97	70-130
307-55-1	Perfluorododecanoic acid	0.0769	0.0757	98	70-130
72629-94-8	Perfluorotridecanoic acid	0.0769	0.0745	97	70-139
376-06-7	Perfluorotetradecanoic acid	0.0769	0.0729	95	70-130
375-73-5	Perfluorobutanesulfonic acid	0.0769	0.0766	100	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.0769	0.0856	111	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0769	0.0752	98	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.0769	0.0864	112	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.0769	0.0745	97	70-130
68259-12-1	Perfluorononanesulfonic acid	0.0769	0.0684	89	70-130
335-77-3	Perfluorodecanesulfonic acid	0.0769	0.0647	84	70-130
754-91-6	PFOSA	0.0769	0.0744	97	70-131
2355-31-9	MeFOSAA	0.0769	0.0768	100	70-130
2991-50-6	EtFOSAA	0.0769	0.0715	93	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.0769	0.0786	102	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.0769	0.0793	103	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.0769	0.0769	100	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	114%	30-140%
	13C5-PFPeA	112%	40-140%
	13C5-PFHxA	110%	50-150%
	13C4-PFHpA	110%	50-150%
	13C8-PFOA	114%	50-150%
	13C9-PFNA	112%	50-150%
	13C6-PFDA	111%	50-150%
	13C7-PFUnDA	108%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73679-BS	2Q27032.D	1	02/06/19	NG	02/05/19	OP73679	S2Q424

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

FA61190-1, FA61190-2, FA61190-4, FA61190-5, FA61190-6, FA61190-7, FA61190-8, FA61190-9, FA61190-10, FA61190-11, FA61190-12

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	103%	50-150%
	13C2-PFTeDA	99%	40-150%
	13C3-PFBS	106%	50-150%
	13C3-PFHxS	95%	50-150%
	13C8-PFOS	107%	50-150%
	13C8-FOSA	109%	30-140%
	d3-MeFOSAA	108%	50-150%
	13C2-4:2FTS	113%	50-150%
	13C2-6:2FTS	115%	50-150%
	13C2-8:2FTS	108%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73738-BS [a]	2Q27093.D	1	02/11/19	NAF	02/08/19	OP73738	S2Q426

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

FA61190-3

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.0769	0.0787	102	70-130
2706-90-3	Perfluoropentanoic acid	0.0769	0.0784	102	70-130
307-24-4	Perfluorohexanoic acid	0.0769	0.0785	102	70-130
375-85-9	Perfluoroheptanoic acid	0.0769	0.0734	95	71-130
335-67-1	Perfluorooctanoic acid	0.0769	0.0778	101	74-130
375-95-1	Perfluorononanoic acid	0.0769	0.0751	98	76-130
335-76-2	Perfluorodecanoic acid	0.0769	0.0770	100	70-130
2058-94-8	Perfluoroundecanoic acid	0.0769	0.0767	100	70-130
307-55-1	Perfluorododecanoic acid	0.0769	0.0769	100	70-130
72629-94-8	Perfluorotridecanoic acid	0.0769	0.0709	92	70-139
376-06-7	Perfluorotetradecanoic acid	0.0769	0.0778	101	70-130
375-73-5	Perfluorobutanesulfonic acid	0.0769	0.0787	102	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.0769	0.0875	114	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0769	0.0769	100	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.0769	0.0749	97	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.0769	0.0749	97	70-130
68259-12-1	Perfluorononanesulfonic acid	0.0769	0.0616	80	70-130
335-77-3	Perfluorodecanesulfonic acid	0.0769	0.0576	75	70-130
754-91-6	PFOSA	0.0769	0.0770	100	70-131
2355-31-9	MeFOSAA	0.0769	0.0764	99	70-130
2991-50-6	EtFOSAA	0.0769	0.0695	90	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.0769	0.0799	104	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.0769	0.0833	108	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.0769	0.0777	101	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	88%	30-140%
	13C5-PFPeA	90%	40-140%
	13C5-PFHxA	91%	50-150%
	13C4-PFHpA	91%	50-150%
	13C8-PFOA	90%	50-150%
	13C9-PFNA	87%	50-150%
	13C6-PFDA	80%	50-150%
	13C7-PFUnDA	69%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73738-BS [a]	2Q27093.D	1	02/11/19	NAF	02/08/19	OP73738	S2Q426

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

FA61190-3

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	61%	50-150%
	13C2-PFTeDA	54%	40-150%
	13C3-PFBS	87%	50-150%
	13C3-PFHxS	83%	50-150%
	13C8-PFOS	67%	50-150%
	13C8-FOSA	76%	30-140%
	d3-MeFOSAA	78%	50-150%
	13C2-4:2FTS	89%	50-150%
	13C2-6:2FTS	87%	50-150%
	13C2-8:2FTS	79%	50-150%

(a) Insufficient sample for MS/MSD.

