

Revitalizing Auto Communities  
Environmental Response Trust

# **INTERIM MEASURES WORK PLAN: PLANTS 2, 3, AND 6 SEWER MODIFICATIONS**

Lansing Industrial Land  
Lansing, Michigan

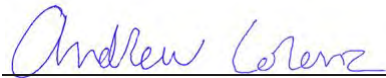
September 2020



**INTERIM MEASURES  
WORK PLAN: PLANTS  
2, 3, AND 6 SEWER  
MODIFICATIONS**



Jacelyn Saling, P.E.-MI  
Technical Expert



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

Lansing Industrial Land  
Lansing, Michigan

Prepared for:

Revitalizing Auto Communities  
Environmental Response Trust

Prepared by:

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

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## CONTENTS

Acronyms and Abbreviations.....	iii
1 Introduction .....	1
1.1 Corrective Action Objectives.....	1
1.2 Sewer Work Completed .....	1
1.2.1 Plant 2 .....	2
1.2.2 Plant 3 .....	2
1.2.3 Plant 6 .....	3
2 Plant 2 Sewer Modifications.....	4
2.1 Plant 2 Proposed Modifications .....	4
2.1.1 Cap Catch Basins.....	4
2.1.2 Fill Four Storm and One Sanitary Manhole with Concrete.....	4
2.2 Performance Monitoring .....	5
3 Plant 3 Sewer Modifications.....	6
3.1 Proposed Modifications .....	6
3.1.1 Cap Catch Basins.....	6
3.1.2 P3-MH-308 Fill.....	6
3.1.3 Sanitary Sewer Vault Bulkhead.....	6
3.2 Performance Monitoring .....	7
4 Plant 6 Sewer Inspection and Modifications .....	8
4.1 Proposed Inspection and Modifications .....	8
4.1.1 Pipe Plugging .....	8
4.1.2 CCTV Inspection of Lansing City Sewers .....	8
4.2 Performance Monitoring .....	9
5 Contingency .....	10
6 Schedule .....	11
7 References.....	12

## TABLES

Table 1	Summary of Plant 2 Storm Sewer Sampling Results
Table 2	Summary of Plant 3 Storm Sewer Sampling Results
Table 3	Summary of Plant 6 Storm Sewer Sampling Results

## FIGURES

Figure 1	Site Location
Figure 2A	Plant 2 PFAS Storm Sewer Sampling Analytical Results
Figure 2B	Plant 2 PFAS Sanitary Sewer Sampling Analytical Results
Figure 3	Plant 3 PFAS Sewer Sampling Analytical Results
Figure 4	Plant 6 PFAS Sewer Sampling Analytical Results
Figure 5A	2020 Plant 2 Storm Sewer Modifications Plan Layout
Figure 5B	2020 Plant 2 Sanitary Sewer Modifications Plan Layout
Figure 6A	2020 Plant 3 Storm Sewer Modifications Plan Layout
Figure 6B	2020 Plant 3 Sanitary Sewer Modifications Layout
Figure 7	2020 Plant 6 Storm Sewer Modifications Layout
Figure 8	Typical Structure Fill and Catch Basin Cap Details
Figure 9	Typical Bulkhead Section Details

## APPENDICES

Appendix A	Plants 2, 3, and 6 Storm Sewer Sampling Laboratory Results
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## ACRONYMS AND ABBREVIATIONS

CCTV	Closed Circuit Television
DW	Drinking Water
EGLE	Michigan Department of Environment, Great Lakes, and Energy
HNV	Human Non-Cancer Screening Value
IM	Interim Measures
PFAS	Poly- and Perfluoroalkyl Substances
PFOS	Perfluorooctanesulfonic acid
PVC	Polyvinyl chloride
RACER	Revitalizing Auto Communities Environmental Response
Rule 57 Criteria	EGLE Rule 57 Human Non-Cancer Screening Value (HNV) for Surface Water from a Non-Drinking Water Source

# 1 INTRODUCTION

Arcadis of Michigan, LLC prepared this Interim Measures (IM) Workplan (Work Plan) on behalf of the Revitalizing Auto Communities Environmental Response (RACER) Trust for Plants 2, 3, and 6 at the RACER Lansing Industrial Land (Site) located in Lansing, Michigan (**Figure 1**). The purpose of this Work Plan is to provide information to support Michigan Department of Environment, Great Lakes, and Energy (EGLE) City of Lansing, and the Ingham County Drain Commission, as applicable, approval of the Plants 2, 3, and 6 supplemental storm sewer modifications proposed for implementation at the Site to address per- and polyfluoroalkyl substances (PFAS) discharges to offsite sewers. It is noted that even though this Work Plan is being submitted as an interim measure while other matters related to the Site are being addressed, it is intended that this interim measure will be a part of the final corrective measure to address PFAS.

This IM Work Plan outlines proposed modifications to the Plants 2 and 3 storm and sanitary sewer systems and further investigation into the Plant 6 sewer outfalls to mitigate the Site's PFAS-impacted water discharges to an offsite sewer owned by the City of Lansing and the Ingham County Drain Commission. The proposed scope of work includes: Plugging of the Northwest storm sewer main and Eastern sanitary sewer on Plant 3; plugging five manholes at Plant 2; capping selected catch basins at Plant 2; and performing CCTV inspection of the storm sewer which Plant 6 outfalls connect to. This Work Plan also includes post-installation monitoring of the property boundary manholes to verify corrective action objectives are met.

## 1.1 Corrective Action Objectives

The corrective action objective of this IM Work Plan is to eliminate off-Site sewer discharges exceeding the Rule 57 criteria. The points of compliance for Plant 2 are the northwest outfall, (P2-MH-30, northeast outfall (P2-MH-9), and the southwest outfall (P2-MH-W) (**Figure 2A**); and the northeast sanitary outfall (**Figure 2B**). The points of compliance for Plant 3 are the northwest (P3-MH-284), northeast (P3-MH-NE) (**Figure 3A**) and the eastern sanitary outfall. The Plant 6 points of compliance are the manholes in Michigan Ave, Verlinden Ave, and Osborn Rd (**Figure 4**).

## 1.2 Sewer Work Completed

In September 2018, storm sewer modifications were executed on Plant 3 in accordance with *Interim Measures Work Plan: Plant 3 Storm Sewer Modifications* (Arcadis, 2018a). Details of the modifications are documented in *Plant 3 Storm Sewer Modifications Completion Report* (Arcadis, 2019a). In December 2019 and May 2020, storm sewer modifications were executed on Plants 2, 3, and 6 in accordance with *Interim Measures Workplan: Plants 2 and 3 Storm Sewer Modifications* (Arcadis, 2019b) and *Interim Measure Workplan: Plant 6 Storm Sewer Modifications* (Arcadis, 2019c). Details of the December 2019 and May 2020 modifications are documented in the *Plants 2, 3, and 6 Storm Sewer Modifications Completion Report* (Arcadis, 2020b).

### 1.2.1 Plant 2

Storm sewer outfalls on Plant 2 were sampled in December of 2018, and PFOS above the Rule 57 criteria was detected in the northern most outfall (P2-MH-NW). Follow-up sampling of select manholes and catch basins in January and March of 2019 demonstrated the highest concentrations are entering the sewers in the southeast corner of Plant 2. Modifications were completed in December 2019 and May 2020 to address PFAS discharges. Inspections completed during sampling and rain events following the modifications show the manhole fills and catch basin caps completed in December 2019 and May 2020 are successful in blocking flow in the sewer lines. The storm sewer modifications achieved a 75% decrease in PFOS concentration at Plant 2 outfall manhole P2-MH-30, however, follow up sampling completed in July 2020 indicate PFOS still remains above Rule 57 criteria (**Table 1, Figure 2A**) at the Plant 2 northwest outfall.

The manhole immediately upstream of the sanitary sewer outfall, P2-SAN-3-7, was inspected and sampled in July 2020, revealing PFOS exceeding surface water criteria in the northeast sanitary sewer line (**Figure 2B**). This was the only sanitary sewer outfall that could be field located at Plant 2. Historically, a sanitary sewer outfall existed in the northwest corner of Plant 2, however none of the manholes associated with this sanitary sewer could be located.

### 1.2.2 Plant 3

In fall of 2017, it was confirmed that PFAS impacts were infiltrating into the storm sewer system on Plant 3 from a former plating area in the north-central portion of Plant 3. This storm sewer system was composed of catch basins, manholes, and sewer mains, and eventually drained into a municipally owned storm main. An initial scope of work to address these impacts was completed in 2018. Follow up inspections and sampling conducted in 2019 indicated that these efforts were successful at blocking 95 to 99% the base flow, but that the remaining flow exceeded the PFOS Rule 57 criteria at the manhole located at the property outfall P3-MH-NE. Further modifications were completed in December 2019 and May 2020. Inspections and monitoring completed at P3-MH-NE indicate the modifications have successfully mitigated discharge from the Site.

Sampling of the storm sewer outfall at the north west corner of Plant 3 in July and August 2020 revealed PFOS exceedances of surface water criteria discharging offsite (**Table 2, Figure 3**).

There appear to be four historic sanitary outfalls at Plant 3. Two are located on the west and northwest portion of Plant 3. Utility map documentation indicates these two outfalls were abandoned and they are away from known impacts on Plant 3, therefore no further action is proposed for these former sanitary outfalls. Two historical sanitary outfalls are located on the eastern property line of Plant 3. Documentation associated with southernmost sanitary outfall on the eastern property line indicates it was abandoned. Field inspections indicate back up of water in this sanitary line, providing additional evidence that this sanitary outfall was abandoned. Field inspections of a vault structure associated with the northern most sanitary outfall on the eastern property line indicates the potential for discharge during wet weather. This outfall is near the Plant 3 PFAS source area, and therefore will be addressed as part of this work plan.

### 1.2.3 Plant 6

Arcadis conducted field investigations to characterize the extent of PFAS impacts in the Plant 6 storm sewer network, which lies at the same approximate elevation as perched groundwater (10 to 18 feet below ground surface). The majority of the storm and sanitary sewer lines were cut and capped at the street curb during plant demolition activities in 2009 (**Figure 4**) (O'Brien & Gere, 2009). The remaining open storm sewer outfall manholes on and around Plant 6 were sampled between November 2018 and May 2019. PFOS concentrations above the Rule 57 criteria for surface water were detected in on-site and off-site manholes sampled. An initial scope of work to address PFOS concentrations was completed in December 2019 including filling four open storm sewer outfall manholes (**Figure 4**). Follow up sampling in February showed all plant 6 locations were below surface water criteria. Additional sampling in July indicated two exceedances of PFOS just above the surface water criteria in the off-site manholes following a period of particularly dry weather (**Table 3, Figure 4**).

## 2 PLANT 2 SEWER MODIFICATIONS

### 2.1 Plant 2 Proposed Modifications

The components of the Plant 2 modifications are as follows, listed in order of planned implementation:

1. Cap approximately 30 catch basins associated with storm sewer manholes P2-MH-10, P2-MH-16, P2-MH-59, and P2-MH-79
2. Fill manholes P2-MH-10, P2-MH-16, P2-MH-59, P2-MH-79, and P2-SAN-3-7

All work will be completed per the requirements of the Arcadis Site-Specific Health and Safety Plan (Arcadis, 2020a) and industry best practices.

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

#### 2.1.1 Cap Catch Basins

All catch basins in the P2-MH-10, P2-MH-16, P2-MH-59, and P2-MH-79 drainage area will be capped to minimize surface water inflow into the portion of the sewer system to be deactivated (**Figure 5A**). Capping catch basins is considered a best practice to reduce surface water inflow, hydraulic pressure on deactivated storm pipes, and the possibility of water from storm sewer lines daylighting to ground surface through open catch basins following large storm events. Prior to capping, Arcadis will perform a field survey to finalize quantity and locations of the catch basins to be capped. Consistent with prior modifications, approximately 30 catch basins will be capped by removing the existing grate, placing a polyvinyl chloride (PVC) liner with a silicone bead sealant over the opening, reinstalling the existing catch basin grate over the PVC liner, followed by placing a galvanized steel plate on top as shown by the detail on **Figure 8**. The steel plate will also be sealed with silicone and covered with gravel to prevent theft (**Figure 8**, Detail A).

#### 2.1.2 Fill Four Storm and One Sanitary Manhole with Concrete

Manholes P2-MH-10, P2-MH-16, P2-MH-59, and P2-MH-79 will be filled with concrete (**Figure 5A**) to mitigate flow of PFAS-impacted water to the Plant 2 storm sewer outfalls P2-MH-30 and P2-MH-9. P2-SAN-3-7 will be filled to mitigate flow of PFAS-impacted water to the northeastern Plant 2 sanitary sewer outfall (**Figure 5B**). The manhole structures will be filled with concrete to ground surface (**Figure 8**). Concrete placement will follow standard construction practices including but not limited to consolidation (i.e. vibrating) to eliminate air voids and ensure complete placement. Prior to filling, the manholes will be cleaned to remove dirt and debris that would prevent a proper seal between the concrete and existing structure. Manhole cleaning may involve confined space entry which will be performed according to contractor health and safety standards.

The concrete will be allowed to cure for 2 to 3 days while Arcadis monitors for signs of cracking or settling. An anticipated volume of 3,000 to 6,000 gallons of sewer water from cleaning will be pumped into

dewatering boxes staged on-Site, characterized, and disposed of at an appropriate off-Site disposal facility. Actual volume removed may vary based on field conditions.

## 2.2 Performance Monitoring

After blocking the proposed manholes, increased surface ponding may occur following rain events. This ponding is expected to dissipate relatively quickly, as has been observed on Plants 2 and 3 following prior modifications. In order to monitor storm water ponding and potential runoff, personnel will mobilize to the Site within 24 hours following the first four precipitation events of various intensity after completion of the sewer modifications. The Site will be generally inspected with more attention to locations that based on surface topography have the potential for runoff.

Storm sewer water quality monitoring will be completed following the storm sewer modification activities to evaluate PFAS at the compliance points outlined in **Section 1.1**. Confirmatory dry weather sampling for PFAS will be completed at manhole P2-MH-30 and P2-MH-9 following construction and quarterly thereafter for one year.

## 3 PLANT 3 SEWER MODIFICATIONS

### 3.1 Proposed Modifications

The components of the Plant 3 modifications are as follows, listed in order of planned implementation:

1. Cap approximately 7 catch basins associated with storm sewer manhole P3-MH-308
2. Fill storm sewer manhole P3-MH-308 in the northwest parking lot with underwater concrete and cap the associated catch basins.
3. Bulkhead the Plant 3 sanitary sewer vault along the eastern property boundary.

#### 3.1.1 Cap Catch Basins

All catch basins in the P3-MH-308 drainage area will be capped to minimize surface water inflow and hydraulic pressure on deactivated storm pipes of the sewer system to be deactivated (**Figure 6A**). Prior to capping, Arcadis will perform a field survey to finalize quantity and locations of the catch basins to be capped. Consistent with prior modifications, approximately 7 catch basins will be capped by removing the existing grate, placing a polyvinyl chloride (PVC) liner with a silicone bead sealant over the opening, reinstalling the existing catch basin grate over the PVC liner, followed by placing a galvanized steel plate on top as shown by the detail on **Figure 8**. The steel plate will also be sealed with silicone and covered with gravel to prevent theft (**Figure 8, Detail A**).

#### 3.1.2 P3-MH-308 Fill

Manhole P3-MH-308 will be filled with concrete to mitigate the highest mass flux pathway to the outfall, while retaining the rest of the storm sewer network for drainage (**Figure 6A**). The manhole structures will be filled with concrete to ground surface (**Figure 8**). Concrete placement will follow standard construction practices including but not limited to consolidation (i.e. vibrating) to eliminate air voids and ensure complete placement. Prior to filling, the manholes will be cleaned to remove dirt and debris that would prevent a proper seal between the concrete and existing structure. Manhole cleaning may involve confined space entry which will be performed according to contractor health and safety standards.

The concrete will be allowed to cure for 2 to 3 days while Arcadis monitors for signs of cracking or settling. An anticipated volume of 1,000 to 2,000 gallons of sewer water from cleaning will be pumped into dewatering boxes staged on-Site, characterized, and disposed of at an appropriate off-Site disposal facility. Actual volume removed may vary based on field conditions.

#### 3.1.3 Sanitary Sewer Vault Bulkhead

A trickle of water flow was observed discharging through the northeast sanitary sewer vault (**Figure 6B**) in June 2020 following a rain event. The sanitary sewer system is no longer in use and has been abandoned farther upstream, which indicates the potential for groundwater infiltration into the sanitary sewers and offsite discharge. The sanitary sewer is in the vicinity of the Plant 3 PFAS source area in perched groundwater. A reinforced concrete bulkhead will be installed in the 30-inch diameter pipe

entering the Plant 3 sanitary vault to block potential groundwater infiltration from discharging off-Site (**Figure 6B**) while retaining the vault for use during redevelopment.

Prior to bulkheading, the contractor will stop the water flow by installing inflatable plugs at upstream manhole. The bulkhead will then be installed in the vault pouring a reinforced concrete form (bulkhead) inside the upstream invert. Concrete placement will follow standard construction practices including but not limited to consolidation (i.e. vibrating) to eliminate air voids and ensure complete placement. The contractor will perform slump testing and send samples to a laboratory for compressive strength testing to ensure that the concrete has cured to the required strength and consistency. Then holes will be drilled every 12 inches around the entire circumference of the bulkhead and a polyurethane grout will be injected into the holes. The holes will allow the injected grout to spread out and seal the entire contact surface between the new concrete and the sewer pipe as indicated in **Figure 9**. Bulkhead installation will involve confined space entry which will be performed according to contractor health and safety standards.

All work will be completed per the requirements of the Arcadis Site-Specific Health and Safety Plan (Arcadis, 2020a) and industry best practices.

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

### 3.2 Performance Monitoring

Northwest parking lot manhole P3-MH-284 will be inspected quarterly and dry weather sampled if flow is observed for one year after implementation. The Plant 3 Sanitary Vault will be inspected quarterly for the first year following the construction to evaluate remedy effectiveness.

After blocking the storm sewer manhole, increased surface ponding may occur following rain events. This ponding is expected to dissipate relatively quickly, as has been observed on Plants 2 and 3 following prior modifications. In order to monitor storm water ponding and potential runoff, personnel will mobilize to the Site within 24 hours following the first four precipitation events of various intensity after completion of the sewer modifications. The Site will be generally inspected with more attention to locations that based on surface topography have the potential for runoff. Bulkheading the sanitary vault is not expected to affect site drainage.

## 4 PLANT 6 SEWER INSPECTION AND MODIFICATIONS

### 4.1 Proposed Inspection and Modifications

The primary components of the Plant 6 inspection and modifications are as follows, listed in order of planned implementation:

1. Plug the pipe entering Osborn-CB-1 from the southwest
2. Plug the corrugated drainage pipe entering Osborn-MH-1 from the southwest
3. Closed circuit television (CCTV) inspection of Verlinden Avenue, Osborne Rd, and Michigan Avenue storm sewer from Verlinden-MH-1 to Verlinden-MH-5 and MichAve-MH-3 to Verlinden-MH-5

All work will be completed per the requirements of the Arcadis Site-Specific Health and Safety Plan (Arcadis, 2020a) and industry best practices.

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

#### 4.1.1 Pipe Plugging

Outfall manhole Osborn-MH-1 has four pipes that enter from Plant 6 (**Figure 7**). Of the four pipes, one was abandoned during prior modifications; one pipe is a corrugated drainage pipe with no upstream access; a third pipe connects to a partially abandoned storm sewer pipe with access via a nearby catch basin; and a fourth pipe has no known upstream access. Pipes associated with drainage from Site into Osborn-MH-1 will be plugged at the Osborn-MH-1 manhole using hydraulic cement with the exception of the pipe with access via an upstream catch basin (Osborn-CB-1). The pipe entering Osborn-CB-1 from the Site will be plugged rather than filling the manhole to allow drainage of runoff from Osborn Road as the catch basin is outside of Site. Upstream manholes along this sewer line have already been abandoned. Cleaning and removal of debris in the pipes will be completed prior to plugging if needed to ensure a proper seal of the pipes. Pipe plugging will involve confined space entry which will be performed according to contractor health and safety standards.

#### 4.1.2 CCTV Inspection of Lansing City Sewers

CCTV inspection of the storm sewer in Verlinden Avenue, Osborne Road and Michigan Avenue will be completed to look for evidence of groundwater infiltration through pipe joints or cracks, discharge from sewer lateral connections, and/or to observe for pipe integrity issues which could affect future sewer modifications (**Figure 7**). This information will be used to evaluate additional modifications, if necessary. Prior to the CCTV inspection, sections of the sewer may be cleaned to provide access for the camera. CCTV inspection may involve confined space entry to position the camera which will be performed according to contractor health and safety standards.

## 4.2 Performance Monitoring

Storm sewer water quality monitoring will continue to evaluate PFAS at the compliance points outlined in **Section 1.1**. Confirmatory dry weather sampling for PFAS will be completed at manholes in Michigan Ave, Verlinden Ave, and Osborn Rd following completion of the cleaning and CCTV work and quarterly thereafter for one year.

## 5 CONTINGENCY

Should confirmatory water quality samples return PFAS exceedances discharging from the compliance points, additional characterization, modifications, and/or corrective measures will be evaluated. .

## 6 SCHEDULE

Implementation will be initiated after all necessary approvals of this Work Plan are obtained. At this time, the identified approvals needed are from EGLE and the City of Lansing. The first step in implementing this Work is to procure a contractor, which could take up to two months after Work Plan approval. After contractor selection a schedule for field implementation will be determined. Field implementation is targeted to be initiated in the fall of 2020.

## 7 REFERENCES

- Arcadis, 2018a. Interim Measures Work Plan: Plant 3 Storm Sewer Modifications. May 24.
- Arcadis, 2018b. Monitoring Well PFAS Summary – Plants 2 and 6 RACER Trust Site, Lansing, Michigan. September 14.
- Arcadis, 2019a. Plant 3 Storm Sewer Modifications Completion Report. January 25.
- Arcadis, 2019b. Interim Measures Workplan: Plants 2 and 3 Storm Sewer Modifications. July 16.
- Arcadis, 2019c. Interim Measures Workplan: Plant 6 Storm Sewer Modifications. October 18.
- Arcadis, 2020a. Site Specific Health and Safety Plan. RACER Trust, Lansing Plants 2, 3, and 6. May 21.
- Arcadis, 2020b. Plants 2, 3, and 6 Storm Sewer Completion Report. August 14.
- O'Brien & Gere, 2009. General Motors Corporation Plant 6 Demolition, Lansing, MI. May.

# TABLES



**Table 1**  
**Plant 2 Sewer Sampling Results**  
**Interim Measures Work Plan: Plants 2, 3, and 6 Sewer Modifications**  
**RACER Trust - Plant 2 Industrial Land, Lansing, Michigan**

Location ID: Date Collected:	Units	MI Rule 57 SW (EGLE 2017)	P2-CB-32 07/07/20	P2-MH-2 07/07/20	P2-MH-9 07/07/20	P2-MH-10 07/07/20	P2-MH-14 07/07/20	P2-MH-16 07/07/20
<b>Results</b>								
Perfluorooctanesulfonic acid (PFOS)	ng/L	12	15.4	45.4	36.4	32.6	25.8	80.7 [94.6]
Perfluorooctanoic acid (PFOA)	ng/L	12,000	4.6	28.7	26	25.1	22.5	56.5 [60.5]
Other PFAS	ng/L	NC	42.7	97.2	85.4	82.2	80.5	247.5 [274.5]

Location ID: Date Collected:	Units	MI Rule 57 SW (EGLE 2017)	P2-MH-25 07/07/20	P2-MH-26 07/06/20	P2-MH-30 07/07/20	P2-MH-32 07/07/20	P2-MH-36 07/07/20	P2-MH-58 07/06/20
<b>Results</b>								
Perfluorooctanesulfonic acid (PFOS)	ng/L	12	45.7	47.1	45.1	<17	2.4 J	21.8
Perfluorooctanoic acid (PFOA)	ng/L	12,000	40.7	36.2	29.8	<17	2.9 J	12.3
Other PFAS	ng/L	NC	171.1	120.2	102.5	80.3	36.4	50.1

Location ID: Date Collected:	Units	MI Rule 57 SW (EGLE 2017)	P2-MH-73 07/06/20	P2-MH-79 07/06/20	P2-MH-W 07/06/20	P2-MH-NW 07/07/20	P2-SAN-3-7 07/07/20
<b>Results</b>							
Perfluorooctanesulfonic acid (PFOS)	ng/L	12	29.5	52.8	<4.0	44.1	16.1
Perfluorooctanoic acid (PFOA)	ng/L	12,000	29.8	37.9	4.3	31.7	20.2
Other PFAS	ng/L	NC	82.4	101.4	35.3	103.4	69.7

**Notes:**

- Shaded Exceeds Rule 57 Human Non-Cancer Screening Value for Surface Water from a Non-Drinking Water Source for PFOS or PFOA
- NC No criteria
- ng/L Nanograms per liter
- PFAS Per- and polyfluoroalkyl substances
- [ ] Indicates duplicate sample
- J Indicates an estimated value below laboratory reporting limit
- < The compound was analyzed for but not detected.

Total Other PFAS is calculated using detections and the Method Detection Limit for Non-detections

All samples analyzed for PFAS via USEPA Method 537

**Table 2**  
**Plant 3 Sewer Sampling Results**  
**Interim Measures Work Plan: Plants 2, 3, and 6 Sewer Modifications**  
**RACER Trust - Plant 3 Industrial Land, Lansing, Michigan**

Location ID: Date Collected:	Units	MI Rule 57 SW (EGLE 2017)	P3-MH-284 07/06/20	P3-MH-284 08/18/20	P3-MH-290 08/18/20	P3-MH-308 08/18/20
<b>Results</b>						
Perfluorooctanesulfonic acid (PFOS)	ng/L	12	32.8	17.2	17.8 [17.3]	22.4
Perfluorooctanoic acid (PFOA)	ng/L	12,000	1.7 J	1.2 J	1.1 J [0.87 J]	1.3 J
Other PFAS	ng/L	NC	38.4	39.7	40 [39.8]	40.9

**Notes:**

- Shaded Exceeds Rule 57 Human Non-Cancer Screening Value for Surface Water from a Non-Drinking Water Source for PFOS or PFOA
- NC No criteria
- ng/L Nanograms per liter
- PFAS Per- and polyfluoroalkyl substances
- [ ] Indicates duplicate sample
- J Indicates an estimated value below laboratory reporting limit
- Total Other PFAS is calculated using detections and the Method Detection Limit for Non-detections
- All samples analyzed for PFAS via USEPA Method 537

**Table 3**  
**Plant 6 Sewer Sampling Results**  
**Interim Measures Work Plan: Plants 2, 3, and 6 Sewer Modifications**  
**RACER Trust - Plant 6 Industrial Land, Lansing, Michigan**

Location ID: Date Collected:	Units	MI Rule 57 SW (EGLE 2017)	MICH AVE-MH-3 07/07/20	MICH AVE-MH-4 07/07/20	OSBORNE-MH-1 07/07/20	P6-MH-16 07/06/20
<b>Results</b>						
Perfluorooctanesulfonic acid (PFOS)	ng/L	12	4.9	11.9	16.6 [21.4]	12.8
Perfluorooctanoic acid (PFOA)	ng/L	12,000	8.2	11.2	39 [43.8]	54.8
Other PFAS	ng/L	NC	56.0	52.8	91.1 [97.8]	140.0

Location ID: Date Collected:	Units	MI Rule 57 SW (EGLE 2017)	VERLINDEN-MH-2 07/07/20	VERLINDEN-MH-3 07/07/20	VERLINDEN-MH-4 07/07/20	VERLINDEN-MH-5 07/07/20
<b>Results</b>						
Perfluorooctanesulfonic acid (PFOS)	ng/L	12	13.1	10.6	9.9	11.7
Perfluorooctanoic acid (PFOA)	ng/L	12,000	22.5	30.4	23.4	24.5
Other PFAS	ng/L	NC	86.6	109.5	87.21	86.6

**Notes:**

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

NC No criteria

ng/L Nanograms per liter

PFAS Per- and polyfluoroalkyl substances

[ ] Indicates duplicate sample

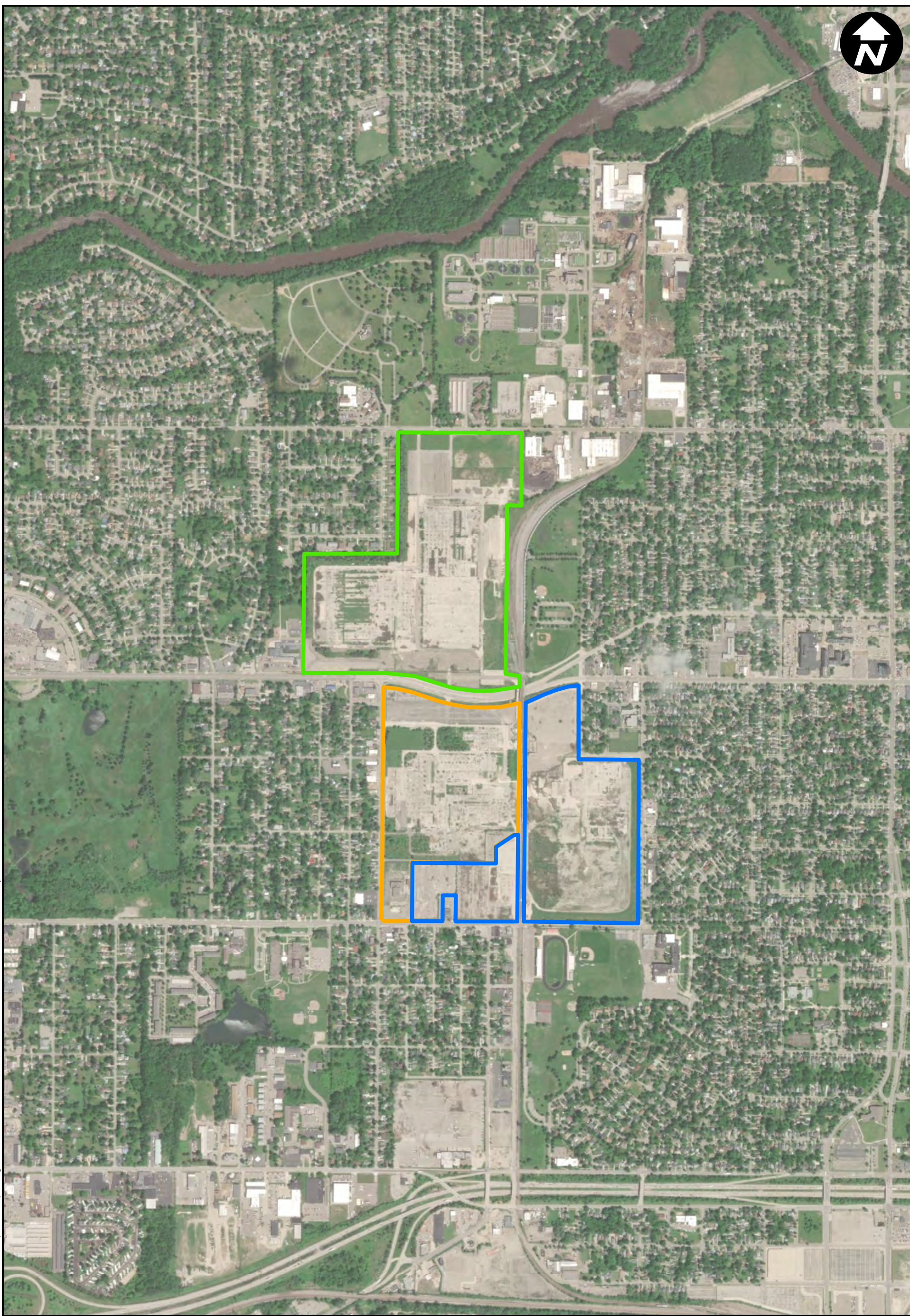
J Indicates an estimated value below laboratory reporting limit

Total Other PFAS calculated using detections and Method Detection Limit for Non-Detections

All samples analyzed for PFAS via USEPA Method 537




# FIGURES

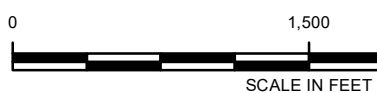




CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: J. SALING PROJECT NUMBER: 30042872.03600 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl  
K:\MXDs\2020 P2 P3 P6 Storm Sewer Modifications Completion Report\Figure 1 - Site Location.mxd PLOTTED: 9/16/2020 12:58:24 PM BY: MJoye

**PLANT BOUNDARIES**

-  PLANT 2
-  PLANT 3
-  PLANT 6



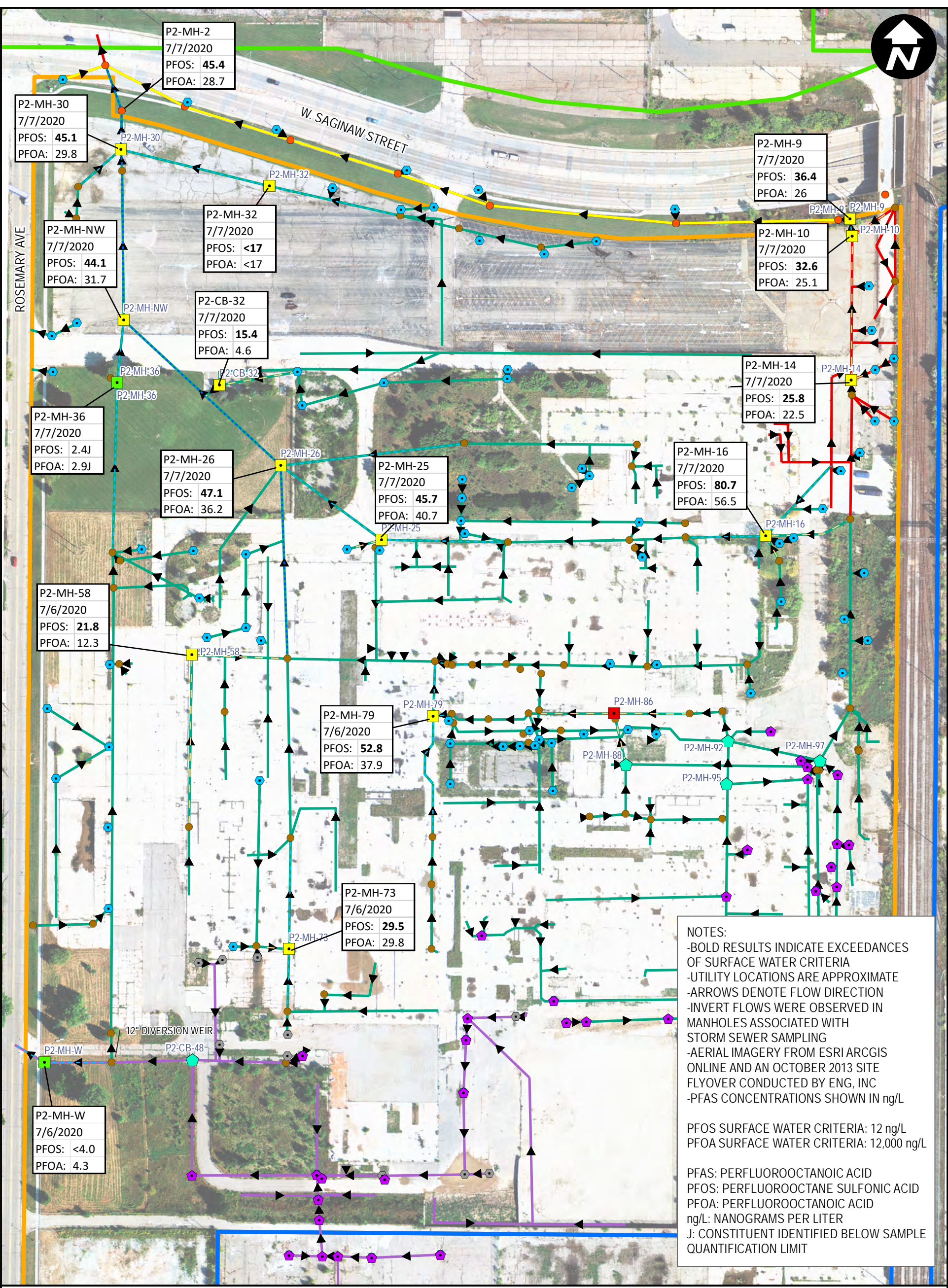
RACER TRUST  
PLANTS 2, 3 & 6  
LANSING, MICHIGAN

**SITE LOCATION**

NOTE: AERIAL IMAGERY FROM ESRI ARCGIS ONLINE.



