

TO

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DATE

August 10, 2022

DEPARTMENT

Environment

COPIES TO

Dave Favero, RACER Trust

SUBJECT

Off-Site PFAS Monitoring Summary & Proposed Scope of Work
RACER Trust Industrial Land, Plant 6, Lansing, Michigan

PROJECT NUMBER

30075941

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The following provides a summary of the off-site investigation activities completed to delineate per- and polyfluoroalkyl substances (PFAS) at RACER Trust, Plant 6 located in the City of Lansing, Michigan (Site). The scope of work was provided to the Michigan Department of Energy Great Lakes and Environment (EGLE) on January 4, 2022, as part of the *Plant 6 PFAS Off-site Investigation* approved by EGLE on March 4, 2022 (Work Plan).

Previous investigation results for Plant 6 PFAS impacts are summarized in the *PFAS Investigation Phase 1 Summary* report (Arcadis 2019a), the *Plant 6 PFAS Investigation Summary – Phase 2* report (Arcadis 2019b), and the 2022 *Plant 6 PFAS Off-site Investigation* report (Arcadis 2022). The phased investigation at Plant 6 identified concentrations of perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorononanoic acid (PFNA) above the current Michigan Department of Environment, Great Lakes and Energy (EGLE) Drinking Water Criteria (EGLE 2020) along the eastern and southern Plant 6 property boundaries. Of these, only PFOA has been identified off-site at concentrations greater than Residential Drinking Water (DW) Criteria (8 nanograms per liter [ng/L]).

PFOA at the property boundary and off-site are detected within shallow more permeable sand and silty sand seams encountered at depths ranging from 5 to 35 feet below ground surface (bgs) (Arcadis 2019a, 2019b). Based on the previous investigation results, six monitoring wells were installed at the perimeter of Plant 6 (MW-21-133 through MW-21-135) and within the Michigan Avenue right-of-way (MW-21-136 through MW-21-138) to verify PFAS concentrations at the perimeter and locations for potential downgradient migration. Monitoring well construction details and analytical results for the perimeter monitoring wells were summarized in the Work Plan.

Additional vertical aquifer profile (VAP) borings and installation of ten monitoring wells to the east and northeast of the Site (MW-22-143 through MW-22-152) was completed in Fall of 2021 and Spring 2022, respectively. The objective of the new off-site monitoring wells was to provide a sentinel monitoring network for off-site PFOA impacts and provide a basis for a City of Lansing ordinance restricting installation of groundwater wells within the area. The location of the proposed borings and wells is shown on **Figure 1**.

Results from the off-site wells successfully establish the perimeter of PFAS impacts except for southeast of Plant 6 (MW-22-145). The extent of PFOA above DW Criteria to the southeast of Plant 6 will require further delineation as outlined in Section 3 below.

1. INVESTIGATION ACTIVITIES

The additional VAP and monitoring well installation to the east and northeast of Plant 6 was completed in two phases of drilling. The first phase was completed from September 8 to 10, 2021 and on September 27, 2021, and consisted of eight VAP borings located within the City of Lansing ROWs with a total of eleven groundwater samples. The VAP groundwater samples were collected from saturated sand seams encountered within the overburden consistent with previous studies. Soil boring logs are provided as **Attachment 1**. The VAP boring locations are shown on **Figure 1**, which provides an overview of the PFOA results at Plant 6 to date and includes the PFOA results for the last two quarters of data collected at each monitoring well.

The second phase of investigation activities consisted of the installation of ten monitoring wells (MW-22-143 through MW-22-152) on March 21 to 31, 2022. The monitoring wells were installed at eight locations using hollow-stem auger drilling methods and include two nested well pairs (MW-22-147/MW-22-148 and MW-22-144/ MW-22-145) where two impacted zones have been identified at the perimeter of Plant 6. Monitoring wells were constructed of 2-inch PVC materials with 0.010-slot, 5-foot stainless steel well screens. An appropriate sand pack was placed around the well screen followed by bentonite grout to grade and a flush mount manhole cover. Monitoring wells were developed following installation using a surge block and purge technique, alternating until the water was relatively free of fine-grained material. Well construction logs are included in **Attachment 1**. Off-site monitoring wells were sampled in April and June 2022.

All groundwater samples were sent to PACE Analytical Laboratory located in Columbia, South Carolina and analyzed for the 28 PFAS outlined in the EGLE PFAS Minimum Laboratory Analyte List using modified USEPA Method 537 with isotope dilution (DoD QSM 5.1). Laboratory analytical reports are included as **Attachment 2**. To avoid cross contamination, all sampling was conducted in accordance with the Arcadis PFAS Sampling Technical Guidance Instruction, available upon request.

2. RESULTS AND DISCUSSION

The analytical results for groundwater samples were compared to the Part 201 Residential DW and Groundwater Surface Water Interface (GSI) Criteria and are summarized on **Table 1**. Groundwater sample locations (i.e., VAP borings and monitoring wells), criteria comparison for PFOA, and the last two quarters of analytical results for monitoring wells are shown on **Figure 1**.

- Geology observed in soil borings completed during the investigation is generally consistent with observations from previous investigations. The geology is dominated by clay with discontinuous layers of sand, silt, and some shallow fill material. Perched water was encountered within the more permeable sand lenses; however, the permeable zones appear discontinuous. The interbedded clays, silts, and sand lenses are underlain by a dense glacial till, generally encountered at depths of 20 to 35 feet bgs. Several borings contained dry sands and silts below the perched water table.
- SB-OS-KG312 is located to the northeast of Plant 6 approximately 500 ft north of the previously completed VAP borings along Osborn Road that contained PFOA concentrations ranging from 11.4 to 50.4 ng/L in perched groundwater. PFOA was detected at a concentration of 11 nanograms per liter (ng/L) in a groundwater sample collected from 11-15 ft bgs at SB-OS-KG312 in September 2021, exceeding the Residential DW Criterion of 8 ng/L. A deeper groundwater sample at SB-OS-KG312, was collected from the next encountered permeable sand seam at a depth of 23-27 ft bgs and was non-detect (< 3.5 ng/L) for PFOA.

- Other PFAS detected in the shallow groundwater at SB-OS-KG312 including PFBA, PFHpA, PFHxA, and PFPeA are consistent with detections observed in groundwater samples collected previously from monitoring wells and VAP borings in the northeast corner of Plant 6.
- Monitoring well MW-22-151 was installed slightly north of SB-OS-KG312 and was below DW Criteria for PFOA in June 2022. This well will continue to be monitored to evaluate if additional step-outs are required.
- The groundwater sampling at MW-22-145 has shown PFOA detections of 14 to 16 ng/L in perched groundwater, exceeding the DW Criteria of 8 ng/L. MW-22-145 is located adjacent to the previously completed VAP boring SB-OS-SW386, which had a PFOA concentration of 4.8 ng/L in the same shallow depth interval. The detected PFAS at MW-22-145 are like those detected at the Plant 6 perimeter and the horizontal gradient calculated for the shallow (~8-15 feet below ground surface) monitoring wells in this area suggest a southeasterly component to groundwater flow (**Figure 2**). To further define PFOA in this area, additional investigation activities are outlined in Section 3 below.

3. PROPOSED ADDITIONAL ACTIVITIES

Groundwater monitoring to date indicates MW-22-145 exceeds DW Criteria for PFOA off-site to the southeast of Plant 6. Additional work will be completed further southeast to define the extent of PFOA above DW Criteria. The scope of work will include completion of four VAP borings to initially define the extent and geology followed by the installation of up to four monitoring wells with the City of Lansing ROWs. The objective is to locate sentinel monitoring wells just outside a potential well restriction area. The proposed VAP borings are shown on **Figure 2**. The scope of work includes the following:

- Up to four (4) VAP borings will be completed with groundwater samples collected from the first encountered saturated sand seam targeting the 8-15 ft bgs zone. Groundwater samples will be submitted for analysis of the 28 PFAS outlined in the EGLE PFAS Minimum Laboratory Analyte List using modified USEPA Method 537 with isotope dilution (DoD QSM 5.1).
- Continuous soil cores will be obtained from the ground surface to the target well depth at each boring location. Arcadis will log and describe the soils in accordance with the Arcadis Soil Description Standard Operating Procedures included with the MDEQ-approved FSP (Arcadis 2011). Boring logs will be generated based on the field descriptions.
- Based on the VAP results, up to four (4) additional monitoring wells will be installed using rotary drilling methods. The monitoring wells will be screened within the first encountered saturated seam (shallow saturated sand interval) to serve as sentinel monitoring point for PFAS impacts identified within the shallow zone southeast of the Plant 6 perimeter. The locations of the proposed VAP locations and potential monitoring wells are shown on **Figure 2**.
- Monitoring wells will be screened at a depth based on observed soil conditions and be constructed with a 5-foot stainless-steel wire-wrapped 0.010-slot screens and 2-inch PVC riser. An appropriate sand pack will be placed around the screen interval to a depth of 1 foot above the well screen followed by 1 to 2 feet of choker sand and then bentonite grout to grade. The wells will be finished with a flush-mount well cover.

The proposed additional wells will be integrated into the revised Interim Groundwater Monitoring Plan. The new monitoring wells will be sampled quarterly for one year and then re-evaluated to determine an appropriate long-term sampling frequency.

Please direct any questions to Dave Favero at 217-741-6235 or Patrick Curry at Arcadis at 810-225-1926.

Christine Matlock, Joe Rogers, John McCabe
Michigan Department of Environment, Great Lakes and Energy
August 10, 2022

References:

- Arcadis. 2011. Field Sampling Plan. RACER Trust, Lansing, Michigan Plants 2, 3, and 6 Industrial Land. August 26.
- Arcadis. 2019a. Memorandum, PFAS Investigation Phase 1 Summary. RACER Trust Plant 6, Lansing, Michigan. January 29.
- Arcadis. 2019b. Memorandum, Plant 6 PFAS Investigation Summary – Phase 2. RACER Trust Plant 6, Lansing, Michigan. August 23.
- Arcadis. 2021. Plant 6 PFAS Monitoring Well Installation Summary and Off-site Investigation Work Plan, RACER Trust Plant 6, Lansing, Michigan. August 6.
- Arcadis. 2022. Plant 6 PFAS Off-Site Investigation Summary. RACER Trust Plant 6, Lansing, Michigan. January 4.

Enclosures:

TABLES

- Table 1 Plant 6 - 2022 VAP and Monitoring Well Groundwater Analytical Results

FIGURES

- Figure 1 PFOA Groundwater Analytical Results
- Figure 2 Proposed Step-Out VAP and Potential Monitoring Well Locations

ATTACHMENTS

- Attachment 1 Soil Boring Logs and Well Construction Diagrams
- Attachment 2 Laboratory Analytical Reports

Table

Table 1
 Plant 6 - 2022 VAP and Monnitoring Well Groundwater Analytical Results
 RACER Trust Plant6
 Lansing, Michigan



Location ID: Date Collected: Sample Name: Sample Depth (ft. bgs):	P201 Residential Drinking Water	P201 Groundwater Surface Water Interface	Units	MW-22-143 04/05/22 MW-22-143_040522 26-31	MW-22-143 06/01/22 MW-22-143_060122 26-31	MW-22-144 04/04/22 144_040422 19.5-24.5	MW-22-144 06/01/22 144_060122 19.5-24.5	MW-22-145 04/04/22 145_040422 10.5-15.5	MW-22-145 06/01/22 145_060122 10.5-15.5	MW-22-146 04/05/22 146_040522 5.5-10.5	MW-22-146 06/01/22 146_060122 5.5-10.5	MW-22-147 04/04/22 MW-22-147_040422 7.5-12.5	MW-22-147 06/01/22 MW-22-147_060122 7.5-12.5	MW-22-148 04/04/22 MW-22-148_040422 24.5-29.5
Per- and Polyfluoroalkyl Substances (PFAS) (via EPA Method 537 Modified)														
11CI-PF3OUds (F-53B Minor)	--	--	ng/L	< 6.9 [< 6.9]	< 6.9	< 7.1	< 7.3	< 7.2	< 6.8 [< 6.8]	< 7.0	< 7.0	< 6.9	< 6.8	< 7.0
4:2 FTS	--	--	ng/L	< 6.9 [< 6.9]	< 6.9	< 7.1	< 7.3	< 7.2	< 6.8 [< 6.8]	< 7.0	< 7.0	< 6.9	< 6.8	< 7.0
6:2 FTS	--	--	ng/L	< 6.9 [< 6.9]	< 6.9	< 7.1	< 7.3	< 7.2	< 6.8 [< 6.8]	< 7.0	< 7.0	< 6.9	< 6.8	< 7.0
8:2 FTS	--	--	ng/L	< 6.9 [< 6.9]	< 6.9	< 7.1	< 7.3	< 7.2	< 6.8 [< 6.8]	< 7.0	< 7.0	< 6.9	< 6.8	< 7.0
9CI-PF3ONS (F-53B Major)	--	--	ng/L	< 6.9 [< 6.9]	< 6.9	< 7.1	< 7.3	< 7.2	< 6.8 [< 6.8]	< 7.0	< 7.0	< 6.9	< 6.8	< 7.0
ADONA	--	--	ng/L	< 6.9 [< 6.9]	< 6.9	< 7.1	< 7.3	< 7.2	< 6.8 [< 6.8]	< 7.0	< 7.0	< 6.9	< 6.8	< 7.0
Hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)	370	--	ng/L	< 6.9 [< 6.9]	< 6.9	< 7.1	< 7.3	< 7.2	< 6.8 [< 6.8]	< 7.0	< 7.0	< 6.9	< 6.8	< 7.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	--	--	ng/L	< 6.9 [< 6.9]	< 6.9	< 7.1	< 7.3	< 7.2	< 6.8 [< 6.8]	< 7.0	< 7.0	< 6.9	< 6.8	< 7.0
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	--	--	ng/L	< 6.9 [< 6.9]	< 6.9	< 7.1	< 7.3	< 7.2	< 6.8 [< 6.8]	< 7.0	< 7.0	< 6.9	< 6.8	< 7.0
Perfluorobutanesulfonic acid (PFBS)	420	--	ng/L	0.81 J [0.91 J]	1.0 J	1.9 J	2.3 J	3.4 J	3.0 J [2.8 J]	4.0	6.0	2.5 JS	3.2 J	1.6 J
Perfluorobutanoic acid (PFBA)	--	--	ng/L	11 [11]	9.7	5.3	5.4	5.2	5.5 [5.6]	14	16	3.8 S	6.1	3.0 J
Perfluorodecanesulfonic acid (PFDS)	--	--	ng/L	< 3.5 [< 3.5]	< 3.5	< 3.5	< 3.6	< 3.6	< 3.4 [< 3.4]	< 3.5	< 3.5	< 3.5	< 3.4	< 3.5
Perfluorodecanoic acid (PFDA)	--	--	ng/L	< 3.5 [< 3.5]	< 3.5	< 3.5	< 3.6	< 3.6	< 3.4 [< 3.4]	< 3.5	< 3.5	< 3.5	< 3.4	< 3.5
Perfluorododecanoic acid (PFDoA)	--	--	ng/L	< 3.5 [< 3.5]	< 3.5	< 3.5	< 3.6	< 3.6	< 3.4 [< 3.4]	< 3.5	< 3.5	< 3.5	< 3.4	< 3.5
Perfluoroheptanesulfonic Acid (PFHpS)	--	--	ng/L	< 3.5 [< 3.5]	< 3.5	< 3.5	< 3.6	< 3.6	< 3.4 [< 3.4]	< 3.5	< 3.5	< 3.5	< 3.4	< 3.5
Perfluoroheptanoic acid (PFHpA)	--	--	ng/L	3.7 [3.7]	5.9	3.6	4.5	5.7	5.8 [6.0]	0.59 J	1.0 J	0.69 J	1.4 J	0.39 J
Perfluorohexanesulfonic acid (PFHxS)	51	--	ng/L	< 3.5 [< 3.5]	< 3.5	2.3 J	2.2 J	1.9 J	1.9 J [2.1 J]	1.1 J	1.2 J	1.3 J	1.4 J	< 3.5
Perfluorohexanoic acid (PFHxA)	400,000	--	ng/L	19 [19]	16	7.7	10	9.9	9.7 [8.7]	6.7	5.8	1.1 J	2.7 J	1.1 J
Perfluorononanesulfonic acid (PFNS)	--	--	ng/L	< 3.5 [< 3.5]	< 3.5	< 3.5	< 3.6	< 3.6	< 3.4 [< 3.4]	< 3.5	< 3.5	< 3.5	< 3.4	< 3.5
Perfluorononanoic acid (PFNA)	6	--	ng/L	< 3.5 [< 3.5]	< 3.5	< 3.5	< 3.6	< 3.6	0.75 J [0.79 J]	< 3.5	< 3.5	< 3.5	< 3.4	< 3.5
Perfluorooctane Sulfonamide (PFOSA)	--	--	ng/L	< 3.5 [< 3.5]	< 3.5	< 3.5	< 3.6	1.1 J	< 3.4 [< 3.4]	< 3.5	< 3.5	0.67 J	< 3.4	2.0 J
Perfluorooctane sulfonic acid (PFOS)	16	12	ng/L	< 3.5 [< 3.5]	< 3.5	< 3.5	< 3.6	3.6	6.8 [6.9]	1.7 J	1.9 J	2.0 JS	2.2 J	< 3.5
Perfluorooctanoic acid (PFOA)	8	12,000	ng/L	1.5 J [1.5 J]	4.1	5.3	7.5	16	14 [14]	6.5	5.8	2.8 JS	3.7	1.1 J
Perfluoropentanesulfonic acid (PFPeS)	--	--	ng/L	< 3.5 [< 3.5]	< 3.5	< 3.5	< 3.6	< 3.6	0.54 J [0.51 J]	< 3.5	< 3.5	< 3.5	< 3.4	< 3.5
Perfluoropentanoic acid (PFPeA)	--	--	ng/L	18 [20]	12	8.8	9.9	9.3	9.5 [8.8]	5.4	4.9	1.2 J	2.9 J	0.92 J
Perfluorotetradecanoic acid (PFTeA)	--	--	ng/L	< 3.5 [< 3.5]	< 3.5	< 3.5	< 3.6	< 3.6	< 3.4 [< 3.4]	< 3.5	< 3.5	< 3.5	< 3.4	< 3.5
Perfluorotridecanoic Acid (PFTriA)	--	--	ng/L	< 3.5 [< 3.5]	< 3.5	< 3.5	< 3.6	< 3.6	< 3.4 [< 3.4]	< 3.5	< 3.5	< 3.5	< 3.4	< 3.5
Perfluoroundecanoic acid (PFUnA)	--	--	ng/L	< 3.5 [< 3.5]	< 3.5	< 3.5	< 3.6	< 3.6	< 3.4 [< 3.4]	< 3.5	< 3.5	< 3.5	< 3.4	< 3.5

See notes on last page.

Table 1
 Plant 6 - 2022 VAP and Monnitoring Well Groundwater Analytical Results
 RACER Trust Plant6
 Lansing, Michigan



Location ID: Date Collected: Sample Name: Sample Depth (ft. bgs):	P201 Residential Drinking Water	P201 Groundwater Surface Water Interface	Units	MW-22-148 06/01/22 MW-22-148_060122 24.5-29.5	MW-22-149 04/05/22 149_040522 5.5-10.5	MW-22-149 06/01/22 149_060122 5.5-10.5	MW-22-150 04/05/22 150_040522 13-18	MW-22-150 06/01/22 150_060122 13-18	MW-22-151 04/05/22 151_040522 13-18	MW-22-151 06/01/22 151_060122 13-18	MW-22-152 04/05/22 152_040522 10-15	MW-22-152 06/01/22 152_060122 10-15	SB-OS-KG312 09/08/21 SB-OS-KG312_11-15_20210908 11 - 15
Per- and Polyfluoroalkyl Substances (PFAS) (via EPA Method 537 Modified)													
11CI-PF3OUdS (F-53B Minor)	--	--	ng/L	< 7.2	< 6.9	< 7.0	< 7.1	< 6.8	< 7.2	< 6.8	< 6.8	< 6.8	< 7.0
4:2 FTS	--	--	ng/L	< 7.2	< 6.9	< 7.0	< 7.1	< 6.8	< 7.2	< 6.8	< 6.8	< 6.8	< 7.0
6:2 FTS	--	--	ng/L	< 7.2	< 6.9	< 7.0	< 7.1	< 6.8	< 7.2	5.3 JQ	< 6.8	< 6.8	< 7.0
8:2 FTS	--	--	ng/L	< 7.2	< 6.9	< 7.0	< 7.1	< 6.8	< 7.2	< 6.8	< 6.8	< 6.8	< 7.0
9CI-PF3ONS (F-53B Major)	--	--	ng/L	< 7.2	< 6.9	< 7.0	< 7.1	< 6.8	< 7.2	< 6.8	< 6.8	< 6.8	< 7.0
ADONA	--	--	ng/L	< 7.2	< 6.9	< 7.0	< 7.1	< 6.8	< 7.2	< 6.8	< 6.8	< 6.8	< 7.0
Hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)	370	--	ng/L	< 7.2	< 6.9	< 7.0	< 7.1	< 6.8	< 7.2	< 6.8	< 6.8	< 6.8	< 7.0
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	--	--	ng/L	< 7.2	< 6.9	< 7.0	< 7.1	< 6.8	< 7.2	< 6.8	< 6.8	< 6.8	< 7.0
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	--	--	ng/L	< 7.2	< 6.9	< 7.0	< 7.1	< 6.8	< 7.2	< 6.8	< 6.8	< 6.8	< 7.0
Perfluorobutanesulfonic acid (PFBS)	420	--	ng/L	1.0 J	1.8 J	1.4 J	< 3.5	< 3.4	7.9	8.4	1.8 J	2.1 J	4.2
Perfluorobutanoic acid (PFBA)	--	--	ng/L	0.88 J	1.2 J	0.91 J	3.1 J	2.9 J	11	10	3.7	4.0	11
Perfluorodecanesulfonic acid (PFDS)	--	--	ng/L	< 3.6	< 3.5	< 3.5	< 3.5	< 3.4	< 3.6	< 3.4	< 3.4	< 3.4	< 3.5
Perfluorodecanoic acid (PFDA)	--	--	ng/L	< 3.6	< 3.5	< 3.5	< 3.5	< 3.4	< 3.6	< 3.4	< 3.4	< 3.4	< 3.5
Perfluorododecanoic acid (PFDoA)	--	--	ng/L	< 3.6	< 3.5	< 3.5	< 3.5	< 3.4	< 3.6	< 3.4	< 3.4	< 3.4	< 3.5
Perfluoroheptanesulfonic Acid (PFHpS)	--	--	ng/L	< 3.6	< 3.5	< 3.5	< 3.5	< 3.4	< 3.6	< 3.4	< 3.4	< 3.4	< 3.5
Perfluoroheptanoic acid (PFHpA)	--	--	ng/L	< 3.6	< 3.5	0.41 J	< 3.5	< 3.4	3.5 J	2.7 J	1.0 J	0.99 J	8.5
Perfluorohexanesulfonic acid (PFHxS)	51	--	ng/L	< 3.6	0.88 J	0.91 J	< 3.5	< 3.4	1.8 J	< 3.4	1.1 J	1.8 J	3.3 J
Perfluorohexanoic acid (PFHxA)	400,000	--	ng/L	< 3.6	< 3.5	< 3.5	1.7 J	1.2 J	6.0	6.2	2.4 J	2.6 J	23
Perfluorononanesulfonic acid (PFNS)	--	--	ng/L	< 3.6	< 3.5	< 3.5	< 3.5	< 3.4	< 3.6	< 3.4	< 3.4	< 3.4	< 3.5
Perfluorononanoic acid (PFNA)	6	--	ng/L	< 3.6	< 3.5	< 3.5	< 3.5	< 3.4	0.59 J	0.39 J	< 3.4	< 3.4	< 3.5
Perfluorooctane Sulfonamide (PFOSA)	--	--	ng/L	< 3.6	0.53 J	< 3.5	0.57 J	1.6 J	< 3.6	< 3.4	< 3.4	< 3.4	< 3.5
Perfluorooctane sulfonic acid (PFOS)	16	12	ng/L	< 3.6	2.1 J	< 3.5	< 3.5	< 3.4	2.0 J	3.4	< 3.4	< 3.4	< 3.5
Perfluorooctanoic acid (PFOA)	8	12,000	ng/L	< 3.6	0.72 J	1.1 J	< 3.5	< 3.4	9.4	7.7	2.4 J	2.5 J	11
Perfluoropentanesulfonic acid (PFPeS)	--	--	ng/L	< 3.6	< 3.5	< 3.5	< 3.5	< 3.4	< 3.6	< 3.4	< 3.4	< 3.4	0.94 J
Perfluoropentanoic acid (PFPeA)	--	--	ng/L	< 3.6	< 3.5	< 3.5	2.1 J	1.7 J	13	14	2.7 J	3.0 J	29
Perfluorotetradecanoic acid (PFTeA)	--	--	ng/L	< 3.6	< 3.5	< 3.5	< 3.5	< 3.4	< 3.6	< 3.4	< 3.4	< 3.4	< 3.5
Perfluorotridecanoic Acid (PFTriA)	--	--	ng/L	< 3.6	< 3.5	< 3.5	< 3.5	< 3.4	< 3.6	< 3.4	< 3.4	< 3.4	< 3.5
Perfluoroundecanoic acid (PFUnA)	--	--	ng/L	< 3.6	< 3.5	< 3.5	< 3.5	< 3.4	< 3.6	< 3.4	< 3.4	< 3.4	< 3.5

See notes on last page.

Table 1
 Plant 6 - 2022 VAP and Monnitoring Well Groundwater Analytical Results
 RACER Trust Plant6
 Lansing, Michigan



Location ID: Date Collected: Sample Name: Sample Depth (ft. bgs):	P201 Residential Drinking Water	P201 Groundwater Surface Water Interface	Units	SB-OS-KG312 09/08/21 SB-OS-KG312_23-27_20210908 23 - 27	SB-OS-LE285 09/08/21 SB-OS-LE285_11-15_20210908 11 - 15	SB-OS-LI335 09/09/21 SB-OS-LI335_14-18_20210909 14 - 18	SB-OS-OS376 09/27/21 SB-OS-OS376_6-10_20210927 6 - 10	SB-OS-QM379 09/09/21 SB-OS-QM379_8-12_20210909 8 - 12	SB-OS-QM379 09/09/21 SB-OS-QM379_25-29_20210909 25 - 29
Per- and Polyfluoroalkyl Substances (PFAS) (via EPA Method 537 Modified)									
11Cl-PF3OUdS (F-53B Minor)	--	--	ng/L	<6.9	<6.8	<7.0	<6.8	<6.9	<8.8
4:2 FTS	--	--	ng/L	<6.9	<6.8	<7.0	<6.8	<6.9	<8.8
6:2 FTS	--	--	ng/L	<6.9	<6.8	<7.0	<6.8	<6.9	<8.8
8:2 FTS	--	--	ng/L	<6.9	<6.8	<7.0	<6.8	<6.9	<8.8
9Cl-PF3ONS (F-53B Major)	--	--	ng/L	<6.9	<6.8	<7.0	<6.8	<6.9	<8.8
ADONA	--	--	ng/L	<6.9	<6.8	<7.0	<6.8	<6.9	<8.8
Hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)	370	--	ng/L	<6.9	<6.8	<7.0	<6.8	<6.9	<8.8
N-ethyl perfluorooctane sulfonamidoacetic acid (NETFOSAA)	--	--	ng/L	<6.9	<6.8	<7.0	<6.8	<6.9	<8.8
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	--	--	ng/L	<6.9	<6.8	<7.0	<6.8	<6.9	<8.8
Perfluorobutanesulfonic acid (PFBS)	420	--	ng/L	<3.5	2.4 J	<3.5	1.3 J	1.9 J	1.2 J
Perfluorobutanoic acid (PFBA)	--	--	ng/L	3.8	3.6	4.2	0.95 J	5.0	<4.4
Perfluorodecanesulfonic acid (PFDS)	--	--	ng/L	<3.5	<3.4	<3.5	<3.4	<3.4	<4.4
Perfluorodecanoic acid (PFDA)	--	--	ng/L	<3.5	<3.4	<3.5	<3.4	<3.4	<4.4
Perfluorododecanoic acid (PFDoA)	--	--	ng/L	<3.5	<3.4	<3.5	<3.4	<3.4	<4.4
Perfluoroheptanesulfonic Acid (PFHpS)	--	--	ng/L	<3.5	<3.4	<3.5	<3.4	<3.4	<4.4
Perfluoroheptanoic acid (PFHpA)	--	--	ng/L	<3.5	<3.4	<3.5	<3.4	1.3 J	<4.4
Perfluorohexanesulfonic acid (PFHxS)	51	--	ng/L	<3.5	<3.4	<3.5	1.4 J	2.7 J	<4.4
Perfluorohexanoic acid (PFHxA)	400,000	--	ng/L	2.1 J	2.1 J	1.3 J	<3.4	2.1 J	<4.4
Perfluorononanesulfonic acid (PFNS)	--	--	ng/L	<3.5	<3.4	<3.5	<3.4	<3.4	<4.4
Perfluorononanoic acid (PFNA)	6	--	ng/L	<3.5	<3.4	<3.5	<3.4	<3.4	<4.4
Perfluorooctane Sulfonamide (PFOSA)	--	--	ng/L	<3.5	<3.4	<3.5	<3.4	<3.4	<4.4
Perfluorooctane sulfonic acid (PFOS)	16	12	ng/L	<3.5	<3.4	<3.5	2.8 J	1.6 J	1.3 J
Perfluorooctanoic acid (PFOA)	8	12,000	ng/L	<3.5	2.9 J	<3.5	<3.4	3.4	<4.4
Perfluoropentanesulfonic acid (PFPeS)	--	--	ng/L	<3.5	<3.4	<3.5	<3.4	<3.4	<4.4
Perfluoropentanoic acid (PFPeA)	--	--	ng/L	4.5	2.2 J	2.6 J	<3.4	2.4 J	<4.4
Perfluorotetradecanoic acid (PFTeA)	--	--	ng/L	<3.4	<3.4	<3.5	<3.4	<3.4	<4.4
Perfluorotridecanoic Acid (PFTriA)	--	--	ng/L	<3.5	<3.4	<3.5	<3.4	<3.4	<4.4
Perfluoroundecanoic acid (PFUnA)	--	--	ng/L	<3.5	<3.4	<3.5	<3.4	<3.4	<4.4

See notes on last page.