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73679-MS	2Q27052.D	1	02/06/19	NG	02/05/19	OP73679	S2Q424
OP73679-MSD	2Q27053.D	1	02/06/19	NG	02/05/19	OP73679	S2Q424
FA61222-4	2Q27051.D	1	02/06/19	NG	02/05/19	OP73679	S2Q424

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

FA61190-1, FA61190-2, FA61190-4, FA61190-5, FA61190-6, FA61190-7, FA61190-8, FA61190-9, FA61190-10, FA61190-11, FA61190-12

CAS No.	Compound	FA61222-4 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
375-22-4	Perfluorobutanoic acid	ND		0.0769	0.0751	98	0.0769	0.0710	92	6	70-130/30
2706-90-3	Perfluoropentanoic acid	ND		0.0769	0.0754	98	0.0769	0.0718	93	5	70-130/30
307-24-4	Perfluorohexanoic acid	0.00291	J	0.0769	0.0753	94	0.0769	0.0711	89	6	70-130/30
375-85-9	Perfluoroheptanoic acid	0.00191	J	0.0769	0.0730	92	0.0769	0.0693	88	5	71-130/30
335-67-1	Perfluorooctanoic acid	0.0114		0.0769	0.0839	94	0.0769	0.0789	88	6	74-130/30
375-95-1	Perfluorononanoic acid	ND		0.0769	0.0720	94	0.0769	0.0678	88	6	76-130/30
335-76-2	Perfluorodecanoic acid	ND		0.0769	0.0731	95	0.0769	0.0691	90	6	70-130/30
2058-94-8	Perfluoroundecanoic acid	ND		0.0769	0.0746	97	0.0769	0.0692	90	8	70-130/30
307-55-1	Perfluorododecanoic acid	ND		0.0769	0.0754	98	0.0769	0.0700	91	7	70-130/30
72629-94-8	Perfluorotridecanoic acid	ND		0.0769	0.0766	100	0.0769	0.0735	96	4	70-139/30
376-06-7	Perfluorotetradecanoic acid	ND		0.0769	0.0722	94	0.0769	0.0666	87	8	70-130/30
375-73-5	Perfluorobutanesulfonic acid	0.0140		0.0769	0.0875	96	0.0769	0.0850	92	3	73-130/30
2706-91-4	Perfluoropentanesulfonic acid	0.00307	J	0.0769	0.0890	112	0.0769	0.0854	107	4	70-130/30
355-46-4	Perfluorohexanesulfonic acid	0.0539		0.0769	0.122	89	0.0769	0.114	78	7	74-130/30
375-92-8	Perfluoroheptanesulfonic acid	ND		0.0769	0.0767	100	0.0769	0.0704	92	9	74-130/30
1763-23-1	Perfluorooctanesulfonic acid	0.0480		0.0769	0.112	83	0.0769	0.109	79	3	70-130/30
68259-12-1	Perfluorononanesulfonic acid	ND		0.0769	0.0630	82	0.0769	0.0581	76	8	70-130/30
335-77-3	Perfluorodecanesulfonic acid	ND		0.0769	0.0606	79	0.0769	0.0530	69*	13	70-130/30
754-91-6	PFOSA	ND		0.0769	0.0747	97	0.0769	0.0692	90	8	70-131/30
2355-31-9	MeFOSAA	ND		0.0769	0.0741	96	0.0769	0.0690	90	7	70-130/30
2991-50-6	EtFOSAA	ND		0.0769	0.0701	91	0.0769	0.0645	84	8	70-130/30
757124-72-4	4:2 Fluorotelomer sulfonate	ND		0.0769	0.0781	102	0.0769	0.0746	97	5	70-130/30
27619-97-2	6:2 Fluorotelomer sulfonate	ND		0.0769	0.0804	105	0.0769	0.0757	98	6	70-133/30
39108-34-4	8:2 Fluorotelomer sulfonate	ND		0.0769	0.0753	98	0.0769	0.0704	92	7	70-130/30

CAS No.	ID Standard Recoveries	MS	MSD	FA61222-4	Limits
	13C4-PFBA	97%	96%	97%	30-140%
	13C5-PFPeA	104%	101%	103%	40-140%
	13C5-PFHxA	107%	104%	108%	50-150%
	13C4-PFHpA	111%	107%	112%	50-150%
	13C8-PFOA	122%	117%	125%	50-150%
	13C9-PFNA	119%	112%	118%	50-150%
	13C6-PFDA	117%	107%	114%	50-150%
	13C7-PFUnDA	108%	100%	107%	50-150%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA61190
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73679-MS	2Q27052.D	1	02/06/19	NG	02/05/19	OP73679	S2Q424
OP73679-MSD	2Q27053.D	1	02/06/19	NG	02/05/19	OP73679	S2Q424
FA61222-4	2Q27051.D	1	02/06/19	NG	02/05/19	OP73679	S2Q424

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

FA61190-1, FA61190-2, FA61190-4, FA61190-5, FA61190-6, FA61190-7, FA61190-8, FA61190-9, FA61190-10, FA61190-11, FA61190-12