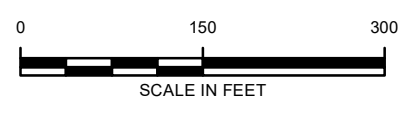
FIGURE  
**1**



CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: J. SALING PROJECT NUMBER: 30042872.03600 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl  
 K:\MXD\2020 P2 P3 P6 Storm Sewer Modifications Completion Report\Figure 2A - Plant 2 PFAS Storm Sewer Sampling Analytical Results.mxd PLOTTED: 9/25/2020 12:42:02 PM BY: MJOYE

<b>ADJUSTMENT TYPE</b> FILLED STRUCTURE CAPPED STRUCTURE	<b>PLANT 2 DRAINAGE NETWORKS</b> NORTHEAST (ACTIVE) CENTRAL (PARTIALLY ABANDONED) SOUTHWEST (ABANDONED) OFFSITE STORM LINE <b>OBSERVED FLOW (JULY 2020)</b> NO FLOW TRICKLE (~1 GPM OR LESS) LITTLE (~1-3 GPM)	<b>PLANT BOUNDARIES</b> PLANT 2 PLANT 3 PLANT 6
<b>STRUCTURES &amp; SAMPLE POINTS</b> MANHOLE OFFSITE MANHOLE CATCH BASIN REMAINING OPEN COULD NOT LOCATE STRUCTURE MANHOLE ABOVE PFOS CRITERIA (12 ng/L) MANHOLE BELOW SURFACE WATER CRITERIA DRY MANHOLE		

**NOTES:**  
 -BOLD RESULTS INDICATE EXCEEDANCES OF SURFACE WATER CRITERIA  
 -UTILITY LOCATIONS ARE APPROXIMATE  
 -ARROWS DENOTE FLOW DIRECTION  
 -INVERT FLOWS WERE OBSERVED IN MANHOLES ASSOCIATED WITH STORM SEWER SAMPLING  
 -AERIAL IMAGERY FROM ESRI ARCGIS ONLINE AND AN OCTOBER 2013 SITE FLYOVER CONDUCTED BY ENG, INC  
 -PFAS CONCENTRATIONS SHOWN IN ng/L  
  
 PFOS SURFACE WATER CRITERIA: 12 ng/L  
 PFOA SURFACE WATER CRITERIA: 12,000 ng/L  
  
 PFAS: PERFLUOROOCCTANOIC ACID  
 PFOS: PERFLUOROOCCTANE SULFONIC ACID  
 PFOA: PERFLUOROOCCTANOIC ACID  
 ng/L: NANOGRAMS PER LITER  
 J: CONSTITUENT IDENTIFIED BELOW SAMPLE QUANTIFICATION LIMIT



RACER TRUST  
 PLANTS 2, 3 & 6  
 LANSING, MICHIGAN

**JULY 2020 PLANT 2 PFAS STORM SEWER SAMPLING ANALYTICAL RESULTS**

FIGURE  
**2A**

CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: J. SALING PROJECT NUMBER: 30042872.03600 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl  
 K:\MXD\2020 P2 P3 P6 Storm Sewer Modifications Completion Report\Figure 2B - Plant 2 PFAS Sanitary Sewer Sampling Analytical Results.mxd PLOTTED: 9/25/2020 12:49:48 PM BY: M.Joye

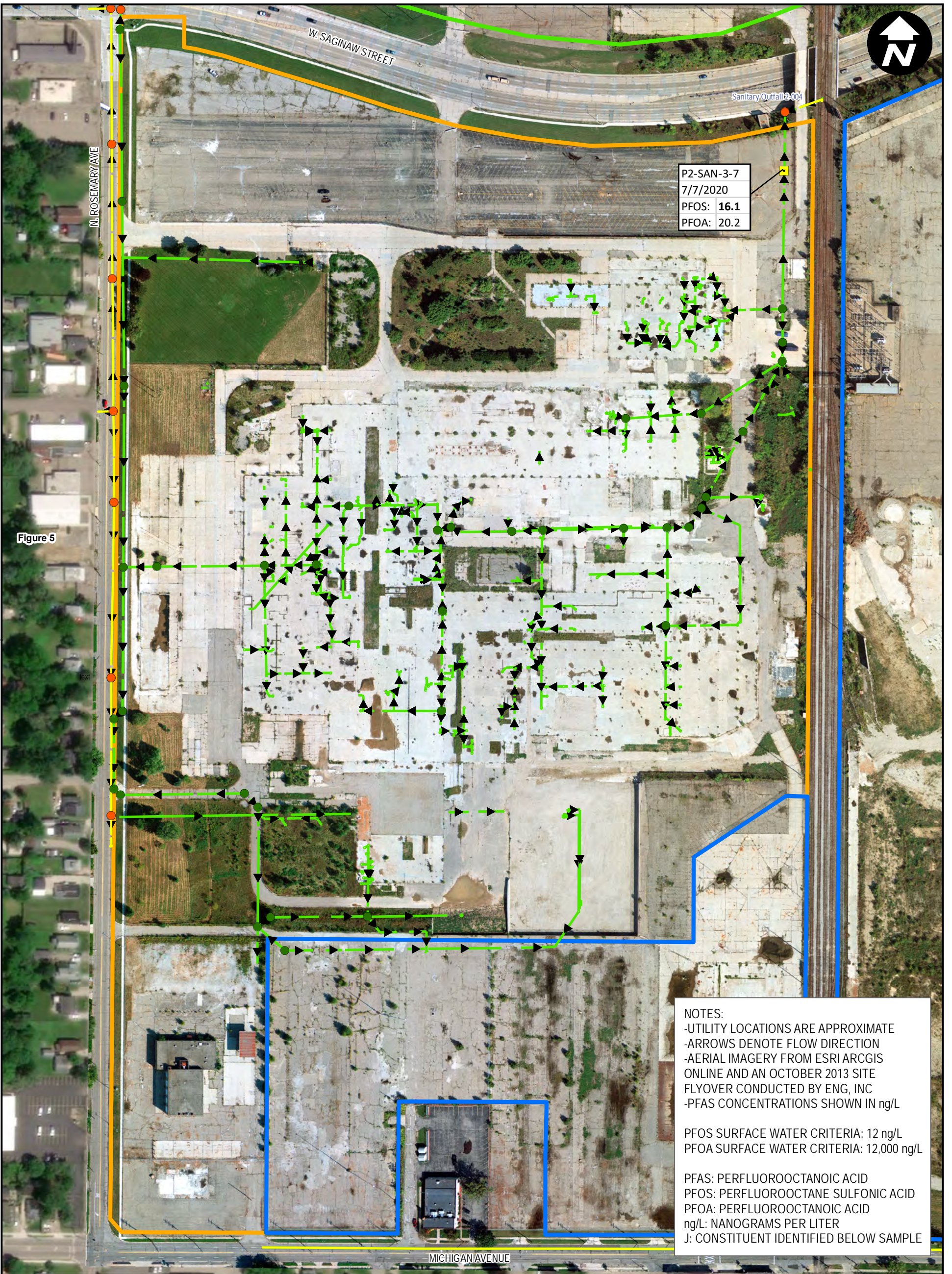


Figure 5

P2-SAN-3-7  
 7/7/2020  
 PFOS: 16.1  
 PFOA: 20.2

NOTES:  
 -UTILITY LOCATIONS ARE APPROXIMATE  
 -ARROWS DENOTE FLOW DIRECTION  
 -AERIAL IMAGERY FROM ESRI ARCGIS ONLINE AND AN OCTOBER 2013 SITE FLYOVER CONDUCTED BY ENG, INC  
 -PFAS CONCENTRATIONS SHOWN IN ng/L

PFOS SURFACE WATER CRITERIA: 12 ng/L  
 PFOA SURFACE WATER CRITERIA: 12,000 ng/L

PFAS: PERFLUOROCTANOIC ACID  
 PFOS: PERFLUOROCTANE SULFONIC ACID  
 PFOA: PERFLUOROCTANOIC ACID  
 ng/L: NANOGRAMS PER LITER  
 J: CONSTITUENT IDENTIFIED BELOW SAMPLE

- STRUCTURES & SAMPLE POINTS**
- SANITARY MANHOLE
  - OFFSITE MANHOLE
  - ▶ SANITARY SEWER
  - MANHOLE ABOVE SURFACE WATER CRITERIA
  - OFFSITE SANITARY SEWER
- PLANT BOUNDARIES**
- PLANT 2
  - PLANT 3
  - PLANT 6

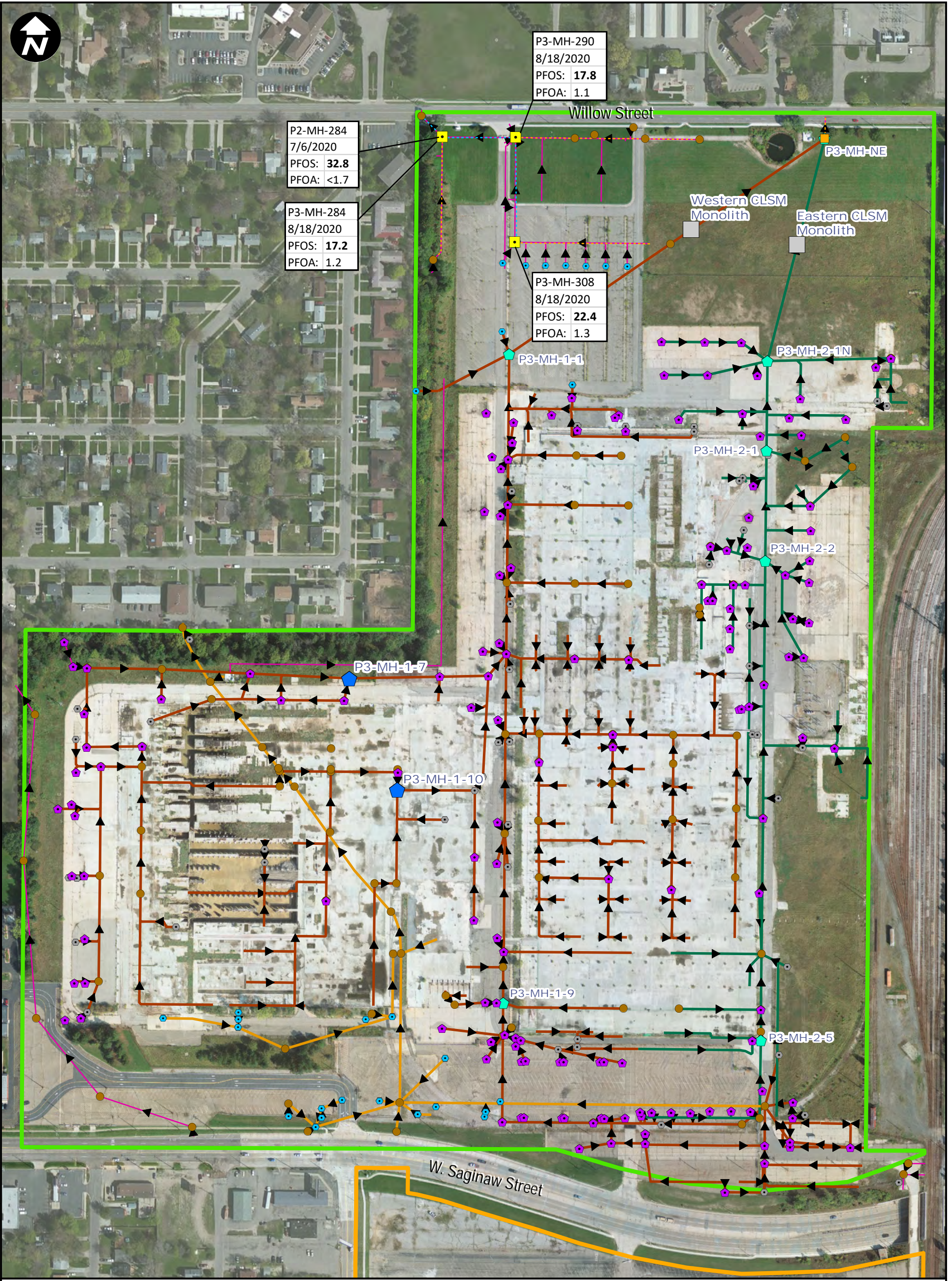


RACER TRUST  
 PLANTS 2, 3 & 6  
 LANSING, MICHIGAN

**JULY 2020 PLANT 2 PFAS SANITARY SEWER SAMPLING ANALYTICAL RESULTS**



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 for natural and  
 built assets



P2-MH-284  
7/6/2020  
PFOS: 32.8  
PFOA: <1.7

P3-MH-284  
8/18/2020  
PFOS: 17.2  
PFOA: 1.2

P3-MH-290  
8/18/2020  
PFOS: 17.8  
PFOA: 1.1

P3-MH-308  
8/18/2020  
PFOS: 22.4  
PFOA: 1.3

CITY: NOVI DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: J. SALLING PROJECT NUMBER: 30042872.03600 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl K:\MXD\2020\20\20\_P3 PFAS Storm Sewer Monitoring Completion Report\Figure 3 - Plant 3 PFAS Storm Sewer Sampling Analytical Results.mxd PLOTTED: 10/22/2020 10:13:29 AM Bvr\_Mjove

**STRUCTURES & SAMPLE POINTS**

- MANHOLE
- MANHOLE COULD NOT BE LOCATED
- CATCH BASIN REMAINING OPEN
- COULD NOT LOCATE STRUCTURE
- MANHOLE ABOVE SURFACE WATER CRITERIA
- FILLED STRUCTURE
- CAPPED STRUCTURE
- POUR TO ALLOW OUTFALL TO REMAIN OPEN AND ALL INCOMING PIPES TO BE PLUGGED
- CLSM MONOLITH
- BULKHEAD

**PLANT 3 DRAINAGE NETWORKS**

- COUNTY MAIN (ACTIVE)
- EAST MAIN (ABANDONED)
- WEST MAIN (ABANDONED)
- OTHER (ACTIVE)

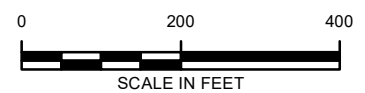
**OBSERVED FLOW (JULY 2020)**

- NO FLOW
- TRICKLE (~1 GPM OR LESS)
- LITTLE (~1-3 GPM)

**PLANT BOUNDARIES**

- ▭ PLANT 2
- ▭ PLANT 3

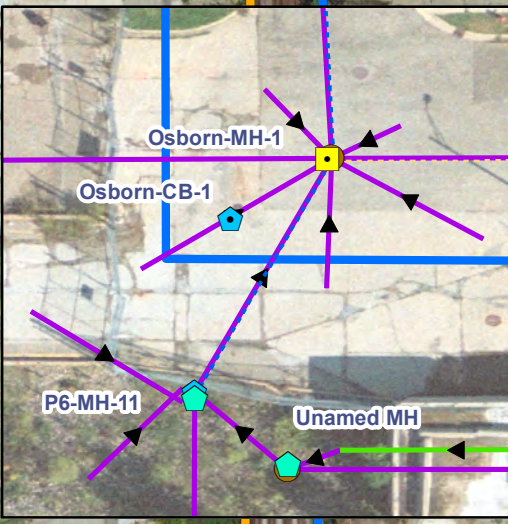
NOTES:  
-UTILITY LOCATIONS ARE APPROXIMATE  
-ARROWS DENOTE FLOW DIRECTION  
-INVERT FLOWS WERE OBSERVED IN MANHOLES ASSOCIATED WITH STORM SEWER SAMPLING  
-AERIAL IMAGERY FROM ESRI ARCGIS ONLINE AND AN OCTOBER 2013 SITE FLYOVER CONDUCTED BY ENG, INC



RACER TRUST  
PLANTS 2, 3 & 6  
LANSING, MICHIGAN

**PLANT 3 PFAS STORM SEWER SAMPLING ANALYTICAL RESULTS**





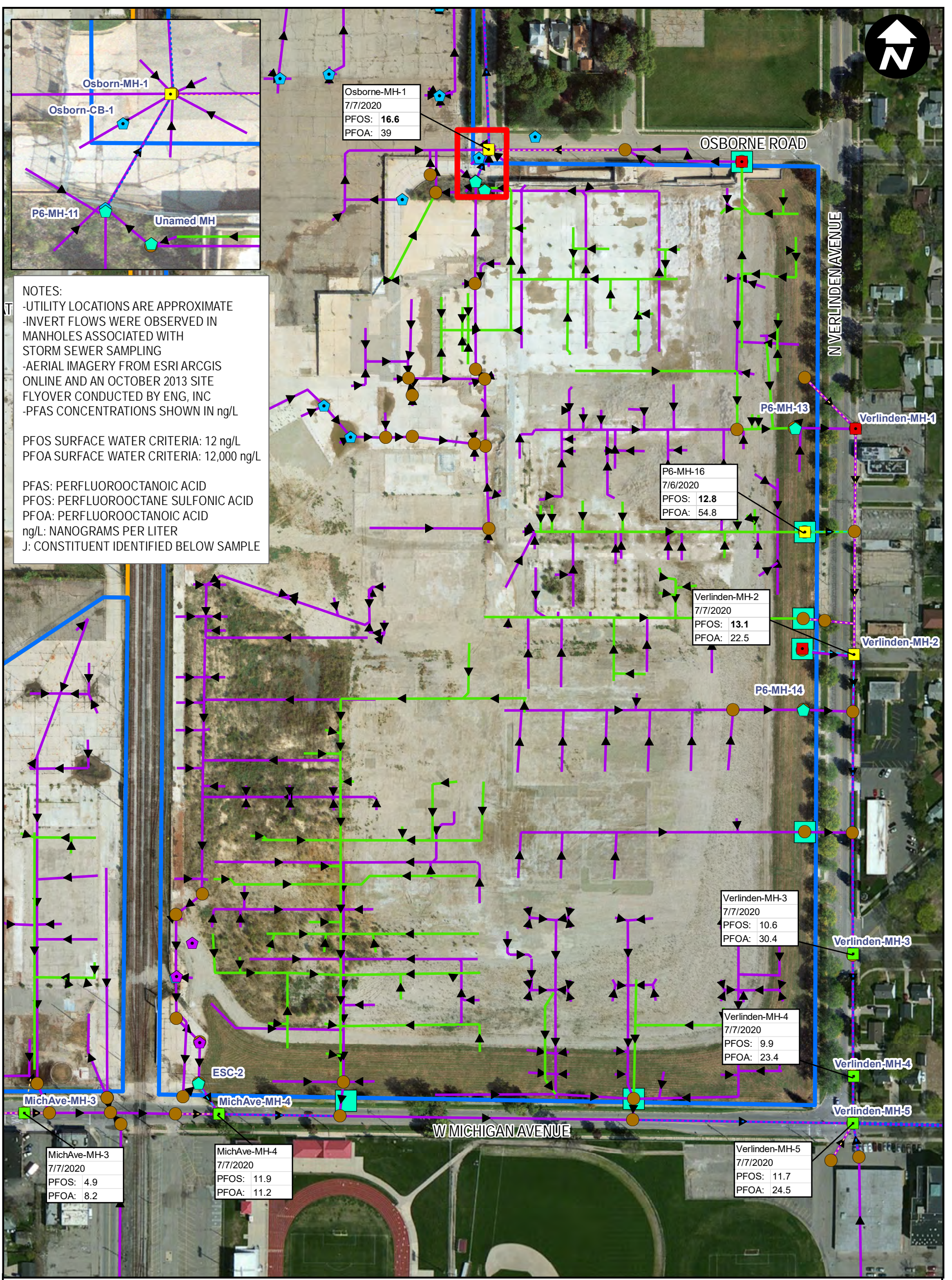
Osborne-MH-1
7/7/2020
PFOS: 16.6
PFOA: 39

NOTES:  
 -UTILITY LOCATIONS ARE APPROXIMATE  
 -INVERT FLOWS WERE OBSERVED IN MANHOLES ASSOCIATED WITH STORM SEWER SAMPLING  
 -AERIAL IMAGERY FROM ESRI ARCGIS ONLINE AND AN OCTOBER 2013 SITE FLYOVER CONDUCTED BY ENG, INC  
 -PFAS CONCENTRATIONS SHOWN IN ng/L

PFOS SURFACE WATER CRITERIA: 12 ng/L  
 PFOA SURFACE WATER CRITERIA: 12,000 ng/L

PFAS: PERFLUOROOCCTANOIC ACID  
 PFOS: PERFLUOROOCCTANE SULFONIC ACID  
 PFOA: PERFLUOROOCCTANOIC ACID  
 ng/L: NANOGRAMS PER LITER  
 J: CONSTITUENT IDENTIFIED BELOW SAMPLE

CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: J. SALING PROJECT NUMBER: 30042872.03600 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl K:\MXD\2020 P2 P3 P6 Storm Sewer Modifications Completion Report\Figure 4 - Plant 6 PFAS Sewer Sampling Analytical Results.mxd PLOTTED: 10/5/2020 12:07:37 AM BY: M.Joye



STRUCTURES

- MANHOLE
- ⬢ CATCH BASIN REMAINING OPEN
- ⬢ FILLED STRUCTURE
- ⬢ CAPPED STRUCTURE
- ⬢ SEWER LINE CUT AND CAPPED AT PROPERTY LINE

SAMPLING

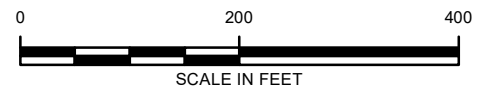
- ⬢ MANHOLE ABOVE SURFACE WATER CRITERIA
- ⬢ MANHOLE BELOW SURFACE WATER CRITERIA
- ⬢ DRY MANHOLE

PLANT 6 DRAINAGE NETWORKS

- STORM LINE
- SANITARY LINE
- OBSERVED FLOW (JULY 2020)
- NO FLOW
- TRICKLE (~1 GPM OR LESS)
- LITTLE (~1-3 GPM)
- MODERATE (~3 GPM OR GREATER)

PLANT BOUNDARIES

- ⬢ PLANT 2
- ⬢ PLANT 6



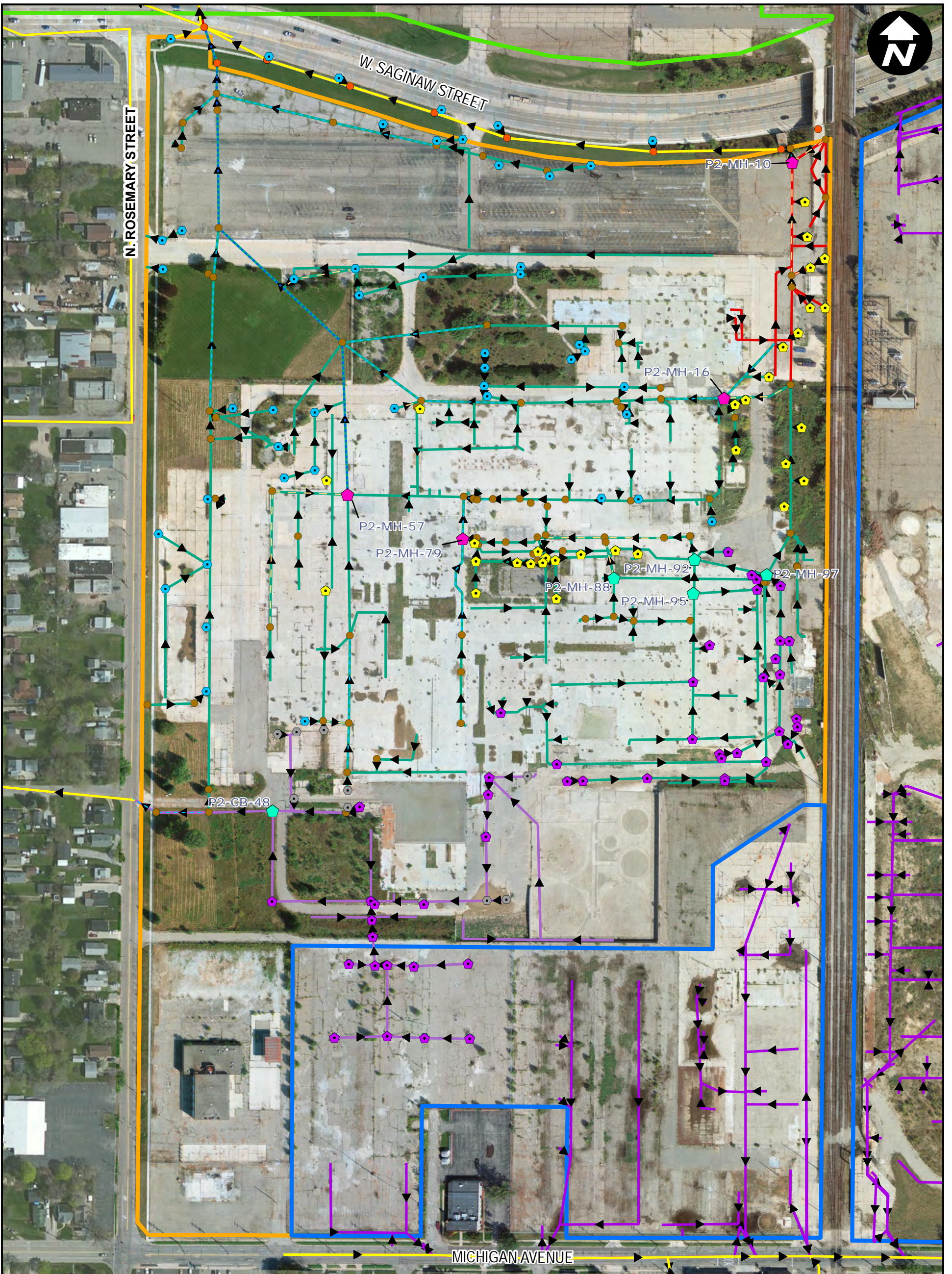
RACER TRUST  
 PLANTS 2, 3 & 6  
 LANSING, MICHIGAN

**PLANT 6 PFAS SEWER SAMPLING ANALYTICAL RESULTS**

ARCADIS Design & Consultancy for natural and built assets

FIGURE 4

CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TR: A. LORENZ TR: J. SALING PROJECT NUMBER: 30042872.03600 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl  
 K:\MXD\2020 P2 P3 P6 Storm Sewer Modifications Completion Report\Figures5A - Plant 2 Storm Sewer Modifications Plan Layout.mxd PLOTTED: 9/25/2020 11:37:20 AM BY: MJoye



**STRUCTURES & SAMPLE POINTS**

- MANHOLE
- OFFSITE MANHOLE
- ◆ FILLED STRUCTURE
- ◆ CAPPED STRUCTURE
- ◆ STRUCTURE TO BE FILLED
- ◆ STRUCTURE TO BE CAPPED
- CATCH BASIN REMAINING OPEN
- COULD NOT LOCATE STRUCTURE

**OBSERVED FLOW (JULY 2020)**

- NO FLOW
- TRICKLE (~1 GPM OR LESS)
- LITTLE (~1-3 GPM)
- PLANT 2 DRAINAGE NETWORKS
- NORTHEAST (ACTIVE)
- CENTRAL (PARTIALLY ABANDONED)
- SOUTHWEST (ABANDONED)
- STORM LINE
- OFFSITE STORM LINE

**PLANT BOUNDARIES**

- PLANT 2
- PLANT 3
- PLANT 6

NOTES:  
 -UTILITY LOCATIONS ARE APPROXIMATE  
 -ARROWS DENOTE FLOW DIRECTION  
 -INVERT FLOWS WERE OBSERVED IN MANHOLES ASSOCIATED WITH STORM SEWER SAMPLING  
 -AERIAL IMAGERY FROM ESRI ARCGIS ONLINE AND AN OCTOBER 2013 SITE FLYOVER CONDUCTED BY ENG, INC



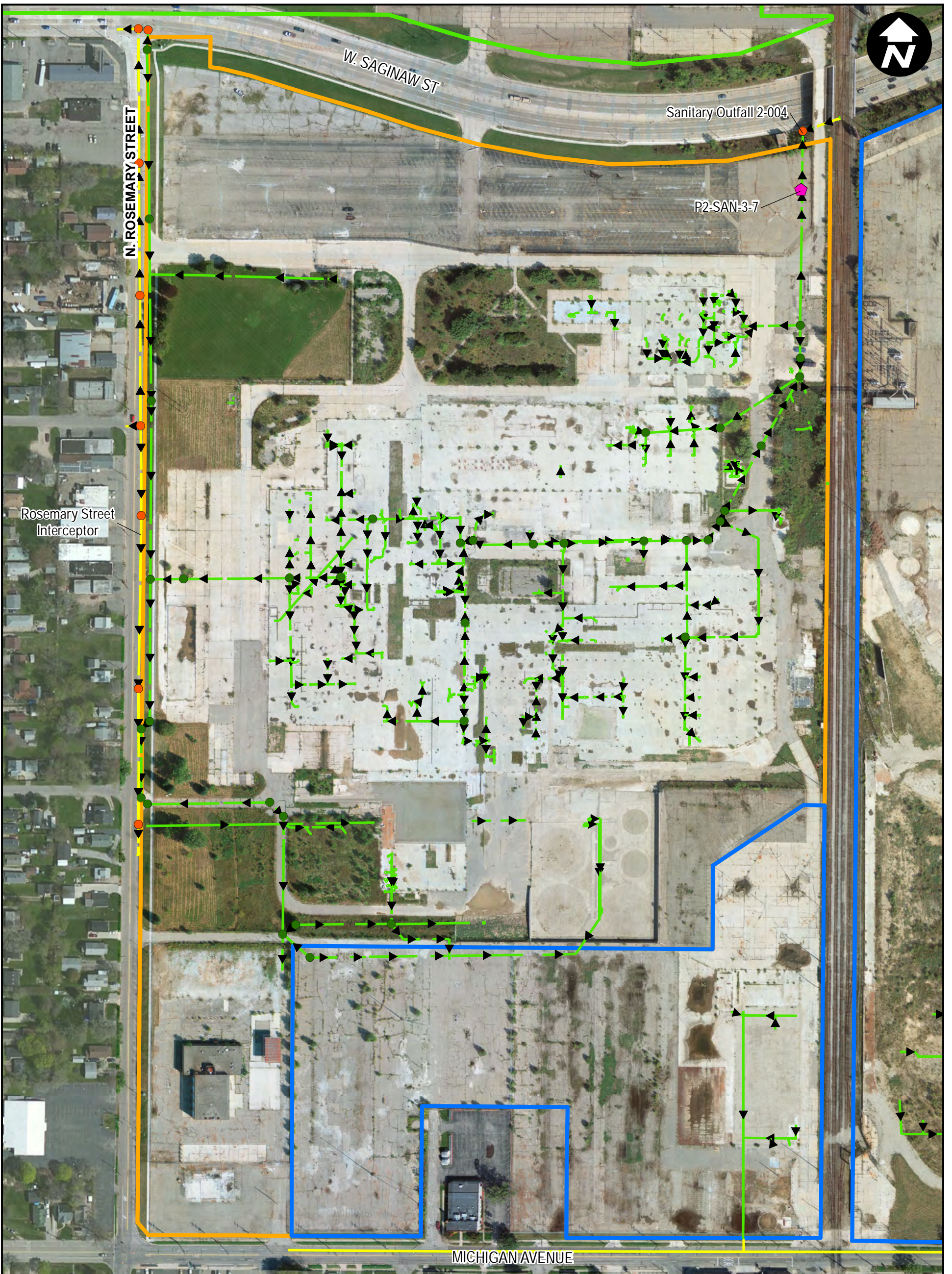
RACER TRUST  
 PLANTS 2, 3 & 6  
 LANSING, MICHIGAN

**2020 PLANT 2 STORM SEWER MODIFICATIONS PLAN LAYOUT**



FIGURE  
**5A**

CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: J. SALING PROJECT NUMBER: 30042872.03600 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl  
 K:\MXDs\2020 P2 P3 P6 Storm Sewer Modifications Completion Report\Figure 5B - Plant 2 Storm Sanitary Modifications Plan Layout.mxd PLOTTED: 10/2/2020 12:44:02 PM BY: M.Joye



**STRUCTURES**

- MANHOLE
- OFFSITE MANHOLE
- ◆ STRUCTURE TO BE FILLED
- SANITARY SEWER
- OFFSITE SANITARY SEWER

**PLANT BOUNDARIES**

- ▭ PLANT 2
- ▭ PLANT 3
- ▭ PLANT 6

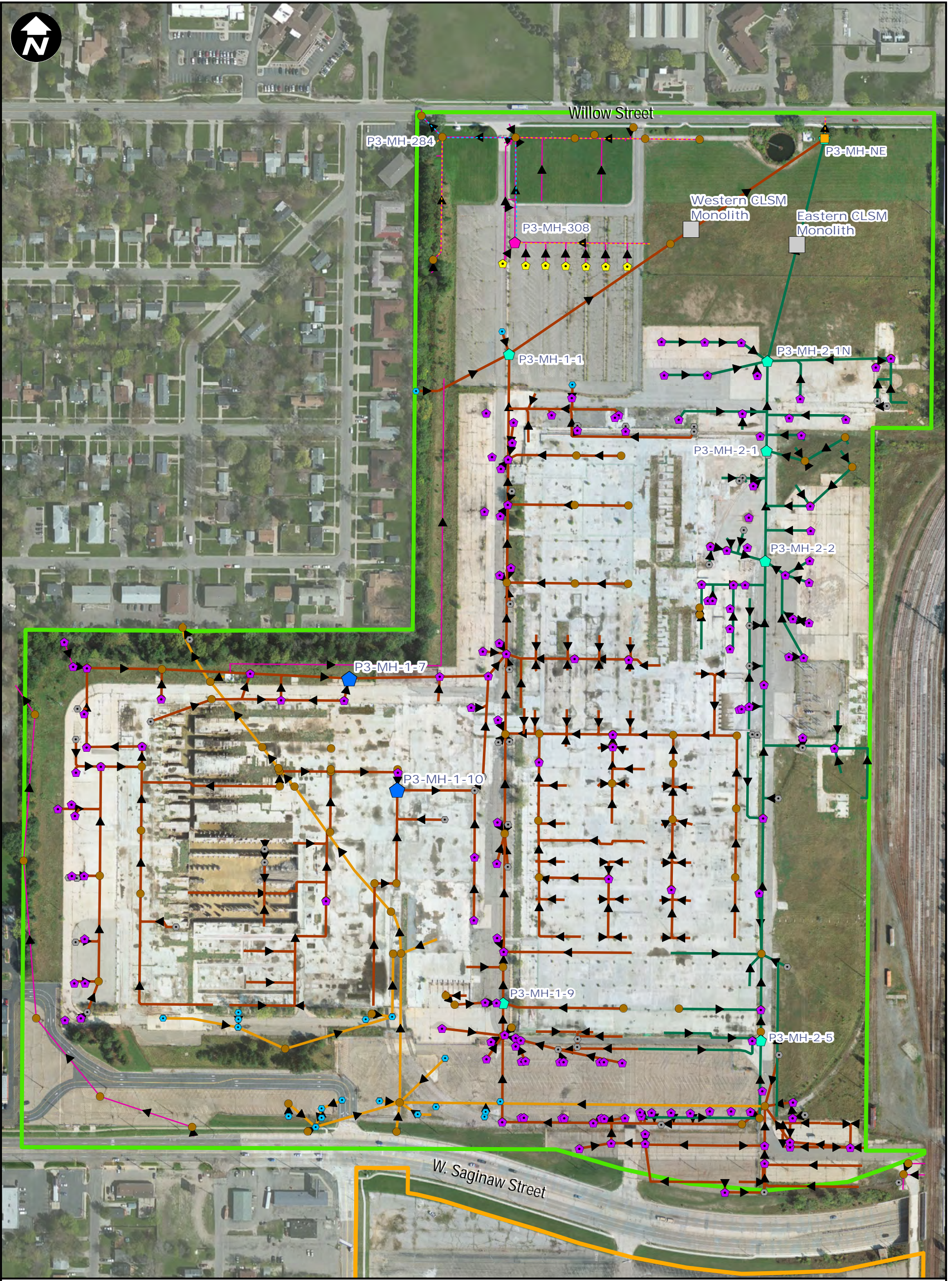


NOTES:  
 -UTILITY LOCATIONS ARE APPROXIMATE  
 -ARROWS DENOTE FLOW DIRECTION  
 -AERIAL IMAGERY FROM ESRI ARCGIS ONLINE AND AN OCTOBER 2013 SITE FLYOVER CONDUCTED BY ENG, INC  
 -SANITARY OUTFALL 2-004 WAS THE ONLY SANITARY OUTFALL THAT COULD BE LOCATED AT PLANT 2. NO OUTFALL WAS IDENTIFIED ALONG THE WESTERN PROPERTY BOUNDARY.