Location ID: Date Collected: Sample Name: Sample Depth (ft. bgs):	P201 Residential Drinking Water	P201 Groundwater Surface Water Interface	Units	SB-OS-RO398 09/10/21 SB-OS-RO398_6-10_20210910 6 - 10	SB-OS-SW386 09/10/21 SB-OS-SW386_11-15_20210910 11 - 15	SB-OS-SW386 09/10/21 SB-OS-SW386_20-24_20210910 20 - 24	SB-OS-TC335 09/27/21 SB-OS-TC335_26-30_20210927 26 - 30
Per- and Polyfluoroalkyl Substances (PFAS) (via EPA Method 537 Modified)							
11CI-PF3OUdS (F-53B Minor)	--	--	ng/L	<7.3	<6.9	<7.9	<6.9
4:2 FTS	--	--	ng/L	<7.3	<6.9	<7.9	<6.9
6:2 FTS	--	--	ng/L	<7.3	20	<7.9	<6.9
8:2 FTS	--	--	ng/L	<7.3	<6.9	<7.9	<6.9
9CI-PF3ONS (F-53B Major)	--	--	ng/L	<7.3	<6.9	<7.9	<6.9
ADONA	--	--	ng/L	<7.3	<6.9	<7.9	<6.9
Hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)	370	--	ng/L	<7.3	<6.9	<7.9	<6.9
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	--	--	ng/L	<7.3	<6.9	<7.9	<6.9
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	--	--	ng/L	<7.3	<6.9	<7.9	<6.9
Perfluorobutanesulfonic acid (PFBS)	420	--	ng/L	2.7 J	1.7 J	1.1 J	<3.4
Perfluorobutanoic acid (PFBA)	--	--	ng/L	5.5	6.2	4.5	12
Perfluorodecanesulfonic acid (PFDS)	--	--	ng/L	<3.6	<3.5	<3.9	<3.4
Perfluorodecanoic acid (PFDA)	--	--	ng/L	<3.6	<3.5	<3.9	<3.4
Perfluorododecanoic acid (PFDoA)	--	--	ng/L	<3.6	<3.5	<3.9	<3.4
Perfluoroheptanesulfonic Acid (PFHpS)	--	--	ng/L	<3.6	<3.5	<3.9	<3.4
Perfluoroheptanoic acid (PFHpA)	--	--	ng/L	<3.6	4.0	1.1 J	1.8 J
Perfluorohexanesulfonic acid (PFHxS)	51	--	ng/L	<3.6	1.4 J	<3.9	<3.4
Perfluorohexanoic acid (PFHxA)	400,000	--	ng/L	1.4 J	6.9	2.8 J	18
Perfluorononanesulfonic acid (PFNS)	--	--	ng/L	<3.6	<3.5	<3.9	<3.4
Perfluorononanoic acid (PFNA)	6	--	ng/L	<3.6	<3.5	<3.9	<3.4
Perfluorooctane Sulfonamide (PFOSA)	--	--	ng/L	<3.6	<3.5	<3.9	<3.4
Perfluorooctane sulfonic acid (PFOS)	16	12	ng/L	2.1 J	<3.5	<3.9	<3.4
Perfluorooctanoic acid (PFOA)	8	12,000	ng/L	2.1 J	4.8	<3.9	<3.4
Perfluoropentanesulfonic acid (PFPeS)	--	--	ng/L	<3.6	<3.5	<3.9	<3.4
Perfluoropentanoic acid (PFPeA)	--	--	ng/L	0.97 J	7.1	3.1 J	23
Perfluorotetradecanoic acid (PFTeA)	--	--	ng/L	<3.6	<3.5	<3.9	<3.4
Perfluorotridecanoic Acid (PFTriA)	--	--	ng/L	<3.6	<3.5	<3.9	<3.4
Perfluoroundecanoic acid (PFUnA)	--	--	ng/L	<3.6	<3.5	<3.9	<3.4

See notes on last page.

Table 1
Summary of Groundwater Analytical Results
2021 Plant 6 PFAS Off-Site Investigation Summary
RACER Trust Plant 6
Lansing, Michigan

Data Flagging:

Bold font represents data where detections were noted above the laboratory method detection limit.

Gray shading represents result exceeding either or both the EGLE Part 201 Generic Cleanup Criteria and Screening Levels or the EGLE GSI Criteria (Updated December 21, 2020)

Notes:

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

Abbreviations:

< = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

[] = duplicate analytical data, listed in brackets next to parent sample

- - = Not listed in the EGLE Criteria Tables.

* = Analyzed for low-level 1,4-Dioxane via EPA Method 522

Deg. C. = degrees Celsius

EGLE = Michigan Department of Environment, Great Lakes, and Energy

mg/L = milligrams per liter

NA = Not Analyzed

NR = Not Recorded

NTU = Nephelometric Turbidity Unit

s.u. = standard unit

ug/L = micrograms per liter

µS/cm = microSiemens per centimeter

Lab and Validation Data Qualifiers:

F1 = Matrix spike and/or matrix spike duplicate recovery is outside acceptance limits.

J = The compound was positively identified, however, the associated numerical value is an estimated concentration only.

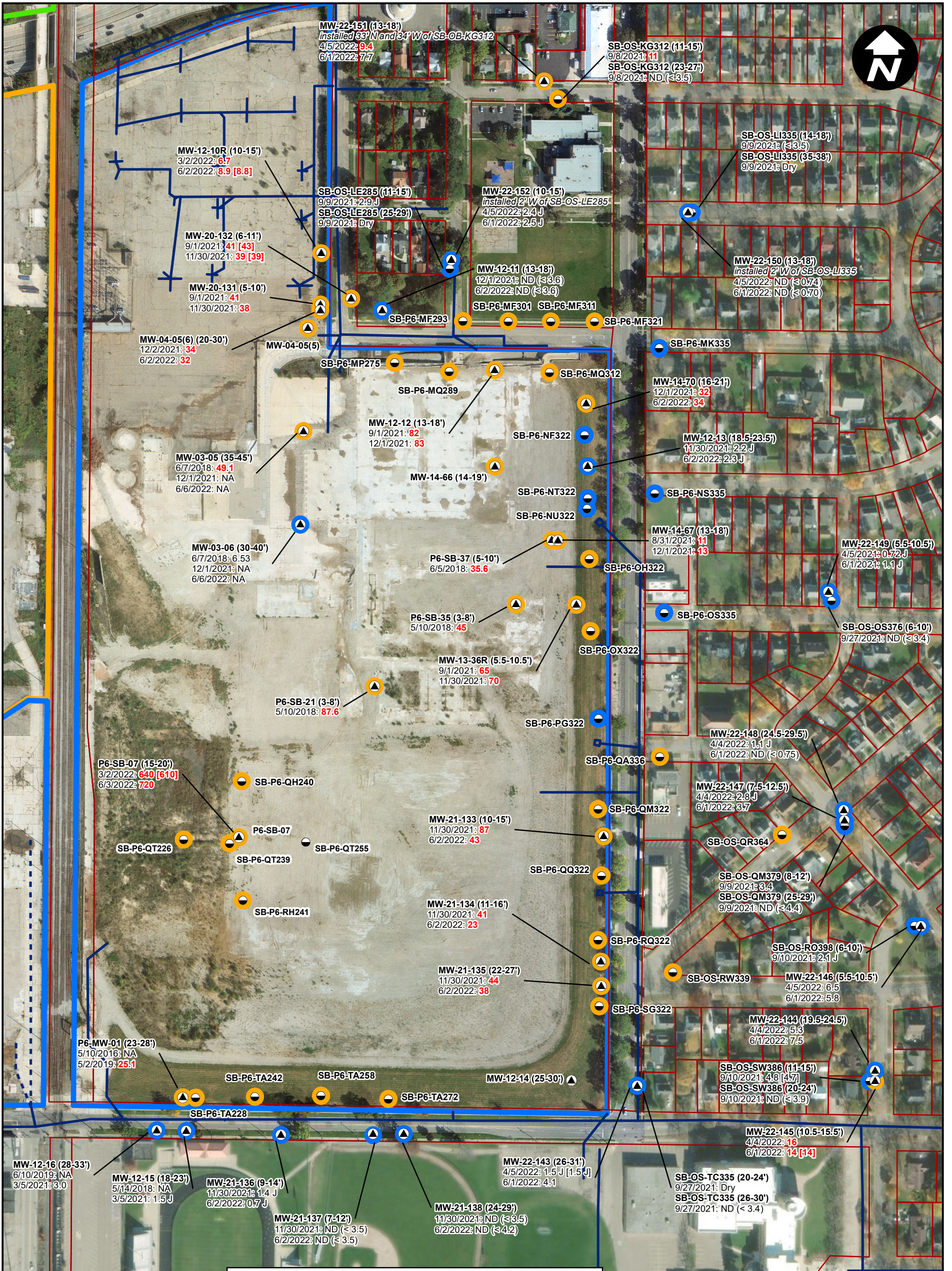
Q = Surrogate failure

S = MS/MSD failure

U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

Y = Elevated reporting limit due to high target concentration.

Figures



LEGEND

- MONITORING WELL
- VAP BORING
- WELL SAMPLED AND PFOA DOES NOT EXCEED DW CRITERIA
- WELL SAMPLED AND PFOA EXCEED DW CRITERIA
- STORM SEWER LOCATION
- ASSUMED/ESTIMATED STORM SEWER LOCATION
- PARCEL OUTLINE

APPROXIMATE PLANT

- PLANT 2
- PLANT 3
- PLANT 6

NOTES:

RESULTS IN **RED** DENOTE AN EXCEEDANCE OF EGLE DRINKING WATER CRITERIA (8 ng/L FOR PFOA).

ALL ANALYSES COMPLETED USING MODIFIED USEPA METHOD 537.

THE SAMPLES ARE PRESENTED IN UNITS OF ng/L. THE MOST RECENT SAMPLING DATA IS SHOWN.

ANALYTICAL RESULTS IN BRACKETS REPRESENT DUPLICATE SAMPLE RESULTS.

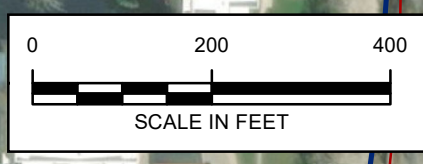
J - COMPOUND DETECTED ABOVE LABORATORY METHOD DETECTION LIMIT AND BELOW THE QUANTITATIVE REPORTING LIMIT

NA - NOT ANALYZED

ND - NON-DETECT

ng/L - NANOGRAMS PER LITER

PFOA - PERFLUOROCTANOIC ACID

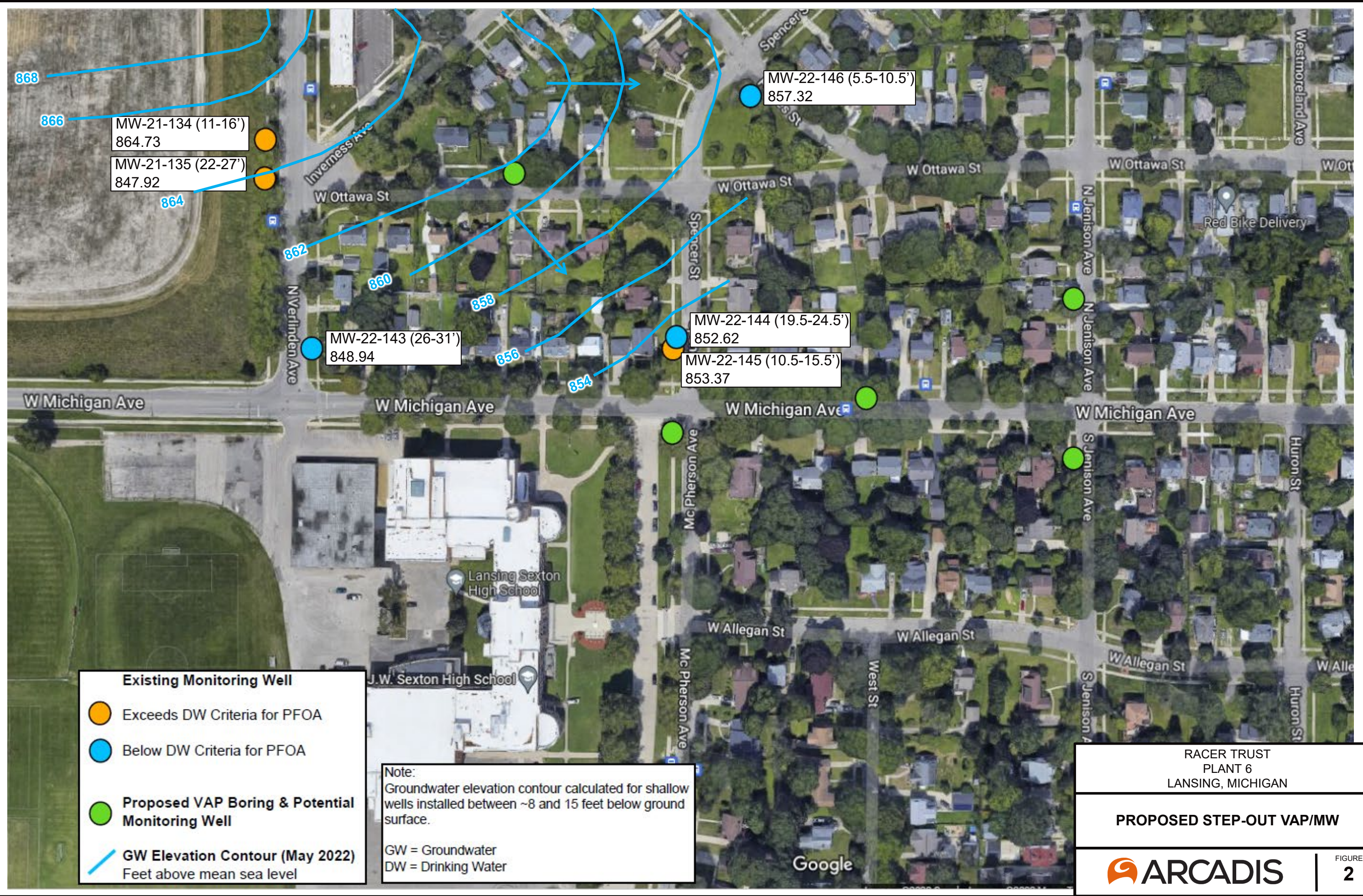


RACER TRUST
 PLANT 6
 LANSING, MICHIGAN

PFOA GROUNDWATER ANALYTICAL RESULTS

ARCADIS | FIGURE 1

8/8/2022 4:22:08 PM



Existing Monitoring Well

- Exceeds DW Criteria for PFOA
- Below DW Criteria for PFOA

Proposed VAP Boring & Potential Monitoring Well

-

GW Elevation Contour (May 2022)
Feet above mean sea level

Note:
Groundwater elevation contour calculated for shallow wells installed between ~8 and 15 feet below ground surface.

GW = Groundwater
DW = Drinking Water

RACER TRUST
PLANT 6
LANSING, MICHIGAN

PROPOSED STEP-OUT VAP/MW

ARCADIS | FIGURE 2

Attachment 1

Soil Boring Logs and Well Construction Diagrams

Date Start: 9/2/2014
Date Finish: 9/2/2014
Drilling Company: Cascade
Driller's Name: Scott
Drilling Method: Continuous
Sampling Method: 10', 5" core barrel
Rig Type: Sonic
Water Level Start (ft. bgs.): 8.5
Water Level Finish (ft. btoc.): NA

Northing:
Easting:
Casing Elevation: NA
Borehole Depth (ft. bgs.): 17.0
Surface Elevation:
Descriptions By: J.Ness

Well/Boring ID: MW-12-10R
Client: RACER
Location: RACER Lansing Plant 6
Weather Conditions: Sunny 73 F


DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
0	0							(0.0'-0.9') ASPHALT.		
0.0		1	0.0-7.0	7.0				(0.9'-1.3') CLAY, high plasticity, no dilatancy; little very coarse sand to granules, round to subround; trace small to medium pebbles, round; dry; very stiff; dark gray (10YR 4/1).		
1.3								(1.3'-8.5') CLAY, little silt, high plasticity, no dilatancy; trace very fine sand; dry; very stiff; pale brown (10YR 4/1).		
8.5		2	7.0-17.0	10.0				(8.5'-11.8') SAND, fine to medium; trace small to medium pebbles, round; little clay; trace silt; poorly sorted; wet; brown (10YR 5/3).	8.5	0.0-7.0' bgs. (Grout) 3.0' ags. - 10.0' bgs. (2.0" PVC Well Casing). 7.0-8.0' bgs. (Bentonite) 8.0-9.0' bgs. (Choker Sand - K&E #00N)
11.8								(11.8'-16.8') CLAY, medium plasticity, no dilatancy; some fine to medium sand; trace small pebbles, round to subround; wet; medium stiff; grayish brown (10YR 5/2).		9.0-17.0' bgs. (Filter Pack - K&E #1) 10.0-15.0' bgs. (2.0" 10-Slot Stainless Steel Screen)
16.8								(16.8'-17.0') SILT, non-plastic, rapid dilatancy; wet; stiff; gray brown (10YR 5/2).		

Remarks: bgs = below ground surface
 Groundwater encountered from 8.5'-17.0' bgs.
 No odor or staining observed.



Date Start: 9/2/2014 Date Finish: 9/2/2014 Drilling Company: Cascade Driller's Name: Scott Drilling Method: Continuous Sampling Method: 10', 5" core barrel Rig Type: Sonic Water Level Start (ft. bgs.): 8.5 Water Level Finish (ft. btoc.): NA	Northing: Easting: Casing Elevation: NA Borehole Depth (ft. bgs.): 17.0 Surface Elevation: Descriptions By: J.Ness	Well/Boring ID: MW-12-10R Client: RACER Location: RACER Lansing Plant 6 Weather Conditions: Sunny 73 F
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
20	-20							End of boring at 17.0' bgs.		
25	-25									
30	-30									
35	-35									

 <i>Infrastructure · Water · Environment · Buildings</i>	Remarks: bgs = below ground surface Groundwater encountered from 8.5'-17.0' bgs. No odor or staining observed.
-----------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------

Date Start: 11/15/12
Date Finish: 11/16/12
Drilling Company: Boart Longyear
Driller's Name: Jason Greer
Drilling Method: Hand Auger/Sonic
Sampling Method: Hand Auger/5.0' Core Barrel
Rig Type: Sonic
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA

Northing: 451197.3273
Eastng: 13066766.25
Casing Elevation: NA

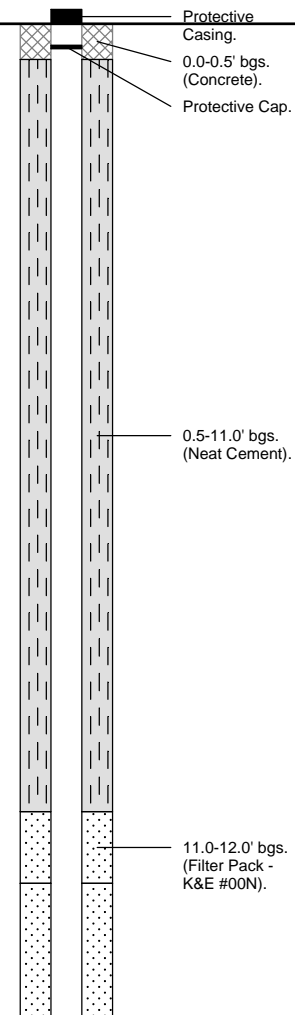
Borehole Depth (ft. bgs.): 30.0' bgs.
Surface Elevation: 874.963989

Descriptions By: Austin Westhuis

Well/Boring ID: MW-12-13
Client: RACER

Location: RACER Lansing
 2800 West Saginaw Hwy.
 Lansing, MI 48909

Weather Conditions: NA

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
0	875									
0.0		1	1.0-5.0	5.0	0.0			(0.0-12.0') CLAY, low plasticity; little to some fine sand, subrounded; trace granules to large pebbles, subrounded; dry; stiff; brown (10YR 4/3).		 <p> Protective Casing. 0.0-0.5' bgs. (Concrete). Protective Cap. 0.5-11.0' bgs. (Neat Cement). 11.0-12.0' bgs. (Filter Pack - K&E #00N). </p>
5	870	2	5.0-10.0	5.0	0.0					
10	865	3	10.0-20.0	8.0	0.0			(12.0-20.0') CLAY, little silt, high plasticity; trace fine sand, subrounded; trace granules to large pebbles, subrounded; moist, medium stiff; brown (10YR 5/3).		


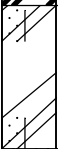
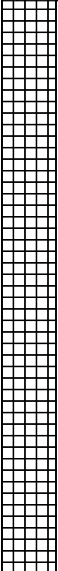
Remarks: bgs = below ground surface
 Hand auger to 5.0' bgs.
 Groundwater encountered from 20.0-22.0' bgs.
 No odor or staining observed.



Date Start: 11/15/12
Date Finish: 11/16/12
Drilling Company: Boart Longyear
Driller's Name: Jason Greer
Drilling Method: Hand Auger/Sonic
Sampling Method: Hand Auger/5.0' Core Barrel
Rig Type: Sonic
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA

Northing: 451197.3273
Easting: 13066766.25
Casing Elevation: NA
Borehole Depth (ft. bgs.): 30.0' bgs.
Surface Elevation: 874.963989
Descriptions By: Austin Westhuis

Well/Boring ID: MW-12-13
Client: RACER
Location: RACER Lansing
 2800 West Saginaw Hwy.
 Lansing, MI 48909
Weather Conditions: NA

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
15	860				0.0					
20	855	4	20.0-30.0	10.0	0.0			(20.0-22.0') SAND, fine to medium, subrounded; and SILT, medium plasticity, rapid dilatancy; wet; well sorted; very soft to soft; gray (10YR 5/1).		12.0-18.0' bgs. (Filter Pack - K&E #1).
					0.0			(22.0-30.0') CLAY and SILT, low to medium plasticity; little very fine to fine sand, subrounded; trace granules to large pebbles, subrounded; moist; stiff; gray (10YR 5/1).		18.5-23.5' bgs. (10-Slot Stainless Steel Screen).
25	850				0.0					
30	845				0.0			End of boring at 30.0' bgs.		18.0-30.0' bgs. (Backfill).

Remarks: bgs = below ground surface
 Hand auger to 5.0' bgs.
 Groundwater encountered from 20.0-22.0' bgs.
 No odor or staining observed.



Date Start: 8/29/2014
Date Finish: 8/29/2014
Drilling Company: Cascade
Driller's Name: Scott
Drilling Method: Continuous
Sampling Method: 10', 5" core barrel
Rig Type: Sonic
Water Level Start (ft. bgs.): 17.0' bgs.
Water Level Finish (ft. btoc.): NA

Northing:
Easting:
Casing Elevation: NA
Borehole Depth (ft. bgs.): 27.0' bgs.
Surface Elevation:
Descriptions By: J.Ness

Well/Boring ID: MW-14-70
Client: RACER
Location: RACER Lansing Plant 6
Weather Conditions: Sunny 73 F

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
0	0							(0.0'-0.1') GRASS/TOPSOIL.		
0.1		1	0.0-7.0	5.5	0.0		(0.1'-3.0') SAND, fine to medium; little very coarse sand to granules, round to subround; trace medium pebbles, round; poorly sorted; dry; dark yellow brown (10YR 4/6). Note: FILL.			
3.0					0.0		(3.0'-12.0') CLAY, high plasticity, no dilatancy; little small to large pebbles, round to subround; little very coarse sand to granules; dry; stiff; light yellow brown (10YR 6/4).			0.0-12.0' bgs. (Bentonite Grout)
7.0		2	7.0-17.0	10.0	0.0		(12.0'-27.0') CLAY, medium plasticity, no dilatancy; some fine to medium sand; little granules to large pebbles; moist; silt yellowish brown (10YR 5/4).			3.0' ags.-16.0' bgs. (2.0" PVC Well Casing)
12.0					0.0		Note: Wet; fine to medium sand interval ~2.5' thick at 15.0' bgs.			12.0-13.0' bgs. (Bentonite)
13.0					0.0					13.0-14.0' bgs. (Choaker Sand - K&E #00N)

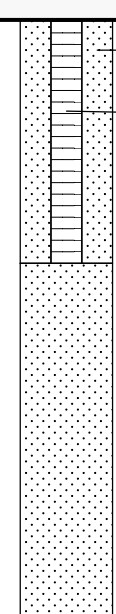
Remarks: bgs = below ground surface
 Groundwater encountered at 15.0', 18.0', and 19.0' bgs.
 No odor or staining observed.



Date Start: 8/29/2014
Date Finish: 8/29/2014
Drilling Company: Cascade
Driller's Name: Scott
Drilling Method: Continuous
Sampling Method: 10', 5" core barrel
Rig Type: Sonic
Water Level Start (ft. bgs.): 17.0' bgs.
Water Level Finish (ft. btoc.): NA

Northing:
Easting:
Casing Elevation: NA
Borehole Depth (ft. bgs.): 27.0' bgs.
Surface Elevation:
Descriptions By: J.Ness

Well/Boring ID: MW-14-70
Client: RACER
Location: RACER Lansing Plant 6
Weather Conditions: Sunny 73 F

DEPTH (feet bgs.)	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Water Level (ft. bgs.)	Well/Boring Construction
20 -20		3	17.0-27.0	10.0	0.0			Note: Wet; fine to medium sand interval ~5" thick at 18.0' bgs. Note: Wet; color change to gray (10YR 5/1); at 19.0' bgs.		 <p> 14.0-27.0' bgs. (Filter Pack - K&E #1) 16.0-21.0' bgs. (2.0" 10-Slot Stainless Steel Screen) </p>
25 -25					0.0			End of boring at 27.0' bgs.		
30 -30					0.0					
35 -35					0.0					

Remarks: bgs = below ground surface
 Groundwater encountered at 15.0', 18.0', and 19.0' bgs.
 No odor or staining observed.



Soil Boring Log

Project Name: RACER Lansing Date Started: 03/10/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/10/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 60° F, Cloudy/Windy

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

Drilling Co.: Cascade Sampling Method: 5.0' Macro Core
 Driller: Todd Grossman Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG - 2013 VARCADIS-US-COM-OFFICE-DATA-ANALYSIS-BORING-LOGS-RACER-LANSING-MASTER-DATABASE_040821.GPJ ARCADIS 2013 GDT 4/8/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/11/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/11/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 60° F, Cloudy/Windy

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

Drilling Co.: Cascade Sampling Method: 5.0' Macro Core
 Driller: Todd Grossman Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): 5
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Converted to Well: Yes No
 Surface Elev.: NA
 North Coord.: _____
 East Coord.: _____

SOIL BORING LOG - 2013 VARCADIS-US.COM\OFFICE\DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_040821.GPJ ARCADIS 2013 GDT 4/8/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/11/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/11/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 58° F, Partly Cloudy/Windy

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

Drilling Co.: Cascade Sampling Method: 5.0' Macro Core
 Driller: Todd Grossman Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG - 2013 VARCADIS-US-COM-OFFICE-DATA-ANNOVI-HMICOMMON-RACER-LANSING-WORKING-DATA-ANALYSIS-BORING-LOGS-RACER-LANSING-MASTER-DATABASE_06021.GPJ ARCADIS_2013.GDT 4/8/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/11/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/11/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 58° F, Partly Cloudy/Windy

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

Remarks:

SOIL BORING LOG: 2013 \ARCADIS\US\COM\OFFICE\DATA\NOV\11\COMMON\1\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_040021.GPJ ARCADIS 2013.GDT 4/6/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/12/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/12/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 45° F, Sunny

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

Drilling Co.: Cascade Sampling Method: 5.0' Macro Core
 Driller: Todd Grossman Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG: 2013 VARCADIS-US-COM-OFFICE-DATA\NOV-11-MICOMMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_040821.GPJ ARCADIS 2013.GDT 4/8/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/12/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/12/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 45° F, Sunny

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

Drilling Co.: Cascade Sampling Method: 5.0' Macro Core
 Driller: Todd Grossman Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Converted to Well: Yes No
 Surface Elev.: NA
 North Coord.: _____
 East Coord.: _____

SOIL BORING LOG - 2013 VARCADIS-US-COM-OFFICE-DATA\NOV-11-MICROMON\BACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_040821.GPJ ARCADIS - 2013 GDT 4/8/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/15/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/15/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 25° F, Cloudy

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

Drilling Co.: Cascade Sampling Method: 5.0' Macro Core
 Driller: Todd Grossman Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG - 2013 VARCADIS-US-COM-OFFICE-DATA-ANALYSIS-BORING-LOGS-RACER-LANSING-MASTER-DATABASE_040821.GPJ ARCADIS 2013 GDT 4/8/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/15/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/15/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 25° F, Cloudy

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

Remarks:

SOIL BORING LOG: 2013 \ARCADIS\US\COM\OFFICE\DATA\NOV\11\MICOM\MONI\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_040621.GPJ ARCADIS_2013.GDT 4/6/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 11/01/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 11/08/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 45° F, Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					0.0	SP	(0.0-2.0') SAND, very fine to fine, subrounded; little silt; trace granules, subrounded; trace pebbles, small to medium, subrounded; well sorted; moist; yellowish brown (10YR 5/4).	(0.0-0.5') Concrete Well Pad	Well
2				0.0					
3			84		0.0	MH	(2.0-18.0') CLAY, high plasticity, no dilatancy; little silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; stiff; brown (10YR 5/3).	(0.0-77.0') 6.0" dia. drilled hole	
4				0.0					
5				0.0					
6				0.0					
7				0.0					
8				0.0					
9				0.0					
10				0.0					
11				0.0					
12			120	0.0					
13				0.0					
14				0.0					
15				0.0					
16				0.0					
17				0.0					
18				0.0	MH	(18.0-33.5') CLAY, medium to high plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; stiff; gray (10YR 5/1).	(0.5-68.0') Bentonite Slurry		
19				0.0					
20				0.0					

Drilling Co.: Cascade Sampling Method: 10.0' Core Barrel
 Driller: Chris Barden Sampling Interval: Continuous
 Drilling Method: Sonic Drilling Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: ' / ft = feet. bgs = below ground surface. Converted to Well: Yes No
 Surface Elev.: _____
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG - 2013 \ARCADIS-US-COM\OFFICE\DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_121021_NEW ONLY.GPJ ARCADIS_2013.GDT 12/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 11/01/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 11/08/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 45° F, Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					0.0	[Diagonal Hatching]	(18.0-33.5') CLAY, medium to high plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; stiff; gray (10YR 5/1).		
22			120		0.0				
23					0.0				
24					0.0				
25					0.0				
26					0.0				
27					0.0				
28					0.0	[Diagonal Hatching]			
29					0.0				
30					0.0				
31					0.0				
32			120		0.0				
33					0.0				
34					0.0				
35					0.0	[Dotted Pattern]	(33.5-35.5') SAND, very fine to fine, subrounded; little silt; well sorted; wet; pale brown (10YR 6/3).	(0.5-68.0') Bentonite Slurry	
36					0.0	[Diagonal Hatching]	(35.5-36.5') CLAY, high plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; stiff; gray (10YR 5/1).		
37					0.0	[Vertical Lines]	(36.5-39.0') SILT, low plasticity to nonplastic, slow dilatancy; little sand, very fine; trace clay; wet; soft; grayish brown (10YR 5/2).		
38					0.0				
39					0.0	[Diagonal Hatching]	(39.0-52.5') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to very large, subrounded; dry to moist; very stiff; gray (10YR 5/1).		
40					0.0				
41					0.0				

Remarks:

SOIL BORING LOG: 2013 \ARCADIS\US\COM\OFFICE\DATA\NOV\H\MICOMMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_121021_NEW ONLY.GPJ ARCADIS_2013.GDT 12/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 11/01/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 11/08/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 45° F, Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
42	X		120		0.0	[Diagonal Hatching]	(39.0-52.5') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to very large, subrounded; dry to moist; very stiff; gray (10YR 5/1).		
43					0.0				
44					0.0				
45					0.0				
46					0.0				
47					0.0				
48					0.0				
49	X		120		0.0	[Diagonal Hatching]	(52.5-57.0') SAND, very fine to coarse, subrounded to subangular; little sand, very coarse, subrounded to subangular; little granules, subrounded; little pebbles, small to medium, subrounded; little silt; trace pebbles, large to very large, subrounded; poorly sorted; dry to moist; pale brown (10YR 6/3).	(0.5-68.0') Bentonite Slurry	
50					0.0				
51					0.0				
52					0.0				
53					0.0				
54					0.0				
55					0.0				
56	X		120		0.0	[Diagonal Hatching]	(57.0-59.0') CLAY, low to medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; gray (10YR 5/1).		
57					0.0				
58					0.0				
59					0.0				
60					0.0				
61					0.0				
62					0.0				
62	X		120		0.0	[Diagonal Hatching]	(59.0-65.0') SILT, low plasticity to nonplastic, no dilatancy; little clay; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; gray (10YR 5/1).		