CAS No.	ID Standard Recoveries	MS	MSD	FA61222-4	Limits
	13C2-PFDoDA	97%	88%	94%	50-150%
	13C2-PFTeDA	89%	79%	92%	40-150%
	13C3-PFBS	98%	94%	98%	50-150%
	13C3-PFHxS	104%	98%	102%	50-150%
	13C8-PFOS	102%	93%	98%	50-150%
	13C8-FOSA	84%	88%	102%	30-140%
	d3-MeFOSAA	97%	89%	95%	50-150%
	13C2-4:2FTS	108%	104%	102%	50-150%
	13C2-6:2FTS	122%	116%	120%	50-150%
	13C2-8:2FTS	114%	105%	107%	50-150%

* = 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

B0064479.2019.03100

SGS Job Number: FA63909

Sampling Date: 05/06/19

Report to:

Arcadis
300 S Washington Sq Suite 315
Lansing, MI 48933
alex.villhauer@arcadis.com; christine.gregg@arcadis.com;
daniel.stockard@arcadis.com
ATTN: Alex Villhauer

Total number of pages in report: 35

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Caitlin Brice, M.S.
General Manager

Client Service contact: Andrea Colby 407-425-6700

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

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SGS North America Inc.

Sample Summary

Arcadis

Job No: FA63909

Racer Lansing PFAS Delineation; Lansing, MI
Project No: B0064479.2019.03100

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
FA63909-1	05/06/19	08:55	DR	05/07/19	AQ	Water	VERLINDEN-MH-4_050619
FA63909-2	05/06/19	09:30	DR	05/07/19	AQ	Water	MICHIGAN AVE-MH-4_050619
FA63909-3	05/06/19	09:55	DR	05/07/19	AQ	Water	MICHIGAN AVE-MH-3_050619
FA63909-4	05/06/19	10:20	DR	05/07/19	AQ	Water	MICHIGAN AVE-MH-2_050619
FA63909-5	05/06/19	10:45	DR	05/07/19	AQ	Water	MICHIGAN AVE-MH-1_050619
FA63909-6	05/06/19	11:05	DR	05/07/19	AQ	Water	P2-MH-122-NORTH_050619
FA63909-7	05/06/19	11:10	DR	05/07/19	AQ	Water	P2-MH-122-SOUTH_050619
FA63909-8	05/06/19	11:20	DR	05/07/19	AQ	Equipment Blank	EB-01_050619
FA63909-9	05/06/19	00:00	DR	05/07/19	AQ	Water	DUP-01_050619

Summary of Hits

Job Number: FA63909
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 05/06/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
FA63909-1	**VERLINDEN-MH-4_050619**					
Perfluorobutanoic acid		0.0139	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0289	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0234	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0160	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0272	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00231 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00134 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00259 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00114 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0122	0.0040	0.0015	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate		0.00475 J	0.0080	0.0020	ug/l	EPA 537M BY ID
FA63909-2	**MICHIGAN AVE-MH-4_050619**					
Perfluorobutanoic acid		0.00679 J	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00379 J	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00331 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00355 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00587	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00171 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00187 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00524	0.0040	0.0015	ug/l	EPA 537M BY ID
FA63909-3	**MICHIGAN AVE-MH-3_050619**					
Perfluorobutanoic acid		0.00893	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00515	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00392 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00434	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00833	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00545	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00312 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00617	0.0040	0.0015	ug/l	EPA 537M BY ID
FA63909-4	**MICHIGAN AVE-MH-2_050619**					
Perfluorobutanoic acid		0.0102	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00541	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00339 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00358 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00384 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00406	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00203 J	0.0040	0.0010	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA63909
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 05/06/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluorooctanesulfonic acid		0.00305 J	0.0040	0.0015	ug/l	EPA 537M BY ID
FA63909-5	**MICHIGAN AVE-MH-1_050619**					
Perfluorobutanoic acid		0.00667 J	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00151 J	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00120 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00118 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00246 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00429	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.00546	0.0040	0.0015	ug/l	EPA 537M BY ID
FA63909-6	**P2-MH-122-NORTH_050619**					
Perfluorobutanoic acid		0.00776 J	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00221 J	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00212 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00223 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00406	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00134 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00140 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00234 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0247	0.0040	0.0015	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate		0.0147	0.0080	0.0020	ug/l	EPA 537M BY ID
FA63909-7	**P2-MH-122-SOUTH_050619**					
Perfluorobutanoic acid		0.0175	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.00598	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00594	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00593	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0101	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00160 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00203 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0145	0.0040	0.0015	ug/l	EPA 537M BY ID
FA63909-8	**EB-01_050619**					
Perfluorooctanesulfonic acid		0.00181 J	0.0040	0.0015	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate		0.00238 J	0.0080	0.0020	ug/l	EPA 537M BY ID
FA63909-9	**DUP-01_050619**					
Perfluorobutanoic acid		0.0135	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0223	0.0040	0.0015	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA63909
Account: Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI
Collected: 05/06/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Perfluorohexanoic acid		0.0206	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0149	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0269	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00238 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.00143 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00378 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.00151 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0123	0.0040	0.0015	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate		0.00256 J	0.0080	0.0020	ug/l	EPA 537M BY ID