RACER TRUST  
 PLANTS 2, 3 & 6  
 LANSING, MICHIGAN

**2020 PLANT 2 SANITARY SEWER MODIFICATIONS PLAN LAYOUT**

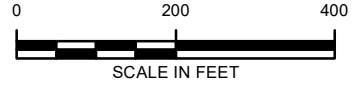




CITY: NOVI DIV: ENV PIC: J. BARRITT PM: R. CHRISTENSEN TM: A. LORENZ TR: J. SALLING PROJECT NUMBER: 30042872.03600 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl K:\MWD\2020\20\_P3\_P6\_Storm\_Sewer\_Modifications\_Completion\_Reports\Figure 6A - Plant 3 Storm Sewer Modifications Plan Layout.mxd PLOTTED: 9/25/2020 1:37:20 PM BY: MLOVE

- ADJUSTMENT TYPE**
- FILLED STRUCTURE
  - CAPPED STRUCTURE
  - STRUCTURE TO BE FILLED
  - CLSM MONOLITH
  - BULKHEAD
  - MANHOLE FILLED WITH CUSTOM POUR TO ALLOW OUTFALL TO REMAIN OPEN AND ALL INCOMING PIPES TO BE PLUGGED
- STRUCTURE & SAMPLE POINTS**
- MANHOLE
  - CATCH BASIN REMAINING OPEN
  - CATCH BASIN TO BE CAPPED

- PLANT 3 DRAINAGE NETWORKS**
- COUNTY MAIN (ACTIVE)
  - EAST MAIN (ABANDONED)
  - WEST MAIN (ABANDONED)
  - OTHER (ACTIVE)
- PLANT BOUNDARIES**
- PLANT 2
  - PLANT 3
- OBSERVED FLOW (JULY 2020)**
- NO FLOW
  - TRICKLE (~1 GPM OR LESS)



**NOTES:**

- UTILITY LOCATIONS ARE APPROXIMATE
- ARROWS DENOTE FLOW DIRECTION
- INVERT FLOWS WERE OBSERVED IN MANHOLES ASSOCIATED WITH STORM SEWER SAMPLING
- AERIAL IMAGERY FROM ESRI ARCGIS ONLINE AND AN OCTOBER 2013 SITE FLYOVER CONDUCTED BY ENG, INC

RACER TRUST  
PLANTS 2, 3 & 6  
LANSING, MICHIGAN

**2020 PLANT 3 STORM SEWER MODIFICATIONS PLAN LAYOUT**

**ARCADIS** Design & Consultancy for natural and built assets

FIGURE **6A**



Willow Street

Plant 3  
Sanitary Vault

60" Sanitary Main

W. Saginaw Street

STRUCTURES

- SANITARY MANHOLE
- SANITARY VAULT TO BE BULKHEADED
- SANITARY LINE (ACTIVE)
- SANITARY LINE (ABANDONED)

PLANT BOUNDARIES

- PLANT 2
- PLANT 3



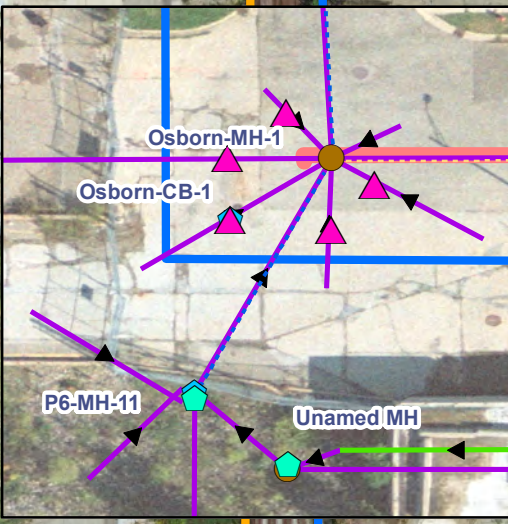
NOTES:  
 -UTILITY LOCATIONS ARE APPROXIMATE  
 -ARROWS DENOTE FLOW DIRECTION  
 -AERIAL IMAGERY FROM ESRI ARCGIS  
 ONLINE AND AN OCTOBER 2013 SITE  
 FLYOVER CONDUCTED BY ENG, INC  
 -THE EASTERN SANITARY OUTFALL  
 WAS THE ONLY OUTFALL THAT COULD  
 BE IDENTIFIED IN THE FIELD AND IS  
 LOCATED NEAR THE PFAS SOURCE  
 AREA.

RACER TRUST  
 PLANTS 2, 3 & 6  
 LANSING, MICHIGAN

**2020 PLANT 3 SANITARY SEWER  
 MODIFICATIONS PLAN LAYOUT**



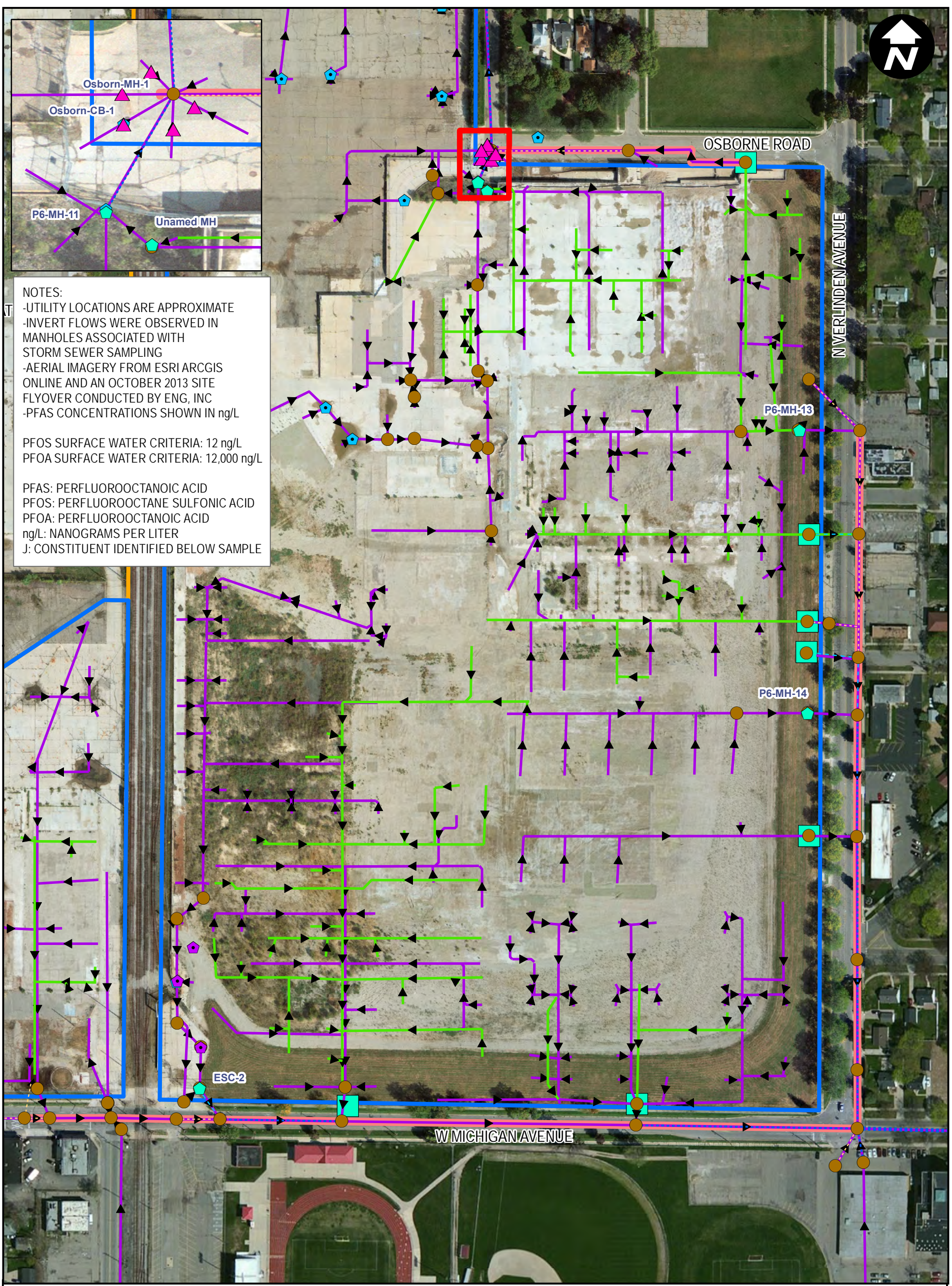
FIGURE  
**6B**



NOTES:  
 -UTILITY LOCATIONS ARE APPROXIMATE  
 -INVERT FLOWS WERE OBSERVED IN MANHOLES ASSOCIATED WITH STORM SEWER SAMPLING  
 -AERIAL IMAGERY FROM ESRI ARCGIS ONLINE AND AN OCTOBER 2013 SITE FLYOVER CONDUCTED BY ENG, INC  
 -PFAS CONCENTRATIONS SHOWN IN ng/L

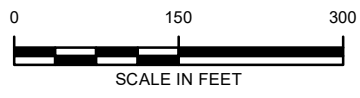
PFOS SURFACE WATER CRITERIA: 12 ng/L  
 PFOA SURFACE WATER CRITERIA: 12,000 ng/L

PFAS: PERFLUOROOCCTANOIC ACID  
 PFOS: PERFLUOROOCCTANE SULFONIC ACID  
 PFOA: PERFLUOROOCCTANOIC ACID  
 ng/L: NANOGRAMS PER LITER  
 J: CONSTITUENT IDENTIFIED BELOW SAMPLE



- STRUCTURES**
- MANHOLE
  - MANHOLE COULD NOT BE LOCATED
  - CATCH BASIN REMAINING OPEN
  - ▲ PLUG INFLUENT LATERALS FROM PLANT 6 SITE
  - FILLED STRUCTURE
  - CAPPED STRUCTURE
  - SEWER LINE CUT AND CAPPED AT PROPERTY LINE
  - CCTV TO BE COMPLETED

- PLANT 6 DRAINAGE NETWORKS**
- ▲ STORM LINE
  - ▲ SANITARY LINE
- OBSERVED FLOW (JULY 2020)**
- NO FLOW
  - TRICKLE (~1 GPM OR LESS)
  - LITTLE (~1-3 GPM)
  - MODERATE (~3 GPM OR GREATER)
- PLANT BOUNDARIES**
- PLANT 2
  - PLANT 6

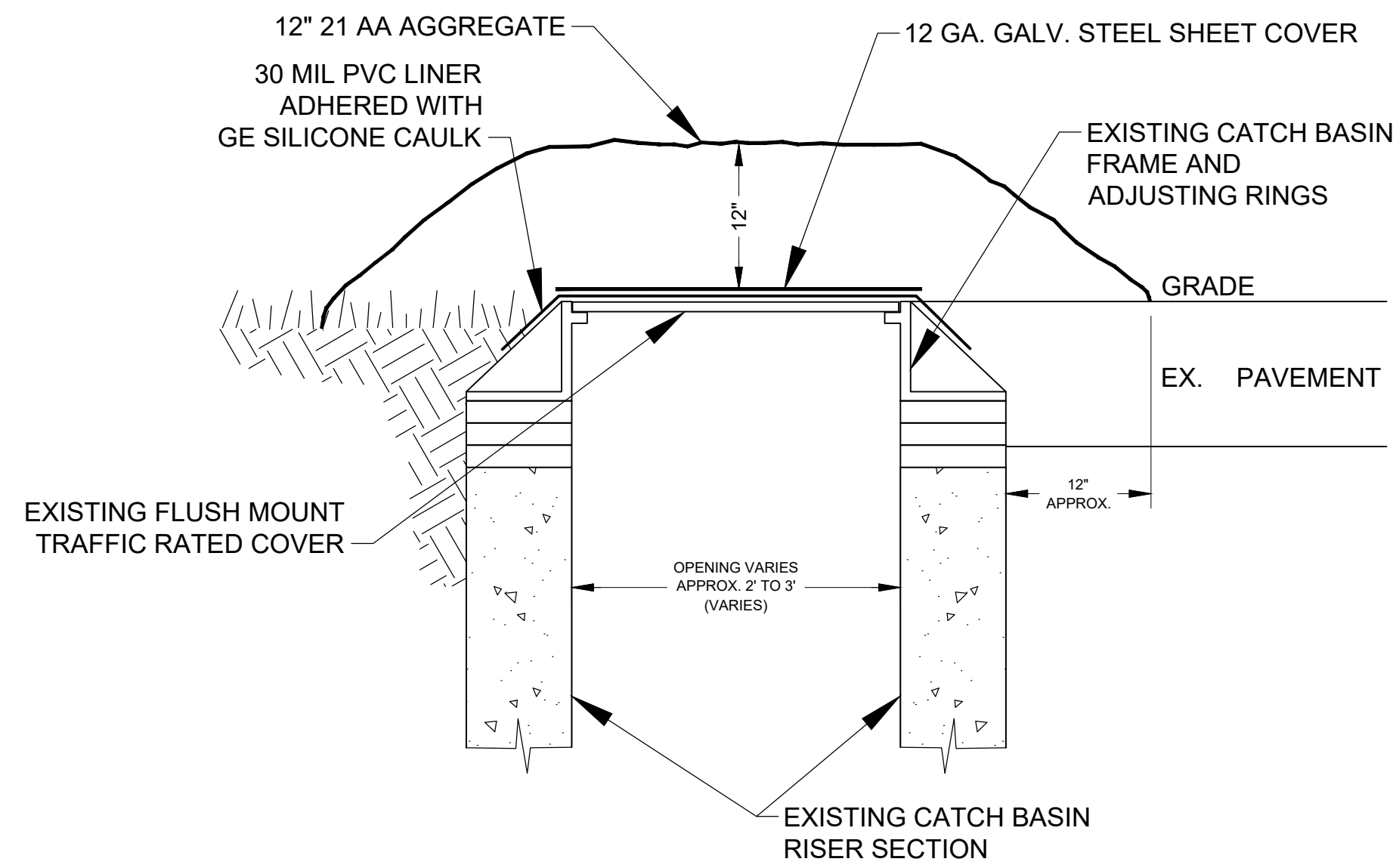


RACER TRUST  
 PLANTS 2, 3 & 6  
 LANSING, MICHIGAN

**PLANT 6 PFAS SEWER  
 INSPECTION AND MODIFICATIONS PLAN**

CITY: Novi DIV: ENV PIC: J. BARRETT PM: R. CHRISTENSEN TM: A. LORENZ TR: J. SALING PROJECT NUMBER: 30042872.03600 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl K:\MXD\2020 P2 P3 P6 Storm Sewer Modifications Completion Report\Figure 7 - 2020 Plant 6 Storm Sewer Modifications Layout.mxd PLOTTED: 10/4/2020 11:01:40 PM BY: MJoye

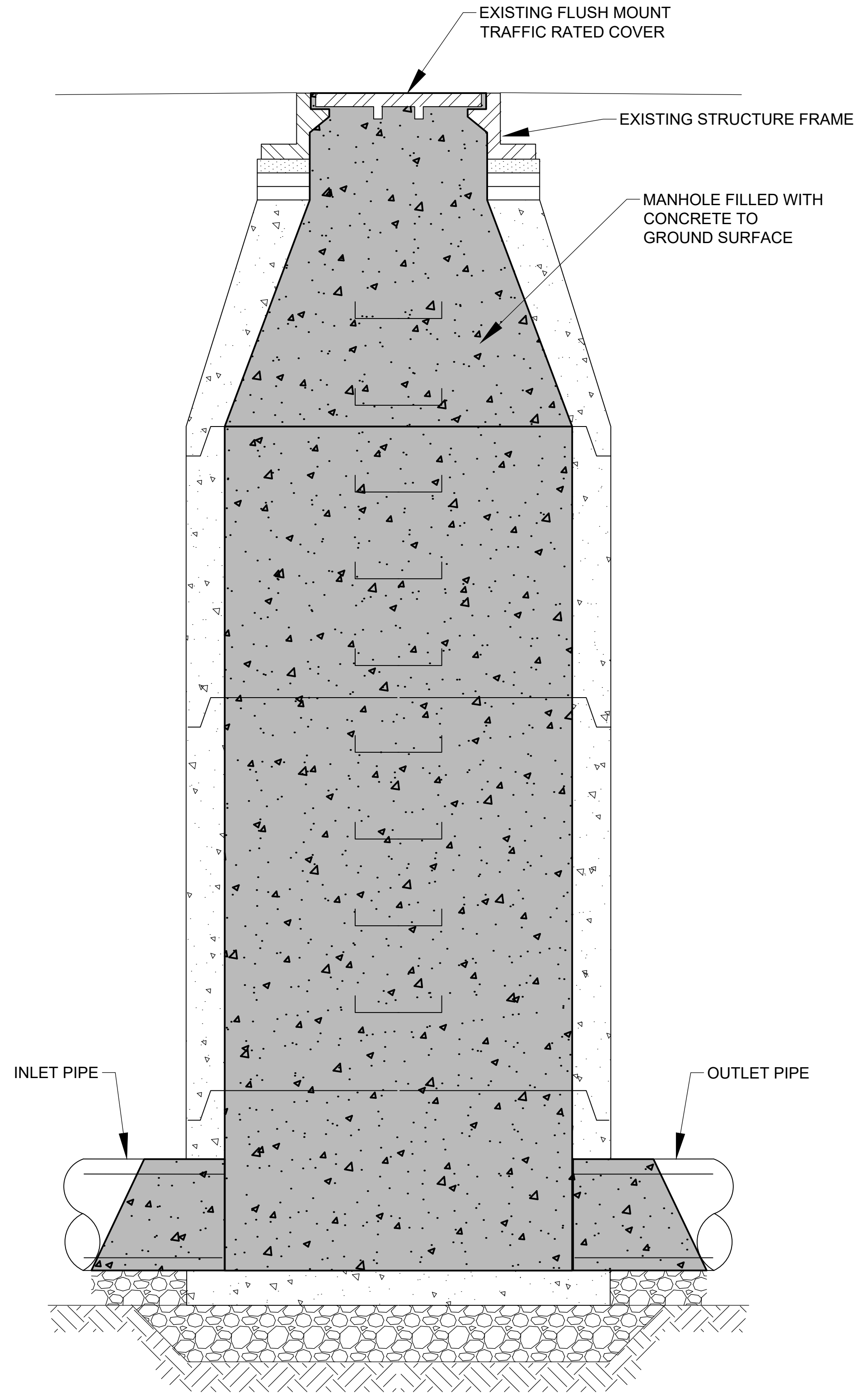
CITY: DIVISION OF PUBLIC WORKS, LANSING, MI; PROJECT: RACER TRUST INDUSTRIAL LAND, LANSING, MI; DRAWING: TYPICAL CATCH BASIN CAP DETAIL; DATE: 09/16/2020; TIME: 11:40 AM; BY: SANCHEZ, ADRIAN



**TYPICAL CATCH BASIN CAP DETAIL**

1" = 1'-0"

- LEGEND:**
- CONCRETE
  - GRAVEL FILL
  - PRECAST CONCRETE
  - UNDISTURBED SOIL
  - EX. EXISTING
  - GA. GAUGE
  - GALV. GALVANIZED
  - PVC POLYVINYL CHLORIDE
  - MIL MILLIMETER



**TYPICAL STRUCTURE FILLED WITH CONCRETE**

1" = 1'-0"

SCALE(S) AS INDICATED	
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING.	USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
1	05.11.2018	PRELIMINARY DRAFT DESIGN	EF	AL

THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REUSED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

Professional Engineer's Name <b>JACELYN SALING</b>		
Professional Engineer's No. 6201054715		
State MI	Date Signed	Project Mgr. R. CHRISTENSEN
Designed by E. FEENSTRA	Drawn by A. SANCHEZ	Checked by A. LORENZ

**ARCADIS** Design & Consultancy for natural and built assets

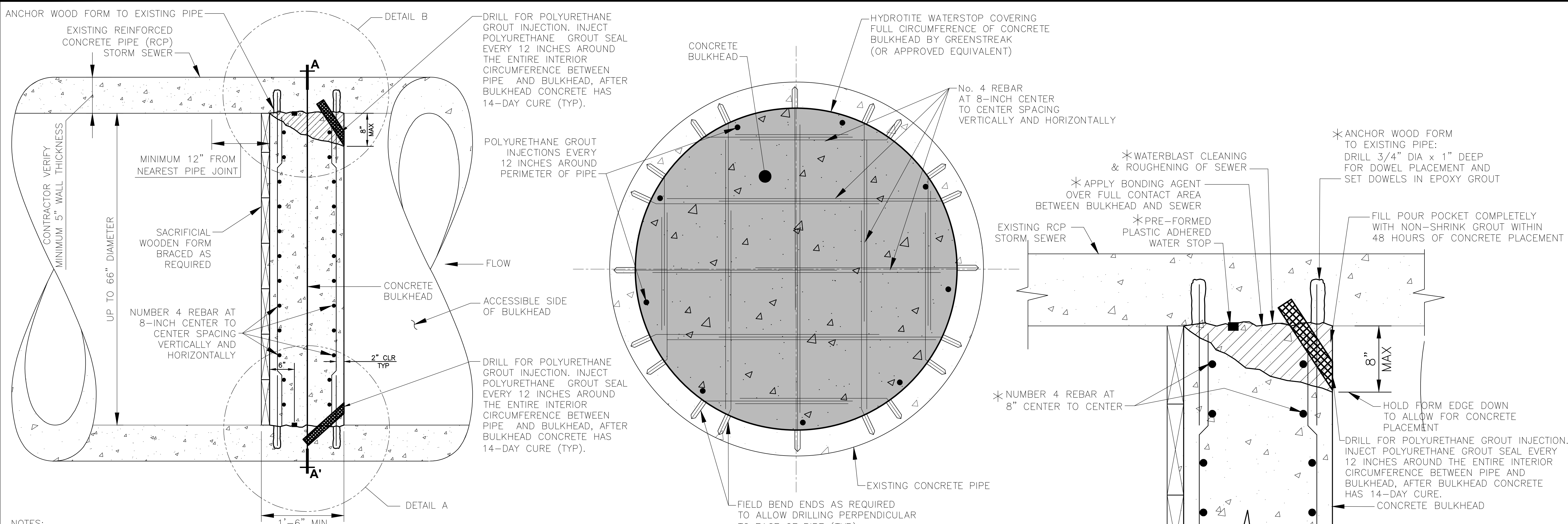
ARCADIS OF MICHIGAN, LLC.

RACER TRUST • INDUSTRIAL LAND, LANSING, MICHIGAN

**TYPICAL STRUCTURE FILL AND CATCH BASIN CAP DETAILS**

ARCADIS Project No. 30042872.03600
Date SEPTEMBER 2020
ARCADIS 28550 CABOT DRIVE SUITE 500 NOVI, MICHIGAN 48377 TEL. 248.994.2240

CITY: DIVISION OF PUBLIC WORKS, SAN ANTONIO, TEXAS  
 PROJECT: RACER TRUST PROJECT - INDUSTRIAL LAND, LANSING, MICHIGAN  
 DRAWING: TYPICAL BULKHEAD SECTION FOR UP TO 66" PIPE  
 DATE: 09/24/2020  
 BY: A. SANCHEZ, ADRIAN



**NOTES:**

1. CONTRACTOR MUST STOP ALL PIPE FLOW IN ORDER TO CLEAN AND PREPARE SEWER FOR BONDING AGENT. MAINTAIN ZERO FLOW UNTIL CONCRETE HAS REACHED FULL STRENGTH (MINIMUM 28 DAYS).
2. ASSUMES PIPE IS CONCRETE. IF PIPE MATERIAL IS DIFFERENT OR IN UNACCEPTABLE CONDITION, CONTACT ENGINEER.

\* FULL CIRCUMFERENCE OF BULKHEAD.

**TYPICAL BULKHEAD SECTION FOR UP TO 66" PIPE**

1/2" = 1'-0"

**SECTION A-A'**

**DETAIL B**

1" = 1'-0"

**DETAIL A**

1" = 1'-0"

SCALE(S) AS INDICATED		Professional Engineer's Name <b>JACELYN SALING</b>	
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING.		Professional Engineer's No. 6201054715	
USE TO VERIFY FIGURE REPRODUCTION SCALE	1	05.11.2018	PRELIMINARY DRAFT DESIGN
	No.	Date	Revisions
	By	DS	AL
	Ckd		
THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REUSED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.			
	Designed by	Drawn by	Checked by
	D.STOCKARD	A.SANCHEZ	A.LORENZ

Professional Engineer's Name <b>JACELYN SALING</b>		
Professional Engineer's No. 6201054715		
State MI	Date Signed	Project Mgr. R.CHRISTENSEN
Designed by D.STOCKARD	Drawn by A.SANCHEZ	Checked by A.LORENZ

**ARCADIS** Design & Consultancy for natural and built assets

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**TYPICAL BULKHEAD SECTION DETAILS**

ARCADIS Project No. 30042872.03600	<b>9</b>
Date SEPTEMBER 2020	
ARCADIS 28550 CABOT DRIVE SUITE 500 NOVI, MICHIGAN 48377 TEL. 248.994.2240	

CITY: DIV/CORP.: DS: A SANCHEZ LD: PIC: RM: R CHRISTENSEN TM: LYR: CH: L OFE: REF: C:\Users\asanchez\BIM\360\Arcadis\ANA - RACER TRUST\Project Files\BAGEL LANSING PLANTS 23 4892020\360\0427201-DWG\RT-LP236-PFAS\IMP-PLUG-CB-DETAIL.dwg LAYOUT: 9A. SAVED: 9/16/2020 1:51 PM ACADVER: 23.18 (LMS TECH). PAGES: 1. PLOTSTYLETABLE: ---. PLOTSETUP: ---. PLOTSTYLETABLE: ---. PLOTTED: 9/24/2020 11:40 AM BY: SANCHEZ, ADRIAN

**DESIGN AND CODE INFORMATION**

- ALL CONSTRUCTION SHALL CONFORM TO 2009 INTERNATIONAL BUILDING CODE, MICHIGAN EDITION.
- VERIFY EXISTING CONDITIONS AND DIMENSIONS AND NOTIFY ENGINEER OF ANY CONDITIONS WHICH DO NOT COMPLY WITH PLANS AND SPECIFICATIONS.
- SHOP DRAWINGS WILL NOT BE REVIEWED BY THE DESIGNER UNTIL AFTER THE GENERAL CONTRACTOR HAS THOROUGHLY REVIEWED THE SHOP DRAWINGS, VERIFIED EXISTING CONDITIONS, AND COORDINATED THE SHOP DRAWINGS WITH OTHER AFFECTED TRADES. SUBMIT FOUR COPIES OF REVIEWED SHOP DRAWINGS FOR ENGINEER'S REVIEW. ONLY THREE SETS OF MARKED UP SHOP DRAWINGS SHALL BE RETURNED BY THE DESIGNER. REPRODUCTION OF STRUCTURAL DRAWINGS FOR SHOP DRAWINGS IS NOT PERMITTED.
- DO NOT SCALE STRUCTURAL DRAWINGS.
- LIVE LOADS:**  
BULKHEAD DESIGN IS BASED ON 15ft HEAD.
- SPECIAL INSPECTIONS:**  
THIS WORK IS EXEMPT FROM SPECIAL INSPECTIONS BECAUSE "WORK IS OF MINOR NATURE" PER IBC 2009 SECTION 1704.1 EXCEPTION 1.

**GENERAL NOTES:**

- EPOXY ADHESIVE FOR DOWELS:
  - MANUFACTURERS: HILTI CORPORATION, HIT-RE 500 SD, OR AS APPROVED.
  - A. INJECTABLE TWO-COMPONENT EPOXY ADHESIVE.
  - B. DEFORMED REINFORCING BAR.
  - C. ADHESIVE ANCHORAGE SYSTEM SHALL BE SEISMIC QUALIFIED PER IBC 2009.
  - D. ADHESIVE ANCHORAGE SYSTEM SHALL MEET REQUIREMENTS OF ASTM C881-90, TYPE N, GRADE 2 AND 3, CLASS A, B, C EXCEPT GEL TIMES.
- BONDING AGENT: 3 COMPONENT, SOLVENT FREE WATER-BASED EPOXY RESIN WITH PORTLAND CEMENT, SIKA CORP., SIKA ARMATEC 110 EPOCEM, OR AS APPROVED.
- NON-SHRINK GROUT: PRE-MIXED COMPOUND CONSISTING OF NON-METALLIC AGGREGATE, CEMENT, WATER-REDUCING AND PLASTICIZING AGENTS; CAPABLE OF DEVELOPING A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI IN 28 DAYS; BASF MASTERFLOW 713 PLUS, OR AS APPROVED.
- PREFORMED PLASTIC ADHESIVE WATERSTOP (PPAWS): FEDERAL SPECIFICATION SS-SS-210A; SINGLE-COMPONENT, SELF-SEALING PLASTIC ADHESIVE TYPE, EXTRUDED ROPE FORM BETWEEN TWO PROTECTIVE SILICONE TREATED PAPERS, 1 INCH SQUARE CROSS SECTION, 1 INCH LAP SPLICE, FURNISH WITH PRIMER; SYNKO-FLEX PRODUCTS SYNKO-FLEX, OR AS APPROVED.
- ALL MATERIALS SHALL BE FREE OF PFAS COMPOUNDS.
- FORM MATERIALS**

FORMS FOR FINISH CONCRETE: PLYWOOD, METAL, METAL-FRAMED PLYWOOD FACED, OR OTHER ACCEPTABLE PANEL-TYPE MATERIALS, TO PROVIDE CONTINUOUS, STRAIGHT, SMOOTH, SURFACES. FURNISH IN LARGEST PRACTICABLE SIZES TO MINIMIZE NUMBER OF FORM MARKS. SEAL FORM TIE HOLES TO WATERTIGHT CONDITION.

CONTRACTOR IS RESPONSIBLE FOR DESIGN OF FORMS AND BRACING OF FORMS TO WITHSTAND LOADING IMPOSED BY WET CONCRETE.
- FIELD QUALITY CONTROL**

TESTS OF CONCRETE SLUMP, AIR CONTENT AND STRENGTH WILL BE MADE AT THE DIRECTION OF ENGINEER. SAMPLES FOR STRENGTH SHOULD BE TAKEN AS NEAR AS PRACTICAL TO THE POINT OF PLACEMENT INTO THE FORMWORK OR AT A LOCATION WHICH CLOSELY MATCHES THE HANDLING CONDITIONS WHEN THE CONCRETE IS PLACED IN THE FORMS. PRIOR TO THE ADDITION OF A MID OR HIGH RANGE WATER REDUCER, A SLUMP TEST MAY BE MADE FROM A SAMPLE TAKEN FROM THE VERY FIRST CONCRETE OUT OF THE LOAD.

**REINFORCED CONCRETE**

- ALL CONCRETE WORK SHALL CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318-05).
- REINFORCING STEEL SHALL BE DEFORMED BARS ASTM A-615 (GRADE 60).
- THE COMPRESSIVE STRENGTH AT 28 DAYS OF ALL CAST IN PLACE CONCRETE SHALL BE 5000 PSI. MINIMUM
- LAP SPLICES FOR REINFORCING BARS SHALL BE CLASS B IN ACCORDANCE WITH ACI 318-05, UNLESS NOTED OTHERWISE.
- CLEAR CONCRETE COVER FOR REINFORCING STEEL: **WALLS 2"**
- CONCRETE MATERIALS AND ADMIXTURES**  
CEMENT: ASTM C150, TYPE I NORMAL PORTLAND TYPE.  
  
FINE AND COARSE AGGREGATES: ASTM C33 (NORMAL WEIGHT AGGREGATE); MATERIALS CONTAINING DELETERIOUS SUBSTANCES (SPALLING CAUSING) ARE NOT ACCEPTABLE.  
  