Remarks:

SOIL BORING LOG: 2013 \ARCADIS\US\COM\OFFICE\DATA\NOV\H\MICOMMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_121021_NEW ONLY.GPJ ARCADIS_2013.GDT 11/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 11/01/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 11/08/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 45° F, Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
64					0.0		(59.0-65.0') SILT, low plasticity to nonplastic, no dilatancy; little clay; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; gray (10YR 5/1).		
65					0.0				
66					0.0		(65.0-77.0') SANDSTONE, very fine; light gray (10YR 7/2).	(0.5-68.0') Bentonite Slurry	
67					0.0				
68					0.0			(68.0-69.0') Bentonite Pellets	
69			60		0.0			(69.0-70.0') Choker Sand	
70					0.0				
71					0.0			(70.0-77.0') Filter Pack Sand	
72					0.0		End of boring at 72.0' bgs.		
73					0.0				
74					0.0			(72.0-77.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
75			60	SB-A5.6-OO211_72-77 @ 0955 on 11/02/21	0.0				
76					0.0				
77					0.0				
78									
79									
80									
81									
82									
83									
84									

Remarks:

SOIL BORING LOG: 2013 \ARCADIS-US-CO\OFFICE\DATA\NOV\COMMON\COMMON\RACER LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_121021_NEW ONLY.GPJ ARCADIS_2013.GDT 12/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/24/2022 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/24/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 43° F, Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					0.0		(0.0-0.5') ASPHALT.	(0.0-0.5') Concrete Well Pad	
2					0.0		(0.5-8.5') CLAY, low plasticity, no dilatancy; and SILT; little to some sand, fine to medium, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; medium stiff to stiff; dark grayish brown (10YR 4/2) to brown (10YR 5/3). Note: Trace concrete fragments present.	(0.5-1.5') Filter Pack Sand	
3				0.0					
4		84			0.0				
5					0.0				
6					0.0				
7					1.1			(0.5-26.0') 2.0" dia. SCH-40 PVC casing	
8					1.9		(8.5-16.5') CLAY, nonplastic to low plasticity, no dilatancy; little silt; moist; soft; gray (10YR 5/1). Note: Organic-rich interval, dark brown (10YR 3/3) present from 8.5-10.5' bgs.	(1.5-23.0') Bentonite Slurry (0.0-31.0') 8.0" dia. drilled hole	
9					6.3				
10					6.6				
11					7.1				
12		120			22.1				
13					4.6				
14					2.1				
15					0.1				
16					0.1				
17					0.0				
18					0.0		(16.5-17.0') SAND, fine to medium, subrounded; trace to little sand, sorace, subrounded; trace granules, subrounded; poorly sorted; wet; gray (10YR 6/1).		
19					0.0		(17.0-23.5') CLAY, low plasticity, no dilatancy; little to some silt; trace sand, fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; soft; gray (10YR 5/1).		
20					0.0				

Drilling Co.: Fibertec Sampling Method: 5.0' Macro Core
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: ' / ft = feet. bgs = below ground surface. Installed 2 ft north of SB-OS-TC335. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG - 2013 \ARCADIS\US\COMMON\MONITORING\WORKING DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/24/2022 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/24/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 43° F, Partly Cloudy

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21			120		0.0	[Diagonal Hatching]	(17.0-23.5') CLAY, low plasticity, no dilatancy; little to some silt; trace sand, fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; soft; gray (10YR 5/1).	(1.5-23.0') Bentonite Slurry	[Well Diagram]
22		0.0							
23		0.0							
24		0.0							
25			48		0.0	[Dotted Pattern]	(23.0-24.0') Bentonite Pellets	[Well Diagram]	
26		0.0		(24.0-31.0') Filter Pack Sand					
27		0.0			[Diagonal Hatching]				
28		0.0		(26.0-31.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen					
29		0.0							
30		0.0							
31		0.0	End of boring at 31.0' bgs.						
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG: 2013 \ARCADIS\US\COM\OFFICE\DATA\NOV\MI\COMMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING\MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/28/2022 Logger: C. Weaver
 Project Number: 30042872 Date Completed: 03/28/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR	(0.0-1.5') GRASS/TOPSOIL.		(0.0-0.5') Concrete Well Pad	
2					NR	(1.5-6.5') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).		(0.5-1.5') Filter Pack Sand	
3					NR				
4					NR				
5					NR			(0.5-19.5') 2.0" dia. SCH-40 PVC casing	
6					NR				
7					NR	(6.5-10.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; medium stiff to stiff; yellowish brown (10YR 5/4).			
8					NR				
9					NR			(1.5-16.5') Bentonite Slurry	
10					NR				
11					NR	(10.0-12.0') SAND, medium to coarse, subrounded; little sand, very fine to fine, subrounded; little silt; trace granules, subrounded; trace pebbles, small to medium, subrounded; poorly sorted; moist; yellowish brown (10YR 5/4).			
12					NR			(0.0-77.0') 8.0" dia. drilled hole	
13					NR	(12.0-13.5') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; gray (10YR 5/1).			
14					NR				
15					NR	(13.5-15.5') SAND, very fine to fine, subrounded; little silt; well sorted; wet; yellowish brown (10YR 5/4) to pale brown (10YR 6/3).			
16					NR				
17					NR	(15.5-20.0') CLAY, medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; stiff; grayish brown (10YR 5/2).		(16.5-17.5') Bentonite Pellets	
18					NR				
19					NR			(17.5-24.5') Filter Pack Sand	
20					NR				

Drilling Co.: Fibertec Sampling Method: Auger
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Hollow Stem Auger Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: ' / ft = feet. bgs = below ground surface. Installed near SB-OS-SW386. Converted to Well: Yes No
 Surface Elev.: NA
 North Coord.: _____
 East Coord.: _____

SOIL BORING LOG - 2013 \ARCADIS-US-COM\OFFICE\DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/28/2022 Logger: C. Weaver
 Project Number: 30042872 Date Completed: 03/28/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					NR	(20.0-20.4') SAND, fine to medium, subrounded; little silt; trace sand, coarse, subrounded; poorly sorted; wet; gray (10YR 5/4).	(19.5-24.5') 2.0" dia. Stainless-Steel 0.010-Slot Screen		
22				NR	(20.4-22.0') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; medium stiff; grayish brown (10YR 5/2).				
23				NR	(22.0-22.3') SAND, very fine to fine, subrounded; little silt; well sorted; wet; pale brown (10YR 6/3).				
24				NR	(22.3-24.5') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; stiff; gray (10YR 5/1).				
25						End of boring at 24.5' bgs.			
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG: 2013 \ARCADIS-US-COM\OFFICE\DATA\ANNOV\MI\COMMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/28/2022 Logger: C. Weaver
 Project Number: 30042872 Date Completed: 03/28/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR	(0.0-1.5') GRASS/TOPSOIL.		(0.0-0.5') Concrete Well Pad	
2					NR	(1.5-6.5') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).		(0.5-1.5') Filter Pack Sand	
3					NR				
4					NR				
5					NR			(1.5-7.5') Bentonite Slurry	
6					NR			(0.5-10.5') 2.0" dia. SCH-40 PVC casing	
7					NR	(6.5-10.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; medium stiff to stiff; yellowish brown (10YR 5/4).		(0.0-15.5') 8.0" dia. drilled hole	
8					NR			(7.5-8.5') Bentonite Pellets	
9					NR			(8.5-15.5') Filter Pack Sand	
10					NR	(10.0-12.0') SAND, medium to coarse, subrounded; little sand, very fine to fine, subrounded; little silt; trace granules, subrounded; trace pebbles, small to medium, subrounded; poorly sorted; moist; yellowish brown (10YR 5/4).			
11					NR				
12					NR	(12.0-13.5') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; gray (10YR 5/1).		(10.5-15.5') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
13					NR				
14					NR	(13.5-15.5') SAND, very fine to fine, subrounded; little silt; well sorted; wet; yellowish brown (10YR 5/4) to pale brown (10YR 6/3).			
15					NR				
16							End of boring at 15.5' bgs.		
17									
18									
19									
20									

Drilling Co.: Fibertec Sampling Method: Auger
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Hollow Stem Auger Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: ' / ft = feet. bgs = below ground surface. Installed near SB-OS-SW386. Converted to Well: Yes No
 Surface Elev.: NA
 North Coord.: _____
 East Coord.: _____

SOIL BORING LOG - 2013 \ARCADIS-US-COM\OFFICE\DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/28/2022 Logger: C. Weaver
 Project Number: 30042872 Date Completed: 03/28/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-1.5') GRASS/TOPSOIL.	(0.0-0.5') Concrete Well Pad	
2					NR		(1.5-7.5') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).	(0.5-1.0') Filter Pack Sand	
3		78			NR			(1.0-3.5') Bentonite Slurry	
4					NR			(0.5-5.5') 2.0" dia. SCH-40 PVC casing	
5					NR			(3.5-4.5') Bentonite Pellets	
6					NR			(4.5-10.5') Filter Pack Sand	
7					NR			(0.0-10.5') 8.0" dia. drilled hole	
8			42		NR		(7.5-7.6') SAND, very fine to fine, subrounded; little silt; well sorted; wet; yellowish brown (10YR 5/4).		
9					NR		(7.6-9.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; brown (10YR 5/3).		
10			6		NR		(9.0-9.3') SAND, very fine to fine, subrounded; little silt; well sorted; wet; brown (10YR 5/3).		
11					NR		(9.3-10.5') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; stiff; brown (10YR 5/3).	Stainless-Steel 0.010-Slot Screen	
12							End of boring at 10.5' bgs.		
13									
14									
15									
16									
17									
18									
19									
20									

Drilling Co.: Fibertec Sampling Method: Auger
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Hollow Stem Auger Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: ' / ft = feet. bgs = below ground surface. Installed 2 ft southeast of SB-OS-RO398. Converted to Well: Yes No
 Surface Elev.: NA
 North Coord.: _____
 East Coord.: _____

SOIL BORING LOG: 2013 \ARCADIS\US\COM\OFFICE\DATA\NOV\MI\COMMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2015.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/29/2022 Logger: C. Weaver
 Project Number: 30042872 Date Completed: 03/29/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR	(0.0-1.5') GRASS/TOPSOIL.		(0.0-0.5') Concrete Well Pad	
2					NR	(1.5-6.0') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).	(0.5-1.5') Filter Pack Sand		
3		78		NR					
4				NR					
5				NR					
6				NR					
7					NR	(6.0-7.0') SAND, very fine to fine, subrounded; and SILT, nonplastic, no dilatancy; well sorted; dry to moist; yellowish brown (10YR 5/4).	(2.0" dia. SCH-40 PVC casing (1.5-5.0') Bentonite Slurry (0.0-12.5') 8.0" dia. drilled hole (5.0-5.5') Bentonite Pellets (5.5-12.5') Filter Pack Sand		
8		42		NR	(7.0-11.0') SAND, very fine to fine, subrounded; little to some silt, nonplastic, slow to rapid dilatancy; well sorted; moist to wet; yellowish brown (10YR 5/4). Note: Wet at 7.5' bgs.				
9				NR					
10					NR	(11.0-12.5') SAND, very fine to fine, subrounded; and SILT, nonplastic to low plasticity, rapid dilatancy; little clay; well sorted; wet; soft; yellowish brown (10YR 5/4).	(7.5-12.5') 2.0" dia. Stainless-Steel 0.010-Slot Screen		
11				NR					
12			48		NR	End of boring at 12.5' bgs.			
13									
14									
15									
16									
17									
18									
19									
20									

Drilling Co.: Fibertec Sampling Method: Auger
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Hollow Stem Auger Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: ' / ft = feet. bgs = below ground surface. Installed 1 ft south of SB-OS-QM379. Converted to Well: Yes No
 Surface Elev.: NA
 North Coord.: _____
 East Coord.: _____

SOIL BORING LOG - 2013 \ARCADIS\US\COM\OFFICE\DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2015.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/29/2022 Logger: C. Weaver
 Project Number: 30042872 Date Completed: 03/29/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR	(0.0-1.5') GRASS/TOPSOIL.		(0.0-0.5') Concrete Well Pad (0.5-1.5') Filter Pack Sand	
2					NR	(1.5-6.0') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).			
3			78		NR			(0.5-24.5') 2.0" dia. SCH-40 PVC casing	
4					NR				
5					NR				
6					NR				
7					NR	(6.0-7.0') SAND, very fine to fine, subrounded; and SILT, nonplastic, no dilatancy; well sorted; dry to moist; yellowish brown (10YR 5/4).			
8			42		NR	(7.0-11.0') SAND, very fine to fine, subrounded; little to some silt, nonplastic, slow to rapid dilatancy; well sorted; moist to wet; yellowish brown (10YR 5/4). Note: Wet at 7.5' bgs.			
9					NR		(1.5-21.5') Bentonite Slurry		
10					NR				
11					NR	(11.0-13.5') SAND, very fine to fine, subrounded; and SILT, nonplastic to low plasticity, rapid dilatancy; little clay; well sorted; wet; soft; yellowish brown (10YR 5/4).			
12					NR		(0.0-29.5') 8.0" dia. drilled hole		
13			48		NR	(13.5-13.7') SAND, medium to coarse, subrounded; little sand, very fine to fine, subrounded; little silt; poorly sorted; wet; yellowish brown (10YR 5/4).			
14					NR	(13.7-15.0') SAND, very fine to fine, subrounded; and SILT, nonplastic, slow dilatancy; little clay; well sorted; wet; soft; yellowish brown (10YR 5/4).			
15					NR	(15.0-19.7') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; medium stiff to stiff; grayish brown (10YR 5/2).			
16					NR				
17					NR				
18			36		NR				
19					NR				
20					NR				

Drilling Co.: Fibertec Sampling Method: Auger
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Hollow Stem Auger Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: ' / ft = feet. bgs = below ground surface. Installed 1 ft north of SB-OS-QM379. Converted to Well: Yes No
 Surface Elev.: NA
 North Coord.: _____
 East Coord.: _____

SOIL BORING LOG - 2013 VARCADIS-US-COM-OFFICE-DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2015.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/29/2022 Logger: C. Weaver
 Project Number: 30042872 Date Completed: 03/29/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21	X		36		NR	(19.7-20.2') SILT, nonplastic, no dilatancy; little sand, very fine, subrounded; dry to moist; gray (10YR 5/1).		(1.5-21.5') Bentonite Slurry	(20.2-25.5') SAND, very fine to fine, subrounded; little silt; well sorted; moist to wet; pale brown (10YR 6/3).
22				NR					
23				NR					
24				NR					
25				NR					
26	X		36		NR	(25.5-25.8') SAND, very fine; and SILT; well sorted; moist; brown (10YR 5/3).	(24.5-29.5') 2.0" dia. Stainless-Steel 0.010-Slot Screen		
27				NR	(25.8-28.5') SAND, very fine to fine, subrounded; little sand, medium to coarse, subrounded; trace to little silt; poorly sorted; wet; pale brown (10YR 6/3).				
28				NR					
29				NR	(28.5-30.0') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).				
30				NR	End of boring at 29.5' bgs.				
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG: 2013 \\ARCADIS\US\COM\OFFICE\DATA\ANNOV\MI\COMMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/29/2022 Logger: C. Weaver
 Project Number: 30042872 Date Completed: 03/29/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 65° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-1.5') GRASS/TOPSOIL.	(0.0-0.5') Concrete Well Pad	
2					NR		(1.5-9.0') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).	(0.5-1.5') Filter Pack Sand	
3			114		NR			(0.5-5.5') 2.0" dia. SCH-40 PVC casing	
4					NR			(1.5-4.0') Bentonite Slurry	
5					NR			(0.0-10.5') 8.0" dia. drilled hole	
6					NR			(4.0-4.5') Bentonite Pellets	
7					NR			(4.5-10.5') Filter Pack Sand	
8					NR			(5.5-10.5') 2.0" dia. SCH-40 PVC	
9					NR			0.010-Slot Screen	
10			12		NR		(9.0-9.5') SAND, very fine to fine, subrounded; and SILT, nonplastic, rapid dilatancy; well sorted; wet; yellowish brown (10YR 5/4).		
11					NR		(9.5-10.5') CLAY, medium to high plasticity, no dilatancy; little to some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; medium stiff to stiff; grayish brown (10YR 5/2).		
12							End of boring at 10.5' bgs.		
13									
14									
15									
16									
17									
18									
19									
20									

Drilling Co.: Fibertec Sampling Method: Auger
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Hollow Stem Auger Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: ' / ft = feet. bgs = below ground surface. Installed near SB-OS-OS376. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG - 2013 \ARCADIS\US\COM\OFFICE\DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/30/2022 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/30/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR	(0.0-2.0') GRASS/TOPSOIL.		(0.0-0.5') Concrete Well Pad	
2					NR			(0.5-1.5') Filter Pack Sand	
3			78		NR	(2.0-5.0') SAND, fine to medium, subrounded; little silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small to medium, subrounded; poorly sorted; dry; yellowish brown (10YR 5/4).			
4					NR				
5					NR			(0.5-13.0') 2.0" dia. SCH-40 PVC casing	
6					NR	(5.0-8.0') CLAY, medium plasticity, no dilatancy; some silt; trace to little sand, very fine to fine, subrounded; dry to moist; stiff; brown (10YR 5/3).		(1.5-11.0') Bentonite Pellets	
7					NR			(0.0-18.0') 8.0" dia. drilled hole	
8			42		NR	(8.0-15.0') CLAY, medium to high plasticity, no dilatancy; little to some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).			
9					NR				
10					NR				
11					NR				
12			56		NR			(11.0-18.0') Filter Pack Sand	
13					NR				
14					NR				
15					NR			(13.0-18.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
16			24		NR	(15.0-16.5') SAND, medium to coarse, subrounded; little silt; trace to little sand, very fine to fine, subrounded; poorly sorted; wet; pale brown (10YR 6/3).			
17					NR	(16.5-18.0') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).			
18					NR				
19							End of boring at 18.0' bgs.		
20									

Drilling Co.: Fibertec Sampling Method: 5.0' Macro Core
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: ' / ft = feet. bgs = below ground surface. Installed 2 ft west of SB-OS-LI335. Converted to Well: Yes No
 Surface Elev.: NA
 North Coord.: _____
 East Coord.: _____

SOIL BORING LOG - 2013 \ARCADIS\US\COMMON\MONITORING\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/30/2022 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/30/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR	(0.0-1.0') GRASS/TOPSOIL.		(0.0-0.5') Concrete Well Pad	
2			60		NR	(1.0-9.0') CLAY, high plasticity, no dilatancy; some silt; little sand, very fine to fine; dry to moist; soft; light brownish gray (10YR 6/2).		(0.5-1.5') Filter Pack Sand	
3					NR				
4					NR			(0.5-13.0') 2.0" dia. SCH-40 PVC casing	
5					NR			(1.5-8.0') Bentonite Pellets	
6					NR				
7			52		NR			(0.0-15.0') 8.0" dia. drilled hole	
8					NR				
9					NR				
10					NR	(9.0-9.2') SILT, nonplastic, rapid dilatancy; some clay; moist; soft; gray (10YR 6/1).			
11					NR	(9.2-9.7') SAND, very fine to medium; little silt; well sorted; wet; light yellowish brown (10YR 6/4).		(8.0-15.0') Filter Pack Sand	
12			41		NR	(9.7-10.5') SILT, nonplastic, rapid dilatancy; little sand, very fine to fine; little clay; trace granules, subangular; trace pebbles, small, subangular; dry to moist; soft; grayish brown (10YR 5/2).			
13					NR	(10.5-13.5') CLAY, medium plasticity, slow dilatancy; little silt; trace sand, very fine; trace pebbles, small, subangular; moist; soft; gray (10YR 5/1).			
14					NR	(13.5-15.0') SAND, medium to coarse, subangular to subrounded; little silt; little pebbles, small to medium, subangular; poorly sorted; wet; gray (10YR 5/1).			
15					NR			(13.0-18.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
16			30		NR	(15.0-18.0') CLAY, low to medium plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; gray (10YR 5/1).			
17					NR				
18					NR				
							End of boring at 18.0' bgs.		
19									
20									

Drilling Co.: Fibertec Sampling Method: 5.0' Macro Core
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: ' / ft = feet. bgs = below ground surface. Installed 33 ft north and 34 ft west of SB-OS-KG312. Converted to Well: Yes No
 Surface Elev.: NA
 North Coord.: _____
 East Coord.: _____

SOIL BORING LOG - 2013 \ARCADIS-US-COM\OFFICE\DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 03/30/2022 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 03/30/2022 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR	(0.0-2.0') GRASS/TOPSOIL.		(0.0-0.5') Concrete Well Pad	
2					NR			(0.5-1.5') Filter Pack Sand	
3			78		NR	(2.0-5.0') CLAY, low plasticity, no dilatancy; some silt; trace to little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; light brownish gray (10YR 6/2).			
4					NR				
5					NR			(1.5-8.0') Bentonite Pellets	
6					NR	(5.0-9.7') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine; moist; medium stiff; grayish brown (10YR 5/2).		(0.5-10.0') 2.0" dia. SCH-40 PVC casing	
7					NR			(0.0-15.0') 8.0" dia. drilled hole	
8			42		NR			(8.0-15.0') Filter Pack Sand	
9					NR				
10					NR	(9.7-10.0') SAND, very fine to fine, subrounded; and SILT, nonplastic, slow dilatancy; wet sorted; wet; soft; brown (10YR 5/3).			
11					NR	(10.0-11.0') CLAY, low to medium plasticity; little to some silt; little sand, fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; medium stiff; grayish brown (10YR 5/2).			
12					NR	(11.0-11.8') SAND, very fine to medium, subrounded; little silt; trace to little sand, coarse, subrounded; poorly sorted; wet; gray (10YR 5/1).		(10.0-15.0') 2.0" dia. Stainless-Steel 0.010-Slot Screen	
13			41		NR	(11.8-12.3') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; stiff; gray (10YR 5/1).			
14					NR	(12.3-13.0') SAND, medium to coarse, subrounded; trace to sand, very fine to fine, subrounded; little silt; poorly sorted; wet; gray (10YR 5/1).			
15					NR	(13.0-13.5') CLAY, medium plasticity, no dilatancy; some silt; moist; stiff; gray (10YR 5/1).			
16						(13.5-14.5') SAND, fine to medium, subrounded; trace sand, coarse to very coarse, subrounded; little silt; poorly sorted; wet; gray (10YR 5/1).			
17						(14.5-15.0') CLAY, medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; grayish brown (10YR 5/2).			
18						End of boring at 15.0' bgs.			
19									
20									

Drilling Co.: Fibertec Sampling Method: 5.0' Macro Core
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: ' / ft = feet. bgs = below ground surface. Installed 2 ft west of SB-OS-LE285. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG - 2013 \ARCADIS\US\COM\OFFICE\DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_042722_NEW ONLY.GPJ ARCADIS_2013.GDT 5/17/22

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/08/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/08/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-2.0') GRASS/TOPSOIL.		
2					NR				
3			78		NR		(2.0-5.5') CLAY, low plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; light brownish gray (10YR 6/2).		
4					NR				
5					NR				
6					NR		(5.5-9.0') CLAY, medium plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; moist; medium stiff; grayish brown (10YR 5/2).		
7					NR				
8			36		NR				
9					NR				
10					NR		(9.0-9.8') SILT, nonplastic to low plasticity, slow dilatancy; little sand, very fine; trace clay; well sorted; moist; soft; brown (10YR 5/3).	(0.0-30.0') Backfilled with bentonite	
11					NR		(9.8-10.5') SAND, very fine to fine, subrounded; little sand, medium to coarse, subrounded; trace silt; poorly sorted; wet; pale brown (10YR 6/3).		
12					NR		(10.5-11.5') CLAY, low to medium plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; grayish brown (10YR 5/2).		
13			42	SB-OS-KG312_11-15 @ 1535	NR		(11.5-12.5') SAND, medium to coarse, subrounded; trace to sand, very fine to fine, subrounded; trace silt; poorly sorted; wet; grayish brown (10YR 5/2).		
14					NR		(12.5-20.0') CLAY, medium plasticity, no dilatancy; little silt; trace sand, fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; grayish brown (10YR 5/2).		
15					NR				
16					NR				
17					NR				
18			46		NR				
19					NR				
20					NR				

Drilling Co.: Fibertec Sampling Method: 5.0' Macro Core
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG - 2013 VARCADIS-US-COM-OFFICE-DATA\NOV-11-MICOMMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_101921.GPJ ARCADIS_2013.GDT 10/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/08/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/08/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21	X		44		NR	(20.0-21.0')	SAND, fine, subrounded; trace silt; well sorted; wet; pale brown (10YR 6/3).	(0.0-30.0') Backfilled with bentonite	
22					NR	(21.0-22.5')	CLAY, medium plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; grayish brown (10YR 5/2).		
23					NR	(22.5-26.0')	SAND, fine to medium, subrounded; trace silt; well sorted; brown (10YR 5/3).		
24					NR				
25					NR				
26					NR				
27	X		48	SB-OS-KG312_23-27 @ 1635	NR	(26.0-27.0')	SAND, very fine; and SILT, nonplastic, rapid dilatancy; well sorted; wet; soft; grayish brown (10YR 5/2).	(0.0-30.0') Backfilled with bentonite	
28					NR	(27.0-28.0')	SILT, nonplastic, slow dilatancy; and SAND, very fine; well sorted; moist to wet; soft; grayish brown (10YR 5/2).		
29					NR	(28.0-30.0')	CLAY, medium plasticity, no dilatancy; some silt; trace sand, fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; gray (10YR 5/1).		
30					NR		End of boring at 30.0' bgs.		
31					NR				
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG: 2013 \\ARCADIS\US\COM\OFFICE\DATA\NOV\11\MICOM\MON\1\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_101921.GPJ ARCADIS_2013.GDT 10/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/08/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/08/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-2.0') GRASS/TOPSOIL.		
2					NR				
3			78		NR		(2.0-5.0') CLAY, low plasticity, no dilatancy; some silt; trace to little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; light brownish gray (10YR 6/2).		
4					NR				
5					NR				
6					NR		(5.0-9.7') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine; moist; medium stiff; grayish brown (10YR 5/2).		
7					NR				
8			42		NR				
9					NR				
10					NR		(9.7-10.0') SAND, very fine to fine, subrounded; and SILT, nonplastic, slow dilatancy; wet sorted; wet; soft; brown (10YR 5/3).	(0.0-40.0') Backfilled with bentonite	
11					NR		(10.0-11.0') CLAY, low to medium plasticity; little to some silt; little sand, fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; medium stiff; grayish brown (10YR 5/2).		
12					NR		(11.0-11.8') SAND, very fine to medium, subrounded; little silt; trace to little sand, coarse, subrounded; poorly sorted; wet; gray (10YR 5/1).		
13			41	SB-OS-LE285_11-15 @ 1315	NR		(11.8-12.3') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; stiff; gray (10YR 5/1).		
14					NR		(12.3-13.0') SAND, medium to coarse, subrounded; trace to sand, very fine to fine, subrounded; little silt; poorly sorted; wet; gray (10YR 5/1).		
15					NR		(13.0-13.5') CLAY, medium plasticity, no dilatancy; some silt; moist; stiff; gray (10YR 5/1).		
16					NR		(13.5-14.5') SAND, fine to medium, subrounded; trace sand, coarse to very coarse, subrounded; little silt; poorly sorted; wet; gray (10YR 5/1).		
17					NR		(14.5-20.5') CLAY, medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; grayish brown (10YR 5/2).		
18			42		NR				
19					NR				
20					NR				