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID: VERLINDEN-MH-4_050619
Lab Sample ID: FA63909-1
Matrix: AQ - Water
Method: EPA 537M BY ID EPA 537 MOD
Project: Racer Lansing PFAS Delineation; Lansing, MI

Date Sampled: 05/06/19
Date Received: 05/07/19
Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q3712.D	1	05/10/19 12:58	NG	05/09/19 08:00	OP74960	S3Q94
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0139	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0289	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0234	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0160	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0272	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00231	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00134	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00259	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00114	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0122	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.00475	0.0080	0.0020	ug/l	J

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:	VERLINDEN-MH-4_050619		
Lab Sample ID:	FA63909-1	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	123%		30-140%
	13C5-PFPeA	131%		40-140%
	13C5-PFHxA	128%		50-150%
	13C4-PFHpA	132%		50-150%
	13C8-PFOA	131%		50-150%
	13C9-PFNA	125%		50-150%
	13C6-PFDA	115%		50-150%
	13C7-PFUnDA	100%		50-150%
	13C2-PFDoDA	87%		50-150%
	13C2-PFTeDA	80%		40-150%
	13C3-PFBS	127%		50-150%
	13C3-PFHxS	128%		50-150%
	13C8-PFOS	127%		50-150%
	13C8-FOSA	117%		30-140%
	d3-MeFOSAA	100%		50-150%
	13C2-4:2FTS	133%		50-150%
	13C2-6:2FTS	129%		50-150%
	13C2-8:2FTS	107%		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:	MICHIGAN AVE-MH-4_050619		
Lab Sample ID:	FA63909-2	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	3Q3713.D	1	05/10/19 13:13	NG	05/09/19 08:00	OP74960	S3Q94
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00679	0.0080	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00379	0.0040	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.00331	0.0040	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00355	0.0040	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00587	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00171	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00187	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00524	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	MICHIGAN AVE-MH-4_050619		
Lab Sample ID:	FA63909-2	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	113%		30-140%
	13C5-PFPeA	119%		40-140%
	13C5-PFHxA	115%		50-150%
	13C4-PFHpA	120%		50-150%
	13C8-PFOA	123%		50-150%
	13C9-PFNA	118%		50-150%
	13C6-PFDA	108%		50-150%
	13C7-PFUnDA	94%		50-150%
	13C2-PFDoDA	81%		50-150%
	13C2-PFTeDA	77%		40-150%
	13C3-PFBS	118%		50-150%
	13C3-PFHxS	117%		50-150%
	13C8-PFOS	120%		50-150%
	13C8-FOSA	93%		30-140%
	d3-MeFOSAA	98%		50-150%
	13C2-4:2FTS	123%		50-150%
	13C2-6:2FTS	123%		50-150%
	13C2-8:2FTS	105%		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:	MICHIGAN AVE-MH-3_050619		
Lab Sample ID:	FA63909-3	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	3Q3714.D	1	05/10/19 13:28	NG	05/09/19 08:00	OP74960	S3Q94
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00893	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.00515	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00392	0.0040	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00434	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00833	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00545	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00312	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00617	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	MICHIGAN AVE-MH-3_050619		
Lab Sample ID:	FA63909-3	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	107%		30-140%
	13C5-PFPeA	115%		40-140%
	13C5-PFHxA	114%		50-150%
	13C4-PFHpA	120%		50-150%
	13C8-PFOA	126%		50-150%
	13C9-PFNA	123%		50-150%
	13C6-PFDA	110%		50-150%
	13C7-PFUnDA	91%		50-150%
	13C2-PFDoDA	78%		50-150%
	13C2-PFTeDA	71%		40-150%
	13C3-PFBS	112%		50-150%
	13C3-PFHxS	109%		50-150%
	13C8-PFOS	114%		50-150%
	13C8-FOSA	85%		30-140%
	d3-MeFOSAA	93%		50-150%
	13C2-4:2FTS	124%		50-150%
	13C2-6:2FTS	136%		50-150%
	13C2-8:2FTS	107%		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:	MICHIGAN AVE-MH-2_050619		
Lab Sample ID:	FA63909-4	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	3Q3715.D	1	05/10/19 13:43	NG	05/09/19 08:00	OP74960	S3Q94
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0102	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.00541	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00339	0.0040	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00358	0.0040	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00384	0.0040	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00406	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00203	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.00305	0.0040	0.0015	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	MICHIGAN AVE-MH-2_050619		
Lab Sample ID:	FA63909-4	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	101%		30-140%
	13C5-PFPeA	109%		40-140%
	13C5-PFHxA	107%		50-150%
	13C4-PFHpA	113%		50-150%
	13C8-PFOA	122%		50-150%
	13C9-PFNA	123%		50-150%
	13C6-PFDA	112%		50-150%
	13C7-PFUnDA	89%		50-150%
	13C2-PFDoDA	63%		50-150%
	13C2-PFTeDA	50%		40-150%
	13C3-PFBS	105%		50-150%
	13C3-PFHxS	106%		50-150%
	13C8-PFOS	113%		50-150%
	13C8-FOSA	106%		30-140%
	d3-MeFOSAA	89%		50-150%
	13C2-4:2FTS	117%		50-150%
	13C2-6:2FTS	136%		50-150%
	13C2-8:2FTS	110%		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:	MICHIGAN AVE-MH-1_050619		
Lab Sample ID:	FA63909-5	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	3Q3716.D	1	05/10/19 13:59	NG	05/09/19 08:00	OP74960	S3Q94
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00667	0.0080	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00151	0.0040	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.00120	0.0040	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00118	0.0040	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00246	0.0040	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00429	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	0.00546	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	MICHIGAN AVE-MH-1_050619		
Lab Sample ID:	FA63909-5	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	115%		30-140%
	13C5-PFPeA	118%		40-140%
	13C5-PFHxA	120%		50-150%
	13C4-PFHpA	121%		50-150%
	13C8-PFOA	124%		50-150%
	13C9-PFNA	119%		50-150%
	13C6-PFDA	104%		50-150%
	13C7-PFUnDA	81%		50-150%
	13C2-PFDoDA	73%		50-150%
	13C2-PFTeDA	69%		40-150%
	13C3-PFBS	115%		50-150%
	13C3-PFHxS	115%		50-150%
	13C8-PFOS	113%		50-150%
	13C8-FOSA	84%		30-140%
	d3-MeFOSAA	86%		50-150%
	13C2-4:2FTS	123%		50-150%
	13C2-6:2FTS	124%		50-150%
	13C2-8:2FTS	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:	P2-MH-122-NORTH_050619		
Lab Sample ID:	FA63909-6	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	3Q3717.D	1	05/10/19 14:14	NG	05/09/19 08:00	OP74960	S3Q94
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.00776	0.0080	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.00221	0.0040	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.00212	0.0040	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.00223	0.0040	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00406	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00134	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00140	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
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	0.00234	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0247	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0147	0.0080	0.0020	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:	P2-MH-122-NORTH_050619		
Lab Sample ID:	FA63909-6	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	133%		30-140%
	13C5-PFPeA	133%		40-140%
	13C5-PFHxA	131%		50-150%
	13C4-PFHpA	130%		50-150%
	13C8-PFOA	130%		50-150%
	13C9-PFNA	115%		50-150%
	13C6-PFDA	86%		50-150%
	13C7-PFUnDA	71%		50-150%
	13C2-PFDoDA	56%		50-150%
	13C2-PFTeDA	43%		40-150%
	13C3-PFBS	131%		50-150%
	13C3-PFHxS	121%		50-150%
	13C8-PFOS	89%		50-150%
	13C8-FOSA	88%		30-140%
	d3-MeFOSAA	68%		50-150%
	13C2-4:2FTS	133%		50-150%
	13C2-6:2FTS	134%		50-150%
	13C2-8:2FTS	89%		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:	P2-MH-122-SOUTH_050619		
Lab Sample ID:	FA63909-7	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	3Q3718.D	1	05/10/19 14:29	NG	05/09/19 08:00	OP74960	S3Q94
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0175	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.00598	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.00594	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00593	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0101	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00160	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
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	0.00203	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0145	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
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	