WATER: CLEAN AND NOT DETRIMENTAL TO CONCRETE, AND FREE OF PFAS COMPOUNDS.  
  
AIR ENTRAINMENT: ASTM C260; MASTER BUILDERS (BASF CONSTRUCTION CHEMICALS) MICRO-AIR, OR AS APPROVED.  
  
CHEMICAL: ASTM C494 TYPE A - WATER-REDUCING, TYPE B RETARDING, TYPE D - WATER-REDUCING AND RETARDING, TYPE F - WATER-REDUCING, HIGH RANGE, TYPE G - WATER-REDUCING, HIGH RANGE AND RETARDING; CONTAINING NO CHLORIDES; MASTER BUILDERS (BASF CONSTRUCTION CHEMICALS), W.R. GRACE, OR AS APPROVED.  
  
MEMBRANE CURING COMPOUND: ASTM C309, TYPE I-D, CLASS B, CLEAR WITH FUGITIVE DYE WHICH DISAPPEARS APPROXIMATELY 24 HOURS AFTER EXPOSURE TO SUNLIGHT; SPRAY-CURE SAFE CURE CLEAR, EUCLID CHEMICAL COMPANY KUREZ DR, OR AS APPROVED. WET CURING CONCRETE MAY BE SUBSTITUTED FOR CURING COMPOUND.
- CONCRETE MIX**  
CONCRETE PROPORTIONS: COMPLY WITH ACI 301, 4.2.  
  
PROVIDE CONCRETE TO THE FOLLOWING CRITERIA:  
COMPRESSIVE STRENGTH (7 DAY): 4,000 PSI.  
COMPRESSIVE STRENGTH (28 DAY): 5,000 PSI.  
WATER/CEMENT RATIO (MAXIMUM): 0.40 BY WEIGHT.  
AIR ENTRAINMENT: NOT APPLICABLE.  
  
SLUMP (MAXIMUM): 3 INCHES (DUE TO WATER).  
MID OR HIGH RANGE WATER REDUCER:  
ADD AT SITE TO INCREASE SLUMP TO 7 INCHES ±1 INCHES.
- POLYURETHANE GROUT**  
  
INJECT POLYURETHANE GROUT SEAL AROUND THE ENTIRE INTERIOR CIRCUMFERENCE BETWEEN PIPE AND BULKHEAD, AFTER BULKHEAD CONCRETE HAS 14-DAY CURE. SIKA FIX HH HYDROPHILIC, OR EQUAL AS APPROVED BY ENGINEER. FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR INJECTION PORTS, MIXING, INJECTION, AND CURING.

PROJECTNAME: ---  
 IMAGES: ---  
 XREFS: X-RT-LP236-PFAS

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING.	USE TO VERIFY FIGURE REPRODUCTION SCALE	1	05.11.2018	PRELIMINARY DRAFT DESIGN	DS	AL
		No.	Date	Revisions	By	Ckd
THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REUSED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.						
		State	Date Signed	Project Mgr.		
		MI		R. CHRISTENSEN		
		Designed by	Drawn by	Checked by		
		D. STOCKARD	A. SANCHEZ	A. LORENZ		

Professional Engineer's Name  
**JACELYN SALING**

Professional Engineer's No.  
6201054715



Design & Consultancy for natural and built assets

ARCADIS OF MICHIGAN, LLC.

RACER TRUST • INDUSTRIAL LAND, LANSING, MICHIGAN

**GENERAL NOTES**

ARCADIS Project No. 30042872.03600
Date SEPTEMBER 2020
ARCADIS 28550 CABOT DRIVE SUITE 500 NOVI, MICHIGAN 48377 TEL. 248.994.2240

**9a**

# APPENDIX A

## Plants 2, 3, and 6 Storm Sewer Sampling Laboratory Results



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

*e-Hardcopy 2.0*  
*Automated Report*

## Technical Report for

### Arcadis

Racer Lansing PFAS Delineation; Lansing, MI

30042872.03700

SGS Job Number: FA76660

Sampling Dates: 07/06/20 - 07/07/20



### Report to:

Arcadis  
300 S Washington Sq Suite 315  
Lansing, MI 48933  
marina.samp@arcadis.com; alex.villhauer@arcadis.com;  
trevor.swarthout@arcadis.com; tiffany.linder@arcadis.com  
ATTN: Alex Villhauer

Total number of pages in report: 115



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

Caitlin Brice, M.S.  
General Manager

Client Service contact: Andrea Colby 407-425-6700

Certifications: FL(E83510), LA(03051), KS(E-10327), IL(200063), NC(573), NJ(FI002), NY(12022), SC(96038001)  
DoD ELAP(ANAB L2229), AZ(AZ0806), CA(2937), TX(T104704404), PA(68-03573), VA(460177),  
AK, AR, IA, KY, MA, MS, ND, NH, NV, OK, OR, UT, WA, WV

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Test results relate only to samples analyzed.

# Table of Contents

-1-

<b>Section 1: Sample Summary .....</b>	<b>3</b>
<b>Section 2: Summary of Hits .....</b>	<b>6</b>
<b>Section 3: Sample Results .....</b>	<b>14</b>
<b>3.1:</b> FA76660-1: P3-MH-284_070620 .....	15
<b>3.2:</b> FA76660-2: VERLINDEN-MH-2_070720 .....	17
<b>3.3:</b> FA76660-3: VERLINDEN-MH-3_070720 .....	19
<b>3.4:</b> FA76660-4: VERLINDEN-MH-4_070720 .....	21
<b>3.5:</b> FA76660-5: VERLINDEN-MH-5_070720 .....	23
<b>3.6:</b> FA76660-6: MICH AVE-MH-3_070720 .....	25
<b>3.7:</b> FA76660-7: MICH AVE-MH-4_070720 .....	27
<b>3.8:</b> FA76660-8: OSBORNE-MH-1_070720 .....	29
<b>3.9:</b> FA76660-9: P2-MH-10_070720 .....	31
<b>3.10:</b> FA76660-10: P6-MH-16_070620 .....	33
<b>3.11:</b> FA76660-11: P2-SAN-3-7_070720 .....	35
<b>3.12:</b> FA76660-12: P2-CB-32_070720 .....	37
<b>3.13:</b> FA76660-13: P2-MH-NW_070720 .....	39
<b>3.14:</b> FA76660-14: P2-MH-2_070720 .....	41
<b>3.15:</b> FA76660-15: P2-MH-9_070720 .....	43
<b>3.16:</b> FA76660-16: P2-MH-16_070720 .....	45
<b>3.17:</b> FA76660-17: P2-MH-25_070720 .....	47
<b>3.18:</b> FA76660-18: P2-MH-32_070720 .....	49
<b>3.19:</b> FA76660-19: P2-MH-30_070720 .....	51
<b>3.20:</b> FA76660-20: P2-MH-36_070720 .....	53
<b>3.21:</b> FA76660-21: EB-01_070720 .....	55
<b>3.22:</b> FA76660-22: FB-01_070720 .....	57
<b>3.23:</b> FA76660-23: P2-MH-14_070720 .....	59
<b>3.24:</b> FA76660-24: P2-MH-W_070620 .....	61
<b>3.25:</b> FA76660-25: P2-MH-73_070620 .....	63
<b>3.26:</b> FA76660-26: P2-MH-26_070620 .....	65
<b>3.27:</b> FA76660-27: P2-MH-58_070620 .....	67
<b>3.28:</b> FA76660-28: P2-MH-79_070620 .....	69
<b>3.29:</b> FA76660-29: DUP-02 .....	71
<b>3.30:</b> FA76660-30: DUP-03 .....	73
<b>Section 4: Misc. Forms .....</b>	<b>75</b>
<b>4.1:</b> Certification Exceptions .....	76
<b>4.2:</b> Chain of Custody .....	77
<b>Section 5: MS Semi-volatiles - QC Data Summaries .....</b>	<b>81</b>
<b>5.1:</b> Method Blank Summary .....	82
<b>5.2:</b> Blank Spike Summary .....	98
<b>5.3:</b> Matrix Spike Summary .....	106
<b>5.4:</b> Matrix Spike/Matrix Spike Duplicate Summary .....	110
<b>5.5:</b> Duplicate Summary .....	114



## Sample Summary

Arcadis

**Job No:** FA76660

Racer Lansing PFAS Delineation; Lansing, MI  
 Project No: 30042872.03700

Sample Number	Collected Date	Time By	Matrix Received	Code Type	Client Sample ID
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This report contains results reported as ND = Not detected. The following applies:  
 Organics ND = Not detected above the MDL

FA76660-1	07/06/20	13:00	MSAM	07/09/20	AQ	Water	P3-MH-284_070620
FA76660-2	07/07/20	09:45	MSAM	07/09/20	AQ	Water	VERLINDEN-MH-2_070720
FA76660-3	07/07/20	09:25	MSAM	07/09/20	AQ	Water	VERLINDEN-MH-3_070720
FA76660-4	07/07/20	09:10	MSAM	07/09/20	AQ	Water	VERLINDEN-MH-4_070720
FA76660-5	07/07/20	08:50	MSAM	07/09/20	AQ	Water	VERLINDEN-MH-5_070720
FA76660-6	07/07/20	08:15	MSAM	07/09/20	AQ	Water	MICH AVE-MH-3_070720
FA76660-7	07/07/20	08:30	MSAM	07/09/20	AQ	Water	MICH AVE-MH-4_070720
FA76660-8	07/07/20	10:20	MSAM	07/09/20	AQ	Water	OSBORNE-MH-1_070720
FA76660-9	07/07/20	15:10	MSAM	07/09/20	AQ	Water	P2-MH-10_070720
FA76660-10	07/06/20	10:15	MSAM	07/09/20	AQ	Water	P6-MH-16_070620
FA76660-11	07/07/20	15:40	MSAM	07/09/20	AQ	Water	P2-SAN-3-7_070720
FA76660-12	07/07/20	13:05	MSAM	07/09/20	AQ	Water	P2-CB-32_070720



## Sample Summary

(continued)

Arcadis

**Job No:** FA76660

Racer Lansing PFAS Delineation; Lansing, MI  
 Project No: 30042872.03700

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
FA76660-13	07/07/20	13:50	MSAM07/09/20	AQ	Water	P2-MH-NW_070720
FA76660-14	07/07/20	14:20	MSAM07/09/20	AQ	Water	P2-MH-2_070720
FA76660-15	07/07/20	15:25	MSAM07/09/20	AQ	Water	P2-MH-9_070720
FA76660-16	07/07/20	11:45	MSAM07/09/20	AQ	Water	P2-MH-16_070720
FA76660-17	07/07/20	12:05	MSAM07/09/20	AQ	Water	P2-MH-25_070720
FA76660-18	07/07/20	14:45	MSAM07/09/20	AQ	Water	P2-MH-32_070720
FA76660-19	07/07/20	14:05	MSAM07/09/20	AQ	Water	P2-MH-30_070720
FA76660-20	07/07/20	13:25	MSAM07/09/20	AQ	Water	P2-MH-36_070720
FA76660-21	07/07/20	15:45	MSAM07/09/20	AQ	Equipment Blank	EB-01_070720
FA76660-22	07/07/20	15:45	MSAM07/09/20	AQ	Field Blank Water	FB-01_070720
FA76660-23	07/07/20	11:25	MSAM07/09/20	AQ	Water	P2-MH-14_070720
FA76660-24	07/06/20	13:50	MSAM07/09/20	AQ	Water	P2-MH-W_070620
FA76660-25	07/06/20	14:20	MSAM07/09/20	AQ	Water	P2-MH-73_070620



## Sample Summary

(continued)

Arcadis

Job No: FA76660

Racer Lansing PFAS Delineation; Lansing, MI  
Project No: 30042872.03700

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
FA76660-26	07/07/20	12:50	MSAM07/09/20	AQ	Water	P2-MH-26_070620
FA76660-27	07/06/20	14:45	MSAM07/09/20	AQ	Water	P2-MH-58_070620
FA76660-28	07/06/20	15:20	MSAM07/09/20	AQ	Water	P2-MH-79_070620
FA76660-29	07/06/20	00:00	MSAM07/09/20	AQ	Water	DUP-02
FA76660-30	07/06/20	00:00	MSAM07/09/20	AQ	Water	DUP-03

## Summary of Hits

**Job Number:** FA76660  
**Account:** Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI  
**Collected:** 07/06/20 thru 07/07/20

Lab Sample ID	Client Sample ID	Result/ Analyte	RL	MDL	Units	Method
<b>FA76660-1</b>	<b>P3-MH-284_070620</b>					
		Perfluorobutanoic acid	0.0069 J	0.0080	0.0020	ug/l EPA 537M BY ID
		Perfluorohexanoic acid	0.0010 J	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorooctanoic acid	0.0017 J	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorobutanesulfonic acid	0.0015 J	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorooctanesulfonic acid	0.0328	0.0040	0.0015	ug/l EPA 537M BY ID
<b>FA76660-2</b>	<b>VERLINDEN-MH-2_070720</b>					
		Perfluorobutanoic acid	0.0152	0.0080	0.0020	ug/l EPA 537M BY ID
		Perfluoropentanoic acid	0.0142	0.0040	0.0015	ug/l EPA 537M BY ID
		Perfluorohexanoic acid	0.0133	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluoroheptanoic acid	0.0105	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorooctanoic acid	0.0225	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorononanoic acid	0.0022 J	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorodecanoic acid	0.0016 J	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorobutanesulfonic acid	0.0040	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorohexanesulfonic acid	0.0021 J	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorooctanesulfonic acid	0.0131	0.0040	0.0015	ug/l EPA 537M BY ID
<b>FA76660-3</b>	<b>VERLINDEN-MH-3_070720</b>					
		Perfluorobutanoic acid	0.0154	0.0080	0.0020	ug/l EPA 537M BY ID
		Perfluoropentanoic acid	0.0207	0.0040	0.0015	ug/l EPA 537M BY ID
		Perfluorohexanoic acid	0.0198	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluoroheptanoic acid	0.0146	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorooctanoic acid	0.0304	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorononanoic acid	0.0023 J	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorobutanesulfonic acid	0.0083	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorohexanesulfonic acid	0.0029 J	0.0040	0.0010	ug/l EPA 537M BY ID
		Perfluorooctanesulfonic acid <sup>a</sup>	0.0106	0.0080	0.0030	ug/l EPA 537M BY ID
<b>FA76660-4</b>	<b>VERLINDEN-MH-4_070720</b>					
		Perfluorobutanoic acid	0.0126	0.0071	0.0018	ug/l EPA 537M BY ID
		Perfluoropentanoic acid	0.0139	0.0036	0.0013	ug/l EPA 537M BY ID
		Perfluorohexanoic acid	0.0163	0.0036	0.00089	ug/l EPA 537M BY ID
		Perfluoroheptanoic acid	0.0129	0.0036	0.00089	ug/l EPA 537M BY ID
		Perfluorooctanoic acid	0.0234	0.0036	0.00089	ug/l EPA 537M BY ID
		Perfluorononanoic acid	0.0020 J	0.0036	0.00089	ug/l EPA 537M BY ID
		Perfluorobutanesulfonic acid	0.0052	0.0036	0.00089	ug/l EPA 537M BY ID
		Perfluorohexanesulfonic acid	0.0024 J	0.0036	0.00089	ug/l EPA 537M BY ID
		Perfluorooctanesulfonic acid	0.0099	0.0036	0.0013	ug/l EPA 537M BY ID

## Summary of Hits

**Job Number:** FA76660  
**Account:** Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI  
**Collected:** 07/06/20 thru 07/07/20

2

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
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**FA76660-5 VERLINDEN-MH-5\_070720**

Perfluorobutanoic acid	0.0111	0.0071	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid	0.0146	0.0036	0.0013	ug/l	EPA 537M BY ID
Perfluorohexanoic acid	0.0158	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid	0.0123	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0245	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid	0.0023 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorodecanoic acid	0.0011 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0071	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid	0.0013 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.0117	0.0036	0.0013	ug/l	EPA 537M BY ID

**FA76660-6 MICH AVE-MH-3\_070720**

Perfluorobutanoic acid	0.0100	0.0071	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid	0.0051	0.0036	0.0013	ug/l	EPA 537M BY ID
Perfluorohexanoic acid <sup>a</sup>	0.0047 J	0.0071	0.0018	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid <sup>a</sup>	0.0049 J	0.0071	0.0018	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0082	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0038	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid	0.0047	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.0049	0.0036	0.0013	ug/l	EPA 537M BY ID

**FA76660-7 MICH AVE-MH-4\_070720**

Perfluorobutanoic acid	0.0079	0.0069	0.0017	ug/l	EPA 537M BY ID
Perfluoropentanoic acid	0.0051	0.0034	0.0013	ug/l	EPA 537M BY ID
Perfluorohexanoic acid	0.0063	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid	0.0053	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0112	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorononanoic acid	0.0012 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0032 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid	0.0029 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.0119	0.0034	0.0013	ug/l	EPA 537M BY ID

**FA76660-8 OSBORNE-MH-1\_070720**

Perfluorobutanoic acid	0.0162	0.0071	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid	0.0135	0.0036	0.0013	ug/l	EPA 537M BY ID
Perfluorohexanoic acid	0.0192	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid	0.0126	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0390	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid	0.0032 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorodecanoic acid	0.0015 J	0.0036	0.00089	ug/l	EPA 537M BY ID

## Summary of Hits

**Job Number:** FA76660  
**Account:** Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI  
**Collected:** 07/06/20 thru 07/07/20

2

Lab Sample ID	Client Sample ID	Result/ Analyte	RL	MDL	Units	Method
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Perfluorobutanesulfonic acid		0.0018 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.0010 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0020 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0166	0.0036	0.0013	ug/l	EPA 537M BY ID

**FA76660-9 P2-MH-10\_070720**

Perfluorobutanoic acid		0.0149	0.0069	0.0017	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0158	0.0034	0.0013	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0140	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0105	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0251	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.0021 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0011 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0029 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0326	0.0034	0.0013	ug/l	EPA 537M BY ID

**FA76660-10 P6-MH-16\_070620**

Perfluorobutanoic acid		0.0226	0.0071	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0264	0.0036	0.0013	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0359	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0235	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0548	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.0036	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.0014 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0031 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0128	0.0036	0.0013	ug/l	EPA 537M BY ID
Perfluorodecanesulfonic acid		0.0025 J	0.0036	0.00089	ug/l	EPA 537M BY ID

**FA76660-11 P2-SAN-3-7\_070720**

Perfluorobutanoic acid		0.0126	0.0071	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0105	0.0036	0.0013	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0111	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0082	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0202	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00097 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0026 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0018 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0161	0.0036	0.0013	ug/l	EPA 537M BY ID

**FA76660-12 P2-CB-32\_070720**

Perfluorobutanoic acid		0.0098	0.0069	0.0017	ug/l	EPA 537M BY ID
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## Summary of Hits

**Job Number:** FA76660  
**Account:** Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI  
**Collected:** 07/06/20 thru 07/07/20

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
		0.0024 J	0.0034	0.0013	ug/l	EPA 537M BY ID
		0.0031 J	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0023 J	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0046	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0012 J	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0017 J	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0013 J	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0154	0.0034	0.0013	ug/l	EPA 537M BY ID

### FA76660-13 P2-MH-NW\_070720

		0.0136	0.0071	0.0018	ug/l	EPA 537M BY ID
		0.0169	0.0036	0.0013	ug/l	EPA 537M BY ID
		0.0165	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0152	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0317	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0039	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0041	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0038	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0079	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0014 J	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0441	0.0036	0.0013	ug/l	EPA 537M BY ID

### FA76660-14 P2-MH-2\_070720

		0.0119	0.0069	0.0017	ug/l	EPA 537M BY ID
		0.0166	0.0034	0.0013	ug/l	EPA 537M BY ID
		0.0146	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0134	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0287	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0035	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0036	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0065	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.00096 J	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0069	0.0034	0.00086	ug/l	EPA 537M BY ID
		0.0454	0.0034	0.0013	ug/l	EPA 537M BY ID

### FA76660-15 P2-MH-9\_070720

		0.0150	0.0071	0.0018	ug/l	EPA 537M BY ID
		0.0171	0.0036	0.0013	ug/l	EPA 537M BY ID
		0.0145	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0107	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0260	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0023 J	0.0036	0.00089	ug/l	EPA 537M BY ID

## Summary of Hits

**Job Number:** FA76660  
**Account:** Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI  
**Collected:** 07/06/20 thru 07/07/20

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
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Perfluorobutanesulfonic acid		0.0014 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0025 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0364	0.0036	0.0013	ug/l	EPA 537M BY ID

### FA76660-16 P2-MH-16\_070720

Perfluorobutanoic acid		0.0272	0.0071	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0522	0.0036	0.0013	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0434	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0416	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0565	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.0054	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.0011 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0044	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.0022 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0307	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.0030 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0807	0.0036	0.0013	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate		0.0189	0.0071	0.0018	ug/l	EPA 537M BY ID

### FA76660-17 P2-MH-25\_070720

Perfluorobutanoic acid		0.0207	0.0071	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0353	0.0036	0.0013	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0300	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0288	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0407	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.0036	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorodecanoic acid		0.0011 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0027 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.0020 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0204	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.0018 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0457	0.0036	0.0013	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate		0.0073	0.0071	0.0018	ug/l	EPA 537M BY ID

### FA76660-18 P2-MH-32\_070720

Perfluorobutanoic acid		0.0107	0.0069	0.0017	ug/l	EPA 537M BY ID
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### FA76660-19 P2-MH-30\_070720

Perfluorobutanoic acid		0.0125	0.0071	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0177	0.0036	0.0013	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0156	0.0036	0.00089	ug/l	EPA 537M BY ID

## Summary of Hits

**Job Number:** FA76660  
**Account:** Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI  
**Collected:** 07/06/20 thru 07/07/20

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
		0.0140	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0298	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0036	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0035 J	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0066	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0011 J	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0078	0.0036	0.00089	ug/l	EPA 537M BY ID
		0.0451	0.0036	0.0013	ug/l	EPA 537M BY ID

### FA76660-20 P2-MH-36\_070720

Perfluorobutanoic acid	0.0064 J	0.0069	0.0017	ug/l	EPA 537M BY ID
Perfluoropentanoic acid	0.0019 J	0.0034	0.0013	ug/l	EPA 537M BY ID
Perfluorohexanoic acid	0.0019 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid	0.0018 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0029 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0017 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.0024 J	0.0034	0.0013	ug/l	EPA 537M BY ID

### FA76660-21 EB-01\_070720

No hits reported in this sample.

### FA76660-22 FB-01\_070720

No hits reported in this sample.

### FA76660-23 P2-MH-14\_070720

Perfluorobutanoic acid	0.0141	0.0071	0.0018	ug/l	EPA 537M BY ID
Perfluoropentanoic acid	0.0160	0.0036	0.0013	ug/l	EPA 537M BY ID
Perfluorohexanoic acid	0.0134	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid	0.0097	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0225	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorononanoic acid	0.0016 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0013 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid	0.0025 J	0.0036	0.00089	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.0258	0.0036	0.0013	ug/l	EPA 537M BY ID

### FA76660-24 P2-MH-W\_070620

Perfluorobutanoic acid	0.0030 J	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0043	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0014 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid	0.0019 J	0.0040	0.0010	ug/l	EPA 537M BY ID

## Summary of Hits

**Job Number:** FA76660  
**Account:** Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI  
**Collected:** 07/06/20 thru 07/07/20

2

Lab Sample ID	Client Sample ID	Result/ Analyte	RL	MDL	Units	Method
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**FA76660-25 P2-MH-73\_070620**

Perfluorobutanoic acid	0.0145	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid	0.0099	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid	0.0138	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid	0.0106	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0298	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid	0.0030 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid	0.0015 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0019 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid	0.0037 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid <sup>b</sup>	0.0295	0.0040	0.0015	ug/l	EPA 537M BY ID

**FA76660-26 P2-MH-26\_070620**

Perfluorobutanoic acid	0.0163	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid	0.0217	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid	0.0194	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid	0.0185	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0362	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid	0.0041	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorodecanoic acid	0.0036 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0030 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid	0.0011 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid	0.0097	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.0471	0.0040	0.0015	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate	0.0023 J	0.0080	0.0020	ug/l	EPA 537M BY ID

**FA76660-27 P2-MH-58\_070620**

Perfluorobutanoic acid	0.0113	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid	0.0027 J	0.0040	0.0015	ug/l	EPA 537M BY ID
Perfluorohexanoic acid	0.0042	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid	0.0031 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0123	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorononanoic acid	0.0016 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0014 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid	0.0013 J	0.0040	0.0010	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid <sup>c</sup>	0.0218	0.0040	0.0015	ug/l	EPA 537M BY ID

**FA76660-28 P2-MH-79\_070620**

Perfluorobutanoic acid	0.0154	0.0080	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanoic acid	0.0137	0.0040	0.0015	ug/l	EPA 537M BY ID

## Summary of Hits

**Job Number:** FA76660  
**Account:** Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI  
**Collected:** 07/06/20 thru 07/07/20

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
		0.0170	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0160	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0379	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0043	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0054	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0024 J	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0037 J	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0528	0.0040	0.0015	ug/l	EPA 537M BY ID

### FA76660-29 DUP-02

		0.0175	0.0080	0.0020	ug/l	EPA 537M BY ID
		0.0158	0.0040	0.0015	ug/l	EPA 537M BY ID
		0.0204	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0128	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0438	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0034 J	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0012 J	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0013 J	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0019 J	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0214	0.0040	0.0015	ug/l	EPA 537M BY ID

### FA76660-30 DUP-03

		0.0295	0.0080	0.0020	ug/l	EPA 537M BY ID
		0.0634	0.0040	0.0015	ug/l	EPA 537M BY ID
		0.0452	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0450	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0605	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0060	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0034 J	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0028 J	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0360	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0028 J	0.0040	0.0010	ug/l	EPA 537M BY ID
		0.0946	0.0040	0.0015	ug/l	EPA 537M BY ID
		0.0199	0.0080	0.0020	ug/l	EPA 537M BY ID

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

Sample Results

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Report of Analysis

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# Report of Analysis

<b>Client Sample ID:</b> P3-MH-284_070620	
<b>Lab Sample ID:</b> FA76660-1	<b>Date Sampled:</b> 07/06/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q23931.D	1	07/22/20 00:51	NG	07/18/20 10:00	OP81139	S3Q367
Run #2	3Q23740.D	1	07/17/20 08:08	NG	07/14/20 13:00	OP81064	S3Q364

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0069	0.0080	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0010 <sup>a</sup>	0.0040	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	ND <sup>a</sup>	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0017	0.0040	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid <sup>b</sup>	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid <sup>b</sup>	ND	0.0040	0.0010	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0015	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0328 <sup>a</sup>	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA <sup>b</sup>	ND	0.0040	0.0010	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

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

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND <sup>a</sup>	0.0080	0.0020	ug/l	

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

## Report of Analysis

3.1  
3

<b>Client Sample ID:</b> P3-MH-284_070620		<b>Date Sampled:</b> 07/06/20
<b>Lab Sample ID:</b> FA76660-1		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

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

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	56%	56%	35-135%
	13C5-PFPeA	55%	59%	50-150%
	13C5-PFHxA	53%	58%	50-150%
	13C4-PFHpA	56%	65%	50-150%
	13C8-PFOA	59%	70%	50-150%
	13C9-PFNA	62%	72%	50-150%
	13C6-PFDA	63%	57%	50-150%
	13C7-PFUnDA	56%	23% <sup>c</sup>	40-140%
	13C2-PFDoDA	42%	5% <sup>c</sup>	40-140%
	13C2-PFTeDA	13% <sup>d</sup>	1% <sup>c</sup>	30-130%
	13C3-PFBS	52%	60%	50-150%
	13C3-PFHxS	52%	61%	50-150%
	13C8-PFOS	54%	56%	50-150%
	13C8-FOSA	22% <sup>d</sup>	6% <sup>c</sup>	30-130%
	d3-MeFOSAA	65%	27% <sup>c</sup>	50-150%
	13C2-4:2FTS	58%	75%	50-150%
	13C2-6:2FTS	84%	93%	50-150%
	13C2-8:2FTS	65%	60%	50-150%

- (a) Result is from Run# 2
- (b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.
- (c) Outside control limits.
- (d) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

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

## Report of Analysis

<b>Client Sample ID:</b>	VERLINDEN-MH-2_070720	<b>Date Sampled:</b>	07/07/20
<b>Lab Sample ID:</b>	FA76660-2	<b>Date Received:</b>	07/09/20
<b>Matrix:</b>	AQ - Water	<b>Percent Solids:</b>	n/a
<b>Method:</b>	EPA 537M BY ID EPA 537 MOD		
<b>Project:</b>	Racer Lansing PFAS Delineation; Lansing, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q23741.D	1	07/17/20 08:23	NG	07/14/20 13:00	OP81064	S3Q364
Run #2	3Q23932.D	1	07/22/20 01:07	NG	07/18/20 10:00	OP81139	S3Q367

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0152	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0142	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0133	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0105	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0225	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0022	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.0016	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0040	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0021	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0131 <sup>a</sup>	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND <sup>a</sup>	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

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

**FLUOROTELOMER SULFONATES**

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

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

## Report of Analysis

32  
3

<b>Client Sample ID:</b> VERLINDEN-MH-2_070720		<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-2		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

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

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	49%	61%	35-135%
	13C5-PFPeA	51%	62%	50-150%
	13C5-PFHxA	54%	62%	50-150%
	13C4-PFHpA	60%	64%	50-150%
	13C8-PFOA	64%	66%	50-150%
	13C9-PFNA	62%	67%	50-150%
	13C6-PFDA	54%	64%	50-150%
	13C7-PFUnDA	65%	57%	40-140%
	13C2-PFDoDA	66%	47%	40-140%
	13C2-PFTeDA	32%	24% <sup>b</sup>	30-130%
	13C3-PFBS	53%	59%	50-150%
	13C3-PFHxS	55%	59%	50-150%
	13C8-PFOS	45% <sup>b</sup>	58%	50-150%
	13C8-FOSA	47%	38%	30-130%
	d3-MeFOSAA	54%	67%	50-150%
	13C2-4:2FTS	81%	65%	50-150%
	13C2-6:2FTS	81%	72%	50-150%
	13C2-8:2FTS	65%	64%	50-150%

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

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

# Report of Analysis

<b>Client Sample ID:</b>	VERLINDEN-MH-3_070720	<b>Date Sampled:</b>	07/07/20
<b>Lab Sample ID:</b>	FA76660-3	<b>Date Received:</b>	07/09/20
<b>Matrix:</b>	AQ - Water	<b>Percent Solids:</b>	n/a
<b>Method:</b>	EPA 537M BY ID EPA 537 MOD		
<b>Project:</b>	Racer Lansing PFAS Delineation; Lansing, MI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q23742.D	1	07/17/20 08:39	NG	07/14/20 13:00	OP81064	S3Q364
Run #2 <sup>a</sup>	3Q23755.D	2	07/17/20 12:05	NG	07/14/20 13:00	OP81064	S3Q364

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0154	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0207	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0198	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0146	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0304	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0023	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0083	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0029	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0106 <sup>b</sup>	0.0080	0.0030	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND <sup>b</sup>	0.0080	0.0020	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

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

**FLUOROTELOMER SULFONATES**

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

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

## Report of Analysis

<b>Client Sample ID:</b> VERLINDEN-MH-3_070720		<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-3		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

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

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	57%	61%	35-135%
	13C5-PFPeA	58%	62%	50-150%
	13C5-PFHxA	62%	65%	50-150%
	13C4-PFHpA	68%	71%	50-150%
	13C8-PFOA	71%	74%	50-150%
	13C9-PFNA	69%	71%	50-150%
	13C6-PFDA	58%	57%	50-150%
	13C7-PFUnDA	69%	73%	40-140%
	13C2-PFDoDA	70%	80%	40-140%
	13C2-PFTeDA	41%	46%	30-130%
	13C3-PFBS	60%	64%	50-150%
	13C3-PFHxS	62%	65%	50-150%
	13C8-PFOS	48% <sup>c</sup>	50%	50-150%
	13C8-FOSA	58%	61%	30-130%
	d3-MeFOSAA	61%	58%	50-150%
	13C2-4:2FTS	91%	87%	50-150%
	13C2-6:2FTS	90%	89%	50-150%
	13C2-8:2FTS	70%	65%	50-150%

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

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

# Report of Analysis

<b>Client Sample ID:</b> VERLINDEN-MH-4_070720	<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-4	<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water	<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71455.D	1	07/16/20 17:30	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0126	0.0071	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0139	0.0036	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0163	0.0036	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0129	0.0036	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0234	0.0036	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0020	0.0036	0.00089	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0036	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0036	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0036	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0036	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0036	0.00089	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0052	0.0036	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0036	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0024	0.0036	0.00089	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0036	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0099	0.0036	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0036	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0036	0.00089	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0036	0.00089	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0071	0.0036	ug/l	
2991-50-6	EtFOSAA	ND	0.0071	0.0036	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

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

## Report of Analysis

34  
3

<b>Client Sample ID:</b> VERLINDEN-MH-4_070720		<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-4		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	64%		35-135%
	13C5-PFPeA	66%		50-150%
	13C5-PFHxA	60%		50-150%
	13C4-PFHpA	60%		50-150%
	13C8-PFOA	69%		50-150%
	13C9-PFNA	76%		50-150%
	13C6-PFDA	78%		50-150%
	13C7-PFUnDA	77%		40-140%
	13C2-PFDoDA	73%		40-140%
	13C2-PFTeDA	71%		30-130%
	13C3-PFBS	63%		50-150%
	13C3-PFHxS	66%		50-150%
	13C8-PFOS	69%		50-150%
	13C8-FOSA	71%		30-130%
	d3-MeFOSAA	80%		50-150%
	13C2-4:2FTS	70%		50-150%
	13C2-6:2FTS	82%		50-150%
	13C2-8:2FTS	82%		50-150%

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

# Report of Analysis

<b>Client Sample ID:</b>	VERLINDEN-MH-5_070720	<b>Date Sampled:</b>	07/07/20
<b>Lab Sample ID:</b>	FA76660-5	<b>Date Received:</b>	07/09/20
<b>Matrix:</b>	AQ - Water	<b>Percent Solids:</b>	n/a
<b>Method:</b>	EPA 537M BY ID EPA 537 MOD		
<b>Project:</b>	Racer Lansing PFAS Delineation; Lansing, MI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71456.D	1	07/16/20 17:45	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0111	0.0071	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0146	0.0036	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0158	0.0036	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0123	0.0036	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0245	0.0036	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0023	0.0036	0.00089	ug/l	J
335-76-2	Perfluorodecanoic acid	0.0011	0.0036	0.00089	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0036	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0036	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0036	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0036	0.00089	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0071	0.0036	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0036	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0013	0.0036	0.00089	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0036	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0117	0.0036	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0036	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0036	0.00089	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0036	0.00089	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0071	0.0036	ug/l	
2991-50-6	EtFOSAA	ND	0.0071	0.0036	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