Drilling Co.: Fibertec Sampling Method: 5.0' Macro Core
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Attempted to collect water from 25-29' interval, but well was dry. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG - 2013 VARCADIS-US-COM-OFFICE-DATA-ANALYSIS-BORING-LOGS-RACER-LANSING MASTER.DAT\BASE_121021.GPJ ARCADIS - 2013.GDT 12/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/08/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/08/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					NR		(20.5-20.6') SILT, no dilatancy to slow dilatancy; and SAND, very fine; well sorted; moist to wet; soft; grayish brown (10YR 5/2).	(0.0-40.0') Backfilled with bentonite	
22				NR	(20.6-25.5') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).				
23			46	NR					
24				NR					
25				NR					
26				NR		(25.5-29.0') SILT, nonplastic, rapid dilatancy; and SAND, very fine; well sorted; dry; soft; grayish brown (10YR 5/2).			
27				NR					
28			44	NR					
29				NR					
30				NR		(29.0-40.0') CLAY, low plasticity, no dilatancy; some silt; trace to little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; stiff to very stiff; grayish brown (10YR 5/2).			
31				NR					
32				NR					
33			43	NR					
34				NR					
35				NR					
36				NR					
37				NR					
38			42	NR					
39				NR					
40				NR		End of boring at 40.0' bgs.			
41									

Remarks:

SOIL BORING LOG: 2013 \ARCADIS\US\COM\OFFICE\DATA\NOV\11\COMMON\1\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_121021.GPJ ARCADIS_2013.GDT 12/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/09/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/09/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-2.0') GRASS/TOPSOIL.	(0.0-40.0') Backfilled with bentonite	
2					NR				
3			78		NR		(2.0-5.0') SAND, fine to medium, subrounded; little silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small to medium, subrounded; poorly sorted; dry; yellowish brown (10YR 5/4).		
4					NR				
5					NR				
6					NR		(5.0-8.0') CLAY, medium plasticity, no dilatancy; some silt; trace to little sand, very fine to fine, subrounded; dry to moist; stiff; brown (10YR 5/3).		
7					NR				
8			42		NR		(8.0-15.0') CLAY, medium to high plasticity, no dilatancy; little to some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).		
9					NR				
10					NR				
11					NR				
12					NR				
13			56		NR				
14					NR				
15					NR				
16				SB-OS-LI335_14-18 @ 1105	NR		(15.0-16.5') SAND, medium to coarse, subrounded; little silt; trace to little sand, very fine to fine, subrounded; poorly sorted; wet; pale brown (10YR 6/3).		
17					NR		(16.5-20.0') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).		
18			48		NR				
19					NR				
20					NR				

Drilling Co.: Fibertec Sampling Method: 5.0' Macro Core
 Driller: Kody Neal Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Attempted to collect water from 35-39' interval, but well was dry. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG - 2013 VARCADIS-US-COM-OFFICE-DATA\NOV-11-MICOMMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_101921.GPJ ARCADIS - 2013 GDT - 10/20/2021

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/09/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/09/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					NR		(20.0-20.5') SAND, very fine; well sorted; dry; light gray (10YR 7/2).	(0.0-40.0') Backfilled with bentonite	
22			18		NR		(20.5-21.0') SILT, nonplastic, no dilatancy; little to some sand, very fine; well sorted; dry to moist; soft; light gray (10YR 7/2).		
23					NR		(21.0-32.0') CLAY, low to medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).		
24					NR				
25					NR				
26					NR				
27			36		NR				
28					NR				
29					NR				
30					NR				
31					NR				
32					NR				
33			18		NR		(32.0-35.0') SAND, very fine to fine, subrounded; trace silt; well sorted; dry; pale brown (10YR 6/3).		
34					NR				
35					NR				
36					NR		(35.0-40.0') SAND, very fine; and SILT, nonplastic, no dilatancy to slow dilatancy; trace pebbles, medium, subrounded; dry to moist; stiff; gray (10YR 5/1).		
37			33		NR				
38					NR				
39					NR				
40					NR		End of boring at 40.0' bgs.		
41									

Remarks:

SOIL BORING LOG: 2013 VARCADIS-US-COM-OFFICE-DATA\NOV-11-MICOMMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_101921.GPJ ARCADIS_2013.GDT 10/20/2021

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/27/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/27/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 65° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR	(0.0-1.5') GRASS/TOPSOIL.			
2					NR	(1.5-9.0') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).			
3				NR					
4				NR					
5		114		NR					
6				NR					
7					NR				
8				SB-OS-OS376_6-10 @ 0955	NR				
9					NR	(9.0-9.5') SAND, very fine to fine, subrounded; and SILT, nonplastic, rapid dilatancy; well sorted; wet; yellowish brown (10YR 5/4).			
10					NR	(9.5-22.0') CLAY, medium to high plasticity, no dilatancy; little to some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; medium stiff to stiff; grayish brown (10YR 5/4).	(0.0-40.0') Backfilled with bentonite		
11				NR					
12		60		NR					
13				NR					
14				NR					
15					NR				
16					NR				
17					NR				
18		30			NR				
19					NR				
20					NR				

Drilling Co.: Fibertec Sampling Method: 5.0' Macro Core
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): 9.0
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Converted to Well: Yes No
 Surface Elev.: NA
 North Coord.: _____
 East Coord.: _____

SOIL BORING LOG - 2013 VARCADIS-US-COM-OFFICE-DATA\NOV-11-MICOMMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_101921.GPJ ARCADIS - 2013 GDT - 10/20/2021

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/27/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/27/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 65° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					NR		(9.5-22.0') CLAY, medium to high plasticity, no dilatancy; little to some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; medium stiff to stiff; grayish brown (10YR 5/2).	(0.0-40.0') Backfilled with bentonite	
22				NR					
23			37	NR					
24				NR		(23.0-31.0') SILT, nonplastic to low plasticity, no dilatancy; trace clay; well sorted; dry; gray (10YR 5/1).			
25				NR					
26					NR				
27				NR					
28			35	NR					
29				NR					
30				NR					
31					NR		(31.0-33.6') CLAY, medium plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist.		
32			54	NR					
33				NR					
34					NR		(33.6-34.5') SILT, nonplastic, no dilatancy; trace clay; trace sand, very fine; well sorted; dry; light brownish gray (10YR 6/2).		
35				NR					
36					NR		(34.5-40.0') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).		
37				NR					
38			44	NR					
39				NR					
40				NR	End of boring at 40.0' bgs.				
41									

Remarks:

SOIL BORING LOG: 2013 \ARCADIS\US\COM\OFFICE\DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_101921.GPJ ARCADIS_2013.GDT 10/20/2021

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/09/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/09/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-1.5') GRASS/TOPSOIL.		
2					NR		(1.5-6.0') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).		
3				NR					
4			78	NR					
5				NR					
6				NR					
7					NR		(6.0-7.0') SAND, very fine to fine, subrounded; and SILT, nonplastic, no dilatancy; well sorted; dry to moist; yellowish brown (10YR 5/4).		
8					NR		(7.0-11.0') SAND, very fine to fine, subrounded; little to some silt, nonplastic, slow to rapid dilatancy; well sorted; moist to wet; yellowish brown (10YR 5/4). Note: Wet at 7.5' bgs.	(0.0-30.0') Backfilled with bentonite	
9			42	NR					
10				NR					
11				SB-OS-QM379_8-12 @ 1510	NR		(11.0-13.5') SAND, very fine to fine, subrounded; and SILT, nonplastic to low plasticity, rapid dilatancy; little clay; well sorted; wet; soft; yellowish brown (10YR 5/4).		
12				NR					
13			48	NR					
14				NR					
15					NR		(13.5-13.7') SAND, medium to coarse, subrounded; little sand, very fine to fine, subrounded; little silt; poorly sorted; wet; yellowish brown (10YR 5/4).		
16					NR		(13.7-15.0') SAND, very fine to fine, subrounded; and SILT, nonplastic, slow dilatancy; little clay; well sorted; wet; soft; yellowish brown (10YR 5/4).		
17				NR					
18			36	NR					
19				NR					
20				NR					

Drilling Co.: Fibertec Sampling Method: 5.0' Macro Core
 Driller: Kody Neal Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): 7.5
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG - 2013 VARCADIS-US-COM-OFFICE-DATA\ANALYSIS\BORING LOGS\RACER LANSING MASTER.DAT\BASE_101921.GPJ ARCADIS - 2013.GDT 10/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/09/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/09/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well	
21	X		36		NR	(19.7-20.2') SILT, nonplastic, no dilatancy; little sand, very fine, subrounded; dry to moist; gray (10YR 5/1).		(0.0-30.0') Backfilled with bentonite		
22					NR					(20.2-25.5') SAND, very fine to fine, subrounded; little silt; well sorted; moist to wet; pale brown (10YR 6/3).
23					NR					
24					NR					
25					NR					
26	X		36	SB-OS-QM379_25-29 @ 1630	NR	(25.5-25.8') SAND, very fine; and SILT; well sorted; moist; brown (10YR 5/3).				
27					NR					(25.8-28.5') SAND, very fine to fine, subrounded; little sand, medium to coarse, subrounded; trace to little silt; poorly sorted; wet; pale brown (10YR 6/3).
28					NR					
29					NR					
30					NR	(28.5-30.0') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; grayish brown (10YR 5/2). End of boring at 30.0' bgs.				
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										

Remarks:

SOIL BORING LOG: 2013 \ARCADIS\US\COM\OFFICE\DATA\NOV\11\MICROMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING\MASTER.DAT\DATABASE_101921.GPJ ARCADIS_2013.GDT 10/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/10/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/10/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-1.5') GRASS/TOPSOIL.		
2					NR		(1.5-7.5') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).		
3			78		NR				
4					NR				
5					NR				
6					NR				
7					NR		(7.5-7.6') SAND, very fine to fine, subrounded; little silt; well sorted; wet; yellowish brown (10YR 5/4).	(0.0-40.0') Backfilled with bentonite	
8			42	SB-OS-RO398_6-10 @ 0955	NR	(7.6-9.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; brown (10YR 5/3).			
9					NR	(9.0-9.3') SAND, very fine to fine, subrounded; little silt; well sorted; wet; brown (10YR 5/3).			
10					NR	(9.3-12.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; stiff; brown (10YR 5/3).			
11					NR		(12.0-21.0') CLAY, medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large subrounded; moist; stiff; grayish brown (10YR 5/2).		
12			36		NR				
13					NR				
14					NR				
15					NR				
16					NR				
17					NR				
18			36		NR				
19					NR				
20					NR				

Drilling Co.: Fibertec Sampling Method: 5.0' Macro Core
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG: 2013 VARCADIS-US-COM-OFFICE-DATA\NOV-11-MICOMMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_101921.GPJ ARCADIS 2013 GDT 10/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/10/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/10/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					NR				
22			60		NR		(21.0-31.0') CLAY, low plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; stiff to very stiff; grayish brown (10YR 5/2).		
23				NR					
24				NR					
25				NR					
26				NR					
27			48		NR		(31.0-31.5') SAND, very fine to fine, subrounded; trace silt; well sorted; dry; pale brown (10YR 6/3).	(0.0-40.0') Backfilled with bentonite	
28				NR					
29				NR					
30				NR					
31				NR					
32			33		NR		(31.5-35.0') CLAY, low to medium plasticity, no dilatancy; and SILT; trace sand, very fine to fine, subrounded; dry; medium stiff to stiff; gray (10YR 5/1).		
33				NR					
34				NR					
35				NR					
36			36		NR		(35.0-40.0') SAND, very fine to fine, subrounded; trace silt; well sorted; dry; pale brown (10YR 6/3).		
37				NR					
38				NR					
39				NR					
40				NR		End of boring at 40.0' bgs.			
41									

Remarks:

SOIL BORING LOG - 2013 \ARCADIS-US-COM\OFFICE\DATA\ANNOV\H\MICOM\MONI\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_101921.GPJ ARCADIS_2013.GDT 10/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/10/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/10/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-1.5') GRASS/TOPSOIL.	(0.0-25.0') Backfilled with bentonite	
2					NR		(1.5-6.5') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).		
3		78			NR				
4					NR				
5					NR				
6					NR				
7					NR		(6.5-10.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; medium stiff to stiff; yellowish brown (10YR 5/4).		
8		42			NR				
9					NR				
10									
11					NR		(10.0-12.0') SAND, medium to coarse, subrounded; little sand, very fine to fine, subrounded; little silt; trace granules, subrounded; trace pebbles, small to medium, subrounded; poorly sorted; moist; yellowish brown (10YR 5/4).		
12					NR				
13		60		SB-OS-SW386_11-15 @ 1150 and DUP-01_091021 collected	NR		(12.0-13.5') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; gray (10YR 5/1).		
14					NR		(13.5-15.5') SAND, very fine to fine, subrounded; little silt; well sorted; wet; yellowish brown (10YR 5/4) to pale brown (10YR 6/3).		
15					NR				
16					NR		(15.5-20.0') CLAY, medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; stiff; grayish brown (10YR 5/2).		
17					NR				
18		48			NR				
19					NR				
20					NR				

Drilling Co.: Fibertec Sampling Method: 5.0' Macro Core
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): NA
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG: 2013 \ARCADIS\US\COMMON\PROJECTS\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_101921.GPJ ARCADIS_2013.GDT 10/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/10/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/10/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21	X		48	SB-OS-SW386_20-24 @ 1225	NR	NR	(20.0-20.4') SAND, fine to medium, subrounded; little silt; trace sand, coarse, subrounded; poorly sorted; wet; gray (10YR 5/4).	(0.0-25.0') Backfilled with bentonite	
22							(20.4-22.0') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; medium stiff; grayish brown (10YR 5/2).		
23							(22.0-22.3') SAND, very fine to fine, subrounded; little silt; well sorted; wet; pale brown (10YR 6/3).		
24							(22.3-25.0') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; stiff; gray (10YR 5/1).		
25							End of boring at 25.0' bgs.		
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									

Remarks:

SOIL BORING LOG: 2013 \ARCADIS\US\COM\OFFICE\DATA\ANNOV\MI\COM\MON\I\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_101921.GPJ ARCADIS_2013.GDT 10/20/21

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/27/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/27/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 75° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-1.5') GRASS/TOPSOIL.		
2					NR		(1.5-7.0') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).		
3		78		NR					
4				NR					
5				NR					
6				NR					
7				NR					
8			42		NR		(7.0-8.0') CLAY, low plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; soft; light brownish gray (10YR 6/2).		
9				NR					
10					NR		(8.0-19.0') CLAY, low to medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; gray (10YR 5/1).	(0.0-40.0') Backfilled with bentonite	
11				NR					
12				NR					
13		60		NR					
14				NR					
15				NR					
16					NR		(19.0-24.0') CLAY, nonplastic to low plasticity, no dilatancy; and SILT; moist; medium stiff; gray (10YR 5/1).		
17				NR					
18		50		NR					
19				NR					
20				NR					

Drilling Co.: Fibertec Sampling Method: 5.0' Macro Core
 Driller: Nick Wiseman Sampling Interval: Continuous
 Drilling Method: Hand Auger / Direct Push Water Level Start (ft. bgs.): 9.0
 Drilling Fluid: None Water Level Finish (ft. btoc.): NA
 Remarks: bgs = below ground surface. Attempted to collect water from 20-24' interval, but well was dry. Converted to Well: Yes No
 Surface Elev.: NA
 North Coor.: _____
 East Coor.: _____

SOIL BORING LOG - 2013 VARCADIS-US-COM-OFFICE-DATA-ANALYSIS-BORING-LOGS-RACER-LANSING MASTER-DATABASE_101921.GPJ ARCADIS - 2013 GDT - 10/20/2021

Soil Boring Log

Project Name: RACER Lansing Date Started: 09/27/2021 Logger: A. Westhuis
 Project Number: 30042872 Date Completed: 09/27/2021 Editor: C. Cisco
 Project Location: Lansing, MI Weather Conditions: 75° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					NR	[Cross-hatched pattern]	(19.0-24.0') CLAY, nonplastic to low plasticity, no dilatancy; and SILT; moist; medium stiff; gray (10YR 5/1). Note: Lenses of silt and very fine sand present at 22.0' bgs, moist.		
22				NR					
23			52	NR					
24				NR					
25					NR	[Diagonal lines pattern]	(24.0-28.5') CLAY, low plasticity, no dilatancy; some silt; trace to little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; gray (10YR 5/1).		
26				NR					
27				NR					
28			43	SB-OS-TC335_26-30 @ 1450	NR				
29					NR	[Dotted pattern]	(28.5-29.5') SAND, fine to coarse, subrounded; trace to little silt; poorly sorted; wet; pale brown (10YR 6/3).		
30				NR					
31					NR	[Diagonal lines pattern]	(29.5-40.0') CLAY, low to medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; very stiff; gray (10YR 5/1).	(0.0-40.0') Backfilled with bentonite	
32				NR					
33			42	NR					
34				NR					
35				NR					
36				NR					
37				NR	[Diagonal lines pattern]				
38			46	NR					
39				NR					
40				NR					
41							End of boring at 40.0' bgs.		

Remarks:

SOIL BORING LOG: 2013 \ARCADIS\US\COM\OFFICE\DATA\NOV\11\MICROMON\RACER\LANSING\WORKING DATA\ANALYSIS\BORING LOGS\RACER\LANSING MASTER.DAT\BASE_101921.GPJ ARCADIS_2013.GDT 10/20/21

Attachment 2

Laboratory Analytical Reports



Report of Analysis

Arcadis U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: RACER Lansing
Project Number: 30112892.03100
Lot Number: **XD06118**
Date Completed: 04/20/2022

Kathy Smith

04/21/2022 12:19 PM
Approved and released by:
Project Manager II: **Kathy E. Smith**



The electronic signature above is the equivalent of a handwritten signature.
This report shall not be reproduced, except in its entirety, without the written approval of Pace Analytical Services, LLC.

PACE ANALYTICAL SERVICES, LLC

SC DHEC No: 32010001

NELAC No: E87653

NC DENR No: 329

NC Field Parameters No: 5639

Case Narrative Arcadis U.S., Inc. Lot Number: XD06118

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.3 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples was in compliance with DOD QSM 5.3 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). For undiluted analysis. For undiluted analysis, the extract is prepared for injection by adding 182 uL of sample extract + 8 uL of reagent water + 10 uL of internal standard solution to a polypropylene autosampler vial. An extra correction factor of 0.91 (182 uL / 200 uL = 0.91) applies. The CF is calculated as follows:

$$CF = DF * FV / Vo$$

FV is volume of extract (mL)

Vo is initial sample volume (mL)

DF is dilution factor. For undiluted analysis, DF = 1/0.91.

Sample concentration for aqueous samples:

Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{A_s \times C_{is}}{A_{is}} \right) - B}{M1}$$

Where

C_s is on column concentration of target analyte in the sample (ng/L)

C_{is} is concentration of internal standard in the sample (ng/L)

A_s is peak response of target analyte in the sample

A_{is} is peak response of internal standard in the sample

M1 is the average RF from ICAL or the slope from linear regression ICAL

B is the y-intercept from the ICAL

PACE ANALYTICAL SERVICES, LLC

SC DHEC No: 32010001

NELAC No: E87653

NC DENR No: 329

NC Field Parameters No: 5639

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

The MS/MSD associated with sample XD06118-004 had compounds recovered outside of the acceptance limits. The LCS was recovered within the required acceptance limits; therefore, this demonstrates a matrix effect and data quality is not impacted.

Samples XD06118-008, XD06118-009, XD06118-010, XD06118-011, XD06118-012 had surrogates recovered above the acceptance limits. This reflects a high bias for compounds associated with this surrogate. There were no detections for these compounds in the sample; therefore, there is no impact on data quality and no corrective action is required.

PACE ANALYTICAL SERVICES, LLC

Sample Summary

Arcadis U.S., Inc.

Lot Number: XD06118

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	MW-22-145_040422	Aqueous	04/04/2022 1325	04/06/2022
002	MW-22-144_040422	Aqueous	04/04/2022 1425	04/06/2022
003	MW-22-148_040422	Aqueous	04/04/2022 1545	04/06/2022
004	MW-22-147_040422	Aqueous	04/04/2022 1630	04/06/2022
005	MW-22-143_040522	Aqueous	04/05/2022 1045	04/06/2022
006	MW-22-146_040522	Aqueous	04/05/2022 1205	04/06/2022
007	MW-22-149_040522	Aqueous	04/05/2022 1250	04/06/2022
008	MW-22-150_040522	Aqueous	04/05/2022 1345	04/06/2022
009	MW-22-151_040522	Aqueous	04/05/2022 1440	04/06/2022
010	MW-22-152_040522	Aqueous	04/05/2022 1550	04/06/2022
011	Dup-01_040522	Aqueous	04/05/2022	04/06/2022
012	EB-01_040522	Aqueous	04/05/2022 1615	04/06/2022

(12 samples)

PACE ANALYTICAL SERVICES, LLC

Detection Summary

Arcadis U.S., Inc.

Lot Number: XD06118

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	MW-22-145_040422	Aqueous	PFBS	PFAS by ID	3.4	J	ng/L	6
001	MW-22-145_040422	Aqueous	PFOSA	PFAS by ID	1.1	J	ng/L	6
001	MW-22-145_040422	Aqueous	PFHxS	PFAS by ID	1.9	J	ng/L	6
001	MW-22-145_040422	Aqueous	PFBA	PFAS by ID	5.2		ng/L	6
001	MW-22-145_040422	Aqueous	PFHpA	PFAS by ID	5.7		ng/L	6
001	MW-22-145_040422	Aqueous	PFHxA	PFAS by ID	9.9		ng/L	6
001	MW-22-145_040422	Aqueous	PFOA	PFAS by ID	16		ng/L	6
001	MW-22-145_040422	Aqueous	PFPeA	PFAS by ID	9.3		ng/L	6
001	MW-22-145_040422	Aqueous	PFOS	PFAS by ID	3.6		ng/L	6
002	MW-22-144_040422	Aqueous	PFBS	PFAS by ID	1.9	J	ng/L	8
002	MW-22-144_040422	Aqueous	PFHxS	PFAS by ID	2.3	J	ng/L	8
002	MW-22-144_040422	Aqueous	PFBA	PFAS by ID	5.3		ng/L	8
002	MW-22-144_040422	Aqueous	PFHpA	PFAS by ID	3.6		ng/L	8
002	MW-22-144_040422	Aqueous	PFHxA	PFAS by ID	7.7		ng/L	8
002	MW-22-144_040422	Aqueous	PFOA	PFAS by ID	5.3		ng/L	8
002	MW-22-144_040422	Aqueous	PFPeA	PFAS by ID	8.8		ng/L	8
003	MW-22-148_040422	Aqueous	PFBS	PFAS by ID	1.6	J	ng/L	10
003	MW-22-148_040422	Aqueous	PFOSA	PFAS by ID	2.0	J	ng/L	10
003	MW-22-148_040422	Aqueous	PFBA	PFAS by ID	3.0	J	ng/L	10
003	MW-22-148_040422	Aqueous	PFHpA	PFAS by ID	0.39	J	ng/L	10
003	MW-22-148_040422	Aqueous	PFHxA	PFAS by ID	1.1	J	ng/L	10
003	MW-22-148_040422	Aqueous	PFOA	PFAS by ID	1.1	J	ng/L	10
003	MW-22-148_040422	Aqueous	PFPeA	PFAS by ID	0.92	J	ng/L	10
004	MW-22-147_040422	Aqueous	PFBS	PFAS by ID	2.5	JS	ng/L	12
004	MW-22-147_040422	Aqueous	PFOSA	PFAS by ID	0.67	J	ng/L	12
004	MW-22-147_040422	Aqueous	PFHxS	PFAS by ID	1.3	J	ng/L	12
004	MW-22-147_040422	Aqueous	PFBA	PFAS by ID	3.8	S	ng/L	12
004	MW-22-147_040422	Aqueous	PFHpA	PFAS by ID	0.69	J	ng/L	12
004	MW-22-147_040422	Aqueous	PFHxA	PFAS by ID	1.1	J	ng/L	12
004	MW-22-147_040422	Aqueous	PFOA	PFAS by ID	2.8	JS	ng/L	12
004	MW-22-147_040422	Aqueous	PFPeA	PFAS by ID	1.2	J	ng/L	12
004	MW-22-147_040422	Aqueous	PFOS	PFAS by ID	2.0	JS	ng/L	12
005	MW-22-143_040522	Aqueous	PFBS	PFAS by ID	0.81	J	ng/L	14
005	MW-22-143_040522	Aqueous	PFBA	PFAS by ID	11		ng/L	14
005	MW-22-143_040522	Aqueous	PFHpA	PFAS by ID	3.7		ng/L	14
005	MW-22-143_040522	Aqueous	PFHxA	PFAS by ID	19		ng/L	14
005	MW-22-143_040522	Aqueous	PFOA	PFAS by ID	1.5	J	ng/L	14
005	MW-22-143_040522	Aqueous	PFPeA	PFAS by ID	18		ng/L	14
006	MW-22-146_040522	Aqueous	PFBS	PFAS by ID	4.0		ng/L	16
006	MW-22-146_040522	Aqueous	PFHxS	PFAS by ID	1.1	J	ng/L	16
006	MW-22-146_040522	Aqueous	PFBA	PFAS by ID	14		ng/L	16
006	MW-22-146_040522	Aqueous	PFHpA	PFAS by ID	0.59	J	ng/L	16
006	MW-22-146_040522	Aqueous	PFHxA	PFAS by ID	6.7		ng/L	16
006	MW-22-146_040522	Aqueous	PFOA	PFAS by ID	6.5		ng/L	16
006	MW-22-146_040522	Aqueous	PFPeA	PFAS by ID	5.4		ng/L	16

Detection Summary (Continued)

Lot Number: XD06118

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
006	MW-22-146_040522	Aqueous	PFOS	PFAS by ID	1.7	J	ng/L	16
007	MW-22-149_040522	Aqueous	PFBS	PFAS by ID	1.8	J	ng/L	18
007	MW-22-149_040522	Aqueous	PFOSA	PFAS by ID	0.53	J	ng/L	18
007	MW-22-149_040522	Aqueous	PFHxS	PFAS by ID	0.88	J	ng/L	18
007	MW-22-149_040522	Aqueous	PFBA	PFAS by ID	1.2	J	ng/L	18
007	MW-22-149_040522	Aqueous	PFOA	PFAS by ID	0.72	J	ng/L	18
007	MW-22-149_040522	Aqueous	PFOS	PFAS by ID	2.1	J	ng/L	18
008	MW-22-150_040522	Aqueous	PFOSA	PFAS by ID	0.57	J	ng/L	20
008	MW-22-150_040522	Aqueous	PFBA	PFAS by ID	3.1	J	ng/L	20
008	MW-22-150_040522	Aqueous	PFHxA	PFAS by ID	1.7	J	ng/L	20
008	MW-22-150_040522	Aqueous	PFPeA	PFAS by ID	2.1	J	ng/L	20
009	MW-22-151_040522	Aqueous	PFBS	PFAS by ID	7.9		ng/L	22
009	MW-22-151_040522	Aqueous	PFHxS	PFAS by ID	1.8	J	ng/L	22
009	MW-22-151_040522	Aqueous	PFBA	PFAS by ID	11		ng/L	22
009	MW-22-151_040522	Aqueous	PFHpA	PFAS by ID	3.5	J	ng/L	22
009	MW-22-151_040522	Aqueous	PFHxA	PFAS by ID	6.0		ng/L	22
009	MW-22-151_040522	Aqueous	PFNA	PFAS by ID	0.59	J	ng/L	22
009	MW-22-151_040522	Aqueous	PFOA	PFAS by ID	9.4		ng/L	22
009	MW-22-151_040522	Aqueous	PFPeA	PFAS by ID	13		ng/L	22
009	MW-22-151_040522	Aqueous	PFOS	PFAS by ID	2.0	J	ng/L	22
010	MW-22-152_040522	Aqueous	PFBS	PFAS by ID	1.8	J	ng/L	24
010	MW-22-152_040522	Aqueous	PFHxS	PFAS by ID	1.1	J	ng/L	24
010	MW-22-152_040522	Aqueous	PFBA	PFAS by ID	3.7		ng/L	24
010	MW-22-152_040522	Aqueous	PFHpA	PFAS by ID	1.0	J	ng/L	24
010	MW-22-152_040522	Aqueous	PFHxA	PFAS by ID	2.4	J	ng/L	24
010	MW-22-152_040522	Aqueous	PFOA	PFAS by ID	2.4	J	ng/L	24
010	MW-22-152_040522	Aqueous	PFPeA	PFAS by ID	2.7	J	ng/L	24
011	Dup-01_040522	Aqueous	PFBS	PFAS by ID	0.91	J	ng/L	26
011	Dup-01_040522	Aqueous	PFBA	PFAS by ID	11		ng/L	26
011	Dup-01_040522	Aqueous	PFHpA	PFAS by ID	3.7		ng/L	26
011	Dup-01_040522	Aqueous	PFHxA	PFAS by ID	19		ng/L	26
011	Dup-01_040522	Aqueous	PFOA	PFAS by ID	1.5	J	ng/L	26
011	Dup-01_040522	Aqueous	PFPeA	PFAS by ID	20		ng/L	26