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:	P2-MH-122-SOUTH_050619		
Lab Sample ID:	FA63909-7	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	120%		30-140%
	13C5-PFPeA	120%		40-140%
	13C5-PFHxA	118%		50-150%
	13C4-PFHpA	118%		50-150%
	13C8-PFOA	122%		50-150%
	13C9-PFNA	122%		50-150%
	13C6-PFDA	112%		50-150%
	13C7-PFUnDA	97%		50-150%
	13C2-PFDoDA	75%		50-150%
	13C2-PFTeDA	60%		40-150%
	13C3-PFBS	119%		50-150%
	13C3-PFHxS	112%		50-150%
	13C8-PFOS	112%		50-150%
	13C8-FOSA	105%		30-140%
	d3-MeFOSAA	94%		50-150%
	13C2-4:2FTS	122%		50-150%
	13C2-6:2FTS	126%		50-150%
	13C2-8:2FTS	111%		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:	EB-01_050619		
Lab Sample ID:	FA63909-8	**Date Sampled:**	05/06/19
Matrix:	AQ - Equipment Blank	**Date Received:**	05/07/19
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	3Q3721.D	1	05/10/19 15:13	NG	05/09/19 08:00	OP74960	S3Q94
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
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	0.00181	0.0040	0.0015	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.00238	0.0080	0.0020	ug/l	J