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

## Report of Analysis

3.5  
3

<b>Client Sample ID:</b> VERLINDEN-MH-5_070720		<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-5		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	60%		35-135%
	13C5-PFPeA	63%		50-150%
	13C5-PFHxA	59%		50-150%
	13C4-PFHpA	60%		50-150%
	13C8-PFOA	69%		50-150%
	13C9-PFNA	76%		50-150%
	13C6-PFDA	77%		50-150%
	13C7-PFUnDA	77%		40-140%
	13C2-PFDoDA	73%		40-140%
	13C2-PFTeDA	69%		30-130%
	13C3-PFBS	62%		50-150%
	13C3-PFHxS	66%		50-150%
	13C8-PFOS	70%		50-150%
	13C8-FOSA	73%		30-130%
	d3-MeFOSAA	79%		50-150%
	13C2-4:2FTS	69%		50-150%
	13C2-6:2FTS	82%		50-150%
	13C2-8:2FTS	80%		50-150%

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

## Report of Analysis

<b>Client Sample ID:</b>	MICH AVE-MH-3_070720	<b>Date Sampled:</b>	07/07/20
<b>Lab Sample ID:</b>	FA76660-6	<b>Date Received:</b>	07/09/20
<b>Matrix:</b>	AQ - Water	<b>Percent Solids:</b>	n/a
<b>Method:</b>	EPA 537M BY ID EPA 537 MOD		
<b>Project:</b>	Racer Lansing PFAS Delineation; Lansing, MI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71457.D	1	07/16/20 18:00	NG	07/14/20 15:15	OP81066	SQ1619
Run #2 <sup>a</sup>	4Q2882.D	2	07/17/20 17:05	MV	07/14/20 15:15	OP81066	S4Q44

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0100	0.0071	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0051	0.0036	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0047 <sup>b</sup>	0.0071	0.0018	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.0049 <sup>b</sup>	0.0071	0.0018	ug/l	J
335-67-1	Perfluorooctanoic acid	0.0082	0.0036	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0036	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0036	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0036	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0036	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0036	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0036	0.00089	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0038	0.0036	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0036	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0047	0.0036	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0036	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0049	0.0036	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0036	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0036	0.00089	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0036	0.00089	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0071	0.0036	ug/l	
2991-50-6	EtFOSAA	ND	0.0071	0.0036	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> MICH AVE-MH-3_070720		<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-6		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	51%	60%	35-135%
	13C5-PFPeA	53%	67%	50-150%
	13C5-PFHxA	47% <sup>c</sup>	74%	50-150%
	13C4-PFHpA	49% <sup>c</sup>	79%	50-150%
	13C8-PFOA	57%	88%	50-150%
	13C9-PFNA	66%	93%	50-150%
	13C6-PFDA	70%	94%	50-150%
	13C7-PFUnDA	70%	78%	40-140%
	13C2-PFDoDA	67%	77%	40-140%
	13C2-PFTeDA	64%	75%	30-130%
	13C3-PFBS	53%	71%	50-150%
	13C3-PFHxS	56%	75%	50-150%
	13C8-PFOS	59%	81%	50-150%
	13C8-FOSA	59%	88%	30-130%
	d3-MeFOSAA	77%	84%	50-150%
	13C2-4:2FTS	58%	82%	50-150%
	13C2-6:2FTS	77%	100%	50-150%
	13C2-8:2FTS	80%	96%	50-150%

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

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

# Report of Analysis

<b>Client Sample ID:</b> MICH AVE-MH-4_070720	<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-7	<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water	<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71458.D	1	07/16/20 18:16	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

Run #	Initial Volume	Final Volume
Run #1	290 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0079	0.0069	0.0017	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0051	0.0034	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0063	0.0034	0.00086	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0053	0.0034	0.00086	ug/l	
335-67-1	Perfluorooctanoic acid	0.0112	0.0034	0.00086	ug/l	
375-95-1	Perfluorononanoic acid	0.0012	0.0034	0.00086	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0034	0.00086	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0034	0.00086	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0034	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0034	0.00086	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0032	0.0034	0.00086	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0034	0.00086	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0029	0.0034	0.00086	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0034	0.00086	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0119	0.0034	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0034	0.00086	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0034	0.00086	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0034	0.00086	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0069	0.0034	ug/l	
2991-50-6	EtFOSAA	ND	0.0069	0.0034	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

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

## Report of Analysis

37  
3

<b>Client Sample ID:</b> MICH AVE-MH-4_070720		<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-7		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	65%		35-135%
	13C5-PFPeA	71%		50-150%
	13C5-PFHxA	66%		50-150%
	13C4-PFHpA	69%		50-150%
	13C8-PFOA	80%		50-150%
	13C9-PFNA	89%		50-150%
	13C6-PFDA	92%		50-150%
	13C7-PFUnDA	90%		40-140%
	13C2-PFDoDA	86%		40-140%
	13C2-PFTeDA	82%		30-130%
	13C3-PFBS	71%		50-150%
	13C3-PFHxS	76%		50-150%
	13C8-PFOS	81%		50-150%
	13C8-FOSA	82%		30-130%
	d3-MeFOSAA	96%		50-150%
	13C2-4:2FTS	80%		50-150%
	13C2-6:2FTS	99%		50-150%
	13C2-8:2FTS	99%		50-150%

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

# Report of Analysis

<b>Client Sample ID:</b> OSBORNE-MH-1_070720	<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-8	<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water	<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71459.D	1	07/16/20 18:31	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0162	0.0071	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0135	0.0036	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0192	0.0036	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0126	0.0036	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0390	0.0036	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0032	0.0036	0.00089	ug/l	J
335-76-2	Perfluorodecanoic acid	0.0015	0.0036	0.00089	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0036	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0036	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0036	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0036	0.00089	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0018	0.0036	0.00089	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0010	0.0036	0.00089	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0020	0.0036	0.00089	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0036	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0166	0.0036	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0036	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0036	0.00089	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0036	0.00089	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0071	0.0036	ug/l	
2991-50-6	EtFOSAA	ND	0.0071	0.0036	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

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

## Report of Analysis



<b>Client Sample ID:</b> OSBORNE-MH-1_070720		<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-8		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	65%		35-135%
	13C5-PFPeA	68%		50-150%
	13C5-PFHxA	63%		50-150%
	13C4-PFHpA	62%		50-150%
	13C8-PFOA	71%		50-150%
	13C9-PFNA	78%		50-150%
	13C6-PFDA	77%		50-150%
	13C7-PFUnDA	78%		40-140%
	13C2-PFDoDA	75%		40-140%
	13C2-PFTeDA	71%		30-130%
	13C3-PFBS	67%		50-150%
	13C3-PFHxS	68%		50-150%
	13C8-PFOS	72%		50-150%
	13C8-FOSA	74%		30-130%
	d3-MeFOSAA	83%		50-150%
	13C2-4:2FTS	73%		50-150%
	13C2-6:2FTS	85%		50-150%
	13C2-8:2FTS	82%		50-150%

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

# Report of Analysis

3.9  
3

<b>Client Sample ID:</b> P2-MH-10_070720	
<b>Lab Sample ID:</b> FA76660-9	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71460.D	1	07/16/20 18:46	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

Run #	Initial Volume	Final Volume
Run #1	290 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0149	0.0069	0.0017	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0158	0.0034	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0140	0.0034	0.00086	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0105	0.0034	0.00086	ug/l	
335-67-1	Perfluorooctanoic acid	0.0251	0.0034	0.00086	ug/l	
375-95-1	Perfluorononanoic acid	0.0021	0.0034	0.00086	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0034	0.00086	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0034	0.00086	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0034	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0034	0.00086	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0011	0.0034	0.00086	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0034	0.00086	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0029	0.0034	0.00086	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0034	0.00086	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0326	0.0034	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0034	0.00086	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0034	0.00086	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0034	0.00086	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0069	0.0034	ug/l	
2991-50-6	EtFOSAA	ND	0.0069	0.0034	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-10_070720	
<b>Lab Sample ID:</b> FA76660-9	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	69%		35-135%
	13C5-PFPeA	71%		50-150%
	13C5-PFHxA	66%		50-150%
	13C4-PFHpA	64%		50-150%
	13C8-PFOA	71%		50-150%
	13C9-PFNA	77%		50-150%
	13C6-PFDA	77%		50-150%
	13C7-PFUnDA	74%		40-140%
	13C2-PFDoDA	70%		40-140%
	13C2-PFTeDA	66%		30-130%
	13C3-PFBS	68%		50-150%
	13C3-PFHxS	70%		50-150%
	13C8-PFOS	72%		50-150%
	13C8-FOSA	72%		30-130%
	d3-MeFOSAA	75%		50-150%
	13C2-4:2FTS	70%		50-150%
	13C2-6:2FTS	79%		50-150%
	13C2-8:2FTS	75%		50-150%

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

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

# Report of Analysis

<b>Client Sample ID:</b> P6-MH-16_070620	
<b>Lab Sample ID:</b> FA76660-10	<b>Date Sampled:</b> 07/06/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71461.D	1	07/16/20 19:02	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0226	0.0071	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0264	0.0036	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0359	0.0036	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0235	0.0036	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0548	0.0036	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0036	0.0036	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	0.0014	0.0036	0.00089	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0036	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0036	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0036	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0036	0.00089	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	ND	0.0036	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0036	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0031	0.0036	0.00089	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0036	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0128	0.0036	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0036	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0025	0.0036	0.00089	ug/l	J

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0036	0.00089	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0071	0.0036	ug/l	
2991-50-6	EtFOSAA	ND	0.0071	0.0036	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P6-MH-16_070620		<b>Date Sampled:</b> 07/06/20
<b>Lab Sample ID:</b> FA76660-10		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	59%		35-135%
	13C5-PFPeA	60%		50-150%
	13C5-PFHxA	53%		50-150%
	13C4-PFHpA	53%		50-150%
	13C8-PFOA	60%		50-150%
	13C9-PFNA	67%		50-150%
	13C6-PFDA	70%		50-150%
	13C7-PFUnDA	73%		40-140%
	13C2-PFDoDA	71%		40-140%
	13C2-PFTeDA	67%		30-130%
	13C3-PFBS	60%		50-150%
	13C3-PFHxS	60%		50-150%
	13C8-PFOS	62%		50-150%
	13C8-FOSA	58%		30-130%
	d3-MeFOSAA	78%		50-150%
	13C2-4:2FTS	64%		50-150%
	13C2-6:2FTS	79%		50-150%
	13C2-8:2FTS	81%		50-150%

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

## Report of Analysis

<b>Client Sample ID:</b> P2-SAN-3-7_070720	<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-11	<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water	<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71462.D	1	07/16/20 19:17	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0126	0.0071	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0105	0.0036	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0111	0.0036	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0082	0.0036	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0202	0.0036	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.00097	0.0036	0.00089	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0036	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0036	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0036	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0036	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0036	0.00089	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0026	0.0036	0.00089	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0036	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0018	0.0036	0.00089	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0036	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0161	0.0036	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0036	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0036	0.00089	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0036	0.00089	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0071	0.0036	ug/l	
2991-50-6	EtFOSAA	ND	0.0071	0.0036	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> P2-SAN-3-7_070720	
<b>Lab Sample ID:</b> FA76660-11	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	67%		35-135%
	13C5-PFPeA	69%		50-150%
	13C5-PFHxA	63%		50-150%
	13C4-PFHpA	63%		50-150%
	13C8-PFOA	70%		50-150%
	13C9-PFNA	77%		50-150%
	13C6-PFDA	78%		50-150%
	13C7-PFUnDA	78%		40-140%
	13C2-PFDoDA	73%		40-140%
	13C2-PFTeDA	74%		30-130%
	13C3-PFBS	66%		50-150%
	13C3-PFHxS	68%		50-150%
	13C8-PFOS	70%		50-150%
	13C8-FOSA	72%		30-130%
	d3-MeFOSAA	86%		50-150%
	13C2-4:2FTS	74%		50-150%
	13C2-6:2FTS	85%		50-150%
	13C2-8:2FTS	87%		50-150%

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

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

# Report of Analysis

<b>Client Sample ID:</b> P2-CB-32_070720	
<b>Lab Sample ID:</b> FA76660-12	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71465.D	1	07/16/20 20:03	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

Run #	Initial Volume	Final Volume
Run #1	290 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0098	0.0069	0.0017	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0024	0.0034	0.0013	ug/l	J
307-24-4	Perfluorohexanoic acid	0.0031	0.0034	0.00086	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.0023	0.0034	0.00086	ug/l	J
335-67-1	Perfluorooctanoic acid	0.0046	0.0034	0.00086	ug/l	
375-95-1	Perfluorononanoic acid	0.0012	0.0034	0.00086	ug/l	J
335-76-2	Perfluorodecanoic acid	0.0017	0.0034	0.00086	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0034	0.00086	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0034	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0034	0.00086	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0013	0.0034	0.00086	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0034	0.00086	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0034	0.00086	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0034	0.00086	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0154	0.0034	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0034	0.00086	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0034	0.00086	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0034	0.00086	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0069	0.0034	ug/l	
2991-50-6	EtFOSAA	ND	0.0069	0.0034	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P2-CB-32_070720	
<b>Lab Sample ID:</b> FA76660-12	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	64%		35-135%
	13C5-PFPeA	65%		50-150%
	13C5-PFHxA	60%		50-150%
	13C4-PFHpA	59%		50-150%
	13C8-PFOA	65%		50-150%
	13C9-PFNA	71%		50-150%
	13C6-PFDA	71%		50-150%
	13C7-PFUnDA	69%		40-140%
	13C2-PFDoDA	67%		40-140%
	13C2-PFTeDA	62%		30-130%
	13C3-PFBS	63%		50-150%
	13C3-PFHxS	64%		50-150%
	13C8-PFOS	64%		50-150%
	13C8-FOSA	66%		30-130%
	d3-MeFOSAA	76%		50-150%
	13C2-4:2FTS	66%		50-150%
	13C2-6:2FTS	75%		50-150%
	13C2-8:2FTS	75%		50-150%

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-NW_070720	
<b>Lab Sample ID:</b> FA76660-13	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71466.D	1	07/16/20 20:18	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0136	0.0071	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0169	0.0036	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0165	0.0036	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0152	0.0036	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0317	0.0036	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0039	0.0036	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	0.0041	0.0036	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0036	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0036	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0036	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0036	0.00089	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0038	0.0036	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0036	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0079	0.0036	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0014	0.0036	0.00089	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.0441	0.0036	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0036	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0036	0.00089	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0036	0.00089	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0071	0.0036	ug/l	
2991-50-6	EtFOSAA	ND	0.0071	0.0036	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-NW_070720		<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-13		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	67%		35-135%
	13C5-PFPeA	67%		50-150%
	13C5-PFHxA	59%		50-150%
	13C4-PFHpA	58%		50-150%
	13C8-PFOA	65%		50-150%
	13C9-PFNA	70%		50-150%
	13C6-PFDA	67%		50-150%
	13C7-PFUnDA	66%		40-140%
	13C2-PFDoDA	73%		40-140%
	13C2-PFTeDA	76%		30-130%
	13C3-PFBS	68%		50-150%
	13C3-PFHxS	66%		50-150%
	13C8-PFOS	65%		50-150%
	13C8-FOSA	40%		30-130%
	d3-MeFOSAA	88%		50-150%
	13C2-4:2FTS	73%		50-150%
	13C2-6:2FTS	90%		50-150%
	13C2-8:2FTS	90%		50-150%

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-2_070720	
<b>Lab Sample ID:</b> FA76660-14	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q2883.D	1	07/17/20 17:20	MV	07/14/20 15:15	OP81066	S4Q44
Run #2							

Run #	Initial Volume	Final Volume
Run #1	290 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0119	0.0069	0.0017	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0166	0.0034	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0146	0.0034	0.00086	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0134	0.0034	0.00086	ug/l	
335-67-1	Perfluorooctanoic acid	0.0287	0.0034	0.00086	ug/l	
375-95-1	Perfluorononanoic acid	0.0035	0.0034	0.00086	ug/l	
335-76-2	Perfluorodecanoic acid	0.0036	0.0034	0.00086	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0034	0.00086	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0034	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0034	0.00086	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0065	0.0034	0.00086	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.00096	0.0034	0.00086	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0069	0.0034	0.00086	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0034	0.00086	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0454	0.0034	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0034	0.00086	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0034	0.00086	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0034	0.00086	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0069	0.0034	ug/l	
2991-50-6	EtFOSAA	ND	0.0069	0.0034	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-2_070720	
<b>Lab Sample ID:</b> FA76660-14	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	54%		35-135%
	13C5-PFPeA	61%		50-150%
	13C5-PFHxA	68%		50-150%
	13C4-PFHpA	71%		50-150%
	13C8-PFOA	77%		50-150%
	13C9-PFNA	82%		50-150%
	13C6-PFDA	81%		50-150%
	13C7-PFUnDA	77%		40-140%
	13C2-PFDoDA	75%		40-140%
	13C2-PFTeDA	70%		30-130%
	13C3-PFBS	67%		50-150%
	13C3-PFHxS	70%		50-150%
	13C8-PFOS	66%		50-150%
	13C8-FOSA	62%		30-130%
	d3-MeFOSAA	87%		50-150%
	13C2-4:2FTS	79%		50-150%
	13C2-6:2FTS	91%		50-150%
	13C2-8:2FTS	88%		50-150%

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-9_070720	
<b>Lab Sample ID:</b> FA76660-15	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71468.D	1	07/16/20 20:49	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0150	0.0071	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0171	0.0036	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0145	0.0036	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0107	0.0036	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0260	0.0036	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0023	0.0036	0.00089	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0036	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0036	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0036	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0036	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0036	0.00089	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0014	0.0036	0.00089	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0036	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0025	0.0036	0.00089	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0036	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0364	0.0036	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0036	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0036	0.00089	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0036	0.00089	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0071	0.0036	ug/l	
2991-50-6	EtFOSAA	ND	0.0071	0.0036	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-9_070720	
<b>Lab Sample ID:</b> FA76660-15	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	69%		35-135%
	13C5-PFPeA	69%		50-150%
	13C5-PFHxA	65%		50-150%
	13C4-PFHpA	63%		50-150%
	13C8-PFOA	70%		50-150%
	13C9-PFNA	76%		50-150%
	13C6-PFDA	73%		50-150%
	13C7-PFUnDA	72%		40-140%
	13C2-PFDoDA	68%		40-140%
	13C2-PFTeDA	65%		30-130%
	13C3-PFBS	67%		50-150%
	13C3-PFHxS	69%		50-150%
	13C8-PFOS	69%		50-150%
	13C8-FOSA	71%		30-130%
	d3-MeFOSAA	75%		50-150%
	13C2-4:2FTS	70%		50-150%
	13C2-6:2FTS	77%		50-150%
	13C2-8:2FTS	75%		50-150%

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

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

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-16_070720	
<b>Lab Sample ID:</b> FA76660-16	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71469.D	1	07/16/20 21:04	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0272	0.0071	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0522	0.0036	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0434	0.0036	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0416	0.0036	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0565	0.0036	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0054	0.0036	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	0.0011	0.0036	0.00089	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0036	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0036	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0036	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0036	0.00089	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0044	0.0036	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0022	0.0036	0.00089	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0307	0.0036	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0030	0.0036	0.00089	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.0807	0.0036	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0036	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0036	0.00089	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0036	0.00089	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0071	0.0036	ug/l	
2991-50-6	EtFOSAA	ND	0.0071	0.0036	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0189	0.0071	0.0018	ug/l	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-16_070720		<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-16		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	61%		35-135%
	13C5-PFPeA	61%		50-150%
	13C5-PFHxA	55%		50-150%
	13C4-PFHpA	54%		50-150%
	13C8-PFOA	60%		50-150%
	13C9-PFNA	63%		50-150%
	13C6-PFDA	62%		50-150%
	13C7-PFUnDA	64%		40-140%
	13C2-PFDoDA	65%		40-140%
	13C2-PFTeDA	65%		30-130%
	13C3-PFBS	60%		50-150%
	13C3-PFHxS	59%		50-150%
	13C8-PFOS	57%		50-150%
	13C8-FOSA	48%		30-130%
	d3-MeFOSAA	77%		50-150%
	13C2-4:2FTS	67%		50-150%
	13C2-6:2FTS	80%		50-150%
	13C2-8:2FTS	76%		50-150%

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-25_070720	
<b>Lab Sample ID:</b> FA76660-17	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71470.D	1	07/16/20 21:20	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0207	0.0071	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0353	0.0036	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0300	0.0036	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0288	0.0036	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0407	0.0036	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0036	0.0036	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	0.0011	0.0036	0.00089	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0036	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0036	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0036	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0036	0.00089	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0027	0.0036	0.00089	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0020	0.0036	0.00089	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0204	0.0036	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0018	0.0036	0.00089	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.0457	0.0036	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0036	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0036	0.00089	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0036	0.00089	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0071	0.0036	ug/l	
2991-50-6	EtFOSAA	ND	0.0071	0.0036	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0073	0.0071	0.0018	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-25_070720	
<b>Lab Sample ID:</b> FA76660-17	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	65%		35-135%
	13C5-PFPeA	64%		50-150%
	13C5-PFHxA	58%		50-150%
	13C4-PFHpA	57%		50-150%
	13C8-PFOA	64%		50-150%
	13C9-PFNA	69%		50-150%
	13C6-PFDA	70%		50-150%
	13C7-PFUnDA	72%		40-140%
	13C2-PFDoDA	70%		40-140%
	13C2-PFTeDA	66%		30-130%
	13C3-PFBS	62%		50-150%
	13C3-PFHxS	62%		50-150%
	13C8-PFOS	62%		50-150%
	13C8-FOSA	59%		30-130%
	d3-MeFOSAA	84%		50-150%
	13C2-4:2FTS	70%		50-150%
	13C2-6:2FTS	83%		50-150%
	13C2-8:2FTS	86%		50-150%

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-32_070720	
<b>Lab Sample ID:</b> FA76660-18	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71471.D	1	07/16/20 21:35	NG	07/14/20 15:15	OP81066	SQ1619
Run #2 <sup>a</sup>	4Q2885.D	5	07/17/20 17:49	MV	07/14/20 15:15	OP81066	S4Q44

Run #	Initial Volume	Final Volume
Run #1	290 ml	1.0 ml
Run #2	290 ml	1.0 ml

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0107	0.0069	0.0017	ug/l	
2706-90-3	Perfluoropentanoic acid	ND <sup>b</sup>	0.017	0.0065	ug/l	
307-24-4	Perfluorohexanoic acid	ND <sup>b</sup>	0.017	0.0043	ug/l	
375-85-9	Perfluoroheptanoic acid	ND <sup>b</sup>	0.017	0.0043	ug/l	
335-67-1	Perfluorooctanoic acid	ND <sup>b</sup>	0.017	0.0043	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0034	0.00086	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0034	0.00086	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0034	0.00086	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0034	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0034	0.00086	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	ND <sup>b</sup>	0.017	0.0043	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND <sup>b</sup>	0.017	0.0043	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND <sup>b</sup>	0.017	0.0043	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND <sup>b</sup>	0.017	0.0043	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND <sup>b</sup>	0.017	0.0065	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND <sup>b</sup>	0.017	0.0043	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND <sup>b</sup>	0.017	0.0043	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND <sup>b</sup>	0.017	0.0043	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0069	0.0034	ug/l	
2991-50-6	EtFOSAA	ND	0.0069	0.0034	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND <sup>b</sup>	0.034	0.0086	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-32_070720		<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-18		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	36%	59%	35-135%
	13C5-PFPeA	39% <sup>c</sup>	66%	50-150%
	13C5-PFHxA	34% <sup>c</sup>	71%	50-150%
	13C4-PFHpA	35% <sup>c</sup>	76%	50-150%
	13C8-PFOA	44% <sup>c</sup>	85%	50-150%
	13C9-PFNA	52%	90%	50-150%
	13C6-PFDA	51%	86%	50-150%
	13C7-PFUnDA	55%	78%	40-140%
	13C2-PFDoDA	59%	74%	40-140%
	13C2-PFTeDA	61%	76%	30-130%
	13C3-PFBS	44% <sup>c</sup>	69%	50-150%
	13C3-PFHxS	45% <sup>c</sup>	72%	50-150%
	13C8-PFOS	49% <sup>c</sup>	74%	50-150%
	13C8-FOSA	22% <sup>c</sup>	77%	30-130%
	d3-MeFOSAA	77%	85%	50-150%
	13C2-4:2FTS	44% <sup>c</sup>	81%	50-150%
	13C2-6:2FTS	64%	101%	50-150%
	13C2-8:2FTS	76%	87%	50-150%

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

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-30_070720	
<b>Lab Sample ID:</b> FA76660-19	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4Q2886.D	1	07/17/20 18:04	MV	07/14/20 15:15	OP81066	S4Q44
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0125	0.0071	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0177	0.0036	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0156	0.0036	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0140	0.0036	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0298	0.0036	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0036	0.0036	0.00089	ug/l	
335-76-2	Perfluorodecanoic acid	0.0035	0.0036	0.00089	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0036	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0036	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0036	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0036	0.00089	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0066	0.0036	0.00089	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0011	0.0036	0.00089	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0078	0.0036	0.00089	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0036	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0451	0.0036	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0036	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0036	0.00089	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0036	0.00089	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0071	0.0036	ug/l	
2991-50-6	EtFOSAA	ND	0.0071	0.0036	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-30_070720		<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-19		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	52%		35-135%
	13C5-PFPeA	58%		50-150%
	13C5-PFHxA	65%		50-150%
	13C4-PFHpA	68%		50-150%
	13C8-PFOA	75%		50-150%
	13C9-PFNA	81%		50-150%
	13C6-PFDA	81%		50-150%
	13C7-PFUnDA	76%		40-140%
	13C2-PFDoDA	73%		40-140%
	13C2-PFTeDA	72%		30-130%
	13C3-PFBS	64%		50-150%
	13C3-PFHxS	67%		50-150%
	13C8-PFOS	67%		50-150%
	13C8-FOSA	60%		30-130%
	d3-MeFOSAA	84%		50-150%
	13C2-4:2FTS	76%		50-150%
	13C2-6:2FTS	87%		50-150%
	13C2-8:2FTS	87%		50-150%

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-36_070720	
<b>Lab Sample ID:</b> FA76660-20	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71475.D	1	07/16/20 22:36	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

Run #	Initial Volume	Final Volume
Run #1	290 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0064	0.0069	0.0017	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.0019	0.0034	0.0013	ug/l	J
307-24-4	Perfluorohexanoic acid	0.0019	0.0034	0.00086	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.0018	0.0034	0.00086	ug/l	J
335-67-1	Perfluorooctanoic acid	0.0029	0.0034	0.00086	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0034	0.00086	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0034	0.00086	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0034	0.00086	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0034	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0034	0.00086	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0017	0.0034	0.00086	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0034	0.00086	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0034	0.00086	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0034	0.00086	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0024	0.0034	0.0013	ug/l	J
68259-12-1	Perfluorononanesulfonic acid	ND	0.0034	0.00086	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0034	0.00086	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0034	0.00086	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0069	0.0034	ug/l	
2991-50-6	EtFOSAA	ND	0.0069	0.0034	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-36_070720		<b>Date Sampled:</b> 07/07/20
<b>Lab Sample ID:</b> FA76660-20		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	58%		35-135%
	13C5-PFPeA	60%		50-150%
	13C5-PFHxA	57%		50-150%
	13C4-PFHpA	58%		50-150%
	13C8-PFOA	65%		50-150%
	13C9-PFNA	69%		50-150%
	13C6-PFDA	67%		50-150%
	13C7-PFUnDA	65%		40-140%
	13C2-PFDoDA	60%		40-140%
	13C2-PFTeDA	56%		30-130%
	13C3-PFBS	60%		50-150%
	13C3-PFHxS	62%		50-150%
	13C8-PFOS	60%		50-150%
	13C8-FOSA	62%		30-130%
	d3-MeFOSAA	73%		50-150%
	13C2-4:2FTS	68%		50-150%
	13C2-6:2FTS	82%		50-150%
	13C2-8:2FTS	78%		50-150%

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

# Report of Analysis

<b>Client Sample ID:</b> EB-01_070720		
<b>Lab Sample ID:</b> FA76660-21		<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Equipment Blank		<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q23933.D	1	07/22/20 01:23	NG	07/18/20 10:00	OP81139	S3Q367
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

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

**PERFLUOROALKYL SULFONATES**

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

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

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

**FLUOROTELOMER SULFONATES**

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

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

## Report of Analysis

<b>Client Sample ID:</b> EB-01_070720	
<b>Lab Sample ID:</b> FA76660-21	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Equipment Blank	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

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

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	94%		35-135%
	13C5-PFPeA	92%		50-150%
	13C5-PFHxA	93%		50-150%
	13C4-PFHpA	94%		50-150%
	13C8-PFOA	94%		50-150%
	13C9-PFNA	95%		50-150%
	13C6-PFDA	98%		50-150%
	13C7-PFUnDA	97%		40-140%
	13C2-PFDoDA	90%		40-140%
	13C2-PFTeDA	72%		30-130%
	13C3-PFBS	89%		50-150%
	13C3-PFHxS	90%		50-150%
	13C8-PFOS	92%		50-150%
	13C8-FOSA	83%		30-130%
	d3-MeFOSAA	106%		50-150%
	13C2-4:2FTS	89%		50-150%
	13C2-6:2FTS	91%		50-150%
	13C2-8:2FTS	91%		50-150%

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

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

# Report of Analysis

<b>Client Sample ID:</b> FB-01_070720		
<b>Lab Sample ID:</b> FA76660-22		<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Field Blank Water		<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71479.D	1	07/16/20 23:38	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

Run #	Initial Volume	Final Volume
Run #1	300 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	ND	0.0067	0.0017	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0033	0.0012	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0033	0.00083	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0033	0.00083	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0033	0.00083	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0033	0.00083	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0033	0.00083	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0033	0.00083	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0033	0.0012	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0033	0.00083	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0033	0.00083	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	ND	0.0033	0.00083	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0033	0.00083	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0033	0.00083	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0033	0.00083	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0033	0.0012	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0033	0.00083	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0033	0.00083	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0033	0.00083	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0067	0.0033	ug/l	
2991-50-6	EtFOSAA	ND	0.0067	0.0033	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0067	0.0017	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0067	0.0017	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> FB-01_070720	
<b>Lab Sample ID:</b> FA76660-22	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Field Blank Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0067	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	81%		35-135%
	13C5-PFPeA	80%		50-150%
	13C5-PFHxA	75%		50-150%
	13C4-PFHpA	73%		50-150%
	13C8-PFOA	80%		50-150%
	13C9-PFNA	85%		50-150%
	13C6-PFDA	85%		50-150%
	13C7-PFUnDA	87%		40-140%
	13C2-PFDoDA	82%		40-140%
	13C2-PFTeDA	69%		30-130%
	13C3-PFBS	77%		50-150%
	13C3-PFHxS	80%		50-150%
	13C8-PFOS	82%		50-150%
	13C8-FOSA	78%		30-130%
	d3-MeFOSAA	87%		50-150%
	13C2-4:2FTS	75%		50-150%
	13C2-6:2FTS	81%		50-150%
	13C2-8:2FTS	86%		50-150%

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-14_070720	
<b>Lab Sample ID:</b> FA76660-23	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	Q71480.D	1	07/16/20 23:53	NG	07/14/20 15:15	OP81066	SQ1619
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0141	0.0071	0.0018	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0160	0.0036	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	0.0134	0.0036	0.00089	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0097	0.0036	0.00089	ug/l	
335-67-1	Perfluorooctanoic acid	0.0225	0.0036	0.00089	ug/l	
375-95-1	Perfluorononanoic acid	0.0016	0.0036	0.00089	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0036	0.00089	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0036	0.00089	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0036	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0036	0.00089	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0036	0.00089	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0013	0.0036	0.00089	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0036	0.00089	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0025	0.0036	0.00089	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0036	0.00089	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0258	0.0036	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0036	0.00089	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0036	0.00089	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0036	0.00089	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0071	0.0036	ug/l	
2991-50-6	EtFOSAA	ND	0.0071	0.0036	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b>	P2-MH-14_070720	<b>Date Sampled:</b>	07/07/20
<b>Lab Sample ID:</b>	FA76660-23	<b>Date Received:</b>	07/09/20
<b>Matrix:</b>	AQ - Water	<b>Percent Solids:</b>	n/a
<b>Method:</b>	EPA 537M BY ID EPA 537 MOD		
<b>Project:</b>	Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0071	0.0018	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	68%		35-135%
	13C5-PFPeA	68%		50-150%
	13C5-PFHxA	64%		50-150%
	13C4-PFHpA	63%		50-150%
	13C8-PFOA	70%		50-150%
	13C9-PFNA	74%		50-150%
	13C6-PFDA	75%		50-150%
	13C7-PFUnDA	75%		40-140%
	13C2-PFDoDA	69%		40-140%
	13C2-PFTeDA	63%		30-130%
	13C3-PFBS	65%		50-150%
	13C3-PFHxS	68%		50-150%
	13C8-PFOS	70%		50-150%
	13C8-FOSA	75%		30-130%
	d3-MeFOSAA	76%		50-150%
	13C2-4:2FTS	69%		50-150%
	13C2-6:2FTS	78%		50-150%
	13C2-8:2FTS	77%		50-150%

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-W_070620	
<b>Lab Sample ID:</b> FA76660-24	<b>Date Sampled:</b> 07/06/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q23702.D	1	07/16/20 21:57	NG	07/15/20 12:30	OP81083	S3Q364
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0030	0.0080	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0043	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0014	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0019	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

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

**FLUOROTELOMER SULFONATES**

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

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

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-W_070620	
<b>Lab Sample ID:</b> FA76660-24	<b>Date Sampled:</b> 07/06/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

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

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	56%		35-135%
	13C5-PFPeA	60%		50-150%
	13C5-PFHxA	65%		50-150%
	13C4-PFHpA	72%		50-150%
	13C8-PFOA	77%		50-150%
	13C9-PFNA	77%		50-150%
	13C6-PFDA	63%		50-150%
	13C7-PFUnDA	66%		40-140%
	13C2-PFDoDA	67%		40-140%
	13C2-PFTeDA	42%		30-130%
	13C3-PFBS	61%		50-150%
	13C3-PFHxS	64%		50-150%
	13C8-PFOS	54%		50-150%
	13C8-FOSA	54%		30-130%
	d3-MeFOSAA	63%		50-150%
	13C2-4:2FTS	96%		50-150%
	13C2-6:2FTS	92%		50-150%
	13C2-8:2FTS	76%		50-150%

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-73_070620	
<b>Lab Sample ID:</b> FA76660-25	<b>Date Sampled:</b> 07/06/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q23934.D	1	07/22/20 01:39	NG	07/18/20 10:00	OP81139	S3Q367
Run #2	3Q23704.D	1	07/16/20 22:29	NG	07/15/20 12:30	OP81083	S3Q364

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0145	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0099	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0138 <sup>a</sup>	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0106 <sup>a</sup>	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0298	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0030	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.0015	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0019	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0037	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid <sup>b</sup>	0.0295 <sup>a</sup>	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

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

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND <sup>a</sup>	0.0080	0.0020	ug/l	

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-73_070620	
<b>Lab Sample ID:</b> FA76660-25	<b>Date Sampled:</b> 07/06/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

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

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	88%	57%	35-135%
	13C5-PFPeA	88%	59%	50-150%
	13C5-PFHxA	86%	62%	50-150%
	13C4-PFHpA	89%	67%	50-150%
	13C8-PFOA	90%	70%	50-150%
	13C9-PFNA	89%	70%	50-150%
	13C6-PFDA	86%	58%	50-150%
	13C7-PFUnDA	78%	65%	40-140%
	13C2-PFDoDA	63%	61%	40-140%
	13C2-PFTeDA	30%	44%	30-130%
	13C3-PFBS	84%	59%	50-150%
	13C3-PFHxS	81%	59%	50-150%
	13C8-PFOS	79%	48% <sup>c</sup>	50-150%
	13C8-FOSA	40%	51%	30-130%
	d3-MeFOSAA	92%	62%	50-150%
	13C2-4:2FTS	90%	93%	50-150%
	13C2-6:2FTS	97%	87%	50-150%
	13C2-8:2FTS	87%	74%	50-150%

- (a) Result is from Run# 2
- (b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.
- (c) Outside control limits.