(78 detections)

PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XD06118-001**

Description: **MW-22-145_040422**

Matrix: **Aqueous**

Date Sampled: **04/04/2022 1325**

Date Received: **04/06/2022**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/19/2022 0131	MMM	04/11/2022 1037	37696

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.2	0.44	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.2	0.60	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.2	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.2	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.2	0.79	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.2	1.9	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.2	0.44	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.2	0.68	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.2	0.84	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	3.4	J	3.6	0.37	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.6	0.70	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.6	0.45	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.6	0.64	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	1.1	J	3.6	0.55	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.6	0.54	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.9	J	3.6	0.50	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	5.2		3.6	0.54	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.6	0.47	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.6	0.43	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	5.7		3.6	0.40	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	9.9		3.6	0.62	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.6	0.42	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	16		3.6	0.75	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	9.3		3.6	0.49	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.6	0.54	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.6	0.48	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.6	0.57	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	3.6		3.6	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		95	25-150
13C2_6:2FTS		123	25-150
13C2_8:2FTS		92	25-150
13C2_PFDa		82	25-150
13C2_PFTeDA		84	25-150
13C3_PFBs		81	25-150
13C3_PFHxS		82	25-150
13C3-HFPO-DA		90	25-150
13C4_PFBa		82	25-150
13C4_PFHpA		85	25-150
13C5_PFHxA		87	25-150
13C5_PFPeA		89	25-150
13C6_PFDa		88	25-150
13C7_PFUdA		83	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)
 106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XD06118-001
Description: MW-22-145_040422	Matrix: Aqueous
Date Sampled: 04/04/2022 1325	
Date Received: 04/06/2022	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		95	25-150
13C8_PFOS		84	25-150
13C8_PFOSA		86	10-150
13C9_PFNA		84	25-150
d5-EtFOSAA		82	25-150
d3-MeFOSAA		85	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
 106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XD06118-002**

Description: **MW-22-144_040422**

Matrix: **Aqueous**

Date Sampled: **04/04/2022 1425**

Date Received: **04/06/2022**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/19/2022 0142	MMM	04/11/2022 1037	37696

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.1	0.43	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.1	0.59	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.1	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.1	0.77	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.1	0.43	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.1	0.67	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.1	0.83	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1.9	J	3.5	0.37	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.69	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.44	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.63	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	2.3	J	3.5	0.49	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	5.3		3.5	0.53	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.47	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.42	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	3.6		3.5	0.40	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	7.7		3.5	0.61	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	5.3		3.5	0.74	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	8.8		3.5	0.48	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.47	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.56	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		102	25-150
13C2_6:2FTS		120	25-150
13C2_8:2FTS		90	25-150
13C2_PFDa		86	25-150
13C2_PFTeDA		85	25-150
13C3_PFBS		86	25-150
13C3_PFHxS		88	25-150
13C3-HFPO-DA		87	25-150
13C4_PFBA		79	25-150
13C4_PFHpA		88	25-150
13C5_PFHxA		92	25-150
13C5_PFPeA		88	25-150
13C6_PFDA		87	25-150
13C7_PFUdA		84	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XD06118-002
Description: MW-22-144_040422	Matrix: Aqueous
Date Sampled: 04/04/2022 1425	
Date Received: 04/06/2022	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		98	25-150
13C8_PFOS		85	25-150
13C8_PFOSA		85	10-150
13C9_PFNA		83	25-150
d5-EtFOSAA		83	25-150
d3-MeFOSAA		86	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XD06118-003**

Description: **MW-22-148_040422**

Matrix: **Aqueous**

Date Sampled: **04/04/2022 1545**

Date Received: **04/06/2022**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/19/2022 0153	MMM	04/11/2022 1037	37696

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	0.58	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.0	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	0.66	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	0.81	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1.6	J	3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.68	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.44	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	2.0	J	3.5	0.54	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	3.0	J	3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.39	J	3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	1.1	J	3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	1.1	J	3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	0.92	J	3.5	0.48	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.55	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		117	25-150
13C2_6:2FTS		122	25-150
13C2_8:2FTS		89	25-150
13C2_PFDaA		84	25-150
13C2_PFTeDA		80	25-150
13C3_PFBs		85	25-150
13C3_PFHxS		87	25-150
13C3-HFPO-DA		87	25-150
13C4_PFBa		81	25-150
13C4_PFHpA		86	25-150
13C5_PFHxA		94	25-150
13C5_PFPeA		89	25-150
13C6_PFDa		87	25-150
13C7_PFUdA		88	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XD06118-003
Description: MW-22-148_040422	Matrix: Aqueous
Date Sampled: 04/04/2022 1545	
Date Received: 04/06/2022	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		99	25-150
13C8_PFOS		91	25-150
13C8_PFOSA		88	10-150
13C9_PFNA		87	25-150
d5-EtFOSAA		86	25-150
d3-MeFOSAA		88	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XD06118-004**

Description: **MW-22-147_040422**

Matrix: **Aqueous**

Date Sampled: **04/04/2022 1630**

Date Received: **04/06/2022**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/19/2022 0204	MMM	04/11/2022 1037	37696

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND	S	6.9	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND	S	6.9	0.58	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND	S	6.9	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	S	6.9	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	S	6.9	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND	S	6.9	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND	S	6.9	0.65	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND	S	6.9	0.81	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.5	JS	3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND	S	3.5	0.68	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND	S	3.5	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND	S	3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	0.67	J	3.5	0.53	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND	S	3.5	0.52	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.3	J	3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	3.8	S	3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND	S	3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND	S	3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.69	J	3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	1.1	J	3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND	S	3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	2.8	JS	3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	1.2	J	3.5	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND	S	3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND	S	3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND	S	3.5	0.54	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	2.0	JS	3.5	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		142	25-150
13C2_6:2FTS		121	25-150
13C2_8:2FTS		89	25-150
13C2_PFDaA		82	25-150
13C2_PFTeDA		81	25-150
13C3_PFBs		79	25-150
13C3_PFHxS		87	25-150
13C3-HFPO-DA		81	25-150
13C4_PFBa		61	25-150
13C4_PFHpA		86	25-150
13C5_PFHxA		89	25-150
13C5_PFPeA		80	25-150
13C6_PFDa		84	25-150
13C7_PFUdA		87	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XD06118-004
Description: MW-22-147_040422	Matrix: Aqueous
Date Sampled: 04/04/2022 1630	
Date Received: 04/06/2022	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		90	25-150
13C8_PFOS		86	25-150
13C8_PFOSA		83	10-150
13C9_PFNA		83	25-150
d5-EtFOSAA		84	25-150
d3-MeFOSAA		84	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XD06118-005**

Description: **MW-22-143_040522**

Matrix: **Aqueous**

Date Sampled: **04/05/2022 1045**

Date Received: **04/06/2022**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/19/2022 0237	MMM	04/11/2022 1037	37696

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.9	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.9	0.58	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.9	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.9	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.9	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.9	0.65	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.9	0.81	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.81	J	3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.68	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	11		3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	3.7		3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	19		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	1.5	J	3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	18		3.5	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTriDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		122	25-150
13C2_6:2FTS		125	25-150
13C2_8:2FTS		87	25-150
13C2_PFDa		79	25-150
13C2_PFTeDA		75	25-150
13C3_PFBs		76	25-150
13C3_PFHxS		84	25-150
13C3-HFPO-DA		80	25-150
13C4_PFBa		62	25-150
13C4_PFHpA		81	25-150
13C5_PFHxA		82	25-150
13C5_PFPeA		77	25-150
13C6_PFDa		85	25-150
13C7_PFUdA		80	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XD06118-005
Description: MW-22-143_040522	Matrix: Aqueous
Date Sampled: 04/05/2022 1045	
Date Received: 04/06/2022	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		88	25-150
13C8_PFOS		82	25-150
13C8_PFOSA		82	10-150
13C9_PFNA		78	25-150
d5-EtFOSAA		78	25-150
d3-MeFOSAA		79	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XD06118-006**

Description: **MW-22-146_040522**

Matrix: **Aqueous**

Date Sampled: **04/05/2022 1205**

Date Received: **04/06/2022**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/19/2022 0248	MMM	04/11/2022 1037	37696

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	0.58	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.0	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	0.66	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	0.81	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	4.0		3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.68	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.44	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.1	J	3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	14		3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.59	J	3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	6.7		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	6.5		3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	5.4		3.5	0.48	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.55	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	1.7	J	3.5	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		143	25-150
13C2_6:2FTS		116	25-150
13C2_8:2FTS		86	25-150
13C2_PFDaA		79	25-150
13C2_PFTeDA		82	25-150
13C3_PFBS		72	25-150
13C3_PFHxS		84	25-150
13C3-HFPO-DA		78	25-150
13C4_PFBA		44	25-150
13C4_PFHpA		83	25-150
13C5_PFHxA		83	25-150
13C5_PFPeA		70	25-150
13C6_PFDA		85	25-150
13C7_PFUdA		83	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XD06118-006
Description: MW-22-146_040522	Matrix: Aqueous
Date Sampled: 04/05/2022 1205	
Date Received: 04/06/2022	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		85	25-150
13C8_PFOS		81	25-150
13C8_PFOSA		81	10-150
13C9_PFNA		81	25-150
d5-EtFOSAA		80	25-150
d3-MeFOSAA		85	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XD06118-007**

Description: **MW-22-149_040522**

Matrix: **Aqueous**

Date Sampled: **04/05/2022 1250**

Date Received: **04/06/2022**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/19/2022 0259	MMM	04/11/2022 1037	37696

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.9	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.9	0.57	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.9	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.9	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.9	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.9	0.65	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.9	0.81	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1.8	J	3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.67	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	0.53	J	3.5	0.53	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.51	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.88	J	3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	1.2	J	3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.72	J	3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.5	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	2.1	J	3.5	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		94	25-150
13C2_6:2FTS		116	25-150
13C2_8:2FTS		85	25-150
13C2_PFDaA		83	25-150
13C2_PFTeDA		83	25-150
13C3_PFBs		80	25-150
13C3_PFHxS		79	25-150
13C3-HFPO-DA		84	25-150
13C4_PFBa		80	25-150
13C4_PFHpA		79	25-150
13C5_PFHxA		82	25-150
13C5_PFPeA		84	25-150
13C6_PFDa		86	25-150
13C7_PFUdA		84	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XD06118-007
Description: MW-22-149_040522	Matrix: Aqueous
Date Sampled: 04/05/2022 1250	
Date Received: 04/06/2022	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		90	25-150
13C8_PFOS		81	25-150
13C8_PFOSA		84	10-150
13C9_PFNA		83	25-150
d5-EtFOSAA		85	25-150
d3-MeFOSAA		88	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XD06118-008**

Description: **MW-22-150_040522**

Matrix: **Aqueous**

Date Sampled: **04/05/2022 1345**

Date Received: **04/06/2022**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/19/2022 0310	MMM	04/11/2022 1037	37696

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.1	0.43	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.1	0.59	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.1	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	7.1	0.77	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.1	0.43	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.1	0.67	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.1	0.83	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.5	0.37	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.69	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.44	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.63	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	0.57	J	3.5	0.54	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.49	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	3.1	J	3.5	0.53	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.47	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.42	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.5	0.40	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	1.7	J	3.5	0.61	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.5	0.74	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	2.1	J	3.5	0.48	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.47	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.56	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	177	25-150
13C2_6:2FTS		136	25-150
13C2_8:2FTS		90	25-150
13C2_PFDa		78	25-150
13C2_PFTeDA		78	25-150
13C3_PFBs		68	25-150
13C3_PFHxS		85	25-150
13C3-HFPO-DA		67	25-150
13C4_PFBa		34	25-150
13C4_PFHpA		83	25-150
13C5_PFHxA		76	25-150
13C5_PFPeA		55	25-150
13C6_PFDa		82	25-150
13C7_PFUdA		82	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XD06118-008
Description: MW-22-150_040522	Matrix: Aqueous
Date Sampled: 04/05/2022 1345	
Date Received: 04/06/2022	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		86	25-150
13C8_PFOS		85	25-150
13C8_PFOSA		79	10-150
13C9_PFNA		83	25-150
d5-EtFOSAA		80	25-150
d3-MeFOSAA		86	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XD06118-009**

Description: **MW-22-151_040522**

Matrix: **Aqueous**

Date Sampled: **04/05/2022 1440**

Date Received: **04/06/2022**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/19/2022 2332	MMM		37899

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.2	0.44	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.2	0.60	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.2	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	7.2	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	7.2	0.79	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.2	1.9	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.2	0.44	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.2	0.68	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.2	0.84	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	7.9		3.6	0.37	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.6	0.70	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.6	0.45	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.6	0.64	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.6	0.55	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.6	0.54	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.8	J	3.6	0.50	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	11		3.6	0.54	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.6	0.47	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.6	0.43	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	3.5	J	3.6	0.40	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	6.0		3.6	0.62	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.59	J	3.6	0.42	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	9.4		3.6	0.75	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	13		3.6	0.49	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.6	0.54	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.6	0.48	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.6	0.57	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	2.0	J	3.6	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	205	25-150
13C2_6:2FTS	N	216	25-150
13C2_8:2FTS		107	25-150
13C2_PFDa		79	25-150
13C2_PFTeDA		80	25-150
13C3_PFBS		85	25-150
13C3_PFHxS		85	25-150
13C3-HFPO-DA		65	25-150
13C4_PFBA		43	25-150
13C4_PFHpA		89	25-150
13C5_PFHxA		83	25-150
13C5_PFPeA		64	25-150
13C6_PFDA		93	25-150
13C7_PFUdA		82	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XD06118-009
Description: MW-22-151_040522	Matrix: Aqueous
Date Sampled: 04/05/2022 1440	
Date Received: 04/06/2022	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		92	25-150
13C8_PFOS		91	25-150
13C8_PFOSA		86	10-150
13C9_PFNA		96	25-150
d5-EtFOSAA		86	25-150
d3-MeFOSAA		81	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XD06118-010**

Description: **MW-22-152_040522**

Matrix: **Aqueous**

Date Sampled: **04/05/2022 1550**

Date Received: **04/06/2022**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/19/2022 2342	MMM		37899

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	0.57	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.8	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.8	0.75	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	0.64	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	0.80	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1.8	J	3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.67	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.61	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.1	J	3.4	0.47	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	3.7		3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	1.0	J	3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	2.4	J	3.4	0.59	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	2.4	J	3.4	0.71	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	2.7	J	3.4	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.54	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		123	25-150
13C2_6:2FTS	N	273	25-150
13C2_8:2FTS		76	25-150
13C2_PFDa		76	25-150
13C2_PFTeDA		75	25-150
13C3_PFBS		102	25-150
13C3_PFHxS		99	25-150
13C3-HFPO-DA		93	25-150
13C4_PFBA		83	25-150
13C4_PFHpA		89	25-150
13C5_PFHxA		95	25-150
13C5_PFPeA		92	25-150
13C6_PFDA		80	25-150
13C7_PFUdA		77	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XD06118-010
Description: MW-22-152_040522	Matrix: Aqueous
Date Sampled: 04/05/2022 1550	
Date Received: 04/06/2022	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		102	25-150
13C8_PFOS		88	25-150
13C8_PFOSA		89	10-150
13C9_PFNA		90	25-150
d5-EtFOSAA		78	25-150
d3-MeFOSAA		82	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XD06118-011**

Description: **Dup-01_040522**

Matrix: **Aqueous**

Date Sampled: **04/05/2022**

Date Received: **04/06/2022**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/20/2022 0004	MMM		37899

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.9	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.9	0.58	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.9	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	6.9	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.9	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.9	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.9	0.65	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.9	0.81	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	0.91	J	3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.68	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	11		3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	3.7		3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	19		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	1.5	J	3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	20		3.5	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		149	25-150
13C2_6:2FTS	N	260	25-150
13C2_8:2FTS		80	25-150
13C2_PFDaA		79	25-150
13C2_PFTeDA		80	25-150
13C3_PFBS		103	25-150
13C3_PFHxS		98	25-150
13C3-HFPO-DA		94	25-150
13C4_PFBA		76	25-150
13C4_PFHpA		98	25-150
13C5_PFHxA		95	25-150
13C5_PFPeA		87	25-150
13C6_PFDA		98	25-150
13C7_PFUdA		83	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XD06118-011
Description: Dup-01_040522	Matrix: Aqueous
Date Sampled: 04/05/2022	
Date Received: 04/06/2022	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		105	25-150
13C8_PFOS		95	25-150
13C8_PFOSA		89	10-150
13C9_PFNA		90	25-150
d5-EtFOSAA		79	25-150
d3-MeFOSAA		85	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XD06118-012**

Description: **EB-01_040522**

Matrix: **Aqueous**

Date Sampled: **04/05/2022 1615**

Date Received: **04/06/2022**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	04/20/2022 0014	MMM		37899

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.3	0.44	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.3	0.61	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.3	1.5	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	7.3	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.3	0.80	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.3	1.9	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.3	0.44	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.3	0.69	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.3	0.85	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.7	0.38	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.7	0.71	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.7	0.46	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.7	0.65	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.7	0.56	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.7	0.54	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.7	0.51	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.7	0.55	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.7	0.48	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.7	0.43	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.7	0.41	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.7	0.63	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.7	0.42	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.7	0.76	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.7	0.50	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.7	0.55	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.7	0.48	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.7	0.57	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.7	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		104	25-150
13C2_6:2FTS	N	259	25-150
13C2_8:2FTS		73	25-150
13C2_PFDa		69	25-150
13C2_PFTeDA		68	25-150
13C3_PFBS		94	25-150
13C3_PFHxS		95	25-150
13C3-HFPO-DA		96	25-150
13C4_PFBA		90	25-150
13C4_PFHpA		89	25-150
13C5_PFHxA		94	25-150
13C5_PFPeA		90	25-150
13C6_PFDA		88	25-150
13C7_PFUdA		81	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XD06118-012
Description: EB-01_040522	Matrix: Aqueous
Date Sampled: 04/05/2022 1615	
Date Received: 04/06/2022	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		110	25-150
13C8_PFOS		82	25-150
13C8_PFOSA		82	10-150
13C9_PFNA		88	25-150
d5-EtFOSAA		79	25-150
d3-MeFOSAA		78	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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QC Summary

PFAS by LC/MS/MS - MB

Sample ID: XQ37696-001

Matrix: Aqueous

Batch: 37696

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/11/2022 1037

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
9CI-PF3ONS	ND		1	8.0	0.48	ng/L	04/19/2022 0109
11CI-PF3OUdS	ND		1	8.0	0.66	ng/L	04/19/2022 0109
8:2 FTS	ND		1	8.0	1.6	ng/L	04/19/2022 0109
6:2 FTS	ND		1	8.0	2.0	ng/L	04/19/2022 0109
4:2 FTS	ND		1	8.0	0.87	ng/L	04/19/2022 0109
GenX	ND		1	8.0	2.1	ng/L	04/19/2022 0109
ADONA	ND		1	8.0	0.48	ng/L	04/19/2022 0109
EtFOSAA	ND		1	8.0	0.75	ng/L	04/19/2022 0109
MeFOSAA	ND		1	8.0	0.93	ng/L	04/19/2022 0109
PFBS	ND		1	4.0	0.41	ng/L	04/19/2022 0109
PFDS	ND		1	4.0	0.78	ng/L	04/19/2022 0109
PFHpS	ND		1	4.0	0.50	ng/L	04/19/2022 0109
PFNS	ND		1	4.0	0.71	ng/L	04/19/2022 0109
PFOSA	ND		1	4.0	0.61	ng/L	04/19/2022 0109
PFPeS	ND		1	4.0	0.59	ng/L	04/19/2022 0109
PFHxS	ND		1	4.0	0.55	ng/L	04/19/2022 0109
PFBA	ND		1	4.0	0.60	ng/L	04/19/2022 0109
PFDA	ND		1	4.0	0.52	ng/L	04/19/2022 0109
PFDaA	ND		1	4.0	0.47	ng/L	04/19/2022 0109
PFHpA	ND		1	4.0	0.45	ng/L	04/19/2022 0109
PFHxA	ND		1	4.0	0.69	ng/L	04/19/2022 0109
PFNA	ND		1	4.0	0.46	ng/L	04/19/2022 0109
PFOA	ND		1	4.0	0.83	ng/L	04/19/2022 0109
PFPeA	ND		1	4.0	0.54	ng/L	04/19/2022 0109
PFTeDA	ND		1	4.0	0.60	ng/L	04/19/2022 0109
PFTTrDA	ND		1	4.0	0.53	ng/L	04/19/2022 0109
PFUdA	ND		1	4.0	0.63	ng/L	04/19/2022 0109
PFOS	ND		1	4.0	2.0	ng/L	04/19/2022 0109

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		89	25-150
13C2_6:2FTS		110	25-150
13C2_8:2FTS		94	25-150
13C2_PFDaA		85	25-150
13C2_PFTeDA		81	25-150
13C3_PFBS		85	25-150
13C3_PFHxS		86	25-150
13C3-HFPO-DA		92	25-150
13C4_PFBA		90	25-150
13C4_PFHpA		86	25-150
13C5_PFHxA		86	25-150
13C5_PFPeA		90	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - MB

Sample ID: XQ37696-001

Matrix: Aqueous

Batch: 37696

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/11/2022 1037

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		91	25-150
13C7_PFUdA		90	25-150
13C8_PFOA		96	25-150
13C8_PFOS		90	25-150
13C8_PFOSA		86	10-150
13C9_PFNA		89	25-150
d5-EtFOSAA		88	25-150
d3-MeFOSAA		88	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - LCS

Sample ID: XQ37696-002

Matrix: Aqueous

Batch: 37696

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/11/2022 1037

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9CI-PF3ONS	15	15		1	104	50-150	04/19/2022 0120
11CI-PF3OUdS	15	15		1	98	50-150	04/19/2022 0120
8:2 FTS	15	16		1	105	50-150	04/19/2022 0120
6:2 FTS	15	17		1	110	50-150	04/19/2022 0120
4:2 FTS	15	16		1	108	50-150	04/19/2022 0120
GenX	32	37		1	114	50-150	04/19/2022 0120
ADONA	15	18		1	118	50-150	04/19/2022 0120
EtFOSAA	16	17		1	108	50-150	04/19/2022 0120
MeFOSAA	16	19		1	117	50-150	04/19/2022 0120
PFBS	14	15		1	105	50-150	04/19/2022 0120
PFDS	15	16		1	104	50-150	04/19/2022 0120
PFHpS	15	18		1	118	50-150	04/19/2022 0120
PFNS	15	16		1	106	50-150	04/19/2022 0120
PFOSA	16	17		1	107	50-150	04/19/2022 0120
PFPeS	15	16		1	110	50-150	04/19/2022 0120
PFHxS	15	16		1	113	50-150	04/19/2022 0120
PFBA	16	17		1	108	50-150	04/19/2022 0120
PFDA	16	18		1	112	50-150	04/19/2022 0120
PFDoA	16	18		1	114	50-150	04/19/2022 0120
PFHpA	16	18		1	110	50-150	04/19/2022 0120
PFHxA	16	18		1	113	50-150	04/19/2022 0120
PFNA	16	18		1	111	50-150	04/19/2022 0120
PFOA	16	16		1	101	50-150	04/19/2022 0120
PFPeA	16	17		1	109	50-150	04/19/2022 0120
PFTeDA	16	18		1	110	50-150	04/19/2022 0120
PFTTrDA	16	17		1	108	50-150	04/19/2022 0120
PFUdA	16	18		1	111	50-150	04/19/2022 0120
PFOS	15	15		1	102	50-150	04/19/2022 0120

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		99	25-150
13C2_6:2FTS		136	25-150
13C2_8:2FTS		99	25-150
13C2_PFDoA		86	25-150
13C2_PFTeDA		80	25-150
13C3_PFBS		93	25-150
13C3_PFHxS		89	25-150
13C3-HFPO-DA		95	25-150
13C4_PFBA		94	25-150
13C4_PFHpA		91	25-150
13C5_PFHxA		99	25-150
13C5_PFPeA		95	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - LCS

Sample ID: XQ37696-002

Matrix: Aqueous

Batch: 37696

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/11/2022 1037

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		96	25-150
13C7_PFUdA		94	25-150
13C8_PFOA		105	25-150
13C8_PFOS		96	25-150
13C8_PFOSA		93	10-150
13C9_PFNA		91	25-150
d5-EtFOSAA		88	25-150
d3-MeFOSAA		93	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - MS

Sample ID: XD06118-004MS

Matrix: Aqueous

Batch: 37696

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/11/2022 1037

Parameter	Sample Amount (ng/L)	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9CI-PF3ONS	ND	13	14		1	108	50-150	04/19/2022 0215
11CI-PF3OUdS	ND	14	14		1	106	50-150	04/19/2022 0215
8:2 FTS	ND	14	14		1	105	50-150	04/19/2022 0215
6:2 FTS	ND	14	14		1	106	50-150	04/19/2022 0215
4:2 FTS	ND	13	16		1	117	50-150	04/19/2022 0215
GenX	ND	29	30		1	103	50-150	04/19/2022 0215
ADONA	ND	14	15		1	113	50-150	04/19/2022 0215
EtFOSAA	ND	14	16		1	112	50-150	04/19/2022 0215
MeFOSAA	ND	14	17		1	116	50-150	04/19/2022 0215
PFBS	2.5	13	15		1	103	50-150	04/19/2022 0215
PFDS	ND	14	14		1	105	50-150	04/19/2022 0215
PFHpS	ND	14	14		1	103	50-150	04/19/2022 0215
PFNS	ND	14	15		1	110	50-150	04/19/2022 0215
PFOSA	0.67	14	17		1	113	50-150	04/19/2022 0215
PFPeS	ND	13	15		1	112	50-150	04/19/2022 0215
PFHxS	1.3	13	16		1	109	50-150	04/19/2022 0215
PFBA	3.8	14	19		1	104	50-150	04/19/2022 0215
PFDA	ND	14	15		1	108	50-150	04/19/2022 0215
PFDoA	ND	14	16		1	113	50-150	04/19/2022 0215
PFHpA	0.69	14	16		1	109	50-150	04/19/2022 0215
PFHxA	1.1	14	17		1	111	50-150	04/19/2022 0215
PFNA	ND	14	16		1	109	50-150	04/19/2022 0215
PFOA	2.8	14	18		1	104	50-150	04/19/2022 0215
PFPeA	1.2	14	17		1	109	50-150	04/19/2022 0215
PFTeDA	ND	14	16		1	109	50-150	04/19/2022 0215
PFTrDA	ND	14	16		1	112	50-150	04/19/2022 0215
PFUdA	ND	14	16		1	110	50-150	04/19/2022 0215
PFOS	2.0	13	16		1	123	50-150	04/19/2022 0215

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		140	25-150
13C2_6:2FTS		122	25-150
13C2_8:2FTS		86	25-150
13C2_PFDoA		81	25-150
13C2_PFTeDA		83	25-150
13C3_PFBs		78	25-150
13C3_PFHxS		84	25-150
13C3-HFPO-DA		83	25-150
13C4_PFBA		64	25-150
13C4_PFHpA		84	25-150
13C5_PFHxA		90	25-150
13C5_PFPeA		77	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - MS

Sample ID: XD06118-004MS

Matrix: Aqueous

Batch: 37696

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/11/2022 1037

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		86	25-150
13C7_PFUdA		84	25-150
13C8_PFOA		89	25-150
13C8_PFOS		83	25-150
13C8_PFOSA		83	10-150
13C9_PFNA		83	25-150
d5-EtFOSAA		79	25-150
d3-MeFOSAA		84	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - MSD

Sample ID: XD06118-004MD

Matrix: Aqueous

Batch: 37696

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/11/2022 1037

Parameter	Sample Amount (ng/L)	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% RPD	%Rec Limit	% RPD Limit	Analysis Date
9CI-PF3ONS	ND	8.0	2.7	N,+	1	34	140	50-150	30	04/19/2022 0226
11CI-PF3OUdS	ND	8.1	2.8	N,+	1	34	140	50-150	30	04/19/2022 0226
8:2 FTS	ND	1.7	2.9	N,+	1	178	130	50-150	30	04/19/2022 0226
6:2 FTS	ND	1.6	2.9	N,+	1	180	130	50-150	30	04/19/2022 0226
4:2 FTS	ND	1.6	2.9	N,+	1	182	140	50-150	30	04/19/2022 0226
GenX	ND	8.6	6.1	+	1	71	130	50-150	30	04/19/2022 0226
ADONA	ND	8.1	2.9	N,+	1	36	140	50-150	30	04/19/2022 0226
EtFOSAA	ND	1.7	3.0	N,+	1	176	140	50-150	30	04/19/2022 0226
MeFOSAA	ND	1.7	3.1	N,+	1	180	140	50-150	30	04/19/2022 0226
PFBS	2.5	1.5	3.1	N,+	1	42	130	50-150	30	04/19/2022 0226
PFDS	ND	1.7	2.7	N,+	1	164	140	50-150	30	04/19/2022 0226
PFHpS	ND	1.6	2.6	N,+	1	161	140	50-150	30	04/19/2022 0226
PFNS	ND	1.7	2.7	N,+	1	165	140	50-150	30	04/19/2022 0226
PFOSA	0.67	1.7	3.1	+	1	143	140	50-150	30	04/19/2022 0226
PFPeS	ND	1.6	2.9	N,+	1	181	140	50-150	30	04/19/2022 0226
PFHxS	1.3	1.6	3.0	+	1	107	140	50-150	30	04/19/2022 0226
PFBA	3.8	1.7	3.6	N,+	1	-9.9	140	50-150	30	04/19/2022 0226
PFDA	ND	1.7	3.2	N,+	1	183	130	50-150	30	04/19/2022 0226
PFDoA	ND	1.7	3.0	N,+	1	173	140	50-150	30	04/19/2022 0226
PFHpA	0.69	1.7	3.1	+	1	140	140	50-150	30	04/19/2022 0226
PFHxA	1.1	1.7	3.3	+	1	130	130	50-150	30	04/19/2022 0226
PFNA	ND	1.7	3.1	N,+	1	179	130	50-150	30	04/19/2022 0226
PFOA	2.8	1.7	3.6	N,+	1	48	130	50-150	30	04/19/2022 0226
PFPeA	1.2	1.7	3.2	+	1	117	140	50-150	30	04/19/2022 0226
PFTeDA	ND	1.7	3.0	N,+	1	177	140	50-150	30	04/19/2022 0226
PFTrDA	ND	1.7	3.2	N,+	1	186	130	50-150	30	04/19/2022 0226
PFUdA	ND	1.7	3.1	N,+	1	182	130	50-150	30	04/19/2022 0226
PFOS	2.0	1.6	2.9	N,+	1	180	140	50-150	30	04/19/2022 0226