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_050619		
Lab Sample ID:	FA63909-8	**Date Sampled:**	05/06/19
Matrix:	AQ - Equipment Blank	**Date Received:**	05/07/19
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	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	139%		30-140%
	13C5-PFPeA	136%		40-140%
	13C5-PFHxA	137%		50-150%
	13C4-PFHpA	135%		50-150%
	13C8-PFOA	139%		50-150%
	13C9-PFNA	128%		50-150%
	13C6-PFDA	108%		50-150%
	13C7-PFUnDA	82%		50-150%
	13C2-PFDoDA	74%		50-150%
	13C2-PFTeDA	70%		40-150%
	13C3-PFBS	135%		50-150%
	13C3-PFHxS	133%		50-150%
	13C8-PFOS	125%		50-150%
	13C8-FOSA	122%		30-140%
	d3-MeFOSAA	91%		50-150%
	13C2-4:2FTS	129%		50-150%
	13C2-6:2FTS	126%		50-150%
	13C2-8:2FTS	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-01_050619		
Lab Sample ID:	FA63909-9	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	3Q3722.D	1	05/10/19 15:28	NG	05/09/19 08:00	OP74960	S3Q94
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS						
375-22-4	Perfluorobutanoic acid	0.0135	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0223	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0206	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0149	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0269	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00238	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.00143	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
PERFLUOROALKYLSULFONATES						
375-73-5	Perfluorobutanesulfonic acid	0.00378	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00151	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0123	0.0040	0.0015	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	
PERFLUOROOCTANESULFONAMIDES						
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS						
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
FLUOROTELOMER SULFONATES						
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.00256	0.0080	0.0020	ug/l	J

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-01_050619		
Lab Sample ID:	FA63909-9	**Date Sampled:**	05/06/19
Matrix:	AQ - Water	**Date Received:**	05/07/19
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	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	123%		30-140%
	13C5-PFPeA	130%		40-140%
	13C5-PFHxA	129%		50-150%
	13C4-PFHpA	133%		50-150%
	13C8-PFOA	140%		50-150%
	13C9-PFNA	131%		50-150%
	13C6-PFDA	120%		50-150%
	13C7-PFUnDA	100%		50-150%
	13C2-PFDoDA	87%		50-150%
	13C2-PFTeDA	81%		40-150%
	13C3-PFBS	128%		50-150%
	13C3-PFHxS	128%		50-150%
	13C8-PFOS	126%		50-150%
	13C8-FOSA	108%		30-140%
	d3-MeFOSAA	102%		50-150%
	13C2-4:2FTS	133%		50-150%
	13C2-6:2FTS	141%		50-150%
	13C2-8:2FTS	114%		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:

- Chain of Custody

FA63909

SGS

...merica Inc - Orlando
...hain of Custody

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

SGS - ORLANDO JOB # : PAGE 1 OF 1

SGS - ORLANDO Quote #	SKIFF #

Client / Reporting Information

Company Name: Arcadis
Address: 2850 Cabot Dr Suite 500
City: Novi State: MI Zip: 48377
Project Contact: Email: daniel.stockard@arcadis.com
Phone #: 248 722 2945
Sampler(s) Name(s) (Printed)
Sampler 1: Donald Pirl Sampler 2:

Project Information

Project Name: Racer Landing
Street: Michigan Ave.
City: Lansing State: MI
Project #: B0064479.2019.03100
Fax #
Client Purchase Order #

Analytical Information

PFAS-LCID 537 DODFL

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	CONTAINER INFORMATION TOTAL # OF BOTTLES	OTHER	NONE	HCl	NaOH	HNO3	H2SO4	NaOH+ZNA	DI WATER	MEOH	LAB USE ONLY
1	Verlinden - MH-4_050619	5/6/19	0855	DRR	GW	2		X								
2	Michigan Ave. - MH-4_050619	5/6/19	0930	DRR	GW	2		X								
3	Michigan Ave. - MH-3_050619	5/6/19	0955	DRR	GW	2		X								
4	Michigan Ave. - MH-2_050619	5/6/19	1020	DRR	GW	2		X								
5	Michigan Ave. - MH-1_050619	5/6/19	1045	DRR	GW	2		X								
6	P2-MH-122-North_050619	5/6/19	1105	DRR	GW	2		X								
7	P2-MH-122-South_050619	5/6/19	1110	DRR	GW	2		X								
8	[redacted] EB-01_050619	5/6/19	1120	DRR	GW	2		X								
9	Dup-01_050619	5/6/19	[redacted]	DRR	GW	2		X								

Turnaround Time (Business days)

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

Rush T/A Data Available VIA Email or Lablink

Data Deliverable Information

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

Comments / Remarks

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler/Affiliation	Date Time:	Received By/Affiliation	Relinquished By/Affiliation	Date Time:	Received By/Affiliation
1 Arcadis	5/6/19/1400	2	3		4 Fedex 5/7/19 900
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): 2.4

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

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

FA63909: Chain of Custody
Page 1 of 2

SGS Sample Receipt Summary

Job Number: FA63909 **Client:** ARCADIS **Project:** RACER LANSING

Date / Time Received: 5/7/2019 9:00:00 AM **Delivery Method:** FX **Airbill #'s:** 1002284340910003281100490063534278