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-26_070620	
<b>Lab Sample ID:</b> FA76660-26	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q23705.D	1	07/16/20 22:45	NG	07/15/20 12:30	OP81083	S3Q364
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0163	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0217	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0194	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0185	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0362	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0041	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0036	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0030	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0011	0.0040	0.0010	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0097	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0471	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

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

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0023	0.0080	0.0020	ug/l	J

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

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-26_070620	
<b>Lab Sample ID:</b> FA76660-26	<b>Date Sampled:</b> 07/07/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

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

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	59%		35-135%
	13C5-PFPeA	60%		50-150%
	13C5-PFHxA	62%		50-150%
	13C4-PFHpA	64%		50-150%
	13C8-PFOA	67%		50-150%
	13C9-PFNA	66%		50-150%
	13C6-PFDA	60%		50-150%
	13C7-PFUnDA	82%		40-140%
	13C2-PFDoDA	82%		40-140%
	13C2-PFTeDA	59%		30-130%
	13C3-PFBS	62%		50-150%
	13C3-PFHxS	61%		50-150%
	13C8-PFOS	50%		50-150%
	13C8-FOSA	55%		30-130%
	d3-MeFOSAA	68%		50-150%
	13C2-4:2FTS	97%		50-150%
	13C2-6:2FTS	90%		50-150%
	13C2-8:2FTS	76%		50-150%

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

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

# Report of Analysis

<b>Client Sample ID:</b> P2-MH-58_070620	
<b>Lab Sample ID:</b> FA76660-27	<b>Date Sampled:</b> 07/06/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q23935.D	1	07/22/20 01:55	NG	07/18/20 10:00	OP81139	S3Q367
Run #2	3Q23707.D	1	07/16/20 23:16	NG	07/15/20 12:30	OP81083	S3Q364

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0113	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0027	0.0040	0.0015	ug/l	J
307-24-4	Perfluorohexanoic acid	0.0042 <sup>a</sup>	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0031 <sup>a</sup>	0.0040	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	0.0123	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0016	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND <sup>a</sup>	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND <sup>a</sup>	0.0040	0.0010	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0014	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0013	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid <sup>b</sup>	0.0218 <sup>a</sup>	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

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

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND <sup>a</sup>	0.0080	0.0020	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-58_070620		<b>Date Sampled:</b> 07/06/20
<b>Lab Sample ID:</b> FA76660-27		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

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

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	85%	59%	35-135%
	13C5-PFPeA	86%	62%	50-150%
	13C5-PFHxA	85%	65%	50-150%
	13C4-PFHpA	88%	71%	50-150%
	13C8-PFOA	89%	73%	50-150%
	13C9-PFNA	89%	71%	50-150%
	13C6-PFDA	86%	56%	50-150%
	13C7-PFUnDA	80%	59%	40-140%
	13C2-PFDoDA	66%	59%	40-140%
	13C2-PFTeDA	28% <sup>c</sup>	45%	30-130%
	13C3-PFBS	83%	61%	50-150%
	13C3-PFHxS	82%	60%	50-150%
	13C8-PFOS	81%	47% <sup>c</sup>	50-150%
	13C8-FOSA	63%	46%	30-130%
	d3-MeFOSAA	91%	58%	50-150%
	13C2-4:2FTS	88%	96%	50-150%
	13C2-6:2FTS	95%	87%	50-150%
	13C2-8:2FTS	86%	70%	50-150%

- (a) Result is from Run# 2
- (b) Associated ID Standard outside control limits. Hits confirmed by re-extraction and reanalysis.
- (c) Outside control limits.

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

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-79_070620	
<b>Lab Sample ID:</b> FA76660-28	<b>Date Sampled:</b> 07/06/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q23936.D	1	07/22/20 02:11	NG	07/18/20 10:00	OP81139	S3Q367
Run #2	3Q23710.D	1	07/17/20 00:04	NG	07/15/20 12:30	OP81083	S3Q364

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0154	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0137	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0170 <sup>a</sup>	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0160 <sup>a</sup>	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0379	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0043	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0054	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND <sup>a</sup>	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND <sup>a</sup>	0.0040	0.0010	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0024	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0037 <sup>a</sup>	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND <sup>a</sup>	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid <sup>b</sup>	0.0528 <sup>a</sup>	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid <sup>c</sup>	ND <sup>a</sup>	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND <sup>a</sup>	0.0040	0.0010	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

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

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND <sup>a</sup>	0.0080	0.0020	ug/l	

ND = Not detected MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

## Report of Analysis

<b>Client Sample ID:</b> P2-MH-79_070620		<b>Date Sampled:</b> 07/06/20
<b>Lab Sample ID:</b> FA76660-28		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

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

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	52%	52%	35-135%
	13C5-PFPeA	52%	53%	50-150%
	13C5-PFHxA	49% <sup>d</sup>	54%	50-150%
	13C4-PFHpA	50%	60%	50-150%
	13C8-PFOA	51%	57%	50-150%
	13C9-PFNA	52%	54%	50-150%
	13C6-PFDA	52%	47% <sup>d</sup>	50-150%
	13C7-PFUnDA	54%	57%	40-140%
	13C2-PFDoDA	46%	46%	40-140%
	13C2-PFTeDA	19% <sup>d</sup>	32%	30-130%
	13C3-PFBS	50%	56%	50-150%
	13C3-PFHxS	47% <sup>d</sup>	54%	50-150%
	13C8-PFOS	46% <sup>d</sup>	38% <sup>e</sup>	50-150%
	13C8-FOSA	20% <sup>d</sup>	33%	30-130%
	d3-MeFOSAA	66%	55%	50-150%
	13C2-4:2FTS	54%	86%	50-150%
	13C2-6:2FTS	58%	81%	50-150%
	13C2-8:2FTS	56%	62%	50-150%

- (a) Result is from Run# 2
- (b) Associated ID Standard outside control limits. Hits confirmed by re-extraction and reanalysis.
- (c) Associated ID Standard outside control limits. Confirmed ND by re-extraction and reanalysis.
- (d) Outside control limits.
- (e) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

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

# Report of Analysis

<b>Client Sample ID:</b> DUP-02		
<b>Lab Sample ID:</b> FA76660-29		<b>Date Sampled:</b> 07/06/20
<b>Matrix:</b> AQ - Water		<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q23711.D	1	07/17/20 00:20	NG	07/15/20 12:30	OP81083	S3Q364
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0175	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0158	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0204	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0128	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0438	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0034	0.0040	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.0012	0.0040	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0013	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0019	0.0040	0.0010	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0214	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

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

**FLUOROTELOMER SULFONATES**

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

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

## Report of Analysis

<b>Client Sample ID:</b> DUP-02		<b>Date Sampled:</b> 07/06/20
<b>Lab Sample ID:</b> FA76660-29		<b>Date Received:</b> 07/09/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

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

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	59%		35-135%
	13C5-PFPeA	62%		50-150%
	13C5-PFHxA	66%		50-150%
	13C4-PFHpA	75%		50-150%
	13C8-PFOA	78%		50-150%
	13C9-PFNA	78%		50-150%
	13C6-PFDA	62%		50-150%
	13C7-PFUnDA	63%		40-140%
	13C2-PFDoDA	57%		40-140%
	13C2-PFTeDA	48%		30-130%
	13C3-PFBS	63%		50-150%
	13C3-PFHxS	65%		50-150%
	13C8-PFOS	51%		50-150%
	13C8-FOSA	65%		30-130%
	d3-MeFOSAA	65%		50-150%
	13C2-4:2FTS	99%		50-150%
	13C2-6:2FTS	96%		50-150%
	13C2-8:2FTS	81%		50-150%

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

# Report of Analysis

<b>Client Sample ID:</b> DUP-03		
<b>Lab Sample ID:</b> FA76660-30		<b>Date Sampled:</b> 07/06/20
<b>Matrix:</b> AQ - Water		<b>Date Received:</b> 07/09/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q23712.D	1	07/17/20 00:35	NG	07/15/20 12:30	OP81083	S3Q364
Run #2							

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

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0295	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0634	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0452	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0450	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0605	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0060	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0034	0.0040	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0028	0.0040	0.0010	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0360	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0028	0.0040	0.0010	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.0946	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

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

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0199	0.0080	0.0020	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b>	DUP-03	<b>Date Sampled:</b>	07/06/20
<b>Lab Sample ID:</b>	FA76660-30	<b>Date Received:</b>	07/09/20
<b>Matrix:</b>	AQ - Water	<b>Percent Solids:</b>	n/a
<b>Method:</b>	EPA 537M BY ID EPA 537 MOD		
<b>Project:</b>	Racer Lansing PFAS Delineation; Lansing, MI		

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

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	57%		35-135%
	13C5-PFPeA	58%		50-150%
	13C5-PFHxA	61%		50-150%
	13C4-PFHpA	64%		50-150%
	13C8-PFOA	67%		50-150%
	13C9-PFNA	70%		50-150%
	13C6-PFDA	66%		50-150%
	13C7-PFUnDA	82%		40-140%
	13C2-PFDoDA	78%		40-140%
	13C2-PFTeDA	53%		30-130%
	13C3-PFBS	59%		50-150%
	13C3-PFHxS	59%		50-150%
	13C8-PFOS	52%		50-150%
	13C8-FOSA	62%		30-130%
	d3-MeFOSAA	70%		50-150%
	13C2-4:2FTS	93%		50-150%
	13C2-6:2FTS	89%		50-150%
	13C2-8:2FTS	79%		50-150%

ND = Not detected      MDL = Method Detection Limit  
 RL = Reporting Limit  
 E = Indicates value exceeds calibration range

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

## Misc. Forms

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### Custody Documents and Other Forms

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Includes the following where applicable:

- Certification Exceptions
- Chain of Custody

# Parameter Certification Exceptions

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

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

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

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SGS North America Inc - Orlando  
Chain of Custody

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

FA76660

SGS - ORLANDO JOB #: PAGE 1 OF 3

SGS - ORLANDO Quote # SKIFF #

Client / Reporting Information			Project Information			Analytical Information										Matrix Codes	
Company Name: <b>ARCADIS</b>			Project Name: <b>RACER Lansing PFA5 Delineation</b>													DW - Drinking Water GW - Ground Water WW - Water SW - Surface Water SO - Soil SL - Sludge OI - Oil LIQ - Other Liquid AIR - Air SOL - Other Solid	
Address: <b>28550 Cubot Dr. Ste. 500</b>			Street														
City: <b>NOV</b> State: <b>MI</b> Zip: <b>48377</b>			City: <b>Lansing</b> State: <b>MI</b>														
Project Contact: <b>Marina Samp</b> Email: <b>marina.samp@arcadis.com</b>			Project # <b>30042872-03600</b>														
Phone #: <b>248-994-2318</b>			Fax #														
Sampler(s) Name(s) (Printed): Sampler 1: <b>M. Samp</b> Sampler 2: <b>A. Mandich</b>			Client Purchase Order # <b>30042872-03600</b>														
SGS Orlando Sample #	Field ID / Point of Collection	DATE	TIME	SAMPLED BY:	MATRIX	TOTAL # OF BOTTLES	OTHER	NONE	HCl	NO3	NO2	NH3	NH4	NO3+NO2	DIWATER	MEDIH	LAB USE ONLY
1	P3-MH-284-070620	7/6/20	1300	MS/AM	WW	2		X									X
2	Verlinden-MH-2-070720	7/7/20	0945	MS/AM	WW	6		X									X
3	Verlinden-MH-3-070720	7/7/20	0925	MS/AM	WW	2		X									X
4	Verlinden-MH-4-070720	7/7/20	0910	MS/AM	WW	2		X									X
5	Verlinden-MH-5-070720	7/7/20	0850	MS/AM	WW	2		X									X
6	MichAve-MH-3-070720	7/7/20	0815	MS/AM	WW	2		X									X
7	MichAve-MH-4-070720	7/7/20	0830	MS/AM	WW	2		X									X
8	Osborne-MH-1-070720	7/7/20	1020	MS/AM	WW	2		X									X
	<del>P6-MH-16-070620</del>	<del>7/6/20</del>	<del>1510</del>	<del>MS/AM</del>	<del>WW</del>	<del>2</del>											
9	P2-MH-10-070720	7/7/20	1510	MS/AM	WW	2		X									X
10	P6-MH-16-070620	7/6/20	1015	MS/AM	WW	2		X									X
11	P2-SAN-3-7-070720	7/7/20	1540	MS/AM	WW	2		X									X
Turnaround Time (Business days)			Data Deliverable Information			Comments / Remarks											
<input checked="" type="checkbox"/> 10 Day (Business) <input type="checkbox"/> 7 Day <input type="checkbox"/> 5 Day <input type="checkbox"/> 3 Day RUSH <input type="checkbox"/> 2 Day RUSH <input type="checkbox"/> 1 Day RUSH <input type="checkbox"/> Other			Approved By: / Date:			<input type="checkbox"/> COMMERCIAL "A" (RESULTS ONLY) <input type="checkbox"/> COMMERCIAL "B" (RESULTS PLUS QC) <input type="checkbox"/> REDT1 (EPA LEVEL 3) <input type="checkbox"/> FULLT1 (EPA LEVEL 4) <input type="checkbox"/> EDD'S											
						Email results to Andrew Lorenz (andrew.lorenz@arcadis.com) Marina Samp (marina.samp@arcadis.com) WW = Waste Water											
Rush TIA Data Available VIA Email or Lablink																	
Sample Custody must be documented below each time samples change possession, including courier delivery.																	
Relinquished by Sampler/Affiliation		Date Time:		Received By/Affiliation		Date Time:		Relinquished By/Affiliation		Date Time:		Received By/Affiliation					
Andrew Mandich / Arcadis		7/8/2020		FedEx		7/9/20		FX		7/9/20		P. Lorenz		9:30			
Relinquished by/Affiliation		Date Time:		Received By/Affiliation		Date Time:		Relinquished By/Affiliation		Date Time:		Received By/Affiliation					
5				4.1				7				8					

4.2  
4

FA76660: Chain of Custody

Page 1 of 4







SGS North America Inc - Orlando  
Chain of Custody

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FA76660

SGS - ORLANDO JOB #: PAGE 3 OF 3

Client / Reporting Information		Project Information		Analytical Information										Matrix Codes									
Company Name: Arcadis		Project Name: RAGER Lansing PFAS Decontamination												DW - Drinking Water									
Address: 2855D Cabot Dr. Ste. 500		Street												GW - Ground Water									
City: Novi State: MI ZIP: 48377		City: Lansing State: MI												WW - Water									
Project Contact: Marina Samp Email: marina.samp@arcadis.com		Project #: 30042872-03600												SW - Surface Water									
Phone #: 248-994-2318 CRM		Fax #:												SO - Soil									
Sampler(s) Name(s) (Printed): Sampler 1: M. Samp Sampler 2: A. Manichich		Client Purchase Order #: 30042872-03600												SL - Sludge									
COLLECTION		CONTAINER INFORMATION												OI - Oil									
SGS Orlando Sample #	Field ID / Point of Collection	DATE	TIME	SAMPLED BY:	MATRIX	TOTAL # OF BOTTLES	OTHER	IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9	IC10	IC11	IC12	IC13	IC14	IC15	LAB USE ONLY
21	FB-01-070720	7/7/20	1545	MS/AM	WW	2		X															
22	FB-01-070720	7/7/20	1545	MS/AM	WW	2		X															
23	P2-MH-14-070720	7/6/20	1125	MS/AM	WW	2		X															
24	P2-MH-W-070620	7/6/20	1350	MS/AM	WW	2		X															
25	P2-MH-T3-070620	7/6/20	1720	MS/AM	WW	2		X															
26	P2-MH-26-070720	7/7/20	1250	MS/AM	WW	2		X															
27	P2-MH-58-070620	7/6/20	1445	MS/AM	WW	2		X															
28	P2-MH-79-070620	7/6/20	1520	MS/AM	WW	2		X															
29	DUP-02			MS/AM	WW	2																	
30	DUP-03			MS/AM	WW	2																	
31	DUP-01			MS/AM	WW	2																	
32	P2-MH-86-070620	7/6/20	1550	MS/AM	WW	2		X															
Turnaround Time (Business days)		Data Deliverable Information		Comments / Remarks																			
10 Day (Business) Approved By: / Date:		<input type="checkbox"/> COMMERCIAL "A" (RESULTS ONLY) <input type="checkbox"/> COMMERCIAL "B" (RESULTS PLUS QC) <input type="checkbox"/> REDT1 (EPA LEVEL 3) <input type="checkbox"/> FULLT1 (EPA LEVEL 4) <input type="checkbox"/> EDD'S		Email results to Andrew Lorenz (andrew.lorenz@arcadis.com) re Marina Sump (marina.samp@arcadis.com) WW = wastewater INITIAL ASSESSMENT JK LABEL VERIFICATION																			
Rush TIA Data Available VIA Email or Lablink		Sample Custody must be documented below each time samples change possession, including courier delivery.																					
Relinquished by Sampler/Affiliation	Date Time:	Received By/Affiliation	Date Time:	Relinquished By/Affiliation	Date Time:	Received By/Affiliation	Date Time:	Relinquished By/Affiliation	Date Time:	Received By/Affiliation	Date Time:	Relinquished By/Affiliation	Date Time:	Received By/Affiliation	Date Time:								
1	7/8/20	2	FedEx	3	FX	4	RETT	5		6		7		8									
5		6		7		8																	
Lab Use Only: Cooler Temperature (s) Celsius (corrected): 5.4		http://www.sgs.com/en/terms-and-conditions																					

4.2  
4

FA76660: Chain of Custody

Page 3 of 4



## SGS Sample Receipt Summary

Job Number: FA76660

Client: ARCADIS

Project: RACER LANSING PFAS

Date / Time Received: 7/9/2020 9:30:00 AM

Delivery Method: FX

Airbill #s: 1386 6600 0897

Therm ID: IR 1;

Therm CF: -0.8;

# of Coolers: 1

Cooler Temps (Raw Measured) °C: Cooler 1: (4.9);

Cooler Temps (Corrected) °C: Cooler 1: (4.1);

**Cooler Information**

Y or N

- 1. Custody Seals Present
- 2. Custody Seals Intact
- 3. Temp criteria achieved
- 4. Cooler temp verification IR Gun
- 5. Cooler media Ice (Bag)

**Trip Blank Information**

Y or N N/A

- 1. Trip Blank present / cooler
  - 2. Trip Blank listed on COC
- W or S N/A
- 3. Type Of TB Received

**Sample Information**

Y or N N/A

- 1. Sample labels present on bottles
- 2. Samples preserved properly
- 3. Sufficient volume/containers recvd for analysis:
- 4. Condition of sample Intact
- 5. Sample recvd within HT
- 6. Dates/Times/IDs on COC match Sample Label
- 7. VOCs have headspace
- 8. Bottles received for unspecified tests
- 9. Compositing instructions clear
- 10. Voa Soil Kits/Jars received past 48hrs?
- 11. % Solids Jar received?
- 12. Residual Chlorine Present?

**Misc. Information**

Number of Encores: 25-Gram \_\_\_\_\_ 5-Gram \_\_\_\_\_  
 Test Strip Lot #: pH 0-3 230315  
 Residual Chlorine Test Strip Lot #: \_\_\_\_\_

Number of 5035 Field Kits: \_\_\_\_\_  
 pH 10-12 219813A

Number of Lab Filtered Metals: \_\_\_\_\_  
 Other: (Specify) \_\_\_\_\_

Comments

SM001  
Rev. Date 05/24/17

Technician: PETERH

Date: 7/9/2020 9:30:00 AM

Reviewer: \_\_\_\_\_

Date: \_\_\_\_\_

**FA76660: Chain of Custody**

**Page 4 of 4**

4.2  
4

## MS Semi-volatiles

### QC Data Summaries

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Includes the following where applicable:

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

# Method Blank Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81064-MB	3Q23716.D	1	07/17/20	NG	07/14/20	OP81064	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-1, FA76660-2, FA76660-3

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.0080	0.0040	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	65% 35-135%
	13C5-PFPeA	64% 50-150%
	13C5-PFHxA	65% 50-150%
	13C4-PFHpA	69% 50-150%
	13C8-PFOA	69% 50-150%
	13C9-PFNA	69% 50-150%
	13C6-PFDA	70% 50-150%
	13C7-PFUnDA	67% 40-140%

## Method Blank Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81064-MB	3Q23716.D	1	07/17/20	NG	07/14/20	OP81064	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-1, FA76660-2, FA76660-3

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	63% 40-140%
	13C2-PFTeDA	50% 30-130%
	13C3-PFBS	65% 50-150%
	13C3-PFHxS	68% 50-150%
	13C8-PFOS	67% 50-150%
	13C8-FOSA	70% 30-130%
	d3-MeFOSAA	66% 50-150%
	13C2-4:2FTS	63% 50-150%
	13C2-6:2FTS	68% 50-150%
	13C2-8:2FTS	66% 50-150%
	13C3-HFPO-DA	69% 50-150%

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# Method Blank Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81066-MB	Q71454.D	1	07/16/20	NG	07/14/20	OP81066	SQ1619

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-4, FA76660-5, FA76660-6, FA76660-7, FA76660-8, FA76660-9, FA76660-10, FA76660-11, FA76660-12, FA76660-13, FA76660-14, FA76660-15, FA76660-16, FA76660-17, FA76660-18, FA76660-19, FA76660-20, FA76660-22, FA76660-23

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.0080	0.0040	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	73% 35-135%
	13C5-PFPeA	73% 50-150%
	13C5-PFHxA	68% 50-150%
	13C4-PFHpA	67% 50-150%
	13C8-PFOA	71% 50-150%
	13C9-PFNA	76% 50-150%
	13C6-PFDA	76% 50-150%
	13C7-PFUnDA	76% 40-140%

## Method Blank Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81066-MB	Q71454.D	1	07/16/20	NG	07/14/20	OP81066	SQ1619

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-4, FA76660-5, FA76660-6, FA76660-7, FA76660-8, FA76660-9, FA76660-10, FA76660-11, FA76660-12, FA76660-13, FA76660-14, FA76660-15, FA76660-16, FA76660-17, FA76660-18, FA76660-19, FA76660-20, FA76660-22, FA76660-23

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	69% 40-140%
	13C2-PFTeDA	65% 30-130%
	13C3-PFBS	69% 50-150%
	13C3-PFHxS	73% 50-150%
	13C8-PFOS	75% 50-150%
	13C8-FOSA	79% 30-130%
	d3-MeFOSAA	72% 50-150%
	13C2-4:2FTS	67% 50-150%
	13C2-6:2FTS	71% 50-150%
	13C2-8:2FTS	73% 50-150%

## Method Blank Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81083-MB	3Q23699.D	1	07/16/20	NG	07/15/20	OP81083	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-24, FA76660-25, FA76660-26, FA76660-27, FA76660-28, FA76660-29, FA76660-30

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.0080	0.0040	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	45% 35-135%
	13C5-PFPeA	45% * a 50-150%
	13C5-PFHxA	46% * a 50-150%
	13C4-PFHpA	47% * a 50-150%
	13C8-PFOA	48% * a 50-150%
	13C9-PFNA	48% * a 50-150%
	13C6-PFDA	48% * a 50-150%
	13C7-PFUnDA	46% 40-140%

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## Method Blank Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81083-MB	3Q23699.D	1	07/16/20	NG	07/15/20	OP81083	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-24, FA76660-25, FA76660-26, FA76660-27, FA76660-28, FA76660-29, FA76660-30

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	45% 40-140%
	13C2-PFTeDA	37% 30-130%
	13C3-PFBS	46% * a 50-150%
	13C3-PFHxS	47% * a 50-150%
	13C8-PFOS	45% * a 50-150%
	13C8-FOSA	45% 30-130%
	d3-MeFOSAA	44% * a 50-150%
	13C2-4:2FTS	44% * a 50-150%
	13C2-6:2FTS	46% * a 50-150%
	13C2-8:2FTS	42% * a 50-150%

(a) Outside control limits.

## Method Blank Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81139-MB	3Q23929.D	1	07/22/20	NG	07/18/20	OP81139	S3Q367

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-1, FA76660-2, FA76660-21, FA76660-25, FA76660-27, FA76660-28

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0033	0.0040	0.0010	ug/l	J
375-85-9	Perfluoroheptanoic acid	0.0032	0.0040	0.0010	ug/l	J
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0104	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.0080	0.0040	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0509	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	101% 35-135%
	13C5-PFPeA	98% 50-150%
	13C5-PFHxA	98% 50-150%
	13C4-PFHpA	99% 50-150%
	13C8-PFOA	99% 50-150%
	13C9-PFNA	98% 50-150%
	13C6-PFDA	98% 50-150%
	13C7-PFUnDA	92% 40-140%

## Method Blank Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81139-MB	3Q23929.D	1	07/22/20	NG	07/18/20	OP81139	S3Q367

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-1, FA76660-2, FA76660-21, FA76660-25, FA76660-27, FA76660-28

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	83% 40-140%
	13C2-PFTeDA	78% 30-130%
	13C3-PFBS	95% 50-150%
	13C3-PFHxS	93% 50-150%
	13C8-PFOS	92% 50-150%
	13C8-FOSA	96% 30-130%
	d3-MeFOSAA	101% 50-150%
	13C2-4:2FTS	94% 50-150%
	13C2-6:2FTS	97% 50-150%
	13C2-8:2FTS	92% 50-150%

# Instrument Blank

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
SQ1619-IBLK	Q71421.D	1	07/16/20	NG	n/a	n/a	SQ1619

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FA76660-4, FA76660-5, FA76660-6, FA76660-7, FA76660-8, FA76660-9, FA76660-10, FA76660-11, FA76660-12, FA76660-13, FA76660-15, FA76660-16, FA76660-17, FA76660-18, FA76660-20, FA76660-22, FA76660-23

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	99% 50-150%
	13C5-PFPeA	96% 50-150%
	13C5-PFHxA	93% 50-150%
	13C4-PFHpA	92% 50-150%
	13C8-PFOA	98% 50-150%
	13C9-PFNA	102% 50-150%
	13C6-PFDA	105% 50-150%
	13C7-PFUnDA	109% 50-150%

# Instrument Blank

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
SQ1619-IBLK	Q71421.D	1	07/16/20	NG	n/a	n/a	SQ1619

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FA76660-4, FA76660-5, FA76660-6, FA76660-7, FA76660-8, FA76660-9, FA76660-10, FA76660-11, FA76660-12, FA76660-13, FA76660-15, FA76660-16, FA76660-17, FA76660-18, FA76660-20, FA76660-22, FA76660-23

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	103% 50-150%
	13C2-PFTeDA	103% 50-150%
	13C3-PFBS	94% 50-150%
	13C3-PFHxS	98% 50-150%
	13C8-PFOS	101% 50-150%
	13C8-FOSA	109% 50-150%
	d3-MeFOSAA	108% 50-150%
	13C2-4:2FTS	89% 50-150%
	13C2-6:2FTS	96% 50-150%
	13C2-8:2FTS	103% 50-150%
	13C3-HFPO-DA	95% 50-150%

5.1.5  
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# Instrument Blank

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S3Q364-IBLK	3Q23661.D	1	07/16/20	NG	n/a	n/a	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FA76660-1, FA76660-2, FA76660-3, FA76660-24, FA76660-25, FA76660-26, FA76660-27, FA76660-28, FA76660-29, FA76660-30

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	74% 50-150%
	13C5-PFPeA	72% 50-150%
	13C5-PFHxA	73% 50-150%
	13C4-PFHpA	75% 50-150%
	13C8-PFOA	77% 50-150%
	13C9-PFNA	77% 50-150%
	13C6-PFDA	79% 50-150%
	13C7-PFUnDA	80% 50-150%

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**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S3Q364-IBLK	3Q23661.D	1	07/16/20	NG	n/a	n/a	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FA76660-1, FA76660-2, FA76660-3, FA76660-24, FA76660-25, FA76660-26, FA76660-27, FA76660-28, FA76660-29, FA76660-30

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	86% 50-150%
	13C2-PFTeDA	65% 50-150%
	13C3-PFBS	75% 50-150%
	13C3-PFHxS	76% 50-150%
	13C8-PFOS	76% 50-150%
	13C8-FOSA	78% 50-150%
	d3-MeFOSAA	80% 50-150%
	13C2-4:2FTS	70% 50-150%
	13C2-6:2FTS	72% 50-150%
	13C2-8:2FTS	72% 50-150%
	13C3-HFPO-DA	88% 50-150%

5.1.6  
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# Instrument Blank

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S4Q44-IBLK	4Q2877.D	1	07/17/20	MV	n/a	n/a	S4Q44

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FA76660-6, FA76660-14, FA76660-18, FA76660-19

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

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

5.1.7  
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# Instrument Blank

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S4Q44-IBLK	4Q2877.D	1	07/17/20	MV	n/a	n/a	S4Q44

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FA76660-6, FA76660-14, FA76660-18, FA76660-19

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	96% 50-150%
	13C2-PFTeDA	93% 50-150%
	13C3-PFBS	99% 50-150%
	13C3-PFHxS	99% 50-150%
	13C8-PFOS	97% 50-150%
	13C8-FOSA	106% 50-150%
	d3-MeFOSAA	102% 50-150%
	13C2-4:2FTS	95% 50-150%
	13C2-6:2FTS	96% 50-150%
	13C2-8:2FTS	91% 50-150%
	13C3-HFPO-DA	93% 50-150%

5.1.7  
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# Instrument Blank

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S3Q367-IBLK	3Q23894.D	1	07/21/20	NG	n/a	n/a	S3Q367

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FA76660-1, FA76660-2, FA76660-21, FA76660-25, FA76660-27, FA76660-28

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	116% 50-150%
	13C5-PFPeA	116% 50-150%
	13C5-PFHxA	118% 50-150%
	13C4-PFHpA	117% 50-150%
	13C8-PFOA	120% 50-150%
	13C9-PFNA	119% 50-150%
	13C6-PFDA	119% 50-150%
	13C7-PFUnDA	119% 50-150%

# Instrument Blank

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S3Q367-IBLK	3Q23894.D	1	07/21/20	NG	n/a	n/a	S3Q367

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FA76660-1, FA76660-2, FA76660-21, FA76660-25, FA76660-27, FA76660-28

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	117% 50-150%
	13C2-PFTeDA	118% 50-150%
	13C3-PFBS	113% 50-150%
	13C3-PFHxS	114% 50-150%
	13C8-PFOS	116% 50-150%
	13C8-FOSA	121% 50-150%
	d3-MeFOSAA	127% 50-150%
	13C2-4:2FTS	109% 50-150%
	13C2-6:2FTS	110% 50-150%
	13C2-8:2FTS	109% 50-150%
	13C3-HFPO-DA	122% 50-150%

5.1.8  
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# Blank Spike Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81064-BS	3Q23715.D	1	07/17/20	NG	07/14/20	OP81064	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-1, FA76660-2, FA76660-3

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0756	95	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0800	100	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0785	98	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0775	97	70-130
335-67-1	Perfluorooctanoic acid	0.08	0.0807	101	70-130
375-95-1	Perfluorononanoic acid	0.08	0.0789	99	70-130
335-76-2	Perfluorodecanoic acid	0.08	0.0776	97	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0779	97	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0779	97	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0968	121	65-130
376-06-7	Perfluorotetradecanoic acid	0.08	0.0809	101	70-130
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0781	98	70-130
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0783	98	70-130
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0848	106	70-130
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0834	104	70-130
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0784	98	70-130
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0694	87	65-130
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0671	84	60-130
754-91-6	PFOSA	0.08	0.0787	98	70-130
2355-31-9	MeFOSAA	0.08	0.0913	114	70-130
2991-50-6	EtFOSAA	0.08	0.0866	108	70-130
757124-72-44:2	Fluorotelomer sulfonate	0.08	0.0896	112	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.0830	104	70-130
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0957	120	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	67%	35-135%
	13C5-PFPeA	66%	50-150%
	13C5-PFHxA	67%	50-150%
	13C4-PFHpA	71%	50-150%
	13C8-PFOA	70%	50-150%
	13C9-PFNA	69%	50-150%
	13C6-PFDA	68%	50-150%
	13C7-PFUnDA	64%	40-140%

\* = Outside of Control Limits.

# Blank Spike Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81064-BS	3Q23715.D	1	07/17/20	NG	07/14/20	OP81064	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-1, FA76660-2, FA76660-3

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	60%	40-140%
	13C2-PFTeDA	49%	30-130%
	13C3-PFBS	67%	50-150%
	13C3-PFHxS	69%	50-150%
	13C8-PFOS	67%	50-150%
	13C8-FOSA	71%	30-130%
	d3-MeFOSAA	63%	50-150%
	13C2-4:2FTS	68%	50-150%
	13C2-6:2FTS	73%	50-150%
	13C2-8:2FTS	70%	50-150%
	13C3-HFPO-DA	71%	50-150%

\* = Outside of Control Limits.

# Blank Spike Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81066-BS	Q71453.D	1	07/16/20	NG	07/14/20	OP81066	SQ1619

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-4, FA76660-5, FA76660-6, FA76660-7, FA76660-8, FA76660-9, FA76660-10, FA76660-11, FA76660-12, FA76660-13, FA76660-14, FA76660-15, FA76660-16, FA76660-17, FA76660-18, FA76660-19, FA76660-20, FA76660-22, FA76660-23

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0767	96	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0706	88	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0836	105	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0771	96	70-130
335-67-1	Perfluorooctanoic acid	0.08	0.0818	102	70-130
375-95-1	Perfluorononanoic acid	0.08	0.0763	95	70-130
335-76-2	Perfluorodecanoic acid	0.08	0.0849	106	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0789	99	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0815	102	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0728	91	65-130
376-06-7	Perfluorotetradecanoic acid	0.08	0.0724	91	70-130
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0810	101	70-130
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0792	99	70-130
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0815	102	70-130
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0829	104	70-130
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0703	88	70-130
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0731	91	65-130
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0678	85	60-130
754-91-6	PFOSA	0.08	0.0818	102	70-130
2355-31-9	MeFOSAA	0.08	0.0928	116	70-130
2991-50-6	EtFOSAA	0.08	0.0847	106	70-130
757124-72-44:2	Fluorotelomer sulfonate	0.08	0.0929	116	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.0825	103	70-130
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0952	119	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	76%	35-135%
	13C5-PFPeA	76%	50-150%
	13C5-PFHxA	70%	50-150%
	13C4-PFHpA	69%	50-150%
	13C8-PFOA	72%	50-150%
	13C9-PFNA	77%	50-150%
	13C6-PFDA	75%	50-150%
	13C7-PFUnDA	76%	40-140%

\* = Outside of Control Limits.