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		139	25-150
13C2_6:2FTS		120	25-150
13C2_8:2FTS		85	25-150
13C2_PFDoA		79	25-150
13C2_PFTeDA		70	25-150
13C3_PFBS		80	25-150
13C3_PFHxS		85	25-150
13C3-HFPO-DA		79	25-150
13C4_PFBA		62	25-150
13C4_PFHpA		80	25-150
13C5_PFHxA		86	25-150
13C5_PFPeA		79	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - MSD

Sample ID: XD06118-004MD

Matrix: Aqueous

Batch: 37696

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 04/11/2022 1037

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		81	25-150
13C7_PFUdA		83	25-150
13C8_PFOA		90	25-150
13C8_PFOS		83	25-150
13C8_PFOSA		82	10-150
13C9_PFNA		80	25-150
d5-EtFOSAA		80	25-150
d3-MeFOSAA		84	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

PFAS by LC/MS/MS - MB

Sample ID: XQ37899-001

Matrix: Aqueous

Batch: 37899

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 12/30/1899 0000

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
9CI-PF3ONS	ND		1	8.0	0.48	ng/L	04/19/2022 2310
11CI-PF3OUdS	ND		1	8.0	0.66	ng/L	04/19/2022 2310
8:2 FTS	ND		1	8.0	1.6	ng/L	04/19/2022 2310
6:2 FTS	ND		1	8.0	2.0	ng/L	04/19/2022 2310
4:2 FTS	ND		1	8.0	0.87	ng/L	04/19/2022 2310
GenX	ND		1	8.0	2.1	ng/L	04/19/2022 2310
ADONA	ND		1	8.0	0.48	ng/L	04/19/2022 2310
EtFOSAA	ND		1	8.0	0.75	ng/L	04/19/2022 2310
MeFOSAA	ND		1	8.0	0.93	ng/L	04/19/2022 2310
PFBS	ND		1	4.0	0.41	ng/L	04/19/2022 2310
PFDS	ND		1	4.0	0.78	ng/L	04/19/2022 2310
PFHpS	ND		1	4.0	0.50	ng/L	04/19/2022 2310
PFNS	ND		1	4.0	0.71	ng/L	04/19/2022 2310
PFOSA	ND		1	4.0	0.61	ng/L	04/19/2022 2310
PFPeS	ND		1	4.0	0.59	ng/L	04/19/2022 2310
PFHxS	ND		1	4.0	0.55	ng/L	04/19/2022 2310
PFBA	ND		1	4.0	0.60	ng/L	04/19/2022 2310
PFDA	ND		1	4.0	0.52	ng/L	04/19/2022 2310
PFDaA	ND		1	4.0	0.47	ng/L	04/19/2022 2310
PFHpA	ND		1	4.0	0.45	ng/L	04/19/2022 2310
PFHxA	ND		1	4.0	0.69	ng/L	04/19/2022 2310
PFNA	ND		1	4.0	0.46	ng/L	04/19/2022 2310
PFOA	ND		1	4.0	0.83	ng/L	04/19/2022 2310
PFPeA	ND		1	4.0	0.54	ng/L	04/19/2022 2310
PFTeDA	ND		1	4.0	0.60	ng/L	04/19/2022 2310
PFTTrDA	ND		1	4.0	0.53	ng/L	04/19/2022 2310
PFUdA	ND		1	4.0	0.63	ng/L	04/19/2022 2310
PFOS	ND		1	4.0	2.0	ng/L	04/19/2022 2310

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		125	25-150
13C2_6:2FTS	N	273	25-150
13C2_8:2FTS		103	25-150
13C2_PFDaA		113	25-150
13C2_PFTeDA		102	25-150
13C3_PFBS		124	25-150
13C3_PFHxS		117	25-150
13C3-HFPO-DA		118	25-150
13C4_PFBA		117	25-150
13C4_PFHpA		113	25-150
13C5_PFHxA		121	25-150
13C5_PFPeA		110	25-150

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J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

PFAS by LC/MS/MS - MB

Sample ID: XQ37899-001

Matrix: Aqueous

Batch: 37899

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 12/30/1899 0000

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		114	25-150
13C7_PFUdA		107	25-150
13C8_PFOA		132	25-150
13C8_PFOS		105	25-150
13C8_PFOSA		109	10-150
13C9_PFNA		112	25-150
d5-EtFOSAA		106	25-150
d3-MeFOSAA		113	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

PFAS by LC/MS/MS - LCS

Sample ID: XQ37899-002

Matrix: Aqueous

Batch: 37899

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 12/30/1899 0000

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9CI-PF3ONS	15	15		1	103	50-150	04/19/2022 2321
11CI-PF3OUdS	15	14		1	94	50-150	04/19/2022 2321
8:2 FTS	15	18		1	118	50-150	04/19/2022 2321
6:2 FTS	15	19		1	126	50-150	04/19/2022 2321
4:2 FTS	15	16		1	110	50-150	04/19/2022 2321
GenX	32	32		1	101	50-150	04/19/2022 2321
ADONA	15	17		1	112	50-150	04/19/2022 2321
EtFOSAA	16	18		1	113	50-150	04/19/2022 2321
MeFOSAA	16	17		1	106	50-150	04/19/2022 2321
PFBS	14	15		1	104	50-150	04/19/2022 2321
PFDS	15	15		1	95	50-150	04/19/2022 2321
PFHpS	15	17		1	109	50-150	04/19/2022 2321
PFNS	15	18		1	120	50-150	04/19/2022 2321
PFOSA	16	17		1	104	50-150	04/19/2022 2321
PFPeS	15	15		1	100	50-150	04/19/2022 2321
PFHxS	15	16		1	113	50-150	04/19/2022 2321
PFBA	16	17		1	105	50-150	04/19/2022 2321
PFDA	16	16		1	102	50-150	04/19/2022 2321
PFDoA	16	18		1	109	50-150	04/19/2022 2321
PFHpA	16	17		1	108	50-150	04/19/2022 2321
PFHxA	16	18		1	110	50-150	04/19/2022 2321
PFNA	16	18		1	114	50-150	04/19/2022 2321
PFOA	16	18		1	115	50-150	04/19/2022 2321
PFPeA	16	16		1	102	50-150	04/19/2022 2321
PFTeDA	16	19		1	116	50-150	04/19/2022 2321
PFTTrDA	16	16		1	102	50-150	04/19/2022 2321
PFUdA	16	17		1	104	50-150	04/19/2022 2321
PFOS	15	16		1	107	50-150	04/19/2022 2321

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		101	25-150
13C2_6:2FTS	N	207	25-150
13C2_8:2FTS		83	25-150
13C2_PFDoA		84	25-150
13C2_PFTeDA		83	25-150
13C3_PFBS		108	25-150
13C3_PFHxS		94	25-150
13C3-HFPO-DA		105	25-150
13C4_PFBA		96	25-150
13C4_PFHpA		95	25-150
13C5_PFHxA		93	25-150
13C5_PFPeA		98	25-150

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DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - LCS

Sample ID: XQ37899-002

Matrix: Aqueous

Batch: 37899

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 12/30/1899 0000

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		94	25-150
13C7_PFUdA		87	25-150
13C8_PFOA		106	25-150
13C8_PFOS		94	25-150
13C8_PFOSA		95	10-150
13C9_PFNA		92	25-150
d5-EtFOSAA		83	25-150
d3-MeFOSAA		89	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - Duplicate

Sample ID: XD06118-010DU

Matrix: Aqueous

Batch: 37899

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 12/30/1899 0000

Parameter	Sample Amount (ng/L)	Result (ng/L)	Q	Dil	% RPD	%RPD Limit	Analysis Date
9CI-PF3ONS	ND	ND		1	0.00	20	04/19/2022 2353
11CI-PF3OUdS	ND	ND		1	0.00	20	04/19/2022 2353
8:2 FTS	ND	ND		1	0.00	20	04/19/2022 2353
6:2 FTS	ND	ND		1	0.00	20	04/19/2022 2353
4:2 FTS	ND	ND		1	0.00	20	04/19/2022 2353
GenX	ND	ND		1	0.00	20	04/19/2022 2353
ADONA	ND	ND		1	0.00	20	04/19/2022 2353
EtFOSAA	ND	ND		1	0.00	20	04/19/2022 2353
MeFOSAA	ND	ND		1	0.00	20	04/19/2022 2353
PFBS	1.8	1.8	J	1	2.0	20	04/19/2022 2353
PFDS	ND	ND		1	0.00	20	04/19/2022 2353
PFHpS	ND	ND		1	0.00	20	04/19/2022 2353
PFNS	ND	ND		1	0.00	20	04/19/2022 2353
PFOSA	ND	ND		1	0.00	20	04/19/2022 2353
PFPeS	ND	ND		1	0.00	20	04/19/2022 2353
PFHxS	1.1	1.3	J	1	8.7	20	04/19/2022 2353
PFBA	3.7	3.6	J	1	2.8	20	04/19/2022 2353
PFDA	ND	ND		1	0.00	20	04/19/2022 2353
PFDaA	ND	ND		1	0.00	20	04/19/2022 2353
PFHpA	1.0	1.0	J	1	2.0	20	04/19/2022 2353
PFHxA	2.4	2.4	J	1	3.8	20	04/19/2022 2353
PFNA	ND	ND		1	0.00	20	04/19/2022 2353
PFOA	2.4	2.3	J	1	1.1	20	04/19/2022 2353
PFPeA	2.7	2.6	J	1	1.3	20	04/19/2022 2353
PFTeDA	ND	ND		1	0.00	20	04/19/2022 2353
PFTTrDA	ND	ND		1	0.00	20	04/19/2022 2353
PFUdA	ND	ND		1	0.00	20	04/19/2022 2353
PFOS	ND	ND		1	0.00	20	04/19/2022 2353

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		121	25-150
13C2_6:2FTS	N	242	25-150
13C2_8:2FTS		82	25-150
13C2_PFDaA		80	25-150
13C2_PFTeDA		75	25-150
13C3_PFBs		106	25-150
13C3_PFHxS		97	25-150
13C3-HFPO-DA		91	25-150
13C4_PFBa		84	25-150
13C4_PFHpA		88	25-150
13C5_PFHxA		93	25-150
13C5_PFPeA		90	25-150

LOQ = Limit of Quantitation

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DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

PFAS by LC/MS/MS - Duplicate

Sample ID: XD06118-010DU

Matrix: Aqueous

Batch: 37899

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 12/30/1899 0000

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		94	25-150
13C7_PFUdA		85	25-150
13C8_PFOA		114	25-150
13C8_PFOS		84	25-150
13C8_PFOSA		90	10-150
13C9_PFNA		90	25-150
d5-EtFOSAA		82	25-150
d3-MeFOSAA		85	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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**Chain of Custody
and
Miscellaneous Documents**

PACE ANALYTICAL SERVICES, LLC



PACE ANALYTICAL SERVICES, LLC
 106 Vantage Point Drive • West Columbia, SC 29172
 Telephone No. 803-791-9700 Fax No. 803-791-9111
 www.pacelabs.com

Number 132698

Client Arcadis	Report to Contact T. Hays C. Little C. Little	Telephone No. / Email 916-335-1927 / t.hays@arcadis.com 858-263-2811 / c.little@arcadis.com 858-263-2811 / c.little@arcadis.com	Quote No. XD06118	Page 1 of 2
Address 88550 Cabot Avenue, Suite 500	Sampler's Signature 	Analysis (Attach as many as possible)		
City Novi	Printed Name Austin Westhuis			
Project Name PACER Lansing	PO No. 30112892.03100			
State MI	Collection Date(s)	Collection Time (Military)	Matrix	Abundance by Preservative Type
Zip Code 48377				
<i>(Containers for each sample may be numbered on one (1) side.)</i>				
MW-22-145-040422	4/4/22	1325	X	2
MW-22-144-040422	4/4/22	1425	X	2
MW-22-148-040422	4/4/22	1545	X	2
MW-22-147-040422	4/4/22	1630	X	6
MW-22-143-040522	4/5/22	1045	X	2
MW-22-146-040522	4/5/22	1205	X	2
MW-22-149-040522	4/5/22	1350	X	2
MW-22-150-040522	4/5/22	1345	X	2
MW-22-151-040522	4/5/22	1440	X	2
MW-22-152-040522	4/5/22	1550	X	2
Turn Around Time Required (Prior lab approval required for expedited rate.) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush (Specify) _____				
Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				
Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown				
Relinquished by C. Little / Austin Westhuis / Arcadis	Date 4/5/22	Time 1715	CC Requirements (Specify) Day 4/5/22	Time 1715
Relinquished by	Date	Time	CC Requirements (Specify) Date	Time
Relinquished by	Date	Time	CC Requirements (Specify) Date	Time
Relinquished by Fed Ex	Date 4/5/22	Time 16:20	CC Requirements (Specify) Date	Time 16:20
LAB USE ONLY Received on Ice (Circle) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Ice Pack <input type="checkbox"/> Yes <input type="checkbox"/> No Temp Blank <input type="checkbox"/> Y <input type="checkbox"/> N Temp. °C: 3.5				

Document Number: AFE003AVE-01

*** Report EGLE 28 Compounds X**

PACE ANALYTICAL SERVICES, LLC



PACE ANALYTICAL SERVICES, LLC
 106 Vantage Point Drive • West Columbia, SC 29172
 Telephone No. 803-791-9700 Fax No. 803-791-9111
 www.pacelabs.com

Number 132699

Client Arcadis	Regulate Contact Timmy Linder Linder Environmental 2411 - 2411 - 2411	Reference No. / Facility 310-285-1403 2411 - 2411 - 2411	Quote No. _____	Page <u>2</u> of <u>2</u>
Address 28550 Cabot Drive, Suite 500	Sampler's Signature 	Analysis (Attach list if more spaces is needed)		
City Novi	State MI	Zip Code 48377	Remarks / Cooler I.D. XD06118 KES2	
Project Name RACER Lansing	Printed Name Austin Westhuis	No. of Containers by Preservation Type		
Project No. 30112892.03100	Matrix Solid <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas <input type="checkbox"/> Other <input type="checkbox"/>	FG. No. _____	No. of Containers by Preservation Type Solid <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas <input type="checkbox"/> Other <input type="checkbox"/>	Remarks / Cooler I.D.
Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date (M/Day)	Collection Date (M/Day)	No. of Containers by Preservation Type Solid <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas <input type="checkbox"/> Other <input type="checkbox"/>	Remarks / Cooler I.D.
Dup-01_040522	4/5/22	4/5/22	Solid <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas <input type="checkbox"/> Other <input type="checkbox"/>	_____
EB-01_040522	4/5/22	4/5/22	Solid <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Gas <input type="checkbox"/> Other <input type="checkbox"/>	_____

Turn Around Time Required (Prior lab approval required for expedited TAT.)
 Standard Rush (Specify) Return to Client Disposal by Lab

1. Requisitioned by: Timmy Linder - Arcadis Date: 4/5/22 Time: 1715
2. Requisitioned by: _____ Date: _____ Time: _____
3. Requisitioned by: _____ Date: _____ Time: _____
4. Requisitioned by: FedEx Date: 4/6/22 Time: 1620

QC Requirements (Specify)
 Date: 4/9/22 Time: 1715
 Date: _____ Time: _____
 Date: _____ Time: _____
 Date: 4/8/22 Time: 16:20
 Date: _____ Time: _____

Possible Hazard Identification
 Non-Hazard Flammable Skin Irritant Poison Unstable

LAB USE ONLY
 Requisitioned on ice (Circle) (Yes) No Is Pack Receipt Temp. 5.5 °C

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy **★ Report EGLE 28 Compounds ★** Document Number: ME000249-01

PACE ANALYTICAL SERVICES, LLC



Samples Receipt Checklist (SRC) (ME0018C-15)

Revised: 9/29/2020

Issuing Authority: Pace ENV - WCOL

Page 1 of 1

Sample Receipt Checklist (SRC)

Client: Arcadis

Cooler Inspected by/date: TEC / 04/06/2022

Lot #: XD06118

Means of receipt: <input type="checkbox"/> Pace <input type="checkbox"/> Client <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Other:	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1. Were custody seals present on the cooler?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	2. If custody seals were present, were they intact and unbroken?
pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA	
Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA	
3.5 / 3.5 °C NA / NA °C NA / NA °C NA / NA °C	
Method: <input checked="" type="checkbox"/> Temperature Blank <input type="checkbox"/> Against Bottles IR Gun ID: 5 IR Gun Correction Factor: 0 °C	
Method of coolant: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry Ice <input type="checkbox"/> None	
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	4. Is the commercial courier's packing slip attached to this form?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5. Were proper custody procedures (relinquished/received) followed?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Were sample IDs listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7. Were sample IDs listed on all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8. Was collection date & time listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9. Was collection date & time listed on all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10. Did all container label information (ID, date, time) agree with the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. Were tests to be performed listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	13. Was adequate sample volume available?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	19. Were all applicable NH ₃ /TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc...) correctly transcribed from the COC into the comment section in LIMS?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	21. Was the quote number listed on the container label? If yes, Quote #
Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)	
Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA	
Time of preservation NA. If more than one preservative is needed, please note in the comments below.	
Sample(s) NA were received with bubbles >6 mm in diameter.	
Samples(s) NA were received with TRC > 0.5 mg/L. (If #19 is NO) and were adjusted accordingly in sample receiving with sodium thiosulfate (Na ₂ S ₂ O ₃) with Shealy ID: NA	
SR barcode labels applied by: KDRW Date: 04/06/2022	

Comments:



Report of Analysis

Arcadis U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: RACER Lansing
Project Number: 30112892.0370A
Lot Number: **XF07078**
Date Completed: 06/24/2022

Kathy Smith

06/24/2022 4:10 PM
Approved and released by:
Project Manager II: **Kathy E. Smith**



The electronic signature above is the equivalent of a handwritten signature.
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PACE ANALYTICAL SERVICES, LLC

SC DHEC No: 32010001

NELAC No: E87653

NC DENR No: 329

NC Field Parameters No: 5639

Case Narrative Arcadis U.S., Inc. Lot Number: XF07078

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.3 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples was in compliance with DOD QSM 5.3 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). For undiluted analysis. For undiluted analysis, the extract is prepared for injection by adding 182 uL of sample extract + 8 uL of reagent water + 10 uL of internal standard solution to a polypropylene autosampler vial. An extra correction factor of 0.91 (182 uL / 200 uL = 0.91) applies. The CF is calculated as follows:

$$CF = DF * FV / Vo$$

FV is volume of extract (mL)

Vo is initial sample volume (mL)

DF is dilution factor. For undiluted analysis, DF = 1/0.91.

Sample concentration for aqueous samples:

Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{A_s \times C_{is}}{A_{is}} \right) - B}{M1}$$

Where

C_s is on column concentration of target analyte in the sample (ng/L)

C_{is} is concentration of internal standard in the sample (ng/L)

A_s is peak response of target analyte in the sample

A_{is} is peak response of internal standard in the sample

M1 is the average RF from ICAL or the slope from linear regression ICAL

B is the y-intercept from the ICAL

PACE ANALYTICAL SERVICES, LLC

SC DHEC No: 32010001

NELAC No: E87653

NC DENR No: 329

NC Field Parameters No: 5639

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18.

If you have any questions regarding this report, please contact the Pace Project Manager listed on the cover page.

Sample XF07078-005, XF07078-009, XF07078-010, XF07078-011, XF07078-012, XF07078-014, XF07078-015, XF07078-016, XF07078-018, XF07078-019, XF07078-020 had surrogates recovered outside of the acceptance limits due to confirmed matrix interference.

PACE ANALYTICAL SERVICES, LLC

Sample Summary

Arcadis U.S., Inc.

Lot Number: XF07078

Project Name: RACER Lansing

Project Number: 30112892.0370A

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	MW-22-143_060122	Aqueous	06/01/2022 1045	06/07/2022
002	MW-22-144_060122	Aqueous	06/01/2022 1200	06/07/2022
003	MW-22-145_060122	Aqueous	06/01/2022 1235	06/07/2022
004	Dup-17_060122	Aqueous	06/01/2022	06/07/2022
005	MW-22-146_060122	Aqueous	06/01/2022 1315	06/07/2022
006	MW-22-147_060122	Aqueous	06/01/2022 1400	06/07/2022
007	MW-22-148_060122	Aqueous	06/01/2022 1430	06/07/2022
008	EB-02_060122	Aqueous	06/01/2022 1445	06/07/2022
009	MW-22-149_060122	Aqueous	06/01/2022 1340	06/07/2022
010	MW-22-150_060122	Aqueous	06/01/2022 1105	06/07/2022
011	MW-22-151_060122	Aqueous	06/01/2022 1225	06/07/2022
012	MW-22-152_060122	Aqueous	06/01/2022 1440	06/07/2022
013	EB-03_060122	Aqueous	06/01/2022 1000	06/07/2022
014	MW-14-70_060222	Aqueous	06/02/2022 0955	06/07/2022
015	MW-12-13_060222	Aqueous	06/02/2022 1055	06/07/2022
016	MW-21-133_060222	Aqueous	06/02/2022 1150	06/07/2022
017	MW-21-134_060222	Aqueous	06/02/2022 1250	06/07/2022
018	MW-21-135_060222	Aqueous	06/02/2022 1430	06/07/2022
019	MW-12-10R_060222	Aqueous	06/02/2022 1520	06/07/2022
020	Dup-15_060222	Aqueous	06/02/2022	06/07/2022

(20 samples)

PACE ANALYTICAL SERVICES, LLC

Detection Summary

Arcadis U.S., Inc.

Lot Number: XF07078

Project Name: RACER Lansing

Project Number: 30112892.0370A

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	MW-22-143_060122	Aqueous	PFBS	PFAS by ID	1.0	J	ng/L	7
001	MW-22-143_060122	Aqueous	PFBA	PFAS by ID	9.7		ng/L	7
001	MW-22-143_060122	Aqueous	PFHpA	PFAS by ID	5.9		ng/L	7
001	MW-22-143_060122	Aqueous	PFHxA	PFAS by ID	16		ng/L	7
001	MW-22-143_060122	Aqueous	PFOA	PFAS by ID	4.1		ng/L	7
001	MW-22-143_060122	Aqueous	PFPeA	PFAS by ID	12		ng/L	7
002	MW-22-144_060122	Aqueous	PFBS	PFAS by ID	2.3	J	ng/L	9
002	MW-22-144_060122	Aqueous	PFHxS	PFAS by ID	2.2	J	ng/L	9
002	MW-22-144_060122	Aqueous	PFBA	PFAS by ID	5.4		ng/L	9
002	MW-22-144_060122	Aqueous	PFHpA	PFAS by ID	4.5		ng/L	9
002	MW-22-144_060122	Aqueous	PFHxA	PFAS by ID	10		ng/L	9
002	MW-22-144_060122	Aqueous	PFOA	PFAS by ID	7.5		ng/L	9
002	MW-22-144_060122	Aqueous	PFPeA	PFAS by ID	9.9		ng/L	9
003	MW-22-145_060122	Aqueous	PFBS	PFAS by ID	3.0	J	ng/L	11
003	MW-22-145_060122	Aqueous	PFPeS	PFAS by ID	0.54	J	ng/L	11
003	MW-22-145_060122	Aqueous	PFHxS	PFAS by ID	1.9	J	ng/L	11
003	MW-22-145_060122	Aqueous	PFBA	PFAS by ID	5.5		ng/L	11
003	MW-22-145_060122	Aqueous	PFHpA	PFAS by ID	5.8		ng/L	11
003	MW-22-145_060122	Aqueous	PFHxA	PFAS by ID	9.7		ng/L	11
003	MW-22-145_060122	Aqueous	PFNA	PFAS by ID	0.75	J	ng/L	11
003	MW-22-145_060122	Aqueous	PFOA	PFAS by ID	14		ng/L	11
003	MW-22-145_060122	Aqueous	PFPeA	PFAS by ID	9.5		ng/L	11
003	MW-22-145_060122	Aqueous	PFOS	PFAS by ID	6.8		ng/L	11
004	Dup-17_060122	Aqueous	PFBS	PFAS by ID	2.8	J	ng/L	13
004	Dup-17_060122	Aqueous	PFPeS	PFAS by ID	0.51	J	ng/L	13
004	Dup-17_060122	Aqueous	PFHxS	PFAS by ID	2.1	J	ng/L	13
004	Dup-17_060122	Aqueous	PFBA	PFAS by ID	5.6		ng/L	13
004	Dup-17_060122	Aqueous	PFHpA	PFAS by ID	6.0		ng/L	13
004	Dup-17_060122	Aqueous	PFHxA	PFAS by ID	8.7		ng/L	13
004	Dup-17_060122	Aqueous	PFNA	PFAS by ID	0.79	J	ng/L	13
004	Dup-17_060122	Aqueous	PFOA	PFAS by ID	14		ng/L	13
004	Dup-17_060122	Aqueous	PFPeA	PFAS by ID	8.8		ng/L	13
004	Dup-17_060122	Aqueous	PFOS	PFAS by ID	6.9		ng/L	13
005	MW-22-146_060122	Aqueous	PFBS	PFAS by ID	6.0		ng/L	15
005	MW-22-146_060122	Aqueous	PFHxS	PFAS by ID	1.2	J	ng/L	15
005	MW-22-146_060122	Aqueous	PFBA	PFAS by ID	16		ng/L	15
005	MW-22-146_060122	Aqueous	PFHpA	PFAS by ID	1.0	J	ng/L	15
005	MW-22-146_060122	Aqueous	PFHxA	PFAS by ID	5.8		ng/L	15
005	MW-22-146_060122	Aqueous	PFOA	PFAS by ID	5.8		ng/L	15
005	MW-22-146_060122	Aqueous	PFPeA	PFAS by ID	4.9		ng/L	15
005	MW-22-146_060122	Aqueous	PFOS	PFAS by ID	1.9	J	ng/L	15
006	MW-22-147_060122	Aqueous	PFBS	PFAS by ID	3.2	J	ng/L	17
006	MW-22-147_060122	Aqueous	PFHxS	PFAS by ID	1.4	J	ng/L	17

Detection Summary (Continued)

Lot Number: XF07078

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
006	MW-22-147_060122	Aqueous	PFBA	PFAS by ID	6.1		ng/L	17
006	MW-22-147_060122	Aqueous	PFHpA	PFAS by ID	1.4	J	ng/L	17
006	MW-22-147_060122	Aqueous	PFHxA	PFAS by ID	2.7	J	ng/L	17
006	MW-22-147_060122	Aqueous	PFOA	PFAS by ID	3.7		ng/L	17
006	MW-22-147_060122	Aqueous	PFPeA	PFAS by ID	2.9	J	ng/L	17
006	MW-22-147_060122	Aqueous	PFOS	PFAS by ID	2.2	J	ng/L	17
007	MW-22-148_060122	Aqueous	PFBS	PFAS by ID	1.0	J	ng/L	19
007	MW-22-148_060122	Aqueous	PFBA	PFAS by ID	0.88	J	ng/L	19
009	MW-22-149_060122	Aqueous	PFBS	PFAS by ID	1.4	J	ng/L	23
009	MW-22-149_060122	Aqueous	PFHxS	PFAS by ID	0.91	J	ng/L	23
009	MW-22-149_060122	Aqueous	PFBA	PFAS by ID	0.91	J	ng/L	23
009	MW-22-149_060122	Aqueous	PFHpA	PFAS by ID	0.41	J	ng/L	23
009	MW-22-149_060122	Aqueous	PFOA	PFAS by ID	1.1	J	ng/L	23
010	MW-22-150_060122	Aqueous	PFOSA	PFAS by ID	1.6	J	ng/L	25
010	MW-22-150_060122	Aqueous	PFBA	PFAS by ID	2.9	J	ng/L	25
010	MW-22-150_060122	Aqueous	PFHxA	PFAS by ID	1.2	J	ng/L	25
010	MW-22-150_060122	Aqueous	PFPeA	PFAS by ID	1.7	J	ng/L	25
011	MW-22-151_060122	Aqueous	6:2 FTS	PFAS by ID	5.3	JQ	ng/L	27
011	MW-22-151_060122	Aqueous	PFBS	PFAS by ID	8.4		ng/L	27
011	MW-22-151_060122	Aqueous	PFBA	PFAS by ID	10		ng/L	27
011	MW-22-151_060122	Aqueous	PFHpA	PFAS by ID	2.7	J	ng/L	27
011	MW-22-151_060122	Aqueous	PFHxA	PFAS by ID	6.2		ng/L	27
011	MW-22-151_060122	Aqueous	PFNA	PFAS by ID	0.39	J	ng/L	27
011	MW-22-151_060122	Aqueous	PFOA	PFAS by ID	7.7		ng/L	27
011	MW-22-151_060122	Aqueous	PFPeA	PFAS by ID	14		ng/L	27
011	MW-22-151_060122	Aqueous	PFOS	PFAS by ID	3.4		ng/L	27
012	MW-22-152_060122	Aqueous	PFBS	PFAS by ID	2.1	J	ng/L	29
012	MW-22-152_060122	Aqueous	PFHxS	PFAS by ID	1.8	J	ng/L	29
012	MW-22-152_060122	Aqueous	PFBA	PFAS by ID	4.0		ng/L	29
012	MW-22-152_060122	Aqueous	PFHpA	PFAS by ID	0.99	J	ng/L	29
012	MW-22-152_060122	Aqueous	PFHxA	PFAS by ID	2.6	J	ng/L	29
012	MW-22-152_060122	Aqueous	PFOA	PFAS by ID	2.5	J	ng/L	29
012	MW-22-152_060122	Aqueous	PFPeA	PFAS by ID	3.0	J	ng/L	29
014	MW-14-70_060222	Aqueous	PFBS	PFAS by ID	7.9		ng/L	33
014	MW-14-70_060222	Aqueous	PFHxS	PFAS by ID	3.0	J	ng/L	33
014	MW-14-70_060222	Aqueous	PFBA	PFAS by ID	44		ng/L	33
014	MW-14-70_060222	Aqueous	PFHpA	PFAS by ID	46		ng/L	33
014	MW-14-70_060222	Aqueous	PFHxA	PFAS by ID	80		ng/L	33
014	MW-14-70_060222	Aqueous	PFNA	PFAS by ID	0.44	J	ng/L	33
014	MW-14-70_060222	Aqueous	PFOA	PFAS by ID	34		ng/L	33
014	MW-14-70_060222	Aqueous	PFPeA	PFAS by ID	100		ng/L	33
015	MW-12-13_060222	Aqueous	PFBS	PFAS by ID	2.7	J	ng/L	35
015	MW-12-13_060222	Aqueous	PFBA	PFAS by ID	26		ng/L	35
015	MW-12-13_060222	Aqueous	PFHpA	PFAS by ID	15		ng/L	35
015	MW-12-13_060222	Aqueous	PFHxA	PFAS by ID	54		ng/L	35
015	MW-12-13_060222	Aqueous	PFOA	PFAS by ID	2.3	J	ng/L	35
015	MW-12-13_060222	Aqueous	PFPeA	PFAS by ID	38		ng/L	35
016	MW-21-133_060222	Aqueous	PFBS	PFAS by ID	2.0	J	ng/L	37