Therm ID: IR 1; **Therm CF:** 0.4; **# of Coolers:** 1

Cooler Temps (Raw Measured) °C: Cooler 1: (2.0);

Cooler Temps (Corrected) °C: Cooler 1: (2.4);

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: 5/7/2019 9:00:00 AM Reviewer: _____ Date: _____

FA63909: 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: FA63909
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP74960-MB	3Q3701.D	1	05/10/19	NG	05/09/19	OP74960	S3Q94

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

FA63909-1, FA63909-2, FA63909-3, FA63909-4, FA63909-5, FA63909-6, FA63909-7, FA63909-8, FA63909-9

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	136%	30-140%
	13C5-PFPeA	129%	40-140%
	13C5-PFHxA	131%	50-150%
	13C4-PFHpA	128%	50-150%
	13C8-PFOA	125%	50-150%
	13C9-PFNA	118%	50-150%
	13C6-PFDA	109%	50-150%
	13C7-PFUnDA	96%	50-150%

Method Blank Summary

Job Number: FA63909
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP74960-MB	3Q3701.D	1	05/10/19	NG	05/09/19	OP74960	S3Q94

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

FA63909-1, FA63909-2, FA63909-3, FA63909-4, FA63909-5, FA63909-6, FA63909-7, FA63909-8, FA63909-9

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	80%	50-150%
	13C2-PFTeDA	71%	40-150%
	13C3-PFBS	131%	50-150%
	13C3-PFHxS	131%	50-150%
	13C8-PFOS	123%	50-150%
	13C8-FOSA	108%	30-140%
	d3-MeFOSAA	97%	50-150%
	13C2-4:2FTS	128%	50-150%
	13C2-6:2FTS	114%	50-150%
	13C2-8:2FTS	95%	50-150%

Blank Spike Summary

Job Number: FA63909
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP74960-BS	3Q3700.D	1	05/10/19	NG	05/09/19	OP74960	S3Q94

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

FA63909-1, FA63909-2, FA63909-3, FA63909-4, FA63909-5, FA63909-6, FA63909-7, FA63909-8, FA63909-9

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0765	96	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0764	96	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0734	92	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0731	91	71-130
335-67-1	Perfluorooctanoic acid	0.08	0.0751	94	74-130
375-95-1	Perfluorononanoic acid	0.08	0.0748	94	76-130
335-76-2	Perfluorodecanoic acid	0.08	0.0747	93	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0773	97	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0746	93	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0767	96	70-139
376-06-7	Perfluorotetradecanoic acid	0.08	0.0764	96	70-130
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0788	99	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0731	91	70-130
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0727	91	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0704	88	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0713	89	70-130
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0660	83	70-130
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0723	90	70-130
754-91-6	PFOSA	0.08	0.0757	95	70-131
2355-31-9	MeFOSAA	0.08	0.0735	92	70-130
2991-50-6	EtFOSAA	0.08	0.0585	73	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.08	0.0713	89	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.0740	93	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0740	93	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	129%	30-140%
	13C5-PFPeA	121%	40-140%
	13C5-PFHxA	122%	50-150%
	13C4-PFHpA	121%	50-150%
	13C8-PFOA	118%	50-150%
	13C9-PFNA	116%	50-150%
	13C6-PFDA	108%	50-150%
	13C7-PFUnDA	96%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA63909
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP74960-BS	3Q3700.D	1	05/10/19	NG	05/09/19	OP74960	S3Q94

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

FA63909-1, FA63909-2, FA63909-3, FA63909-4, FA63909-5, FA63909-6, FA63909-7, FA63909-8, FA63909-9

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	81%	50-150%
	13C2-PFTeDA	71%	40-150%
	13C3-PFBS	126%	50-150%
	13C3-PFHxS	125%	50-150%
	13C8-PFOS	123%	50-150%
	13C8-FOSA	81%	30-140%
	d3-MeFOSAA	95%	50-150%
	13C2-4:2FTS	129%	50-150%
	13C2-6:2FTS	116%	50-150%
	13C2-8:2FTS	100%	50-150%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA63909
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP74960-MS	3Q3708.D	1	05/10/19	NG	05/09/19	OP74960	S3Q94
OP74960-MSD	3Q3709.D	1	05/10/19	NG	05/09/19	OP74960	S3Q94
JC87576-6	3Q3707.D	1	05/10/19	NG	05/09/19	OP74960	S3Q94