5.2.2  
5

# Blank Spike Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81066-BS	Q71453.D	1	07/16/20	NG	07/14/20	OP81066	SQ1619

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-4, FA76660-5, FA76660-6, FA76660-7, FA76660-8, FA76660-9, FA76660-10, FA76660-11, FA76660-12, FA76660-13, FA76660-14, FA76660-15, FA76660-16, FA76660-17, FA76660-18, FA76660-19, FA76660-20, FA76660-22, FA76660-23

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	75%	40-140%
	13C2-PFTeDA	69%	30-130%
	13C3-PFBS	71%	50-150%
	13C3-PFHxS	75%	50-150%
	13C8-PFOS	75%	50-150%
	13C8-FOSA	75%	30-130%
	d3-MeFOSAA	74%	50-150%
	13C2-4:2FTS	73%	50-150%
	13C2-6:2FTS	76%	50-150%
	13C2-8:2FTS	79%	50-150%

\* = Outside of Control Limits.

# Blank Spike Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81083-BS	3Q23698.D	1	07/16/20	NG	07/15/20	OP81083	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-24, FA76660-25, FA76660-26, FA76660-27, FA76660-28, FA76660-29, FA76660-30

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0746	93	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0772	97	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0772	97	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0767	96	70-130
335-67-1	Perfluorooctanoic acid	0.08	0.0793	99	70-130
375-95-1	Perfluorononanoic acid	0.08	0.0769	96	70-130
335-76-2	Perfluorodecanoic acid	0.08	0.0766	96	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0784	98	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0784	98	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0882	110	65-130
376-06-7	Perfluorotetradecanoic acid	0.08	0.0824	103	70-130
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0752	94	70-130
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0773	97	70-130
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0840	105	70-130
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0827	103	70-130
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0765	96	70-130
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0674	84	65-130
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0660	83	60-130
754-91-6	PFOSA	0.08	0.0781	98	70-130
2355-31-9	MeFOSAA	0.08	0.0896	112	70-130
2991-50-6	EtFOSAA	0.08	0.0851	106	70-130
757124-72-44:2	Fluorotelomer sulfonate	0.08	0.0888	111	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.0824	103	70-130
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0938	117	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	69%	35-135%
	13C5-PFPeA	68%	50-150%
	13C5-PFHxA	69%	50-150%
	13C4-PFHpA	70%	50-150%
	13C8-PFOA	71%	50-150%
	13C9-PFNA	71%	50-150%
	13C6-PFDA	69%	50-150%
	13C7-PFUnDA	66%	40-140%

\* = Outside of Control Limits.

# Blank Spike Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81083-BS	3Q23698.D	1	07/16/20	NG	07/15/20	OP81083	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-24, FA76660-25, FA76660-26, FA76660-27, FA76660-28, FA76660-29, FA76660-30

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	63%	40-140%
	13C2-PFTeDA	52%	30-130%
	13C3-PFBS	69%	50-150%
	13C3-PFHxS	70%	50-150%
	13C8-PFOS	70%	50-150%
	13C8-FOSA	71%	30-130%
	d3-MeFOSAA	64%	50-150%
	13C2-4:2FTS	70%	50-150%
	13C2-6:2FTS	71%	50-150%
	13C2-8:2FTS	68%	50-150%

\* = Outside of Control Limits.

# Blank Spike Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81139-BS	3Q23928.D	1	07/22/20	NG	07/18/20	OP81139	S3Q367

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-1, FA76660-2, FA76660-21, FA76660-25, FA76660-27, FA76660-28

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0805	101	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0813	102	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0800	100	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0811	101	70-130
335-67-1	Perfluorooctanoic acid	0.08	0.0813	102	70-130
375-95-1	Perfluorononanoic acid	0.08	0.0822	103	70-130
335-76-2	Perfluorodecanoic acid	0.08	0.0808	101	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0801	100	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0832	104	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0843	105	65-130
376-06-7	Perfluorotetradecanoic acid	0.08	0.0852	107	70-130
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0810	101	70-130
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0812	102	70-130
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0832	104	70-130
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0843	105	70-130
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0835	104	70-130
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0773	97	65-130
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0707	88	60-130
754-91-6	PFOSA	0.08	0.0815	102	70-130
2355-31-9	MeFOSAA	0.08	0.0838	105	70-130
2991-50-6	EtFOSAA	0.08	0.0808	101	70-130
757124-72-44:2	Fluorotelomer sulfonate	0.08	0.0833	104	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.102	128	70-130
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0840	105	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	93%	35-135%
	13C5-PFPeA	91%	50-150%
	13C5-PFHxA	92%	50-150%
	13C4-PFHpA	92%	50-150%
	13C8-PFOA	91%	50-150%
	13C9-PFNA	92%	50-150%
	13C6-PFDA	91%	50-150%
	13C7-PFUnDA	86%	40-140%

\* = Outside of Control Limits.

5.2.4  
5

# Blank Spike Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81139-BS	3Q23928.D	1	07/22/20	NG	07/18/20	OP81139	S3Q367

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-1, FA76660-2, FA76660-21, FA76660-25, FA76660-27, FA76660-28

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	77%	40-140%
	13C2-PFTeDA	73%	30-130%
	13C3-PFBS	90%	50-150%
	13C3-PFHxS	88%	50-150%
	13C8-PFOS	87%	50-150%
	13C8-FOSA	85%	30-130%
	d3-MeFOSAA	94%	50-150%
	13C2-4:2FTS	91%	50-150%
	13C2-6:2FTS	92%	50-150%
	13C2-8:2FTS	90%	50-150%

\* = Outside of Control Limits.

# Matrix Spike Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81083-MS	3Q23703.D	1	07/16/20	NG	07/15/20	OP81083	S3Q364
FA76660-24	3Q23702.D	1	07/16/20	NG	07/15/20	OP81083	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-24, FA76660-25, FA76660-26, FA76660-27, FA76660-28, FA76660-29, FA76660-30

CAS No.	Compound	FA76660-24 ug/l	Spike Q	MS ug/l	MS %	Limits	
375-22-4	Perfluorobutanoic acid	0.0030	J	0.08	0.0802	97	70-130
2706-90-3	Perfluoropentanoic acid	ND		0.08	0.0821	103	70-130
307-24-4	Perfluorohexanoic acid	ND		0.08	0.0805	101	70-130
375-85-9	Perfluoroheptanoic acid	ND		0.08	0.0798	100	70-130
335-67-1	Perfluorooctanoic acid	0.0043		0.08	0.0858	102	70-130
375-95-1	Perfluorononanoic acid	ND		0.08	0.0800	100	70-130
335-76-2	Perfluorodecanoic acid	ND		0.08	0.0804	101	70-130
2058-94-8	Perfluoroundecanoic acid	ND		0.08	0.0794	99	70-130
307-55-1	Perfluorododecanoic acid	ND		0.08	0.0803	100	70-130
72629-94-8	Perfluorotridecanoic acid	ND		0.08	0.115	144*	65-130
376-06-7	Perfluorotetradecanoic acid	ND		0.08	0.0826	103	70-130
375-73-5	Perfluorobutanesulfonic acid	0.0014	J	0.08	0.0823	101	70-130
2706-91-4	Perfluoropentanesulfonic acid	ND		0.08	0.0818	102	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0019	J	0.08	0.0892	109	70-130
375-92-8	Perfluoroheptanesulfonic acid	ND		0.08	0.0879	110	70-130
1763-23-1	Perfluorooctanesulfonic acid	ND		0.08	0.0959	120	70-130
68259-12-1	Perfluorononanesulfonic acid	ND		0.08	0.0563	70	65-130
335-77-3	Perfluorodecanesulfonic acid	ND		0.08	0.0480	60	60-130
754-91-6	PFOSA	ND		0.08	0.0817	102	70-130
2355-31-9	MeFOSAA	ND		0.08	0.0926	116	70-130
2991-50-6	EtFOSAA	ND		0.08	0.0807	101	70-130
757124-72-44:2	Fluorotelomer sulfonate	ND		0.08	0.0914	114	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	ND		0.08	0.0854	107	70-130
39108-34-4	8:2 Fluorotelomer sulfonate	ND		0.08	0.0977	122	70-130

CAS No.	ID Standard Recoveries	MS	FA76660-24	Limits
	13C4-PFBA	52%	56%	35-135%
	13C5-PFPeA	55%	60%	50-150%
	13C5-PFHxA	59%	65%	50-150%
	13C4-PFHpA	65%	72%	50-150%
	13C8-PFOA	67%	77%	50-150%
	13C9-PFNA	67%	77%	50-150%
	13C6-PFDA	52%	63%	50-150%
	13C7-PFUnDA	55%	66%	40-140%

\* = Outside of Control Limits.

5.3.1  
5

# Matrix Spike Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81083-MS	3Q23703.D	1	07/16/20	NG	07/15/20	OP81083	S3Q364
FA76660-24	3Q23702.D	1	07/16/20	NG	07/15/20	OP81083	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-24, FA76660-25, FA76660-26, FA76660-27, FA76660-28, FA76660-29, FA76660-30

CAS No.	ID Standard Recoveries	MS	FA76660-24	Limits
	13C2-PFDoDA	57%	67%	40-140%
	13C2-PFTeDA	51%	42%	30-130%
	13C3-PFBS	55%	61%	50-150%
	13C3-PFHxS	58%	64%	50-150%
	13C8-PFOS	47%* a	54%	50-150%
	13C8-FOSA	58%	54%	30-130%
	d3-MeFOSAA	54%	63%	50-150%
	13C2-4:2FTS	93%	96%	50-150%
	13C2-6:2FTS	83%	92%	50-150%
	13C2-8:2FTS	71%	76%	50-150%

(a) Outside control limits.

\* = Outside of Control Limits.

# Matrix Spike Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81139-MS	3Q23940.D	1	07/22/20	NG	07/18/20	OP81139	S3Q367
FA76899-1	3Q23939.D	1	07/22/20	NG	07/18/20	OP81139	S3Q367

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-1, FA76660-2, FA76660-21, FA76660-25, FA76660-27, FA76660-28

CAS No.	Compound	FA76899-1 ug/l	Spike Q	ug/l	MS ug/l	MS %	Limits
375-22-4	Perfluorobutanoic acid	0.016 U	0.16	0.168	105	70-130	
2706-90-3	Perfluoropentanoic acid	0.0080 U	0.16	0.167	104	70-130	
307-24-4	Perfluorohexanoic acid	0.0080 U	0.16	0.167	104	70-130	
375-85-9	Perfluoroheptanoic acid	0.0080 U	0.16	0.169	106	70-130	
335-67-1	Perfluorooctanoic acid	0.0080 U	0.16	0.171	107	70-130	
375-95-1	Perfluorononanoic acid	0.0080 U	0.16	0.173	108	70-130	
335-76-2	Perfluorodecanoic acid	0.0080 U	0.16	0.168	105	70-130	
2058-94-8	Perfluoroundecanoic acid	0.0080 U	0.16	0.170	106	70-130	
307-55-1	Perfluorododecanoic acid	0.0080 U	0.16	0.176	110	70-130	
72629-94-8	Perfluorotridecanoic acid	0.0080 U	0.16	0.176	110	65-130	
376-06-7	Perfluorotetradecanoic acid	0.0080 U	0.16	0.177	111	70-130	
375-73-5	Perfluorobutanesulfonic acid	0.0080 U	0.16	0.170	106	70-130	
2706-91-4	Perfluoropentanesulfonic acid	0.0080 U	0.16	0.171	107	70-130	
355-46-4	Perfluorohexanesulfonic acid	0.0080 U	0.16	0.175	109	70-130	
375-92-8	Perfluoroheptanesulfonic acid	0.0080 U	0.16	0.174	109	70-130	
1763-23-1	Perfluorooctanesulfonic acid	0.0080 U	0.16	0.174	109	70-130	
68259-12-1	Perfluorononanesulfonic acid	0.0080 U	0.16	0.169	106	65-130	
335-77-3	Perfluorodecanesulfonic acid	0.0080 U	0.16	0.158	99	60-130	
754-91-6	PFOSA	0.0080 U	0.16	0.172	108	70-130	
2355-31-9	MeFOSAA	0.016 U	0.16	0.180	113	70-130	
2991-50-6	EtFOSAA	0.016 U	0.16	0.168	105	70-130	
757124-72-44:2	Fluorotelomer sulfonate	0.016 U	0.16	0.171	107	70-130	
27619-97-2	6:2 Fluorotelomer sulfonate	0.016 U	0.16	0.195	122	70-130	
39108-34-4	8:2 Fluorotelomer sulfonate	0.016 U	0.16	0.176	110	70-130	

CAS No.	ID Standard Recoveries	MS	FA76899-1	Limits
	13C4-PFBA	100%	97%	35-135%
	13C5-PFPeA	99%	95%	50-150%
	13C5-PFHxA	99%	96%	50-150%
	13C4-PFHpA	100%	98%	50-150%
	13C8-PFOA	98%	99%	50-150%
	13C9-PFNA	99%	98%	50-150%
	13C6-PFDA	100%	99%	50-150%
	13C7-PFUnDA	98%	95%	40-140%

\* = Outside of Control Limits.

5.3.2  
5

# Matrix Spike Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81139-MS	3Q23940.D	1	07/22/20	NG	07/18/20	OP81139	S3Q367
FA76899-1	3Q23939.D	1	07/22/20	NG	07/18/20	OP81139	S3Q367

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-1, FA76660-2, FA76660-21, FA76660-25, FA76660-27, FA76660-28

CAS No.	ID Standard Recoveries	MS	FA76899-1	Limits
	13C2-PFDoDA	93%	90%	40-140%
	13C2-PFTeDA	90%	87%	30-130%
	13C3-PFBS	97%	94%	50-150%
	13C3-PFHxS	96%	94%	50-150%
	13C8-PFOS	95%	93%	50-150%
	13C8-FOSA	85%	79%	30-130%
	d3-MeFOSAA	104%	103%	50-150%
	13C2-4:2FTS	101%	94%	50-150%
	13C2-6:2FTS	103%	97%	50-150%
	13C2-8:2FTS	102%	104%	50-150%

\* = Outside of Control Limits.

5.3.2  
5

# Matrix Spike/Matrix Spike Duplicate Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81064-MS	3Q23725.D	1	07/17/20	NG	07/14/20	OP81064	S3Q364
OP81064-MSD	3Q23726.D	1	07/17/20	NG	07/14/20	OP81064	S3Q364
JD9843-6	3Q23724.D	1	07/17/20	NG	07/14/20	OP81064	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-1, FA76660-2, FA76660-3

CAS No.	Compound	JD9843-6 ug/l	Spike Q ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
375-22-4	Perfluorobutanoic acid	0.0179	0.08	0.0982	100	0.08	0.102	105	4	70-130/30
2706-90-3	Perfluoropentanoic acid	0.0157	0.08	0.102	108	0.08	0.106	113	4	70-130/30
307-24-4	Perfluorohexanoic acid	0.0144	0.08	0.0988	106	0.08	0.101	108	2	70-130/30
375-85-9	Perfluoroheptanoic acid	0.0103	0.08	0.0930	103	0.08	0.0968	108	4	70-130/30
335-67-1	Perfluorooctanoic acid	0.0538	0.08	0.140	108	0.08	0.147	117	5	70-130/30
375-95-1	Perfluorononanoic acid	0.0050	0.08	0.0899	106	0.08	0.0914	108	2	70-130/30
335-76-2	Perfluorodecanoic acid	ND	0.08	0.0807	101	0.08	0.0836	105	4	70-130/30
2058-94-8	Perfluoroundecanoic acid	ND	0.08	0.0803	100	0.08	0.0834	104	4	70-130/30
307-55-1	Perfluorododecanoic acid	ND	0.08	0.0809	101	0.08	0.0844	106	4	70-130/30
72629-94-8	Perfluorotridecanoic acid	ND	0.08	0.127	159*	0.08	0.133	166*	5	65-130/30
376-06-7	Perfluorotetradecanoic acid	ND	0.08	0.0825	103	0.08	0.0873	109	6	70-130/30
375-73-5	Perfluorobutanesulfonic acid	0.0051	0.08	0.0907	107	0.08	0.0922	109	2	70-130/30
2706-91-4	Perfluoropentanesulfonic acid	0.0039	J 0.08	0.0864	103	0.08	0.0879	105	2	70-130/30
355-46-4	Perfluorohexanesulfonic acid	0.0221	0.08	0.113	114	0.08	0.119	121	5	70-130/30
375-92-8	Perfluoroheptanesulfonic acid	ND	0.08	0.0898	112	0.08	0.0916	115	2	70-130/30
1763-23-1	Perfluorooctanesulfonic acid	0.0302	0.08	0.117	109	0.08	0.122	115	4	70-130/30
68259-12-1	Perfluorononanesulfonic acid	ND	0.08	0.0543	68	0.08	0.0575	72	6	65-130/30
335-77-3	Perfluorodecanesulfonic acid	ND	0.08	0.0422	53*	0.08	0.0431	54*	2	60-130/30
754-91-6	PFOSA	ND	0.08	0.0830	104	0.08	0.0847	106	2	70-130/30
2355-31-9	MeFOSAA	ND	0.08	0.0954	119	0.08	0.101	126	6	70-130/30
2991-50-6	EtFOSAA	ND	0.08	0.0782	98	0.08	0.0829	104	6	70-130/30
757124-72-44:2	Fluorotelomer sulfonate	ND	0.08	0.0937	117	0.08	0.0962	120	3	70-130/30
27619-97-2	6:2 Fluorotelomer sulfonate	0.0020	J 0.08	0.0886	108	0.08	0.0908	111	2	70-130/30
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.08	0.0991	124	0.08	0.102	128	3	70-130/30

CAS No.	ID Standard Recoveries	MS	MSD	JD9843-6	Limits
13C4-PFBA		59%	51%	58%	35-135%
13C5-PFPeA		61%	52%	60%	50-150%
13C5-PFHxA		65%	55%	64%	50-150%
13C4-PFHpA		71%	61%	70%	50-150%
13C8-PFOA		75%	63%	73%	50-150%
13C9-PFNA		75%	63%	73%	50-150%
13C6-PFDA		59%	50%	59%	50-150%
13C7-PFUnDA		62%	53%	71%	40-140%

\* = Outside of Control Limits.

5.4.1  
5

# Matrix Spike/Matrix Spike Duplicate Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81064-MS	3Q23725.D	1	07/17/20	NG	07/14/20	OP81064	S3Q364
OP81064-MSD	3Q23726.D	1	07/17/20	NG	07/14/20	OP81064	S3Q364
JD9843-6	3Q23724.D	1	07/17/20	NG	07/14/20	OP81064	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-1, FA76660-2, FA76660-3

CAS No.	ID Standard Recoveries	MS	MSD	JD9843-6	Limits
	13C2-PFDoDA	55%	50%	69%	40-140%
	13C2-PFTeDA	40%	34%	47%	30-130%
	13C3-PFBS	63%	54%	62%	50-150%
	13C3-PFHxS	66%	55%	64%	50-150%
	13C8-PFOS	52%	43%* a	51%	50-150%
	13C8-FOSA	55%	48%	53%	30-130%
	d3-MeFOSAA	59%	50%	61%	50-150%
	13C2-4:2FTS	101%	83%	94%	50-150%
	13C2-6:2FTS	98%	82%	92%	50-150%
	13C2-8:2FTS	79%	68%	75%	50-150%
	13C3-HFPO-DA	67%	57%		50-150%

(a) Outside control limits.

\* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81066-MS	Q71476.D	1	07/16/20	NG	07/14/20	OP81066	SQ1619
OP81066-MSD	Q71477.D	1	07/16/20	NG	07/14/20	OP81066	SQ1619
FA76660-20	Q71475.D	1	07/16/20	NG	07/14/20	OP81066	SQ1619

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-4, FA76660-5, FA76660-6, FA76660-7, FA76660-8, FA76660-9, FA76660-10, FA76660-11, FA76660-12, FA76660-13, FA76660-14, FA76660-15, FA76660-16, FA76660-17, FA76660-18, FA76660-19, FA76660-20, FA76660-22, FA76660-23

CAS No.	Compound	FA76660-20 ug/l	Spike Q	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD	
375-22-4	Perfluorobutanoic acid	0.0064	J	0.0667	0.0712	97	0.0667	0.0720	98	1	70-130/30
2706-90-3	Perfluoropentanoic acid	0.0019	J	0.0667	0.0625	91	0.0667	0.0630	92	1	70-130/30
307-24-4	Perfluorohexanoic acid	0.0019	J	0.0667	0.0695	101	0.0667	0.0713	104	3	70-130/30
375-85-9	Perfluoroheptanoic acid	0.0018	J	0.0667	0.0675	99	0.0667	0.0717	105	6	70-130/30
335-67-1	Perfluorooctanoic acid	0.0029	J	0.0667	0.0729	105	0.0667	0.0719	104	1	70-130/30
375-95-1	Perfluorononanoic acid	ND		0.0667	0.0624	94	0.0667	0.0627	94	0	70-130/30
335-76-2	Perfluorodecanoic acid	ND		0.0667	0.0690	104	0.0667	0.0697	105	1	70-130/30
2058-94-8	Perfluoroundecanoic acid	ND		0.0667	0.0674	101	0.0667	0.0683	102	1	70-130/30
307-55-1	Perfluorododecanoic acid	ND		0.0667	0.0678	102	0.0667	0.0676	101	0	70-130/30
72629-94-8	Perfluorotridecanoic acid	ND		0.0667	0.0603	90	0.0667	0.0625	94	4	65-130/30
376-06-7	Perfluorotetradecanoic acid	ND		0.0667	0.0628	94	0.0667	0.0649	97	3	70-130/30
375-73-5	Perfluorobutanesulfonic acid	0.0017	J	0.0667	0.0710	104	0.0667	0.0686	100	3	70-130/30
2706-91-4	Perfluoropentanesulfonic acid	ND		0.0667	0.0641	96	0.0667	0.0655	98	2	70-130/30
355-46-4	Perfluorohexanesulfonic acid	ND		0.0667	0.0713	107	0.0667	0.0737	111	3	70-130/30
375-92-8	Perfluoroheptanesulfonic acid	ND		0.0667	0.0719	108	0.0667	0.0721	108	0	70-130/30
1763-23-1	Perfluorooctanesulfonic acid	0.0024	J	0.0667	0.0656	95	0.0667	0.0633	91	4	70-130/30
68259-12-1	Perfluorononanesulfonic acid	ND		0.0667	0.0711	107	0.0667	0.0652	98	9	65-130/30
335-77-3	Perfluorodecanesulfonic acid	ND		0.0667	0.0624	94	0.0667	0.0600	90	4	60-130/30
754-91-6	PFOSA	ND		0.0667	0.0702	105	0.0667	0.0695	104	1	70-130/30
2355-31-9	MeFOSAA	ND		0.0667	0.0808	121	0.0667	0.0759	114	6	70-130/30
2991-50-6	EtFOSAA	ND		0.0667	0.0713	107	0.0667	0.0734	110	3	70-130/30
757124-72-44:2	Fluorotelomer sulfonate	ND		0.0667	0.0777	117	0.0667	0.0794	119	2	70-130/30
27619-97-2	6:2 Fluorotelomer sulfonate	ND		0.0667	0.0697	105	0.0667	0.0698	105	0	70-130/30
39108-34-4	8:2 Fluorotelomer sulfonate	ND		0.0667	0.0793	119	0.0667	0.0766	115	3	70-130/30

CAS No.	ID Standard Recoveries	MS	MSD	FA76660-20	Limits
13C4-PFBA		59%	53%	58%	35-135%
13C5-PFPeA		61%	56%	60%	50-150%
13C5-PFHxA		57%	52%	57%	50-150%
13C4-PFHpA		57%	52%	58%	50-150%
13C8-PFOA		65%	62%	65%	50-150%
13C9-PFNA		71%	67%	69%	50-150%
13C6-PFDA		71%	65%	67%	50-150%
13C7-PFUnDA		74%	66%	65%	40-140%

\* = Outside of Control Limits.

5.4.2  
5

# Matrix Spike/Matrix Spike Duplicate Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81066-MS	Q71476.D	1	07/16/20	NG	07/14/20	OP81066	SQ1619
OP81066-MSD	Q71477.D	1	07/16/20	NG	07/14/20	OP81066	SQ1619
FA76660-20	Q71475.D	1	07/16/20	NG	07/14/20	OP81066	SQ1619

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-4, FA76660-5, FA76660-6, FA76660-7, FA76660-8, FA76660-9, FA76660-10, FA76660-11, FA76660-12, FA76660-13, FA76660-14, FA76660-15, FA76660-16, FA76660-17, FA76660-18, FA76660-19, FA76660-20, FA76660-22, FA76660-23

CAS No.	ID Standard Recoveries	MS	MSD	FA76660-20	Limits
13C2-PFDoDA		70%	64%	60%	40-140%
13C2-PFTeDA		69%	61%	56%	30-130%
13C3-PFBS		63%	57%	60%	50-150%
13C3-PFHxS		62%	57%	62%	50-150%
13C8-PFOS		63%	60%	60%	50-150%
13C8-FOSA		61%	56%	62%	30-130%
d3-MeFOSAA		80%	70%	73%	50-150%
13C2-4:2FTS		74%	67%	68%	50-150%
13C2-6:2FTS		88%	83%	82%	50-150%
13C2-8:2FTS		88%	81%	78%	50-150%

\* = Outside of Control Limits.

5.4.2  
5

# Duplicate Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81083-DUP	3Q23706.D	1	07/16/20	NG	07/15/20	OP81083	S3Q364
FA76660-26	3Q23705.D	1	07/16/20	NG	07/15/20	OP81083	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-24, FA76660-25, FA76660-26, FA76660-27, FA76660-28, FA76660-29, FA76660-30

CAS No.	Compound	FA76660-26 DUP		Q	RPD	Limits
		ug/l	Q ug/l			
375-22-4	Perfluorobutanoic acid	0.0163	0.0152		7	30
2706-90-3	Perfluoropentanoic acid	0.0217	0.0197		10	30
307-24-4	Perfluorohexanoic acid	0.0194	0.0185		5	30
375-85-9	Perfluoroheptanoic acid	0.0185	0.0171		8	30
335-67-1	Perfluorooctanoic acid	0.0362	0.0351		3	30
375-95-1	Perfluorononanoic acid	0.0041	0.0038	J	8	30
335-76-2	Perfluorodecanoic acid	0.0036	J 0.0031	J	15	30
2058-94-8	Perfluoroundecanoic acid	ND	ND		nc	30
307-55-1	Perfluorododecanoic acid	ND	ND		nc	30
72629-94-8	Perfluorotridecanoic acid	ND	ND		nc	30
376-06-7	Perfluorotetradecanoic acid	ND	ND		nc	30
375-73-5	Perfluorobutanesulfonic acid	0.0030	J 0.0019	J	45*	30
2706-91-4	Perfluoropentanesulfonic acid	0.0011	J ND		200*	30
355-46-4	Perfluorohexanesulfonic acid	0.0097	0.0092		5	30
375-92-8	Perfluoroheptanesulfonic acid	ND	ND		nc	30
1763-23-1	Perfluorooctanesulfonic acid	0.0471	0.0437		7	30
68259-12-1	Perfluorononanesulfonic acid	ND	ND		nc	30
335-77-3	Perfluorodecanesulfonic acid	ND	ND		nc	30
754-91-6	PFOSA	ND	ND		nc	30
2355-31-9	MeFOSAA	ND	ND		nc	30
2991-50-6	EtFOSAA	ND	ND		nc	30
757124-72-44:2	Fluorotelomer sulfonate	ND	ND		nc	30
27619-97-2	6:2 Fluorotelomer sulfonate	0.0023	J ND		200*	30
39108-34-4	8:2 Fluorotelomer sulfonate	ND	ND		nc	30

CAS No.	ID Standard Recoveries	DUP	FA76660-26	Limits
	13C4-PFBA	55%	59%	35-135%
	13C5-PFPeA	56%	60%	50-150%
	13C5-PFHxA	58%	62%	50-150%
	13C4-PFHpA	60%	64%	50-150%
	13C8-PFOA	62%	67%	50-150%
	13C9-PFNA	60%	66%	50-150%
	13C6-PFDA	43% * a	60%	50-150%
	13C7-PFUnDA	47%	82%	40-140%

\* = Outside of Control Limits.

5.5.1  
5

## Duplicate Summary

**Job Number:** FA76660  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81083-DUP	3Q23706.D	1	07/16/20	NG	07/15/20	OP81083	S3Q364
FA76660-26	3Q23705.D	1	07/16/20	NG	07/15/20	OP81083	S3Q364

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA76660-24, FA76660-25, FA76660-26, FA76660-27, FA76660-28, FA76660-29, FA76660-30

CAS No.	ID Standard Recoveries	DUP	FA76660-26	Limits
	13C2-PFDoDA	46%	82%	40-140%
	13C2-PFTeDA	44%	59%	30-130%
	13C3-PFBS	57%	62%	50-150%
	13C3-PFHxS	57%	61%	50-150%
	13C8-PFOS	37% * a	50%	50-150%
	13C8-FOSA	54%	55%	30-130%
	d3-MeFOSAA	47% * a	68%	50-150%
	13C2-4:2FTS	90%	97%	50-150%
	13C2-6:2FTS	83%	90%	50-150%
	13C2-8:2FTS	57%	76%	50-150%

(a) Outside control limits.

\* = Outside of Control Limits.

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

*e-Hardcopy 2.0*  
*Automated Report*

## Technical Report for

Arcadis

Racer Lansing PFAS Delineation; Lansing, MI

30042872.03600

SGS Job Number: FA77940

Sampling Date: 08/18/20

Report to:

Arcadis  
300 S Washington Sq Suite 315  
Lansing, MI 48933  
marina.samp@arcadis.com; alex.villhauer@arcadis.com;  
trevor.swarhout@arcadis.com; tiffany.linder@arcadis.com  
ATTN: Alex Villhauer

Total number of pages in report: **30**



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

Norm Farmer  
Technical Director

Client Service contact: Andrea Colby 407-425-6700

Certifications: FL(E83510), LA(03051), KS(E-10327), IL(200063), NC(573), NJ(FL002), NY(12022), SC(96038001)  
DoD ELAP(ANAB L2229), AZ(AZ0806), CA(2937), TX(T104704404), PA(68-03573), VA(460177),  
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Test results relate only to samples analyzed.

# Table of Contents

-1-

<b>Section 1: Sample Summary .....</b>	<b>3</b>
<b>Section 2: Summary of Hits .....</b>	<b>4</b>
<b>Section 3: Sample Results .....</b>	<b>5</b>
<b>3.1:</b> FA77940-1: P3-MH-308_081820 .....	6
<b>3.2:</b> FA77940-2: P3-MH-290_081820 .....	8
<b>3.3:</b> FA77940-3: DUP-01_081820 .....	10
<b>3.4:</b> FA77940-4: P3-MH-284_081820 .....	12
<b>3.5:</b> FA77940-5: FB-01_081820 .....	14
<b>3.6:</b> FA77940-6: EB-01_081820 .....	16
<b>Section 4: Misc. Forms .....</b>	<b>18</b>
<b>4.1:</b> Certification Exceptions .....	19
<b>4.2:</b> Chain of Custody .....	20
<b>Section 5: MS Semi-volatiles - QC Data Summaries .....</b>	<b>22</b>
<b>5.1:</b> Method Blank Summary .....	23
<b>5.2:</b> Blank Spike Summary .....	27
<b>5.3:</b> Matrix Spike/Matrix Spike Duplicate Summary .....	29

1

2

3

4

5



## Sample Summary

Arcadis

**Job No:** FA77940

Racer Lansing PFAS Delineation; Lansing, MI  
 Project No: 30042872.03600

Sample Number	Collected Date	Time By	Matrix Received	Code Type	Client Sample ID
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This report contains results reported as ND = Not detected. The following applies:  
 Organics ND = Not detected above the MDL

FA77940-1	08/18/20	10:20 AM	AB08/19/20	AQ	Water	P3-MH-308_081820
FA77940-1D	08/18/20	10:20 AM	AB08/19/20	AQ	Water Dup/MSD	P3-MH-308_081820
FA77940-1S	08/18/20	10:20 AM	AB08/19/20	AQ	Water Matrix Spike	P3-MH-308_081820
FA77940-2	08/18/20	11:30 AM	AB08/19/20	AQ	Water	P3-MH-290_081820
FA77940-3	08/18/20	00:00 AM	AB08/19/20	AQ	Water	DUP-01_081820
FA77940-4	08/18/20	12:00 AM	AB08/19/20	AQ	Water	P3-MH-284_081820
FA77940-5	08/18/20	13:00 AM	AB08/19/20	AQ	Field Blank Water	FB-01_081820
FA77940-6	08/18/20	13:05 AM	AB08/19/20	AQ	Equipment Blank	EB-01_081820

## Summary of Hits

**Job Number:** FA77940  
**Account:** Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI  
**Collected:** 08/18/20

Lab Sample ID	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
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**FA77940-1 P3-MH-308\_081820**

Perfluorobutanoic acid	0.0040 J	0.0069	0.0017	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0013 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0017 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid	0.0010 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.0224	0.0034	0.0013	ug/l	EPA 537M BY ID

**FA77940-2 P3-MH-290\_081820**

Perfluorobutanoic acid	0.0038 J	0.0069	0.0017	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0011 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0011 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.0178	0.0034	0.0013	ug/l	EPA 537M BY ID

**FA77940-3 DUP-01\_081820**

Perfluorobutanoic acid	0.0035 J	0.0069	0.0017	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.00087 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0012 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.0173	0.0034	0.0013	ug/l	EPA 537M BY ID

**FA77940-4 P3-MH-284\_081820**

Perfluorobutanoic acid	0.0035 J	0.0069	0.0017	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.0012 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.0011 J	0.0034	0.00086	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.0172	0.0034	0.0013	ug/l	EPA 537M BY ID

**FA77940-5 FB-01\_081820**

No hits reported in this sample.

**FA77940-6 EB-01\_081820**

No hits reported in this sample.