Detection Summary (Continued)

Lot Number: XF07078

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
016	MW-21-133_060222	Aqueous	PFPeS	PFAS by ID	0.54	J	ng/L	37
016	MW-21-133_060222	Aqueous	PFHxS	PFAS by ID	1.7	J	ng/L	37
016	MW-21-133_060222	Aqueous	PFBA	PFAS by ID	14		ng/L	37
016	MW-21-133_060222	Aqueous	PFHpA	PFAS by ID	17		ng/L	37
016	MW-21-133_060222	Aqueous	PFHxA	PFAS by ID	24		ng/L	37
016	MW-21-133_060222	Aqueous	PFNA	PFAS by ID	1.1	J	ng/L	37
016	MW-21-133_060222	Aqueous	PFOA	PFAS by ID	43		ng/L	37
016	MW-21-133_060222	Aqueous	PFPeA	PFAS by ID	22		ng/L	37
016	MW-21-133_060222	Aqueous	PFOS	PFAS by ID	4.6		ng/L	37
017	MW-21-134_060222	Aqueous	PFBS	PFAS by ID	1.9	J	ng/L	39
017	MW-21-134_060222	Aqueous	PFPeS	PFAS by ID	0.77	J	ng/L	39
017	MW-21-134_060222	Aqueous	PFHxS	PFAS by ID	2.0	J	ng/L	39
017	MW-21-134_060222	Aqueous	PFBA	PFAS by ID	13		ng/L	39
017	MW-21-134_060222	Aqueous	PFHpA	PFAS by ID	15		ng/L	39
017	MW-21-134_060222	Aqueous	PFHxA	PFAS by ID	22		ng/L	39
017	MW-21-134_060222	Aqueous	PFOA	PFAS by ID	23		ng/L	39
017	MW-21-134_060222	Aqueous	PFPeA	PFAS by ID	21		ng/L	39
017	MW-21-134_060222	Aqueous	PFOS	PFAS by ID	4.2		ng/L	39
018	MW-21-135_060222	Aqueous	PFBS	PFAS by ID	1.9	J	ng/L	41
018	MW-21-135_060222	Aqueous	PFPeS	PFAS by ID	1.2	J	ng/L	41
018	MW-21-135_060222	Aqueous	PFHxS	PFAS by ID	1.6	J	ng/L	41
018	MW-21-135_060222	Aqueous	PFBA	PFAS by ID	12		ng/L	41
018	MW-21-135_060222	Aqueous	PFHpA	PFAS by ID	47		ng/L	41
018	MW-21-135_060222	Aqueous	PFHxA	PFAS by ID	39		ng/L	41
018	MW-21-135_060222	Aqueous	PFNA	PFAS by ID	1.1	J	ng/L	41
018	MW-21-135_060222	Aqueous	PFOA	PFAS by ID	38		ng/L	41
018	MW-21-135_060222	Aqueous	PFPeA	PFAS by ID	39		ng/L	41
018	MW-21-135_060222	Aqueous	PFOS	PFAS by ID	2.1	J	ng/L	41
019	MW-12-10R_060222	Aqueous	PFBS	PFAS by ID	5.5		ng/L	43
019	MW-12-10R_060222	Aqueous	PFBA	PFAS by ID	9.6		ng/L	43
019	MW-12-10R_060222	Aqueous	PFHpA	PFAS by ID	3.5		ng/L	43
019	MW-12-10R_060222	Aqueous	PFHxA	PFAS by ID	4.5		ng/L	43
019	MW-12-10R_060222	Aqueous	PFNA	PFAS by ID	0.76	J	ng/L	43
019	MW-12-10R_060222	Aqueous	PFOA	PFAS by ID	8.9		ng/L	43
019	MW-12-10R_060222	Aqueous	PFPeA	PFAS by ID	5.3		ng/L	43
019	MW-12-10R_060222	Aqueous	PFOS	PFAS by ID	7.6		ng/L	43
020	Dup-15_060222	Aqueous	PFBS	PFAS by ID	7.9		ng/L	45
020	Dup-15_060222	Aqueous	PFHxS	PFAS by ID	1.4	J	ng/L	45
020	Dup-15_060222	Aqueous	PFBA	PFAS by ID	9.4		ng/L	45
020	Dup-15_060222	Aqueous	PFHpA	PFAS by ID	3.9		ng/L	45
020	Dup-15_060222	Aqueous	PFHxA	PFAS by ID	4.7		ng/L	45
020	Dup-15_060222	Aqueous	PFNA	PFAS by ID	0.63	J	ng/L	45
020	Dup-15_060222	Aqueous	PFOA	PFAS by ID	8.8		ng/L	45
020	Dup-15_060222	Aqueous	PFPeA	PFAS by ID	5.3		ng/L	45
020	Dup-15_060222	Aqueous	PFOS	PFAS by ID	7.7		ng/L	45

(136 detections)

PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-001
Description: MW-22-143_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1045	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/23/2022 2230	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.9	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.9	0.57	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.9	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.9	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.9	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.9	0.65	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.9	0.81	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1.0	J	3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.67	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.51	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	9.7		3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	5.9		3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	16		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	4.1		3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	12		3.5	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		124	25-150
13C2_6:2FTS		108	25-150
13C2_8:2FTS		83	25-150
13C2_PFDa		87	25-150
13C2_PFTeDA		75	25-150
13C3_PFBS		93	25-150
13C3_PFHxS		92	25-150
13C3-HFPO-DA		85	25-150
13C4_PFBA		77	25-150
13C4_PFHpA		88	25-150
13C5_PFHxA		88	25-150
13C5_PFPeA		89	25-150
13C6_PFDA		88	25-150
13C7_PFUdA		88	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-001
Description: MW-22-143_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1045	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		84	25-150
13C8_PFOS		92	25-150
13C8_PFOSA		96	10-150
13C9_PFNA		93	25-150
d5-EtFOSAA		84	25-150
d3-MeFOSAA		88	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-002
Description: MW-22-144_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1200	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/23/2022 2240	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.3	0.44	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.3	0.60	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.3	1.5	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.3	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.3	0.80	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.3	1.9	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.3	0.44	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.3	0.68	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.3	0.85	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.3	J	3.6	0.38	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.6	0.71	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.6	0.46	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.6	0.65	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.6	0.56	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.6	0.54	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	2.2	J	3.6	0.50	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	5.4		3.6	0.55	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.6	0.48	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.6	0.43	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	4.5		3.6	0.41	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	10		3.6	0.63	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.6	0.42	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	7.5		3.6	0.76	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	9.9		3.6	0.50	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.6	0.55	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.6	0.48	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.6	0.57	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.6	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		111	25-150
13C2_6:2FTS		124	25-150
13C2_8:2FTS		111	25-150
13C2_PFDa		109	25-150
13C2_PFTeDA		103	25-150
13C3_PFBs		110	25-150
13C3_PFHxS		110	25-150
13C3-HFPO-DA		98	25-150
13C4_PFBa		107	25-150
13C4_PFHpA		112	25-150
13C5_PFHxA		113	25-150
13C5_PFPeA		116	25-150
13C6_PFDa		95	25-150
13C7_PFUdA		109	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-002
Description: MW-22-144_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1200	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		105	25-150
13C8_PFOS		112	25-150
13C8_PFOSA		117	10-150
13C9_PFNA		110	25-150
d5-EtFOSAA		106	25-150
d3-MeFOSAA		102	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-003
Description: MW-22-145_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1235	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/23/2022 2251	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	0.57	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.8	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.8	0.75	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	0.64	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	0.80	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	3.0	J	3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.67	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.61	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	0.54	J	3.4	0.51	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.9	J	3.4	0.47	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	5.5		3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	5.8		3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	9.7		3.4	0.59	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.75	J	3.4	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	14		3.4	0.71	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	9.5		3.4	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.54	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	6.8		3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		94	25-150
13C2_6:2FTS		75	25-150
13C2_8:2FTS		101	25-150
13C2_PFDaA		100	25-150
13C2_PFTeDA		94	25-150
13C3_PFBS		120	25-150
13C3_PFHxS		104	25-150
13C3-HFPO-DA		99	25-150
13C4_PFBA		106	25-150
13C4_PFHpA		106	25-150
13C5_PFHxA		100	25-150
13C5_PFPeA		105	25-150
13C6_PFDA		106	25-150
13C7_PFUdA		99	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-003
Description: MW-22-145_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1235	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		98	25-150
13C8_PFOS		101	25-150
13C8_PFOSA		106	10-150
13C9_PFNA		97	25-150
d5-EtFOSAA		102	25-150
d3-MeFOSAA		104	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-004
Description: Dup-17_060122	Matrix: Aqueous
Date Sampled: 06/01/2022	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/23/2022 2302	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.7	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.7	0.56	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.7	1.3	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.7	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.7	0.74	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.7	1.7	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.7	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.7	0.63	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.7	0.78	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.8	J	3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.65	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.42	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.60	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	0.51	J	3.4	0.50	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	2.1	J	3.4	0.46	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	5.6		3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.44	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	6.0		3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	8.7		3.4	0.58	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.79	J	3.4	0.39	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	14		3.4	0.70	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	8.8		3.4	0.46	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.50	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.53	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	6.9		3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		96	25-150
13C2_6:2FTS		122	25-150
13C2_8:2FTS		110	25-150
13C2_PFDa		100	25-150
13C2_PFTeDA		94	25-150
13C3_PFBS		112	25-150
13C3_PFHxS		101	25-150
13C3-HFPO-DA		94	25-150
13C4_PFBA		98	25-150
13C4_PFHpA		101	25-150
13C5_PFHxA		99	25-150
13C5_PFPeA		112	25-150
13C6_PFDA		109	25-150
13C7_PFUdA		99	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-004
Description: Dup-17_060122	Matrix: Aqueous
Date Sampled: 06/01/2022	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		101	25-150
13C8_PFOS		99	25-150
13C8_PFOSA		106	10-150
13C9_PFNA		100	25-150
d5-EtFOSAA		96	25-150
d3-MeFOSAA		96	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-005
Description: MW-22-146_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1315	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/23/2022 2312	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	0.58	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	7.0	0.77	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	0.66	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	0.82	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	6.0		3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.68	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.44	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.2	J	3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	16		3.5	0.53	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	1.0	J	3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	5.8		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	5.8		3.5	0.73	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	4.9		3.5	0.48	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.55	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	1.9	J	3.5	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	154	25-150
13C2_6:2FTS		133	25-150
13C2_8:2FTS		103	25-150
13C2_PFDa		111	25-150
13C2_PFTeDA		97	25-150
13C3_PFBS		103	25-150
13C3_PFHxS		111	25-150
13C3-HFPO-DA		93	25-150
13C4_PFBA		64	25-150
13C4_PFHpA		103	25-150
13C5_PFHxA		108	25-150
13C5_PFPeA		94	25-150
13C6_PFDA		108	25-150
13C7_PFUdA		95	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-005
Description: MW-22-146_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1315	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		97	25-150
13C8_PFOS		103	25-150
13C8_PFOSA		103	10-150
13C9_PFNA		101	25-150
d5-EtFOSAA		96	25-150
d3-MeFOSAA		95	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-006
Description: MW-22-147_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1400	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/23/2022 2323	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	0.56	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.8	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.8	0.74	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	0.64	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	0.79	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	3.2	J	3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.66	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.42	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.61	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.4	J	3.4	0.47	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	6.1		3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	1.4	J	3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	2.7	J	3.4	0.58	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.4	0.39	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	3.7		3.4	0.71	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	2.9	J	3.4	0.46	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.53	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	2.2	J	3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		150	25-150
13C2_6:2FTS		145	25-150
13C2_8:2FTS		107	25-150
13C2_PFDa		91	25-150
13C2_PFTeDA		93	25-150
13C3_PFBs		115	25-150
13C3_PFHxS		107	25-150
13C3-HFPO-DA		103	25-150
13C4_PFBa		84	25-150
13C4_PFHpA		108	25-150
13C5_PFHxA		111	25-150
13C5_PFPeA		106	25-150
13C6_PFDa		106	25-150
13C7_PFUdA		100	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-006
Description: MW-22-147_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1400	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		104	25-150
13C8_PFOS		116	25-150
13C8_PFOSA		112	10-150
13C9_PFNA		105	25-150
d5-EtFOSAA		89	25-150
d3-MeFOSAA		96	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-007
Description: MW-22-148_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1430	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/23/2022 2333	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.2	0.44	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.2	0.60	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.2	1.5	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.2	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.2	0.79	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.2	1.9	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.2	0.44	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.2	0.68	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.2	0.84	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	1.0	J	3.6	0.38	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.6	0.70	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.6	0.45	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.6	0.64	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.6	0.56	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.6	0.54	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.6	0.50	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.88	J	3.6	0.54	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.6	0.48	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.6	0.43	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.6	0.41	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.6	0.62	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.6	0.42	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.6	0.75	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.6	0.49	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.6	0.54	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.6	0.48	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.6	0.57	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.6	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		101	25-150
13C2_6:2FTS		116	25-150
13C2_8:2FTS		106	25-150
13C2_PFDa		106	25-150
13C2_PFTeDA		104	25-150
13C3_PFBs		126	25-150
13C3_PFHxS		121	25-150
13C3-HFPO-DA		106	25-150
13C4_PFBa		112	25-150
13C4_PFHpA		107	25-150
13C5_PFHxA		112	25-150
13C5_PFPeA		117	25-150
13C6_PFDa		116	25-150
13C7_PFUdA		110	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-007
Description: MW-22-148_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1430	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		106	25-150
13C8_PFOS		109	25-150
13C8_PFOSA		116	10-150
13C9_PFNA		110	25-150
d5-EtFOSAA		109	25-150
d3-MeFOSAA		102	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-008
Description: EB-02_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1445	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/23/2022 2344	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	0.58	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.0	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	0.65	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	0.81	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.68	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.5	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.55	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		94	25-150
13C2_6:2FTS		113	25-150
13C2_8:2FTS		100	25-150
13C2_PFDa		100	25-150
13C2_PFTeDA		90	25-150
13C3_PFBS		113	25-150
13C3_PFHxS		107	25-150
13C3-HFPO-DA		105	25-150
13C4_PFBA		112	25-150
13C4_PFHpA		101	25-150
13C5_PFHxA		103	25-150
13C5_PFPeA		105	25-150
13C6_PFDA		104	25-150
13C7_PFUdA		94	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-008
Description: EB-02_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1445	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		98	25-150
13C8_PFOS		100	25-150
13C8_PFOSA		96	10-150
13C9_PFNA		92	25-150
d5-EtFOSAA		102	25-150
d3-MeFOSAA		102	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-009
Description: MW-22-149_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1340	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/24/2022 0016	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	0.58	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	7.0	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.0	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	0.66	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	0.81	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	1.4	J	3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.68	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.44	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	0.91	J	3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	0.91	J	3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.41	J	3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	1.1	J	3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.5	0.48	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.55	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		85	25-150
13C2_6:2FTS	N	182	25-150
13C2_8:2FTS		93	25-150
13C2_PFDa		91	25-150
13C2_PFTeDA		86	25-150
13C3_PFBS		106	25-150
13C3_PFHxS		96	25-150
13C3-HFPO-DA		94	25-150
13C4_PFBA		98	25-150
13C4_PFHpA		96	25-150
13C5_PFHxA		92	25-150
13C5_PFPeA		95	25-150
13C6_PFDA		97	25-150
13C7_PFUdA		93	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-009
Description: MW-22-149_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1340	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		100	25-150
13C8_PFOS		100	25-150
13C8_PFOSA		99	10-150
13C9_PFNA		95	25-150
d5-EtFOSAA		96	25-150
d3-MeFOSAA		87	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-010
Description: MW-22-150_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1105	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/24/2022 0027	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	0.56	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.8	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	6.8	0.74	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	0.64	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	0.79	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.66	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.42	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.60	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	1.6	J	3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	0.50	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.4	0.47	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	2.9	J	3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.44	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	1.2	J	3.4	0.58	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.4	0.39	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.4	0.70	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	1.7	J	3.4	0.46	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.53	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	198	25-150
13C2_6:2FTS	N	268	25-150
13C2_8:2FTS		100	25-150
13C2_PFDaA		92	25-150
13C2_PFTeDA		94	25-150
13C3_PFBS		101	25-150
13C3_PFHxS		106	25-150
13C3-HFPO-DA		77	25-150
13C4_PFBA		58	25-150
13C4_PFHpA		108	25-150
13C5_PFHxA		103	25-150
13C5_PFPeA		84	25-150
13C6_PFDA		107	25-150
13C7_PFUdA		119	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-010
Description: MW-22-150_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1105	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		100	25-150
13C8_PFOS		106	25-150
13C8_PFOSA		108	10-150
13C9_PFNA		102	25-150
d5-EtFOSAA		114	25-150
d3-MeFOSAA		91	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XF07078-011**

Description: **MW-22-151_060122**

Matrix: **Aqueous**

Date Sampled: **06/01/2022 1225**

Project Name: **RACER Lansing**

Date Received: **06/07/2022**

Project Number: **30112892.0370A**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/24/2022 0058	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	0.57	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND	Q	6.8	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	5.3	JQ	6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	6.8	0.75	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	0.64	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	0.80	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	8.4		3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.66	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.61	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.4	0.47	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	10		3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	2.7	J	3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	6.2		3.4	0.59	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.39	J	3.4	0.39	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	7.7		3.4	0.71	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	14		3.4	0.46	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.53	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	3.4		3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	207	25-150
13C2_6:2FTS	N	212	25-150
13C2_8:2FTS	N	169	25-150
13C2_PFDa		91	25-150
13C2_PFTeDA		80	25-150
13C3_PFBs		100	25-150
13C3_PFHxS		100	25-150
13C3-HFPO-DA		70	25-150
13C4_PFBa		55	25-150
13C4_PFHpA		98	25-150
13C5_PFHxA		88	25-150
13C5_PFPeA		76	25-150
13C6_PFDa		117	25-150
13C7_PFUdA		101	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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 106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-011
Description: MW-22-151_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1225	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		89	25-150
13C8_PFOS		107	25-150
13C8_PFOSA		104	10-150
13C9_PFNA		116	25-150
d5-EtFOSAA		101	25-150
d3-MeFOSAA		100	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-012
Description: MW-22-152_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1440	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/24/2022 0109	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	0.56	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.8	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.8	0.74	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	0.64	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	0.79	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.1	J	3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.66	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.42	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.60	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	0.50	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.8	J	3.4	0.47	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	4.0		3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.44	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	0.99	J	3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	2.6	J	3.4	0.58	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.4	0.39	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	2.5	J	3.4	0.70	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	3.0	J	3.4	0.46	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND	Q	3.4	0.51	ng/L	1
Perfluoro-n-tridecanoic acid (PFTTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.53	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		130	25-150
13C2_6:2FTS		147	25-150
13C2_8:2FTS		100	25-150
13C2_PFDa		74	25-150
13C2_PFTeDA	N	21	25-150
13C3_PFBS		119	25-150
13C3_PFHxS		101	25-150
13C3-HFPO-DA		102	25-150
13C4_PFBA		101	25-150
13C4_PFHpA		108	25-150
13C5_PFHxA		107	25-150
13C5_PFPeA		113	25-150
13C6_PFDA		102	25-150
13C7_PFUdA		90	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-012
Description: MW-22-152_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1440	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		103	25-150
13C8_PFOS		103	25-150
13C8_PFOA		104	10-150
13C9_PFNA		105	25-150
d5-EtFOSAA		83	25-150
d3-MeFOSAA		99	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-013
Description: EB-03_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1000	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/24/2022 0120	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	0.58	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.0	0.77	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	0.43	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	0.66	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	0.82	ng/L	1
Perfluoro-1-butanefluoro sulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.68	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.44	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.63	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.49	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.42	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.5	0.61	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.5	0.73	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.5	0.48	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.47	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.55	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	1.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		97	25-150
13C2_6:2FTS		72	25-150
13C2_8:2FTS		99	25-150
13C2_PFDaA		103	25-150
13C2_PFTeDA		82	25-150
13C3_PFBS		118	25-150
13C3_PFHxS		127	25-150
13C3-HFPO-DA		104	25-150
13C4_PFBA		114	25-150
13C4_PFHpA		106	25-150
13C5_PFHxA		106	25-150
13C5_PFPeA		107	25-150
13C6_PFDA		101	25-150
13C7_PFUdA		101	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-013
Description: EB-03_060122	Matrix: Aqueous
Date Sampled: 06/01/2022 1000	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		102	25-150
13C8_PFOS		109	25-150
13C8_PFOSA		108	10-150
13C9_PFNA		109	25-150
d5-EtFOSAA		100	25-150
d3-MeFOSAA		100	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.

Laboratory ID: XF07078-014

Description: MW-14-70_060222

Matrix: Aqueous

Date Sampled: 06/02/2022 0955

Project Name: RACER Lansing

Date Received: 06/07/2022

Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/24/2022 0130	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	0.57	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.8	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	6.8	0.75	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	0.64	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	0.80	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	7.9		3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.66	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.61	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	3.0	J	3.4	0.47	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	44		3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	46		3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	80		3.4	0.59	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.44	J	3.4	0.39	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	34		3.4	0.71	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	100		3.4	0.46	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluoro-n-tridecanoic acid (PFTTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.53	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	184	25-150
13C2_6:2FTS		143	25-150
13C2_8:2FTS		96	25-150
13C2_PFDaA		91	25-150
13C2_PFTeDA		85	25-150
13C3_PFBs		90	25-150
13C3_PFHxS		99	25-150
13C3-HFPO-DA		79	25-150
13C4_PFBa		50	25-150
13C4_PFHpA		99	25-150
13C5_PFHxA		92	25-150
13C5_PFPeA		75	25-150
13C6_PFDa		56	25-150
13C7_PFUdA		94	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-014
Description: MW-14-70_060222	Matrix: Aqueous
Date Sampled: 06/02/2022 0955	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		91	25-150
13C8_PFOS		94	25-150
13C8_PFOSA		96	10-150
13C9_PFNA		96	25-150
d5-EtFOSAA		94	25-150
d3-MeFOSAA		89	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-015
Description: MW-12-13_060222	Matrix: Aqueous
Date Sampled: 06/02/2022 1055	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/24/2022 0141	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	0.56	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.8	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	6.8	0.74	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	0.64	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	0.79	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	2.7	J	3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.66	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.42	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.61	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.4	0.47	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	26		3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	15		3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	54		3.4	0.58	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.4	0.39	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	2.3	J	3.4	0.71	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	38		3.4	0.46	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.53	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	157	25-150
13C2_6:2FTS		65	25-150
13C2_8:2FTS		95	25-150
13C2_PFDa		105	25-150
13C2_PFTeDA		93	25-150
13C3_PFBS		107	25-150
13C3_PFHxS		102	25-150
13C3-HFPO-DA		90	25-150
13C4_PFBA		78	25-150
13C4_PFHpA		101	25-150
13C5_PFHxA		103	25-150
13C5_PFPeA		95	25-150
13C6_PFDA		99	25-150
13C7_PFUdA		92	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-015
Description: MW-12-13_060222	Matrix: Aqueous
Date Sampled: 06/02/2022 1055	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		97	25-150
13C8_PFOS		102	25-150
13C8_PFOSA		99	10-150
13C9_PFNA		102	25-150
d5-EtFOSAA		94	25-150
d3-MeFOSAA		95	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-016
Description: MW-21-133_060222	Matrix: Aqueous
Date Sampled: 06/02/2022 1150	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/24/2022 0152	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	0.57	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.8	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.8	0.75	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	0.64	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	0.80	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.0	J	3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.67	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.61	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	0.54	J	3.4	0.51	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.7	J	3.4	0.47	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	14		3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	17		3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	24		3.4	0.59	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.1	J	3.4	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	43		3.4	0.71	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	22		3.4	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluoro-n-tridecanoic acid (PFTeDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.54	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	4.6		3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		148	25-150
13C2_6:2FTS	N	163	25-150
13C2_8:2FTS		117	25-150
13C2_PFDaA		95	25-150
13C2_PFTeDA		91	25-150
13C3_PFBs		110	25-150
13C3_PFHxS		108	25-150
13C3-HFPO-DA		89	25-150
13C4_PFBa		88	25-150
13C4_PFHpA		108	25-150
13C5_PFHxA		104	25-150
13C5_PFPeA		98	25-150
13C6_PFDa		115	25-150
13C7_PFUdA		99	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-016
Description: MW-21-133_060222	Matrix: Aqueous
Date Sampled: 06/02/2022 1150	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		100	25-150
13C8_PFOS		111	25-150
13C8_PFOSA		116	10-150
13C9_PFNA		108	25-150
d5-EtFOSAA		93	25-150
d3-MeFOSAA		97	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-017
Description: MW-21-134_060222	Matrix: Aqueous
Date Sampled: 06/02/2022 1250	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/24/2022 0202	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.7	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.7	0.56	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.7	1.3	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.7	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.7	0.74	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.7	1.7	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.7	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.7	0.63	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.7	0.78	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	1.9	J	3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.65	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.42	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.60	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	0.77	J	3.4	0.50	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	2.0	J	3.4	0.46	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	13		3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.44	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	15		3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	22		3.4	0.58	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.4	0.39	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	23		3.4	0.70	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	21		3.4	0.46	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.50	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.53	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	4.2		3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		144	25-150
13C2_6:2FTS		125	25-150
13C2_8:2FTS		124	25-150
13C2_PFDaA		122	25-150
13C2_PFTeDA		91	25-150
13C3_PFBS		128	25-150
13C3_PFHxS		119	25-150
13C3-HFPO-DA		115	25-150
13C4_PFBA		100	25-150
13C4_PFHpA		117	25-150
13C5_PFHxA		116	25-150
13C5_PFPeA		118	25-150
13C6_PFDA		143	25-150
13C7_PFUdA		123	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-017
Description: MW-21-134_060222	Matrix: Aqueous
Date Sampled: 06/02/2022 1250	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		103	25-150
13C8_PFOS		118	25-150
13C8_PFOSA		137	10-150
13C9_PFNA		116	25-150
d5-EtFOSAA		116	25-150
d3-MeFOSAA		110	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-018
Description: MW-21-135_060222	Matrix: Aqueous
Date Sampled: 06/02/2022 1430	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/24/2022 0213	LAB	06/20/2022 1638	45585

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	0.57	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.8	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	6.8	0.75	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	0.41	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	0.64	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	0.80	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	1.9	J	3.4	0.35	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.66	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.61	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.52	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	1.2	J	3.4	0.51	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.6	J	3.4	0.47	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	12		3.4	0.51	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.40	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	47		3.4	0.38	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	39		3.4	0.59	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	1.1	J	3.4	0.39	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	38		3.4	0.71	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	39		3.4	0.46	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.51	ng/L	1
Perfluoro-n-tridecanoic acid (PFTTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.45	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.53	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	2.1	J	3.4	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	169	25-150
13C2_6:2FTS		102	25-150
13C2_8:2FTS		117	25-150
13C2_PFDa		99	25-150
13C2_PFTeDA		97	25-150
13C3_PFBs		114	25-150
13C3_PFHxS		119	25-150
13C3-HFPO-DA		100	25-150
13C4_PFBa		89	25-150
13C4_PFHpA		113	25-150
13C5_PFHxA		108	25-150
13C5_PFPeA		106	25-150
13C6_PFDa		110	25-150
13C7_PFUdA		101	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-018
Description: MW-21-135_060222	Matrix: Aqueous
Date Sampled: 06/02/2022 1430	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		108	25-150
13C8_PFOS		110	25-150
13C8_PFOSA		116	10-150
13C9_PFNA		113	25-150
d5-EtFOSAA		101	25-150
d3-MeFOSAA		101	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **XF07078-019**

Description: **MW-12-10R_060222**

Matrix: **Aqueous**

Date Sampled: **06/02/2022 1520**

Project Name: **RACER Lansing**

Date Received: **06/07/2022**

Project Number: **30112892.0370A**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/22/2022 2007	ASD	06/21/2022 1155	45642

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.9	0.42	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.9	0.57	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.9	1.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	6.9	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	6.9	0.76	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.9	0.42	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.9	0.65	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.9	0.81	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	5.5		3.5	0.36	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.67	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.43	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.62	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.53	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.51	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.48	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	9.6		3.5	0.52	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.45	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.41	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	3.5		3.5	0.39	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	4.5		3.5	0.60	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.76	J	3.5	0.40	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	8.9		3.5	0.72	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	5.3		3.5	0.47	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.52	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.46	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.54	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	7.6		3.5	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	255	25-150
13C2_6:2FTS	N	198	25-150
13C2_8:2FTS		120	25-150
13C2_PFDaA		100	25-150
13C2_PFTeDA		95	25-150
13C3_PFBs		91	25-150
13C3_PFHxS		95	25-150
13C3-HFPO-DA		78	25-150
13C4_PFBa		50	25-150
13C4_PFHpA		98	25-150
13C5_PFHxA		95	25-150
13C5_PFPeA		74	25-150
13C6_PFDa		105	25-150
13C7_PFUdA		106	25-150

LOQ = Limit of Quantitation B = Detected in the method blank E = Quantitation of compound exceeded the calibration range DL = Detection Limit Q = Surrogate failure
 ND = Not detected at or above the DL N = Recovery is out of criteria P = The RPD between two GC columns exceeds 40% J = Estimated result < LOQ and ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-019
Description: MW-12-10R_060222	Matrix: Aqueous
Date Sampled: 06/02/2022 1520	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		107	25-150
13C8_PFOS		109	25-150
13C8_PFOSA		98	10-150
13C9_PFNA		110	25-150
d5-EtFOSAA		105	25-150
d3-MeFOSAA		106	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.