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

FA63909-1, FA63909-2, FA63909-3, FA63909-4, FA63909-5, FA63909-6, FA63909-7, FA63909-8, FA63909-9

CAS No.	Compound	JC87576-6 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
375-22-4	Perfluorobutanoic acid	ND		0.08	0.0759	95	0.08	0.0702	88	8	70-130/30
2706-90-3	Perfluoropentanoic acid	ND		0.08	0.0760	95	0.08	0.0687	86	10	70-130/30
307-24-4	Perfluorohexanoic acid	ND		0.08	0.0746	93	0.08	0.0676	85	10	70-130/30
375-85-9	Perfluoroheptanoic acid	ND		0.08	0.0745	93	0.08	0.0667	83	11	71-130/30
335-67-1	Perfluorooctanoic acid	ND		0.08	0.0750	94	0.08	0.0680	85	10	74-130/30
375-95-1	Perfluorononanoic acid	ND		0.08	0.0749	94	0.08	0.0680	85	10	76-130/30
335-76-2	Perfluorodecanoic acid	ND		0.08	0.0761	95	0.08	0.0689	86	10	70-130/30
2058-94-8	Perfluoroundecanoic acid	ND		0.08	0.0774	97	0.08	0.0715	89	8	70-130/30
307-55-1	Perfluorododecanoic acid	ND		0.08	0.0749	94	0.08	0.0687	86	9	70-130/30
72629-94-8	Perfluorotridecanoic acid	ND		0.08	0.0756	95	0.08	0.0702	88	7	70-139/30
376-06-7	Perfluorotetradecanoic acid	ND		0.08	0.0781	98	0.08	0.0700	88	11	70-130/30
375-73-5	Perfluorobutanesulfonic acid	ND		0.08	0.0780	98	0.08	0.0709	89	10	73-130/30
2706-91-4	Perfluoropentanesulfonic acid	ND		0.08	0.0739	92	0.08	0.0670	84	10	70-130/30
355-46-4	Perfluorohexanesulfonic acid	ND		0.08	0.0728	91	0.08	0.0672	84	8	74-130/30
375-92-8	Perfluoroheptanesulfonic acid	ND		0.08	0.0717	90	0.08	0.0673	84	6	74-130/30
1763-23-1	Perfluorooctanesulfonic acid	ND		0.08	0.0712	89	0.08	0.0651	81	9	70-130/30
68259-12-1	Perfluorononanesulfonic acid	ND		0.08	0.0607	76	0.08	0.0576	72	5	70-130/30
335-77-3	Perfluorodecanesulfonic acid	ND		0.08	0.0739	92	0.08	0.0709	89	4	70-130/30
754-91-6	PFOSA	ND		0.08	0.0737	92	0.08	0.0671	84	9	70-131/30
2355-31-9	MeFOSAA	ND		0.08	0.0716	90	0.08	0.0681	85	5	70-130/30
2991-50-6	EtFOSAA	ND		0.08	0.0605	76	0.08	0.0550	69*	10	70-130/30
757124-72-4	4:2 Fluorotelomer sulfonate	ND		0.08	0.0717	90	0.08	0.0664	83	8	70-130/30
27619-97-2	6:2 Fluorotelomer sulfonate	ND		0.08	0.0745	93	0.08	0.0693	87	7	70-133/30
39108-34-4	8:2 Fluorotelomer sulfonate	ND		0.08	0.0756	95	0.08	0.0681	85	10	70-130/30

CAS No.	ID Standard Recoveries	MS	MSD	JC87576-6	Limits
	13C4-PFBA	148%* [b]	156%* [b]	144%* [a]	30-140%
	13C5-PFPeA	142%* [b]	150%* [b]	136%	40-140%
	13C5-PFHxA	140%	147%	136%	50-150%
	13C4-PFHpA	135%	139%	132%	50-150%
	13C8-PFOA	134%	140%	133%	50-150%
	13C9-PFNA	125%	131%	123%	50-150%
	13C6-PFDA	109%	116%	113%	50-150%
	13C7-PFUnDA	97%	101%	99%	50-150%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA63909
Account: ARCMIL Arcadis
Project: Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP74960-MS	3Q3708.D	1	05/10/19	NG	05/09/19	OP74960	S3Q94
OP74960-MSD	3Q3709.D	1	05/10/19	NG	05/09/19	OP74960	S3Q94
JC87576-6	3Q3707.D	1	05/10/19	NG	05/09/19	OP74960	S3Q94

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

FA63909-1, FA63909-2, FA63909-3, FA63909-4, FA63909-5, FA63909-6, FA63909-7, FA63909-8, FA63909-9

CAS No.	ID Standard Recoveries	MS	MSD	JC87576-6	Limits
	13C2-PFDoDA	83%	93%	86%	50-150%
	13C2-PFTeDA	77%	86%	79%	40-150%
	13C3-PFBS	143%	151%* [b]	142%	50-150%
	13C3-PFHxS	138%	146%	137%	50-150%
	13C8-PFOS	128%	134%	133%	50-150%
	13C8-FOSA	103%	115%	96%	30-140%
	d3-MeFOSAA	98%	103%	102%	50-150%
	13C2-4:2FTS	144%	150%	134%	50-150%
	13C2-6:2FTS	130%	133%	122%	50-150%
	13C2-8:2FTS	104%	111%	102%	50-150%

(a) Outside control limits. However, sample was ND.
(b) Outside control limits.

* = Outside of Control Limits.