Sample Results

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Report of Analysis

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# Report of Analysis

<b>Client Sample ID:</b> P3-MH-308_081820	
<b>Lab Sample ID:</b> FA77940-1	<b>Date Sampled:</b> 08/18/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 08/19/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q25732.D	1	08/22/20 00:27	NG	08/20/20 08:00	OP81640	S3Q389
Run #2							

Run #	Initial Volume	Final Volume
Run #1	290 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0040	0.0069	0.0017	ug/l	J
2706-90-3	Perfluoropentanoic acid	ND	0.0034	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0034	0.00086	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0034	0.00086	ug/l	
335-67-1	Perfluorooctanoic acid	0.0013	0.0034	0.00086	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0034	0.00086	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0034	0.00086	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0034	0.00086	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0034	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid <sup>a</sup>	ND	0.0034	0.00086	ug/l	
376-06-7	Perfluorotetradecanoic acid <sup>a</sup>	ND	0.0034	0.00086	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0017	0.0034	0.00086	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0034	0.00086	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0010	0.0034	0.00086	ug/l	J
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0034	0.00086	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0224	0.0034	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0034	0.00086	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0034	0.00086	ug/l	
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**PERFLUOROCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0069	0.0034	ug/l	
2991-50-6	EtFOSAA	ND	0.0069	0.0034	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P3-MH-308_081820		<b>Date Sampled:</b> 08/18/20
<b>Lab Sample ID:</b> FA77940-1		<b>Date Received:</b> 08/19/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

**NEXT GENERATION PFAS ANALYTES**

13252-13-6	HFPO-DA (GenX)	ND	0.017	0.0043	ug/l	
919005-14-4	ADONA	ND	0.0069	0.0017	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0069	0.0017	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0069	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	62%		35-135%
	13C5-PFPeA	71%		50-150%
	13C5-PFHxA	65%		50-150%
	13C4-PFHpA	68%		50-150%
	13C8-PFOA	71%		50-150%
	13C9-PFNA	73%		50-150%
	13C6-PFDA	71%		50-150%
	13C7-PFUnDA	59%		40-140%
	13C2-PFDODA	48%		40-140%
	13C2-PFTeDA	23% <sup>b</sup>		30-130%
	13C3-PFBS	69%		50-150%
	13C3-PFHxS	69%		50-150%
	13C8-PFOS	65%		50-150%
	13C8-FOSA	43%		30-130%
	d3-MeFOSAA	61%		50-150%
	13C2-4:2FTS	62%		50-150%
	13C2-6:2FTS	67%		50-150%
	13C2-8:2FTS	70%		50-150%
	13C3-HFPO-DA	63%		50-150%

- (a) Associated ID Standard outside control limits, Confirmed by batch QC.
- (b) Outside control limits due to matrix interference. Confirmed by MS/MSD.

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

## Report of Analysis

<b>Client Sample ID:</b> P3-MH-290_081820		<b>Date Sampled:</b> 08/18/20
<b>Lab Sample ID:</b> FA77940-2		<b>Date Received:</b> 08/19/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q25735.D	1	08/22/20 01:13	NG	08/20/20 08:00	OP81640	S3Q389
Run #2							

Run #1	Initial Volume	Final Volume
Run #1	290 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0038	0.0069	0.0017	ug/l	J
2706-90-3	Perfluoropentanoic acid	ND	0.0034	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0034	0.00086	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0034	0.00086	ug/l	
335-67-1	Perfluorooctanoic acid	0.0011	0.0034	0.00086	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0034	0.00086	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0034	0.00086	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0034	0.00086	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0034	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0034	0.00086	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0011	0.0034	0.00086	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0034	0.00086	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0034	0.00086	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0034	0.00086	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0178	0.0034	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0034	0.00086	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0034	0.00086	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0034	0.00086	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0069	0.0034	ug/l	
2991-50-6	EtFOSAA	ND	0.0069	0.0034	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P3-MH-290_081820		<b>Date Sampled:</b> 08/18/20
<b>Lab Sample ID:</b> FA77940-2		<b>Date Received:</b> 08/19/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

**NEXT GENERATION PFAS ANALYTES**

13252-13-6	HFPO-DA (GenX)	ND	0.017	0.0043	ug/l	
919005-14-4	ADONA	ND	0.0069	0.0017	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0069	0.0017	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0069	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	66%		35-135%
	13C5-PFPeA	75%		50-150%
	13C5-PFHxA	69%		50-150%
	13C4-PFHpA	73%		50-150%
	13C8-PFOA	75%		50-150%
	13C9-PFNA	78%		50-150%
	13C6-PFDA	77%		50-150%
	13C7-PFUnDA	66%		40-140%
	13C2-PFDoDA	61%		40-140%
	13C2-PFTeDA	63%		30-130%
	13C3-PFBS	75%		50-150%
	13C3-PFHxS	74%		50-150%
	13C8-PFOS	69%		50-150%
	13C8-FOSA	48%		30-130%
	d3-MeFOSAA	68%		50-150%
	13C2-4:2FTS	65%		50-150%
	13C2-6:2FTS	73%		50-150%
	13C2-8:2FTS	74%		50-150%
	13C3-HFPO-DA	68%		50-150%

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

# Report of Analysis

<b>Client Sample ID:</b> DUP-01_081820		
<b>Lab Sample ID:</b> FA77940-3		<b>Date Sampled:</b> 08/18/20
<b>Matrix:</b> AQ - Water		<b>Date Received:</b> 08/19/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q25736.D	1	08/22/20 01:28	NG	08/20/20 08:00	OP81640	S3Q389
Run #2							

Run #	Initial Volume	Final Volume
Run #1	290 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0035	0.0069	0.0017	ug/l	J
2706-90-3	Perfluoropentanoic acid	ND	0.0034	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0034	0.00086	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0034	0.00086	ug/l	
335-67-1	Perfluorooctanoic acid	0.00087	0.0034	0.00086	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0034	0.00086	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0034	0.00086	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0034	0.00086	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0034	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0034	0.00086	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0012	0.0034	0.00086	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0034	0.00086	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0034	0.00086	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0034	0.00086	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0173	0.0034	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0034	0.00086	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0034	0.00086	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0034	0.00086	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0069	0.0034	ug/l	
2991-50-6	EtFOSAA	ND	0.0069	0.0034	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> DUP-01_081820		<b>Date Sampled:</b> 08/18/20
<b>Lab Sample ID:</b> FA77940-3		<b>Date Received:</b> 08/19/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

**NEXT GENERATION PFAS ANALYTES**

13252-13-6	HFPO-DA (GenX)	ND	0.017	0.0043	ug/l	
919005-14-4	ADONA	ND	0.0069	0.0017	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0069	0.0017	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0069	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	70%		35-135%
	13C5-PFPeA	80%		50-150%
	13C5-PFHxA	73%		50-150%
	13C4-PFHpA	76%		50-150%
	13C8-PFOA	78%		50-150%
	13C9-PFNA	82%		50-150%
	13C6-PFDA	76%		50-150%
	13C7-PFUnDA	59%		40-140%
	13C2-PFDoDA	48%		40-140%
	13C2-PFTeDA	44%		30-130%
	13C3-PFBS	78%		50-150%
	13C3-PFHxS	75%		50-150%
	13C8-PFOS	69%		50-150%
	13C8-FOSA	50%		30-130%
	d3-MeFOSAA	62%		50-150%
	13C2-4:2FTS	68%		50-150%
	13C2-6:2FTS	75%		50-150%
	13C2-8:2FTS	73%		50-150%
	13C3-HFPO-DA	70%		50-150%

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

# Report of Analysis

<b>Client Sample ID:</b> P3-MH-284_081820	
<b>Lab Sample ID:</b> FA77940-4	<b>Date Sampled:</b> 08/18/20
<b>Matrix:</b> AQ - Water	<b>Date Received:</b> 08/19/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q25737.D	1	08/22/20 01:44	NG	08/20/20 08:00	OP81640	S3Q389
Run #2							

Run #1	Initial Volume	Final Volume
Run #1	290 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	0.0035	0.0069	0.0017	ug/l	J
2706-90-3	Perfluoropentanoic acid	ND	0.0034	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0034	0.00086	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0034	0.00086	ug/l	
335-67-1	Perfluorooctanoic acid	0.0012	0.0034	0.00086	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0034	0.00086	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0034	0.00086	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0034	0.00086	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0034	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0034	0.00086	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	0.0011	0.0034	0.00086	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0034	0.00086	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0034	0.00086	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0034	0.00086	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0172	0.0034	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0034	0.00086	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0034	0.00086	ug/l	
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**PERFLUOROCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0069	0.0034	ug/l	
2991-50-6	EtFOSAA	ND	0.0069	0.0034	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

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

## Report of Analysis

<b>Client Sample ID:</b> P3-MH-284_081820		<b>Date Sampled:</b> 08/18/20
<b>Lab Sample ID:</b> FA77940-4		<b>Date Received:</b> 08/19/20
<b>Matrix:</b> AQ - Water		<b>Percent Solids:</b> n/a
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

**NEXT GENERATION PFAS ANALYTES**

13252-13-6	HFPO-DA (GenX)	ND	0.017	0.0043	ug/l	
919005-14-4	ADONA	ND	0.0069	0.0017	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0069	0.0017	ug/l	
763051-92-9	11Cl-PF3OUds (F-53B Minor)	ND	0.0069	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	68%		35-135%
	13C5-PFPeA	78%		50-150%
	13C5-PFHxA	71%		50-150%
	13C4-PFHpA	73%		50-150%
	13C8-PFOA	78%		50-150%
	13C9-PFNA	82%		50-150%
	13C6-PFDA	83%		50-150%
	13C7-PFUnDA	78%		40-140%
	13C2-PFDoDA	69%		40-140%
	13C2-PFTeDA	66%		30-130%
	13C3-PFBS	77%		50-150%
	13C3-PFHxS	76%		50-150%
	13C8-PFOS	78%		50-150%
	13C8-FOSA	51%		30-130%
	d3-MeFOSAA	77%		50-150%
	13C2-4:2FTS	68%		50-150%
	13C2-6:2FTS	74%		50-150%
	13C2-8:2FTS	82%		50-150%
	13C3-HFPO-DA	68%		50-150%

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

# Report of Analysis

3.5  
3

<b>Client Sample ID:</b> FB-01_081820		
<b>Lab Sample ID:</b> FA77940-5		<b>Date Sampled:</b> 08/18/20
<b>Matrix:</b> AQ - Field Blank Water		<b>Date Received:</b> 08/19/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD		<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q25738.D	1	08/22/20 01:59	NG	08/20/20 08:00	OP81640	S3Q389
Run #2							

Run #	Initial Volume	Final Volume
Run #1	290 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	ND	0.0069	0.0017	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0034	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0034	0.00086	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0034	0.00086	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0034	0.00086	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0034	0.00086	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0034	0.00086	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0034	0.00086	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0034	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0034	0.00086	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	ND	0.0034	0.00086	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0034	0.00086	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0034	0.00086	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0034	0.00086	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0034	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0034	0.00086	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0034	0.00086	ug/l	
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**PERFLUOROCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0069	0.0034	ug/l	
2991-50-6	EtFOSAA	ND	0.0069	0.0034	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

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

# Report of Analysis

<b>Client Sample ID:</b> FB-01_081820	
<b>Lab Sample ID:</b> FA77940-5	<b>Date Sampled:</b> 08/18/20
<b>Matrix:</b> AQ - Field Blank Water	<b>Date Received:</b> 08/19/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

**NEXT GENERATION PFAS ANALYTES**

13252-13-6	HFPO-DA (GenX)	ND	0.017	0.0043	ug/l	
919005-14-4	ADONA	ND	0.0069	0.0017	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0069	0.0017	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0069	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	91%		35-135%
	13C5-PFPeA	91%		50-150%
	13C5-PFHxA	91%		50-150%
	13C4-PFHpA	92%		50-150%
	13C8-PFOA	91%		50-150%
	13C9-PFNA	87%		50-150%
	13C6-PFDA	79%		50-150%
	13C7-PFUnDA	73%		40-140%
	13C2-PFDoDA	69%		40-140%
	13C2-PFTeDA	75%		30-130%
	13C3-PFBS	90%		50-150%
	13C3-PFHxS	90%		50-150%
	13C8-PFOS	77%		50-150%
	13C8-FOSA	74%		30-130%
	d3-MeFOSAA	69%		50-150%
	13C2-4:2FTS	85%		50-150%
	13C2-6:2FTS	82%		50-150%
	13C2-8:2FTS	71%		50-150%
	13C3-HFPO-DA	90%		50-150%

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

# Report of Analysis

<b>Client Sample ID:</b> EB-01_081820	
<b>Lab Sample ID:</b> FA77940-6	<b>Date Sampled:</b> 08/18/20
<b>Matrix:</b> AQ - Equipment Blank	<b>Date Received:</b> 08/19/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q25739.D	1	08/22/20 02:14	NG	08/20/20 08:00	OP81640	S3Q389
Run #2							

Run #	Initial Volume	Final Volume
Run #1	290 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
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**PERFLUOROALKYL CARBOXYLIC ACIDS**

375-22-4	Perfluorobutanoic acid	ND	0.0069	0.0017	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0034	0.0013	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0034	0.00086	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0034	0.00086	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0034	0.00086	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0034	0.00086	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0034	0.00086	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0034	0.00086	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0034	0.0013	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0034	0.00086	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0034	0.00086	ug/l	

**PERFLUOROALKYL SULFONATES**

375-73-5	Perfluorobutanesulfonic acid	ND	0.0034	0.00086	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0034	0.00086	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0034	0.00086	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0034	0.00086	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0034	0.0013	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0034	0.00086	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0034	0.00086	ug/l	

**PERFLUORO OCTANESULFONAMIDES**

754-91-6	PFOSA	ND	0.0034	0.00086	ug/l	
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**PERFLUORO OCTANESULFONAMIDOACETIC ACIDS**

2355-31-9	MeFOSAA	ND	0.0069	0.0034	ug/l	
2991-50-6	EtFOSAA	ND	0.0069	0.0034	ug/l	

**FLUOROTELOMER SULFONATES**

757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

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

# Report of Analysis

<b>Client Sample ID:</b> EB-01_081820	
<b>Lab Sample ID:</b> FA77940-6	<b>Date Sampled:</b> 08/18/20
<b>Matrix:</b> AQ - Equipment Blank	<b>Date Received:</b> 08/19/20
<b>Method:</b> EPA 537M BY ID EPA 537 MOD	<b>Percent Solids:</b> n/a
<b>Project:</b> Racer Lansing PFAS Delineation; Lansing, MI	

CAS No.	Compound	Result	RL	MDL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0069	0.0017	ug/l	

**NEXT GENERATION PFAS ANALYTES**

13252-13-6	HFPO-DA (GenX)	ND	0.017	0.0043	ug/l	
919005-14-4	ADONA	ND	0.0069	0.0017	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0069	0.0017	ug/l	
763051-92-9	11Cl-PF3OUds (F-53B Minor)	ND	0.0069	0.0017	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	95%		35-135%
	13C5-PFPeA	94%		50-150%
	13C5-PFHxA	95%		50-150%
	13C4-PFHpA	95%		50-150%
	13C8-PFOA	96%		50-150%
	13C9-PFNA	93%		50-150%
	13C6-PFDA	85%		50-150%
	13C7-PFUnDA	68%		40-140%
	13C2-PFDODA	60%		40-140%
	13C2-PFTeDA	67%		30-130%
	13C3-PFBS	94%		50-150%
	13C3-PFHxS	94%		50-150%
	13C8-PFOS	86%		50-150%
	13C8-FOSA	70%		30-130%
	d3-MeFOSAA	61%		50-150%
	13C2-4:2FTS	88%		50-150%
	13C2-6:2FTS	87%		50-150%
	13C2-8:2FTS	77%		50-150%
	13C3-HFPO-DA	97%		50-150%

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

## Misc. Forms

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### Custody Documents and Other Forms

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Includes the following where applicable:

- Certification Exceptions
- Chain of Custody

# Parameter Certification Exceptions

**Job Number:** FA77940  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

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

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

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4



SGS North America Inc - Orlando

Chain of Custody

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

FA77940

SGS - ORLANDO JOB # :

PAGE 1 OF 1

SGS - ORLANDO Quote #

SKIFF #

Client / Reporting Information			Project Information			Analytical Information										Matrix Codes															
Company Name: <u>Arcadis</u>			Project Name: <u>PACER Lansing PFAS Delineation</u>			EPA 816-F-03-003 EPA 816-F-03-003 EPA 816-F-03-003 EPA 816-F-03-003 EPA 816-F-03-003 EPA 816-F-03-003										DW - Drinking Water															
Address: <u>28550 Cabot Dr, Suite 500</u>			Street: <u>Lansing</u>													GW - Ground Water															
City: <u>Novi</u> State: <u>MI</u> Zip: <u>48377</u>			City: <u>Lansing</u> State: <u>MI</u>													WW - Water															
Project Contact: <u>Marina Samp</u> Email: <u>marina.samp@arcadis.com</u>			Project # <u>30042872.03600</u>													SW - Surface Water															
Phone #: <u>248-994-2318</u>			Fax #													SO - Soil															
Sampler(s) Name(s) (Printed) Sampler 1: <u>A. Mandich</u> Sampler 2: <u>A. Brownick</u>			Client Purchase Order #													SL - Sludge															
SGS Orlando Sample #	Field ID / Point of Collection		DATE		TIME		SAMPLED BY:		MATRIX		TOTAL # OF BOTTLES		OTHER		NONE		IC		NACH		PHOS		N2SO4		NACH-ZN/A		DI WATER		MICH		LAB USE ONLY
1	P3-MH-308-081820		8/18/20		1020		ARM		WW		6		X																		
2	P3-MH-290-081820		8/18/20		1130		ARM		WW		2		X																		
3	DUP-01-081820		8/18/20				ARM		WW		2		X																		
4	P3-MH-254-081820		8/18/20		1200		ARM		WW		2		X																		
5	EB-01-081820		8/18/20		1300		ARM		WW		2		X																		
6	EB-01-081820		8/18/20		1305		ARM		WW		2		X																		
Turnaround Time ( Business days)			Data Deliverable Information			Comments / Remarks																									
10 Day (Business) Approved By: / Date:			<input type="checkbox"/> COMMERCIAL "A" (RESULTS ONLY)			P3-MH-308-081820 = MS/MSD																									
7 Day			<input checked="" type="checkbox"/> COMMERCIAL "B" (RESULTS PLUS QC)																												
5 Day			<input type="checkbox"/> REDT1 (EPA LEVEL 3)																												
3 Day RUSH			<input type="checkbox"/> FULLT1 (EPA LEVEL 4)																												
2 Day RUSH			<input checked="" type="checkbox"/> EDD'S																												
1 Day RUSH																															
Other																															
Rush T/A Data Available VIA Email or Lablink			Sample Custody must be documented below each time samples change possession, including courier delivery.																												
Relinquished by Sampler/Affiliation <u>A. Mandich / Arcadis</u>		Date Time:	Received By/Affiliation <u>FedEx</u>		Date Time:	Relinquished By/Affiliation <u>FedEx</u>		Date Time:	Received By/Affiliation <u>Woo</u>		Date Time:	Received By/Affiliation <u>Woo</u>																			
Relinquished by/Affiliation		Date Time:	Received By/Affiliation		Date Time:	Relinquished By/Affiliation		Date Time:	Received By/Affiliation		Date Time:	Received By/Affiliation																			
5			6			7			8																						
Lab Use Only : Cooler Temperature (s) Celsius (corrected): <u>3.2</u>													http://www.sgs.com/en/terms-and-conditions																		

4.2  
4

INITIAL ASSESSMENT DO  
ANALYSIS VERIFICATION AK

FA77940: Chain of Custody

Page 1 of 2



## SGS Sample Receipt Summary

Job Number: FA77940

Client: ARCADIS

Project: RACER LANSING PFAS DELINEATION

Date / Time Received: 8/19/2020 10:00:00 AM

Delivery Method: FEDEX

Airbill #'s: 138666015823

Therm ID: IR 1;

Therm CF: -0.2;

# of Coolers: 1

Cooler Temps (Raw Measured) °C: Cooler 1: (3.4);

Cooler Temps (Corrected) °C: Cooler 1: (3.2);

**Cooler Information**

Y or N

- |                             |                                     |                          |
|-----------------------------|-------------------------------------|--------------------------|
| 1. Custody Seals Present    | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Custody Seals Intact     | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Temp criteria achieved   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 4. Cooler temp verification | <u>IR Gun</u>                       |                          |
| 5. Cooler media             | <u>Ice (Bag)</u>                    |                          |

**Trip Blank Information**

Y or N

N/A

- |                                |                          |                          |                                     |
|--------------------------------|--------------------------|--------------------------|-------------------------------------|
| 1. Trip Blank present / cooler | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2. Trip Blank listed on COC    | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
|                                | <u>W or S</u>            |                          | <u>N/A</u>                          |
| 3. Type Of TB Received         | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

**Sample Information**

Y or N

N/A

- |                                                     |                                     |                                     |                                     |
|-----------------------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Sample labels present on bottles                 | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                                     |
| 2. Samples preserved properly                       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                                     |
| 3. Sufficient volume/containers recvd for analysis: | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                                     |
| 4. Condition of sample                              | <u>Intact</u>                       |                                     |                                     |
| 5. Sample recvd within HT                           | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                                     |
| 6. Dates/Times/IDs on COC match Sample Label        | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                                     |
| 7. VOCs have headspace                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 8. Bottles received for unspecified tests           | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                                     |
| 9. Compositing instructions clear                   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 10. Voa Soil Kits/Jars received past 48hrs?         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11. % Solids Jar received?                          | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 12. Residual Chlorine Present?                      | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

**Misc. Information**

Number of Encores: 25-Gram \_\_\_\_\_ 5-Gram \_\_\_\_\_ Number of 5035 Field Kits: \_\_\_\_\_ Number of Lab Filtered Metals: \_\_\_\_\_  
 Test Strip Lot #: pH 0-3 230315 pH 10-12 219813A Other: (Specify) \_\_\_\_\_  
 Residual Chlorine Test Strip Lot #: \_\_\_\_\_

Comments

SM001  
Rev. Date 05/24/17

Technician: BRYANG

Date: 8/19/2020 10:00:00 A

Reviewer: \_\_\_\_\_

Date: \_\_\_\_\_

FA77940: Chain of Custody

Page 2 of 2

4.2  
4

## MS Semi-volatiles

### QC Data Summaries

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Includes the following where applicable:

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

## Method Blank Summary

**Job Number:** FA77940  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81640-MB	3Q25731.D	1	08/22/20	NG	08/20/20	OP81640	S3Q389

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA77940-1, FA77940-2, FA77940-3, FA77940-4, FA77940-5, FA77940-6

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.0080	0.0040	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
13252-13-6	HFPO-DA (GenX)	ND	0.020	0.0050	ug/l	
919005-14-4	ADONA	ND	0.0080	0.0020	ug/l	
756426-58-19C1	PF3ONS (F-53B Major)	ND	0.0080	0.0020	ug/l	
763051-92-911C1	PF3OUdS (F-53B Minor)	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	88% 35-135%
	13C5-PFPeA	88% 50-150%
	13C5-PFHxA	87% 50-150%
	13C4-PFHpA	90% 50-150%

## Method Blank Summary

**Job Number:** FA77940  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81640-MB	3Q25731.D	1	08/22/20	NG	08/20/20	OP81640	S3Q389

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA77940-1, FA77940-2, FA77940-3, FA77940-4, FA77940-5, FA77940-6

CAS No.	ID Standard Recoveries	Limits
	13C8-PFOA	88% 50-150%
	13C9-PFNA	86% 50-150%
	13C6-PFDA	82% 50-150%
	13C7-PFUnDA	60% 40-140%
	13C2-PFDoDA	40% 40-140%
	13C2-PFTeDA	35% 30-130%
	13C3-PFBS	87% 50-150%
	13C3-PFHxS	89% 50-150%
	13C8-PFOS	84% 50-150%
	13C8-FOSA	80% 30-130%
	d3-MeFOSAA	59% 50-150%
	13C2-4:2FTS	81% 50-150%
	13C2-6:2FTS	81% 50-150%
	13C2-8:2FTS	72% 50-150%
	13C3-HFPO-DA	88% 50-150%

5.1.1  
5

# Instrument Blank

**Job Number:** FA77940  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S3Q389-IBLK	3Q25705.D	1	08/21/20	NG	n/a	n/a	S3Q389

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FA77940-1, FA77940-2, FA77940-3, FA77940-4, FA77940-5, FA77940-6

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
13252-13-6	HFPO-DA (GenX)	ND	0.020	0.0050	ug/l	
919005-14-4	ADONA	ND	0.0080	0.0020	ug/l	
756426-58-19C1	PF3ONS (F-53B Major)	ND	0.0080	0.0020	ug/l	
763051-92-911C1	PF3OUdS (F-53B Minor)	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	99% 50-150%
	13C5-PFPeA	99% 50-150%
	13C5-PFHxA	100% 50-150%
	13C4-PFHpA	100% 50-150%

# Instrument Blank

**Job Number:** FA77940  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S3Q389-IBLK	3Q25705.D	1	08/21/20	NG	n/a	n/a	S3Q389

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.3 B-15

FA77940-1, FA77940-2, FA77940-3, FA77940-4, FA77940-5, FA77940-6

CAS No.	ID Standard Recoveries	Limits
	13C8-PFOA	101% 50-150%
	13C9-PFNA	100% 50-150%
	13C6-PFDA	100% 50-150%
	13C7-PFUnDA	101% 50-150%
	13C2-PFDoDA	100% 50-150%
	13C2-PFTeDA	109% 50-150%
	13C3-PFBS	98% 50-150%
	13C3-PFHxS	100% 50-150%
	13C8-PFOS	98% 50-150%
	13C8-FOSA	98% 50-150%
	d3-MeFOSAA	94% 50-150%
	13C2-4:2FTS	93% 50-150%
	13C2-6:2FTS	91% 50-150%
	13C2-8:2FTS	88% 50-150%
	13C3-HFPO-DA	97% 50-150%

5.1.2  
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# Blank Spike Summary

**Job Number:** FA77940  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81640-BS	3Q25730.D	1	08/21/20	NG	08/20/20	OP81640	S3Q389

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA77940-1, FA77940-2, FA77940-3, FA77940-4, FA77940-5, FA77940-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0735	92	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0757	95	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0736	92	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0742	93	70-130
335-67-1	Perfluorooctanoic acid	0.08	0.0731	91	70-130
375-95-1	Perfluorononanoic acid	0.08	0.0752	94	70-130
335-76-2	Perfluorodecanoic acid	0.08	0.0723	90	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0761	95	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0813	102	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0832	104	65-130
376-06-7	Perfluorotetradecanoic acid	0.08	0.0880	110	70-130
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0745	93	70-130
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0756	95	70-130
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0736	92	70-130
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0761	95	70-130
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0732	92	70-130
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0574	72	65-130
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0620	78	60-130
754-91-6	PFOSA	0.08	0.0745	93	70-130
2355-31-9	MeFOSAA	0.08	0.0812	102	70-130
2991-50-6	EtFOSAA	0.08	0.0711	89	70-130
757124-72-44:2	Fluorotelomer sulfonate	0.08	0.0777	97	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.0787	98	70-130
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0786	98	70-130
13252-13-6	HFPO-DA (GenX)	0.08	0.0678	85	60-140
919005-14-4	ADONA	0.08	0.0713	89	60-140
756426-58-19	Cl-PF3ONS (F-53B Major)	0.08	0.0645	81	60-140
763051-92-91	Cl-PF3OUdS (F-53B Minor)	0.08	0.0797	100	60-140

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	97%	35-135%
	13C5-PFPeA	97%	50-150%
	13C5-PFHxA	96%	50-150%
	13C4-PFHpA	96%	50-150%

\* = Outside of Control Limits.

# Blank Spike Summary

**Job Number:** FA77940  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81640-BS	3Q25730.D	1	08/21/20	NG	08/20/20	OP81640	S3Q389

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA77940-1, FA77940-2, FA77940-3, FA77940-4, FA77940-5, FA77940-6

CAS No.	ID Standard Recoveries	BSP	Limits
	13C8-PFOA	96%	50-150%
	13C9-PFNA	92%	50-150%
	13C6-PFDA	85%	50-150%
	13C7-PFUnDA	61%	40-140%
	13C2-PFDoDA	45%	40-140%
	13C2-PFTeDA	44%	30-130%
	13C3-PFBS	98%	50-150%
	13C3-PFHxS	97%	50-150%
	13C8-PFOS	92%	50-150%
	13C8-FOSA	83%	30-130%
	d3-MeFOSAA	58%	50-150%
	13C2-4:2FTS	94%	50-150%
	13C2-6:2FTS	91%	50-150%
	13C2-8:2FTS	78%	50-150%
	13C3-HFPO-DA	100%	50-150%

\* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary

**Job Number:** FA77940  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81640-MS	3Q25733.D	1	08/22/20	NG	08/20/20	OP81640	S3Q389
OP81640-MSD	3Q25734.D	1	08/22/20	NG	08/20/20	OP81640	S3Q389
FA77940-1	3Q25732.D	1	08/22/20	NG	08/20/20	OP81640	S3Q389

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA77940-1, FA77940-2, FA77940-3, FA77940-4, FA77940-5, FA77940-6

CAS No.	Compound	FA77940-1 ug/l	Spike Q	ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
375-22-4	Perfluorobutanoic acid	0.0040	J	0.069	0.0612	83	0.069	0.0658	90	7	70-130/30
2706-90-3	Perfluoropentanoic acid	ND		0.069	0.0609	88	0.069	0.0655	95	7	70-130/30
307-24-4	Perfluoroheptanoic acid	ND		0.069	0.0577	84	0.069	0.0617	89	7	70-130/30
375-85-9	Perfluoroheptanoic acid	ND		0.069	0.0595	86	0.069	0.0641	93	7	70-130/30
335-67-1	Perfluorooctanoic acid	0.0013	J	0.069	0.0594	84	0.069	0.0640	91	7	70-130/30
375-95-1	Perfluorononanoic acid	ND		0.069	0.0601	87	0.069	0.0652	95	8	70-130/30
335-76-2	Perfluorodecanoic acid	ND		0.069	0.0573	83	0.069	0.0635	92	10	70-130/30
2058-94-8	Perfluoroundecanoic acid	ND		0.069	0.0574	83	0.069	0.0670	97	15	70-130/30
307-55-1	Perfluorododecanoic acid	ND		0.069	0.0609	88	0.069	0.0767	111	23	70-130/30
72629-94-8	Perfluorotridecanoic acid	ND		0.069	0.123	178*	0.069	0.187	271*	41*	65-130/30
376-06-7	Perfluorotetradecanoic acid	ND		0.069	0.0618	90	0.069	0.0951	138*	42*	70-130/30
375-73-5	Perfluorobutanesulfonic acid	0.0017	J	0.069	0.0612	86	0.069	0.0653	92	6	70-130/30
2706-91-4	Perfluoropentanesulfonic acid	ND		0.069	0.0601	87	0.069	0.0637	92	6	70-130/30
355-46-4	Perfluoroheptanesulfonic acid	0.0010	J	0.069	0.0612	87	0.069	0.0650	93	6	70-130/30
375-92-8	Perfluoroheptanesulfonic acid	ND		0.069	0.0629	91	0.069	0.0681	99	8	70-130/30
1763-23-1	Perfluorooctanesulfonic acid	0.0224		0.069	0.0779	80	0.069	0.0863	93	10	70-130/30
68259-12-1	Perfluorononanesulfonic acid	ND		0.069	0.0555	80	0.069	0.0610	88	9	65-130/30
335-77-3	Perfluorodecanesulfonic acid	ND		0.069	0.0441	64	0.069	0.0496	72	12	60-130/30
754-91-6	PFOSA	ND		0.069	0.0613	89	0.069	0.0658	95	7	70-130/30
2355-31-9	MeFOSAA	ND		0.069	0.0600	87	0.069	0.0679	98	12	70-130/30
2991-50-6	EtFOSAA	ND		0.069	0.0585	85	0.069	0.0675	98	14	70-130/30
757124-72-44:2	Fluorotelomer sulfonate	ND		0.069	0.0621	90	0.069	0.0678	98	9	70-130/30
27619-97-2	6:2 Fluorotelomer sulfonate	ND		0.069	0.0635	92	0.069	0.0671	97	6	70-130/30
39108-34-4	8:2 Fluorotelomer sulfonate	ND		0.069	0.0631	91	0.069	0.0685	99	8	70-130/30
13252-13-6	HFPO-DA (GenX)	ND		0.069	0.0591	86	0.069	0.0633	92	7	60-140/30
919005-14-4	ADONA	ND		0.069	0.0540	78	0.069	0.0587	85	8	60-140/30
756426-58-19	Cl-PF3ONS (F-53B Major)	ND		0.069	0.0501	73	0.069	0.0543	79	8	60-140/30
763051-92-91	Cl-PF3OUdS (F-53B Minor)	ND		0.069	0.0522	76	0.069	0.0696	101	29	60-140/30

CAS No.	ID Standard Recoveries	MS	MSD	FA77940-1	Limits
	13C4-PFBA	73%	65%	62%	35-135%
	13C5-PFPeA	84%	75%	71%	50-150%
	13C5-PFHxA	75%	68%	65%	50-150%
	13C4-PFHpA	78%	70%	68%	50-150%

\* = Outside of Control Limits.

5.3.1  
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# Matrix Spike/Matrix Spike Duplicate Summary

**Job Number:** FA77940  
**Account:** ARCMIL Arcadis  
**Project:** Racer Lansing PFAS Delineation; Lansing, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP81640-MS	3Q25733.D	1	08/22/20	NG	08/20/20	OP81640	S3Q389
OP81640-MSD	3Q25734.D	1	08/22/20	NG	08/20/20	OP81640	S3Q389
FA77940-1	3Q25732.D	1	08/22/20	NG	08/20/20	OP81640	S3Q389

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA77940-1, FA77940-2, FA77940-3, FA77940-4, FA77940-5, FA77940-6

CAS No.	ID Standard Recoveries	MS	MSD	FA77940-1	Limits
13C8-PFOA		83%	73%	71%	50-150%
13C9-PFNA		87%	76%	73%	50-150%
13C6-PFDA		88%	74%	71%	50-150%
13C7-PFUnDA		77%	61%	59%	40-140%
13C2-PFDoDA		58%	40%	48%	40-140%
13C2-PFTeDA		18% * b	9% * b	23% * a	30-130%
13C3-PFBS		81%	73%	69%	50-150%
13C3-PFHxS		81%	72%	69%	50-150%
13C8-PFOS		85%	69%	65%	50-150%
13C8-FOSA		42%	37%	43%	30-130%
d3-MeFOSAA		76%	63%	61%	50-150%
13C2-4:2FTS		75%	68%	62%	50-150%
13C2-6:2FTS		83%	74%	67%	50-150%
13C2-8:2FTS		87%	75%	70%	50-150%
13C3-HFPO-DA		72%	65%	63%	50-150%

(a) Outside control limits due to matrix interference. Confirmed by MS/MSD.

(b) Outside control limits.

\* = Outside of Control Limits.

5.3.1  
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Arcadis of Michigan, LLC

28550 Cabot Drive

Suite 500

Novi, Michigan 48377

Tel 248 994 2240

Fax 248 994 2241

[www.arcadis.com](http://www.arcadis.com)