Laboratory ID: XF07078-020

Description: Dup-15_060222

Matrix: Aqueous

Date Sampled: 06/02/2022

Project Name: RACER Lansing

Date Received: 06/07/2022

Project Number: 30112892.0370A

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	06/22/2022	2018 ASD	06/21/2022 1155	45642

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CI-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.6	0.40	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.6	0.55	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.6	1.3	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	6.6	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	6.6	0.72	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.6	1.7	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.6	0.40	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.6	0.62	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.6	0.77	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	7.9		3.3	0.34	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.3	0.64	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.3	0.41	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.3	0.59	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.3	0.51	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.3	0.49	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	1.4	J	3.3	0.46	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	9.4		3.3	0.50	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.3	0.43	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.3	0.39	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	3.9		3.3	0.37	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	4.7		3.3	0.57	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.63	J	3.3	0.38	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	8.8		3.3	0.69	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	5.3		3.3	0.45	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.3	0.50	ng/L	1
Perfluoro-n-tridecanoic acid (PFTTrDA)	72629-94-8	PFAS by ID SOP	ND		3.3	0.44	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.3	0.52	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	7.7		3.3	1.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	257	25-150
13C2_6:2FTS	N	205	25-150
13C2_8:2FTS		118	25-150
13C2_PFDA		98	25-150
13C2_PFTeDA		95	25-150
13C3_PFBS		89	25-150
13C3_PFHxS		93	25-150
13C3-HFPO-DA		79	25-150
13C4_PFBA		47	25-150
13C4_PFHpA		101	25-150
13C5_PFHxA		90	25-150
13C5_PFPeA		70	25-150
13C6_PFDA		105	25-150
13C7_PFUdA		103	25-150

LOQ = Limit of Quantitation

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

DL = Detection Limit

Q = Surrogate failure

ND = Not detected at or above the DL

N = Recovery is out of criteria

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

L = LCS/LCSD failure

H = Out of holding time

W = Reported on wet weight basis

S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: XF07078-020
Description: Dup-15_060222	Matrix: Aqueous
Date Sampled: 06/02/2022	Project Name: RACER Lansing
Date Received: 06/07/2022	Project Number: 30112892.0370A

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		102	25-150
13C8_PFOS		104	25-150
13C8_PFOSA		95	10-150
13C9_PFNA		109	25-150
d5-EtFOSAA		103	25-150
d3-MeFOSAA		101	25-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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QC Summary

PFAS by LC/MS/MS - MB

Sample ID: XQ45585-001

Matrix: Aqueous

Batch: 45585

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 06/20/2022 1638

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
9CI-PF3ONS	ND		1	8.0	0.48	ng/L	06/23/2022 2158
11CI-PF3OUdS	ND		1	8.0	0.66	ng/L	06/23/2022 2158
8:2 FTS	ND		1	8.0	1.6	ng/L	06/23/2022 2158
6:2 FTS	ND		1	8.0	2.0	ng/L	06/23/2022 2158
4:2 FTS	ND		1	8.0	0.87	ng/L	06/23/2022 2158
GenX	ND		1	8.0	2.1	ng/L	06/23/2022 2158
ADONA	ND		1	8.0	0.48	ng/L	06/23/2022 2158
EtFOSAA	ND		1	8.0	0.75	ng/L	06/23/2022 2158
MeFOSAA	ND		1	8.0	0.93	ng/L	06/23/2022 2158
PFBS	ND		1	4.0	0.41	ng/L	06/23/2022 2158
PFDS	ND		1	4.0	0.78	ng/L	06/23/2022 2158
PFHpS	ND		1	4.0	0.50	ng/L	06/23/2022 2158
PFNS	ND		1	4.0	0.71	ng/L	06/23/2022 2158
PFOSA	ND		1	4.0	0.61	ng/L	06/23/2022 2158
PFPeS	ND		1	4.0	0.59	ng/L	06/23/2022 2158
PFHxS	ND		1	4.0	0.55	ng/L	06/23/2022 2158
PFBA	ND		1	4.0	0.60	ng/L	06/23/2022 2158
PFDA	ND		1	4.0	0.52	ng/L	06/23/2022 2158
PFDaA	ND		1	4.0	0.47	ng/L	06/23/2022 2158
PFHpA	ND		1	4.0	0.45	ng/L	06/23/2022 2158
PFHxA	ND		1	4.0	0.69	ng/L	06/23/2022 2158
PFNA	ND		1	4.0	0.46	ng/L	06/23/2022 2158
PFOA	ND		1	4.0	0.83	ng/L	06/23/2022 2158
PFPeA	ND		1	4.0	0.54	ng/L	06/23/2022 2158
PFTeDA	ND		1	4.0	0.60	ng/L	06/23/2022 2158
PFTTrDA	ND		1	4.0	0.53	ng/L	06/23/2022 2158
PFUdA	ND		1	4.0	0.63	ng/L	06/23/2022 2158
PFOS	ND		1	4.0	2.0	ng/L	06/23/2022 2158

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		97	25-150
13C2_6:2FTS	N	186	25-150
13C2_8:2FTS		98	25-150
13C2_PFDaA		106	25-150
13C2_PFTeDA		93	25-150
13C3_PFBS		118	25-150
13C3_PFHxS		107	25-150
13C3-HFPO-DA		105	25-150
13C4_PFBA		109	25-150
13C4_PFHpA		109	25-150
13C5_PFHxA		108	25-150
13C5_PFPeA		111	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - MB

Sample ID: XQ45585-001

Matrix: Aqueous

Batch: 45585

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 06/20/2022 1638

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		112	25-150
13C7_PFUdA		102	25-150
13C8_PFOA		112	25-150
13C8_PFOS		110	25-150
13C8_PFOSA		107	10-150
13C9_PFNA		108	25-150
d5-EtFOSAA		97	25-150
d3-MeFOSAA		95	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - LCS

Sample ID: XQ45585-002

Matrix: Aqueous

Batch: 45585

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 06/20/2022 1638

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9CI-PF3ONS	15	14		1	95	50-150	06/23/2022 2209
11CI-PF3OUdS	15	13		1	84	50-150	06/23/2022 2209
8:2 FTS	15	15		1	100	50-150	06/23/2022 2209
6:2 FTS	15	18		1	117	50-150	06/23/2022 2209
4:2 FTS	15	16		1	106	50-150	06/23/2022 2209
GenX	32	33		1	104	50-150	06/23/2022 2209
ADONA	15	16		1	106	50-150	06/23/2022 2209
EtFOSAA	16	16		1	99	50-150	06/23/2022 2209
MeFOSAA	16	19		1	116	50-150	06/23/2022 2209
PFBS	14	14		1	102	50-150	06/23/2022 2209
PFDS	15	13		1	86	50-150	06/23/2022 2209
PFHpS	15	18		1	117	50-150	06/23/2022 2209
PFNS	15	14		1	90	50-150	06/23/2022 2209
PFOSA	16	15		1	96	50-150	06/23/2022 2209
PFPeS	15	15		1	100	50-150	06/23/2022 2209
PFHxS	15	15		1	103	50-150	06/23/2022 2209
PFBA	16	17		1	108	50-150	06/23/2022 2209
PFDA	16	19		1	119	50-150	06/23/2022 2209
PFDoA	16	17		1	109	50-150	06/23/2022 2209
PFHpA	16	17		1	107	50-150	06/23/2022 2209
PFHxA	16	17		1	103	50-150	06/23/2022 2209
PFNA	16	18		1	113	50-150	06/23/2022 2209
PFOA	16	18		1	112	50-150	06/23/2022 2209
PFPeA	16	18		1	113	50-150	06/23/2022 2209
PFTeDA	16	17		1	103	50-150	06/23/2022 2209
PFTTrDA	16	16		1	99	50-150	06/23/2022 2209
PFUdA	16	18		1	112	50-150	06/23/2022 2209
PFOS	15	14		1	96	50-150	06/23/2022 2209

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		112	25-150
13C2_6:2FTS	N	209	25-150
13C2_8:2FTS		107	25-150
13C2_PFDoA		97	25-150
13C2_PFTeDA		82	25-150
13C3_PFBS		125	25-150
13C3_PFHxS		109	25-150
13C3-HFPO-DA		107	25-150
13C4_PFBA		118	25-150
13C4_PFHpA		112	25-150
13C5_PFHxA		109	25-150
13C5_PFPeA		113	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - LCS

Sample ID: XQ45585-002

Matrix: Aqueous

Batch: 45585

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 06/20/2022 1638

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		114	25-150
13C7_PFUdA		100	25-150
13C8_PFOA		112	25-150
13C8_PFOS		122	25-150
13C8_PFOSA		124	10-150
13C9_PFNA		114	25-150
d5-EtFOSAA		102	25-150
d3-MeFOSAA		95	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - MS

Sample ID: XF07078-010MS

Matrix: Aqueous

Batch: 45585

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 06/20/2022 1638

Parameter	Sample Amount (ng/L)	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9CI-PF3ONS	ND	13	14		1	109	50-150	06/24/2022 0037
11CI-PF3OUdS	ND	13	13		1	100	50-150	06/24/2022 0037
8:2 FTS	ND	14	15		1	112	50-150	06/24/2022 0037
6:2 FTS	ND	13	14		1	107	50-150	06/24/2022 0037
4:2 FTS	ND	13	14		1	109	50-150	06/24/2022 0037
GenX	ND	28	35		1	122	50-150	06/24/2022 0037
ADONA	ND	13	14		1	105	50-150	06/24/2022 0037
EtFOSAA	ND	14	18		1	130	50-150	06/24/2022 0037
MeFOSAA	ND	14	19		1	131	50-150	06/24/2022 0037
PFBS	ND	13	15		1	117	50-150	06/24/2022 0037
PFDS	ND	14	15		1	111	50-150	06/24/2022 0037
PFHpS	ND	14	15		1	108	50-150	06/24/2022 0037
PFNS	ND	14	13		1	97	50-150	06/24/2022 0037
PFOSA	1.6	14	16		1	105	50-150	06/24/2022 0037
PFPeS	ND	13	16		1	120	50-150	06/24/2022 0037
PFHxS	ND	13	15		1	114	50-150	06/24/2022 0037
PFBA	2.9	14	19		1	114	50-150	06/24/2022 0037
PFDA	ND	14	15		1	109	50-150	06/24/2022 0037
PFDoA	ND	14	17		1	116	50-150	06/24/2022 0037
PFHpA	ND	14	15		1	106	50-150	06/24/2022 0037
PFHxA	1.2	14	17		1	111	50-150	06/24/2022 0037
PFNA	ND	14	15		1	109	50-150	06/24/2022 0037
PFOA	ND	14	16		1	115	50-150	06/24/2022 0037
PFPeA	1.7	14	18		1	113	50-150	06/24/2022 0037
PFTeDA	ND	14	15		1	108	50-150	06/24/2022 0037
PFTrDA	ND	14	15		1	104	50-150	06/24/2022 0037
PFUdA	ND	14	15		1	103	50-150	06/24/2022 0037
PFOS	ND	13	15		1	113	50-150	06/24/2022 0037

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS	N	226	25-150
13C2_6:2FTS	N	251	25-150
13C2_8:2FTS		110	25-150
13C2_PFDoA		105	25-150
13C2_PFTeDA		102	25-150
13C3_PFBS		109	25-150
13C3_PFHxS		114	25-150
13C3-HFPO-DA		89	25-150
13C4_PFBA		59	25-150
13C4_PFHpA		116	25-150
13C5_PFHxA		105	25-150
13C5_PFPeA		88	25-150

LOQ = Limit of Quantitation

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DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - MS

Sample ID: XF07078-010MS

Matrix: Aqueous

Batch: 45585

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 06/20/2022 1638

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		114	25-150
13C7_PFUdA		119	25-150
13C8_PFOA		110	25-150
13C8_PFOS		114	25-150
13C8_PFOSA		119	10-150
13C9_PFNA		110	25-150
d5-EtFOSAA		109	25-150
d3-MeFOSAA		102	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - MSD

Sample ID: XF07078-010MD

Matrix: Aqueous

Batch: 45585

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 06/20/2022 1638

Parameter	Sample Amount (ng/L)	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% RPD	%Rec Limit	% RPD Limit	Analysis Date
9CI-PF3ONS	ND	12	13	1		107	9.5	50-150	30	06/24/2022 0048
11CI-PF3OUdS	ND	12	12	1		93	14	50-150	30	06/24/2022 0048
8:2 FTS	ND	13	14	1		112	7.6	50-150	30	06/24/2022 0048
6:2 FTS	ND	13	14	1		110	3.7	50-150	30	06/24/2022 0048
4:2 FTS	ND	12	13	1		108	7.7	50-150	30	06/24/2022 0048
GenX	ND	26	34	1		127	2.6	50-150	30	06/24/2022 0048
ADONA	ND	12	13	1		102	10	50-150	30	06/24/2022 0048
EtFOSAA	ND	13	15	1		117	18	50-150	30	06/24/2022 0048
MeFOSAA	ND	13	15	1		110	25	50-150	30	06/24/2022 0048
PFBS	ND	12	12	1		104	19	50-150	30	06/24/2022 0048
PFDS	ND	13	12	1		93	24	50-150	30	06/24/2022 0048
PFHpS	ND	13	13	1		103	12	50-150	30	06/24/2022 0048
PFNS	ND	13	13	1		100	4.7	50-150	30	06/24/2022 0048
PFOSA	1.6	13	16	1		107	4.6	50-150	30	06/24/2022 0048
PFPeS	ND	12	14	1		116	10	50-150	30	06/24/2022 0048
PFHxS	ND	12	14	1		116	5.4	50-150	30	06/24/2022 0048
PFBA	2.9	13	17	1		109	10	50-150	30	06/24/2022 0048
PFDA	ND	13	13	1		101	14	50-150	30	06/24/2022 0048
PFDaA	ND	13	15	1		110	12	50-150	30	06/24/2022 0048
PFHpA	ND	13	13	1		101	12	50-150	30	06/24/2022 0048
PFHxA	1.2	13	15	1		106	11	50-150	30	06/24/2022 0048
PFNA	ND	13	16	1		120	3.1	50-150	30	06/24/2022 0048
PFOA	ND	13	14	1		108	13	50-150	30	06/24/2022 0048
PFPeA	1.7	13	17	1		117	3.8	50-150	30	06/24/2022 0048
PFTeDA	ND	13	15	1		114	1.9	50-150	30	06/24/2022 0048
PFTrDA	ND	13	14	1		104	7.1	50-150	30	06/24/2022 0048
PFUdA	ND	13	15	1		111	0.011	50-150	30	06/24/2022 0048
PFOS	ND	12	13	1		104	16	50-150	30	06/24/2022 0048

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS	N	218	25-150
13C2_6:2FTS	N	229	25-150
13C2_8:2FTS		99	25-150
13C2_PFDaA		94	25-150
13C2_PFTeDA		83	25-150
13C3_PFBs		101	25-150
13C3_PFHxS		104	25-150
13C3-HFPO-DA		73	25-150
13C4_PFBa		54	25-150
13C4_PFHpA		108	25-150
13C5_PFHxA		100	25-150
13C5_PFPeA		76	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - MSD

Sample ID: XF07078-010MD

Matrix: Aqueous

Batch: 45585

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 06/20/2022 1638

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		109	25-150
13C7_PFUdA		96	25-150
13C8_PFOA		95	25-150
13C8_PFOS		110	25-150
13C8_PFOSA		102	10-150
13C9_PFNA		102	25-150
d5-EtFOSAA		99	25-150
d3-MeFOSAA		95	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - MB

Sample ID: XQ45642-001

Matrix: Aqueous

Batch: 45642

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 06/21/2022 1155

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
9CI-PF3ONS	ND		1	8.0	0.48	ng/L	06/22/2022 1912
11CI-PF3OUdS	ND		1	8.0	0.66	ng/L	06/22/2022 1912
8:2 FTS	ND		1	8.0	1.6	ng/L	06/22/2022 1912
6:2 FTS	ND		1	8.0	2.0	ng/L	06/22/2022 1912
4:2 FTS	ND		1	8.0	0.87	ng/L	06/22/2022 1912
GenX	ND		1	8.0	2.1	ng/L	06/22/2022 1912
ADONA	ND		1	8.0	0.48	ng/L	06/22/2022 1912
EtFOSAA	ND		1	8.0	0.75	ng/L	06/22/2022 1912
MeFOSAA	ND		1	8.0	0.93	ng/L	06/22/2022 1912
PFBS	ND		1	4.0	0.41	ng/L	06/22/2022 1912
PFDS	ND		1	4.0	0.78	ng/L	06/22/2022 1912
PFHpS	ND		1	4.0	0.50	ng/L	06/22/2022 1912
PFNS	ND		1	4.0	0.71	ng/L	06/22/2022 1912
PFOSA	ND		1	4.0	0.61	ng/L	06/22/2022 1912
PFPeS	ND		1	4.0	0.59	ng/L	06/22/2022 1912
PFHxS	ND		1	4.0	0.55	ng/L	06/22/2022 1912
PFBA	ND		1	4.0	0.60	ng/L	06/22/2022 1912
PFDA	ND		1	4.0	0.52	ng/L	06/22/2022 1912
PFDaA	ND		1	4.0	0.47	ng/L	06/22/2022 1912
PFHpA	ND		1	4.0	0.45	ng/L	06/22/2022 1912
PFHxA	ND		1	4.0	0.69	ng/L	06/22/2022 1912
PFNA	ND		1	4.0	0.46	ng/L	06/22/2022 1912
PFOA	ND		1	4.0	0.83	ng/L	06/22/2022 1912
PFPeA	ND		1	4.0	0.54	ng/L	06/22/2022 1912
PFTeDA	ND		1	4.0	0.60	ng/L	06/22/2022 1912
PFTTrDA	ND		1	4.0	0.53	ng/L	06/22/2022 1912
PFUdA	ND		1	4.0	0.63	ng/L	06/22/2022 1912
PFOS	ND		1	4.0	2.0	ng/L	06/22/2022 1912

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		100	25-150
13C2_6:2FTS		123	25-150
13C2_8:2FTS		108	25-150
13C2_PFDaA		103	25-150
13C2_PFTeDA		89	25-150
13C3_PFBs		105	25-150
13C3_PFHxS		100	25-150
13C3-HFPO-DA		100	25-150
13C4_PFBa		104	25-150
13C4_PFHpA		106	25-150
13C5_PFHxA		105	25-150
13C5_PFPeA		103	25-150

LOQ = Limit of Quantitation

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DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - MB

Sample ID: XQ45642-001

Matrix: Aqueous

Batch: 45642

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 06/21/2022 1155

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		107	25-150
13C7_PFUdA		103	25-150
13C8_PFOA		117	25-150
13C8_PFOS		108	25-150
13C8_PFOSA		100	10-150
13C9_PFNA		111	25-150
d5-EtFOSAA		102	25-150
d3-MeFOSAA		105	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

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PFAS by LC/MS/MS - LCS

Sample ID: XQ45642-002

Matrix: Aqueous

Batch: 45642

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 06/21/2022 1155

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9CI-PF3ONS	15	13		1	89	50-150	06/22/2022 1923
11CI-PF3OUdS	15	13		1	89	50-150	06/22/2022 1923
8:2 FTS	15	13		1	84	50-150	06/22/2022 1923
6:2 FTS	15	15		1	96	50-150	06/22/2022 1923
4:2 FTS	15	14		1	92	50-150	06/22/2022 1923
GenX	32	32		1	99	50-150	06/22/2022 1923
ADONA	15	14		1	90	50-150	06/22/2022 1923
EtFOSAA	16	15		1	92	50-150	06/22/2022 1923
MeFOSAA	16	16		1	99	50-150	06/22/2022 1923
PFBS	14	14		1	98	50-150	06/22/2022 1923
PFDS	15	14		1	90	50-150	06/22/2022 1923
PFHpS	15	15		1	97	50-150	06/22/2022 1923
PFNS	15	13		1	87	50-150	06/22/2022 1923
PFOSA	16	15		1	95	50-150	06/22/2022 1923
PFPeS	15	14		1	94	50-150	06/22/2022 1923
PFHxS	15	14		1	93	50-150	06/22/2022 1923
PFBA	16	15		1	96	50-150	06/22/2022 1923
PFDA	16	14		1	91	50-150	06/22/2022 1923
PFDoA	16	15		1	91	50-150	06/22/2022 1923
PFHpA	16	15		1	92	50-150	06/22/2022 1923
PFHxA	16	14		1	88	50-150	06/22/2022 1923
PFNA	16	14		1	87	50-150	06/22/2022 1923
PFOA	16	14		1	90	50-150	06/22/2022 1923
PFPeA	16	15		1	93	50-150	06/22/2022 1923
PFTeDA	16	15		1	96	50-150	06/22/2022 1923
PFTrDA	16	14		1	87	50-150	06/22/2022 1923
PFUdA	16	14		1	88	50-150	06/22/2022 1923
PFOS	15	14		1	92	50-150	06/22/2022 1923

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		108	25-150
13C2_6:2FTS		122	25-150
13C2_8:2FTS		108	25-150
13C2_PFDoA		106	25-150
13C2_PFTeDA		95	25-150
13C3_PFBS		105	25-150
13C3_PFHxS		101	25-150
13C3-HFPO-DA		101	25-150
13C4_PFBA		104	25-150
13C4_PFHpA		105	25-150
13C5_PFHxA		109	25-150
13C5_PFPeA		105	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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PFAS by LC/MS/MS - LCS

Sample ID: XQ45642-002

Matrix: Aqueous

Batch: 45642

Prep Method: SOP SPE

Analytical Method: PFAS by ID SOP

Prep Date: 06/21/2022 1155

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		105	25-150
13C7_PFUdA		110	25-150
13C8_PFOA		113	25-150
13C8_PFOS		108	25-150
13C8_PFOSA		103	10-150
13C9_PFNA		110	25-150
d5-EtFOSAA		108	25-150
d3-MeFOSAA		103	25-150

LOQ = Limit of Quantitation

ND = Not detected at or above the DL

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and \geq DL

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

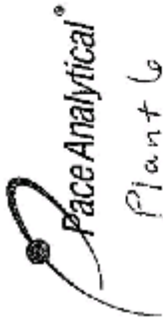
Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Pace Analytical Services, LLC (formerly Shealy Environmental Services, Inc.)

106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

**Chain of Custody
and
Miscellaneous Documents**

PACE ANALYTICAL SERVICES, LLC



PACE ANALYTICAL SERVICES, LLC
 106 Vantage Point Drive • West Columbia, SC 29172
 Telephone No. 803-791-9700 Fax No. 803-791-9111
 www.pacelabs.com

Number 135284

Client Arcadis 9850 Cabot Drive, Suite 500 City: <u>MI</u> Zip Code: <u>48377</u> Project Name: <u>RIVER Lansing</u>		Report to Contact: <u>Tiffany L. White</u> Vial ID: <u>1100</u> Sampler's Signature: <u>[Signature]</u>		Telephone No./Fax No.: <u>810-283-1533 / 810-283-1534</u> Address: <u>75 Ffany, Linden-Darvichs Hwy, 447-777-5215 / 447-777-5216</u> Analytic (Attach list if more space is needed)		Page <u>1</u> of <u>2</u>	
F.O. No. <u>30112892.0370A</u> Sample ID / Description: <u>30112892.0370A</u> (Containers for each sample may be combined on one this.)		Matrix: <u>Water</u> No. of Containers by Preservative Type:		XE SE: <u>XF07078</u> Remarks / Container I.D.:		Barcode:	
Project No.	Collection Date(s)	Collection Time (hh:mm)	Matrix	No. of Containers by Preservative Type	GC Requirements (Specify)	Date	Time
MW-22-143-060122	6/1/22	1045	Water	2			
MW-22-144-060122	6/1/22	1200	Water	2			
MW-22-145-060122	6/1/22	1235	Water	2			
Dup-17-060122	6/1/22		Water	2			
MW-22-146-060122	6/1/22	1315	Water	2			
MW-22-147-060122	6/1/22	1400	Water	2			
MW-22-148-060122	6/1/22	1430	Water	2			
EB-02-060122	6/1/22	1445	Water	2			
MW-22-149-060122	6/1/22	1340	Water	2			
MW-22-150-060122	6/1/22	1105	Water	6			
Turn Around Time Required (Prior lab approval required for expedited RT.) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush (Specify)		Sample Disposal: <input checked="" type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Dispose by Lab		Possible Hazard (Classification): <input checked="" type="checkbox"/> Non-hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown		GC Requirements (Specify)	
1. Relinquished by		Date		Time		Date	
2. Relinquished by		Date		Time		Date	
3. Relinquished by		Date		Time		Date	
4. Relinquished by <u>FedEx</u>		Date <u>6/1/22</u>		Time <u>1130</u>		Date <u>6/22</u>	
Note: All samples are retained for four weeks from receipt unless other arrangements are made.		Received on ice (Check) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Ice Pack <input type="checkbox"/> Yes <input type="checkbox"/> No		Receipt Temp: <u>3.2</u> °C	

* Report EGLE 28 Compounds

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Samples; PINK-Field/Client Copy

Document Number: ME003M2-07

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Number 135284

Client Arcadis	Report to Contact T. Henry Linder	Analysis No. / (S/N) / Agency - 5815 / 5815 / Arcadis	Quote No. XF07078
Address 8550 Cutler Avenue, Suite 600	State ME	City Portland	Page 2 of 2
Zip Code 43377	Project Name PACE Learning	Matrix Water	No. of Containers by Preservative Type None H2O2 HNO3 HCl H2SO4 H3PO4 HAc None Other
Project No. 5815-98-0370A	Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Conversion Time (Hours)
	MW-22-151-060122	6/1/22	1225
	MW-22-152-060122	6/1/22	1440
	EB-03-060122	6/1/22	1000
	MW-14-70-060222	6/2/22	0955
	MW-12-13-060222	6/2/22	1055
	MW-21-133-060222	6/2/22	1150
	MW-21-134-060222	6/2/22	1250
	MW-21-135-060222	6/2/22	1430
	MW-12-10R-060222	6/2/22	1520
	Dup-15-060222	6/2/22	---
Turn Around Time Required (Prior lab approval required for expedited MT.) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush (Specify)	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Destroyed by Lab	Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown	CC Requirements (Specify)
1. Refinishing by Date Time	1. Received by Date Time	2. Received by Date Time	Date Time
2. Refinishing by Date Time	2. Received by Date Time	3. Received by Date Time	Date Time
3. Refinishing by Date Time	3. Received by Date Time	4. Lab Use ONLY Resealed on ice (Circle) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Date Time Temp Blank <input type="checkbox"/> N <input type="checkbox"/> Y <input type="checkbox"/>
4. Refinishing by Date Time	Date Time	Date Time	Date Time

Observant Number: MED0304-01

* Report EGLE 23 Compounds

PACE ANALYTICAL SERVICES, LLC



Samples Receipt Checklist (SRC) (ME0018C-15)

Issuing Authority: Pace ENV - WCOL

Revised: 9/29/2020

Page 1 of 1

Sample Receipt Checklist (SRC)

Client: Areadis

Cooler Inspected by/date: TEC / 06/07/2022

Lot #: XF07078

Means of receipt: <input type="checkbox"/> Pace <input type="checkbox"/> Client <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Other: _____	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1. Were custody seals present on the cooler?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	2. If custody seals were present, were they intact and unbroken?
pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA	
Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cap ID: NA	
3.2 / 3.2 °C NA / NA °C NA / NA °C NA / NA °C	
Method: <input checked="" type="checkbox"/> Temperature Blank <input type="checkbox"/> Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C	
Method of coolant: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry Ice <input type="checkbox"/> None	
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	4. Is the commercial courier's packing slip attached to this form?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5. Were proper custody procedures (relinquished/received) followed?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Were sample IDs listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7. Were sample IDs listed on all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8. Was collection date & time listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9. Was collection date & time listed on all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10. Did all container label information (ID, date, time) agree with the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. Were tests to be performed listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	13. Was adequate sample volume available?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	14. Were all samples received within 1/2 the holding time or 48 hours, whichever comes first?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (>1/8" or 6mm in diameter) in any of the VOA vials?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	19. Were all applicable NH ₃ /TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc...) correctly transcribed from the COC into the comment section in LIMS?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	21. Was the quote number listed on the container label? If yes, Quote # _____
Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)	
Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA	
Time of preservation NA. If more than one preservative is needed, please note in the comments below.	
Sample(s) NA were received with bubbles >6 mm in diameter.	
Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is NA) and were adjusted accordingly in sample receiving with sodium thiosulfate (Na ₂ S ₂ O ₃) with Shealy ID: NA	
SR barcode labels applied by: KDRW Date: 06/07/2022	

Comments:
