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FROM: Clifford Yantz
RE: PFAS Delineation Investigation
FILE: 15388/68545/5
DATE: November 3, 2018

cc: Mr. Joseph Rogers - MDEQ
 Mr. John McCabe – MDEQ
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This technical memorandum has been prepared on behalf of the Revitalizing Auto Communities Environmental Response Trust (RACER Trust) to document the per- and polyfluorinated alkyl substances (PFAS) groundwater delineation investigation and sampling activities conducted in September and October 2018 at Coldwater Road Landfill facility located in Flint, Michigan (Site) ([Figure 1](#)). The groundwater delineation investigation and sampling was conducted to further investigate and delineate PFAS findings observed during previous sampling events conducted in November 2016, June 2017, December 2017, June 2018, and July 2018. In particular, the recent investigation and sampling activities were conducted due to the unexpected detection of PFAS above the groundwater criteria of 70 nanograms per liter (ng/l, or parts per trillion [ppt]) for combined concentrations of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) in monitoring well B-2D, which has been considered as a background well to the landfill Site, and high levels detected along the western fence line/property boundary ([Figure 2](#)).

BACKGROUND

Following a step-wise approach as approved by the Michigan Department of Environmental Quality (MDEQ), OBG collected samples for PFAS analysis from the vaults, sumps and select monitoring wells and temporary wells during five previous events (November 2016, June 2017, December 2017, June 2018, and July 2018) to evaluate the presence and extent of PFAS at the Site, groundwater sampling was completed during several events listed below (see [Figure 2](#) for monitoring well locations):

- » November 29, 2016 and November 30, 2016
 - › Shallow (Perched) Zone – B-7, B-19Ar, MW-4-02, MW-18-13, and MW-19-13 were sampled as part of the initial PFAS sampling/evaluation activities.
 - › Deep (Drift) Aquifer - MW-16-10 was sampled to evaluate if PFAS are present at the downgradient boundary of the Site within the regional Drift aquifer.
- » June 19, 2017 and June 20, 2017
 - › Perched Zone – perched zone monitoring wells B-9, B-18A, B-24r, B-28, OBG MW 7, and OBG MW 9 were sampled to evaluate the presence and/or distribution of PFAS in the shallow groundwater adjacent to the landfill.
 - › Drift Aquifer - B-27D was sampled to evaluate if PFAS are present downgradient of the landfill in the Drift aquifer.
- » December 8, 2017
 - › Perched Zone - Three temporary monitoring wells (SBP-1-GW, SBP-2-GW, and SBP-3-GW) were installed and sampled along the western property line of the Site to evaluate if PFAS are leaving the Site above MDEQ drinking water criteria.
- » June 12, 2018 and June 13, 2018
 - › Perched Zone –annual sampling of the perched zone monitoring wells B-7, B-9, B-18A, B-19Ar, B-24r, B-28, and MW-19-13 was conducted to confirm the previous results and distribution of PFAS in the perched groundwater.



- › Drift Aquifer – B-27D and MW-16-10 were sampled to confirm the previous PFAS results in the Drift aquifer. In addition, upgradient monitoring well B-2D and on-Site monitoring well B-22D were sampled to evaluate if PFAS are present upgradient of the landfill and/or present in the Drift aquifer southeast of the landfill.
- » June 28, 2018
 - Perched Zone – Two temporary monitoring wells (SBP-4 and SBP-5) were installed 200 feet and 400 feet north of SBP-2 to evaluate the distribution of PFAS north of SBP-2 along the western Site property line of the Site. The results previously submitted for SB-4, SBP-5, and DUP-1 (SBP-5) were revised by TestAmerica in an updated laboratory report dated October 25, 2018 ([Attachment 1](#)). The revisions were provided after an internal TestAmerica data review discovered that high particulate content in the samples resulted in partial clogging of the solid-phase extraction (SPE) column; therefore, only a part of the sample volume passed through the SPE cartridge. The partial sample volume was associated with the total mass of isotope dilution internal standard (IDA) added initially rather than the IDA mass associated with the partial sample volume, which generated a (nearly double) high bias in the associated results. [Table 1](#) provides the revised results in red lettering, and the previous results in the adjacent data qualifier column (*e.g.*, was 56).
- » July 19, 2018
 - › Perched Zone – sampled monitoring well OBG-MW-11 installed adjacent to former temporary monitoring well SBP-2-GW to confirm the presence of PFAS along the western Site property line.
 - › Drift Aquifer - B-2D was re-sampled to confirm the PFAS results in this monitoring well located upgradient of the landfill in the Drift aquifer.

During the various sampling events discussed above, PFAS were detected above the MDEQ drinking water criteria of 70 ng/L (0.070 µg/L) for the combined concentrations of PFOA and PFOS in groundwater samples from perched zone monitoring wells B-7 and OBG MW-11, and from temporary monitoring wells SBP-1, SBP-2 (from the duplicate sample, as the initial sample was below criteria), and SBP-5, and from Drift aquifer monitoring well B-2D. [Table 1](#) provides a summary of the available pre-September PFAS data for the Site. [Figures 3A](#) and [4](#) provides data box figures for the perched and drift monitoring well analytical results, respectively. [Figure 5](#) provides a key to the lines of cross-section for three cross-sections constructed for the Site. [Figure 6](#) provides a north-south cross-section for the entire Site (cross-section A-A'), and [Figure 7](#) provides a north-south cross-section (B-B') along the western property line and extending to the northern property line just south of Stanley Road, and [Figure 7](#) also provides a west-east cross-section (C-C') from HPT-11 to monitoring well B-19A.

Based on the sampling results and interpreted flow direction for the Drift aquifer (which is southward, see [Figure 4](#)), it does not appear that concentrations of PFAS above drinking water criteria are migrating off-Site within the Drift (regional glacial) aquifer. However, more investigation was deemed necessary to confirm this hypothesis and to delineate the PFAS impacts in the perched zone at and migrating from the Site. The groundwater flow direction in the perched zone is complicated and may vary because the conceptual site model (CSM) for the Site includes discontinuous perched saturated zones within the otherwise clayey matrix. [Figure 3A](#) provides interpreted contours for the groundwater elevation data collected during the June 2018 semiannual sampling event. Based on these contours, the groundwater flow direction in the perched zone appears to be predominantly toward the northwest.

ADDITIONAL PERCHED ZONE PFAS CHARACTERIZATION ACTIVITIES AND RESULTS

NORTHERN AND NORTHEASTERN PROPERTY BOUNDARY AND B-2D AREAS

Activities

The perched zone was investigated along the northern and northeastern property boundaries, and in the monitoring well B-2D area due to the detection of PFOS at B-2D above the criteria to help determine whether the perched zone was impacted in this area of the Site (*i.e.*, is the source of impacts at B-2D), and to delineate PFAS impacts.

- Utilized hydraulic profiling tool (HPT) to identify more permeable zones within the otherwise silty clay matrix to target the more permeable zones for sampling within three shallow borings (HPT-01, HPT-02, and HPT-13) in this area of the Site (**Figure 2**). The HPT boring logs for HPT-01 through HPT-13 are provided in **Attachment 2**; the remaining borings were conducted using standard Geoprobe or sonic drilling techniques. Boring logs are being prepared and will be provided in a follow-up submittal. **Table 4** provides the generalized lithology including depths and elevations for major units for the remaining boring locations. Two additional boring (HPT-15 and HPT-16; **Figure 2**) were installed without the aid of HPT using standard Geoprobe techniques to allow visual verification of the stratigraphy in this area of the Site where the geology is a little more complex and somewhat atypical from the rest of the Site.
- In addition, to verify the findings of HPT-01, a soil boring (also labeled HPT-01) was installed immediately adjacent to HPT-01. The correlation between the HPT log and boring log for HPT-01 was reasonably good; however, many of the subsequently installed borings had better correlations.
- Temporary well samples were collected at the following locations and intervals:
 - » HPT-01 – 25 feet below grade (fbg) (base of 5-foot-long well screen intervals)
 - » HPT-02 – 20 fbg and 35 fbg
 - » HPT-13 – 15 fbg and 29 fbg
 - » HPT-15 – 15 fbg
 - » HPT-16 – 25 fbg, 35 fbg, and 45 fbg.

Results

- The temporary well groundwater samples from HPT-01-GW-25, HPT-02-GW-20, HPT-15-GW-15, HPT-16-GW-25, HPT-16-GW-35, and HPT-16-GW-45 were below the 70 ng/l criteria or non-detect for the MDEQ recommended 24 PFAS list (HPT-01-GW-25, HPT-15-GW-15, and HPT-16-GW-25) (**Table 2**). **Attachment 3** provides the analytical laboratory reports for the PFAS investigation (on a compact disk [CD]).
- HPT-02-GW-35 contained PFOS at 580 ng/l, and a few other perfluoro sulfonic acids between 10 and 100 ng/l
- HPT-13-GW-15 contained PFOS at a concentration of 470 ng/l and PFOA at 20 ng/l (although the duplicate and laboratory replicate samples for this sample contained PFOS at about one fourth the concentration, but still above the criteria)
- HPT-13-GW-29 contained only PFOS at a detectable concentration of 310 ng/l (**Table 2**).
- The higher PFAS concentrations at depth at HPT-02 indicate that the source of these deeper impacts in this area are attributable to a source at some distance from this location and these impacts have migrated horizontally to this location. Whereas the slightly higher impacts in the shallow zone at HPT-13 indicate this location is closer to a near surface source area, which is likely a residual source area associated with the former land farm activities conducted in this area; however, the Site appears to have been remediated with the removal of sludge and residual soil impacts associated with former metals impacts at the Site that were

landfilled either on- or off-Site. The removal of the metals impacts likely removed PFAS source material as well.

- The CSM for the Site includes: the original source of impacts (former waste water treatment operations) have been removed, but from years of leaching a secondary or residual source area remains within the lower permeability soils at the Site that are likely allowing back diffusion of PFAS into the more permeable saturated zones in the perched zone. It is assumed that PFAS impacts are thus at near steady state conditions and may be attenuating slightly due to adsorption, diffusion, and advection, but are not likely to migrate further than they have already migrated given that the impacts have had 50 to 60 years to reach the current conditions and the Site primary source materials have been removed for approximately 25 years.
- The shallow perched zone impacts appear to be delineated by HPT-01 to the north of B-2D, HPT-15 to the east of B-2D, and HPT-16 to the northwest of B-2D and the former land farm area that was probably the original source for the impacts currently observed as residual impacts in this area of the Site. However, impacts could be migrating off-site in the HPT-13 area.

NORTHWESTERN AREA

Activities

- Shallow soil boring HPT-17 was installed using standard Geoprobe techniques and was installed in the northwestern area of the Site just northwest of the western wetland area ([Figure 2](#)) to verify whether PFAS impacts existed in this area of the Site
- Temporary well samples were collected at 30 and 40 fbg as predominantly clayey soil was observed from about 10 fbg to 25.9 fbg.

Results

- The temporary well groundwater samples from HPT-17-GW-30 and HPT-17-GW-40 were non-detect ([Table 2](#))
- These results along with the HPT-16 results indicate that the PFAS impacts observed in the B-2D area and along the southern boundary of the western arm of the Site and the surface water impacts at the Site have not impacted the northern boundary of the Site.

WWTP AREA

Activities

To help delineate PFAS impacts within the former WWTP area and adjacent to SBP-1, which had elevated PFOS results (1,700 ng/l):

- Monitoring well OBG MW-14 was installed adjacent to SBP-1 ([Figure 2](#)). The well was installed and developed in accordance with the methods contained in the Post-Closure Care Plan (PCCP) for the site as specified in Section 5.1.4 Monitoring Well Installation Specifications, with 5-foot long well screen from 10 to 15 fbg. OBG MW-14 was sampled on October 19, 2018.
- Monitoring wells OBG MW-6 and OBG MW-8 were sampled
- Monitoring wells OBG MW-7 and OBG-MW-9 were resampled
- HPT-03 was installed within the road right-of-way of Temple Street approximately 100-foot west of SBP-1 ([Figure 2](#)). A more permeable zone within the otherwise silty clay matrix was identified at HPT-03 from about 22 fbg to about 25 fbg, and the boring was extended to 38 fbg and no other deeper permeable zone was identified in the boring
- A temporary well was set at HPT-03 at approximately 24 fbg to target the sandy seam, and a groundwater sample (HPT-03-GW-24) was collected

- Monitoring well OBG MW-13 was installed at the location of HPT-03 using sonic drilling methods by over drilled the original boring with a 6-inch sonic casing to a depth of approximately 24 fbg, and constructing a permanent well in accordance with the PCCP. A flush mounted protector casing was placed over the top of casing (TOC) of the well because the well was constructed within the road right-of-way. A locking water-tight cap was placed on the well to prevent runoff from entering the well. OBG MW-13 was sampled on October 19, 2018.

Results

- Groundwater samples from OBG MW-6, OBG MW-7, OBG MW-9, and OBG MW-13 ([Table 3](#)) were non-detect, except for a detection of perfluorobutanoic acid (PFBA) at 30 ng/l in OBG MW-6. No criterion has been established for PFBA at this time
- Several PFAS were detected in OBG MW-8 and OBG MW-14 including PFOA at 20 ng/l in both wells and PFOS at 2,710 ng/l in OBG MW-8, the highest detection of PFOS in groundwater at the Site at this time and at 540 ng/l in OBG MW-14, which is about one third of the concentration detected in the temporary well sample from SBP-1. This is similar to the ratio between temporary well sample data from SBP-2 and permanent well OBG MW-11, which were also about a third of the temporary well sample results. This may indicate a high bias in temporary well samples possibly caused by the amount of sediment in the sample.
- The temporary monitoring well groundwater sample from HPT-03 at 24 fbg was non-detect ([Table 2](#))
- The data indicates that the PFAS impacts associated with the former WWTP area are contained within the area formed by OBG MW-6 to the north, OBG MW-7 to the south, and HPT-03-GW-24/OBG MW-13 to the west ([Figure 2](#)). The results from monitoring wells B-28 and MW-19-13 delineate the PFAS impacts further to the east and southeast, respectfully (see [Table 1](#)).

WESTERN FENCE LINE

Activities

Due to the elevated PFOS results (up to 360 ng/l) at perched zone temporary wells SBP-2 and SBP-5 as well as monitoring well OBG MW-11 that was installed at the SBP-2 location, additional characterization of PFAS impacts along the western fence line of the Site was conducted, including:

- Installation of HPT-12 and HPT-14 north of SBP-5 completing the approximate 200-foot intervals along the western property line
- HPT-04 was conducted approximately 100 feet west of the property line along Hartman
- HPT-05 was conducted at the road ending of Chrysler
- HPT-06 and HPT-18 were conducted approximately 100 and 200 feet, respectively west of the property line along Dunkirk ([Figure 2](#))
- Temporary well samples were collected at the following locations and intervals:
 - » HPT-12 – 39.7 fbg
 - » HPT-14 – 24 fbg
 - » HPT-04 – 24 fbg
 - » HPT-05 – 17 fbg
 - » HPT-06 – 25 fbg
 - » HPT-18 – 24 fbg (only one permeable zone was identified at each of these six locations).

Results

- The temporary well groundwater samples from HPT-12-GW-39.7, HPT-04-GW-24, HPT-05-GW-17, and HPT-18-GW-24 (**Table 2**) were non-detect for PFAS
- HPT-06-GW-25 and HPT-14-GW-24 contained PFOA at 20 ng/l and 10 ng/l, respectively, and PFOS at 80 ng/l and 1,830 ng/l, respectively, the highest detection of PFOS in groundwater along the western fence line (**Table 2**)
- The data indicates that PFAS impacts associated with the western fence line have been delineated generally within 100 to 200 feet west of the western property line.

WESTERN ARM – SOUTHERN FENCE LINE

Activities

Due to the elevated PFOS results (up to 360 ng/l) at perched zone temporary well SBP-5, additional characterization of PFAS impacts along the southern fence line along the western arm of the Site was conducted, including:

- The installation of HPT-07 through HPT-11 at approximate 200-foot intervals starting at the corner of the western and southern fence lines (**Figure 2**). Former sludge drying beds existed approximately 60 feet north of the southern fence line and ran from the corner of the western and southern fence lines approximately 600 feet to the west, so HPT-07 and HPT-10 roughly bounded the drying beds to the east and west, respectively. HPT-11 was installed approximately 200 feet west of the former drying beds to delineate the western extent of impacts in this area
- Monitoring well OBG MW-20 was installed to confirm the temporary well results for this location at approximately 25 fbg at HPT-10 and developed in accordance with the methods specified in the PCCP
- Temporary well samples were collected at the following locations and intervals:
 - » HPT-07 – 25 fbg
 - » HPT-08 – 25 fbg
 - » HPT-09 – 24 fbg and 39 fbg
 - » HPT-10 – 25 fbg and 38 fbg
 - » HPT-11 – 34 fbg; although, a 25 fbg temporary well was attempted, but was dry at the time of sampling and could not be sampled.
- OBG MW-20 was developed on September 26, 2018 and it was purged dry. An attempt was made to sample OBG MW-20 on October 19, 2018; however, the well was dry and could not be sampled.

Results

- The temporary well groundwater samples from HPT-08-GW-25, HPT-09-GW-39, HPT-10-GW-38, and HPT-11-GW-34 (**Table 2**) were either non-detect for PFAS (HPT-10-GW-38 and HPT-11-GW-34) or less than criteria
- HPT-07-GW-25, HPT-09-GW-24, and HPT-10-GW-25 contained PFOS at 760 ng/l, 350 ng/l, and 1,550 ng/l, respectively, and HPT-10-GW-25 also contained PFOA at 10 ng/l (**Table 2**)
- The data indicates that the PFAS impacts associated with the former sludge drying beds may be delineated to the west by HPT-11. In addition, HPT-18 possibly indicates the potential for delineating the southern extent of impacts in that area south of the southern fence line.

DRIFT AQUIFER PFAS CHARACTERIZATION

ACTIVITIES

To further evaluate the distribution of PFAS impacts at the Site within the Drift aquifer, and to confirm or refute the current CSM that PFAS impacts are currently not migrating off-Site in the Drift aquifer at concentrations greater than the drinking water criteria, the following activities were conducted:

- A series of deep borings (SB-B-7, SB-B-19Ar, SB-HPT-01, SB-HPT-02, SB-HPT-07, SB-HPT-13, SB-HPT-16, and SB-SBP-1, [Figure 2](#)) were installed utilizing sonic drilling techniques utilizing 4-inch soil coring and 6-inch casing to the bottom depth of the deep boring
- An 8-inch casing was used to case off the perched zone, typically to about 40 fbg, before advancing beyond this depth
- Vertical aquifer sampling (VAS) within the Drift aquifer was conducted where the thickness of the Drift aquifer was greater than 20 feet using a two-foot long temporary well screen advanced beyond the drilling casing
- The VAS data was utilized to guide the installation of permanent monitoring wells within the Drift aquifer, which required analyzing several of the VAS samples utilizing rush turnaround times (TAT, typically 3-day TAT, but 24-hours in the case of the samples from SB-HPT-01) to avoid drill rig standby charges
- Sonic drilling was initiated on September 10, 2018 at shallow boring HPT-01 at the northeast corner of the Site. The deep borings were labeled with a SB in front of the shallow boring or monitoring well it was installed at or adjacent to
- Sonic drilling was concluded on September 18, 2018, with demobilization activities occurring on September 19, 2019
- Once VAS was completed in the initial boring (SB-HPT-01) north of B-2D with samples collected at 62 fbg and 72 fbg, then VAS was completed at the boring adjacent to B-2D (*i.e.*, shallow boring HPT-02; therefore, deep boring SB-HPT-02) with samples collected at 70 fbg, 80 fbg, and 87 fbg at SB-HPT-02.
- VAS temporary well samples were collected at the following locations and intervals:
 - » SB-HPT-01 – 62 fbg and 72 fbg
 - » SB-HPT-02 – 70 fbg, 80 fbg, and 87 fbg
 - » SB-HPT-07 – 52 fbg, 62 fbg, and 72 fbg
 - » SB-HPT-13 – 62 fbg and 72 fbg
 - » SB-HPT-16 – 62 fbg and 72 fbg
 - » SB-B-7 – 68 fbg
 - » SB-B-19Ar – 72 fbg, 82 fbg, and 92 fbg.
- Permanent monitoring wells were installed at the following locations and approximate intervals, and subsequently developed in accordance with the PCCP:
 - » OBG MW-12D – 57 fbg and 62 fbg (at SB-HPT-01)
 - » OBG MW-15D – 91 fbg to 96 fbg (at SB-SBP-1 – no VAP was conducted at this location due to how thin the Drift aquifer was at this location)
 - » OBG MW-16D – 67 fbg and 72 fbg (at SB-HPT-02)
 - » OBG MW-17D – 54 fbg to 59 fbg (at SB-HPT-13)



- » OBG MW-18D – 52 fbg to 57 fbg (towards the top of the Drift aquifer)(at SB-HPT-16)
- » OBG MW-19D – 49 fbg to 54 fbg (at SB-HPT-07).
- Drift aquifer monitoring wells B-20D, B-21D, B-23Dr, MW-15-10, and PFW-1 were sampled for PFAS analysis to further evaluate the Drift aquifer at and downgradient of the landfill and other former wastewater treatment operations, which are potential sources of PFAS.
- Newly installed Drift aquifer monitoring wells OBG MW-12D, OBG MW-15D, OBG MW-16D, OBG MW-17D, OBG MW-18D, and OBG MW-19D were sampled between October 19 and 23, 2018 for PFAS analysis to confirm the VAS results at these locations.

RESULTS

- **Table 4** provides the Drift Aquifer generalized lithology including depths and elevations for major units
- Cross-Sections A-A', B-B', and C-C' (**Figures 6 and 7**; **Figure 5** provides a key to the lines of cross-sections map) also provide the generalized lithology for the Site
- All of the Drift aquifer temporary well VAS data (**Table 2**) and the Drift aquifer monitoring well data (**Table 3**) collected in September 2018 and for OBG MW-18D collected on October 19, 2018 (results of the remaining October 2018 Drift aquifer sampling will be reported separately once all of the remaining data is available) were non-detect for PFAS
- B-2D is the only Drift aquifer monitoring well with PFAS at anything but trace levels, and the temporary well VAS samples collected at SB-HPT-02 (at 70 fbg, 80 fbg, and 87 fbg) located about 30 feet east of B-2D were non-detect
- Considering the available data, it is possible that B-2D is compromised in some fashion and allowing shallow impacted groundwater to affect samples collected from the well.

SURFACE WATER AND STORM WATER CHARACTERIZATION

ACTIVITIES

An evaluation of the surface water and storm water at the Site was conducted during the PFAS investigation, including:

- Two surface water samples were collected directly from the surface water body (within the wetlands) on September 7, 2018:
 - » SW-01 was collected immediately west of B-2D
 - » SW-02 was collected at the western end of the wetlands near their overflow outlet.
- A storm water sample (SS-01) was collected from the storm sewer that traverses the Site (**Figure 2**) on September 10, 2018. The storm sewer sample was collected using new tubing and a peristaltic pump due to the depth below the ground surface precluding the use of extension rods and a clamping system to directly allow immersing of the laboratory sample bottles in the storm sewer
- Care was taken to collect the surface water/storm sewer samples to avoid the collection of surface films by inserting an uncapped sampling container (polypropylene or HDPE) with the opening pointing down and collecting the water from within the water column. Care was also taken to ensure the water column and the base of the surface water body at the sampling location was not agitated during sampling
- The elevation of the water surface was surveyed on October 1, 2018 in the vicinity of SW-01 located in the eastern wetland and SW-02 located in the western wetland and was 784.29 at SW-01 and 769.84 at SW-02

- Currently there is no flow from the wetlands to the storm sewer system leaving the Site (see [Figure 2](#)). Even with the recent rainfall, the water level in the western wetland is approximately 6 inches below the elevation at which water will overflow the berm and flow into the storm sewer inlet
- At the location of the manhole where SS-01 was collected, the invert of the storm sewer is about 25 feet below the rim of the manhole, which sits about 3 feet higher than the ground surface. Therefore, the storm sewer invert lies about 22 fbg at an elevation of approximately 782.36
- The storm sewer is 72 inches in diameter and drains both the former Peregrine and Landfill portions of the Site
- The storm sewer intersects at least portions of the saturated zones that form the Perched zone, and may take on groundwater from portions of the Site. The water table at B-18A was 786.77 in June 2018 when it was last sampled
- On the date of sampling (September 10, 2018) the depth of water within the sewer was only approximately 4 inches despite having rained the day before and that day. Similarly, the depth of water in the storm sewer on October 23, 2018 was about the same, possibly an inch less
- [Figure 2](#) provides a schematic of the storm sewer system that traverses the Site. Except for the very south end of the former Peregrine Facility where storm water is collected and discharged to the storm sewer beneath Coldwater Road, the storm water at the Site is collected in a series of storm sewers that join a main north-south line that traverses the Site until it reaches the remaining materials area (RMA) where the storm sewer turns from running north-south towards the west (and is joined by a smaller storm sewer coming from the former rail road spur to the east of the landfill) and goes off site joining the municipal storm sewer that runs in Klein Street. We were able to obtain most of the original storm sewer as built drawings from 1952 from the Genesee Drain Commission, and have determined that the sewer is above the water table in the area where the storm sewer leaves the property approximately 200 ft west of HPT-11 where the southern fence line jogs north slightly north of the intersection of George and Klein Streets to continue on the north side of Klein Street. There is a 15-inch municipal storm sewer that joins the 72-inch storm sewer leaving the site at the intersection of George and Klein Streets. The storm sewer is only buried at about 12 fbg (invert depth) in the area where it leaves the property.

RESULTS

Surface water samples SW-01 (eastern wetland) and SW-02 (western wetland) contained PFOS at 360 ng/l and 50 ng/l, respectively, and storm sewer sample SS-01 contained PFOS at 1,750 ng/l and PFOA at 40 ng/l ([Table 2](#)). The PFOS results are above the MDEQ Part 4, Water Quality Standards, Rule 57 Water Quality Value for PFOS of 11 ng/l for drinking water and 12 ng/l for non-drinking water.

The current CSM for surface water within eastern and western wetland areas of the Site includes the eastern wetland is a gaining surface water body, likely receiving water from the shallow perched zone groundwater at least for a portion of the year, and the western wetland is a losing surface water body, likely acting as a source of infiltration to the shallow perched zone groundwater.

The eastern wetland surface water elevation was 784.29 at SW-01 on October 1, 2018 and the water table at B-18A was 786.77 in June 2018, which is slightly higher than the surface water elevation. The standing water in the eastern wetland is up to 5 feet deep, so the eastern wetland intersects the perched groundwater table (base of eastern wetland may be as low as an elevation of 779.29). It is also possible that the eastern wetland area receives water from the shallow perched zone in some areas and replenishes the shallow perched zone in other areas and the relative recharge/discharge conditions may change depending on the short-term precipitation amounts and/or the time of the year.

However, the opposite appears to be the case with the western wetland area where the surface water elevation was 769.84 on October 1, 2018 at SW-02. During the development of OBG MW-20 on September 26, 2018 the groundwater elevation was 762.08; however, on October 19, 2018 OBG MW-20 was dry (the elevation of the

bottom of OBG MW-20 is 756.7 ft), as it had not recovered three weeks after development. The standing water in the western wetland is only up to 3 feet deep (base of western wetland may be as low as an elevation of 766.84), so the western wetland appears to be perched above the local groundwater table and is a losing surface water body.

In either case, the wetlands were constructed on a surface previously remediated (for metals) by soil excavation. Soil excavation removed the original source of impacts, which was the former waste water treatment operations. From years of leaching a secondary or residual source area remains within the lower permeability soils below the former waste water treatment operations. The lower permeability soils are likely allowing back diffusion of PFAS into the more permeable saturated zones in the perched zone, which may discharge to the wetlands, or into the wetland surface water.

PFAS ANALYSIS

OBG proposed to MDEQ using Merit Laboratories in East Lansing, Michigan rather than Test America or Eurofins for PFAS analyses for the MDEQ 24 PFAS list for the PFAS investigation samples because Merit could provide quicker and more reliable turnaround times (and two-week standard turnaround times, whereas TestAmerica is four weeks), and with their courier service samples could be in the lab the same day as they are collected.

In addition, Merit analyzes groundwater and non-drinking water samples by isotope dilution using the current (more up to date) ASTM method (ASTM 7979) rather than a modified version of USEPA Method 537.

MDEQ approved use of Merit laboratories and the ASTM 7979 method in an email dated September 5, 2018.

SUMMARY

All of the Drift aquifer temporary well VAS data ([Table 2](#)) and the Drift aquifer monitoring well data collected thus far at the Site ([Tables 1](#) and [3](#)) were either non-detect for PFAS or less than criteria, except for B-2D ([Figure 4](#)). Considering the available data, it is possible that the well is compromised in some fashion and allowing shallow impacted groundwater to affect samples collected from this well. The available data confirms the current CSM that PFAS impacts are currently not migrating off-Site in the Drift aquifer at concentrations greater than the drinking water criteria.

The temporary well groundwater results from HPT-01, HPT-16, and HPT-17 ([Table 2](#)) indicate that the PFAS impacts observed in the B-2D area and along the southern boundary of the western arm of the Site (*i.e.*, former sludge drying bed area) and the surface water impacts at the Site (*i.e.*, former land farm area) have not impacted the northern boundary of the Site.

Although the highest detection of PFOS in groundwater at the Site at this time were detected in OBG MW-8 at 2,710 ng/l within the former WWTP area, the impacted area has been delineated by OBG MW-6 to the north, OBG MW-7 to the south, and HPT-03-GW-24/OBG MW-13 to the west ([Figure 2](#)). The results from monitoring wells B-28 and MW-19-13 delineate the PFAS impacts further to the east and southeast, respectively (see [Table 1](#) and [Figures 3A](#) and [3B](#)).

In addition, the available data indicates that the PFAS impacts associated with the western fence line have been delineated generally within 100 to 200 feet west of the western property line.

The 25 fbg sample from HPT-10 may not represent true groundwater; it might represent infiltrating water or pore water and might be more indicative of a lysimeter than a monitoring well. Nonetheless, the data indicates that PFAS impacts associated with the former sludge drying beds may be delineated to the west by HPT-11, and at least for the eastern portion of the former sludge drying bed area to the south by HPT-18.

The shallow perched zone impacts in the B-2D area appear to be delineated by HPT-01 to the north, HPT-15 to the east, and HPT-16 to the northwest of the former land farm area that was probably the original source for the impacts currently observed as residual impacts in this area of the Site. However, impacts could be migrating off-Site in the HPT-13 area.

Perched zone PFAS impacts in the B-2D area potentially impact B-2D, if the well is compromised, and are likely attributable to a former source away from this location, potentially closer to the HPT-13 area.

The CSM for the Site includes: the original source of impacts (former waste water treatment operations) have been removed, but from years of leaching a secondary or residual source area remains within the lower permeability soils at the Site that are likely allowing back diffusion of PFAS into the more permeable saturated zones in the perched zone. It is assumed that PFAS impacts are thus at near steady state conditions and may be attenuating slightly due to adsorption, diffusion, and advection, but are not likely to migrate further than they have already migrated given that the impacts have had 50 to 60 years to reach the current conditions and the Site primary source materials have been removed for approximately 25 years.

Surface water and storm water impacts are above the MDEQ Part 4, Water Quality Standards, Rule 57 Water Quality Value for PFOS of 11 ng/l for drinking water and 12 ng/l for non-drinking water. The CSM for the surface water and storm water impacts include: the source of impacts have been removed, but from years of leaching a secondary or residual source area remains within the lower permeability soils below the former waste water treatment operations. The lower permeability soils are likely allowing back diffusion of PFAS into the more permeable saturated zones in the perched zone or into the wetland surface water. The current CSM for surface water within eastern and western wetland areas of the Site includes the eastern wetland is a gaining surface water body, likely receiving water from the shallow perched zone groundwater at least for a portion of the year, and the western wetland is a losing surface water body, likely acting as a source of infiltration to the shallow perched zone groundwater.

In addition, OBG and RACER Trust are aware of the analytical results from residential well sampling conducted by the MDEQ and the Genesee County Health Department, and that all the results except samples from one location are non-detect for PFAS. One location had PFAS results near or slightly above the groundwater drinking water criteria.

PROPOSED ADDITIONAL PFAS CHARACTERIZATION AND INTERIM MEASURES

Further perched zone groundwater samples are proposed at three to four locations (HPT-19 through HPT-22) along Dunkirk Street at approximately 200-foot intervals to delineate the southern extent of PFAS impacts, if any, south of the southern fence line and the former sludge drying beds, and one location west of HPT-11 (HPT-23) (Figure 8). We also propose to collect two to three groundwater samples from borings on the residential properties located at 1278 E. Stanley Road (HPT-24) and 1290 E. Stanley Road (HPT-25 and HPT-26) to evaluate the potential for shallow PFAS groundwater impacts, and refine the CSM relative to off-site migration to the east/northeast (Figure 8). We also propose to collect groundwater samples from borings in the road right-of-way along E. Stanley Road in front of the residential properties located at 1278 E. Stanley Road (HPT-27) and 1290 E. Stanley Road (HPT-28) to evaluate the potential for shallow PFAS groundwater impacts either coming onto or leaving the properties from or toward the north, and refine the CSM relative to off-site migration to the northeast (Figure 8). Currently, our CSM includes: the seal or casing of the existing private well is somehow compromised. An access agreement with the owner and a right of way permit from the township will be necessary prior to completing these activities. We suggest the sampling of the private well(s) east of the impacted private well to determine if PFAS is present in the well(s) and may provide additional data from the bedrock in the area of the impacted private well.

We understand additional shallow perched zone monitoring wells will likely be necessary at selected locations to act as sentinel wells for monitoring the PFAS impacts at the Site based on the PFAS investigations following the aforementioned additional characterization activities. The number and locations of monitoring wells will be selected based on discussions with the MDEQ following receipt of temporary well sample analytical results.

We suggest adding the recently installed PFAS monitoring wells to the annual PFAS monitoring event completed in June of each year for at least the next year to monitor the stability of the PFAS data within the monitoring network at the Site.

We propose that OBG MW-16D be sampled for the landfill monitoring parameters that B-2D is sampled for during the next semi-annual sampling to see if the parameters reasonably agree with the results from B-2D to see if OBG MW-16D can be utilized as a complete replacement well for B-2D, and if so we suggest that B-2D be abandoned via over drilling. If the concentrations of the landfill monitoring parameters at OBG MW-16D do not agree with the results from B-2D, then background levels for the landfill parameters would need to be established for OBG MW-16D by collecting 8 rounds of background results for the statistical analysis conducted for the Site. We propose that quarterly samples be collected from OBG MW-16D if a new background data set has to be collected.

We propose raising the western berm along the western wetland from an elevation of about 770 feet to an elevation of about 772 feet to match the berm height around the northern, eastern and southern portions of this wetland area to contain the water within the wetlands and allow the water to “pond” within the wetland and either evaporate or infiltrate into groundwater; thereby, cutting off the discharge to the local surface water body (*i.e.*, Hughes Drain). A 4-inch pipe with a gate valve will be placed through the berm to facilitate draining of the ponded water should the wetland ever get to the point that it would over top the berms. A separate work plan will be submitted for this work, and the following storm sewer work.

We propose bulkheading the 72-inch storm sewer just before it leaves the Site about 75 feet east of the intersection of George and Klein Streets. The sewer is buried at about 12 feet deep in this area and will be exposed via excavation, a section of the pipe will be removed, the resulting pipe ends will then be bulkheaded to keep the flowable fill from entering the pipe ends, and the resulting pipe ends and excavation including the backfill around the pipe will be sealed using flowable fill up to the top of the pipe and then the remainder of the excavation will be backfilled with the excavated soil. Bypass pumping will occur on the upgradient side of the storm sewer at the first manhole east of the excavation area, which is about 150 feet east of the excavation area. Pumping will be performed until the bulkhead has been installed and had adequate time to set up. The pipe will be entered through confined space entry procedures and a sand bag dam will be created within the pipe to allow the ponding of the water within the pipe for bypass pumping to the nearest manhole downstream of the excavation, which is the manhole located north of the intersections of George and Klein Streets.

We propose the installation and surveying of staff gages (SG-1 through SG-3, [Figure 8](#)) in each of the three wetland areas (the smaller eastern wetland, the middle portion of the wetland area that is at a slightly lower elevation than the eastern wetland, and the western wetland) so that surface water elevations can be determined. We also propose installation of three piezometers (PZ-1 through PZ-3, [Figure 8](#)) adjacent to the south side of the three portions of the wetlands to monitor groundwater elevations adjacent to the wetlands to gain a better understanding of the interaction of surface water and groundwater at the Site. We also recommend resampling at SW-01 and SW-02 to confirm the current results and evaluate possible variability and also recommend sampling the middle portion of the wetlands (sample to be labeled SW-03) to evaluate how its results compare to the results from eastern and western wetlands ([Figure 8](#)). The piezometers will be installed similar to the monitoring wells installed at the Site. In addition, we propose collection of a sediment sample at each of the three surface water sample locations, following surface water sampling, to determine the relative concentration of PFAS in the sediments within the wetland areas.

We propose collecting a sample from the storm sewer line leaving the Site to the South (SS-2, [Figure 8](#)) and at the corners of Saginaw and Klein streets (SS-3), following the bulkheading of the storm sewer east of the intersection of Klein and George Streets, and analyzing the samples for PFAS.

We also recommend the collection of a round of water levels from the existing monitoring wells at the Site, and any monitoring wells, piezometers, and staff gages installed as part of the implementation of the work proposed herein to gain a better understanding of the groundwater flow directions in the perched zone and Drift aquifer, and the interactions with the wetlands at the Site.

SCHEDULE

RACER Trust and OBG are prepared to begin to implement the necessary scope of work to further delineation of Site-related PFAS impacts and the necessary interim measures at the Site upon MDEQ's approval of this proposed work.

If you have any questions or comments concerning this technical memorandum, please feel free to contact me at 313.333.0211 or Dave Favero at 734.879.9525.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.



Clifford S. Yantz, PG
Senior Hydrogeologist

ENCLOSURES:

Table 1 – PFAS Sampling Results – Detections (prior to September 2018)
Table 2 – PFAS Sampling Results – Temporary Well, Surface water, and Storm Water
Table 3 – PFAS Analytical Results – Monitoring Well Results
Table 4 – Generalized Lithology for Geoprobe and Drift Aquifer Borings

Figure 1 – Site Location Map
Figure 2 – PFAS Sample Location Map
Figure 3A – Perched Monitoring Wells/Pre-September 2018 PFAS Sample Locations
Figure 3B – Perched Monitoring Wells/September 2018 PFAS Sample Locations
Figure 4 – Drift Aquifer Monitoring Wells/PFAS Sample Locations
Figure 5 – Lines of Cross Section Map
Figure 6 – Cross Section A-A'
Figure 7 – Cross Section B-B' and C-C'
Figure 8 – Proposed Additional Investigation Locations

Attachment 1 – Revised Laboratory Report for SBP-4 and SBP-5 Results
Attachment 2 – HPT Logs
Attachment 3 – Analytical Laboratory Reports (on CD)

TABLES

TABLE 1
RACER Trust - Coldwater Road Landfill & Peregrine Facilities
Per-and Polyfluoroalkyl Substances Sampling Results - Detections - Prior to September 2018

Coldwater Rd Monitoring Wells - Perched Aquifer

Perfluorinated Compound	Well/Sample ID:	B-7	B-7 (Collocated)	B-7	B-9	B-9	B-18A	B-18A	B-19Ar	B-19Ar	B-24r	B-24r	B-28	B-28	OBG-MW-7	OBG-MW-9	OBG-MW-11
	Sample Date:	11/30/2016	11/30/2016	6/12/2018	6/20/2017	6/12/2018	6/20/2017	6/12/2018	11/30/2016	6/12/2018	6/20/2017	6/12/2018	6/20/2017	6/12/2018	6/20/2017	6/20/2017	7/19/2018
Perfluorobutanoic acid (PFBA)		9.2 J	7.1	8.2 B	14 B	9.5 B	4.2 B	1.1 J/B	1.0 J	1.2 J/B	14 B	8.9 B	2.9 B	1.5 J/B	8.0 B	1.4 J B	29 B
Perfluoropentanoic acid (PFPeA)		2.6	1.7 J	4.2	2.2	1.7 J	<0.94	0.51 J	<0.98 U	1.1 J	<0.93	2.0	<0.96	0.47 J	<0.96	<0.94	5.7
Perfluorohexanoic acid (PFHxA)		3.9	3.1	3.3	9.3	7.0	<0.75	<0.56	<0.78 U	<0.54	3.9	2.7	0.92 J	<0.55	1.0 J	<0.75	29
Perfluoroheptanoic acid (PFHpA)		2.4	1.6 J	2.3	4.2	<0.24	<0.76	<0.24	<0.80 U	0.33 J	1.7 J	<0.23	<0.78	<0.24	<0.78	<0.76	14
Perfluorooctanoic acid (PFOA)		9.2 JN	7.6	9	15	12	1.2 J	<0.82	0.84 JN	0.93 J	3.9	3.4	0.79 J	0.84 J	<0.72	1.1 J	54
Perfluorononanoic acid (PFNA)		0.87 J	<0.79 J	0.82 J	<0.64	<0.26	<0.62	<0.26	<0.65 U	<0.25	<0.62	<0.25	<0.63	<0.26	<0.63	<0.62	<0.22
Perfluorotetradecanoic acid (PFTeA)		<0.20 U	<0.19 U	<0.28	1.2 J B	<0.27	<0.19	<0.28	<0.20 U	<0.27	<0.19	<0.27	<0.19	<0.28	1.0 J B	<0.19	<0.24
Perfluorobutanesulfonic acid (PFBS)		5.7	5.8	4.1	2.3	2.1	<0.87	<0.19	<0.91 U	0.28 J	3.7	1.5 J	<0.89	<0.19	<0.86	2.0	79
Perfluoropentanesulfonic acid (PFPeS)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	160
Perfluorohexanesulfonic acid (PFHxS)		23	22 JN	18 B	6.9	3.7 B	<0.83	0.27 J/B	<2.0 U	0.89 J/B	5.4	2.6 B	<0.84	0.27 J/B	<0.84	5.0	450 B
Perfluoroheptanesulfonic Acid (PFHpS)		3.8	3.9	3.0	0.70 J	0.33 J	<0.68	<0.18	1.0 J	0.31 J	<0.67	<0.18	<0.69	<0.18	<0.69	<0.68	13
Perfluorooctanesulfonic acid (PFOS)		220	230	130	13	9.3	1.3 J	<0.52	3.9	4.1	5.0	2.5	1.7 J	<0.51	<1.9	2.9	110
Perfluorooctance Sulfonamide (FOSA)		<0.64 UJ	<0.62 UJ	<0.34	3.3 J H	<0.33	<0.61	<0.34	<0.63 UJ	<0.33	0.66 J	<0.32	1.2 J	<0.33	<0.62	<0.61	<0.28
6:2FTS		<3.8	<3.7	--	<3.7	--	<3.6	--	<3.8	--	<3.6	--	<3.7	--	<3.7	<3.6	5.4 JB

Coldwater Rd Monitoring Wells - Drift Aquifer

Perfluorinated Compound	Well/Sample ID:	B-2D*	B-2D*	B-2D* (DUP-071918)	B-22D*	B-22D* (DUP-2)	B-27D*	B-27D*
	Sample Date:	6/13/2018	7/19/2018	7/19/2018	6/13/2018	6/13/2018	6/20/2017	6/12/2018
Perfluorobutanoic acid (PFBA)		1.8 J/B	2.7 B	2.8 B	0.72 J/B	0.63 J/B	2.0 B	0.47 J/B
Perfluoropentanoic acid (PFPeA)		1.2 J	<0.41	0.44 J	<0.48	<0.45	<0.95	0.26 J
Perfluorohexanoic acid (PFHxA)		0.78 J	<0.49	0.70 J	<0.57	<0.53	<0.75	<0.53
Perfluoroheptanoic acid (PFHpA)		0.52 J	0.47 J	0.42 J	<0.25	<0.23	<0.77	<0.23
Perfluorooctanoic acid (PFOA)		3.3	3.1	3.7	<0.83	<0.78	<0.72	<0.78
Perfluoroundecanoic acid (PFUnA)		<1.0	<0.93	<0.92	<1.1	<1.0	1.4 J	<1.0
Perfluorobutanesulfonic acid (PFBS)		1.5 J	1.0 J	0.97 J	<0.20	<0.18	<0.88	<0.18
Perfluoropentanesulfonic acid (PFPeS)		--	3.2	2.9	--	--	--	--
Perfluorohexanesulfonic acid (PFHxS)		13 B	13 B	12 B	<0.17	0.29 J/B	<0.83	0.23 J/B
Perfluoroheptanesulfonic Acid (PFHpS)		2.9	2.4	2.6	<0.19	<0.17	<0.68	<0.17
Perfluorooctanesulfonic acid (PFOS)		110	99	98	<0.53	<0.49	<1.2	<0.49

Peregrine Monitoring Wells & Temporary Monitoring Wells

Perfluorinated Compound	Well/Sample ID:	Drift Aquifer Wells:	MW-16-10*	MW-16-10* (Duplicate)	MW-16-10*	Perched Zone Wells:	MW-4-02	MW-18-13	MW-19-13	MW-19-13	SBP-1-GW	SBP-2-GW	SBP-2-GW/SBP-DUP-1	SBP-3-GW	SBP-4	SBP-5	SBP-5 (DUP-1)
	Sample Date:		11/29/2016	11/29/2016	6/13/2018		11/30/2016	11/29/2016	11/30/2016	6/12/2018	12/8/2017	12/8/2017	12/8/2017	12/8/2017	6/28/2018	6/28/2018	6/28/2018
Perfluorobutanoic acid (PFBA)		<0.45 U	0.87 J	0.40 J/B		4.7	5.0	13	5.0 B	24 B	55 B	51 B	1.3 B	4.6	36 was 56	41 was 60	
Perfluoropentanoic acid (PFPeA)		<0.98 U	<0.97 U	<0.46		<0.94 U	<0.93 U	16	3.0	4.2	7.1	7.5	<0.29	1.9 J	6.3 was 9.6	5.2 was 7.5	
Perfluorohexanoic acid (PFHxA)		<0.78 U	<0.77 U	<0.55		<0.75 U	<0.74 U	29	6.0	5.8	12	16	<0.59	1.3 J	14 was 22	17 was 25	
Perfluoroheptanoic acid (PFHpA)		<0.79 U	<0.79 U	<0.24		<0.76 U	<0.76 U	18	6.7	5.2	7.4	9.8	0.36 J	0.58 J	3.9 was 6.0	5.4 was 7.9	
Perfluorooctanoic acid (PFOA)		<0.74 U	<0.73 U	<0.80		<0.71 U	3.9	39	16	38	25	28	<0.86	2.1 J	13 was 20	18 was 26	
Perfluorononanoic acid (PFNA)		<0.65 U	<0.64 U	<0.26		<0.62 U	<0.62 U	<0.63	<0.25	0.49 J	<0.27	0.39 J	0.27 J	<0.30	<0.24 was <0.37	<0.23 was <0.34	
Perfluorodecanoic acid (PFDA)		<0.44	<0.43	<0.29		<0.42	<0.42	<0.42	<0.29	<0.31	<0.31	<0.30	<0.31	0.71 J	0.56 J was 0.86	<0.26 was <0.39	
Perfluoroundecanoic acid (PFUnA)		<0.74	<0.73	<1.0		<0.71	<0.71	<0.72	<1.0	<1.1	<1.1	<1.1	<1.1	<1.2	1.4 J was 2.2	<0.94 was <1.4	
Perfluorododecanoic acid (PFDoA)		<0.58	<0.57	<0.52		<0.56	<0.55	<0.56	<0.51	<0.55	<0.55	<0.54	<0.56	<0.60	1.1 J was 1.6	<0.47 was <0.69	
Perfluorotetradecanoic acid (PFTeA)		0.42 J B	0.50 J B	<0.27		0.65 J F1 B	0.60 J B	0.54 J B	<0.27	0.49 J	<0.29	<0.29	<0.29	<0.32	0.85 J was 1.3	<0.25 was <0.36	
Perfluorobutanesulfonic acid (PFBS)		<0.91 U	<0.90 U	<0.19		0.92 J	2.8	13	9.0	21	150	130	0.48 J	1.7 J	23 was 36	29 was 42	
Perfluoropentanesulfonic acid (PFPeS)		--	--	--		--	--	--	--	--	--	--	--	1.1 J	42 was 65	42 was 62	
Perfluorohexanesulfonic acid (PFHxS)		<0.86 U	<0.85 U	0.30 J/B		<0.83 U	4.3	31	14 B	210 B	280 B	390 B	0.78 J	0.62 J	64 was 99	85 was 120	
Perfluoroheptanesulfonic Acid (PFHpS)		<0.71 U	<0.70 U	<0.18		<0.68 U	0.78 J	1 J	0.46 J	50	3.2	6.1	<0.19	<2.2 was <0.21	8.2 was 13	11 was 16	
Perfluorooctanesulfonic acid (PFOS)		<1.3 U	<1.3 U	<0.51		3.5	27	19	4.9	1700	30	55	4.1	1.2 J	220 was 340	240 was 360	
6:2FTS		<3.8	<3.7	--		<3.5	<3.6	<3.7	--	--	--	--	--	<2.2	3.5 J was 5.4	<1.7 J was <2.5	

see page 2 for notes.



TABLE 1
RACER Trust - Coldwater Road Landfill & Peregrine Facilities
Per-and Polyfluoroalkyl Substances Sampling Results - Detections - Prior to September 2018

Sumps & Vaults

Perfluorinated Compound	Well/Sample ID:	SUMP A	SUMP B	SUMP C	SUMP D	SUMP E	SUMP F	Vault A	Vault A	Vault B	Vault C	Vault C	Vault C (DUP-1)	Vault D	Vault E	Vault E (DUP-1)	Vault E	Vault F
	Sample Date:	6/19/2017	6/19/2017	6/19/2017	11/29/2016	6/19/2017	6/19/2017	6/19/2017	6/12/2018	6/19/2017	6/19/2017	6/12/2018	6/12/2018	6/19/2017	6/19/2017	6/19/2017	6/12/2018	6/19/2017
Perfluorobutanoic acid (PFBA)		220 B	480 B	490 B	440 J	48 B	260 B	18.0 B	13 B	4.6 B	19 B	13 B	13 B	5.3 B	8.6 B	8.0 B	6.3 B	6.8 B
Perfluoropentanoic acid (PFPeA)		260	410	1100 Cl	300 J	86	330	1.9	3.1	<0.98	<0.94	1.7 J	2.4	7	<0.96	4.7	4.1	15
Perfluorohexanoic acid (PFHxA)		110	280	390	99 JN	65	150	4.9	4.7	0.79 J	6.0	2.4	2.4	<0.80	6.5	6.3	4.5	13
Perfluoroheptanoic acid (PFHpA)		<0.78	17	80	24	77	67	4.4	3.4	<0.79	3.3	2.7	2.2	<0.96 J	5.5	5.3	4.1	12
Perfluorooctanoic acid (PFOA)		54	230	230	130 JN	95	80	16.0	15	4.1	12	12	12	9.9	24	25	22	57
Perfluorononanoic acid (PFNA)		<0.64	29 Cl	18	7.1 JN	21	9.7	<0.64	<0.24	<0.65	<0.62	<0.26	<0.26	<0.67	<0.63	0.6 J	0.60 J	1.2 J
Perfluorodecanoic acid (PFDA)		<0.43	<0.43	<0.43	<4.2	1.6 J	1.0 J	<0.43	<0.28	<0.44	<0.42	<0.30	<0.30	<0.45	<0.43	<0.43	<0.28	<0.42
Perfluoroundecanoic acid (PFUnA)		<0.73	<0.73	<0.73	<7.2	1.7 J	<0.74	<0.73	<0.98	<0.74	<0.71	<1.1	<1.1	<0.76	<0.72	<0.74	<1.0	<0.71
Perfluorotetradecanoic acid (PFTeA)		<0.19	0.37 J B	<0.19	<1.9	0.21 J B	<0.20	<0.19	0.45 J	<0.20	0.21 J B	<0.28	<0.28	0.25 J B	<0.19	0.4 J B	<0.27	<0.19
Perfluorobutanesulfonic acid (PFBS)		310 Cl	190 J	410	74	57	100	9.3	8.5	4.1	<0.88	7.4	4.7	11	13	12	11	12
Perfluorohexanesulfonic acid (PFHxS)		410	650	1200	370	170	390	32	27 B	12	<0.83	19 B	19 B	33	65	63	53 B	35
Perfluoroheptanesulfonic Acid (PFHpS)		150	140	200	83	55	82	7.2	6.5	2.4	<0.68	6.0	5.6	8.4	15	15.0	15	7.3
Perfluorodecanesulfonic acid (PFDS)		4.3	2.6	1.9	<12	1.2 J	<1.2	<1.2	<0.29	<1.2	<1.2	<0.31	<0.31	<1.2	<1.2	<1.2	<0.29	<1.2
Perfluorooctanesulfonic acid (PFOS)		13000	9600	12000	5,800 J	3400	5400	450	460	150.0	440	380	400	350	730	730	680	300
Perfluorooctance Sulfonamide (FOSA)		8.1 J B	6.1 J B	8.2 J B	<6.1	4.7 J B	6.1 J B	<0.62	<0.31	<0.63	<0.61	0.65 J	0.71 J	<0.65	3.5 J H	16 J B	1.2 J	22 J H

Quality Assurance / Quality Control Samples - Detections Only

Perfluorinated Compound	Well/Sample ID:	Watera Rinsate Blank	Equipment Blank-1 (Low Flow)	EB-01 Bladder Pump	Equipment Blank-1 (Low Flow)	Equipment Blank-1	Equipment Blank-2	Equipment Blank 071918	Field Blank	FB-01	Field Blank-1	Field Blank-1	Field Blank-2	Field Blank-1	Field Blank 071918
	Sample Date:	11/29/2016	11/29/2016	6/20/2017	12/8/2017	6/12/2018	6/13/2018	7/19/2018	11/30/2016	6/19/2017	12/8/2017	6/12/2018	6/13/2018	6/28/2018	7/19/2018
Perfluorobutanoic acid (PFBA)		<1.8 U	<0.44 U	0.59 J/B	<0.35	0.33 J/B	<0.32	1.1 JB	<0.46	0.92 J B	0.38 J B	0.37 J/B	0.33 J/B	<0.29	1.3 JB
Perfluorotetradecanoic acid (PFTeA)		0.31 J N	0.61 J B	0.89 J B	<0.29	<0.26	<0.27	<0.25	0.93 J	<0.19	<0.29	<0.26	<0.26	<0.24	<0.25
Perfluorohexanesulfonic acid (PFHxS)		<0.80 U	<0.76 U	<0.86	0.28 J B	0.24 J/B	<0.16	0.22 JB	<0.88	<0.84	0.40 J B	0.18 J/B	0.22 J/B	<0.14	0.21 JB
Perfluorooctanesulfonic acid (PFOS)		<1.2 U	<1.2 U	<1.3	<0.54	<0.49	<0.50	<0.46	<1.3	1.4 J	<0.53	<0.48	<0.49	<0.45	<0.46
6:2FTS		<3.5	<3.7	<3.8	--	--	--	2.6 JB	<3.7	--	--	--	--	<1.7	<1.7

Notes

- 1) Concentrations in ng/L.
- 2) < = Not detected at specified reporting limit.
- 3) -- = Not analyzed.
- 4) * Indicates Drift Aquifer monitoring well.
- 5) Dup = Duplicate sample.
- 6) B = Compound was found in the blank and the sample.
- 7) Cl = The peak identified in the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be high bias.
- 8) H = Sample was Prepped or analyzed beyond the specified holding time.
- 9) J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
- 10) JN - Indicates that the target analyte has been "tentatively identified" as present and the associated numerical value is the estimated concentration in the sample.
- 11) U - Indicates that the analyte was not detected and the sample RL is presented. This qualifier is also used to signify blank excursions.
- 12) F1 - MS and/or MSD Recovery is outside acceptance limits.
- 13) Concentrations above the USEPA advisory level (70 ng/L PFOA+PFOS) and/or MDEQ proposed drinking water criteria (70 ng/L PFOA+PFOS) are highlighted in yellow.



TABLE 2
RACER Trust - Coldwater Road Landfill & Peregrine Facilities
Per-and Polyfluoroalkyl Substances Sampling Results - September/October 2018 PFAS Investigation

Coldwater Road Landfill - PFAS Investigation - Perched Aquifer

Perfluorinated Compound	Well/Sample ID:	HPT-01-GW-25	HPT-02-GW-20	HPT-02-GW-35	HPT-03-GW-24	HPT-04-GW-24	HPT-05-GW-17	HPT-06-GW-25	HPT-07-GW-25	HPT-07-GW-25 REPLICATE 01	HPT-08-GW-25	HPT-09-GW-24	HPT-09-GW-39	HPT-09-GW-39 (DUPLICATE)	HPT-10-GW-25	HPT-10-GW-38	HPT-11-GW-34	HPT-12-GW-39.7	HPT-12-GW-39.7 REPLICATE 01
		Sample Date:	9/4/2018	9/4/2018	9/5/2018	9/5/2018	9/5/2018	9/5/2018	9/5/2018	9/5/2018	9/6/2018	9/6/2018	9/10/2018	9/7/2018	9/6/2018	9/10/2018	9/6/2018	9/10/2018	9/11/2018
Perfluorobutanoic Acid (PFBA)		<20	<20	<20	<20	<20	<20	<20	<20	<20	20	<20	40	<20	<20	<20	<20	<20	<20
Perfluoropentanoic Acid (PFPeA)		<10	<10	<10	<10	<10	<10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4:2 Fluorotelomer Sulfonic Acid (4:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorohexanoic Acid (PFHxA)		<10	<10	<10	<10	<10	<10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorobutane Sulfonic Acid (PFBS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	20	<10	10	<10	<10	<10	<10
Perfluoroheptanoic Acid (PFHpA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	20	<10	<10	<10	<10	<10	<10	<10
Perfluoropentane Sulfonic Acid (PFPeS)		<10	<10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	20	<10	<10	<10	<10
6:2 Fluorotelomer Sulfonic Acid (6:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctanoic Acid (PFOA)		<10	<10	<10	<10	<10	<10	20	<10	<10	<10	<10	<10	<10	10	<10	<10	<10	<10
Perfluorohexane Sulfonic Acid (PFHxS)		<10	20	100	<10	<10	<10	20	20	20	<10	<10	<10	<10	80	<10	<10	<10	<10
Perfluorohexane Sulfonic Acid - LN (PFHxS-LN)		<10	20	90	<10	<10	<10	20	20	<10	<10	<10	<10	<10	70	<10	<10	<10	<10
Perfluorohexane Sulfonic Acid - BR (PFHxS-BR)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	10	<10	<10	<10	<10
Perfluorononanoic Acid (PFNA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
8:2 Fluorotelomer Sulfonic Acid (8:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoroheptane Sulfonic Acid (PFHpS)		<10	<10	20	<10	<10	<10	<10	10	<10	<10	<10	<10	<10	20	<10	<10	<10	<10
Perfluorodecanoic Acid (PFDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
N-methyl Perfluorooctanesulfonamidoacetic Acid (N-MeFO)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
N-Ethyl Perfluorooctane Sulfonamidoacetic Acid (EtFOSAA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonic Acid (PFOS)		<10	60	580	<10	<10	<10	80	760	700	30	350	<10	<10	1550	<10	<10	10	<10
Perfluorooctane Sulfonic Acid (PFOS-LN)		<10	20	180	<10	<10	<10	40	400	350	10	190	<10	<10	610	<10	<10	<10	<10
Perfluorooctane Sulfonic Acid (PFOS-BR)		<10	50	400	<10	<10	<10	30	360	340	<10	150	<10	<10	970	<10	<10	<10	<10
Perfluoroundecanoic Acid (PFUnDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorononane Sulfonic Acid (PFNS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorododecanoic Acid (PFDoDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorodecane Sulfonic Acid (PFDS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorotridecanoic Acid (PFTTrDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonamide (FOSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorotetradecanoic Acid (PFTeDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Perfluorinated Compound	Well/Sample ID:	HPT-13-GW-15	HPT-13-GW-15 (DUP-02)	HPT-13-GW-15 (DUP-02) REPLICATE 01	HPT-13-GW-29	HPT-14-GW-24	HPT-15-GW-15	HPT-16-GW-25	HPT-16-GW-35	HPT-16-GW-35 (DUP-03)	HPT-16-GW-35 (DUP-03) REPLICATE 01	HPT-16-GW-45	HPT-16-GW-45 REPLICATE 01	HPT-17-GW-30	HPT-17-GW-40	HPT-18-GW-24
		Sample Date:	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/11/2018	9/11/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/13/2018	9/13/2018
Perfluorobutanoic Acid (PFBA)		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Perfluoropentanoic Acid (PFPeA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4:2 Fluorotelomer Sulfonic Acid (4:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorohexanoic Acid (PFHxA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorobutane Sulfonic Acid (PFBS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoroheptanoic Acid (PFHpA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoropentane Sulfonic Acid (PFPeS)		<10	<10	<10	<10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
6:2 Fluorotelomer Sulfonic Acid (6:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctanoic Acid (PFOA)		20	20	10	<10	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorohexane Sulfonic Acid (PFHxS)		20	10	10	<10	70	<10	<10	10	10	10	<10	<10	<10	<10	<10
Perfluorohexane Sulfonic Acid - LN (PFHxS-LN)		10	<10	<10	<10	60	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorohexane Sulfonic Acid - BR (PFHxS-BR)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorononanoic Acid (PFNA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
8:2 Fluorotelomer Sulfonic Acid (8:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoroheptane Sulfonic Acid (PFHpS)		10	<10	<10	<10	30	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorodecanoic Acid (PFDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
N-methyl Perfluorooctanesulfonamidoacetic Acid (N-MeFO)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
N-Ethyl Perfluorooctane Sulfonamidoacetic Acid (EtFOSAA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonic Acid (PFOS)		470	110	100	310	1,830	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonic Acid (PFOS-LN)		230	30	30	200	920	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonic Acid (PFOS-BR)		230	70	60	110	940	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoroundecanoic Acid (PFUnDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorononane Sulfonic Acid (PFNS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorododecanoic Acid (PFDoDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorodecane Sulfonic Acid (PFDS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorotridecanoic Acid (PFTTrDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonamide (FOSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorotetradecanoic Acid (PFTeDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10



TABLE 2
RACER Trust - Coldwater Road Landfill & Peregrine Facilities
Per-and Polyfluoroalkyl Substances Sampling Results - September/October 2018 PFAS Investigation

Coldwater Road Landfill - PFAS Investigation - DRIFT Aquifer

Perfluorinated Compound	Well/Sample ID:	SB-HPT-01-GW-62	SB-HPT-01-GW-72	SB-HPT-02-GW-70	SB-HPT-02-GW-80	SB-HPT-02-GW-87	SB-HPT-07-GW-52	SB-HPT-07-GW-62	SB-HPT-07-GW-72	SB-HPT-13-GW-62	SB-HPT-13-GW-72	SB-HPT-16-GW-62	SB-HPT-16-GW-72	SB-B-7-GW-68	SB-B-7-GW-68	SB-B-19Ar-GW-72	SB-B-19Ar-GW-82	SB-B-19Ar-GW-92
	Sample Date:	9/10/2018	9/10/2018	9/11/2018	9/12/2018	9/12/2018	9/17/2018	9/17/2018	9/18/2018	9/19/2018	9/19/2018 (DUP04)	9/19/2018	9/20/2018	9/20/2018	9/25/2018	9/25/2018 (DUP-05)	9/21/2018	9/21/2018
Perfluorobutanoic Acid (PFBA)	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Perfluoropentanoic Acid (PFPeA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4:2 Fluorotelomer Sulfonic Acid (4:2 FTSA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorohexanoic Acid (PFHxA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorobutane Sulfonic Acid (PFBS)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoroheptanoic Acid (PFHpA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoropentane Sulfonic Acid (PFPeS)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
6:2 Fluorotelomer Sulfonic Acid (6:2 FTSA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctanoic Acid (PFOA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorohexane Sulfonic Acid (PFHxS)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorohexane Sulfonic Acid - LN (PFHxS-LN)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorohexane Sulfonic Acid - BR (PFHxS-BR)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorononanoic Acid (PFNA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
8:2 Fluorotelomer Sulfonic Acid (8:2 FTSA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoroheptane Sulfonic Acid (PFHpS)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorodecanoic Acid (PFDA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
N-methyl Perfluorooctanesulfonamidoacetic Acid (N-MeFO)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
N-Ethyl Perfluorooctane Sulfonamidoacetic Acid (EtFOSAA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonic Acid (PFOS)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonic Acid (PFOS-LN)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonic Acid (PFOS-BR)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoroundecanoic Acid (PFUnDA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorononane Sulfonic Acid (PFNS)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorododecanoic Acid (PFDoDA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorodecane Sulfonic Acid (PFDS)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorotridecanoic Acid (PFTrDA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonamide (FOSA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorotetradecanoic Acid (PFTeDA)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Coldwater Road Landfill - PFAS Investigation - Surface Water and Storm Water

Perfluorinated Compound	Well/Sample ID:	SS-01	SW-01	SW-02															
	Sample Date:	(Storm Sewer) 9/10/2018	(East Wetland) 9/7/2018	(West Wetland) 9/7/2018															
Perfluorobutanoic Acid (PFBA)	30	<20	<20																
Perfluoropentanoic Acid (PFPeA)	<10	<10	<10																
4:2 Fluorotelomer Sulfonic Acid (4:2 FTSA)	<10	<10	<10																
Perfluorohexanoic Acid (PFHxA)	20	<10	<10																
Perfluorobutane Sulfonic Acid (PFBS)	<10	<10	<10																
Perfluoroheptanoic Acid (PFHpA)	<10	<10	<10																
Perfluoropentane Sulfonic Acid (PFPeS)	<10	<10	<10																
6:2 Fluorotelomer Sulfonic Acid (6:2 FTSA)	<10	<10	<10																
Perfluorooctanoic Acid (PFOA)	40	<10	<10																
Perfluorohexane Sulfonic Acid (PFHxS)	30	10	<10																
Perfluorohexane Sulfonic Acid - LN (PFHxS-LN)	20	10	<10																
Perfluorohexane Sulfonic Acid - BR (PFHxS-BR)	<10	<10	<10																
Perfluorononanoic Acid (PFNA)	<10	<10	<10																
8:2 Fluorotelomer Sulfonic Acid (8:2 FTSA)	<10	<10	<10																
Perfluoroheptane Sulfonic Acid (PFHpS)	10	<10	<10																
Perfluorodecanoic Acid (PFDA)	<10	<10	<10																
N-methyl Perfluorooctanesulfonamidoacetic Acid (N-MeFO)	<10	<10	<10																
N-Ethyl Perfluorooctane Sulfonamidoacetic Acid (EtFOSAA)	<10	<10	<10																
Perfluorooctane Sulfonic Acid (PFOS)	1,750	360	50																
Perfluorooctane Sulfonic Acid (PFOS-LN)	1,290	160	20																
Perfluorooctane Sulfonic Acid (PFOS-BR)	480	190	30																
Perfluoroundecanoic Acid (PFUnDA)	<10	<10	<10																
Perfluorononane Sulfonic Acid (PFNS)	<10	<10	<10																
Perfluorododecanoic Acid (PFDoDA)	<10	<10	<10																
Perfluorodecane Sulfonic Acid (PFDS)	<10	<10	<10																
Perfluorotridecanoic Acid (PFTrDA)	<10	<10	<10																
Perfluorooctane Sulfonamide (FOSA)	<10	<10	<10																
Perfluorotetradecanoic Acid (PFTeDA)	<10	<10	<10																



TABLE 2
RACER Trust - Coldwater Road Landfill & Peregrine Facilities
Per- and Polyfluoroalkyl Substances Sampling Results - September/October 2018 PFAS Investigation

Quality Assurance / Quality Control Samples

Perfluorinated Compound	Well/Sample ID: Sample Date:	EB-01	EB-02	EB-03	EB-04	FB-01	FB-02	FB-03	FB-04	FB-05	FB-06	FB-07	FB-08	FB-09				
		(HDPE Tubing) 9/10/2018	(Submersible Pump) 9/12/2018	(HDPE Tubing) 9/12/2018	(Submersible Pump) 9/19/2018	(Field Blank) 9/4/2018	(Field Blank) 9/5/2018	(Field Blank) 9/6/2018	(Field Blank) 9/10/2018	(Field Blank) 9/11/2018	(Field Blank) 9/12/2018	(Field Blank) 9/13/2018	(Field Blank) 9/19/2018	(Field Blank) 9/25/2018				
Perfluorobutanoic Acid (PFBA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluoropentanoic Acid (PFPeA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
4:2 Fluorotelomer Sulfonic Acid (4:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorohexanoic Acid (PFHxA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorobutane Sulfonic Acid (PFBS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluoroheptanoic Acid (PFHpA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluoropentane Sulfonic Acid (PFPeS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
6:2 Fluorotelomer Sulfonic Acid (6:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorooctanoic Acid (PFOA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorohexane Sulfonic Acid (PFHxS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorohexane Sulfonic Acid - LN (PFHxS-LN)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorohexane Sulfonic Acid - BR (PFHxS-BR)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorononanoic Acid (PFNA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
8:2 Fluorotelomer Sulfonic Acid (8:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluoroheptane Sulfonic Acid (PFHpS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorodecanoic Acid (PFDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
N-methyl Perfluorooctanesulfonamidoacetic Acid (N-MeFO)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
N-Ethyl Perfluorooctane Sulfonamidoacetic Acid (EtFOSAA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorooctane Sulfonic Acid (PFOS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorooctane Sulfonic Acid (PFOS-LN)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorooctane Sulfonic Acid (PFOS-BR)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluoroundecanoic Acid (PFUnDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorononane Sulfonic Acid (PFNS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorododecanoic Acid (PFDoDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorodecane Sulfonic Acid (PFDS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorotridecanoic Acid (PFTrDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorooctane Sulfonamide (FOSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				
Perfluorotetradecanoic Acid (PFTeDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10				

Notes

- 1) Concentrations in ng/L.
- 2) < = Not detected at specified reporting limit.
- 3) -- = Not analyzed.
- 4) * Indicates Drift Aquifer monitoring well.
- 5) Dup = Duplicate sample.
- 6) B = Compound was found in the blank and the sample.
- 7) CI = The peak identified in the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be high bias.
- 8) H = Sample was Prepped or analyzed beyond the specified holding time.
- 9) J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
- 10) JN - Indicates that the target analyte has been "tentatively identified" as present and the associated numerical value is the estimated concentration in the sample.
- 11) U - Indicates that the analyte was not detected and the sample RL is presented. This qualifier is also used to signify blank excursions.
- 12) F1 - MS and/or MSD Recovery is outside acceptance limits.
- 13) Concentrations above the USEPA advisory level (70 ng/L PFOA+PFOS) and/or MDEQ proposed drinking water criteria (70 ng/L PFOA+PFOS) are highlighted in yellow.



TABLE 3

RACER Trust - Coldwater Road Landfill & Peregrine Facilities
Per-and Polyfluoroalkyl Substances Sampling Results - September/October 2018 Monitoring Well Sampling

Coldwater Rd Monitoring Wells - Perched Aquifer

Perfluorinated Compound	Well/Sample ID:	OBG MW-6	OBG MW-7	OBG MW-8	OBG MW-9	OBG MW-9 REPLICATE 01	OBG MW-13	OBG MW-14	OBG MW-20					
	Sample Date:	9/20/2018	9/20/2018	9/20/2018	9/20/2018	9/20/2018	10/19/2018	10/19/2018	Not Sampled Dry					
Perfluorobutanoic Acid (PFBA)		30	<20	<20	<20	<20	<20	<20	NS					
Perfluoropentanoic Acid (PFPeA)		<10	<10	<10	<10	<10	<10	<10	NS					
4:2 Fluorotelomer Sulfonic Acid (4:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorohexanoic Acid (PFHxA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorobutane Sulfonic Acid (PFBS)		<10	<10	<10	<10	<10	<10	10	NS					
Perfluoroheptanoic Acid (PFHpA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluoropentane Sulfonic Acid (PFPeS)		<10	<10	<10	<10	<10	<10	20	NS					
6:2 Fluorotelomer Sulfonic Acid (6:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorooctanoic Acid (PFOA)		<10	<10	20	<10	<10	<10	20	NS					
Perfluorohexane Sulfonic Acid (PFHxS)		<10	<10	70	<10	<10	<10	100	NS					
Perfluorohexane Sulfonic Acid - LN (PFHxS-LN)		<10	<10	60	<10	<10	<10	100	NS					
Perfluorohexane Sulfonic Acid - BR (PFHxS-BR)		<10	<10	<10	<10	<10	<10	10	NS					
Perfluorononanoic Acid (PFNA)		<10	<10	<10	<10	<10	<10	<10	NS					
8:2 Fluorotelomer Sulfonic Acid (8:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluoroheptane Sulfonic Acid (PFHpS)		<10	<10	30	<10	<10	<10	20	NS					
Perfluorodecanoic Acid (PFDA)		<10	<10	<10	<10	<10	<20	<20	NS					
N-methyl Perfluorooctanesulfonamidoacetic Acid (N-MeFOS)		<10	<10	<10	<10	<10	<10	<10	NS					
N-Ethyl Perfluorooctane Sulfonamidoacetic Acid (EtFOSAA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorooctane Sulfonic Acid (PFOS)		<10	<10	2,710	<10	<10	<10	540	NS					
Perfluorooctane Sulfonic Acid (PFOS-LN)		<10	<10	1,570	<10	<10	<10	230	NS					
Perfluorooctane Sulfonic Acid (PFOS-BR)		<10	<10	1,270	<10	<10	<10	300	NS					
Perfluoroundecanoic Acid (PFUnDA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorononane Sulfonic Acid (PFNS)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorododecanoic Acid (PFDoDA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorodecane Sulfonic Acid (PFDS)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorotridecanoic Acid (PFTTrDA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorooctane Sulfonamide (FOSA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorotetradecanoic Acid (PFTeDA)		<10	<10	<10	<10	<10	<10	<10	NS					

Coldwater Rd Monitoring Wells - Drift Aquifer

Perfluorinated Compound	Well/Sample ID:	B-20D	B-21D	B-23Dr	B-23Dr (DUP-01-GW)	MW-15-10	PFW-1	OBG MW-12D	OBG MW-15D	OBG MW-15D (DUP-1)	OBG MW-16D	OBG MW-17D	OBG MW-18D	OBG MW-19D
	Sample Date:	9/19/2018	9/19/2018	9/21/2018	9/21/2018	9/21/2018	9/21/2018	10/22/2018	10/23/2018	10/23/2018	10/22/2018	10/22/2018	10/19/2018	10/23/2018
Perfluorobutanoic Acid (PFBA)		<20	<20	<20	<20	<20	<20						<20	
Perfluoropentanoic Acid (PFPeA)		<10	<10	<10	<10	<10	<10						<10	
4:2 Fluorotelomer Sulfonic Acid (4:2 FTSA)		<10	<10	<10	<10	<10	<10						<10	
Perfluorohexanoic Acid (PFHxA)		<10	<10	<10	<10	<10	<10						<10	
Perfluorobutane Sulfonic Acid (PFBS)		<10	<10	<10	<10	<10	<10						<10	
Perfluoroheptanoic Acid (PFHpA)		<10	<10	<10	<10	<10	<10						<10	
Perfluoropentane Sulfonic Acid (PFPeS)		<10	<10	<10	<10	<10	<10						<10	
6:2 Fluorotelomer Sulfonic Acid (6:2 FTSA)		<10	<10	<10	<10	<10	<10						<10	
Perfluorooctanoic Acid (PFOA)		<10	<10	<10	<10	<10	<10						<10	
Perfluorohexane Sulfonic Acid (PFHxS)		<10	<10	<10	<10	<10	<10						<10	
Perfluorohexane Sulfonic Acid - LN (PFHxS-LN)		<10	<10	<10	<10	<10	<10						<10	
Perfluorohexane Sulfonic Acid - BR (PFHxS-BR)		<10	<10	<10	<10	<10	<10						<10	
Perfluorononanoic Acid (PFNA)		<10	<10	<10	<10	<10	<10						<10	
8:2 Fluorotelomer Sulfonic Acid (8:2 FTSA)		<10	<10	<10	<10	<10	<10						<10	
Perfluoroheptane Sulfonic Acid (PFHpS)		<10	<10	<10	<10	<10	<10						<10	
Perfluorodecanoic Acid (PFDA)		<10	<10	<10	<10	<10	<10						<20	
N-methyl Perfluorooctanesulfonamidoacetic Acid (N-MeFOS)		<10	<10	<10	<10	<10	<10						<10	
N-Ethyl Perfluorooctane Sulfonamidoacetic Acid (EtFOSAA)		<10	<10	<10	<10	<10	<10						<10	
Perfluorooctane Sulfonic Acid (PFOS)		<10	<10	<10	<10	<10	<10						<10	
Perfluorooctane Sulfonic Acid (PFOS-LN)		<10	<10	<10	<10	<10	<10						<10	
Perfluorooctane Sulfonic Acid (PFOS-BR)		<10	<10	<10	<10	<10	<10						<10	
Perfluoroundecanoic Acid (PFUnDA)		<10	<10	<10	<10	<10	<10						<10	
Perfluorononane Sulfonic Acid (PFNS)		<10	<10	<10	<10	<10	<10						<10	
Perfluorododecanoic Acid (PFDoDA)		<10	<10	<10	<10	<10	<10						<10	
Perfluorodecane Sulfonic Acid (PFDS)		<10	<10	<10	<10	<10	<10						<10	
Perfluorotridecanoic Acid (PFTTrDA)		<10	<10	<10	<10	<10	<10						<10	
Perfluorooctane Sulfonamide (FOSA)		<10	<10	<10	<10	<10	<10						<10	
Perfluorotetradecanoic Acid (PFTeDA)		<10	<10	<10	<10	<10	<10						<10	



TABLE 3

RACER Trust - Coldwater Road Landfill & Peregrine Facilities
Per-and Polyfluoroalkyl Substances Sampling Results - September/October 2018 Monitoring Well Sampling

Quality Assurance / Quality Control Samples		EB-01-GW	EB-02-GW	FB-01-GW	FB-02-GW	EB-01	FB-01	FB-02						
Perfluorinated Compound	Well/Sample ID:	(Whale Pump)	(Bladder Pump)	(Field Blank)	(Field Blank)	(Bladder Pump)	(Field Blank)	(Field Blank)						
	Sample Date:	9/21/2018	9/21/2018	9/20/2018	9/21/2018	10/23/2018	10/19/2018	10/23/2018						
Perfluorobutanoic Acid (PFBA)		<20	<20	<20	<20		<20							
Perfluoropentanoic Acid (PFPeA)		<10	<10	<10	<10		<10							
4:2 Fluorotelomer Sulfonic Acid (4:2 FTSA)		<10	<10	<10	<10		<10							
Perfluorohexanoic Acid (PFHxA)		<10	<10	<10	<10		<10							
Perfluorobutane Sulfonic Acid (PFBS)		<10	<10	<10	<10		<10							
Perfluoroheptanoic Acid (PFHpA)		<10	<10	<10	<10		<10							
Perfluoropentane Sulfonic Acid (PFPeS)		<10	<10	<10	<10		<10							
6:2 Fluorotelomer Sulfonic Acid (6:2 FTSA)		<10	<10	<10	<10		<10							
Perfluorooctanoic Acid (PFOA)		<10	<10	<10	<10		<10							
Perfluorohexane Sulfonic Acid (PFHxS)		<10	<10	<10	<10		<10							
Perfluorohexane Sulfonic Acid - LN (PFHxS-LN)		<10	<10	<10	<10		<10							
Perfluorohexane Sulfonic Acid - BR (PFHxS-BR)		<10	<10	<10	<10		<10							
Perfluorononanoic Acid (PFNA)		<10	<10	<10	<10		<10							
8:2 Fluorotelomer Sulfonic Acid (8:2 FTSA)		<10	<10	<10	<10		<10							
Perfluoroheptane Sulfonic Acid (PFHpS)		<10	<10	<10	<10		<10							
Perfluorodecanoic Acid (PFDA)		<10	<10	<10	<10		<20							
N-methyl Perfluorooctanesulfonamidoacetic Acid (N-MeFOS)		<10	<10	<10	<10		<10							
N-Ethyl Perfluorooctane Sulfonamidoacetic Acid (EtFOSAA)		<10	<10	<10	<10		<10							
Perfluorooctane Sulfonic Acid (PFOS)		<10	<10	<10	<10		<10							
Perfluorooctane Sulfonic Acid (PFOS-LN)		<10	<10	<10	<10		<10							
Perfluorooctane Sulfonic Acid (PFOS-BR)		<10	<10	<10	<10		<10							
Perfluoroundecanoic Acid (PFUnDA)		<10	<10	<10	<10		<10							
Perfluorononane Sulfonic Acid (PFNS)		<10	<10	<10	<10		<10							
Perfluorododecanoic Acid (PFDoDA)		<10	<10	<10	<10		<10							
Perfluorodecane Sulfonic Acid (PFDS)		<10	<10	<10	<10		<10							
Perfluorotridecanoic Acid (PFTrDA)		<10	<10	<10	<10		<10							
Perfluorooctane Sulfonamide (FOSA)		<10	<10	<10	<10		<10							
Perfluorotetradecanoic Acid (PFTeDA)		<10	<10	<10	<10		<10							

Notes

- 1) Concentrations in ng/L.
- 2) < = Not detected at specified reporting limit.
- 3) -- = Not analyzed.
- 4) * Indicates Drift Aquifer monitoring well.
- 5) Dup = Duplicate sample.
- 6) B = Compound was found in the blank and the sample.
- 7) Cl = The peak identified in the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be high bias.
- 8) H = Sample was Prepped or analyzed beyond the specified holding time.
- 9) J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
- 10) JN - Indicates that the target analyte has been "tentatively identified" as present and the associated numerical value is the estimated concentration in the sample.
- 11) U - Indicates that the analyte was not detected and the sample RL is presented. This qualifier is also used to signify blank excursions.
- 12) F1 - MS and/or MSD Recovery is outside acceptance limits.
- 13) Concentrations above the USEPA advisory level (70 ng/L PFOA+PFOS) and/or MDEQ proposed drinking water criteria (70 ng/L PFOA+PFOS) are highlighted in yellow.
- 14) NS = Not Sampled - MW-20 had about five feet of water in it when it was developed on September 26, 2018, but was purged dry during development and had not recovered when attempted to be sampled on October 19, 2018.



TABLE 4
RACER Trust - Coldwater Road Landfill & Peregrine Facilities
Generalized Lithology for Geoprobe and Drift Aquifer Borings

Boring ID:	HPT-14					HPT-15					HPT-17					HPT-18				
Ground Elevation:	791.64					795.04					770.72					786.85				
Top of Casing Elevation, if well installed:	791.64					795.04					770.72					786.85				
Depth/Elevation of Major Lithologic Units:	Unit Type	Top Depth	Top Elevation	Bottom Depth	Bottom Elevation	Unit Type	Top Depth	Top Elevation	Bottom Depth	Bottom Elevation	Unit Type	Top Depth	Top Elevation	Bottom Depth	Bottom Elevation	Unit Type	Top Depth	Top Elevation	Bottom Depth	Bottom Elevation
	SILT	0	791.64	3.6	788.04	SILT	0	795.04	2.9	792.14	CLAY	0	770.72	3.4	767.32	SAND	0	786.85	2	784.85
	CLAY	3.6	788.04	10	781.64	CLAY	2.9	792.14	10	785.04	SAND	3.4	767.32	10	760.72	Clayey Silt	2	784.85	8	778.85
	SAND seam	10	781.64	10.5	781.14	SAND	10	785.04	15	780.04	SILT	10	760.72	10.7	760.02	CLAY	8	778.85	19	767.85
	CLAY	10.5	781.14	11.1	780.54	CLAY	15	780.04	35	760.04	CLAY	10.7	760.02	11.4	759.32	SAND seam	19	767.85	19.5	767.35
	SAND seam	11.1	780.54	11.4	780.24						SILT	11.4	759.32	12.4	758.32	CLAY seam	19.5	767.35	20	766.85
	CLAY	11.4	780.24	20.6	771.04						CLAY	12.4	758.32	21.5	749.22	SAND	20	766.85	21.4	765.45
	SAND	20.6	771.04	22.6	769.04						Clayey SILT	21.5	749.22	25.9	744.82	CLAY	21.4	765.45	22.1	764.75
	CLAY	22.6	769.04	30	761.64						SAND	25.9	744.82	40	730.72	SAND	22.1	764.75	24.7	762.15
											Heaving sand - could not tag clay					CLAY	24.7	762.15	25	761.85

Boring ID:	SB-B-7					SB-B-19Ar					SB-HPT-01/OBG MW-12D					SB-HPT-02/OBG MW-16D				
Ground Elevation:	811.00					808.93					794.58					804.97				
Top of Casing Elevation, if well installed:	811.00					808.93					797.13					807.43				
Depth/Elevation of Major Lithologic Units:	Unit Type	Top Depth	Top Elevation	Bottom Depth	Bottom Elevation	Unit Type	Top Depth	Top Elevation	Bottom Depth	Bottom Elevation	Unit Type	Top Depth	Top Elevation	Bottom Depth	Bottom Elevation	Unit Type	Top Depth	Top Elevation	Bottom Depth	Bottom Elevation
	CLAY	0	811	17	794	CLAY	0	808.93	2	806.93	SAND	0	794.58	13.8	780.78	CLAY	0	804.967	1	803.967
	SAND seam	17	794	17.4	793.6	SAND	2	806.93	14.2	794.73	CLAY	13.8	780.78	41.5	753.08	SAND	1	803.97	10	794.97
	CLAY	17.4	793.6	65	746	CLAY	14.2	794.73	39.1	769.83	SAND	41.5	753.08	73	721.58	Clayey Silt seam	10	794.967	11	793.967
	SAND	65	746	68	743	SAND	39.1	769.83	40	768.93	CLAY	73	721.58	80	714.58	SAND	11	793.97	12	792.97
	CLAY	68	743	70	741	CLAY	40	768.93	54	754.93						CLAY seam	12	792.967	13	791.967
						SAND seam	54	754.93	54.4	754.53						SAND	13	791.967	21	783.967
						CLAY	54.4	754.53	62.5	746.43						CLAY	21	783.967	27	777.967
						SAND	62.5	746.43	90	718.93						SAND	27	777.97	35.5	769.47
						CLAY	90	718.93	100	708.93						CLAY	35.5	769.467	60	744.967
																SAND	60	744.967	85.5	719.467
																CLAY	85.5	719.467	90	714.967

Boring ID:	SB-HPT-07/OBG MW-19D					SB-HPT-13/OBG MW-17D					SB-HPT-16/OBG MW-18D					SB-SBP-01/OBG MW-15D				
Ground Elevation:	792.67					797.95					797.29					807.82				
Top of Casing Elevation, if well installed:	795.37					800.09					800.17					810.68				
Depth/Elevation of Major Lithologic Units:	Unit Type	Top Depth	Top Elevation	Bottom Depth	Bottom Elevation	Unit Type	Top Depth	Top Elevation	Bottom Depth	Bottom Elevation	Unit Type	Top Depth	Top Elevation	Bottom Depth	Bottom Elevation	Unit Type	Top Depth	Top Elevation	Bottom Depth	Bottom Elevation
	CLAY	0	792.667	10	782.667	SAND	0	797.95	35	762.95	CLAY	0	797.287	3.5	793.79	CLAY	0	807.823	1.6	806.223
	SAND	10	782.67	14	778.67	CLAY	35	762.953	47	750.953	SAND seam	3.5	793.79	5.5	791.79	SAND	1.6	806.22	4	803.82
	CLAY	14	778.667	46	746.667	Sandy SILT/CLAY	47	750.953	50	747.953	CLAY	5.5	791.787	14.4	782.887	SILT	4	803.823	16	791.823
	SILT seam	46	746.667	47	745.667	SAND	50	747.953	74	723.953	SAND	14.4	782.887	17.5	779.787	CLAY	16	791.823	78	729.823
	SAND	47	745.667	65.5	727.167	CLAY	74	723.953	80	717.953	SILT seam	17.5	779.787	18.2	779.087	SILT	78	729.823	80	727.823
	SILT	65.5	727.167	74	718.667						CLAY	18.2	779.087	22.5	774.787	CLAY	80	727.823	81.8	726.023
	CLAY	74	718.667	80	712.667						SAND	22.5	774.79	26.8	770.49	SAND	81.8	726.02	86	721.82
											CLAY	26.8	770.487	30	767.287	CLAY	86	721.823	88.5	719.323
											SAND	30	767.29	34.1	763.19	SAND	88.5	719.32	95.9	711.92
											CLAY	34.1	763.187	40	757.287	CLAY	95.9	711.923	110	697.823
											SAND	40	757.29	42.5	754.79					
											CLAY	42.5	754.787	49	748.287					
											SAND	49	748.29	72	725.29					
											Clayey SILT	72	725.287	80	717.287					

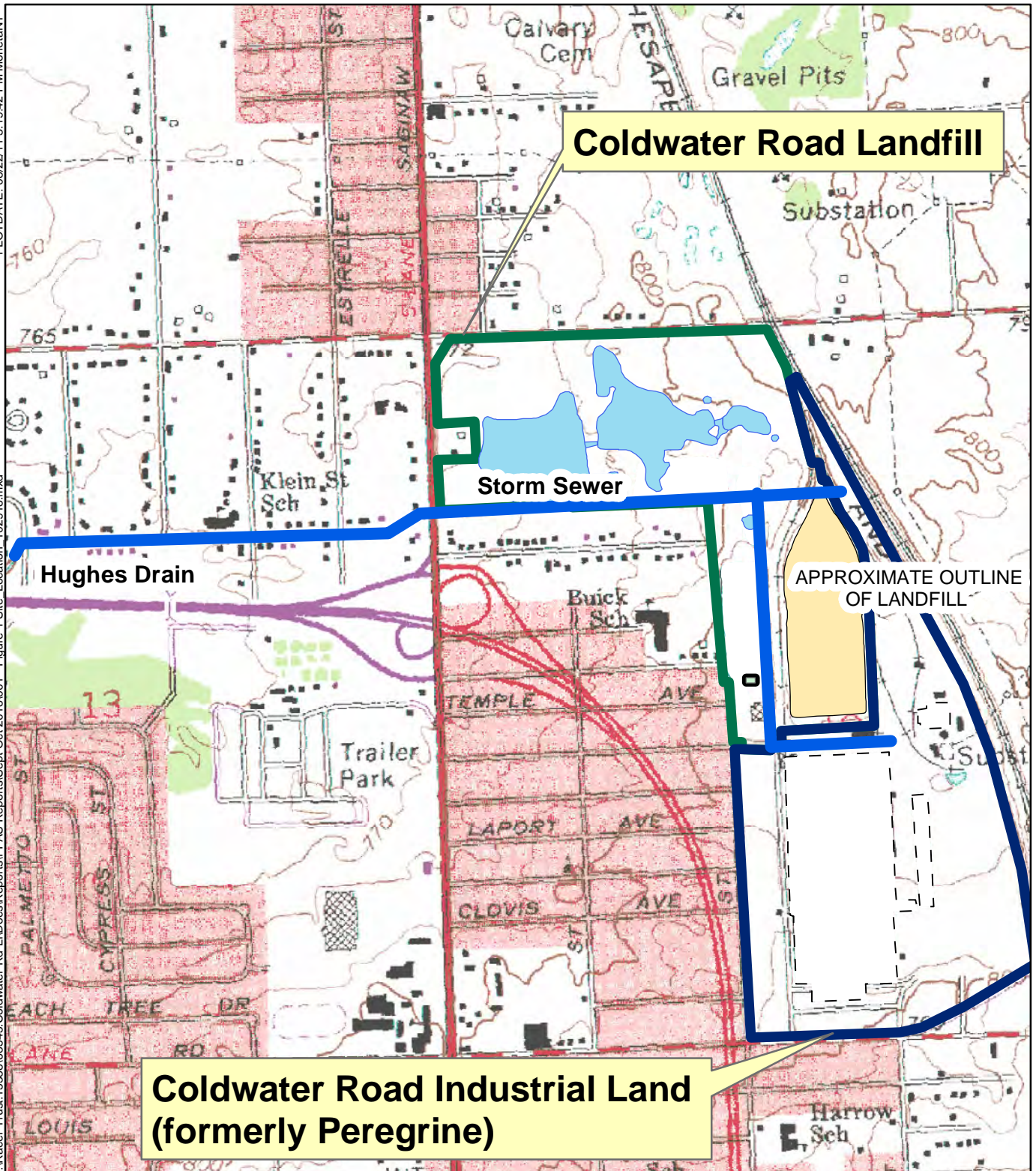
Notes:
Orange highlighting indicates Drift aquifer unit



FIGURES

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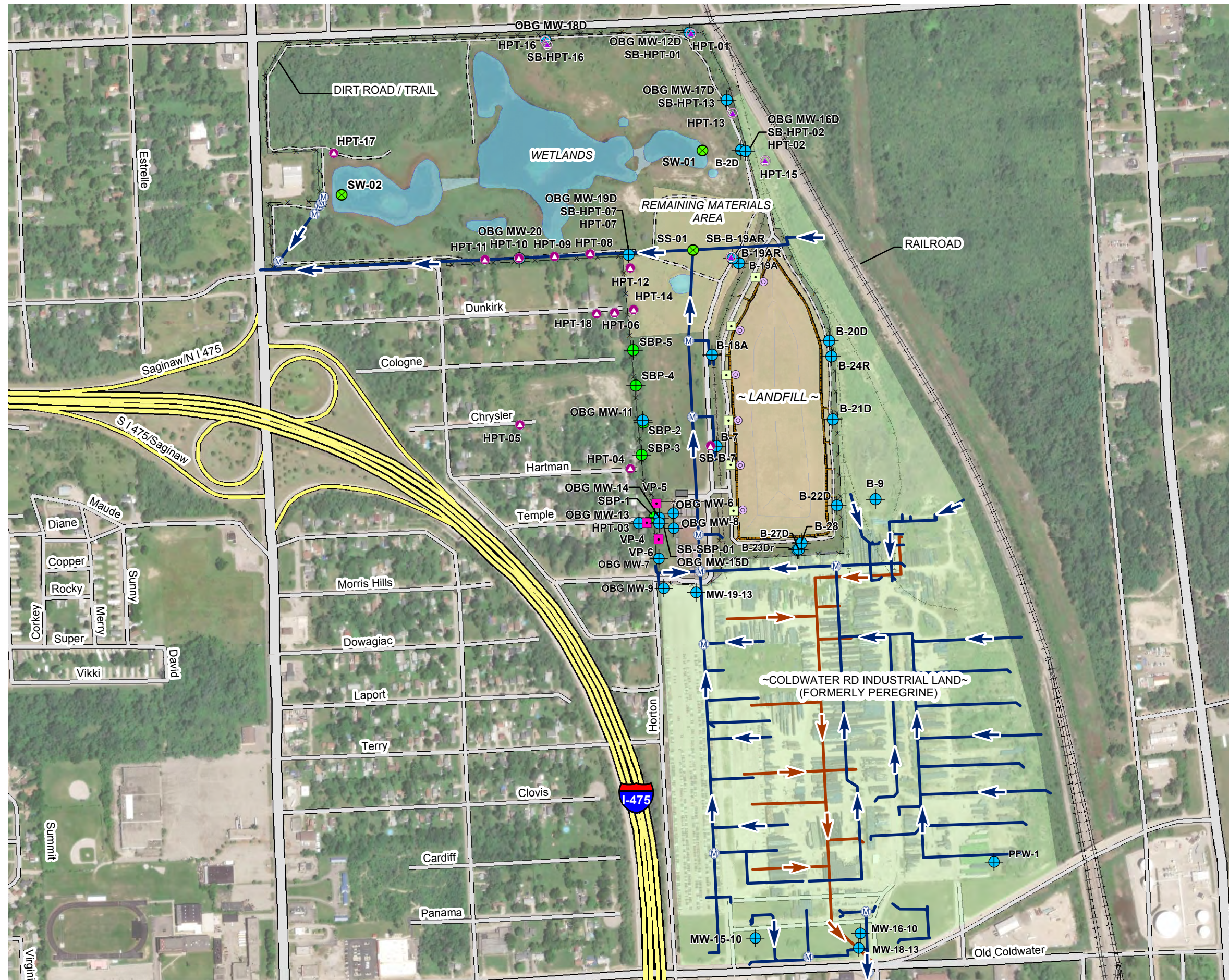
RACER TRUST
 COLDWATER ROAD LANDFILL FACILITY
 FLINT, MICHIGAN

SITE LOCATION MAP



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I:\Racer-Trust_15388\68545_Coldwater-Rd-Lf\Docs\Reports\PFAS Reports\Sept-Oct 2018\002 - Figure 2 - PFAS Sampling Locations.mxd

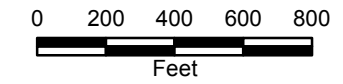


LEGEND

- LEACHATE COLLECTION SUMP
- ACCESS PORT FOR LEAK DETECTION VAULT
- MONITORING WELL
- DEEP BORING LOCATION
- SHALLOW BORING LOCATION
- VAPOR PROBE LOCATION
- TEMPORARY MONITORING WELL LOCATION
- SURFACE/STORM WATER SAMPLE LOCATION
- STORM SEWER MANHOLE
- STORM SEWER LINE
- SANITARY SEWER LINE

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PFAS SAMPLING LOCATIONS



OCTOBER 2018
15388/68545/002



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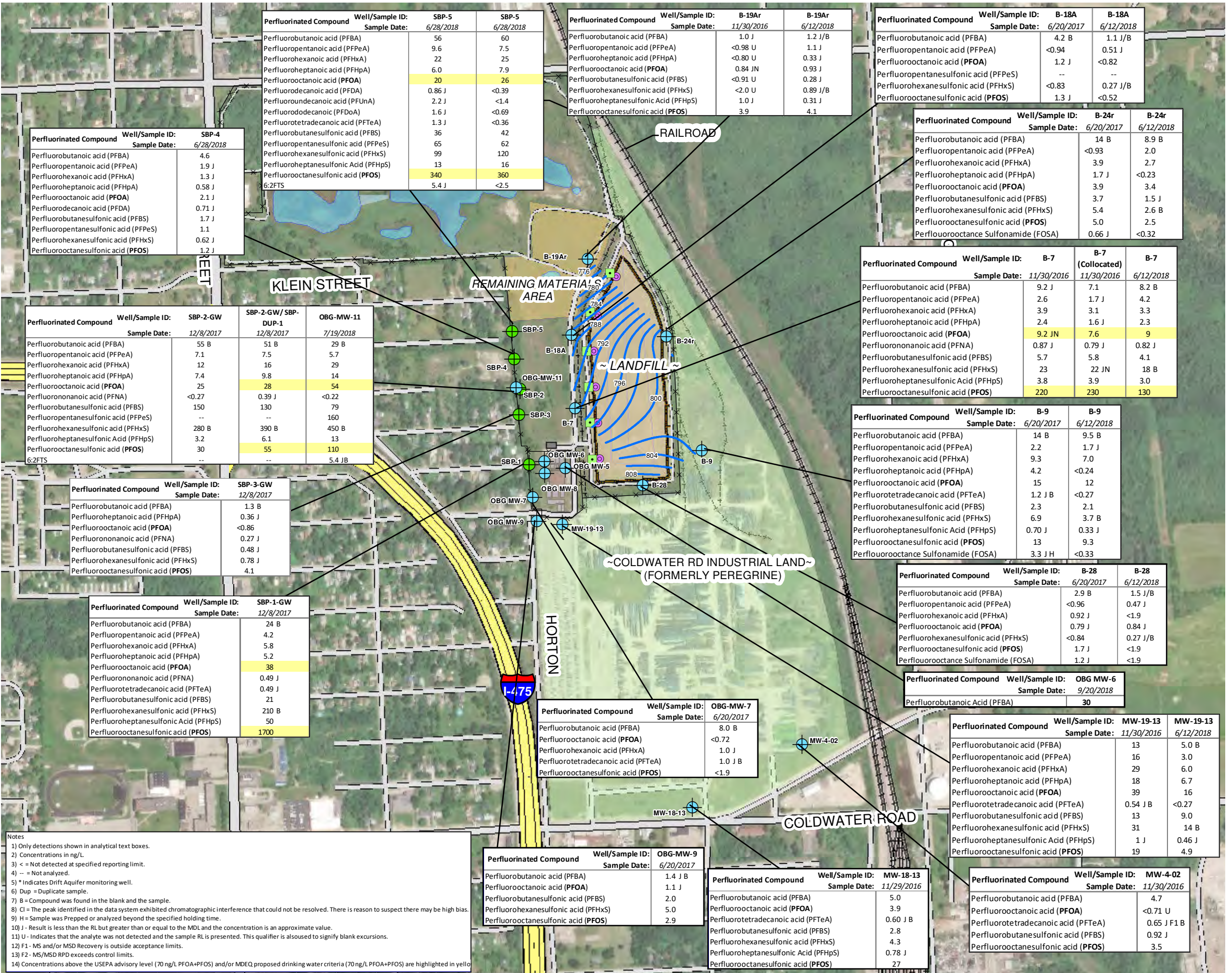
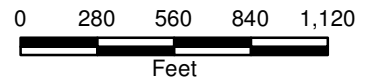


LEGEND

- LEACHATE COLLECTION SUMP
- ACCESS PORT FOR LEAK DETECTION VAULT
- PERCHED MONITORING WELL
- TEMPORARY MONITORING WELL
- GROUNDWATER CONTOUR (JUNE 12, 2018)

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LANDFILL FACILITY
FLINT, MICHIGAN**

**PERCHED MONITORING WELLS
PRE-SEPTEMBER 2018
PFAS SAMPLE LOCATIONS**



- Notes
- 1) Only detections shown in analytical text boxes.
 - 2) Concentrations in ng/L.
 - 3) < = Not detected at specified reporting limit.
 - 4) - = Not analyzed.
 - 5) * Indicates Drift Aquifer monitoring well.
 - 6) Dup = Duplicate sample.
 - 7) B = Compound was found in the blank and the sample.
 - 8) Cl = The peak identified in the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be high bias.
 - 9) H = Sample was Prepped or analyzed beyond the specified holding time.
 - 10) J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
 - 11) U - Indicates that the analyte was not detected and the sample RL is presented. This qualifier is also used to signify blank excursions.
 - 12) F1 - MS and/or MSD Recovery is outside acceptance limits.
 - 13) F2 - MS/MSD RPD exceeds control limits.
 - 14) Concentrations above the USEPA advisory level (70 ng/L PFOA+PFOS) and/or MDEQ proposed drinking water criteria (70 ng/L PFOA+PFOS) are highlighted in yellow.

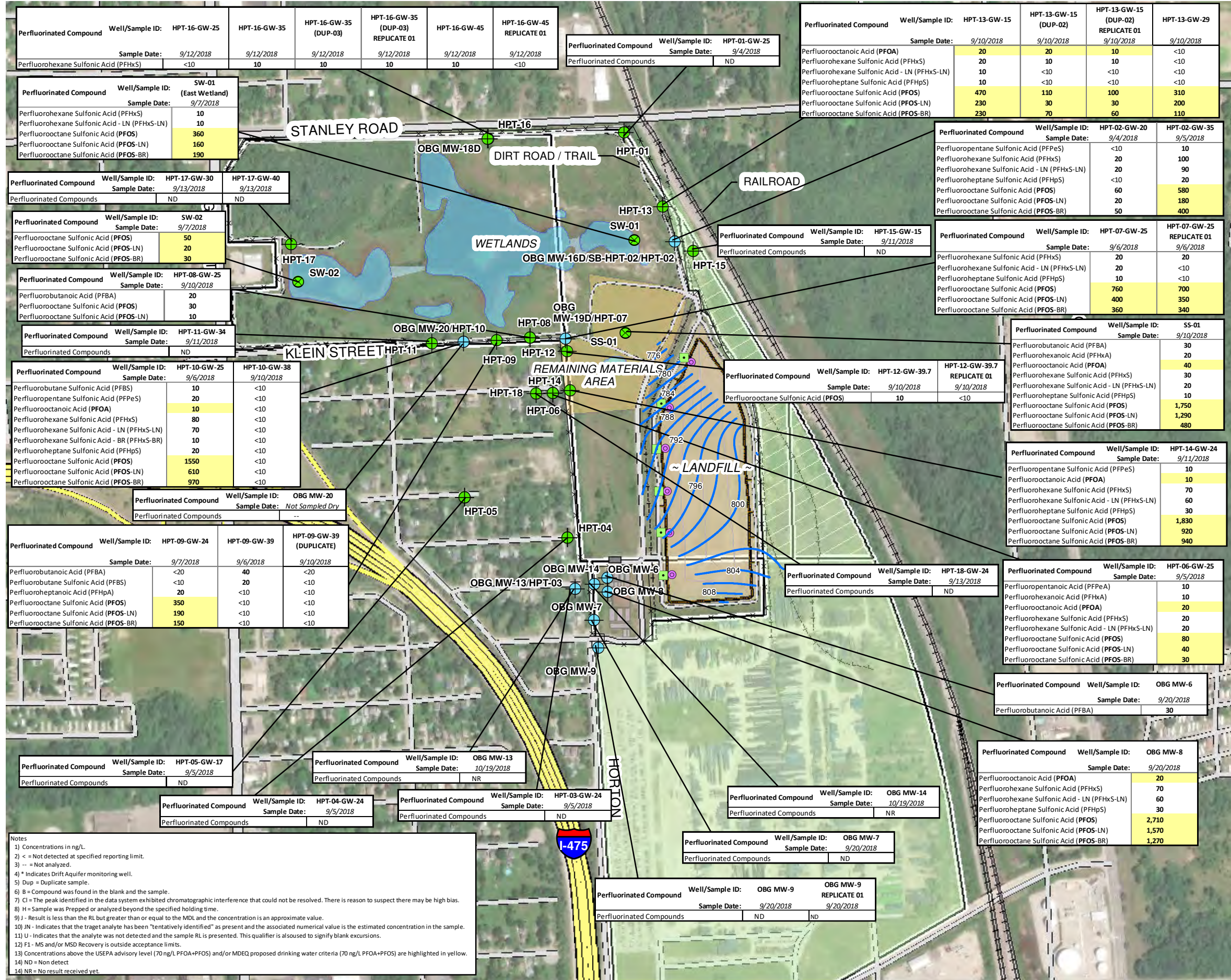
OCTOBER 2018
15388/68545/003



I:\Racer-Tru...15388\68545_Coldwater-Rd-Lt\Docs\Reports\PFAS_Reports\Sept-Oct_2018\003 - Figure 3A Perched Locations-103116.mxd

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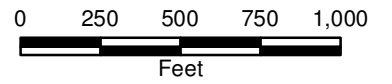


LEGEND

- LEACHATE COLLECTION SUMP
- ACCESS PORT FOR LEAK DETECTION VAULT
- ⊕ PERCHED MONITORING WELL
- ⊕ TEMPORARY MONITORING WELL
- GROUNDWATER CONTOUR (JUNE 12, 2018)
- ⊗ SURFACE/STORM WATER SAMPLE LOCATION

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LANDFILL FACILITY
FLINT, MICHIGAN

**PERCHED MONITORING WELLS
SEPTEMBER 2018
PFAS SAMPLE LOCATIONS**



OCTOBER 2018
15388/68545/003

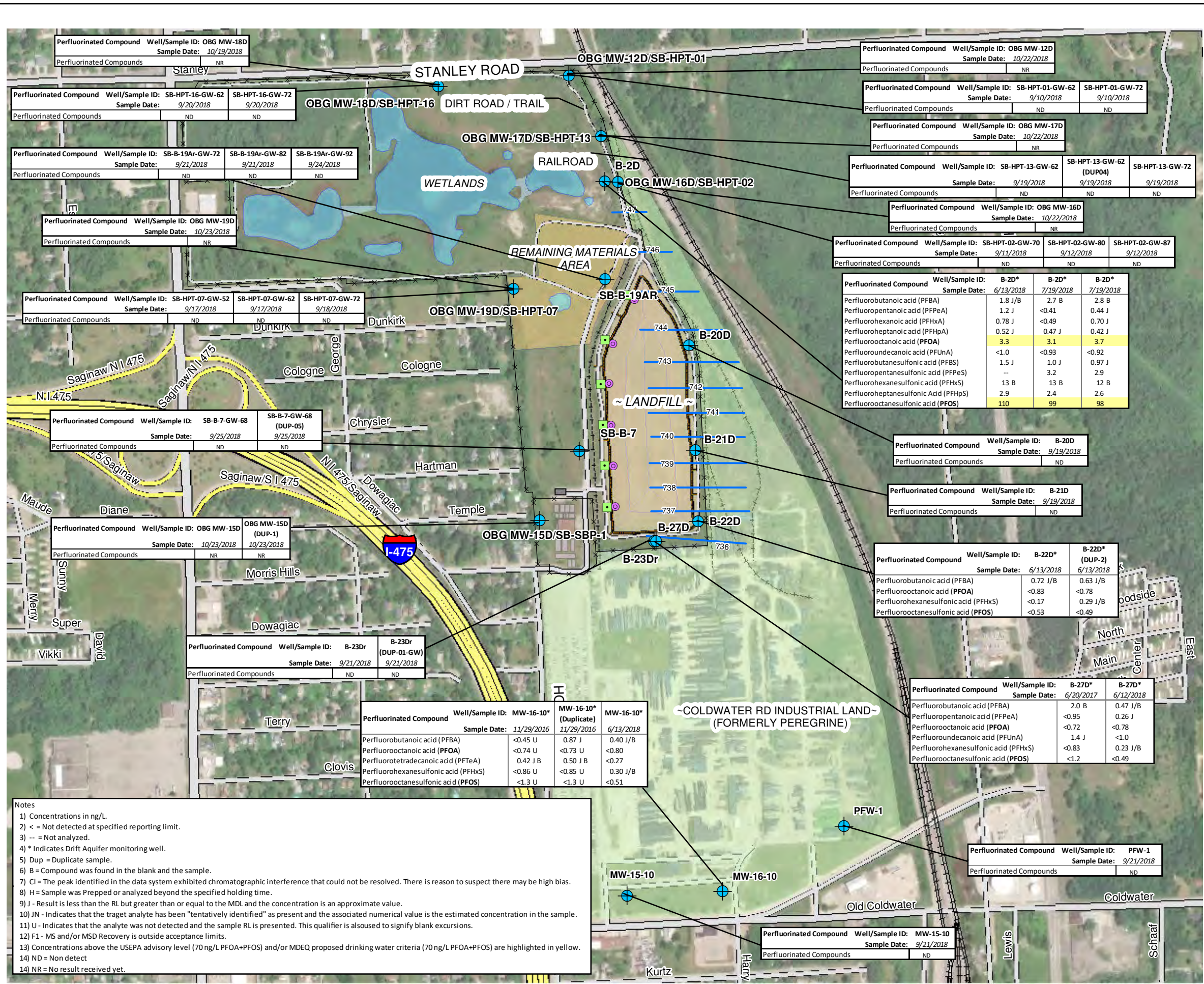


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Notes
 1) Concentrations in ng/L
 2) < = Not detected at specified reporting limit.
 3) -- = Not analyzed.
 4) * Indicates Drift Aquifer monitoring well.
 5) Dup = Duplicate sample.
 6) B = Compound was found in the blank and the sample.
 7) CI = The peak identified in the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be high bias.
 8) H = Sample was Prepped or analyzed beyond the specified holding time.
 9) J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
 10) JN - Indicates that the target analyte has been "tentatively identified" as present and the associated numerical value is the estimated concentration in the sample.
 11) U - Indicates that the analyte was not detected and the sample RL is presented. This qualifier is also used to signify blank excursions.
 12) F1 - MS and/or MSD Recovery is outside acceptance limits.
 13) Concentrations above the USEPA advisory level (70 ng/L PFOA+PFOS) and/or MDEQ proposed drinking water criteria (70 ng/L PFOA+PFOS) are highlighted in yellow.
 14) ND = Non detect
 15) NR = No result received yet.

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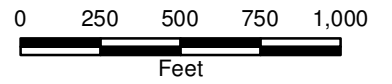


LEGEND

- LEACHATE COLLECTION SUMP
- ACCESS PORT FOR LEAK DETECTION VAULT
- DRIFT MONITORING WELL
- GROUNDWATER CONTOUR (NOVEMBER 6, 2017)

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**DRIFT MONITORING WELLS
PFAS SAMPLE LOCATIONS**



OCTOBER 2018
15388/68545/004



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Notes

- 1) Concentrations in ng/L
- 2) < = Not detected at specified reporting limit.
- 3) -- = Not analyzed.
- 4) * Indicates Drift Aquifer monitoring well.
- 5) Dup = Duplicate sample.
- 6) B = Compound was found in the blank and the sample.
- 7) Cl = The peak identified in the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be high bias.
- 8) H = Sample was Prepped or analyzed beyond the specified holding time.
- 9) J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
- 10) JN - Indicates that the target analyte has been "tentatively identified" as present and the associated numerical value is the estimated concentration in the sample.
- 11) U - Indicates that the analyte was not detected and the sample RL is presented. This qualifier is also used to signify blank excursions.
- 12) F1 - MS and/or MSD Recovery is outside acceptance limits.
- 13) Concentrations above the USEPA advisory level (70 ng/L PFOA+PFOS) and/or MDEQ proposed drinking water criteria (70 ng/L PFOA+PFOS) are highlighted in yellow.
- 14) ND = Non detect
- 14) NR = No result received yet.

Perfluorinated Compound	Well/Sample ID:	B-2D*	B-2D*	B-2D*
	Sample Date:	6/13/2018	7/19/2018	7/19/2018
Perfluorobutanoic acid (PFBA)		1.8 J/B	2.7 B	2.8 B
Perfluoropentanoic acid (PFPeA)		1.2 J	<0.41	0.44 J
Perfluorohexanoic acid (PFHxA)		0.78 J	<0.49	0.70 J
Perfluoroheptanoic acid (PFHpA)		0.52 J	0.47 J	0.42 J
Perfluorooctanoic acid (PFOA)		3.3	3.1	3.7
Perfluoroundecanoic acid (PFUnA)		<1.0	<0.93	<0.92
Perfluorobutanesulfonic acid (PFBS)		1.5 J	1.0 J	0.97 J
Perfluoropentanesulfonic acid (PFPeS)		--	3.2	2.9
Perfluorohexanesulfonic acid (PFHxS)		13 B	13 B	12 B
Perfluoroheptanesulfonic acid (PFHpS)		2.9	2.4	2.6
Perfluorooctanesulfonic acid (PFOS)		110	99	98

Perfluorinated Compound	Well/Sample ID:	B-20D
	Sample Date:	9/19/2018
Perfluorinated Compounds		ND

Perfluorinated Compound	Well/Sample ID:	B-21D
	Sample Date:	9/19/2018
Perfluorinated Compounds		ND

Perfluorinated Compound	Well/Sample ID:	B-22D*	B-22D*
	Sample Date:	6/13/2018	6/13/2018
Perfluorobutanoic acid (PFBA)		0.72 J/B	0.63 J/B
Perfluorooctanoic acid (PFOA)		<0.83	<0.78
Perfluorohexanesulfonic acid (PFHxS)		<0.17	0.29 J/B
Perfluorooctanesulfonic acid (PFOS)		<0.53	<0.49

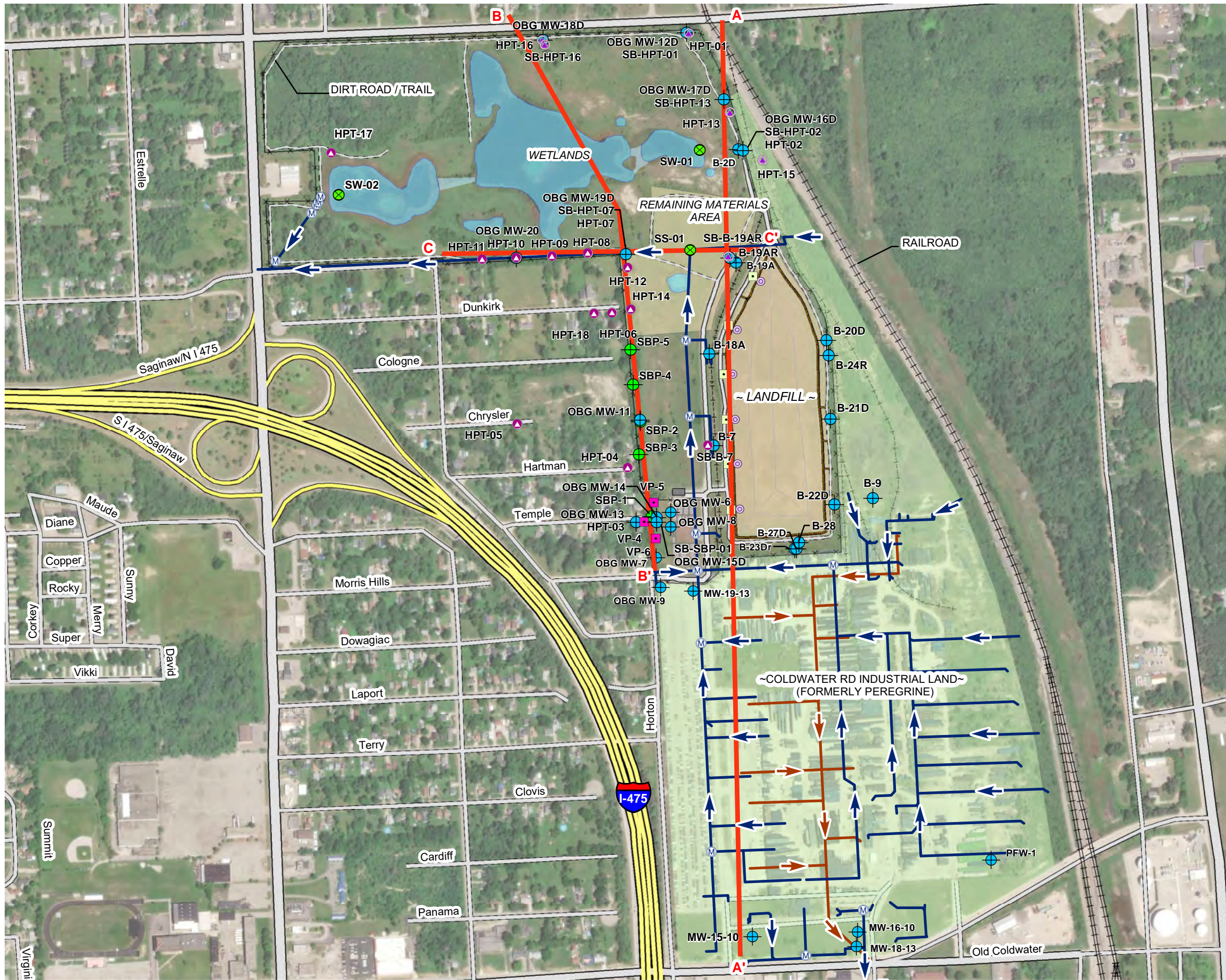
Perfluorinated Compound	Well/Sample ID:	B-27D*	B-27D*
	Sample Date:	6/20/2017	6/12/2018
Perfluorobutanoic acid (PFBA)		2.0 B	0.47 J/B
Perfluoropentanoic acid (PFPeA)		<0.95	0.26 J
Perfluorooctanoic acid (PFOA)		<0.72	<0.78
Perfluoroundecanoic acid (PFUnA)		1.4 J	<1.0
Perfluorohexanesulfonic acid (PFHxS)		<0.83	0.23 J/B
Perfluorooctanesulfonic acid (PFOS)		<1.2	<0.49

Perfluorinated Compound	Well/Sample ID:	MW-15-10
	Sample Date:	9/21/2018
Perfluorinated Compounds		ND

Perfluorinated Compound	Well/Sample ID:	MW-16-10*	MW-16-10*	MW-16-10*
	Sample Date:	11/29/2016	11/29/2016	6/13/2018
Perfluorobutanoic acid (PFBA)		<0.45 U	0.87 J	0.40 J/B
Perfluorooctanoic acid (PFOA)		<0.74 U	<0.73 U	<0.80
Perfluorotetradecanoic acid (PFTeA)		0.42 J/B	0.50 J/B	<0.27
Perfluorohexanesulfonic acid (PFHxS)		<0.86 U	<0.85 U	0.30 J/B
Perfluorooctanesulfonic acid (PFOS)		<1.3 U	<1.3 U	<0.51

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I:\Racer-Trust_15388\68545_Coldwater-Fd-L\Docs\Reports\PFAS Reports\Sept-Oct 2018\005 - Figure 5 - Lines of Cross Section Map.mxd

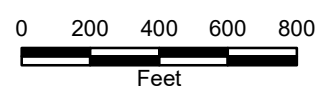


LEGEND

- LEACHATE COLLECTION SUMP
- ACCESS PORT FOR LEAK DETECTION VAULT
- MONITORING WELL
- DEEP BORING LOCATION
- SHALLOW BORING LOCATION
- VAPOR PROBE LOCATION
- TEMPORARY MONITORING WELL LOCATION
- SURFACE/STORM WATER SAMPLE LOCATION
- STORM SEWER MANHOLE
- STORM SEWER LINE
- SANITARY SEWER LINE
- CROSS SECTION LINES

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LINES OF CROSS SECTION MAP

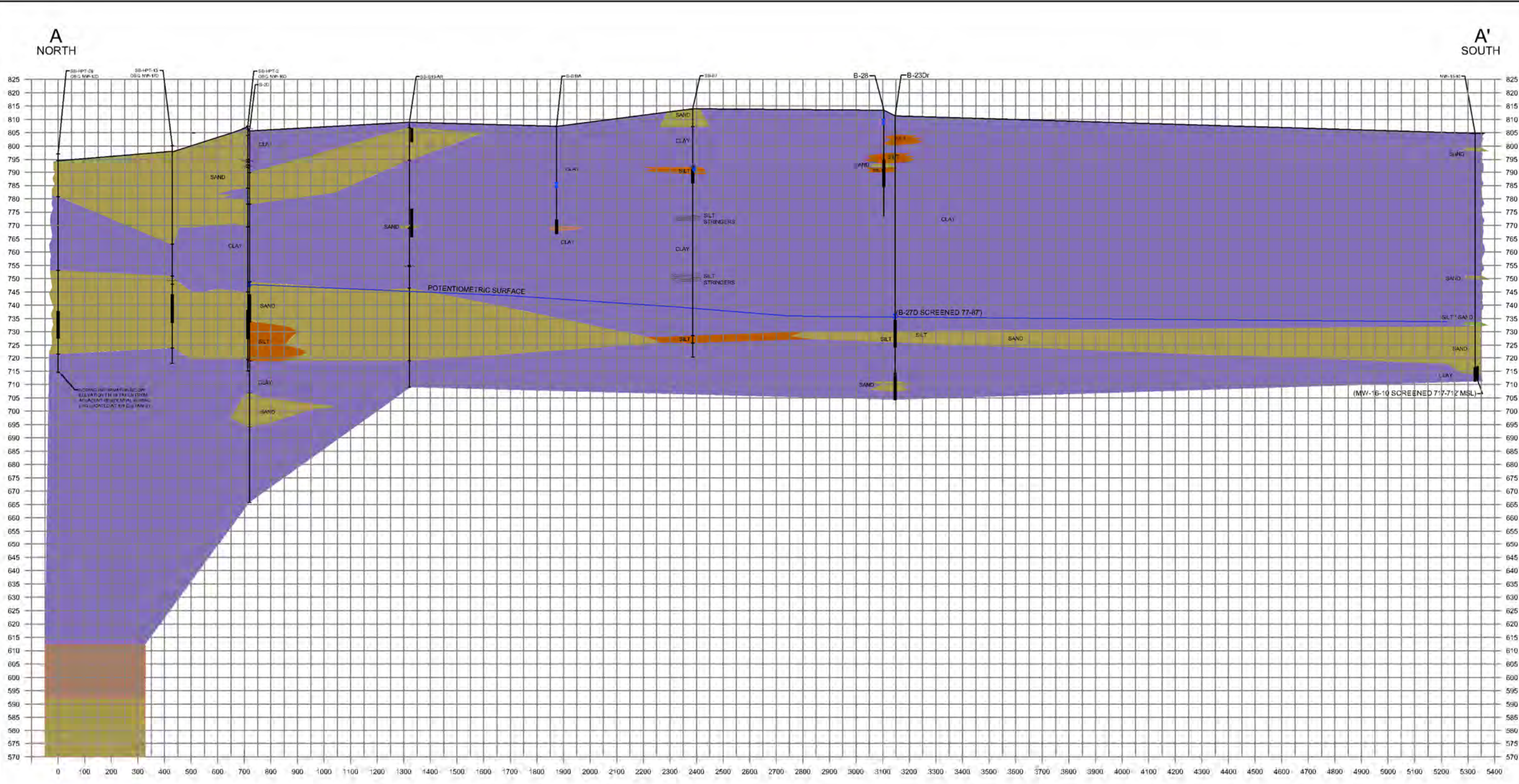


OCTOBER 2018
15388/68545/002



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 I:\Vocor-Truist\15308\68545\Coldwater-Rd-L\Correa\6-11-2018 Presentation\PDF Images\Figure 6 - N-S Geologic Cross-Section A-A' - Oct2018.dwg Layout1
 W:\CS - Truist\15308\68545\Coldwater-Rd-L\Correa\6-11-2018 Presentation\PDF Images\004 - Figure 2 PFAS Sampled Well Locations
 W:\CS - Truist\15308\68545\Coldwater-Rd-L\Correa\6-11-2018 Presentation\PDF Images\002.png; I:\Vocor-Truist\15308\68545\Coldwater-Rd-L\Correa\6-11-2018 Presentation\PDF Images\004 - Figure 2 PFAS Sampled Well Locations\004 - Figure 2 PFAS Sampled Well Locations



- SAND PACK
- LINER
- SAND
- SILT
- CLAY
- SILTY SAND
- CLAY OR SILT SEAM
- WELL SCREEN
- WATER LEVEL AT TIME OF SAMPLING

VERTICAL SCALE IN FEET
 40
 HORIZONTAL SCALE IN FEET
 400
 VERTICAL EXAGGERATION = 10

DRAWN BY:	SLJ	DATE:	10/26/2018
CHECKED BY:	CSY	DATE:	10/26/2018
APPROVED BY:	CSY	DATE:	10/26/2018
DRAWING NO:		REFERENCE:	

GEOLOGIC CROSS-SECTION A-A'

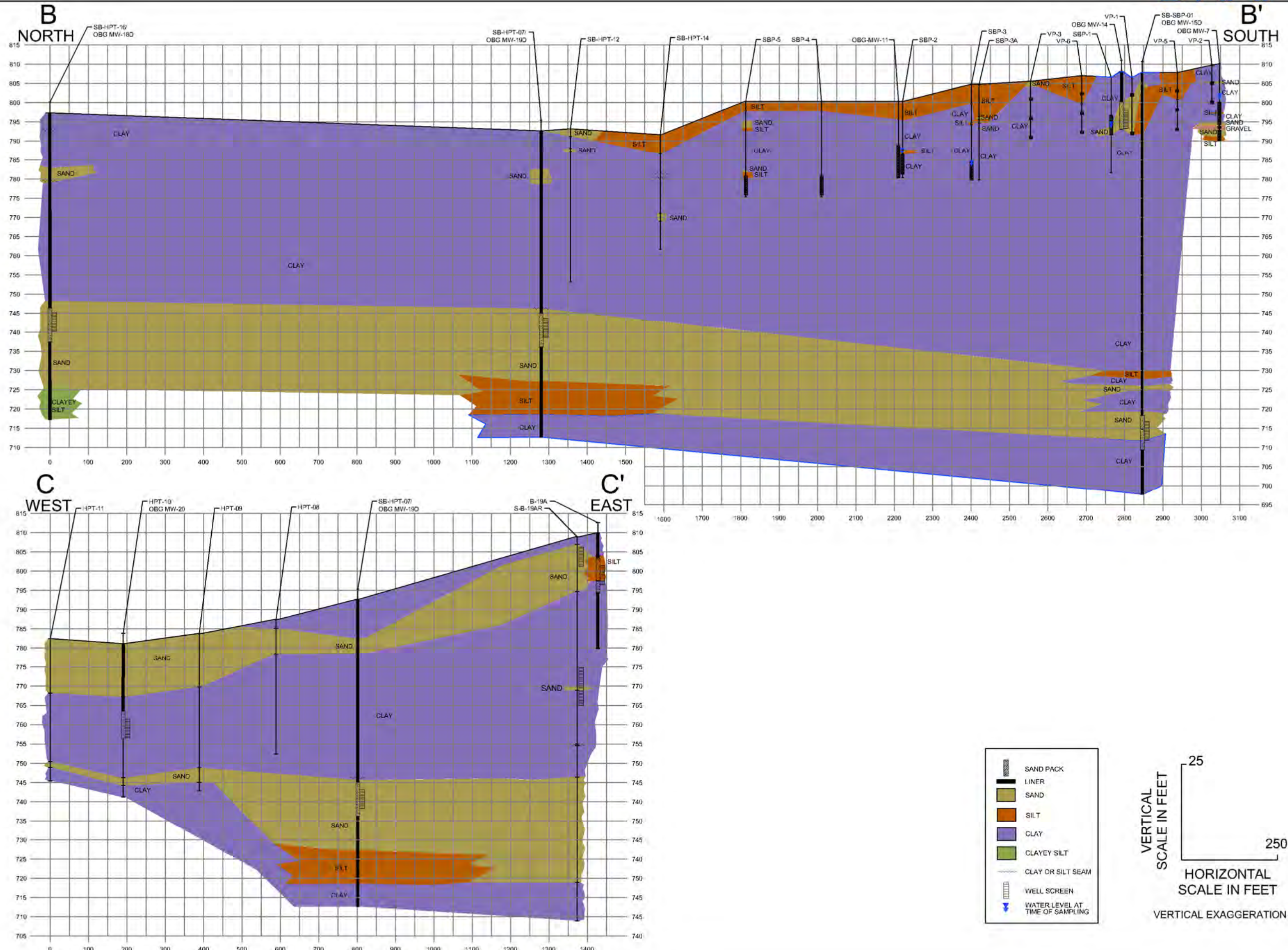
RACER
 COLDWATER ROAD LANDFILL SITE
 FLINT, MICHIGAN



PROJECT NO.
68545

FIGURE NO.
6

Oct. 30, 2018 8:53am PLOTTED BY: YonizCS SAVED BY: YonizCS
 I:\Racer-Flint\15388\68545\Coldwater-Rd-LU\Docs\DWG\Sheets\Figure 7 - Geologic Cross-Section B-B'-C-C'-Oct2018.dwg Layout1
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CHECKED BY:	CSY	DATE:	10/26/2018
APPROVED BY:	CSY	DATE:	10/26/2018
DRAWING NO:			
REFERENCE:			

GEOLOGIC CROSS-SECTION B-B'
GEOLOGIC CROSS-SECTION C-C'

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 FLINT, MICHIGAN

O BRIEN & GERE

PROJECT NO.
68545

FIGURE NO.
7

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I:\Racer-Trust\15388\68545\Coldwater-Rd-LIDocs\Reports\PFAS Reports\Sept-Oct 2018\008 - Figure 8 - Proposed PFAS Sampling Locations.mxd

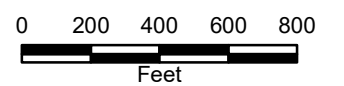


LEGEND

- LEACHATE COLLECTION SUMP
- ACCESS PORT FOR LEAK DETECTION VAULT
- MONITORING WELL
- DEEP BORING LOCATION
- SHALLOW BORING LOCATION
- VAPOR PROBE LOCATION
- TEMPORARY MONITORING WELL LOCATION
- SURFACE/STORM WATER SAMPLE LOCATION
- STORM SEWER MANHOLE
- STORM SEWER LINE
- SANITARY SEWER LINE
- PROPOSED SURFACE/STORM WATER SAMPLING LOCATION
- PROPOSED SHALLOW BORING LOCATION

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**PROPOSED PFAS
SAMPLING LOCATIONS**



OCTOBER 2018
15388/68545/002



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ATTACHMENT 1

***Revised Laboratory Report
for SBP-4 and SBP-5 Results***

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-40782-1
Client Project/Site: PFC Analysis
Revision: 1

For:
O'Brien & Gere Inc of North America
37000 Grand River Ave
Suite 260
Farmington Hills, Michigan 48335

Attn: Mr. Clifford Yantz



Authorized for release by:
10/25/2018 1:20:58 PM

Jill Kellmann, Manager of Project Management
(916)374-4402
jill.kellmann@testamericainc.com

LINKS

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results through
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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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QC Association Summary	17
Lab Chronicle	18
Certification Summary	19
Method Summary	20
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Chain of Custody	22
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Definitions/Glossary

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Qualifiers

LCMS

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
*	Isotope Dilution analyte is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Job ID: 320-40782-1

Laboratory: TestAmerica Sacramento

Narrative

Revision - October 25, 2018

Report revised to correct a sample preparation data entry error discovered during a routine internal review. The error resulted in reporting of a high bias for the PFAS analysis.

Receipt

The samples were received on 6/29/2018 4:54 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.4° C.

Receipt Exceptions

Insufficient sample volume was provided for the following samples for the analysis: SBP-4 (320-40782-1) and DUP-1 (320-40782-4). 1 of 2 containers were filled only with 1/4 amount of volume in container for sample SBP-4 (320-40782-1). 1 of 2 container filled with 3/4 of volume of container for sample DUP-1 (320-40782-4). Reporting limits will be raised due to the reduced volume.

LCMS

Method(s) 537 (modified): Results for samples (320-40757-A-1-A), (320-40757-A-1-B MS) and (320-40757-A-1-C MSD) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits.

Method(s) 537 (modified): The internal standard (ISTD) response for the following sample was outside control limits: (320-40757-A-1-B MS). The sample was re-analyzed at dilution with improved ISTD response; however, several analytes were diluted below the level of quantitation and as a result these analytes could not be evaluated for accuracy or precision in the matrix spike / matrix spike duplicate (MS/MSD). Therefore, the original set of data was reported. The ISTD is not used to quantitate target analytes; therefore, there is no impact to the data.

Method(s) 537 (modified): The Isotope Dilution Analyte (IDA) recoveries are above the method recommended limit for several analytes in the following samples: (320-40757-A-1-A), (320-40757-A-1-B MS) and (320-40757-A-1-C MSD). These samples were re-analyzed at dilution with improved IDA recovery; however, several analytes were diluted below the level of quantitation and as a result these analytes could not be evaluated for accuracy or precision in the matrix spike / matrix spike duplicate (MS/MSD). Therefore, the original set of data was reported. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated IDA recoveries.

Method(s) 537 (modified): Due to the high concentration of several analytes, the matrix spike / matrix spike duplicate (MS/MSD) for preparation batch 320-232888 and analytical batch 320-233780 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria.

Method(s) 537 (modified): The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit for 13C2-PFTeDA: SBP-5 (320-40782-3). Re-analysis was performed with concurring results. Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample.

Method(s) 537 (modified): The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 320-232888 and analytical batch 320-233309 were outside control limits for Perfluoroheptanesulfonic Acid (PFHpS) and 4:2 FTS. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method(s) 537 (modified): Due to the high concentration of Perfluorobutanesulfonic acid (PFBS) and Perfluoropentanesulfonic acid (PFPeS), the matrix spike / matrix spike duplicate (MS/MSD) for preparation batch 320-232888 and analytical batch 320-233309 could not be evaluated for accuracy and precision for these analyte. The associated laboratory control sample (LCS) met acceptance criteria.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

Method(s) 3535: The following sample: SBP-5 (320-40782-3) were observed to be cloudy gray color after the eluting process. Preparation Batch: 320-232888

Method(s) 3535: Due to the matrix of the following sample SBP-5 (320-40782-3), a reduced amount of volume was able to go through the solid phase extraction column due to particulates in the sample, which ended up clogging the column. The reporting limits (RLs) have been adjusted proportionately for the following preparation batch 320-232888.

Case Narrative

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Job ID: 320-40782-1 (Continued)

Laboratory: TestAmerica Sacramento (Continued)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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Detection Summary

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Client Sample ID: SBP-4

Lab Sample ID: 320-40782-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	4.6		2.2	0.38	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	1.9	J	2.2	0.54	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	1.3	J	2.2	0.64	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.58	J	2.2	0.27	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.1	J	2.2	0.93	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.71	J	2.2	0.34	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.7	J	2.2	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.62	J	2.2	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.2	J	2.2	0.59	ng/L	1		537 (modified)	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	1.1	J	2.2	0.33	ng/L	1		537 (modified)	Total/NA

Client Sample ID: Field Blank-1

Lab Sample ID: 320-40782-2

No Detections.

Client Sample ID: SBP-5

Lab Sample ID: 320-40782-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	36		1.8	0.31	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	6.3		1.8	0.44	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	14		1.8	0.52	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.9		1.8	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	13		1.8	0.76	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	0.56	J	1.8	0.28	ng/L	1		537 (modified)	Total/NA
Perfluoroundecanoic acid (PFUnA)	1.4	J	1.8	0.99	ng/L	1		537 (modified)	Total/NA
Perfluorododecanoic acid (PFDoA)	1.1	J	1.8	0.49	ng/L	1		537 (modified)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.85	J	1.8	0.26	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	23		1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	64		1.8	0.15	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanesulfonic Acid (PFHpS)	8.2		1.8	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	220		1.8	0.48	ng/L	1		537 (modified)	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	42		1.8	0.27	ng/L	1		537 (modified)	Total/NA
6:2 FTS	3.5	J	18	1.8	ng/L	1		537 (modified)	Total/NA

Client Sample ID: DUP-1

Lab Sample ID: 320-40782-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanoic acid (PFBA)	41		1.7	0.30	ng/L	1		537 (modified)	Total/NA
Perfluoropentanoic acid (PFPeA)	5.2		1.7	0.42	ng/L	1		537 (modified)	Total/NA
Perfluorohexanoic acid (PFHxA)	17		1.7	0.49	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.4		1.7	0.21	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	18		1.7	0.72	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	29		1.7	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	85		1.7	0.14	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanesulfonic Acid (PFHpS)	11		1.7	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	240		1.7	0.46	ng/L	1		537 (modified)	Total/NA
Perfluoropentanesulfonic acid (PFPeS)	42		1.7	0.26	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Client Sample ID: SBP-4

Date Collected: 06/28/18 10:15

Date Received: 06/29/18 16:54

Lab Sample ID: 320-40782-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	4.6		2.2	0.38	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluoropentanoic acid (PFPeA)	1.9	J	2.2	0.54	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorohexanoic acid (PFHxA)	1.3	J	2.2	0.64	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluoroheptanoic acid (PFHpA)	0.58	J	2.2	0.27	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorooctanoic acid (PFOA)	2.1	J	2.2	0.93	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorononanoic acid (PFNA)	ND		2.2	0.30	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorodecanoic acid (PFDA)	0.71	J	2.2	0.34	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluoroundecanoic acid (PFUnA)	ND		2.2	1.2	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.60	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorotridecanoic acid (PFTriA)	ND		2.2	1.4	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.32	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorobutanesulfonic acid (PFBS)	1.7	J	2.2	0.22	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorohexanesulfonic acid (PFHxS)	0.62	J	2.2	0.19	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.2	0.21	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.2	0.35	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorooctanesulfonic acid (PFOS)	1.2	J	2.2	0.59	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorooctanesulfonamide (FOSA)	ND		2.2	0.38	ng/L		07/07/18 09:25	07/11/18 03:40	1
4:2 FTS	ND		22	5.7	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluoropentanesulfonic acid (PFPeS)	1.1	J	2.2	0.33	ng/L		07/07/18 09:25	07/11/18 03:40	1
6:2 FTS	ND		22	2.2	ng/L		07/07/18 09:25	07/11/18 03:40	1
Perfluorononanesulfonic acid (PFNS)	ND		2.2	0.18	ng/L		07/07/18 09:25	07/11/18 03:40	1
8:2 FTS	ND		22	2.2	ng/L		07/07/18 09:25	07/11/18 03:40	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		22	2.1	ng/L		07/07/18 09:25	07/11/18 03:40	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		22	3.4	ng/L		07/07/18 09:25	07/11/18 03:40	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	63		25 - 150	07/07/18 09:25	07/11/18 03:40	1
13C4 PFBA	48		25 - 150	07/07/18 09:25	07/11/18 03:40	1
13C2 PFHxA	66		25 - 150	07/07/18 09:25	07/11/18 03:40	1
13C4 PFOA	72		25 - 150	07/07/18 09:25	07/11/18 03:40	1
13C5 PFNA	73		25 - 150	07/07/18 09:25	07/11/18 03:40	1
13C2 PFDA	72		25 - 150	07/07/18 09:25	07/11/18 03:40	1
13C2 PFUnA	64		25 - 150	07/07/18 09:25	07/11/18 03:40	1
13C2 PFDoA	60		25 - 150	07/07/18 09:25	07/11/18 03:40	1
13C2 PFTeDA	54		25 - 150	07/07/18 09:25	07/11/18 03:40	1
13C3 PFBS	65		25 - 150	07/07/18 09:25	07/11/18 03:40	1
18O2 PFHxS	73		25 - 150	07/07/18 09:25	07/11/18 03:40	1
13C4 PFOS	67		25 - 150	07/07/18 09:25	07/11/18 03:40	1
13C4 PFHpA	70		25 - 150	07/07/18 09:25	07/11/18 03:40	1
13C5-PFPeA DNU	62		25 - 150	07/07/18 09:25	07/11/18 03:40	1
M2-6:2 FTS	84		25 - 150	07/07/18 09:25	07/11/18 03:40	1
M2-8:2 FTS	81		25 - 150	07/07/18 09:25	07/11/18 03:40	1
d5-NEtFOSAA	62		25 - 150	07/07/18 09:25	07/11/18 03:40	1
d3-NMeFOSAA	66		25 - 150	07/07/18 09:25	07/11/18 03:40	1

TestAmerica Sacramento

Client Sample Results

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Client Sample ID: Field Blank-1

Lab Sample ID: 320-40782-2

Date Collected: 06/28/18 10:25

Matrix: Water

Date Received: 06/29/18 16:54

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		1.7	0.29	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluoropentanoic acid (PFPeA)	ND		1.7	0.41	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorohexanoic acid (PFHxA)	ND		1.7	0.48	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluoroheptanoic acid (PFHpA)	ND		1.7	0.21	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorooctanoic acid (PFOA)	ND		1.7	0.71	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorononanoic acid (PFNA)	ND		1.7	0.23	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.26	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.92	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.46	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.24	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7	0.17	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.7	0.14	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		1.7	0.16	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.7	0.27	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.7	0.45	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorooctanesulfonamide (FOSA)	ND		1.7	0.29	ng/L		07/07/18 09:25	07/11/18 03:48	1
4:2 FTS	ND		17	4.3	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluoropentanesulfonic acid (PFPeS)	ND		1.7	0.25	ng/L		07/07/18 09:25	07/11/18 03:48	1
6:2 FTS	ND		17	1.7	ng/L		07/07/18 09:25	07/11/18 03:48	1
Perfluorononanesulfonic acid (PFNS)	ND		1.7	0.13	ng/L		07/07/18 09:25	07/11/18 03:48	1
8:2 FTS	ND		17	1.7	ng/L		07/07/18 09:25	07/11/18 03:48	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		17	1.6	ng/L		07/07/18 09:25	07/11/18 03:48	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		17	2.6	ng/L		07/07/18 09:25	07/11/18 03:48	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	75		25 - 150	07/07/18 09:25	07/11/18 03:48	1
13C4 PFBA	81		25 - 150	07/07/18 09:25	07/11/18 03:48	1
13C2 PFHxA	84		25 - 150	07/07/18 09:25	07/11/18 03:48	1
13C4 PFOA	88		25 - 150	07/07/18 09:25	07/11/18 03:48	1
13C5 PFNA	96		25 - 150	07/07/18 09:25	07/11/18 03:48	1
13C2 PFDA	89		25 - 150	07/07/18 09:25	07/11/18 03:48	1
13C2 PFUnA	89		25 - 150	07/07/18 09:25	07/11/18 03:48	1
13C2 PFDoA	84		25 - 150	07/07/18 09:25	07/11/18 03:48	1
13C2 PFTeDA	78		25 - 150	07/07/18 09:25	07/11/18 03:48	1
13C3 PFBS	76		25 - 150	07/07/18 09:25	07/11/18 03:48	1
18O2 PFHxS	93		25 - 150	07/07/18 09:25	07/11/18 03:48	1
13C4 PFOS	86		25 - 150	07/07/18 09:25	07/11/18 03:48	1
13C4 PFHpA	90		25 - 150	07/07/18 09:25	07/11/18 03:48	1
13C5-PFPeA DNU	77		25 - 150	07/07/18 09:25	07/11/18 03:48	1
M2-6:2 FTS	92		25 - 150	07/07/18 09:25	07/11/18 03:48	1
M2-8:2 FTS	91		25 - 150	07/07/18 09:25	07/11/18 03:48	1
d5-NEtFOSAA	83		25 - 150	07/07/18 09:25	07/11/18 03:48	1
d3-NMeFOSAA	83		25 - 150	07/07/18 09:25	07/11/18 03:48	1

TestAmerica Sacramento

Client Sample Results

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Client Sample ID: SBP-5

Date Collected: 06/28/18 11:00

Date Received: 06/29/18 16:54

Lab Sample ID: 320-40782-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	36		1.8	0.31	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluoropentanoic acid (PFPeA)	6.3		1.8	0.44	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorohexanoic acid (PFHxA)	14		1.8	0.52	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluoroheptanoic acid (PFHpA)	3.9		1.8	0.22	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorooctanoic acid (PFOA)	13		1.8	0.76	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.24	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorodecanoic acid (PFDA)	0.56	J	1.8	0.28	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluoroundecanoic acid (PFUnA)	1.4	J	1.8	0.99	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorododecanoic acid (PFDoA)	1.1	J	1.8	0.49	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorotetradecanoic acid (PFTeA)	0.85	J	1.8	0.26	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorobutanesulfonic acid (PFBS)	23		1.8	0.18	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorohexanesulfonic acid (PFHxS)	64		1.8	0.15	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluoroheptanesulfonic Acid (PFHpS)	8.2		1.8	0.17	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.8	0.29	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorooctanesulfonic acid (PFOS)	220		1.8	0.48	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorooctanesulfonamide (FOSA)	ND		1.8	0.31	ng/L		07/07/18 09:25	07/11/18 03:55	1
4:2 FTS	ND		18	4.7	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluoropentanesulfonic acid (PFPeS)	42		1.8	0.27	ng/L		07/07/18 09:25	07/11/18 03:55	1
6:2 FTS	3.5	J	18	1.8	ng/L		07/07/18 09:25	07/11/18 03:55	1
Perfluorononanesulfonic acid (PFNS)	ND		1.8	0.14	ng/L		07/07/18 09:25	07/11/18 03:55	1
8:2 FTS	ND		18	1.8	ng/L		07/07/18 09:25	07/11/18 03:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		18	1.7	ng/L		07/07/18 09:25	07/11/18 03:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		18	2.8	ng/L		07/07/18 09:25	07/11/18 03:55	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	51		25 - 150	07/07/18 09:25	07/11/18 03:55	1
13C4 PFBA	27		25 - 150	07/07/18 09:25	07/11/18 03:55	1
13C2 PFHxA	48		25 - 150	07/07/18 09:25	07/11/18 03:55	1
13C4 PFOA	55		25 - 150	07/07/18 09:25	07/11/18 03:55	1
13C5 PFNA	63		25 - 150	07/07/18 09:25	07/11/18 03:55	1
13C2 PFDA	62		25 - 150	07/07/18 09:25	07/11/18 03:55	1
13C2 PFUnA	52		25 - 150	07/07/18 09:25	07/11/18 03:55	1
13C2 PFDoA	42		25 - 150	07/07/18 09:25	07/11/18 03:55	1
13C2 PFTeDA	20	*	25 - 150	07/07/18 09:25	07/11/18 03:55	1
13C3 PFBS	47		25 - 150	07/07/18 09:25	07/11/18 03:55	1
18O2 PFHxS	59		25 - 150	07/07/18 09:25	07/11/18 03:55	1
13C4 PFOS	58		25 - 150	07/07/18 09:25	07/11/18 03:55	1
13C4 PFHpA	57		25 - 150	07/07/18 09:25	07/11/18 03:55	1
13C5-PFPeA DNU	38		25 - 150	07/07/18 09:25	07/11/18 03:55	1
M2-6:2 FTS	60		25 - 150	07/07/18 09:25	07/11/18 03:55	1
M2-8:2 FTS	65		25 - 150	07/07/18 09:25	07/11/18 03:55	1
d5-NEtFOSAA	50		25 - 150	07/07/18 09:25	07/11/18 03:55	1

TestAmerica Sacramento

Client Sample Results

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Client Sample ID: SBP-5

Date Collected: 06/28/18 11:00

Date Received: 06/29/18 16:54

Lab Sample ID: 320-40782-3

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
d3-NMeFOSAA	55		25 - 150	07/07/18 09:25	07/11/18 03:55	1

Client Sample ID: DUP-1

Date Collected: 06/28/18 00:00

Date Received: 06/29/18 16:54

Lab Sample ID: 320-40782-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

<i>Analyte</i>	<i>Result</i>	<i>Qualifier</i>	<i>RL</i>	<i>MDL</i>	<i>Unit</i>	<i>D</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Perfluorobutanoic acid (PFBA)	41		1.7	0.30	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluoropentanoic acid (PFPeA)	5.2		1.7	0.42	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorohexanoic acid (PFHxA)	17		1.7	0.49	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluoroheptanoic acid (PFHpA)	5.4		1.7	0.21	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorooctanoic acid (PFOA)	18		1.7	0.72	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorononanoic acid (PFNA)	ND		1.7	0.23	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.26	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.94	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.47	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.25	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorobutanesulfonic acid (PFBS)	29		1.7	0.17	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorohexanesulfonic acid (PFHxS)	85		1.7	0.14	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluoroheptanesulfonic acid (PFHpS)	11		1.7	0.16	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorodecanesulfonic acid (PFDS)	ND		1.7	0.27	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorooctanesulfonic acid (PFOS)	240		1.7	0.46	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorooctanesulfonamide (FOSA)	ND		1.7	0.30	ng/L		07/07/18 09:25	07/11/18 04:11	1
4:2 FTS	ND		17	4.4	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluoropentanesulfonic acid (PFPeS)	42		1.7	0.26	ng/L		07/07/18 09:25	07/11/18 04:11	1
6:2 FTS	ND		17	1.7	ng/L		07/07/18 09:25	07/11/18 04:11	1
Perfluorononanesulfonic acid (PFNS)	ND		1.7	0.14	ng/L		07/07/18 09:25	07/11/18 04:11	1
8:2 FTS	ND		17	1.7	ng/L		07/07/18 09:25	07/11/18 04:11	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		17	1.6	ng/L		07/07/18 09:25	07/11/18 04:11	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		17	2.6	ng/L		07/07/18 09:25	07/11/18 04:11	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C8 FOSA	61		25 - 150				07/07/18 09:25	07/11/18 04:11	1
13C4 PFBA	29		25 - 150				07/07/18 09:25	07/11/18 04:11	1
13C2 PFHxA	51		25 - 150				07/07/18 09:25	07/11/18 04:11	1
13C4 PFOA	63		25 - 150				07/07/18 09:25	07/11/18 04:11	1
13C5 PFNA	77		25 - 150				07/07/18 09:25	07/11/18 04:11	1
13C2 PFDA	73		25 - 150				07/07/18 09:25	07/11/18 04:11	1
13C2 PFUnA	64		25 - 150				07/07/18 09:25	07/11/18 04:11	1
13C2 PFDoA	58		25 - 150				07/07/18 09:25	07/11/18 04:11	1
13C2 PFTeDA	39		25 - 150				07/07/18 09:25	07/11/18 04:11	1
13C3 PFBS	53		25 - 150				07/07/18 09:25	07/11/18 04:11	1
18O2 PFHxS	68		25 - 150				07/07/18 09:25	07/11/18 04:11	1

TestAmerica Sacramento

Client Sample Results

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Client Sample ID: DUP-1

Date Collected: 06/28/18 00:00

Date Received: 06/29/18 16:54

Lab Sample ID: 320-40782-4

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C4 PFOS	71		25 - 150	07/07/18 09:25	07/11/18 04:11	1
13C4 PFHpA	60		25 - 150	07/07/18 09:25	07/11/18 04:11	1
13C5-PFPeA DNU	42		25 - 150	07/07/18 09:25	07/11/18 04:11	1
M2-6:2 FTS	72		25 - 150	07/07/18 09:25	07/11/18 04:11	1
M2-8:2 FTS	91		25 - 150	07/07/18 09:25	07/11/18 04:11	1
d5-NEtFOSAA	60		25 - 150	07/07/18 09:25	07/11/18 04:11	1
d3-NMeFOSAA	64		25 - 150	07/07/18 09:25	07/11/18 04:11	1

Isotope Dilution Summary

Client: O'Brien & Gere Inc of North America
 Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFOSA (25-150)	PFBA (25-150)	PFHxA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)	PFDaA (25-150)
320-40782-1	SBP-4	63	48	66	72	73	72	64	60
320-40782-2	Field Blank-1	75	81	84	88	96	89	89	84
320-40782-3	SBP-5	51	27	48	55	63	62	52	42
320-40782-4	DUP-1	61	29	51	63	77	73	64	58
LCS 320-232888/2-A	Lab Control Sample	80	87	87	90	91	93	91	88
LCSD 320-232888/3-A	Lab Control Sample Dup	77	83	84	89	89	90	92	85
MB 320-232888/1-A	Method Blank	75	81	79	87	87	88	85	87

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFTDA (25-150)	3C3-PFBs (25-150)	PFHxS (25-150)	PFOS (25-150)	PFHpA (25-150)	PFPeA (25-150)	M262FTS (25-150)	M282FTS (25-150)
320-40782-1	SBP-4	54	65	73	67	70	62	84	81
320-40782-2	Field Blank-1	78	76	93	86	90	77	92	91
320-40782-3	SBP-5	20 *	47	59	58	57	38	60	65
320-40782-4	DUP-1	39	53	68	71	60	42	72	91
LCS 320-232888/2-A	Lab Control Sample	83	81	92	86	93	81	92	99
LCSD 320-232888/3-A	Lab Control Sample Dup	80	78	87	86	86	82	91	88
MB 320-232888/1-A	Method Blank	80	77	93	85	84	78	90	89

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	-NETFOS/ (25-150)	-NMeFOS/ (25-150)
320-40782-1	SBP-4	62	66
320-40782-2	Field Blank-1	83	83
320-40782-3	SBP-5	50	55
320-40782-4	DUP-1	60	64
LCS 320-232888/2-A	Lab Control Sample	93	84
LCSD 320-232888/3-A	Lab Control Sample Dup	85	86
MB 320-232888/1-A	Method Blank	85	80

Surrogate Legend

- PFOSA = 13C8 FOSA
- PFBA = 13C4 PFBA
- PFHxA = 13C2 PFHxA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDaA = 13C2 PFDaA
- PFTDA = 13C2 PFTeDA
- 13C3-PFBs = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- PFHpA = 13C4 PFHpA
- PFPeA = 13C5-PFPeA DNU
- M262FTS = M2-6:2 FTS
- M282FTS = M2-8:2 FTS
- d5-NETFOSAA = d5-NETFOSAA
- d3-NMeFOSAA = d3-NMeFOSAA

TestAmerica Sacramento

QC Sample Results

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-232888/1-A

Matrix: Water

Analysis Batch: 233309

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 232888

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanoic acid (PFBA)	ND		2.0	0.35	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluoropentanoic acid (PFPeA)	ND		2.0	0.49	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.17	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		2.0	0.19	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorodecanesulfonic acid (PFDS)	ND		2.0	0.32	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorooctanesulfonamide (FOSA)	ND		2.0	0.35	ng/L		07/07/18 09:25	07/11/18 01:51	1
4:2 FTS	ND		20	5.2	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluoropentanesulfonic acid (PFPeS)	ND		2.0	0.30	ng/L		07/07/18 09:25	07/11/18 01:51	1
6:2 FTS	ND		20	2.0	ng/L		07/07/18 09:25	07/11/18 01:51	1
Perfluorononanesulfonic acid (PFNS)	ND		2.0	0.16	ng/L		07/07/18 09:25	07/11/18 01:51	1
8:2 FTS	ND		20	2.0	ng/L		07/07/18 09:25	07/11/18 01:51	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		07/07/18 09:25	07/11/18 01:51	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		07/07/18 09:25	07/11/18 01:51	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C8 FOSA	75		25 - 150	07/07/18 09:25	07/11/18 01:51	1
13C4 PFBA	81		25 - 150	07/07/18 09:25	07/11/18 01:51	1
13C2 PFHxA	79		25 - 150	07/07/18 09:25	07/11/18 01:51	1
13C4 PFOA	87		25 - 150	07/07/18 09:25	07/11/18 01:51	1
13C5 PFNA	87		25 - 150	07/07/18 09:25	07/11/18 01:51	1
13C2 PFDA	88		25 - 150	07/07/18 09:25	07/11/18 01:51	1
13C2 PFUnA	85		25 - 150	07/07/18 09:25	07/11/18 01:51	1
13C2 PFDoA	87		25 - 150	07/07/18 09:25	07/11/18 01:51	1
13C2 PFTeDA	80		25 - 150	07/07/18 09:25	07/11/18 01:51	1
13C3 PFBS	77		25 - 150	07/07/18 09:25	07/11/18 01:51	1
18O2 PFHxS	93		25 - 150	07/07/18 09:25	07/11/18 01:51	1
13C4 PFOS	85		25 - 150	07/07/18 09:25	07/11/18 01:51	1
13C4 PFHpA	84		25 - 150	07/07/18 09:25	07/11/18 01:51	1
13C5-PFPeA DNU	78		25 - 150	07/07/18 09:25	07/11/18 01:51	1
M2-6:2 FTS	90		25 - 150	07/07/18 09:25	07/11/18 01:51	1
M2-8:2 FTS	89		25 - 150	07/07/18 09:25	07/11/18 01:51	1
d5-NEtFOSAA	85		25 - 150	07/07/18 09:25	07/11/18 01:51	1
d3-NMeFOSAA	80		25 - 150	07/07/18 09:25	07/11/18 01:51	1

TestAmerica Sacramento

QC Sample Results

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-232888/2-A

Matrix: Water

Analysis Batch: 233309

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 232888

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanoic acid (PFBA)	40.0	37.3		ng/L		93	70 - 130
Perfluoropentanoic acid (PFPeA)	40.0	38.4		ng/L		96	66 - 126
Perfluorohexanoic acid (PFHxA)	40.0	38.9		ng/L		97	66 - 126
Perfluoroheptanoic acid (PFHpA)	40.0	37.4		ng/L		93	66 - 126
Perfluorooctanoic acid (PFOA)	40.0	39.1		ng/L		98	64 - 124
Perfluorononanoic acid (PFNA)	40.0	40.3		ng/L		101	68 - 128
Perfluorodecanoic acid (PFDA)	40.0	37.6		ng/L		94	69 - 129
Perfluoroundecanoic acid (PFUnA)	40.0	36.5		ng/L		91	60 - 120
Perfluorododecanoic acid (PFDoA)	40.0	38.4		ng/L		96	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	33.0		ng/L		82	72 - 132
Perfluorotetradecanoic acid (PFTeA)	40.0	37.6		ng/L		94	68 - 128
Perfluorobutanesulfonic acid (PFBS)	35.4	35.6		ng/L		101	73 - 133
Perfluorohexanesulfonic acid (PFHxS)	36.4	33.8		ng/L		93	63 - 123
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	41.0		ng/L		108	68 - 128
Perfluorodecanesulfonic acid (PFDS)	38.6	35.6		ng/L		92	68 - 128
Perfluorooctanesulfonic acid (PFOS)	37.1	37.9		ng/L		102	67 - 127
Perfluorooctanesulfonamide (FOSA)	40.0	40.0		ng/L		100	70 - 130
4:2 FTS	37.4	40.1		ng/L		107	70 - 130
Perfluoropentanesulfonic acid (PFPeS)	37.5	40.2		ng/L		107	70 - 130
6:2 FTS	37.9	37.7		ng/L		100	66 - 126
Perfluorononanesulfonic acid (PFNS)	38.4	38.4		ng/L		100	70 - 130
8:2 FTS	38.3	34.9		ng/L		91	67 - 127
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	36.7		ng/L		92	65 - 125
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	39.0		ng/L		97	67 - 127

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
¹³ C8 FOSA	80		25 - 150
¹³ C4 PFBA	87		25 - 150
¹³ C2 PFHxA	87		25 - 150
¹³ C4 PFOA	90		25 - 150
¹³ C5 PFNA	91		25 - 150
¹³ C2 PFDA	93		25 - 150
¹³ C2 PFUnA	91		25 - 150
¹³ C2 PFDoA	88		25 - 150
¹³ C2 PFTeDA	83		25 - 150
¹³ C3 PFBS	81		25 - 150
¹⁸ O2 PFHxS	92		25 - 150

TestAmerica Sacramento

QC Sample Results

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-232888/2-A
Matrix: Water
Analysis Batch: 233309

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 232888

<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>
13C4 PFOS	86		25 - 150
13C4 PFHpA	93		25 - 150
13C5-PFPeA DNU	81		25 - 150
M2-6:2 FTS	92		25 - 150
M2-8:2 FTS	99		25 - 150
d5-NEtFOSAA	93		25 - 150
d3-NMeFOSAA	84		25 - 150

Lab Sample ID: LCSD 320-232888/3-A
Matrix: Water
Analysis Batch: 233309

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 232888

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorobutanoic acid (PFBA)	40.0	36.7		ng/L		92	70 - 130	2	30
Perfluoropentanoic acid (PFPeA)	40.0	36.2		ng/L		90	66 - 126	6	30
Perfluorohexanoic acid (PFHxA)	40.0	38.0		ng/L		95	66 - 126	2	30
Perfluoroheptanoic acid (PFHpA)	40.0	38.8		ng/L		97	66 - 126	4	30
Perfluorooctanoic acid (PFOA)	40.0	39.9		ng/L		100	64 - 124	2	30
Perfluorononanoic acid (PFNA)	40.0	39.1		ng/L		98	68 - 128	3	30
Perfluorodecanoic acid (PFDA)	40.0	38.9		ng/L		97	69 - 129	3	30
Perfluoroundecanoic acid (PFUnA)	40.0	35.3		ng/L		88	60 - 120	3	30
Perfluorododecanoic acid (PFDoA)	40.0	38.1		ng/L		95	71 - 131	1	30
Perfluorotridecanoic acid (PFTriA)	40.0	33.1		ng/L		83	72 - 132	0	30
Perfluorotetradecanoic acid (PFTeA)	40.0	38.1		ng/L		95	68 - 128	1	30
Perfluorobutanesulfonic acid (PFBS)	35.4	34.3		ng/L		97	73 - 133	4	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	32.8		ng/L		90	63 - 123	3	30
Perfluoroheptanesulfonic Acid (PFHpS)	38.1	38.1		ng/L		100	68 - 128	7	30
Perfluorodecanesulfonic acid (PFDS)	38.6	34.3		ng/L		89	68 - 128	4	30
Perfluorooctanesulfonic acid (PFOS)	37.1	35.0		ng/L		94	67 - 127	8	30
Perfluorooctanesulfonamide (FOSA)	40.0	38.0		ng/L		95	70 - 130	5	30
4:2 FTS	37.4	39.4		ng/L		105	70 - 130	2	30
Perfluoropentanesulfonic acid (PFPeS)	37.5	40.3		ng/L		108	70 - 130	0	30
6:2 FTS	37.9	36.9		ng/L		97	66 - 126	2	30
Perfluorononanesulfonic acid (PFNS)	38.4	34.7		ng/L		90	70 - 130	10	30
8:2 FTS	38.3	33.9		ng/L		88	67 - 127	3	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	36.8		ng/L		92	65 - 125	0	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	34.7		ng/L		87	67 - 127	11	30

TestAmerica Sacramento

QC Sample Results

Client: O'Brien & Gere Inc of North America
 Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

<i>Isotope Dilution</i>	<i>LCS</i>	<i>LSD</i>	<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
13C8 FOSA	77		25 - 150
13C4 PFBA	83		25 - 150
13C2 PFHxA	84		25 - 150
13C4 PFOA	89		25 - 150
13C5 PFNA	89		25 - 150
13C2 PFDA	90		25 - 150
13C2 PFUnA	92		25 - 150
13C2 PFDoA	85		25 - 150
13C2 PFTeDA	80		25 - 150
13C3 PFBS	78		25 - 150
18O2 PFHxS	87		25 - 150
13C4 PFOS	86		25 - 150
13C4 PFHpA	86		25 - 150
13C5-PFPeA DNU	82		25 - 150
M2-6:2 FTS	91		25 - 150
M2-8:2 FTS	88		25 - 150
d5-NEtFOSAA	85		25 - 150
d3-NMeFOSAA	86		25 - 150

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QC Association Summary

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

LCMS

Prep Batch: 232888

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40782-1	SBP-4	Total/NA	Water	3535	
320-40782-2	Field Blank-1	Total/NA	Water	3535	
320-40782-3	SBP-5	Total/NA	Water	3535	
320-40782-4	DUP-1	Total/NA	Water	3535	
MB 320-232888/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-232888/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-232888/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 233309

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40782-1	SBP-4	Total/NA	Water	537 (modified)	232888
320-40782-2	Field Blank-1	Total/NA	Water	537 (modified)	232888
320-40782-3	SBP-5	Total/NA	Water	537 (modified)	232888
320-40782-4	DUP-1	Total/NA	Water	537 (modified)	232888
MB 320-232888/1-A	Method Blank	Total/NA	Water	537 (modified)	232888
LCS 320-232888/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	232888
LCSD 320-232888/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	232888

Lab Chronicle

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Client Sample ID: SBP-4

Date Collected: 06/28/18 10:15

Date Received: 06/29/18 16:54

Lab Sample ID: 320-40782-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			228.2 mL	10.00 mL	232888	07/07/18 09:25	TWL	TAL SAC
Total/NA	Analysis	537 (modified)		1			233309	07/11/18 03:40	S1M	TAL SAC

Client Sample ID: Field Blank-1

Date Collected: 06/28/18 10:25

Date Received: 06/29/18 16:54

Lab Sample ID: 320-40782-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			299.6 mL	10.00 mL	232888	07/07/18 09:25	TWL	TAL SAC
Total/NA	Analysis	537 (modified)		1			233309	07/11/18 03:48	S1M	TAL SAC

Client Sample ID: SBP-5

Date Collected: 06/28/18 11:00

Date Received: 06/29/18 16:54

Lab Sample ID: 320-40782-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			278.5 mL	10.00 mL	232888	07/07/18 09:25	TWL	TAL SAC
Total/NA	Analysis	537 (modified)		1			233309	07/11/18 03:55	S1M	TAL SAC

Client Sample ID: DUP-1

Date Collected: 06/28/18 00:00

Date Received: 06/29/18 16:54

Lab Sample ID: 320-40782-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			293.6 mL	10.00 mL	232888	07/07/18 09:25	TWL	TAL SAC
Total/NA	Analysis	537 (modified)		1			233309	07/11/18 04:11	S1M	TAL SAC

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Laboratory: TestAmerica Sacramento

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Oregon	NELAP	10	4040	01-29-19

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
537 (modified)	3535	Water	4:2 FTS
537 (modified)	3535	Water	Perfluorononanesulfonic acid (PFNS)
537 (modified)	3535	Water	Perfluoropentanesulfonic acid (PFPeS)



Method Summary

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
3535	Solid-Phase Extraction (SPE)	SW846	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

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Sample Summary

Client: O'Brien & Gere Inc of North America
Project/Site: PFC Analysis

TestAmerica Job ID: 320-40782-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-40782-1	SBP-4	Water	06/28/18 10:15	06/29/18 16:54
320-40782-2	Field Blank-1	Water	06/28/18 10:25	06/29/18 16:54
320-40782-3	SBP-5	Water	06/28/18 11:00	06/29/18 16:54
320-40782-4	DUP-1	Water	06/28/18 00:00	06/29/18 16:54

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Chain of Custody Record

Client Information Company: O'Brien & Gere Inc of North America Address: 37000 Grand River Ave Suite 260 City: Farmington Hills State, Zip: MI, 48335 Phone: 248-477-5701(Tel) Email: clifford.yantz@obg.com Project Name: PFC Analysis Site: <u>4400 Coldwater Rd LF</u>		Lab P.M.: Kellmann, Jill E-Mail: jill.kellmann@testamericainc.com Camer Tracking No(s): 781636070945 COC No: 320-22082-4996.1 Page 1 of 1 Job #	
Due Date Requested: TAT Requested (days): <u>Standard TAT</u> PO #: 11700138 WO #: Project #: 32008780 SSOW#		Analysis Requested  320-40782 Chain of Custody	
Sample Identification SBP-4 Field Blank-1 SBP-5 DUP-1 4/15		Matrix (W=water, S=solid, O=waste/oil, BT=tissue, A=air) Water Water Water Water Water Water Water Water Water	
Sample Date 6/28/18 1025 1100 -		Sample Type (C=Comp, G=grab) G ↓ ↓ ↓	
Sample Time 1015 1025 1100 -		Preservation Code: Water Water Water Water Water Water Water Water Water	
Field Filtered Sample (Yes or No) N ↓ ↓ ↓		Perform MS/MSD (Yes or No) N ↓ ↓ ↓	
Total Number of Containers PEAS		Special Instructions/Note: PEAS	
Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 Z - other (specify)			
Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III(IV) Other (specify)			
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input checked="" type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months			
Special Instructions/QC Requirements:			
Empty Kit Relinquished by:		Method of Shipment:	
Relinquished by: <u>W. Silla</u> <u>066</u> Date/Time: <u>6/28/18</u> <u>1800</u>		Received by: <u>FEDEX</u> <u>OVERNIGHT</u> Date/Time: <u>6/28/18</u> <u>1800</u>	
Relinquished by:		Received by: <u>W. Silla</u> Date/Time:	
Relinquished by:		Received by: <u>107 Sen</u> Date/Time:	
Custody Seals Intact: Δ Yes Δ No		Cooler Temperature(s) °C and Other Remarks: 1.4C	

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1/2 bottle filled 1/4 of the way.
2x 1/2 bottle filled 3/4 of the way.

Login Sample Receipt Checklist

Client: O'Brien & Gere Inc of North America

Job Number: 320-40782-1

Login Number: 40782

List Source: TestAmerica Sacramento

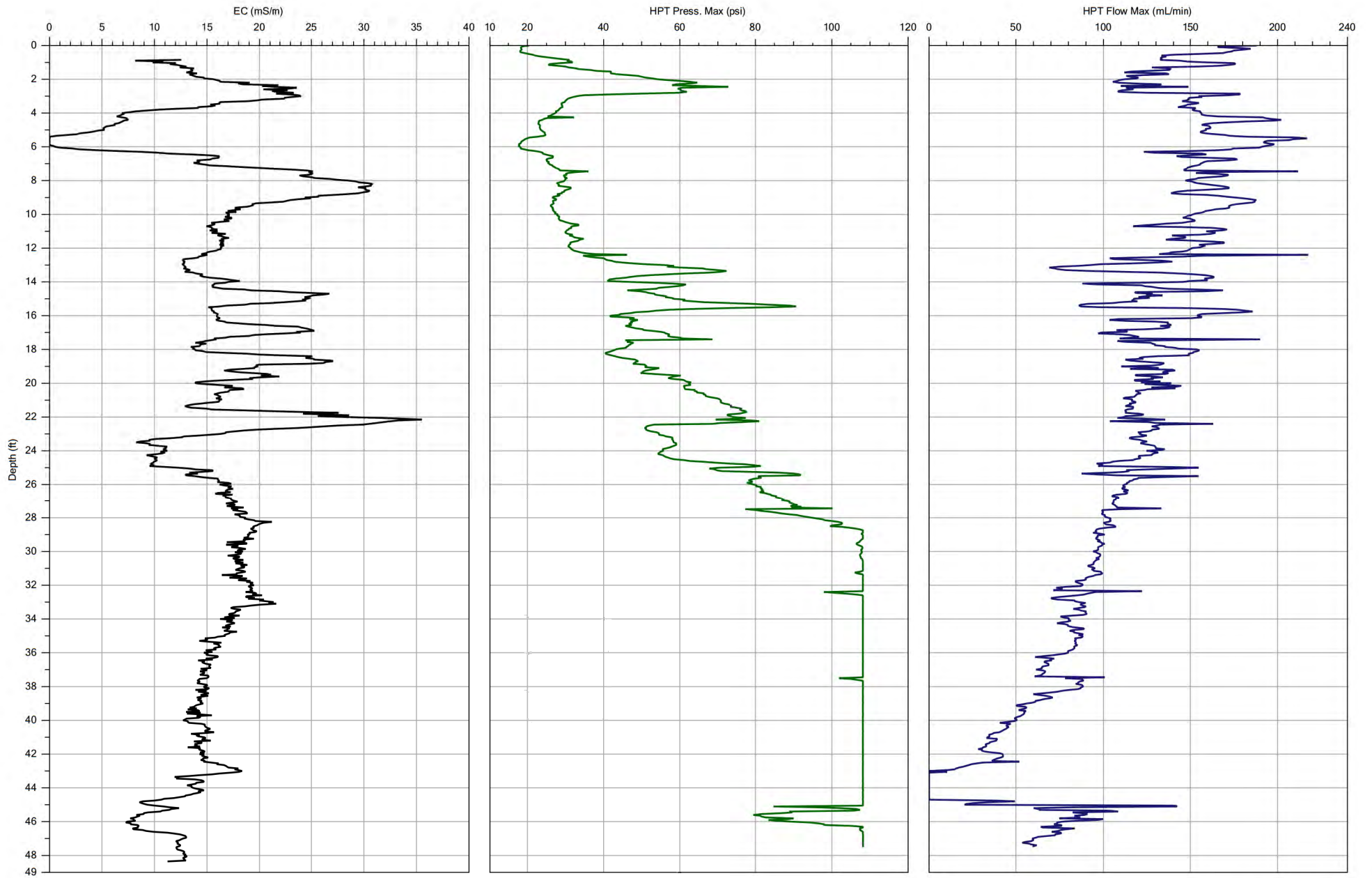
List Number: 1

Creator: Her, David A

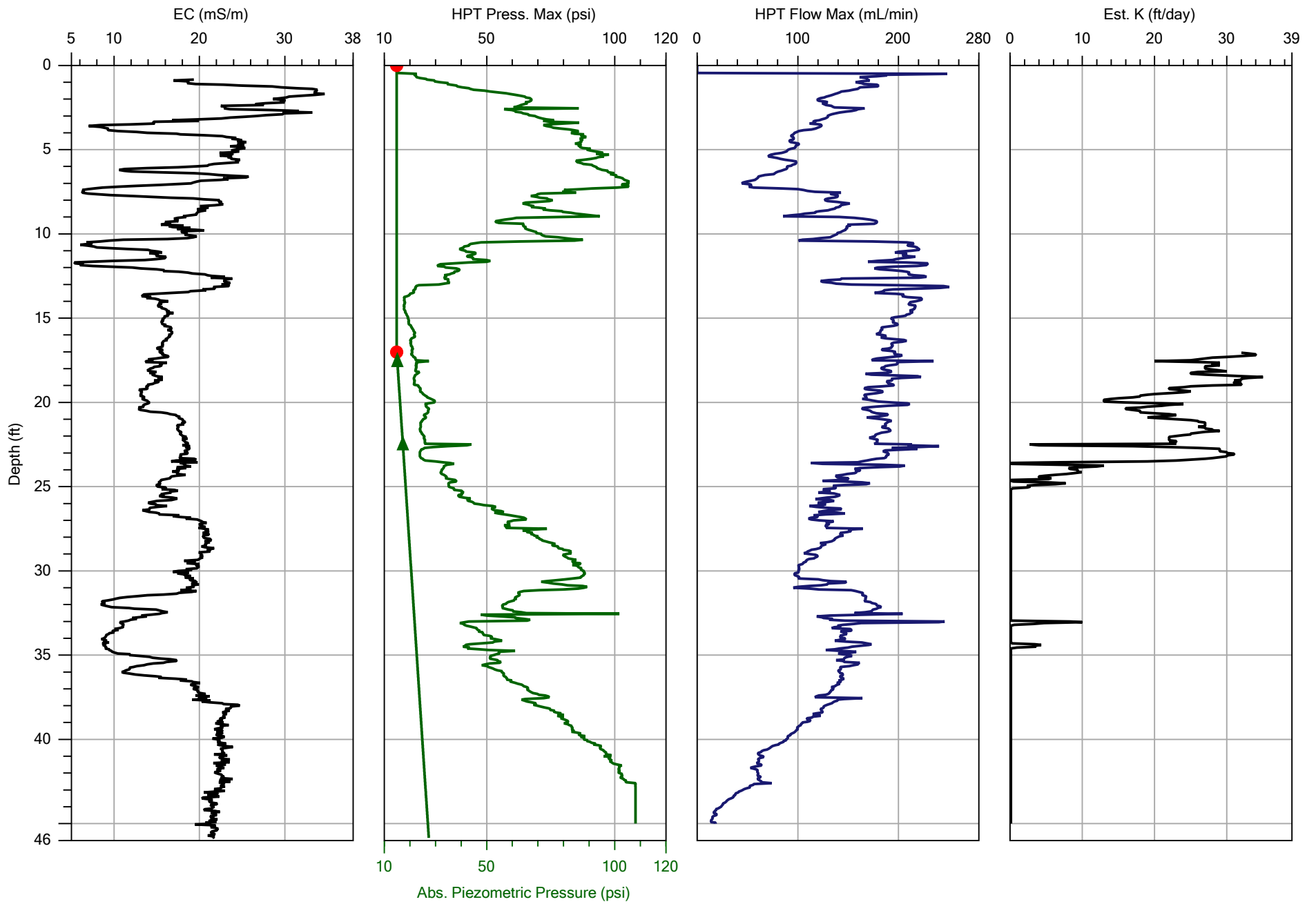
Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	False	Refer to Job Narrative for details.
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

ATTACHMENT 2

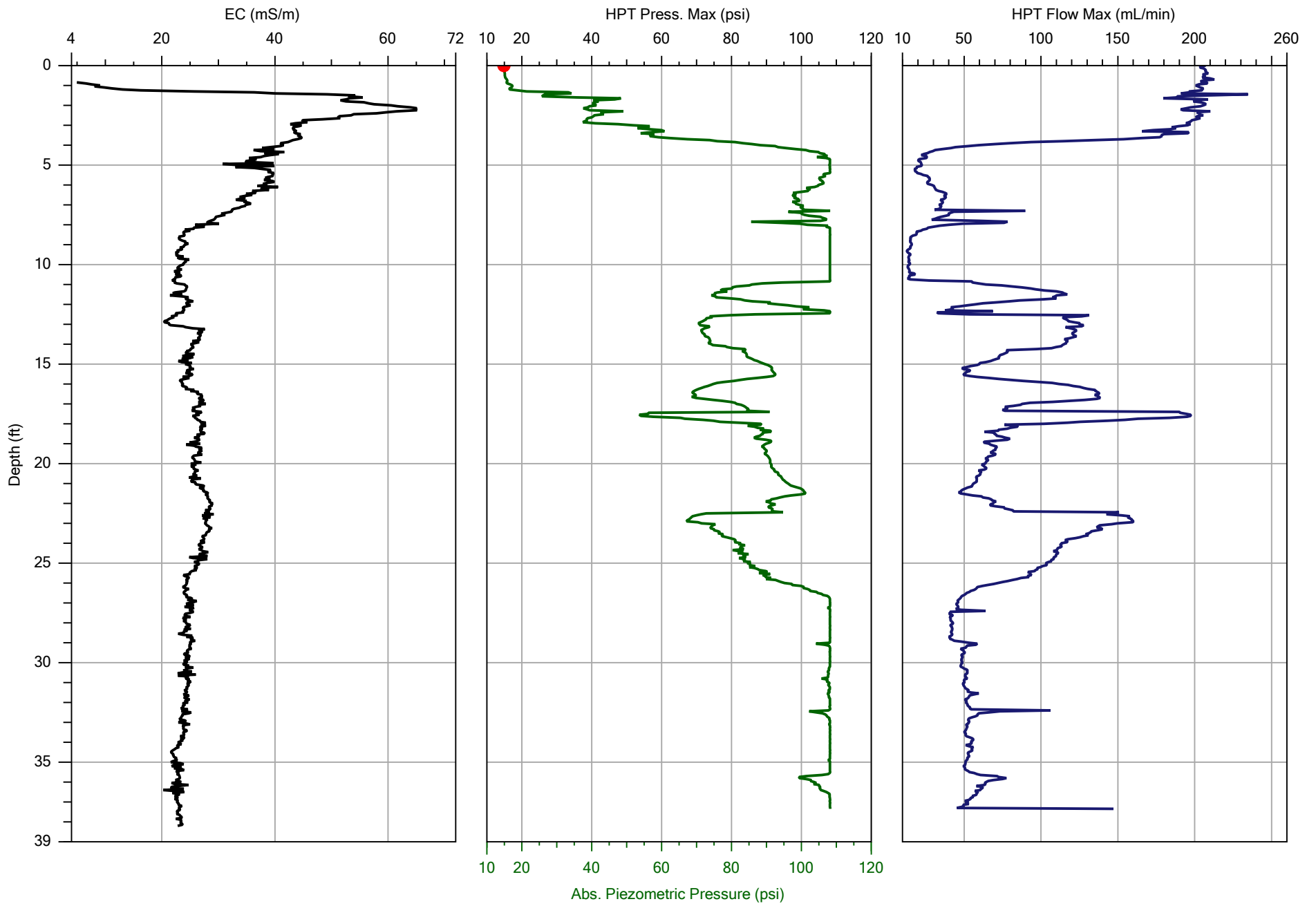
HPT Logs



Company: Stock Drilling Inc.		Operator: Ben L.	File: HPT-01.HPT
Project ID: Coldwater Rd Landfill		Client: O'Brien & Gere	Date: 9/4/2018
			Location: 43° 6' 17" N, 83° 41' 7" W



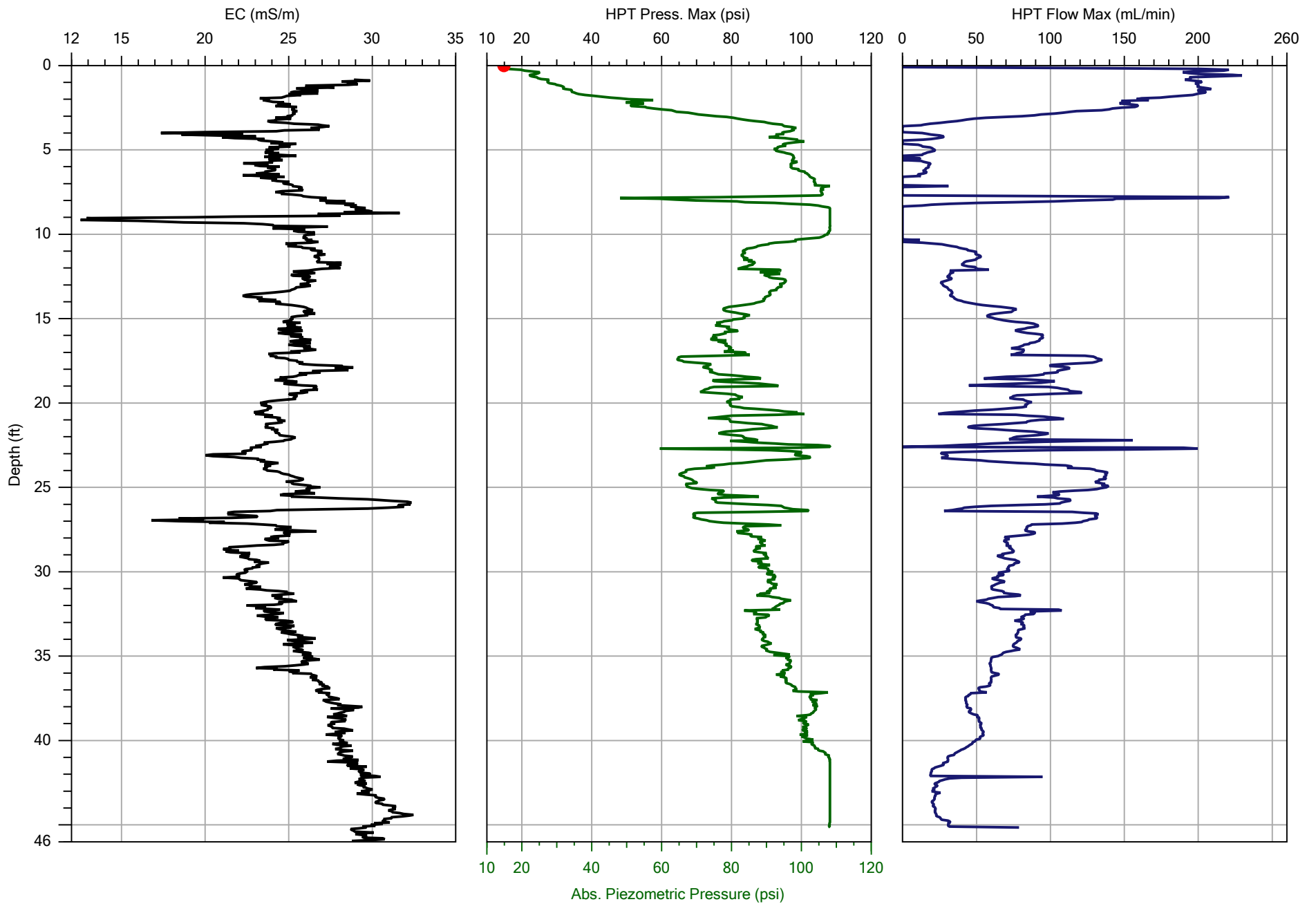
Company: Stock Drilling Inc.		Operator: Ben L.	File: HPT-02.HPT
Project ID: Coldwater Rd Landfill		Client: O'Brien & Gere	Date: 9/4/2018
			Location: 43° 6' 11" N, 83° 41' 3" W



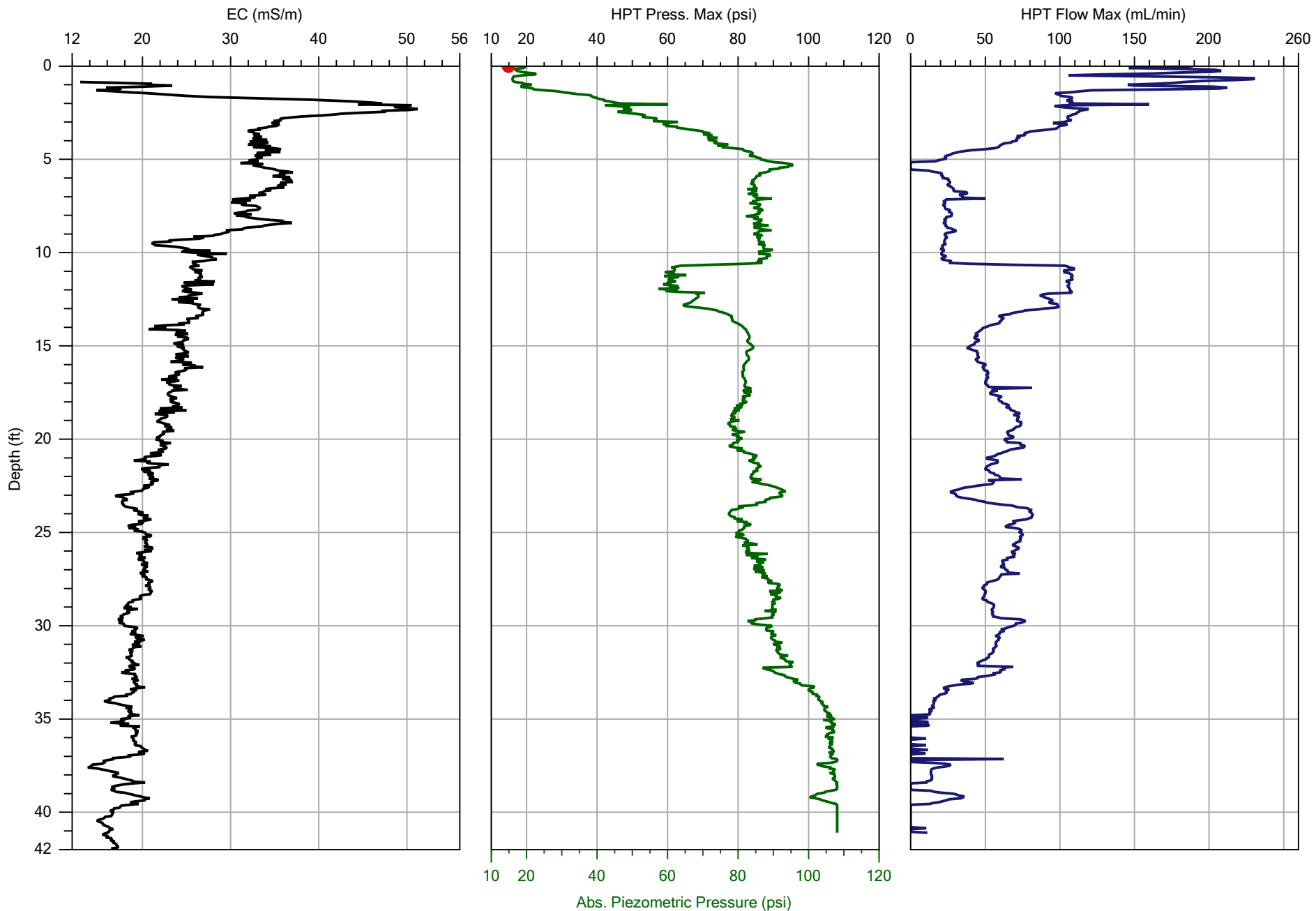
Abs. Piezometric Pressure (psi)



Company:	Stock Drilling Inc.	Operator:	Ben L.	File:	HPT-03.HPT
Project ID:	Coldwater Rd Landfill	Client:	O'Brien & Gere	Date:	9/5/2018
				Location:	43° 5' 50" N, 83° 41' 12" W



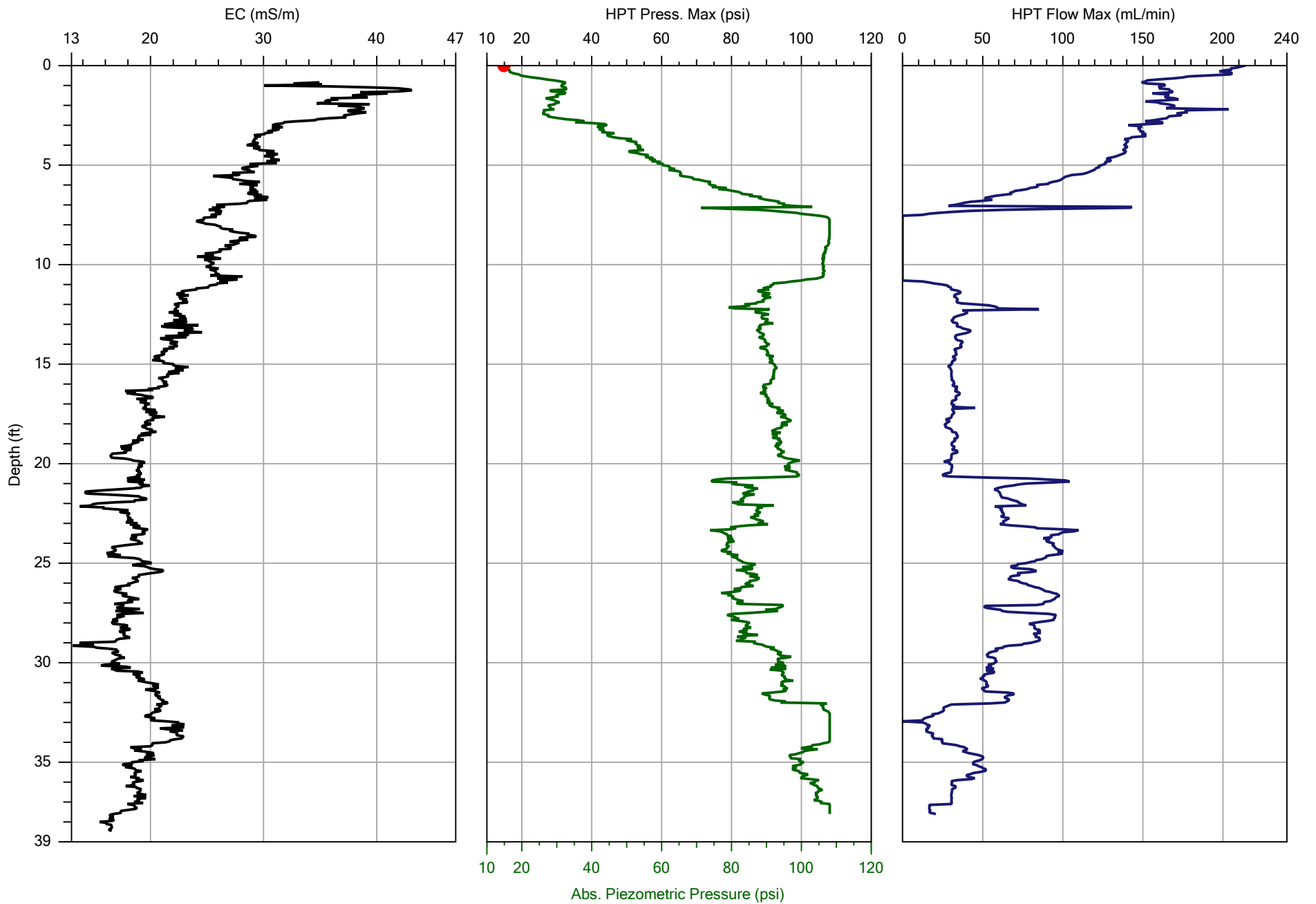
Company: Stock Drilling Inc.		Operator: Ben L.	File: HPT-04.HPT
Project ID: Coldwater Rd Landfill		Client: O'Brien & Gere	Date: 9/5/2018
			Location: 43° 5' 53" N, 83° 41' 12" W



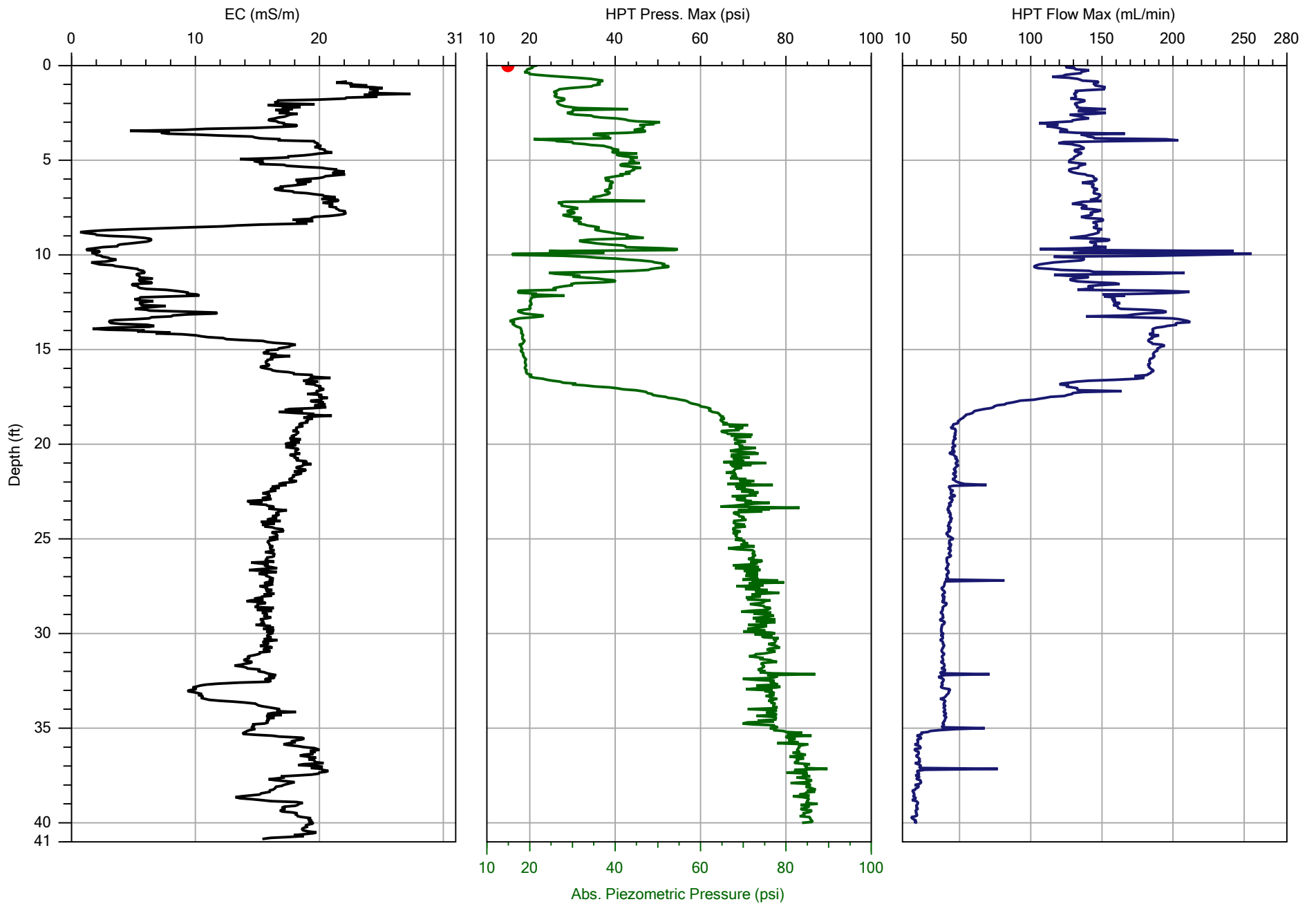
Abs. Piezometric Pressure (psi)



Company:	Stock Drilling Inc.	Operator:	Ben L.	File:	HPT-05.HPT
Project ID:	Coldwater Rd Landfill	Client:	O'Brien & Gere	Date:	9/5/2018
				Location:	43° 5' 56" N, 83° 41' 21" W



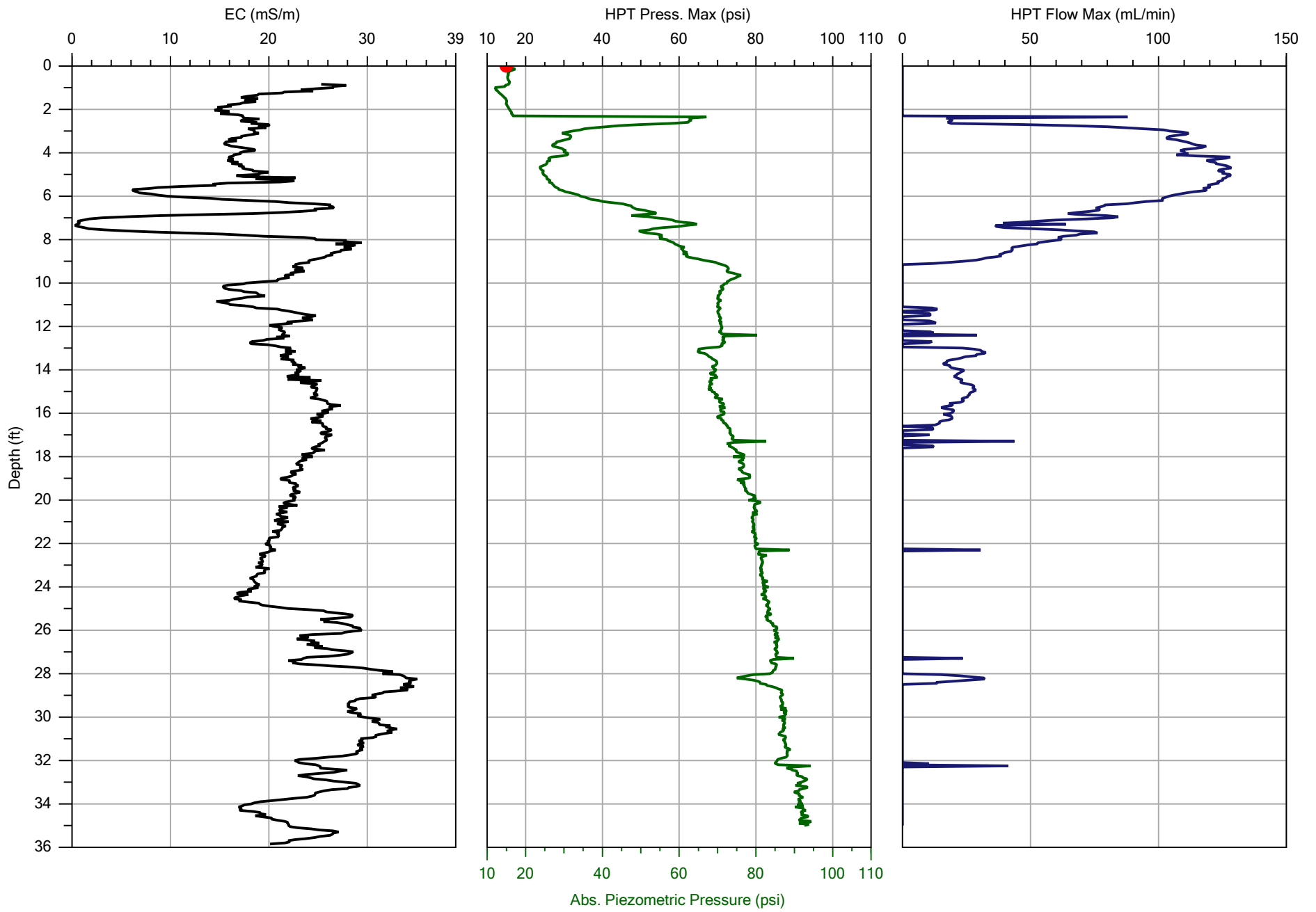
Company: Stock Drilling Inc.		Operator: Ben L.	File: HPT-06.HPT
Project ID: Coldwater Rd Landfill		Client: O'Brien & Gere	Date: 9/5/2018
			Location: 43° 6' 2" N, 83° 41' 13" W



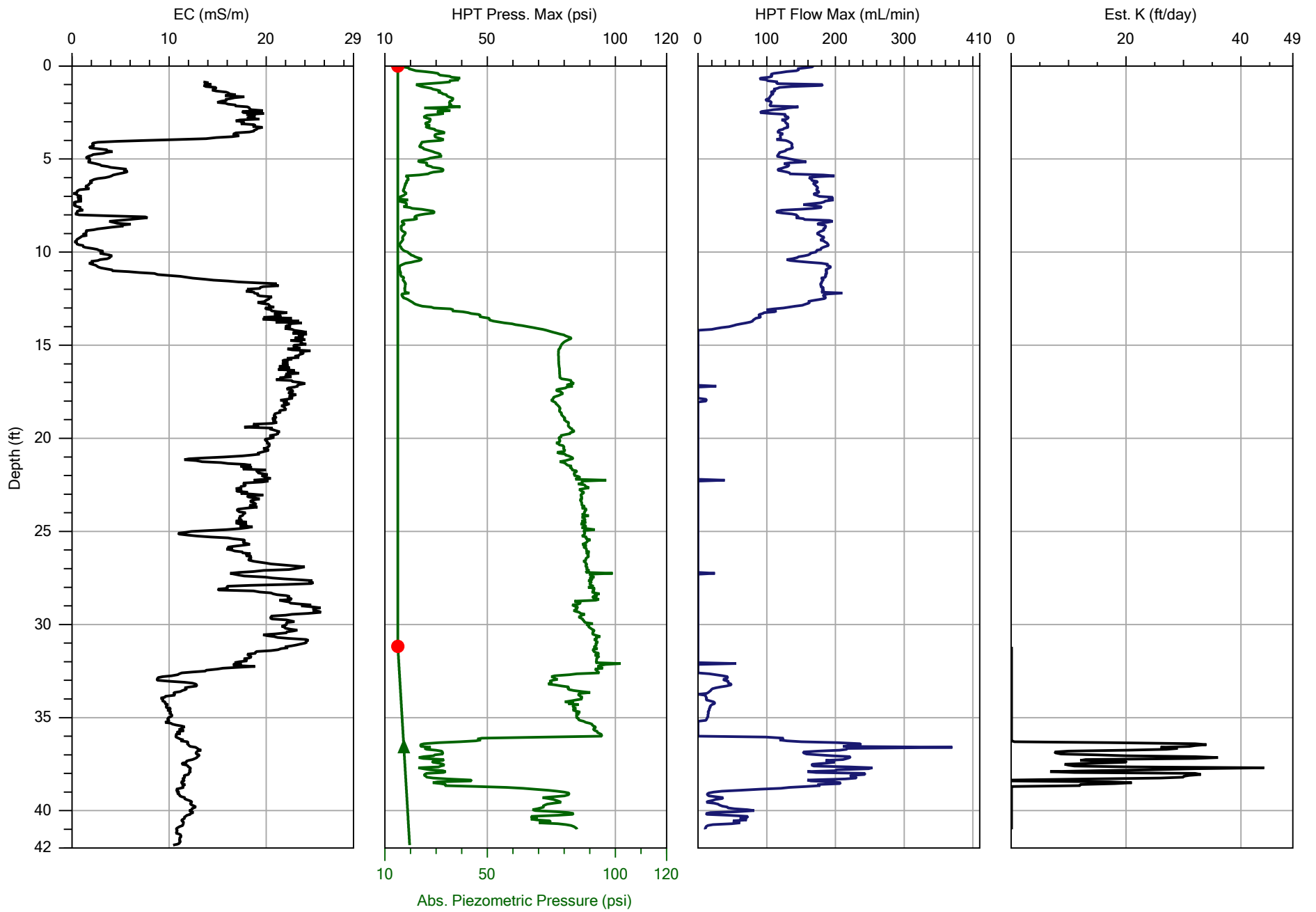
Abs. Piezometric Pressure (psi)



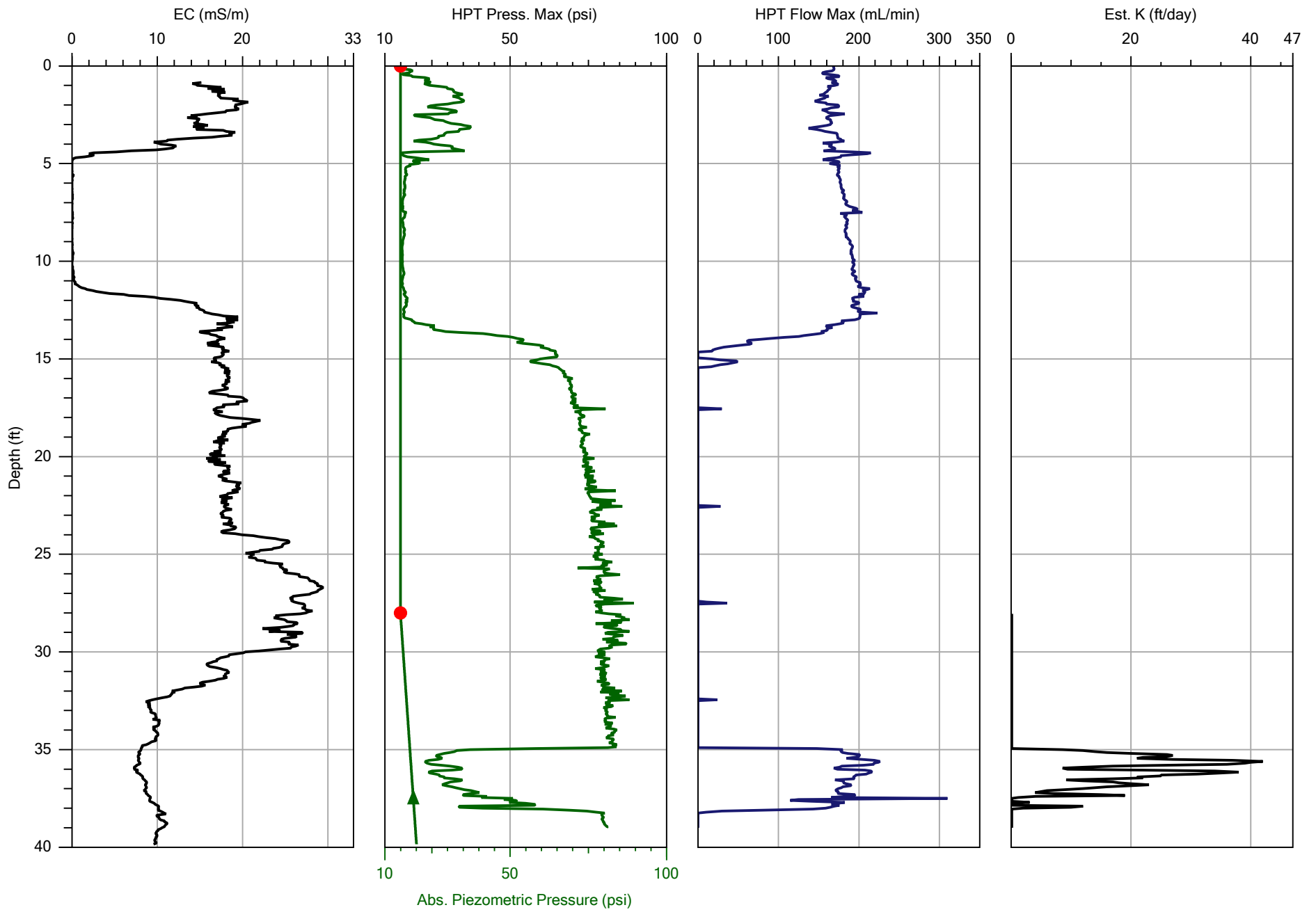
Company: Stock Drilling Inc.		Operator: Ben L.	File: HPT-07.HPT
Project ID: Coldwater Rd Landfill		Client: O'Brien & Gere	Date: 9/6/2018
			Location: 43° 6' 5" N, 83° 41' 12" W



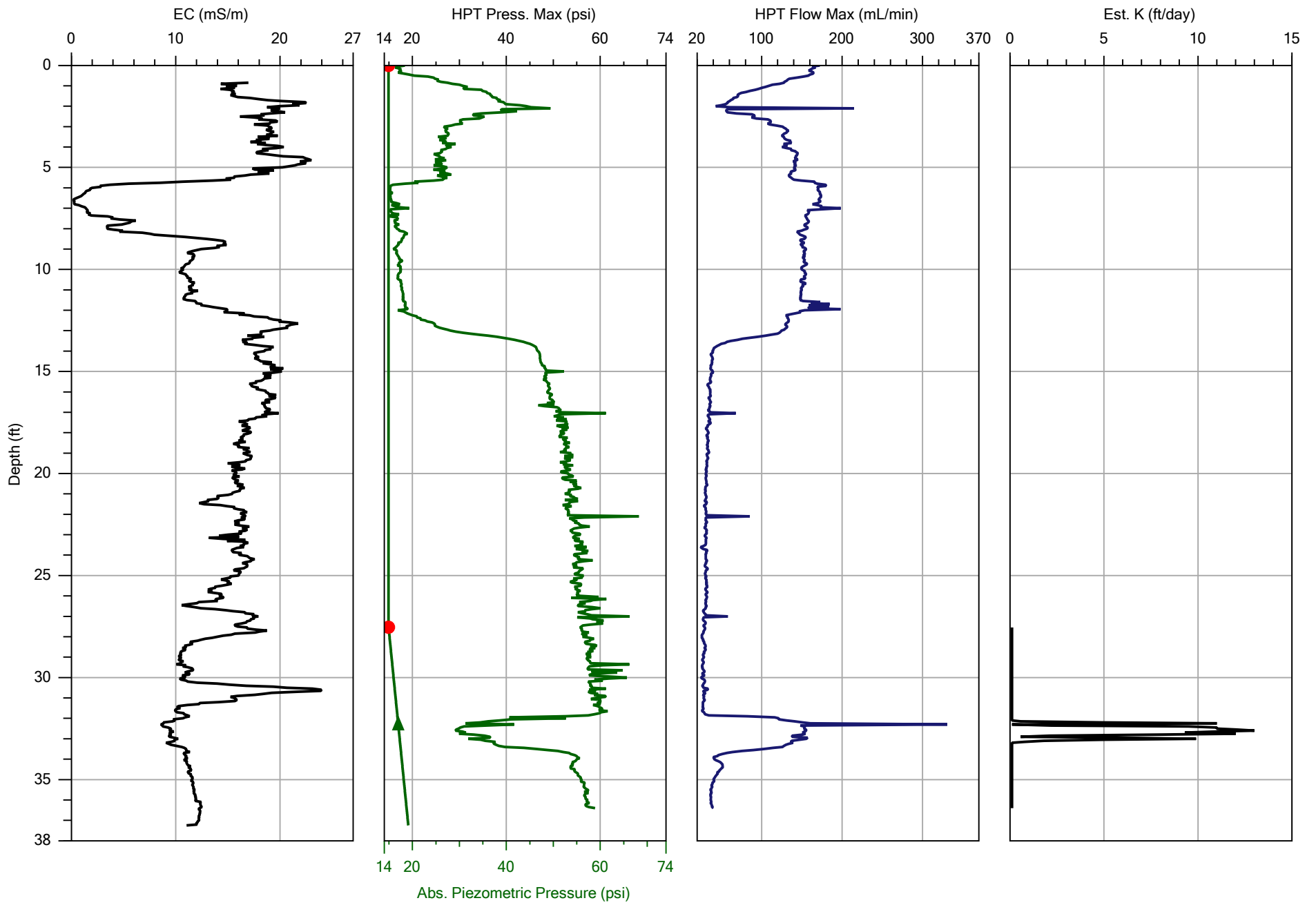
Company: Stock Drilling Inc.		Operator: Ben L.	File: HPT-08.HPT
Project ID: Coldwater Rd Landfill		Client: O'Brien & Gere	Date: 9/6/2018
			Location: 43° 6' 5" N, 83° 41' 15" W



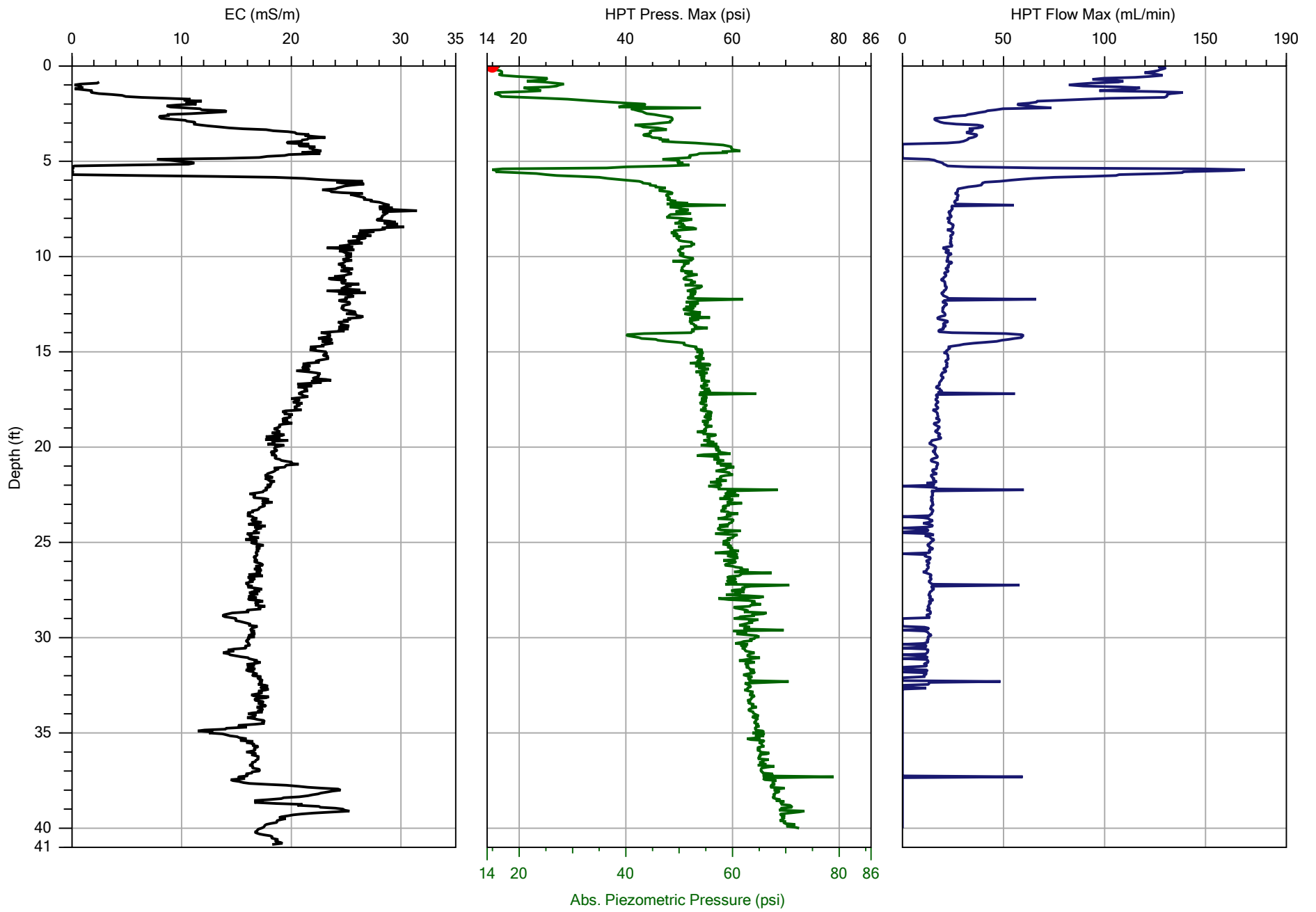
Company:	Stock Drilling Inc.	Operator:	Ben L.	File:	HPT-09.HPT
Project ID:	Coldwater Rd Landfill	Client:	O'Brien & Gere	Date:	9/6/2018
				Location:	43° 6' 5" N, 83° 41' 17" W



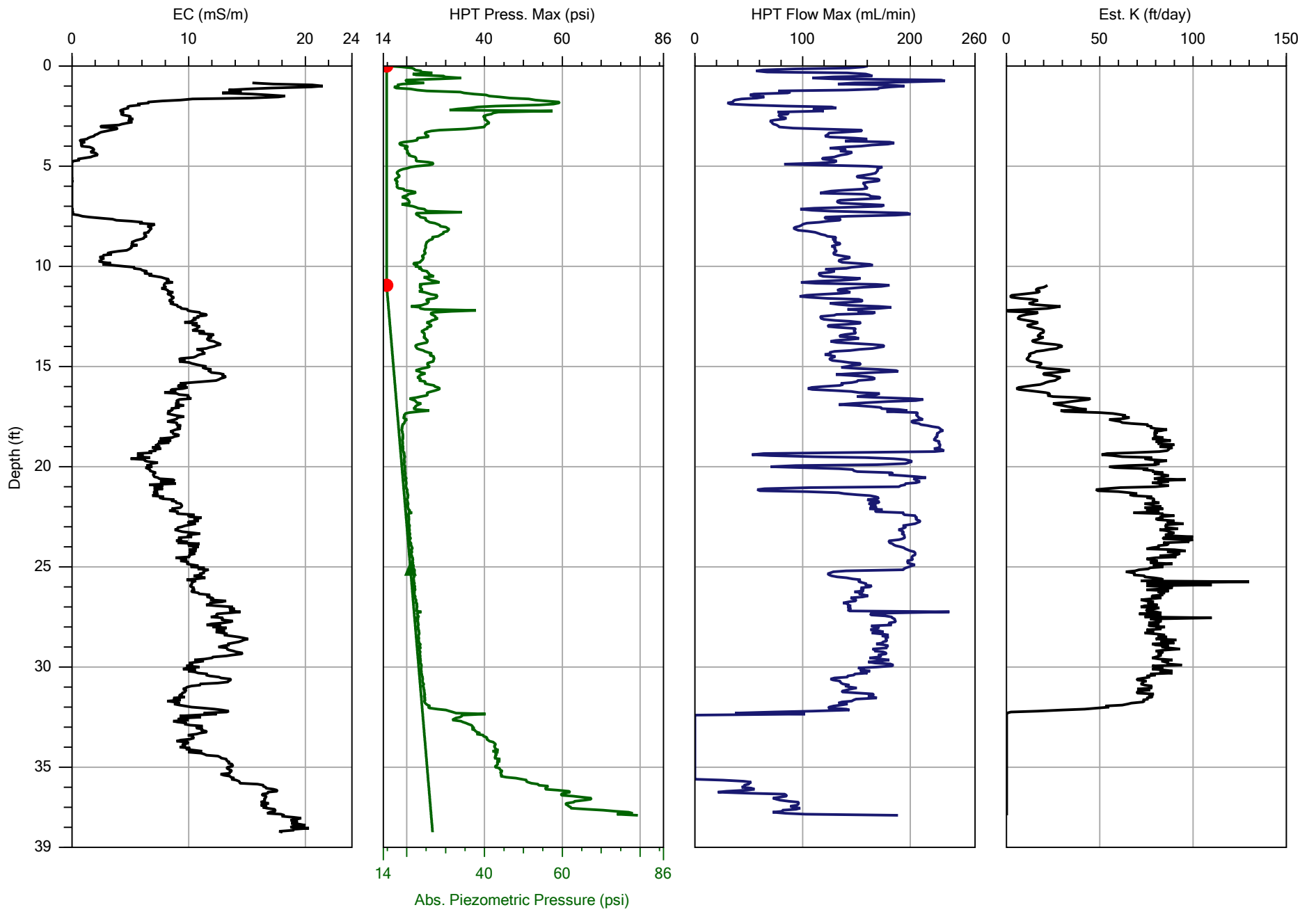
Company: Stock Drilling Inc.		Operator: Ben L.	File: HPT-10.HPT
Project ID: Coldwater Rd Landfill		Client: O'Brien & Gere	Date: 9/6/2018
			Location: 43° 6' 5" N, 83° 41' 20" W



Company: Stock Drilling Inc.		Operator: Mike C.	File: HPT-11.HPT
Project ID: Coldwater Rd Landfill		Client: O'Brien & Gere	Date: 9/7/2018
			Location: Genesee



Company: Stock Drilling Inc.		Operator: Mike C.	File: HPT-12.HPT
Project ID: Coldwater Rd Landfill		Client: O'Brien & Gere	Date: 9/7/2018
			Location: Genesee



Company: Stock Drilling Inc.		Operator: Mike C.	File: HPT-13.HPT
Project ID: Coldwater Rd Landfill		Client: O'Brien & Gere	Date: 9/7/2018
			Location: Genesee

ATTACHMENT 3

***Analytical Laboratory
Reports
(on CD)***



Analytical Laboratory Report

Report ID: S93935.01(01)
Generated on 09/21/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S93935.01-S93935.04
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/04/2018 - 09/05/2018
Submitted Date/Time: 09/05/2018 16:10
Sampled by: Kevin Schneider
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

Sample .01 contained silt. Sample had to be centrifuged and poured off prior to PFC analysis.



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S93935.01	HPT-01-GW-25	Groundwater	09/04/18 14:55
S93935.02	FB-01	Water	09/04/18 16:00
S93935.03	HPT-02-GW-20	Groundwater	09/04/18 17:07
S93935.04	HPT-02-GW-35	Groundwater	09/05/18 08:05



Analytical Laboratory Report

Lab Sample ID: S93935.01

Sample Tag: HPT-01-GW-25

Collected Date/Time: 09/04/2018 14:55

Matrix: Groundwater

COC Reference: 107355

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.9	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/12/18 02:39, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.996	375-22-4	
PFPeA*	Not detected	10		ng/L	1.996	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.996	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.996	307-24-4	
PFBS*	Not detected	10		ng/L	1.996	375-73-5	
PFHpA*	Not detected	10		ng/L	1.996	375-85-9	
PFPeS*	Not detected	10		ng/L	1.996	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.996	27619-97-2	
PFOA*	Not detected	10		ng/L	1.996	335-67-1	
PFHxS*	Not detected	10		ng/L	1.996	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.996	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.996	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.996	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.996	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.996	375-92-8	
PFDA*	Not detected	10		ng/L	1.996	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.996	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.996	2991-50-6	
PFOS*	Not detected	10		ng/L	1.996	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.996	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.996	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.996	2058-94-8	
PFNS*	Not detected	10		ng/L	1.996	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.996	307-55-1	
PFDS*	Not detected	10		ng/L	1.996	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.996	72629-94-8	
FOSA*	Not detected	10		ng/L	1.996	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.996	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S93935.02

Sample Tag: FB-01

Collected Date/Time: 09/04/2018 16:00

Matrix: Water

COC Reference: 107355

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.9	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/07/18 05:09, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0942	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0942	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0942	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0942	307-24-4	
PFBS*	Not detected	10		ng/L	2.0942	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0942	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0942	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0942	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0942	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0942	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0942	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0942	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0942	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0942	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0942	375-92-8	
PFDA*	Not detected	10		ng/L	2.0942	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0942	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0942	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0942	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0942	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0942	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0942	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0942	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.0942	307-55-1	
PFDS*	Not detected	10		ng/L	2.0942	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0942	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0942	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0942	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S93935.03

Sample Tag: HPT-02-GW-20

Collected Date/Time: 09/04/2018 17:07

Matrix: Groundwater

COC Reference: 107355

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.9	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/07/18 05:29, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9608	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9608	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9608	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9608	307-24-4	
PFBS*	Not detected	10		ng/L	1.9608	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9608	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9608	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9608	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9608	335-67-1	
PFHxS*	20	10		ng/L	1.9608	355-46-4	
PFHxS-LN*	20	10		ng/L	1.9608	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9608	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9608	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9608	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9608	375-92-8	
PFDA*	Not detected	10		ng/L	1.9608	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9608	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9608	2991-50-6	
PFOS*	60	10		ng/L	1.9608	1763-23-1	
PFOS-LN*	20	10		ng/L	1.9608	1763-23-1-LN	
PFOS-BR*	50	10		ng/L	1.9608	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9608	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9608	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.9608	307-55-1	
PFDS*	Not detected	10		ng/L	1.9608	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9608	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9608	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9608	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S93935.04

Sample Tag: HPT-02-GW-35

Collected Date/Time: 09/05/2018 08:05

Matrix: Groundwater

COC Reference: 107355

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.9	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/07/18 05:48, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9713	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9713	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9713	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9713	307-24-4	
PFBS*	Not detected	10		ng/L	1.9713	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9713	375-85-9	
PFPeS*	10	10		ng/L	1.9713	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9713	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9713	335-67-1	
PFHxS*	100	10		ng/L	1.9713	355-46-4	
PFHxS-LN*	90	10		ng/L	1.9713	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9713	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9713	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9713	39108-34-4	
PFHpS*	20	10		ng/L	1.9713	375-92-8	
PFDA*	Not detected	10		ng/L	1.9713	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9713	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9713	2991-50-6	
PFOS*	580	10		ng/L	1.9713	1763-23-1	
PFOS-LN*	180	10		ng/L	1.9713	1763-23-1-LN	
PFOS-BR*	400	10		ng/L	1.9713	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9713	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9713	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.9713	307-55-1	
PFDS*	Not detected	10		ng/L	1.9713	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9713	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9713	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9713	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S93935

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted:09/05/2018 16:10 Login User: MMC

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.9 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



2680 East Lansing Dr., East Lansing, MI 48823
 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # 1 OF 1

107355

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: Clifford Yantz
 COMPANY: O'Brien & Gere
 ADDRESS: 2260 East Saginaw St
 CITY: East Lansing STATE: MI ZIP CODE: 48823
 PHONE NO.: 44-837-3607 FAX NO.: P.O. NO.:
 E-MAIL ADDRESS: clifford.yantz@obg.com QUOTE NO.:

CONTACT NAME: SAME
 COMPANY:
 ADDRESS:
 CITY: STATE: ZIP CODE:
 PHONE NO.: E-MAIL ADDRESS:

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME: RACER Coldwater Rd LF - PFAS SAMPLER(S) - PLEASE PRINT/SIGN NAME: Kevin Schneider
 TURNAROUND TIME REQUIRED: 1 DAY 2 DAYS 3 DAYS STANDARD OTHER
 DELIVERABLES REQUIRED: STD LEVEL II LEVEL III LEVEL IV EDD OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE

Containers & Preservatives

Certifications
 OHIO VAP Drinking Water
 DoD NPDES
 Project Locations
 Detroit New York
 Other
 Special Instructions

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS (ASTM D7979)
	DATE	TIME											
9393501	9/4/18	1455	HPT-01-GW-25	GW	3	3							X
.02	9/4/18	1600	FB-01	QC	3	3							X
.03	9/4/18	1707	HPT-02-GW-20	GW	3	3							X
.04	9/5/18	805	HPT-02-GW-35	GW	3	3							X
45													

RELINQUISHED BY: *[Signature]* Sampler DATE: 9/5/18 TIME: 14:30
 RECEIVED BY: *[Signature]* DATE: 9/5/18 TIME: 14:34
 RELINQUISHED BY: *[Signature]* DATE: 9/5/18 TIME: 10:10
 RECEIVED BY: *[Signature]* DATE: 9/5/18 TIME: 16:10

RELINQUISHED BY: DATE: TIME:
 RECEIVED BY: DATE: TIME:
 SEAL NO. SEAL INTACT YES NO INITIALS
 SEAL NO. SEAL INTACT YES NO INITIALS
 NOTES: TEMP. ON ARRIVAL: 4.9



Analytical Laboratory Report

Report ID: S93936.01(01)
Generated on 09/10/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S93936.01-S93936.02
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/05/2018
Submitted Date/Time: 09/05/2018 16:10
Sampled by: Kevin Schneider
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

Samples .01 and .02 contained silt. Samples had to be centrifuged and poured off prior to PFC analysis.



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (2 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S93936.01	HPT-03-GW-24	Groundwater	09/05/18 11:33
S93936.02	HPT-04-GW-24	Groundwater	09/05/18 13:50



Analytical Laboratory Report

Lab Sample ID: S93936.01

Sample Tag: HPT-03-GW-24

Collected Date/Time: 09/05/2018 11:33

Matrix: Groundwater

COC Reference: 107356

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.9	IR

Organics

24 PFAs, Method: ASTM7979-17M, Run Date: 09/07/18 06:08, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.94	375-22-4	
PFPeA*	Not detected	10		ng/L	1.94	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.94	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.94	307-24-4	
PFBS*	Not detected	10		ng/L	1.94	375-73-5	
PFHpA*	Not detected	10		ng/L	1.94	375-85-9	
PFPeS*	Not detected	10		ng/L	1.94	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.94	27619-97-2	
PFOA*	Not detected	10		ng/L	1.94	335-67-1	
PFHxS*	Not detected	10		ng/L	1.94	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.94	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.94	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.94	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.94	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.94	375-92-8	
PFDA*	Not detected	10		ng/L	1.94	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.94	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.94	2991-50-6	
PFOS*	Not detected	10		ng/L	1.94	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.94	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.94	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.94	2058-94-8	
PFNS*	Not detected	10		ng/L	1.94	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.94	307-55-1	
PFDS*	Not detected	10		ng/L	1.94	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.94	72629-94-8	
FOSA*	Not detected	10		ng/L	1.94	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.94	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S93936.02

Sample Tag: HPT-04-GW-24

Collected Date/Time: 09/05/2018 13:50

Matrix: Groundwater

COC Reference: 107356

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.9	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/07/18 06:27, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.37	375-22-4	
PFPeA*	Not detected	10		ng/L	2.37	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.37	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.37	307-24-4	
PFBS*	Not detected	10		ng/L	2.37	375-73-5	
PFHpA*	Not detected	10		ng/L	2.37	375-85-9	
PFPeS*	Not detected	10		ng/L	2.37	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.37	27619-97-2	
PFOA*	Not detected	10		ng/L	2.37	335-67-1	
PFHxS*	Not detected	10		ng/L	2.37	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.37	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.37	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.37	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.37	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.37	375-92-8	
PFDA*	Not detected	10		ng/L	2.37	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.37	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.37	2991-50-6	
PFOS*	Not detected	10		ng/L	2.37	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.37	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.37	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.37	2058-94-8	
PFNS*	Not detected	10		ng/L	2.37	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.37	307-55-1	
PFDS*	Not detected	10		ng/L	2.37	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.37	72629-94-8	
FOSA*	Not detected	10		ng/L	2.37	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.37	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID: S93936

Attention: Clifford Yantz
 Address: O'Brien & Gere Engineers, Inc.
 2260 E Saginaw St
 East Lansing, MI 48823

Client: OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted: 09/05/2018 16:10 Login User: MMC

Phone: 248-477-5701 FAX:
 Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|---|--------|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Samples are received at 4C +/- 2C Thermometer # | IR 4.9 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Received on ice/ cooling process begun | |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Samples shipped | |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Samples left in 24 hr. drop box | |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Are there custody seals/tape or is the drop box locked | |

Chain of Custody

- | | | |
|-----|---|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A COC adequately filled out | |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A COC signed and relinquished to the lab | |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Sample tag on bottles match COC | |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Subcontracting needed? Subcontracted to: | |

Preservation

- | | | |
|-----|--|--|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Do sample have correct chemical preservation | |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Completed pH checks on preserved samples? (no VOAs) | |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Did any samples need to be preserved in the lab? | |

Bottle Conditions

- | | | |
|-----|--|--|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A All bottles intact | |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Appropriate analytical bottles are used | |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Merit bottles used | |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Sufficient sample volume received | |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Samples require laboratory filtration | |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Samples submitted within holding time | |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Do water VOC or TOX bottles contain headspace | |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



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 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # 1 OF 1

107356

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: Clifford Yant 2
 COMPANY: O'Brien & Gere
 ADDRESS: 2260 East Saginaw St
 CITY: East Lansing STATE: MI ZIP CODE: 48823
 PHONE NO.: 414-837-3607 FAX NO.: P.O. NO.: QUOTE NO.:
 E-MAIL ADDRESS: Clifford.Yant2@obg.com

CONTACT NAME: [X] SAME
 COMPANY:
 ADDRESS:
 CITY: STATE: ZIP CODE:
 PHONE NO.: E-MAIL ADDRESS:

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME: MACER Coldwater Rd LF - PFAS SAMPLER(S) - PLEASE PRINT/SIGN NAME: Kevin Schneider KSL
 TURNAROUND TIME REQUIRED: 1 DAY 2 DAYS 3 DAYS STANDARD OTHER
 DELIVERABLES REQUIRED: STD LEVEL II LEVEL III LEVEL IV EDD OTHER

Certifications
 OHIO VAP Drinking Water
 DoD NPDES
 Project Locations
 Detroit New York
 Other
 Special Instructions

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS (ASTM D7919)
	DATE	TIME											
9393601	9/5/18	1133	HPT-03-GW-24	GW	3	3							X
.02	9/5/18	1350	HPT-04-GW-24	GW	3	3							X

RELINQUISHED BY: KSL OBG [X] Sampler DATE: 9/5/18 TIME: 14:34
 RECEIVED BY: [Signature] DATE: 9/5/18 TIME: 14:34
 RELINQUISHED BY: [Signature] DATE: 9/5/18 TIME: 10:10
 RECEIVED BY: M Calcolo DATE: 9/5/18 TIME: 10:10

RELINQUISHED BY: DATE: TIME:
 RECEIVED BY: DATE: TIME:
 SEAL NO. SEAL INTACT YES NO INITIALS
 SEAL NO. SEAL INTACT YES NO INITIALS
 NOTES: TEMP. ON ARRIVAL: 4.9



Analytical Laboratory Report

Report ID: S94021.01(01)
Generated on 09/11/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94021.01-S94021.02
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/05/2018
Submitted Date/Time: 09/06/2018 15:15
Sampled by: Kevin Schneider
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

Samples .01 and .02 contained silt. Samples had to be centrifuged and poured off prior to PFC analysis.



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (2 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94021.01	HPT-05-GW-17	Groundwater	09/05/18 15:47
S94021.02	HPT-06-GW-25	Groundwater	09/05/18 17:15



Analytical Laboratory Report

Lab Sample ID: S94021.01

Sample Tag: HPT-05-GW-17

Collected Date/Time: 09/05/2018 15:47

Matrix: Groundwater

COC Reference: 107364

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.6	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/07/18 06:47, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.16	375-22-4	
PFPeA*	Not detected	10		ng/L	2.16	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.16	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.16	307-24-4	
PFBS*	Not detected	10		ng/L	2.16	375-73-5	
PFHpA*	Not detected	10		ng/L	2.16	375-85-9	
PFPeS*	Not detected	10		ng/L	2.16	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.16	27619-97-2	
PFOA*	Not detected	10		ng/L	2.16	335-67-1	
PFHxS*	Not detected	10		ng/L	2.16	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.16	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.16	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.16	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.16	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.16	375-92-8	
PFDA*	Not detected	10		ng/L	2.16	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.16	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.16	2991-50-6	
PFOS*	Not detected	10		ng/L	2.16	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.16	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.16	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.16	2058-94-8	
PFNS*	Not detected	10		ng/L	2.16	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.16	307-55-1	
PFDS*	Not detected	10		ng/L	2.16	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.16	72629-94-8	
FOSA*	Not detected	10		ng/L	2.16	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.16	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94021.02

Sample Tag: HPT-06-GW-25

Collected Date/Time: 09/05/2018 17:15

Matrix: Groundwater

COC Reference: 107364

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.6	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/07/18 07:06, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.93	375-22-4	
PFPeA*	10	10		ng/L	1.93	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.93	757124-72-4	
PFHxA*	10	10		ng/L	1.93	307-24-4	
PFBS*	Not detected	10		ng/L	1.93	375-73-5	
PFHpA*	Not detected	10		ng/L	1.93	375-85-9	
PFPeS*	Not detected	10		ng/L	1.93	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.93	27619-97-2	
PFOA*	20	10		ng/L	1.93	335-67-1	
PFHxS*	20	10		ng/L	1.93	355-46-4	
PFHxS-LN*	20	10		ng/L	1.93	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.93	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.93	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.93	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.93	375-92-8	
PFDA*	Not detected	10		ng/L	1.93	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.93	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.93	2991-50-6	
PFOS*	80	10		ng/L	1.93	1763-23-1	
PFOS-LN*	40	10		ng/L	1.93	1763-23-1-LN	
PFOS-BR*	30	10		ng/L	1.93	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.93	2058-94-8	
PFNS*	Not detected	10		ng/L	1.93	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.93	307-55-1	
PFDS*	Not detected	10		ng/L	1.93	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.93	72629-94-8	
FOSA*	Not detected	10		ng/L	1.93	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.93	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94021

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted:09/06/2018 15:15 Login User: SRS

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note	
Sample Receiving			
01.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 4.6	
02.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun	
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped	
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box	
05.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody			
06.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out	
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab	
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC	
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:	
Preservation			
10.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Do sample have correct chemical preservation	
11.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)	
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions			
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact	
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used	
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used	
16.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received	Relatively large quantity of mud in sample - will attempt to run per client request
17.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration	
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time	
19.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



Merit
Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

107364

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Clifford Yantz
 COMPANY O'Brien & Gere
 ADDRESS 2260 East Saginaw St
 CITY East Lansing STATE MI ZIP CODE 48823
 PHONE NO. 517-837-3607 FAX NO. _____ P.O. NO. _____
 E-MAIL ADDRESS Clifford.Yantz@obg.com QUOTE NO. _____

CONTACT NAME SAME
 COMPANY _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP CODE _____
 PHONE NO. _____ E-MAIL ADDRESS _____

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME RACER Coldwater Rd LF - PFAS SAMPLER(S) - PLEASE PRINT/SIGN NAME Kevin Schneider
 TURNAROUND TIME REQUIRED 1 DAY 2 DAYS 3 DAYS STANDARD OTHER _____
 DELIVERABLES REQUIRED STD LEVEL II LEVEL III LEVEL IV EDD OTHER _____

PFAS (ASTM D7914)

Certifications
 OHIO VAP Drinking Water
 DoD NPDES
 Project Locations
 Detroit New York
 Other _____
 Special Instructions _____

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS
	DATE	TIME											
94021.01	9/5/18	1547	HPT-05-GW-17	GW	3	3							X
02	9/5/18	1715	HPT-06-GW-25	GW	3	3							X

RELINQUISHED BY: [Signature] DATE 9/4/18 TIME 1100
 RECEIVED BY: [Signature] DATE 9/6/18 TIME 1100
 RELINQUISHED BY: [Signature] DATE 9/6/18 TIME 15:15
 RECEIVED BY: [Signature] DATE 9/6/18 TIME 1515

RELINQUISHED BY: _____ DATE _____ TIME _____
 RECEIVED BY: _____ DATE _____ TIME _____
 SEAL NO. _____ SEAL INTACT YES NO INITIALS _____
 SEAL NO. _____ SEAL INTACT YES NO INITIALS _____
 NOTES: 4.6 TEMP. ON ARRIVAL _____

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S94022.01(01)
Generated on 09/26/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94022.01
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/05/2018
Submitted Date/Time: 09/06/2018 15:15
Sampled by: Kevin Schneider
P.O. #: PO

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Qualifier Descriptions (Page 3)
Glossary of Abbreviations (Page 3)
Method Summary (Page 4)
Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (1 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94022.01	FB-02	Water	09/05/18 17:10



Analytical Laboratory Report

Lab Sample ID: S94022.01

Sample Tag: FB-02

Collected Date/Time: 09/05/2018 17:10

Matrix: Water

COC Reference: 107360

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.6	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/15/18 05:55, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9573	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9573	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9573	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9573	307-24-4	
PFBS*	Not detected	10		ng/L	1.9573	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9573	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9573	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9573	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9573	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9573	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9573	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9573	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9573	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9573	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9573	375-92-8	
PFDA*	Not detected	10		ng/L	1.9573	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9573	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9573	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9573	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9573	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9573	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9573	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9573	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.9573	307-55-1	
PFDS*	Not detected	10		ng/L	1.9573	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9573	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9573	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9573	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94022

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted:09/06/2018 15:15 Login User: SRS

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.6 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out No analysis listed |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



Analytical Laboratory Report

Report ID: S94098.01(01)
Generated on 09/14/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94098.01
Project: RACER Coldwater Rd LF
Collected Date: 09/06/2018
Submitted Date/Time: 09/07/2018 15:35
Sampled by: Clifford Yantz
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

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Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

Sample .01 contained silt. Samples had to be centrifuged and poured off prior to PFC analysis.



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
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MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (1 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94098.01	HPT-10-GW-25	Groundwater	09/06/18 17:05



Analytical Laboratory Report

Lab Sample ID: S94098.01

Sample Tag: HPT-10-GW-25

Collected Date/Time: 09/06/2018 17:05

Matrix: Groundwater

COC Reference: 107363

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.4	IR
1	1L Plastic	None	Yes	5.4	IR

Organics

24 PFAs, Method: ASTM7979-17M, Run Date: 09/12/18 05:55, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0243	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0243	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0243	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0243	307-24-4	
PFBS*	10	10		ng/L	2.0243	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0243	375-85-9	
PFPeS*	20	10		ng/L	2.0243	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0243	27619-97-2	
PFOA*	10	10		ng/L	2.0243	335-67-1	
PFHxS*	80	10		ng/L	2.0243	355-46-4	
PFHxS-LN*	70	10		ng/L	2.0243	355-46-4-LN	
PFHxS-BR*	10	10		ng/L	2.0243	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0243	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0243	39108-34-4	
PFHpS*	20	10		ng/L	2.0243	375-92-8	
PFDA*	Not detected	10		ng/L	2.0243	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0243	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0243	2991-50-6	
PFOS*	1,550	10		ng/L	2.0243	1763-23-1	
PFOS-LN*	610	10		ng/L	2.0243	1763-23-1-LN	
PFOS-BR*	970	10		ng/L	2.0243	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0243	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0243	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.0243	307-55-1	
PFDS*	Not detected	10		ng/L	2.0243	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0243	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0243	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0243	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94098

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF

Submitted:09/07/2018 15:35 Login User: SRS

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701

FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 5.4 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



2680 East Lansing Dr., East Lansing, MI 48823
 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # _____ OF _____

107363

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: **Clifford Yantz**
 COMPANY: **O'Brien & Gere**
 ADDRESS: **2200 East Saginaw St.**
 CITY: **East Lansing** STATE: **MI** ZIP CODE: **48823**
 PHONE NO.: **517 333 0211** FAX NO.: _____ P.O. NO.: _____
 E-MAIL ADDRESS: **clifford.yantz@obg.com** QUOTE NO.: _____

CONTACT NAME: **8**
 COMPANY: _____
 ADDRESS: **SAME**
 CITY: _____ STATE: _____ ZIP CODE: _____
 PHONE NO.: _____ E-MAIL ADDRESS: _____

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME: **RACER Colewater Rd. LF** SAMPLER(S) - PLEASE PRINT/SIGN NAME: **Clifford Yantz / Clifford Yantz**
 TURNAROUND TIME REQUIRED: 1 DAY 2 DAYS 3 DAYS STANDARD OTHER **5 Day ATAT**
 DELIVERABLES REQUIRED: STD LEVEL II LEVEL III LEVEL IV EDD OTHER _____

PFAS (ready)

- Certifications
 OHIO VAP Drinking Water
 DoD NPDES
 Project Locations
 Detroit New York
 Other _____
 Special Instructions

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER								
	DATE	TIME																		
9409861	9/6/18	17:05	HPT-10-GW-25	GW	4	X							X							

RELINQUISHED BY: **Clifford Yantz** DATE: **9/7/18** TIME: **17:40**
 RECEIVED BY: **[Signature]** DATE: **9/7/18** TIME: **19:40**
 RELINQUISHED BY: **[Signature]** DATE: **9/7/18** TIME: **15:35**
 RECEIVED BY: **[Signature]** DATE: **9/7/18** TIME: **15:55**

RELINQUISHED BY: _____ DATE: _____ TIME: _____
 RECEIVED BY: _____ DATE: _____ TIME: _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 NOTES: TEMP. ON ARRIVAL **5.4**

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S94099.01(01)
Generated on 09/26/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94099.01-S94099.06
Project: RACER Coldwater Rd LF
Collected Date: 09/06/2018 - 09/07/2018
Submitted Date/Time: 09/07/2018 15:35
Sampled by: Clifford Yantz
P.O. #: PO

Table of Contents

- Cover Page (Page 1)
- General Report Notes (Page 2)
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- Method Summary (Page 4)
- Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

Samples .01 and .02 contained silt. Samples had to be centrifuged and poured off prior to PFC analysis.



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979	
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (6 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94099.01	HPT-07-GW-25	Groundwater	09/06/18 11:20
S94099.02	HPT-09-GW-39	Groundwater	09/06/18 15:10
S94099.03	HPT-09-GW-24	Groundwater	09/07/18 08:45
S94099.04	FB-03	Water	09/06/18 12:00
S94099.05	SW-01	Liquid	09/07/18 14:05
S94099.06	SW-02	Liquid	09/07/18 14:25



Analytical Laboratory Report

Lab Sample ID: S94099.01

Sample Tag: HPT-07-GW-25

Collected Date/Time: 09/06/2018 11:20

Matrix: Groundwater

COC Reference: 107362

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	5.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml) (Rep#)	1.49/6.68/10	ASTMD7979	09/22/18 16:00	PL	

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/13/18 23:34, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.91	375-22-4	
PFPeA*	Not detected	10		ng/L	1.91	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.91	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.91	307-24-4	
PFBS*	Not detected	10		ng/L	1.91	375-73-5	
PFHpA*	Not detected	10		ng/L	1.91	375-85-9	
PFPeS*	Not detected	10		ng/L	1.91	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.91	27619-97-2	
PFOA*	Not detected	10		ng/L	1.91	335-67-1	
PFHxS*	20	10		ng/L	1.91	355-46-4	
PFHxS-LN*	20	10		ng/L	1.91	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.91	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.91	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.91	39108-34-4	
PFHpS*	10	10		ng/L	1.91	375-92-8	
PFDA*	Not detected	10		ng/L	1.91	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.91	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.91	2991-50-6	
PFOS*	760	10		ng/L	1.91	1763-23-1	
PFOS-LN*	400	10		ng/L	1.91	1763-23-1-LN	
PFOS-BR*	360	10		ng/L	1.91	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.91	2058-94-8	
PFNS*	Not detected	10		ng/L	1.91	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.91	307-55-1	
PFDS*	Not detected	10		ng/L	1.91	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.91	72629-94-8	
FOSA*	Not detected	10		ng/L	1.91	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.91	376-06-7	I

24 PFAs (Replicate 01), Method: ASTMD7979-17M, Run Date: 09/24/18 22:15, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.08	375-22-4	
PFPeA*	Not detected	10		ng/L	2.08	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.08	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.08	307-24-4	
PFBS*	Not detected	10		ng/L	2.08	375-73-5	

I-Matrix interference with internal standard



Analytical Laboratory Report

Lab Sample ID: S94099.01 (continued)

Sample Tag: HPT-07-GW-25

24 PFAs (Replicate 01), Method: ASTM D7979-17M, Run Date: 09/24/18 22:15, Analyst: PL (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFHpA*	Not detected	10		ng/L	2.08	375-85-9	
PFPeS*	Not detected	10		ng/L	2.08	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.08	27619-97-2	
PFOA*	Not detected	10		ng/L	2.08	335-67-1	
PFHxS*	20	10		ng/L	2.08	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.08	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.08	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.08	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.08	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.08	375-92-8	
PFDA*	Not detected	10		ng/L	2.08	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.08	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.08	2991-50-6	
PFOS*	700	10		ng/L	2.08	1763-23-1	
PFOS-LN*	350	10		ng/L	2.08	1763-23-1-LN	
PFOS-BR*	340	10		ng/L	2.08	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.08	2058-94-8	
PFNS*	Not detected	10		ng/L	2.08	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.08	307-55-1	
PFDS*	Not detected	10		ng/L	2.08	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.08	72629-94-8	
FOSA*	Not detected	10		ng/L	2.08	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.08	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94099.02

Sample Tag: HPT-09-GW-39

Collected Date/Time: 09/06/2018 15:10

Matrix: Groundwater

COC Reference: 107362

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	250ml Plastic	None	Yes	5.4	IR
1	15ml Centrifuge Tube	None	Yes	5.4	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/13/18 23:54, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	40	20		ng/L	1.95	375-22-4	
PFPeA*	Not detected	10		ng/L	1.95	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.95	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.95	307-24-4	
PFBS*	20	10		ng/L	1.95	375-73-5	
PFHpA*	Not detected	10		ng/L	1.95	375-85-9	
PFPeS*	Not detected	10		ng/L	1.95	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.95	27619-97-2	
PFOA*	Not detected	10		ng/L	1.95	335-67-1	
PFHxS*	Not detected	10		ng/L	1.95	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.95	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.95	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.95	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.95	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.95	375-92-8	
PFDA*	Not detected	10		ng/L	1.95	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.95	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.95	2991-50-6	
PFOS*	Not detected	10		ng/L	1.95	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.95	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.95	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.95	2058-94-8	
PFNS*	Not detected	10		ng/L	1.95	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.95	307-55-1	
PFDS*	Not detected	10		ng/L	1.95	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.95	72629-94-8	
FOSA*	Not detected	10		ng/L	1.95	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.95	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94099.03

Sample Tag: HPT-09-GW-24

Collected Date/Time: 09/07/2018 08:45

Matrix: Groundwater

COC Reference: 107362

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.4	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/14/18 00:13, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.05	375-22-4	
PFPeA*	Not detected	10		ng/L	2.05	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.05	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.05	307-24-4	
PFBS*	Not detected	10		ng/L	2.05	375-73-5	
PFHpA*	20	10		ng/L	2.05	375-85-9	
PFPeS*	Not detected	10		ng/L	2.05	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.05	27619-97-2	
PFOA*	Not detected	10		ng/L	2.05	335-67-1	
PFHxS*	Not detected	10		ng/L	2.05	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.05	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.05	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.05	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.05	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.05	375-92-8	
PFDA*	Not detected	10		ng/L	2.05	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.05	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.05	2991-50-6	
PFOS*	350	10		ng/L	2.05	1763-23-1	
PFOS-LN*	190	10		ng/L	2.05	1763-23-1-LN	
PFOS-BR*	150	10		ng/L	2.05	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.05	2058-94-8	
PFNS*	Not detected	10		ng/L	2.05	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.05	307-55-1	
PFDS*	Not detected	10		ng/L	2.05	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.05	72629-94-8	
FOSA*	Not detected	10		ng/L	2.05	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.05	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94099.04

Sample Tag: FB-03

Collected Date/Time: 09/06/2018 12:00

Matrix: Water

COC Reference: 107362

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.4	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/14/18 00:33, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.99	375-22-4	
PFPeA*	Not detected	10		ng/L	1.99	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.99	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.99	307-24-4	
PFBS*	Not detected	10		ng/L	1.99	375-73-5	
PFHpA*	Not detected	10		ng/L	1.99	375-85-9	
PFPeS*	Not detected	10		ng/L	1.99	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.99	27619-97-2	
PFOA*	Not detected	10		ng/L	1.99	335-67-1	
PFHxS*	Not detected	10		ng/L	1.99	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.99	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.99	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.99	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.99	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.99	375-92-8	
PFDA*	Not detected	10		ng/L	1.99	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.99	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.99	2991-50-6	
PFOS*	Not detected	10		ng/L	1.99	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.99	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.99	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.99	2058-94-8	
PFNS*	Not detected	10		ng/L	1.99	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.99	307-55-1	
PFDS*	Not detected	10		ng/L	1.99	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.99	72629-94-8	
FOSA*	Not detected	10		ng/L	1.99	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.99	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94099.05

Sample Tag: SW-01

Collected Date/Time: 09/07/2018 14:05

Matrix: Liquid

COC Reference: 107362

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.4	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/14/18 00:52, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2	375-22-4	
PFPeA*	Not detected	10		ng/L	2	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2	757124-72-4	
PFHxA*	Not detected	10		ng/L	2	307-24-4	
PFBS*	Not detected	10		ng/L	2	375-73-5	
PFHpA*	Not detected	10		ng/L	2	375-85-9	
PFPeS*	Not detected	10		ng/L	2	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2	27619-97-2	
PFOA*	Not detected	10		ng/L	2	335-67-1	
PFHxS*	10	10		ng/L	2	355-46-4	
PFHxS-LN*	10	10		ng/L	2	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2	39108-34-4	
PFHpS*	Not detected	10		ng/L	2	375-92-8	
PFDA*	Not detected	10		ng/L	2	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2	2991-50-6	
PFOS*	360	10		ng/L	2	1763-23-1	
PFOS-LN*	160	10		ng/L	2	1763-23-1-LN	
PFOS-BR*	190	10		ng/L	2	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2	2058-94-8	
PFNS*	Not detected	10		ng/L	2	474511-07-4	
PFDODA*	Not detected	10		ng/L	2	307-55-1	
PFDS*	Not detected	10		ng/L	2	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2	72629-94-8	
FOSA*	Not detected	10		ng/L	2	754-91-6	
PFTeDA*	Not detected	10		ng/L	2	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94099.06

Sample Tag: SW-02

Collected Date/Time: 09/07/2018 14:25

Matrix: Liquid

COC Reference: 107362

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.4	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/15/18 00:04, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.03	375-22-4	
PFPeA*	Not detected	10		ng/L	2.03	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.03	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.03	307-24-4	
PFBS*	Not detected	10		ng/L	2.03	375-73-5	
PFHpA*	Not detected	10		ng/L	2.03	375-85-9	
PFPeS*	Not detected	10		ng/L	2.03	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.03	27619-97-2	
PFOA*	Not detected	10		ng/L	2.03	335-67-1	
PFHxS*	Not detected	10		ng/L	2.03	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.03	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.03	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.03	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.03	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.03	375-92-8	
PFDA*	Not detected	10		ng/L	2.03	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.03	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.03	2991-50-6	
PFOS*	50	10		ng/L	2.03	1763-23-1	
PFOS-LN*	20	10		ng/L	2.03	1763-23-1-LN	
PFOS-BR*	30	10		ng/L	2.03	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.03	2058-94-8	
PFNS*	Not detected	10		ng/L	2.03	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.03	307-55-1	
PFDS*	Not detected	10		ng/L	2.03	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.03	72629-94-8	
FOSA*	Not detected	10		ng/L	2.03	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.03	376-06-7	I

I-Matrix interference with internal standard

Merit Laboratories Login Checklist

Lab Set ID:S94099

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF

Submitted:09/07/2018 15:35 Login User: SRS

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
Sample Receiving		
01.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 5.4
02.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box
05.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do sample have correct chemical preservation
11.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received
17.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time
19.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: Clifford S. Yantz
 COMPANY: O'Brien & Gere
 ADDRESS: 2260 East Saginaw St.
 CITY: East Lansing STATE: MI ZIP CODE: 48823
 PHONE NO.: 313333024 FAX NO.: - P.O. NO.: QUOTE NO.:
 E-MAIL ADDRESS: Clifford.Yantz@obg.com

CONTACT NAME: SAME
 COMPANY: SAME
 ADDRESS: SAME
 CITY: STATE: ZIP CODE:
 PHONE NO.: E-MAIL ADDRESS:

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME: RAEBR Colwater Rd. LF. SAMPLER(S) - PLEASE PRINT/SIGN NAME: Clifford Yantz / Clifford Yantz
 TURNAROUND TIME REQUIRED: 1 DAY 2 DAYS 3 DAYS STANDARD OTHER
 DELIVERABLES REQUIRED: STD LEVEL II LEVEL III LEVEL IV EDD OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE
 # Containers & Preservatives

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER
	DATE	TIME										
9409961	9/6/18	11:20	HPT-07-GW-25	GW	1	X						
02	9/6/18	15:10	HPT-09-GW-39	GW	4	X						
03	9/7/18	08:45	HPT-09-GW-24	GW	3	X						
04	9/6/18	12:00	FE003	L	2	X						
05	9/7/18	14:05	SW-01	L	3	X						
06	9/7/18	14:25	SW-02	L	3	X						

PFAS (ML 24)

Certifications
 OHIO VAP Drinking Water
 DoD NPDES
 Project Locations
 Detroit New York
 Other _____
 Special Instructions

RELINQUISHED BY: Clifford S. Yantz (Signature) DATE: 9/7/18 TIME: 18:40
 RECEIVED BY: [Signature] DATE: 9/2/18 TIME: 14:40
 RELINQUISHED BY: [Signature] DATE: 9/2/18 TIME: 15:35
 RECEIVED BY: [Signature] DATE: 9/17/18 TIME: 15:35

RELINQUISHED BY: SIGNATURE/ORGANIZATION DATE TIME
 RECEIVED BY: SIGNATURE/ORGANIZATION DATE TIME
 SEAL NO. SEAL INTACT YES NO INITIALS
 SEAL NO. SEAL INTACT YES NO INITIALS
 NOTES: TEMP. ON ARRIVAL 5.4



Analytical Laboratory Report

Report ID: S94163.01(01)
Generated on 10/02/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94163.01-S94163.06
Project: RACER Coldwater Rd LF
Collected Date: 09/10/2018
Submitted Date/Time: 09/10/2018 16:45
Sampled by: Clifford Yantz
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979	
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (6 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94163.01	SS-01	Liquid	09/10/18 10:50
S94163.02	FB-04	Liquid	09/10/18 11:00
S94163.03	Dup-02	Groundwater	09/10/18 00:01
S94163.04	HPT-13-GW-15	Groundwater	09/10/18 12:10
S94163.05	HPT-13-GW-29	Groundwater	09/10/18 14:40
S94163.06	EB-01	Liquid	09/10/18 12:50



Analytical Laboratory Report

Lab Sample ID: S94163.01

Sample Tag: SS-01

Collected Date/Time: 09/10/2018 10:50

Matrix: Liquid

COC Reference: 114587

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/14/18 02:10, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	30	20		ng/L	2.08	375-22-4	
PFPeA*	Not detected	10		ng/L	2.08	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.08	757124-72-4	
PFHxA*	20	10		ng/L	2.08	307-24-4	
PFBS*	Not detected	10		ng/L	2.08	375-73-5	
PFHpA*	Not detected	10		ng/L	2.08	375-85-9	
PFPeS*	Not detected	10		ng/L	2.08	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.08	27619-97-2	
PFOA*	40	10		ng/L	2.08	335-67-1	
PFHxS*	30	10		ng/L	2.08	355-46-4	
PFHxS-LN*	20	10		ng/L	2.08	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.08	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.08	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.08	39108-34-4	
PFHpS*	10	10		ng/L	2.08	375-92-8	
PFDA*	Not detected	10		ng/L	2.08	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.08	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.08	2991-50-6	
PFOS*	1,750	10		ng/L	2.08	1763-23-1	
PFOS-LN*	1,290	10		ng/L	2.08	1763-23-1-LN	
PFOS-BR*	480	10		ng/L	2.08	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.08	2058-94-8	
PFNS*	Not detected	10		ng/L	2.08	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.08	307-55-1	
PFDS*	Not detected	10		ng/L	2.08	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.08	72629-94-8	
FOSA*	Not detected	10		ng/L	2.08	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.08	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94163.02

Sample Tag: FB-04

Collected Date/Time: 09/10/2018 11:00

Matrix: Liquid

COC Reference: 114587

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/14/18 02:30, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.03	375-22-4	
PFPeA*	Not detected	10		ng/L	2.03	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.03	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.03	307-24-4	
PFBS*	Not detected	10		ng/L	2.03	375-73-5	
PFHpA*	Not detected	10		ng/L	2.03	375-85-9	
PFPeS*	Not detected	10		ng/L	2.03	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.03	27619-97-2	
PFOA*	Not detected	10		ng/L	2.03	335-67-1	
PFHxS*	Not detected	10		ng/L	2.03	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.03	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.03	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.03	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.03	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.03	375-92-8	
PFDA*	Not detected	10		ng/L	2.03	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.03	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.03	2991-50-6	
PFOS*	Not detected	10		ng/L	2.03	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.03	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.03	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.03	2058-94-8	
PFNS*	Not detected	10		ng/L	2.03	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.03	307-55-1	
PFDS*	Not detected	10		ng/L	2.03	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.03	72629-94-8	
FOSA*	Not detected	10		ng/L	2.03	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.03	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94163.03

Sample Tag: Dup-02

Collected Date/Time: 09/10/2018 00:01

Matrix: Groundwater

COC Reference: 114587

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml) (Rep)	2.37/6.86/11	ASTMD7979	09/27/18 19:45	PL	

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/14/18 02:49, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.01	375-22-4	
PFPeA*	Not detected	10		ng/L	2.01	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.01	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.01	307-24-4	
PFBS*	Not detected	10		ng/L	2.01	375-73-5	
PFHpA*	Not detected	10		ng/L	2.01	375-85-9	
PFPeS*	Not detected	10		ng/L	2.01	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.01	27619-97-2	
PFOA*	20	10		ng/L	2.01	335-67-1	
PFHxS*	10	10		ng/L	2.01	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.01	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.01	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.01	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.01	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.01	375-92-8	
PFDA*	Not detected	10		ng/L	2.01	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.01	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.01	2991-50-6	
PFOS*	110	10		ng/L	2.01	1763-23-1	
PFOS-LN*	30	10		ng/L	2.01	1763-23-1-LN	
PFOS-BR*	70	10		ng/L	2.01	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.01	2058-94-8	
PFNS*	Not detected	10		ng/L	2.01	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.01	307-55-1	
PFDS*	Not detected	10		ng/L	2.01	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.01	72629-94-8	
FOSA*	Not detected	10		ng/L	2.01	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.01	376-06-7	I

24 PFAs (Replicate 01), Method: ASTMD7979-17M, Run Date: 09/28/18 03:33, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0067	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0067	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0067	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0067	307-24-4	
PFBS*	Not detected	10		ng/L	2.0067	375-73-5	

I-Matrix interference with internal standard



Analytical Laboratory Report

Lab Sample ID: S94163.03 (continued)

Sample Tag: Dup-02

24 PFAs (Replicate 01), Method: ASTM D7979-17M, Run Date: 09/28/18 03:33, Analyst: PL (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFHpA*	Not detected	10		ng/L	2.0067	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0067	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0067	27619-97-2	
PFOA*	10	10		ng/L	2.0067	335-67-1	
PFHxS*	10	10		ng/L	2.0067	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0067	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0067	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0067	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0067	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0067	375-92-8	
PFDA*	Not detected	10		ng/L	2.0067	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0067	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0067	2991-50-6	
PFOS*	100	10		ng/L	2.0067	1763-23-1	
PFOS-LN*	30	10		ng/L	2.0067	1763-23-1-LN	
PFOS-BR*	60	10		ng/L	2.0067	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0067	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0067	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.0067	307-55-1	
PFDS*	Not detected	10		ng/L	2.0067	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0067	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0067	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0067	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94163.04

Sample Tag: HPT-13-GW-15

Collected Date/Time: 09/10/2018 12:10

Matrix: Groundwater

COC Reference: 114587

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR
1	1L Plastic	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/14/18 03:08, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.97	375-22-4	
PFPeA*	Not detected	10		ng/L	1.97	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.97	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.97	307-24-4	
PFBS*	Not detected	10		ng/L	1.97	375-73-5	
PFHpA*	Not detected	10		ng/L	1.97	375-85-9	
PFPeS*	Not detected	10		ng/L	1.97	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.97	27619-97-2	
PFOA*	20	10		ng/L	1.97	335-67-1	
PFHxS*	20	10		ng/L	1.97	355-46-4	
PFHxS-LN*	10	10		ng/L	1.97	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.97	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.97	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.97	39108-34-4	
PFHpS*	10	10		ng/L	1.97	375-92-8	
PFDA*	Not detected	10		ng/L	1.97	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.97	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.97	2991-50-6	
PFOS*	470	10		ng/L	1.97	1763-23-1	
PFOS-LN*	230	10		ng/L	1.97	1763-23-1-LN	
PFOS-BR*	230	10		ng/L	1.97	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.97	2058-94-8	
PFNS*	Not detected	10		ng/L	1.97	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.97	307-55-1	
PFDS*	Not detected	10		ng/L	1.97	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.97	72629-94-8	
FOSA*	Not detected	10		ng/L	1.97	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.97	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94163.05

Sample Tag: HPT-13-GW-29

Collected Date/Time: 09/10/2018 14:40

Matrix: Groundwater

COC Reference: 114587

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/14/18 03:28, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.06	375-22-4	
PFPeA*	Not detected	10		ng/L	2.06	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.06	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.06	307-24-4	
PFBS*	Not detected	10		ng/L	2.06	375-73-5	
PFHpA*	Not detected	10		ng/L	2.06	375-85-9	
PFPeS*	Not detected	10		ng/L	2.06	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.06	27619-97-2	
PFOA*	Not detected	10		ng/L	2.06	335-67-1	
PFHxS*	Not detected	10		ng/L	2.06	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.06	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.06	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.06	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.06	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.06	375-92-8	
PFDA*	Not detected	10		ng/L	2.06	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.06	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.06	2991-50-6	
PFOS*	310	10		ng/L	2.06	1763-23-1	
PFOS-LN*	200	10		ng/L	2.06	1763-23-1-LN	
PFOS-BR*	110	10		ng/L	2.06	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.06	2058-94-8	
PFNS*	Not detected	10		ng/L	2.06	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.06	307-55-1	
PFDS*	Not detected	10		ng/L	2.06	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.06	72629-94-8	
FOSA*	Not detected	10		ng/L	2.06	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.06	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94163.06

Sample Tag: EB-01

Collected Date/Time: 09/10/2018 12:50

Matrix: Liquid

COC Reference: 114587

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/14/18 03:47, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.01	375-22-4	
PFPeA*	Not detected	10		ng/L	2.01	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.01	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.01	307-24-4	
PFBS*	Not detected	10		ng/L	2.01	375-73-5	
PFHpA*	Not detected	10		ng/L	2.01	375-85-9	
PFPeS*	Not detected	10		ng/L	2.01	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.01	27619-97-2	
PFOA*	Not detected	10		ng/L	2.01	335-67-1	
PFHxS*	Not detected	10		ng/L	2.01	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.01	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.01	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.01	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.01	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.01	375-92-8	
PFDA*	Not detected	10		ng/L	2.01	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.01	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.01	2991-50-6	
PFOS*	Not detected	10		ng/L	2.01	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.01	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.01	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.01	2058-94-8	
PFNS*	Not detected	10		ng/L	2.01	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.01	307-55-1	
PFDS*	Not detected	10		ng/L	2.01	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.01	72629-94-8	
FOSA*	Not detected	10		ng/L	2.01	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.01	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94163

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF

Submitted:09/10/2018 16:45 Login User: SRS

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.3 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



Merit
Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # _____ OF _____

114587

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: *Clifford S. Yantz*

COMPANY: *O'Brien & Gere*

ADDRESS: *2260 East Saginaw St.*

CITY: *East Lansing, MI* STATE: *MI* ZIP CODE: *48823*

PHONE NO.: *313 3330211* FAX NO.: *—* P.O. NO.: *—*

E-MAIL ADDRESS: *Clifford.Yantz@obg.com* QUOTE NO.: *—*

CONTACT NAME: *SAME*

COMPANY: *SAME*

ADDRESS: *SAME*

CITY: *SAME* STATE: *SAME* ZIP CODE: *SAME*

PHONE NO.: *SAME* E-MAIL ADDRESS: *SAME*

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME: *AACER Coldwater Rd & F.* SAMPLER(S) - PLEASE PRINT/SIGN NAME: *Clifford Yantz / Clifford Yantz*

TURNAROUND TIME REQUIRED: 1 DAY 2 DAYS 3 DAYS STANDARD OTHER

DELIVERABLES REQUIRED: STD LEVEL II LEVEL III LEVEL IV EDD OTHER

Certifications

OHIO VAP Drinking Water

DoD NPDES

Project Locations

Detroit New York

Other _____

Special Instructions

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS (MI 24)							
	DATE	TIME																		
<i>94163.01</i>	<i>9/10/18</i>	<i>10:50</i>	<i>SS-01</i>	<i>L</i>	<i>3</i>	<i>X</i>							<i>X</i>							
<i>.02</i>	<i>11:00</i>		<i>FB-01</i>	<i>L</i>	<i>2</i>	<i>X</i>							<i>X</i>							
<i>.03</i>	<i>—</i>		<i>Dug-02</i>	<i>GW</i>	<i>3</i>	<i>X</i>							<i>X</i>							
<i>.04</i>	<i>12:10</i>		<i>HPT-13-GW-15</i>	<i>GW</i>	<i>4</i>	<i>X</i>							<i>X</i>							
<i>.05</i>	<i>14:40</i>		<i>HPT-13-GW-29</i>	<i>GW</i>	<i>3</i>	<i>X</i>							<i>X</i>							
<i>.06</i>	<i>12:50</i>		<i>EB-01</i>	<i>L</i>	<i>3</i>	<i>X</i>							<i>X</i>							
	<i>12:50</i>																			

RELINQUISHED BY: *Clifford Yantz / OBG* (Sampler) DATE: *9/10/18* TIME: *15:50*

RECEIVED BY: *[Signature]* DATE: *9/10/18* TIME: *15:50*

RELINQUISHED BY: *[Signature]* DATE: *9/10/18* TIME: *16:45*

RECEIVED BY: *[Signature]* DATE: *9/10/18* TIME: *16:45*

RELINQUISHED BY: _____ DATE: _____ TIME: _____

SIGNATURE/ORGANIZATION: _____

RECEIVED BY: _____ DATE: _____ TIME: _____

SIGNATURE/ORGANIZATION: _____

SEAL NO. SEAL INTACT INITIALS

YES NO

SEAL NO. SEAL INTACT INITIALS

YES NO

NOTES: *4.3* TEMP. ON ARRIVAL _____

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S94174.01(01)
Generated on 09/12/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94174.01-S94174.02
Project: RACER Coldwater Rd LF
Collected Date: 09/10/2018
Submitted Date/Time: 09/11/2018 10:47
Sampled by: Clifford Yantz
P.O. #: PO

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Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (2 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94174.01	SB-HPT-01-GW-62	Groundwater	09/10/18 16:30
S94174.02	SB-HPT-01-GW-72	Groundwater	09/10/18 17:40



Analytical Laboratory Report

Lab Sample ID: S94174.01

Sample Tag: SB-HPT-01-GW-62

Collected Date/Time: 09/10/2018 16:30

Matrix: Groundwater

COC Reference: 114588

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.8	IR
1	1L Plastic	None	Yes	5.8	IR

Organics

24 PFAs, Method: ASTM7979-17M, Run Date: 09/12/18 08:11, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.98	375-22-4	
PFPeA*	Not detected	10		ng/L	1.98	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.98	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.98	307-24-4	
PFBS*	Not detected	10		ng/L	1.98	375-73-5	
PFHpA*	Not detected	10		ng/L	1.98	375-85-9	
PFPeS*	Not detected	10		ng/L	1.98	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.98	27619-97-2	
PFOA*	Not detected	10		ng/L	1.98	335-67-1	
PFHxS*	Not detected	10		ng/L	1.98	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.98	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.98	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.98	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.98	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.98	375-92-8	
PFDA*	Not detected	10		ng/L	1.98	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.98	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.98	2991-50-6	
PFOS*	Not detected	10		ng/L	1.98	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.98	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.98	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.98	2058-94-8	
PFNS*	Not detected	10		ng/L	1.98	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.98	307-55-1	
PFDS*	Not detected	10		ng/L	1.98	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.98	72629-94-8	
FOSA*	Not detected	10		ng/L	1.98	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.98	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94174.02

Sample Tag: SB-HPT-01-GW-72

Collected Date/Time: 09/10/2018 17:40

Matrix: Groundwater

COC Reference: 114588

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.8	IR
1	1L Plastic	None	Yes	5.8	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/12/18 08:31, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2	375-22-4	
PFPeA*	Not detected	10		ng/L	2	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2	757124-72-4	
PFHxA*	Not detected	10		ng/L	2	307-24-4	
PFBS*	Not detected	10		ng/L	2	375-73-5	
PFHpA*	Not detected	10		ng/L	2	375-85-9	
PFPeS*	Not detected	10		ng/L	2	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2	27619-97-2	
PFOA*	Not detected	10		ng/L	2	335-67-1	
PFHxS*	Not detected	10		ng/L	2	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2	39108-34-4	
PFHpS*	Not detected	10		ng/L	2	375-92-8	
PFDA*	Not detected	10		ng/L	2	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2	2991-50-6	
PFOS*	Not detected	10		ng/L	2	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2	2058-94-8	
PFNS*	Not detected	10		ng/L	2	474511-07-4	
PFDODA*	Not detected	10		ng/L	2	307-55-1	
PFDS*	Not detected	10		ng/L	2	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2	72629-94-8	
FOSA*	Not detected	10		ng/L	2	754-91-6	
PFTeDA*	Not detected	10		ng/L	2	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94174

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF

Submitted:09/11/2018 10:47 Login User: SRS

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
Sample Receiving		
01.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 5.8
02.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box
05.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do sample have correct chemical preservation
11.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received
17.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time
19.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



Merit
Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # _____ OF _____

114588

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: Clifford S. Yantz
 COMPANY: O'Brien & Gere
 ADDRESS: 2260 East Saginaw St.
 CITY: East Lansing STATE: MI ZIP CODE: 48823
 PHONE NO.: 313 333 0211 FAX NO.: P.O. NO.: QUOTE NO.:
 E-MAIL ADDRESS: Clifford.Yantz@obg.com

CONTACT NAME: SAME
 COMPANY: SAME
 ADDRESS: SAME
 CITY: STATE: ZIP CODE:
 PHONE NO.: E-MAIL ADDRESS:
 ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME: RACER Caldwell, Md. LF. SAMPLER(S) - PLEASE PRINT/SIGN NAME: Clifford S. Yantz / [Signature]
 TURNAROUND TIME REQUIRED: 1 DAY 2 DAYS 3 DAYS STANDARD OTHER: 5 Day
 DELIVERABLES REQUIRED: STD LEVEL II LEVEL III LEVEL IV EDD OTHER

Certifications
 OHIO VAP Drinking Water
 DoD NPDES
 Project Locations
 Detroit New York
 Other _____
 Special Instructions

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER								
	DATE	TIME																		
94174.01	9/10/18	16:30	SB-14PT-01-GW-62	GW	4	X														
.02	9/10/18	17:40	SB-14PT-01-GW-72	GW	4	X														
<i>[Large diagonal signature]</i>																				

RELINQUISHED BY: [Signature] DATE: 9/10/18 TIME: 16:47
 RECEIVED BY: [Signature] DATE: 9/11/18 TIME: 10:47

RELINQUISHED BY: SIGNATURE/ORGANIZATION DATE TIME
 RECEIVED BY: SIGNATURE/ORGANIZATION DATE TIME
 SEAL NO. SEAL INTACT YES NO INITIALS
 SEAL NO. SEAL INTACT YES NO INITIALS
 NOTES: TEMP. ON ARRIVAL: 5.8

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S94175.01(01)
Generated on 10/10/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94175.01-S94175.05
Project: RACER Coldwater Rd LF
Collected Date: 09/10/2018 - 09/11/2018
Submitted Date/Time: 09/11/2018 10:47
Sampled by: Clifford Yantz
P.O. #: PO

Table of Contents

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Report Narrative (Page 2)
Laboratory Certifications (Page 3)
Qualifier Descriptions (Page 3)
Glossary of Abbreviations (Page 3)
Method Summary (Page 4)
Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

Samples .03 and .04 contained silt. Samples had to be centrifuged and poured off prior to PFC analysis.



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
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DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
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North Carolina DOH	#26702
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Qualifier Descriptions

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I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
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T	No correction for total solids
X	Elevated reporting limit due to matrix interference
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b	Value detected less than reporting limit, but greater than MDL
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p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
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Glossary of Abbreviations

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E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979	
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
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PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (5 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94175.01	HPT-10-GW-38	Groundwater	09/10/18 17:10
S94175.02	HPT-09-GW-39	Groundwater	09/10/18 16:10
S94175.03	HPT-12-GW-39.7	Groundwater	09/10/18 18:13
S94175.04	HPT-08-GW-25	Groundwater	09/10/18 18:40
S94175.05	FB-05	Liquid	09/11/18 09:55



Analytical Laboratory Report

Lab Sample ID: S94175.01

Sample Tag: HPT-10-GW-38

Collected Date/Time: 09/10/2018 17:10

Matrix: Groundwater

COC Reference: 107361

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.8	IR
1	1L Plastic	None	Yes	5.8	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/24/18 23:33, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.93	375-22-4	
PFPeA*	Not detected	10		ng/L	1.93	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.93	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.93	307-24-4	
PFBS*	Not detected	10		ng/L	1.93	375-73-5	
PFHpA*	Not detected	10		ng/L	1.93	375-85-9	
PFPeS*	Not detected	10		ng/L	1.93	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.93	27619-97-2	
PFOA*	Not detected	10		ng/L	1.93	335-67-1	
PFHxS*	Not detected	10		ng/L	1.93	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.93	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.93	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.93	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.93	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.93	375-92-8	
PFDA*	Not detected	10		ng/L	1.93	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.93	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.93	2991-50-6	
PFOS*	Not detected	10		ng/L	1.93	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.93	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.93	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.93	2058-94-8	
PFNS*	Not detected	10		ng/L	1.93	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.93	307-55-1	
PFDS*	Not detected	10		ng/L	1.93	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.93	72629-94-8	
FOSA*	Not detected	10		ng/L	1.93	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.93	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94175.02

Sample Tag: HPT-09-GW-39

Collected Date/Time: 09/10/2018 16:10

Matrix: Groundwater

COC Reference: 107361

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.8	IR
1	1L Plastic	None	Yes	5.8	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/24/18 23:52, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.03	375-22-4	
PFPeA*	Not detected	10		ng/L	2.03	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.03	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.03	307-24-4	
PFBS*	Not detected	10		ng/L	2.03	375-73-5	
PFHpA*	Not detected	10		ng/L	2.03	375-85-9	
PFPeS*	Not detected	10		ng/L	2.03	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.03	27619-97-2	
PFOA*	Not detected	10		ng/L	2.03	335-67-1	
PFHxS*	Not detected	10		ng/L	2.03	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.03	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.03	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.03	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.03	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.03	375-92-8	
PFDA*	Not detected	10		ng/L	2.03	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.03	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.03	2991-50-6	
PFOS*	Not detected	10		ng/L	2.03	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.03	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.03	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.03	2058-94-8	
PFNS*	Not detected	10		ng/L	2.03	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.03	307-55-1	
PFDS*	Not detected	10		ng/L	2.03	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.03	72629-94-8	
FOSA*	Not detected	10		ng/L	2.03	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.03	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94175.03

Sample Tag: HPT-12-GW-39.7

Collected Date/Time: 09/10/2018 18:13

Matrix: Groundwater

COC Reference: 107361

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.8	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml) (Rep#)	1.8/6.67/10	ASTMD7979	09/25/18 13:30	PL	

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/25/18 00:12, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.92	375-22-4	
PFPeA*	Not detected	10		ng/L	1.92	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.92	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.92	307-24-4	
PFBS*	Not detected	10		ng/L	1.92	375-73-5	
PFHpA*	Not detected	10		ng/L	1.92	375-85-9	
PFPeS*	Not detected	10		ng/L	1.92	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.92	27619-97-2	
PFOA*	Not detected	10		ng/L	1.92	335-67-1	
PFHxS*	Not detected	10		ng/L	1.92	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.92	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.92	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.92	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.92	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.92	375-92-8	
PFDA*	Not detected	10		ng/L	1.92	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.92	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.92	2991-50-6	
PFOS*	10	10		ng/L	1.92	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.92	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.92	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.92	2058-94-8	
PFNS*	Not detected	10		ng/L	1.92	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.92	307-55-1	
PFDS*	Not detected	10		ng/L	1.92	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.92	72629-94-8	
FOSA*	Not detected	10		ng/L	1.92	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.92	376-06-7	I

24 PFAs (Replicate 01), Method: ASTMD7979-17M, Run Date: 09/26/18 00:16, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.949	375-22-4	
PFPeA*	Not detected	10		ng/L	1.949	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.949	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.949	307-24-4	
PFBS*	Not detected	10		ng/L	1.949	375-73-5	

I-Matrix interference with internal standard



Analytical Laboratory Report

Lab Sample ID: S94175.03 (continued)

Sample Tag: HPT-12-GW-39.7

24 PFAs (Replicate 01), Method: ASTM D7979-17M, Run Date: 09/26/18 00:16, Analyst: PL (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFHpA*	Not detected	10		ng/L	1.949	375-85-9	
PFPeS*	Not detected	10		ng/L	1.949	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.949	27619-97-2	
PFOA*	Not detected	10		ng/L	1.949	335-67-1	
PFHxS*	Not detected	10		ng/L	1.949	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.949	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.949	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.949	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.949	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.949	375-92-8	
PFDA*	Not detected	10		ng/L	1.949	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.949	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.949	2991-50-6	
PFOS*	Not detected	10		ng/L	1.949	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.949	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.949	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.949	2058-94-8	
PFNS*	Not detected	10		ng/L	1.949	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.949	307-55-1	
PFDS*	Not detected	10		ng/L	1.949	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.949	72629-94-8	
FOSA*	Not detected	10		ng/L	1.949	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.949	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94175.04

Sample Tag: HPT-08-GW-25

Collected Date/Time: 09/10/2018 18:40

Matrix: Groundwater

COC Reference: 107361

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	1L Plastic	None	Yes	5.8	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/25/18 00:31, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	20	20		ng/L	2.04	375-22-4	
PFPeA*	Not detected	10		ng/L	2.04	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.04	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.04	307-24-4	
PFBS*	Not detected	10		ng/L	2.04	375-73-5	
PFHpA*	Not detected	10		ng/L	2.04	375-85-9	
PFPeS*	Not detected	10		ng/L	2.04	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.04	27619-97-2	
PFOA*	Not detected	10		ng/L	2.04	335-67-1	
PFHxS*	Not detected	10		ng/L	2.04	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.04	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.04	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.04	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.04	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.04	375-92-8	
PFDA*	Not detected	10		ng/L	2.04	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.04	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.04	2991-50-6	
PFOS*	30	10		ng/L	2.04	1763-23-1	
PFOS-LN*	10	10		ng/L	2.04	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.04	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.04	2058-94-8	
PFNS*	Not detected	10		ng/L	2.04	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.04	307-55-1	
PFDS*	Not detected	10		ng/L	2.04	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.04	72629-94-8	
FOSA*	Not detected	10		ng/L	2.04	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.04	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94175.05

Sample Tag: FB-05

Collected Date/Time: 09/11/2018 09:55

Matrix: Liquid

COC Reference: 107361

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.8	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/25/18 00:51, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.91	375-22-4	
PFPeA*	Not detected	10		ng/L	1.91	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.91	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.91	307-24-4	
PFBS*	Not detected	10		ng/L	1.91	375-73-5	
PFHpA*	Not detected	10		ng/L	1.91	375-85-9	
PFPeS*	Not detected	10		ng/L	1.91	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.91	27619-97-2	
PFOA*	Not detected	10		ng/L	1.91	335-67-1	
PFHxS*	Not detected	10		ng/L	1.91	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.91	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.91	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.91	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.91	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.91	375-92-8	
PFDA*	Not detected	10		ng/L	1.91	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.91	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.91	2991-50-6	
PFOS*	Not detected	10		ng/L	1.91	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.91	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.91	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.91	2058-94-8	
PFNS*	Not detected	10		ng/L	1.91	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.91	307-55-1	
PFDS*	Not detected	10		ng/L	1.91	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.91	72629-94-8	
FOSA*	Not detected	10		ng/L	1.91	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.91	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94175

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF

Submitted:09/11/2018 10:47 Login User: SRS

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
Sample Receiving		
01.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 5.8
02.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box
05.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Do sample have correct chemical preservation
11.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received
17.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time
19.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



Merit Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # _____ OF _____

107361

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: Clifford S. Yantke
 COMPANY: O'Brien & Gere
 ADDRESS: 2260 East Saginaw St.
 CITY: East Lansing STATE: MI ZIP CODE: 48823
 PHONE NO.: 313 3330211 FAX NO.: P.O. NO.:
 E-MAIL ADDRESS: Clifford.Yantke@obg.com QUOTE NO.:

CONTACT NAME: SAME
 COMPANY: SAME
 ADDRESS: SAME
 CITY: STATE: ZIP CODE:
 PHONE NO.: E-MAIL ADDRESS:

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME: RACKER Coldwater Area LF
 SAMPLER(S) - PLEASE PRINT/SIGN NAME: Clifford S. Yantke / O'Brien & Gere
 TURNAROUND TIME REQUIRED: 1 DAY 2 DAYS 3 DAYS STANDARD OTHER
 DELIVERABLES REQUIRED: STD LEVEL II LEVEL III LEVEL IV EDD OTHER

Certifications
 OHIO VAP Drinking Water
 DoD NPDES
 Project Locations
 Detroit New York
 Other _____
 Special Instructions

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS (MEQ)
	DATE	TIME											
94175.01	9/10/18	17:10	HPT-10-GW-38	GW	4	X							X
.02	9/10/18	16:10	HPT-09-GW-39	GW	4	X							X
.03	9/10/18	18:13	HPT-12-GW-39.7	GW	3	X							X
.04	9/10/18	18:40	HPT-08-GW-25	GW	1	X							X
.05	9/11/18	09:55	FB-05	L	2	X							X

RELINQUISHED BY: [Signature] DATE: 9/11/18 TIME: 10:47
 RECEIVED BY: [Signature] DATE: 9/11/18 TIME: 10:47

RELINQUISHED BY: DATE: TIME:
 RECEIVED BY: DATE: TIME:
 SEAL NO. SEAL INTACT YES NO INITIALS
 NOTES: TEMP. ON ARRIVAL: 58



Report ID: S94223.01(02)
Generated on 09/26/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94223.01-S94223.04
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/11/2018 - 09/12/2018
Submitted Date/Time: 09/12/2018 16:15
Sampled by: Kevin Schneider
P.O. #: PO

Table of Contents

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Maya Murshak
Technical Director



General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

All analyses completed



Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Method Summary

Method	Version
ASTMD7979	
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94223.01	SB-HPT-02-GW-70	Groundwater	09/11/18 17:00
S94223.02	SB-HPT-02-GW-80	Groundwater	09/12/18 10:15
S94223.03	HPT-16-GW-45	Groundwater	09/12/18 11:58
S94223.04	SB-HPT-02-GW-87	Groundwater	09/12/18 13:25



Analytical Laboratory Report

Lab Sample ID: S94223.01

Sample Tag: SB-HPT-02-GW-70

Collected Date/Time: 09/11/2018 17:00

Matrix: Groundwater

COC Reference: 114594

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR
1	1L Plastic	None	Yes	4.8	IR

Organics

24 PFAs, Method: ASTM7979-17M, Run Date: 09/14/18 04:07, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.93	375-22-4	
PFPeA*	Not detected	10		ng/L	1.93	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.93	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.93	307-24-4	
PFBS*	Not detected	10		ng/L	1.93	375-73-5	
PFHpA*	Not detected	10		ng/L	1.93	375-85-9	
PFPeS*	Not detected	10		ng/L	1.93	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.93	27619-97-2	
PFOA*	Not detected	10		ng/L	1.93	335-67-1	
PFHxS*	Not detected	10		ng/L	1.93	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.93	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.93	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.93	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.93	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.93	375-92-8	
PFDA*	Not detected	10		ng/L	1.93	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.93	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.93	2991-50-6	
PFOS*	Not detected	10		ng/L	1.93	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.93	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.93	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.93	2058-94-8	
PFNS*	Not detected	10		ng/L	1.93	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.93	307-55-1	
PFDS*	Not detected	10		ng/L	1.93	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.93	72629-94-8	
FOSA*	Not detected	10		ng/L	1.93	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.93	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94223.02

Sample Tag: SB-HPT-02-GW-80

Collected Date/Time: 09/12/2018 10:15

Matrix: Groundwater

COC Reference: 114594

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR
1	1L Plastic	None	Yes	4.8	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/14/18 04:26, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2	375-22-4	
PFPeA*	Not detected	10		ng/L	2	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2	757124-72-4	
PFHxA*	Not detected	10		ng/L	2	307-24-4	
PFBS*	Not detected	10		ng/L	2	375-73-5	
PFHpA*	Not detected	10		ng/L	2	375-85-9	
PFPeS*	Not detected	10		ng/L	2	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2	27619-97-2	
PFOA*	Not detected	10		ng/L	2	335-67-1	
PFHxS*	Not detected	10		ng/L	2	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2	39108-34-4	
PFHpS*	Not detected	10		ng/L	2	375-92-8	
PFDA*	Not detected	10		ng/L	2	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2	2991-50-6	
PFOS*	Not detected	10		ng/L	2	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2	2058-94-8	
PFNS*	Not detected	10		ng/L	2	474511-07-4	
PFDODA*	Not detected	10		ng/L	2	307-55-1	
PFDS*	Not detected	10		ng/L	2	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2	72629-94-8	
FOSA*	Not detected	10		ng/L	2	754-91-6	
PFTeDA*	Not detected	10		ng/L	2	376-06-7	



Analytical Laboratory Report

Final Report

Lab Sample ID: S94223.03

Sample Tag: HPT-16-GW-45

Collected Date/Time: 09/12/2018 11:58

Matrix: Groundwater

COC Reference: 114594

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR
1	1L Plastic	None	Yes	4.8	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml) (Rep)	2.33/6.83/11	ASTMD7979	09/22/18 16:00	PL	

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/14/18 04:46, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.01	375-22-4	
PFPeA*	Not detected	10		ng/L	2.01	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.01	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.01	307-24-4	
PFBS*	Not detected	10		ng/L	2.01	375-73-5	
PFHpA*	Not detected	10		ng/L	2.01	375-85-9	
PFPeS*	Not detected	10		ng/L	2.01	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.01	27619-97-2	
PFOA*	Not detected	10		ng/L	2.01	335-67-1	
PFHxS*	10	10		ng/L	2.01	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.01	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.01	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.01	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.01	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.01	375-92-8	
PFDA*	Not detected	10		ng/L	2.01	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.01	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.01	2991-50-6	
PFOS*	Not detected	10		ng/L	2.01	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.01	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.01	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.01	2058-94-8	
PFNS*	Not detected	10		ng/L	2.01	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.01	307-55-1	
PFDS*	Not detected	10		ng/L	2.01	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.01	72629-94-8	
FOSA*	Not detected	10		ng/L	2.01	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.01	376-06-7	I

24 PFAs (Replicate 01), Method: ASTMD7979-17M, Run Date: 09/24/18 22:35, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2	375-22-4	
PFPeA*	Not detected	10		ng/L	2	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2	757124-72-4	
PFHxA*	Not detected	10		ng/L	2	307-24-4	

I-Matrix interference with internal standard



Lab Sample ID: S94223.03 (continued)

Sample Tag: HPT-16-GW-45

24 PFAs (Replicate 01), Method: ASTM D7979-17M, Run Date: 09/24/18 22:35, Analyst: PL (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBS*	Not detected	10		ng/L	2	375-73-5	
PFHpA*	Not detected	10		ng/L	2	375-85-9	
PFPeS*	Not detected	10		ng/L	2	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2	27619-97-2	
PFOA*	Not detected	10		ng/L	2	335-67-1	
PFHxS*	Not detected	10		ng/L	2	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2	39108-34-4	
PFHpS*	Not detected	10		ng/L	2	375-92-8	
PFDA*	Not detected	10		ng/L	2	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2	2991-50-6	
PFOS*	Not detected	10		ng/L	2	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2	2058-94-8	
PFNS*	Not detected	10		ng/L	2	474511-07-4	
PFDODA*	Not detected	10		ng/L	2	307-55-1	
PFDS*	Not detected	10		ng/L	2	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2	72629-94-8	
FOSA*	Not detected	10		ng/L	2	754-91-6	
PFTeDA*	Not detected	10		ng/L	2	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94223.04

Sample Tag: SB-HPT-02-GW-87

Collected Date/Time: 09/12/2018 13:25

Matrix: Groundwater

COC Reference: 114594

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR
1	1L Plastic	None	Yes	4.8	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/14/18 05:05, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.95	375-22-4	
PFPeA*	Not detected	10		ng/L	1.95	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.95	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.95	307-24-4	
PFBS*	Not detected	10		ng/L	1.95	375-73-5	
PFHpA*	Not detected	10		ng/L	1.95	375-85-9	
PFPeS*	Not detected	10		ng/L	1.95	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.95	27619-97-2	
PFOA*	Not detected	10		ng/L	1.95	335-67-1	
PFHxS*	Not detected	10		ng/L	1.95	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.95	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.95	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.95	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.95	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.95	375-92-8	
PFDA*	Not detected	10		ng/L	1.95	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.95	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.95	2991-50-6	
PFOS*	Not detected	10		ng/L	1.95	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.95	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.95	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.95	2058-94-8	
PFNS*	Not detected	10		ng/L	1.95	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.95	307-55-1	
PFDS*	Not detected	10		ng/L	1.95	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.95	72629-94-8	
FOSA*	Not detected	10		ng/L	1.95	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.95	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94223

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted:09/12/2018 16:15 Login User: SRS

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
Sample Receiving		
01.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 4.8
02.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box
05.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do sample have correct chemical preservation
11.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received
17.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time
19.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



Analytical Laboratory Report

Report ID: S94225.01(01)
Generated on 10/10/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94225.01-S94225.09
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/11/2018 - 09/12/2018
Submitted Date/Time: 09/12/2018 16:15
Sampled by: Kevin Schneider
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979	
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (9 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94225.01	HPT-11-GW-34	Groundwater	09/11/18 10:17
S94225.02	HPT-14-GW-24	Groundwater	09/11/18 14:39
S94225.03	HPT-15-GW-15	Groundwater	09/11/18 17:04
S94225.04	FB-06	Water	09/12/18 10:30
S94225.05	HPT-16-GW-35	Groundwater	09/12/18 13:45
S94225.06	DUP-03	Groundwater	09/12/18 00:01
S94225.07	HPT-16-GW-25	Groundwater	09/12/18 14:50
S94225.08	EB-02	Water	09/12/18 13:38
S94225.09	EB-03	Water	09/12/18 15:10



Analytical Laboratory Report

Lab Sample ID: S94225.01

Sample Tag: HPT-11-GW-34

Collected Date/Time: 09/11/2018 10:17

Matrix: Groundwater

COC Reference: 114593

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR
1	1L Plastic	None	Yes	4.8	IR

Organics

24 PFAs, Method: ASTM7979-17M, Run Date: 09/25/18 01:10, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.81	375-22-4	
PFPeA*	Not detected	10		ng/L	1.81	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.81	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.81	307-24-4	
PFBS*	Not detected	10		ng/L	1.81	375-73-5	
PFHpA*	Not detected	10		ng/L	1.81	375-85-9	
PFPeS*	Not detected	10		ng/L	1.81	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.81	27619-97-2	
PFOA*	Not detected	10		ng/L	1.81	335-67-1	
PFHxS*	Not detected	10		ng/L	1.81	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.81	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.81	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.81	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.81	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.81	375-92-8	
PFDA*	Not detected	10		ng/L	1.81	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.81	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.81	2991-50-6	
PFOS*	Not detected	10		ng/L	1.81	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.81	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.81	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.81	2058-94-8	
PFNS*	Not detected	10		ng/L	1.81	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.81	307-55-1	
PFDS*	Not detected	10		ng/L	1.81	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.81	72629-94-8	
FOSA*	Not detected	10		ng/L	1.81	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.81	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94225.02

Sample Tag: HPT-14-GW-24

Collected Date/Time: 09/11/2018 14:39

Matrix: Groundwater

COC Reference: 114593

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR
1	1L Plastic	None	Yes	4.8	IR

Organics

24 PFAs, Method: ASTM7979-17M, Run Date: 09/25/18 01:30, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.03	375-22-4	
PFPeA*	Not detected	10		ng/L	2.03	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.03	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.03	307-24-4	
PFBS*	Not detected	10		ng/L	2.03	375-73-5	
PFHpA*	Not detected	10		ng/L	2.03	375-85-9	
PFPeS*	10	10		ng/L	2.03	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.03	27619-97-2	
PFOA*	10	10		ng/L	2.03	335-67-1	
PFHxS*	70	10		ng/L	2.03	355-46-4	
PFHxS-LN*	60	10		ng/L	2.03	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.03	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.03	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.03	39108-34-4	
PFHpS*	30	10		ng/L	2.03	375-92-8	
PFDA*	Not detected	10		ng/L	2.03	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.03	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.03	2991-50-6	
PFOS*	1,830	10		ng/L	2.03	1763-23-1	
PFOS-LN*	920	10		ng/L	2.03	1763-23-1-LN	
PFOS-BR*	940	10		ng/L	2.03	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.03	2058-94-8	
PFNS*	Not detected	10		ng/L	2.03	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.03	307-55-1	
PFDS*	Not detected	10		ng/L	2.03	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.03	72629-94-8	
FOSA*	Not detected	10		ng/L	2.03	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.03	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94225.03

Sample Tag: HPT-15-GW-15

Collected Date/Time: 09/11/2018 17:04

Matrix: Groundwater

COC Reference: 114593

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR
1	1L Plastic	None	Yes	4.8	IR

Organics

24 PFAs, Method: ASTM7979-17M, Run Date: 09/25/18 01:49, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.96	375-22-4	
PFPeA*	Not detected	10		ng/L	1.96	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.96	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.96	307-24-4	
PFBS*	Not detected	10		ng/L	1.96	375-73-5	
PFHpA*	Not detected	10		ng/L	1.96	375-85-9	
PFPeS*	Not detected	10		ng/L	1.96	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.96	27619-97-2	
PFOA*	Not detected	10		ng/L	1.96	335-67-1	
PFHxS*	Not detected	10		ng/L	1.96	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.96	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.96	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.96	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.96	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.96	375-92-8	
PFDA*	Not detected	10		ng/L	1.96	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.96	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.96	2991-50-6	
PFOS*	Not detected	10		ng/L	1.96	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.96	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.96	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.96	2058-94-8	
PFNS*	Not detected	10		ng/L	1.96	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.96	307-55-1	
PFDS*	Not detected	10		ng/L	1.96	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.96	72629-94-8	
FOSA*	Not detected	10		ng/L	1.96	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.96	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94225.04

Sample Tag: FB-06

Collected Date/Time: 09/12/2018 10:30

Matrix: Water

COC Reference: 114593

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/25/18 02:09, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.08	375-22-4	
PFPeA*	Not detected	10		ng/L	2.08	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.08	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.08	307-24-4	
PFBS*	Not detected	10		ng/L	2.08	375-73-5	
PFHpA*	Not detected	10		ng/L	2.08	375-85-9	
PFPeS*	Not detected	10		ng/L	2.08	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.08	27619-97-2	
PFOA*	Not detected	10		ng/L	2.08	335-67-1	
PFHxS*	Not detected	10		ng/L	2.08	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.08	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.08	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.08	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.08	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.08	375-92-8	
PFDA*	Not detected	10		ng/L	2.08	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.08	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.08	2991-50-6	
PFOS*	Not detected	10		ng/L	2.08	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.08	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.08	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.08	2058-94-8	
PFNS*	Not detected	10		ng/L	2.08	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.08	307-55-1	
PFDS*	Not detected	10		ng/L	2.08	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.08	72629-94-8	
FOSA*	Not detected	10		ng/L	2.08	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.08	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94225.05

Sample Tag: HPT-16-GW-35

Collected Date/Time: 09/12/2018 13:45

Matrix: Groundwater

COC Reference: 114593

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR
1	1L Plastic	None	Yes	4.8	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/25/18 02:28, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2	375-22-4	
PFPeA*	Not detected	10		ng/L	2	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2	757124-72-4	
PFHxA*	Not detected	10		ng/L	2	307-24-4	
PFBS*	Not detected	10		ng/L	2	375-73-5	
PFHpA*	Not detected	10		ng/L	2	375-85-9	
PFPeS*	Not detected	10		ng/L	2	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2	27619-97-2	
PFOA*	Not detected	10		ng/L	2	335-67-1	
PFHxS*	10	10		ng/L	2	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2	39108-34-4	
PFHpS*	Not detected	10		ng/L	2	375-92-8	
PFDA*	Not detected	10		ng/L	2	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2	2991-50-6	
PFOS*	Not detected	10		ng/L	2	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2	2058-94-8	
PFNS*	Not detected	10		ng/L	2	474511-07-4	
PFDODA*	Not detected	10		ng/L	2	307-55-1	
PFDS*	Not detected	10		ng/L	2	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2	72629-94-8	
FOSA*	Not detected	10		ng/L	2	754-91-6	
PFTeDA*	Not detected	10		ng/L	2	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94225.06

Sample Tag: DUP-03

Collected Date/Time: 09/12/2018 00:01

Matrix: Groundwater

COC Reference: 114593

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR
1	1L Plastic	None	Yes	4.8	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml) (Rep)	2.24/6.73/11	ASTMD7979	09/25/18 13:30	PL	

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/25/18 02:48, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.91	375-22-4	
PFPeA*	Not detected	10		ng/L	1.91	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.91	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.91	307-24-4	
PFBS*	Not detected	10		ng/L	1.91	375-73-5	
PFHpA*	Not detected	10		ng/L	1.91	375-85-9	
PFPeS*	Not detected	10		ng/L	1.91	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.91	27619-97-2	
PFOA*	Not detected	10		ng/L	1.91	335-67-1	
PFHxS*	10	10		ng/L	1.91	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.91	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.91	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.91	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.91	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.91	375-92-8	
PFDA*	Not detected	10		ng/L	1.91	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.91	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.91	2991-50-6	
PFOS*	Not detected	10		ng/L	1.91	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.91	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.91	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.91	2058-94-8	
PFNS*	Not detected	10		ng/L	1.91	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.91	307-55-1	
PFDS*	Not detected	10		ng/L	1.91	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.91	72629-94-8	
FOSA*	Not detected	10		ng/L	1.91	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.91	376-06-7	I

24 PFAs (Replicate 01), Method: ASTMD7979-17M, Run Date: 09/26/18 00:35, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.996	375-22-4	
PFPeA*	Not detected	10		ng/L	1.996	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.996	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.996	307-24-4	

I-Matrix interference with internal standard



Analytical Laboratory Report

Lab Sample ID: S94225.06 (continued)

Sample Tag: DUP-03

24 PFAs (Replicate 01), Method: ASTM D7979-17M, Run Date: 09/26/18 00:35, Analyst: PL (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBS*	Not detected	10		ng/L	1.996	375-73-5	
PFHpA*	Not detected	10		ng/L	1.996	375-85-9	
PFPeS*	Not detected	10		ng/L	1.996	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.996	27619-97-2	
PFOA*	Not detected	10		ng/L	1.996	335-67-1	
PFHxS*	10	10		ng/L	1.996	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.996	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.996	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.996	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.996	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.996	375-92-8	
PFDA*	Not detected	10		ng/L	1.996	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.996	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.996	2991-50-6	
PFOS*	Not detected	10		ng/L	1.996	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.996	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.996	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.996	2058-94-8	
PFNS*	Not detected	10		ng/L	1.996	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.996	307-55-1	
PFDS*	Not detected	10		ng/L	1.996	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.996	72629-94-8	
FOSA*	Not detected	10		ng/L	1.996	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.996	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94225.07

Sample Tag: HPT-16-GW-25

Collected Date/Time: 09/12/2018 14:50

Matrix: Groundwater

COC Reference: 114593

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR
1	1L Plastic	None	Yes	4.8	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/25/18 03:07, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.99	375-22-4	
PFPeA*	Not detected	10		ng/L	1.99	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.99	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.99	307-24-4	
PFBS*	Not detected	10		ng/L	1.99	375-73-5	
PFHpA*	Not detected	10		ng/L	1.99	375-85-9	
PFPeS*	Not detected	10		ng/L	1.99	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.99	27619-97-2	
PFOA*	Not detected	10		ng/L	1.99	335-67-1	
PFHxS*	Not detected	10		ng/L	1.99	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.99	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.99	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.99	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.99	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.99	375-92-8	
PFDA*	Not detected	10		ng/L	1.99	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.99	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.99	2991-50-6	
PFOS*	Not detected	10		ng/L	1.99	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.99	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.99	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.99	2058-94-8	
PFNS*	Not detected	10		ng/L	1.99	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.99	307-55-1	
PFDS*	Not detected	10		ng/L	1.99	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.99	72629-94-8	
FOSA*	Not detected	10		ng/L	1.99	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.99	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94225.08

Sample Tag: EB-02

Collected Date/Time: 09/12/2018 13:38

Matrix: Water

COC Reference: 114593

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/25/18 03:26, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.95	375-22-4	
PFPeA*	Not detected	10		ng/L	1.95	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.95	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.95	307-24-4	
PFBS*	Not detected	10		ng/L	1.95	375-73-5	
PFHpA*	Not detected	10		ng/L	1.95	375-85-9	
PFPeS*	Not detected	10		ng/L	1.95	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.95	27619-97-2	
PFOA*	Not detected	10		ng/L	1.95	335-67-1	
PFHxS*	Not detected	10		ng/L	1.95	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.95	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.95	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.95	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.95	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.95	375-92-8	
PFDA*	Not detected	10		ng/L	1.95	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.95	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.95	2991-50-6	
PFOS*	Not detected	10		ng/L	1.95	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.95	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.95	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.95	2058-94-8	
PFNS*	Not detected	10		ng/L	1.95	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.95	307-55-1	
PFDS*	Not detected	10		ng/L	1.95	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.95	72629-94-8	
FOSA*	Not detected	10		ng/L	1.95	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.95	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94225.09

Sample Tag: EB-03

Collected Date/Time: 09/12/2018 15:10

Matrix: Water

COC Reference: 114593

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.8	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/25/18 04:05, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.01	375-22-4	
PFPeA*	Not detected	10		ng/L	2.01	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.01	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.01	307-24-4	
PFBS*	Not detected	10		ng/L	2.01	375-73-5	
PFHpA*	Not detected	10		ng/L	2.01	375-85-9	
PFPeS*	Not detected	10		ng/L	2.01	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.01	27619-97-2	
PFOA*	Not detected	10		ng/L	2.01	335-67-1	
PFHxS*	Not detected	10		ng/L	2.01	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.01	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.01	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.01	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.01	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.01	375-92-8	
PFDA*	Not detected	10		ng/L	2.01	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.01	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.01	2991-50-6	
PFOS*	Not detected	10		ng/L	2.01	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.01	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.01	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.01	2058-94-8	
PFNS*	Not detected	10		ng/L	2.01	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.01	307-55-1	
PFDS*	Not detected	10		ng/L	2.01	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.01	72629-94-8	
FOSA*	Not detected	10		ng/L	2.01	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.01	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94225

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted:09/12/2018 16:15 Login User: SRS

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.8 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



Merit
Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

114593

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Clifford Yantz

COMPANY O'Brien & Gere

ADDRESS 2260 East Saginaw St

CITY East Lansing STATE MI ZIP CODE 48823

PHONE NO. 313-333-0211 FAX NO. _____ P.O. NO. _____

E-MAIL ADDRESS Clifford.Yantz@obg.com QUOTE NO. _____

CONTACT NAME SAME

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

PHONE NO. _____ E-MAIL ADDRESS _____

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME RACER Coldwater Rd LF -PFAS SAMPLER(S) - PLEASE PRINT/SIGN NAME Kevin Schneider

TURNAROUND TIME REQUIRED 1 DAY 2 DAYS 3 DAYS STANDARD OTHER _____

DELIVERABLES REQUIRED STD LEVEL II LEVEL III LEVEL IV EDD OTHER _____

PFAS (MTH)

Certifications
 OHIO VAP Drinking Water
 DoD NPDES

Project Locations
 Detroit New York
 Other _____

Special Instructions _____

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS (MTH)
	DATE	TIME											
94225.01	9/11/18	1017	HPT-11-GW-34	GW	4	4							X
.02	9/11/18	1439	HPT-14-GW-24	GW	4	4							X
.03	9/11/18	1704	HPT-15-GW-15	GW	4	4							X
.04	9/12/18	1030	FB-06	QC	2	2							X
.05	9/12/18	1345	HPT-16-GW-35	GW	4	4							X
.06	9/12/18	—	DUP-03	GW	4	4							X
.07	9/12/18	1450	HPT-16-GW-25	GW	4	4							X
.08	9/12/18	1338	EB-02	QC	3	3							X
.09	9/12/18	1510	EB-03	QC	3	3							X

RELINQUISHED BY: [Signature] OBG #Sampler [Signature] DATE 9/12/18 TIME 15:15

RECEIVED BY: [Signature] DATE 9/12/18 TIME 15:15

RELINQUISHED BY: [Signature] DATE 9/12/18 TIME 15:15

RECEIVED BY: [Signature] DATE 9/12/18 TIME 16:15

RELINQUISHED BY: SIGNATURE/ORGANIZATION _____ DATE _____ TIME _____

RECEIVED BY: SIGNATURE/ORGANIZATION _____ DATE _____ TIME _____

SEAL NO. SEAL INTACT YES NO INITIALS _____

SEAL NO. SEAL INTACT YES NO INITIALS _____

NOTES: 4.8 TEMP. ON ARRIVAL _____

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S94252.01(01)
Generated on 09/19/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94252.01-S94252.04
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/13/2018
Submitted Date/Time: 09/13/2018 13:40
Sampled by: Kevin Schneider
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94252.01	HPT-17-GW-40	Groundwater	09/13/18 09:10
S94252.02	HPT-17-GW-30	Groundwater	09/13/18 10:16
S94252.03	HPT-18-GW-24	Groundwater	09/13/18 12:16
S94252.04	FB-07	Water	09/13/18 12:21



Analytical Laboratory Report

Lab Sample ID: S94252.01

Sample Tag: HPT-17-GW-40

Collected Date/Time: 09/13/2018 09:10

Matrix: Groundwater

COC Reference: 114589

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.9	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/18/18 08:43, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.95	375-22-4	
PFPeA*	Not detected	10		ng/L	1.95	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.95	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.95	307-24-4	
PFBS*	Not detected	10		ng/L	1.95	375-73-5	
PFHpA*	Not detected	10		ng/L	1.95	375-85-9	
PFPeS*	Not detected	10		ng/L	1.95	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.95	27619-97-2	
PFOA*	Not detected	10		ng/L	1.95	335-67-1	
PFHxS*	Not detected	10		ng/L	1.95	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.95	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.95	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.95	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.95	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.95	375-92-8	
PFDA*	Not detected	10		ng/L	1.95	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.95	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.95	2991-50-6	
PFOS*	Not detected	10		ng/L	1.95	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.95	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.95	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.95	2058-94-8	
PFNS*	Not detected	10		ng/L	1.95	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.95	307-55-1	
PFDS*	Not detected	10		ng/L	1.95	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.95	72629-94-8	
FOSA*	Not detected	10		ng/L	1.95	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.95	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94252.02

Sample Tag: HPT-17-GW-30

Collected Date/Time: 09/13/2018 10:16

Matrix: Groundwater

COC Reference: 114589

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.9	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/18/18 09:02, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.04	375-22-4	
PFPeA*	Not detected	10		ng/L	2.04	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.04	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.04	307-24-4	
PFBS*	Not detected	10		ng/L	2.04	375-73-5	
PFHpA*	Not detected	10		ng/L	2.04	375-85-9	
PFPeS*	Not detected	10		ng/L	2.04	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.04	27619-97-2	
PFOA*	Not detected	10		ng/L	2.04	335-67-1	
PFHxS*	Not detected	10		ng/L	2.04	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.04	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.04	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.04	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.04	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.04	375-92-8	
PFDA*	Not detected	10		ng/L	2.04	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.04	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.04	2991-50-6	
PFOS*	Not detected	10		ng/L	2.04	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.04	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.04	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.04	2058-94-8	
PFNS*	Not detected	10		ng/L	2.04	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.04	307-55-1	
PFDS*	Not detected	10		ng/L	2.04	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.04	72629-94-8	
FOSA*	Not detected	10		ng/L	2.04	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.04	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94252.03

Sample Tag: HPT-18-GW-24

Collected Date/Time: 09/13/2018 12:16

Matrix: Groundwater

COC Reference: 114589

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.9	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/18/18 09:22, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9	307-24-4	
PFBS*	Not detected	10		ng/L	1.9	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9	375-92-8	
PFDA*	Not detected	10		ng/L	1.9	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.9	307-55-1	
PFDS*	Not detected	10		ng/L	1.9	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94252.04

Sample Tag: FB-07

Collected Date/Time: 09/13/2018 12:21

Matrix: Water

COC Reference: 114589

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.9	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/18/18 09:41, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.88	375-22-4	
PFPeA*	Not detected	10		ng/L	1.88	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.88	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.88	307-24-4	
PFBS*	Not detected	10		ng/L	1.88	375-73-5	
PFHpA*	Not detected	10		ng/L	1.88	375-85-9	
PFPeS*	Not detected	10		ng/L	1.88	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.88	27619-97-2	
PFOA*	Not detected	10		ng/L	1.88	335-67-1	
PFHxS*	Not detected	10		ng/L	1.88	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.88	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.88	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.88	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.88	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.88	375-92-8	
PFDA*	Not detected	10		ng/L	1.88	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.88	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.88	2991-50-6	
PFOS*	Not detected	10		ng/L	1.88	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.88	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.88	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.88	2058-94-8	
PFNS*	Not detected	10		ng/L	1.88	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.88	307-55-1	
PFDS*	Not detected	10		ng/L	1.88	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.88	72629-94-8	
FOSA*	Not detected	10		ng/L	1.88	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.88	376-06-7	I

I-Matrix interference with internal standard

Merit Laboratories Login Checklist

Lab Set ID:S94252

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted:09/13/2018 13:40 Login User: MMC

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.9 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



Merit
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Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

114589

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Clifford Yantz
 COMPANY O'Brien & Gere
 ADDRESS 2260 East Saginaw St
 CITY East Lansing STATE MI ZIP CODE 48823
 PHONE NO. 313-333-0211 FAX NO. _____ P.O. NO. _____
 E-MAIL ADDRESS clifford.yantz@obg.com QUOTE NO. _____

CONTACT NAME X SAME
 COMPANY _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP CODE _____
 PHONE NO. _____ E-MAIL ADDRESS _____

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME Racer Coldwater Rd CF- PFAS SAMPLER(S) - PLEASE PRINT/SIGN NAME Kevin Schneider KS
 TURNAROUND TIME REQUIRED 1 DAY 2 DAYS 3 DAYS STANDARD OTHER _____
 DELIVERABLES REQUIRED STD LEVEL II LEVEL III LEVEL IV EDD OTHER _____

Certifications
 OHIO VAP Drinking Water
 DoD NPDES
 Project Locations
 Detroit New York
 Other _____
 Special Instructions _____

MATRIX GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 CODE: SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS (M)
	DATE	TIME											
94252.01	9/13/18	9:0	HPT-17-GW-40	GW	3	3							X
.02	9/13/18	10:16	HPT-17-GW-30	GW	3	3							X
.03	9/13/18	12:16	HPT-18-GW-24	GW	3	3							X
.04	9/13/18	12:21	FB-07	QC	2	2							X

RELINQUISHED BY: [Signature] DATE 9/13/18 TIME 12:45
 RECEIVED BY: [Signature] DATE 9/12/18 TIME 12:45
 RELINQUISHED BY: [Signature] DATE 9/13/18 TIME 13:40
 RECEIVED BY: [Signature] DATE 9/13/18 TIME 13:40

RELINQUISHED BY: _____ DATE _____ TIME _____
 RECEIVED BY: _____ DATE _____ TIME _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 NOTES: TEMP. ON ARRIVAL 4.9

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S94460.01(01)
Generated on 09/21/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94460.01-S94460.03
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/17/2018 - 09/18/2018
Submitted Date/Time: 09/18/2018 14:30
Sampled by: Kevin Schneider
P.O. #: PO

Table of Contents

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (3 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94460.01	SB-HPT-07-GW-52	Groundwater	09/17/18 16:00
S94460.02	SB-HPT-07-GW-62	Groundwater	09/17/18 17:07
S94460.03	SB-HPT-07-GW-72	Groundwater	09/18/18 10:17



Analytical Laboratory Report

Lab Sample ID: S94460.01

Sample Tag: SB-HPT-07-GW-52

Collected Date/Time: 09/17/2018 16:00

Matrix: Groundwater

COC Reference: 114590

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.8	IR
1	1L Plastic	None	Yes	5.8	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/20/18 00:19, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.06	375-22-4	
PFPeA*	Not detected	10		ng/L	2.06	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.06	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.06	307-24-4	
PFBS*	Not detected	10		ng/L	2.06	375-73-5	
PFHpA*	Not detected	10		ng/L	2.06	375-85-9	
PFPeS*	Not detected	10		ng/L	2.06	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.06	27619-97-2	
PFOA*	Not detected	10		ng/L	2.06	335-67-1	
PFHxS*	Not detected	10		ng/L	2.06	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.06	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.06	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.06	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.06	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.06	375-92-8	
PFDA*	Not detected	10		ng/L	2.06	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.06	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.06	2991-50-6	
PFOS*	Not detected	10		ng/L	2.06	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.06	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.06	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.06	2058-94-8	
PFNS*	Not detected	10		ng/L	2.06	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.06	307-55-1	
PFDS*	Not detected	10		ng/L	2.06	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.06	72629-94-8	
FOSA*	Not detected	10		ng/L	2.06	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.06	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94460.02

Sample Tag: SB-HPT-07-GW-62

Collected Date/Time: 09/17/2018 17:07

Matrix: Groundwater

COC Reference: 114590

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.8	IR
1	1L Plastic	None	Yes	5.8	IR

Organics

24 PFAs, Method: ASTM7979-17M, Run Date: 09/20/18 00:39, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.01	375-22-4	
PFPeA*	Not detected	10		ng/L	2.01	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.01	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.01	307-24-4	
PFBS*	Not detected	10		ng/L	2.01	375-73-5	
PFHpA*	Not detected	10		ng/L	2.01	375-85-9	
PFPeS*	Not detected	10		ng/L	2.01	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.01	27619-97-2	
PFOA*	Not detected	10		ng/L	2.01	335-67-1	
PFHxS*	Not detected	10		ng/L	2.01	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.01	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.01	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.01	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.01	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.01	375-92-8	
PFDA*	Not detected	10		ng/L	2.01	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.01	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.01	2991-50-6	
PFOS*	Not detected	10		ng/L	2.01	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.01	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.01	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.01	2058-94-8	
PFNS*	Not detected	10		ng/L	2.01	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.01	307-55-1	
PFDS*	Not detected	10		ng/L	2.01	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.01	72629-94-8	
FOSA*	Not detected	10		ng/L	2.01	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.01	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94460.03

Sample Tag: SB-HPT-07-GW-72

Collected Date/Time: 09/18/2018 10:17

Matrix: Groundwater

COC Reference: 114590

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.8	IR
1	1L Plastic	None	Yes	5.8	IR

Organics

24 PFAs, Method: ASTM7979-17M, Run Date: 09/20/18 00:58, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.99	375-22-4	
PFPeA*	Not detected	10		ng/L	1.99	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.99	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.99	307-24-4	
PFBS*	Not detected	10		ng/L	1.99	375-73-5	
PFHpA*	Not detected	10		ng/L	1.99	375-85-9	
PFPeS*	Not detected	10		ng/L	1.99	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.99	27619-97-2	
PFOA*	Not detected	10		ng/L	1.99	335-67-1	
PFHxS*	Not detected	10		ng/L	1.99	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.99	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.99	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.99	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.99	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.99	375-92-8	
PFDA*	Not detected	10		ng/L	1.99	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.99	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.99	2991-50-6	
PFOS*	Not detected	10		ng/L	1.99	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.99	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.99	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.99	2058-94-8	
PFNS*	Not detected	10		ng/L	1.99	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.99	307-55-1	
PFDS*	Not detected	10		ng/L	1.99	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.99	72629-94-8	
FOSA*	Not detected	10		ng/L	1.99	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.99	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94460

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted:09/18/2018 14:30 Login User: MMC

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 5.8 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



Analytical Laboratory Report

Report ID: S94567.01(01)
Generated on 10/02/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94567.01-S94567.07
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/19/2018 - 09/20/2018
Submitted Date/Time: 09/21/2018 08:00
Sampled by: Kevin Schneider
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (7 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94567.01	SB-HPT-13-GW-62	Groundwater	09/19/18 11:42
S94567.02	DUP04	Groundwater	09/19/18 00:01
S94567.03	SB-HPT-13-GW-72	Groundwater	09/19/18 13:56
S94567.04	FB08	Water	09/19/18 11:44
S94567.05	EB04	Water	09/19/18 16:25
S94567.06	SB-HPT-16-GW-62	Groundwater	09/20/18 13:30
S94567.07	SB-HPT-16-GW-72	Groundwater	09/20/18 14:55



Analytical Laboratory Report

Lab Sample ID: S94567.01

Sample Tag: SB-HPT-13-GW-62

Collected Date/Time: 09/19/2018 11:42

Matrix: Groundwater

COC Reference: 114592

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR
1	1L Plastic	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/28/18 03:53, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0295	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0295	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0295	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0295	307-24-4	
PFBS*	Not detected	10		ng/L	2.0295	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0295	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0295	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0295	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0295	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0295	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0295	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0295	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0295	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0295	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0295	375-92-8	
PFDA*	Not detected	10		ng/L	2.0295	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0295	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0295	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0295	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0295	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0295	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0295	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0295	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.0295	307-55-1	
PFDS*	Not detected	10		ng/L	2.0295	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0295	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0295	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0295	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94567.02

Sample Tag: DUP04

Collected Date/Time: 09/19/2018 00:01

Matrix: Groundwater

COC Reference: 114592

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/28/18 04:12, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9713	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9713	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9713	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9713	307-24-4	
PFBS*	Not detected	10		ng/L	1.9713	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9713	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9713	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9713	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9713	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9713	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9713	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9713	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9713	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9713	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9713	375-92-8	
PFDA*	Not detected	10		ng/L	1.9713	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9713	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9713	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9713	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9713	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9713	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9713	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9713	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9713	307-55-1	
PFDS*	Not detected	10		ng/L	1.9713	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9713	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9713	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9713	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94567.03

Sample Tag: SB-HPT-13-GW-72

Collected Date/Time: 09/19/2018 13:56

Matrix: Groundwater

COC Reference: 114592

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR
1	1L Plastic	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTM7979-17M, Run Date: 09/28/18 04:32, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0725	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0725	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0725	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0725	307-24-4	
PFBS*	Not detected	10		ng/L	2.0725	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0725	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0725	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0725	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0725	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0725	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0725	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0725	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0725	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0725	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0725	375-92-8	
PFDA*	Not detected	10		ng/L	2.0725	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0725	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0725	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0725	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0725	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0725	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0725	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0725	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.0725	307-55-1	
PFDS*	Not detected	10		ng/L	2.0725	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0725	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0725	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0725	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94567.04

Sample Tag: FB08

Collected Date/Time: 09/19/2018 11:44

Matrix: Water

COC Reference: 114592

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/28/18 04:51, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0725	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0725	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0725	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0725	307-24-4	
PFBS*	Not detected	10		ng/L	2.0725	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0725	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0725	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0725	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0725	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0725	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0725	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0725	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0725	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0725	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0725	375-92-8	
PFDA*	Not detected	10		ng/L	2.0725	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0725	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0725	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0725	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0725	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0725	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0725	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0725	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.0725	307-55-1	
PFDS*	Not detected	10		ng/L	2.0725	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0725	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0725	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0725	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94567.05

Sample Tag: EB04

Collected Date/Time: 09/19/2018 16:25

Matrix: Water

COC Reference: 114592

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/28/18 05:11, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9538	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9538	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9538	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9538	307-24-4	
PFBS*	Not detected	10		ng/L	1.9538	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9538	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9538	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9538	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9538	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9538	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9538	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9538	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9538	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9538	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9538	375-92-8	
PFDA*	Not detected	10		ng/L	1.9538	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9538	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9538	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9538	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9538	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9538	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9538	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9538	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9538	307-55-1	
PFDS*	Not detected	10		ng/L	1.9538	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9538	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9538	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9538	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94567.06

Sample Tag: SB-HPT-16-GW-62

Collected Date/Time: 09/20/2018 13:30

Matrix: Groundwater

COC Reference: 114592

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR
1	1L Plastic	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/28/18 05:30, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0183	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0183	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0183	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0183	307-24-4	
PFBS*	Not detected	10		ng/L	2.0183	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0183	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0183	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0183	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0183	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0183	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0183	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0183	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0183	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0183	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0183	375-92-8	
PFDA*	Not detected	10		ng/L	2.0183	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0183	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0183	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0183	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0183	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0183	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0183	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0183	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.0183	307-55-1	
PFDS*	Not detected	10		ng/L	2.0183	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0183	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0183	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0183	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94567.07

Sample Tag: SB-HPT-16-GW-72

Collected Date/Time: 09/20/2018 14:55

Matrix: Groundwater

COC Reference: 114592

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR
1	250ml Plastic	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/28/18 05:49, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0036	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0036	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0036	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0036	307-24-4	
PFBS*	Not detected	10		ng/L	2.0036	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0036	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0036	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0036	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0036	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0036	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0036	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0036	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0036	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0036	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0036	375-92-8	
PFDA*	Not detected	10		ng/L	2.0036	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0036	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0036	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0036	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0036	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0036	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0036	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0036	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.0036	307-55-1	
PFDS*	Not detected	10		ng/L	2.0036	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0036	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0036	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0036	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94567

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted:09/21/2018 08:00 Login User: MMC

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701

FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.3 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



Merit
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C.O.C. PAGE # 1 OF 1

114592

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Clifford Yantz

COMPANY O'Brien & Gere

ADDRESS 2260 East Saginaw St

CITY East Lansing STATE MI ZIP CODE 48823

PHONE NO. 313-333-0211 FAX NO. _____ P.O. NO. _____

E-MAIL ADDRESS clifford.yantz@obg.com QUOTE NO. _____

CONTACT NAME SAME

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

PHONE NO. _____ E-MAIL ADDRESS _____

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME RACER Colbywater rd LF-PFAS SAMPLER(S) - PLEASE PRINT/SIGN NAME Kevin Schneider K SLL

TURNAROUND TIME REQUIRED 1 DAY 2 DAYS 3 DAYS STANDARD OTHER _____

DELIVERABLES REQUIRED STD LEVEL II LEVEL III LEVEL IV EDD OTHER _____

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS (MI 24)	Certifications		Project Locations		Special Instructions
	DATE	TIME												<input type="checkbox"/> OHIO VAP	<input type="checkbox"/> Drinking Water	<input type="checkbox"/> DoD	<input type="checkbox"/> NPDES	
94567.01	9-17-18	1142	SB-HPT-13-GW-62	GW	3	X							X					
.02		-	DUP04	GW	3	X							X					
.03		1356	SB-HPT-13-GW-72	GW	3	X							X					
.04		1144	PB08	QC	2	X							X					
.05		1625	EBO4	QC	3	V							X					
.06	9/20/18	1330	SB-HPT-16-GW-62	GW	3	X							X					
.07	9/20/18	1455	SB-HPT-16-GW-72	GW	3	X							X					

RELINQUISHED BY: K SLL OBGX Sampler DATE 9/20/18 TIME 10:30

RECEIVED BY: J Hamblet DATE 9/20/18 TIME 16:30

RELINQUISHED BY: J Hamblet DATE 9/20/18 TIME 16:50

RECEIVED BY: Merit Fridge DATE 9/20/18 TIME 16:50

RELINQUISHED BY: Merit Fridge DATE 9/21/18 TIME 0800

RECEIVED BY: M Dilco DATE 9/21/18 TIME 0800

SEAL NO. _____ SEAL INTACT YES NO INITIALS _____

SEAL NO. _____ SEAL INTACT YES NO INITIALS _____

NOTES: _____ TEMP. ON ARRIVAL 4.3

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S94570.01(01)
Generated on 10/11/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94570.01-S94570.07
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/19/2018 - 09/20/2018
Submitted Date/Time: 09/21/2018 08:00
Sampled by: Kevin Schneider
P.O. #: PO

Table of Contents

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979	
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (7 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94570.01	B-21D	Groundwater	09/19/18 14:27
S94570.02	B-20D	Groundwater	09/19/18 16:39
S94570.03	OBG MW-6	Groundwater	09/20/18 10:57
S94570.04	OBG MW-8	Groundwater	09/20/18 12:42
S94570.05	FB-01-GW	Water	09/20/18 14:10
S94570.06	OBG MW-7	Groundwater	09/20/18 14:02
S94570.07	OBG MW-9	Groundwater	09/20/18 15:30



Analytical Laboratory Report

Lab Sample ID: S94570.01

Sample Tag: B-21D

Collected Date/Time: 09/19/2018 14:27

Matrix: Groundwater

COC Reference: 114591

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 10/03/18 18:50, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0913	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0913	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0913	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0913	307-24-4	
PFBS*	Not detected	10		ng/L	2.0913	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0913	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0913	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0913	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0913	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0913	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0913	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0913	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0913	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0913	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0913	375-92-8	
PFDA*	Not detected	10		ng/L	2.0913	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0913	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0913	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0913	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0913	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0913	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0913	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0913	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.0913	307-55-1	
PFDS*	Not detected	10		ng/L	2.0913	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0913	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0913	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0913	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94570.02

Sample Tag: B-20D

Collected Date/Time: 09/19/2018 16:39

Matrix: Groundwater

COC Reference: 114591

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/28/18 06:29, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9608	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9608	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9608	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9608	307-24-4	
PFBS*	Not detected	10		ng/L	1.9608	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9608	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9608	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9608	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9608	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9608	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9608	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9608	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9608	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9608	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9608	375-92-8	
PFDA*	Not detected	10		ng/L	1.9608	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9608	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9608	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9608	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9608	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9608	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9608	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9608	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9608	307-55-1	
PFDS*	Not detected	10		ng/L	1.9608	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9608	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9608	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9608	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94570.03

Sample Tag: OBG MW-6

Collected Date/Time: 09/20/2018 10:57

Matrix: Groundwater

COC Reference: 114591

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/28/18 06:48, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	30	20		ng/L	2.0036	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0036	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0036	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0036	307-24-4	
PFBS*	Not detected	10		ng/L	2.0036	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0036	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0036	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0036	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0036	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0036	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0036	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0036	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0036	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0036	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0036	375-92-8	
PFDA*	Not detected	10		ng/L	2.0036	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0036	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0036	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0036	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0036	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0036	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0036	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0036	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.0036	307-55-1	
PFDS*	Not detected	10		ng/L	2.0036	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0036	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0036	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0036	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94570.04

Sample Tag: OBG MW-8

Collected Date/Time: 09/20/2018 12:42

Matrix: Groundwater

COC Reference: 114591

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/28/18 07:27, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.1073	375-22-4	
PFPeA*	Not detected	10		ng/L	2.1073	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.1073	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.1073	307-24-4	
PFBS*	Not detected	10		ng/L	2.1073	375-73-5	
PFHpA*	Not detected	10		ng/L	2.1073	375-85-9	
PFPeS*	Not detected	10		ng/L	2.1073	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.1073	27619-97-2	
PFOA*	20	10		ng/L	2.1073	335-67-1	
PFHxS*	70	10		ng/L	2.1073	355-46-4	
PFHxS-LN*	60	10		ng/L	2.1073	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.1073	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.1073	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.1073	39108-34-4	
PFHpS*	30	10		ng/L	2.1073	375-92-8	
PFDA*	Not detected	10		ng/L	2.1073	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.1073	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.1073	2991-50-6	
PFOS*	2,710	10		ng/L	2.1073	1763-23-1	
PFOS-LN*	1,570	10		ng/L	2.1073	1763-23-1-LN	
PFOS-BR*	1,270	10		ng/L	2.1073	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.1073	2058-94-8	
PFNS*	Not detected	10		ng/L	2.1073	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.1073	307-55-1	
PFDS*	Not detected	10		ng/L	2.1073	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.1073	72629-94-8	
FOSA*	Not detected	10		ng/L	2.1073	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.1073	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94570.05

Sample Tag: FB-01-GW

Collected Date/Time: 09/20/2018 14:10

Matrix: Water

COC Reference: 114591

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 09/28/18 08:06, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9048	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9048	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9048	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9048	307-24-4	
PFBS*	Not detected	10		ng/L	1.9048	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9048	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9048	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9048	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9048	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9048	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9048	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9048	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9048	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9048	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9048	375-92-8	
PFDA*	Not detected	10		ng/L	1.9048	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9048	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9048	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9048	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9048	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9048	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9048	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9048	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9048	307-55-1	
PFDS*	Not detected	10		ng/L	1.9048	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9048	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9048	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9048	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94570.06

Sample Tag: OBG MW-7

Collected Date/Time: 09/20/2018 14:02

Matrix: Groundwater

COC Reference: 114591

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/28/18 08:26, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.912	375-22-4	
PFPeA*	Not detected	10		ng/L	1.912	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.912	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.912	307-24-4	
PFBS*	Not detected	10		ng/L	1.912	375-73-5	
PFHpA*	Not detected	10		ng/L	1.912	375-85-9	
PFPeS*	Not detected	10		ng/L	1.912	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.912	27619-97-2	
PFOA*	Not detected	10		ng/L	1.912	335-67-1	
PFHxS*	Not detected	10		ng/L	1.912	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.912	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.912	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.912	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.912	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.912	375-92-8	
PFDA*	Not detected	10		ng/L	1.912	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.912	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.912	2991-50-6	
PFOS*	Not detected	10		ng/L	1.912	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.912	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.912	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.912	2058-94-8	
PFNS*	Not detected	10		ng/L	1.912	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.912	307-55-1	
PFDS*	Not detected	10		ng/L	1.912	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.912	72629-94-8	
FOSA*	Not detected	10		ng/L	1.912	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.912	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94570.07

Sample Tag: OBG MW-9

Collected Date/Time: 09/20/2018 15:30

Matrix: Groundwater

COC Reference: 114591

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml) (Rep)	2.28/6.8/11	ASTMD7979	10/03/18 19:11	PL	

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 09/28/18 08:45, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9892	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9892	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9892	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9892	307-24-4	
PFBS*	Not detected	10		ng/L	1.9892	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9892	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9892	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9892	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9892	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9892	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9892	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9892	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9892	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9892	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9892	375-92-8	
PFDA*	Not detected	10		ng/L	1.9892	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9892	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9892	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9892	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9892	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9892	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9892	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9892	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9892	307-55-1	
PFDS*	Not detected	10		ng/L	1.9892	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9892	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9892	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9892	376-06-7	I

24 PFAs (Replicate 01), Method: ASTMD7979-17M, Run Date: 10/05/18 23:07, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.84	375-22-4	
PFPeA*	Not detected	10		ng/L	1.84	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.84	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.84	307-24-4	
PFBS*	Not detected	10		ng/L	1.84	375-73-5	

I-Matrix interference with internal standard



Analytical Laboratory Report

Lab Sample ID: S94570.07 (continued)

Sample Tag: OBG MW-9

24 PFAs (Replicate 01), Method: ASTMD7979-17M, Run Date: 10/05/18 23:07, Analyst: PL (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFHpA*	Not detected	10		ng/L	1.84	375-85-9	
PFPeS*	Not detected	10		ng/L	1.84	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.84	27619-97-2	
PFOA*	Not detected	10		ng/L	1.84	335-67-1	
PFHxS*	Not detected	10		ng/L	1.84	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.84	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.84	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.84	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.84	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.84	375-92-8	
PFDA*	Not detected	10		ng/L	1.84	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.84	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.84	2991-50-6	
PFOS*	Not detected	10		ng/L	1.84	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.84	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.84	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.84	2058-94-8	
PFNS*	Not detected	10		ng/L	1.84	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.84	307-55-1	
PFDS*	Not detected	10		ng/L	1.84	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.84	72629-94-8	
FOSA*	Not detected	10		ng/L	1.84	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.84	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94570

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted:09/21/2018 08:00 Login User: MMC

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.3 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



Merit
Laboratories, Inc.

2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

114591

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Clifford Yantz
 COMPANY O'Brien & Gere
 ADDRESS 2260 East Saginaw St
 CITY East Lansing STATE MI ZIP CODE 48823
 PHONE NO. 313-333-0211 FAX NO. _____ P.O. NO. _____
 E-MAIL ADDRESS clifford.yantz@obg.com QUOTE NO. _____

CONTACT NAME SAME
 COMPANY _____
 ADDRESS _____
 CITY _____ STATE _____ ZIP CODE _____
 PHONE NO. _____ E-MAIL ADDRESS _____

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME RACER coldwater rd LF-PFAS SAMPLER(S) - PLEASE PRINT/SIGN NAME Kevin Schneider JL DL
 TURNAROUND TIME REQUIRED 1 DAY 2 DAYS 3 DAYS STANDARD OTHER _____
 DELIVERABLES REQUIRED STD LEVEL II LEVEL III LEVEL IV EDD OTHER _____

Certifications

OHIO VAP Drinking Water

DoD NPDES

Project Locations

Detroit New York

Other _____

Special Instructions

MATRIX GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 CODE: SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS (M124)
	DATE	TIME											
94570.01	9/19/18	1427	B-21D	GW	3	3							X
.02	9/19/18	1639	B-20D	GW	3	3							X
.03	9/20/18	1057	OBG MW-6	GW	3	3							X
.04	9/20/18	1242	OBG MW-8	GW	3	3							X
.05	9/20/18	1410	FB-01-GW	QC	2	2							X
.06	9/20/18	1402	OBG MW-7	GW	3	3							X
.07	9/20/18	1530	OBG MW-9	GW	3	3							X

RELINQUISHED BY: JL DL OBG X Sampler DATE 9/20/18 TIME 16:00
 RECEIVED BY: JL DL DATE 9/20/18 TIME 16:30
 RELINQUISHED BY: JL DL DATE 9/20/18 TIME 16:30
 RECEIVED BY: Merit Fridge DATE 9/20/18 TIME 16:50

RELINQUISHED BY: Merit Fridge DATE 9/21/18 TIME 0800
 RECEIVED BY: M Alcala DATE 9/21/18 TIME 0800
 SEAL NO. _____ SEAL INTACT YES NO INITIALS _____
 SEAL NO. _____ SEAL INTACT YES NO INITIALS _____
 NOTES: TEMP. ON ARRIVAL 4.3

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Report ID: S94633.01(02)
Generated on 10/11/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94633.01-S94633.02
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/21/2018
Submitted Date/Time: 09/24/2018 17:09
Sampled by: Kevin Schneider
P.O. #: 11800350

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Maya Murshak
Technical Director



General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

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Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

Run date and time corrected



Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Revised Report

Sample Summary (2 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94633.01	SB-B-19Ar-GW-72	Groundwater	09/21/18 14:05
S94633.02	SB-B-19Ar-GW-82	Groundwater	09/21/18 15:30



Analytical Laboratory Report

Revised Report

Lab Sample ID: S94633.01

Sample Tag: SB-B-19Ar-GW-72

Collected Date/Time: 09/21/2018 14:05

Matrix: Groundwater

COC Reference: 099618

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	3.3	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 10/05/18 23:27, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0873	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0873	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0873	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0873	307-24-4	
PFBS*	Not detected	10		ng/L	2.0873	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0873	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0873	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0873	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0873	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0873	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0873	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0873	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0873	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0873	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0873	375-92-8	
PFDA*	Not detected	10		ng/L	2.0873	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0873	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0873	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0873	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0873	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0873	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0873	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0873	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.0873	307-55-1	
PFDS*	Not detected	10		ng/L	2.0873	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0873	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0873	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0873	376-06-7	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S94633.02

Sample Tag: SB-B-19Ar-GW-82

Collected Date/Time: 09/21/2018 15:30

Matrix: Groundwater

COC Reference: 099618

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	3.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 10/05/18 23:46, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9084	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9084	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9084	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9084	307-24-4	
PFBS*	Not detected	10		ng/L	1.9084	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9084	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9084	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9084	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9084	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9084	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9084	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9084	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9084	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9084	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9084	375-92-8	
PFDA*	Not detected	10		ng/L	1.9084	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9084	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9084	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9084	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9084	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9084	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9084	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9084	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.9084	307-55-1	
PFDS*	Not detected	10		ng/L	1.9084	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9084	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9084	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9084	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94633

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted:09/24/2018 17:09 Login User: SRS

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 3.3 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



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 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # 1 OF 1

099618

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: Clifford Yantz
 COMPANY: O'Brien & Gere
 ADDRESS: 2260 East Saginaw St
 CITY: East Lansing STATE: MI ZIP CODE: 48823
 PHONE NO.: 313-333-0211 FAX NO.: P.O. NO.:
 E-MAIL ADDRESS: clifford.yantz@obg.com QUOTE NO.:

CONTACT NAME: SAME
 COMPANY:
 ADDRESS:
 CITY: STATE: ZIP CODE:
 PHONE NO.: E-MAIL ADDRESS:

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME: BAKER Coldwater Rd LF-PFAS SAMPLER(S) - PLEASE PRINT/SIGN NAME: Kevin Schneider *KS*
 TURNAROUND TIME REQUIRED: 1 DAY 2 DAYS 3 DAYS STANDARD OTHER
 DELIVERABLES REQUIRED: STD LEVEL II LEVEL III LEVEL IV EDD OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE
 # Containers & Preservatives:

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER
	DATE	TIME										
94633.01	9/21/18	1405	SB-B-19AC-GW-72	GW	3	3						
02	9/21/18	1530	SB-B-19AC-GW-82	GW	3	3						
KS												

PFAS (M 24)

Certifications	
<input type="checkbox"/> OHIO VAP	<input type="checkbox"/> Drinking Water
<input type="checkbox"/> DoD	<input type="checkbox"/> NPDES
Project Locations	
<input type="checkbox"/> Detroit	<input type="checkbox"/> New York
<input type="checkbox"/> Other	
Special Instructions	

RELINQUISHED BY: *Clifford Yantz* Sampler DATE: 9/21/18 TIME: 17:09
 RECEIVED BY: *[Signature]* DATE: 9/21/18 TIME: 17:04

RELINQUISHED BY: DATE: TIME:
 RECEIVED BY: DATE: TIME:
 SEAL NO. SEAL INTACT YES NO INITIALS: NOTES: TEMP. ON ARRIVAL: 3.3

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Report ID: S94634.01(02)
Generated on 10/11/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
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East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94634.01-S94634.07
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/21/2018
Submitted Date/Time: 09/24/2018 17:09
Sampled by: Kevin Schneider
P.O. #: 11800350

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Maya Murshak
Technical Director



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Report Narrative

Run date and time corrected



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WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
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Alaska CSLAP	#17-001

Qualifier Descriptions

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Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

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6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
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PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Sample Summary (7 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94634.01	PFW-1	Groundwater	09/21/18 11:37
S94634.02	MW-15-10	Groundwater	09/21/18 13:27
S94634.03	B-23Dr	Groundwater	09/21/18 15:20
S94634.04	FB-02-GW	Water	09/21/18 15:25
S94634.05	DUP-01-GW	Groundwater	09/21/18 00:01
S94634.06	EB-01-GW	Water	09/21/18 16:00
S94634.07	EB-02-GW	Water	09/21/18 16:05



Analytical Laboratory Report

Revised Report

Lab Sample ID: S94634.01

Sample Tag: PFW-1

Collected Date/Time: 09/21/2018 11:37

Matrix: Groundwater

COC Reference: 105866

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	3.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 10/06/18 00:06, Analyst: JGH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.95	375-22-4	
PFPeA*	Not detected	10		ng/L	1.95	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.95	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.95	307-24-4	
PFBS*	Not detected	10		ng/L	1.95	375-73-5	
PFHpA*	Not detected	10		ng/L	1.95	375-85-9	
PFPeS*	Not detected	10		ng/L	1.95	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.95	27619-97-2	
PFOA*	Not detected	10		ng/L	1.95	335-67-1	
PFHxS*	Not detected	10		ng/L	1.95	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.95	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.95	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.95	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.95	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.95	375-92-8	
PFDA*	Not detected	10		ng/L	1.95	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.95	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.95	2991-50-6	
PFOS*	Not detected	10		ng/L	1.95	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.95	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.95	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.95	2058-94-8	
PFNS*	Not detected	10		ng/L	1.95	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.95	307-55-1	
PFDS*	Not detected	10		ng/L	1.95	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.95	72629-94-8	
FOSA*	Not detected	10		ng/L	1.95	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.95	376-06-7	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S94634.02

Sample Tag: MW-15-10

Collected Date/Time: 09/21/2018 13:27

Matrix: Groundwater

COC Reference: 105866

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	3.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 10/06/18 00:25, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9197	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9197	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9197	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9197	307-24-4	
PFBS*	Not detected	10		ng/L	1.9197	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9197	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9197	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9197	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9197	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9197	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9197	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9197	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9197	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9197	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9197	375-92-8	
PFDA*	Not detected	10		ng/L	1.9197	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9197	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9197	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9197	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9197	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9197	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9197	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9197	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9197	307-55-1	
PFDS*	Not detected	10		ng/L	1.9197	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9197	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9197	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9197	376-06-7	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S94634.03

Sample Tag: B-23Dr

Collected Date/Time: 09/21/2018 15:20

Matrix: Groundwater

COC Reference: 105866

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	3.3	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 10/06/18 00:45, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.94	375-22-4	
PFPeA*	Not detected	10		ng/L	1.94	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.94	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.94	307-24-4	
PFBS*	Not detected	10		ng/L	1.94	375-73-5	
PFHpA*	Not detected	10		ng/L	1.94	375-85-9	
PFPeS*	Not detected	10		ng/L	1.94	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.94	27619-97-2	
PFOA*	Not detected	10		ng/L	1.94	335-67-1	
PFHxS*	Not detected	10		ng/L	1.94	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.94	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.94	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.94	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.94	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.94	375-92-8	
PFDA*	Not detected	10		ng/L	1.94	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.94	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.94	2991-50-6	
PFOS*	Not detected	10		ng/L	1.94	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.94	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.94	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.94	2058-94-8	
PFNS*	Not detected	10		ng/L	1.94	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.94	307-55-1	
PFDS*	Not detected	10		ng/L	1.94	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.94	72629-94-8	
FOSA*	Not detected	10		ng/L	1.94	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.94	376-06-7	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S94634.04

Sample Tag: FB-02-GW

Collected Date/Time: 09/21/2018 15:25

Matrix: Water

COC Reference: 105866

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	3.3	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 10/06/18 01:04, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9881	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9881	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9881	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9881	307-24-4	
PFBS*	Not detected	10		ng/L	1.9881	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9881	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9881	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9881	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9881	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9881	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9881	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9881	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9881	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9881	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9881	375-92-8	
PFDA*	Not detected	10		ng/L	1.9881	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9881	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9881	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9881	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9881	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9881	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9881	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9881	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9881	307-55-1	
PFDS*	Not detected	10		ng/L	1.9881	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9881	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9881	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9881	376-06-7	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S94634.05

Sample Tag: DUP-01-GW

Collected Date/Time: 09/21/2018 00:01

Matrix: Groundwater

COC Reference: 105866

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	3.3	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 10/06/18 01:24, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9366	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9366	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9366	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9366	307-24-4	
PFBS*	Not detected	10		ng/L	1.9366	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9366	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9366	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9366	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9366	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9366	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9366	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9366	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9366	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9366	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9366	375-92-8	
PFDA*	Not detected	10		ng/L	1.9366	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9366	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9366	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9366	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9366	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9366	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9366	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9366	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9366	307-55-1	
PFDS*	Not detected	10		ng/L	1.9366	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9366	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9366	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9366	376-06-7	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S94634.06

Sample Tag: EB-01-GW

Collected Date/Time: 09/21/2018 16:00

Matrix: Water

COC Reference: 105866

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	3.3	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 10/06/18 01:43, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0295	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0295	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0295	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0295	307-24-4	
PFBS*	Not detected	10		ng/L	2.0295	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0295	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0295	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0295	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0295	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0295	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0295	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0295	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0295	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0295	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0295	375-92-8	
PFDA*	Not detected	10		ng/L	2.0295	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0295	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0295	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0295	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0295	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0295	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0295	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0295	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.0295	307-55-1	
PFDS*	Not detected	10		ng/L	2.0295	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0295	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0295	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0295	376-06-7	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S94634.07

Sample Tag: EB-02-GW

Collected Date/Time: 09/21/2018 16:05

Matrix: Water

COC Reference: 105866

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	3.3	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 10/06/18 02:03, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9573	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9573	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9573	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9573	307-24-4	
PFBS*	Not detected	10		ng/L	1.9573	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9573	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9573	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9573	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9573	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9573	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9573	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9573	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9573	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9573	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9573	375-92-8	
PFDA*	Not detected	10		ng/L	1.9573	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9573	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9573	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9573	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9573	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9573	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9573	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9573	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9573	307-55-1	
PFDS*	Not detected	10		ng/L	1.9573	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9573	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9573	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9573	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94634

Attention: Clifford Yantz
Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted:09/24/2018 17:09 Login User: SRS

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 3.3 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



2680 East Lansing Dr., East Lansing, MI 48823
 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # 1 OF 1

105866

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: Clifford Vantz
 COMPANY: O'Brien & Gere
 ADDRESS: 2260 East Saginaw St
 CITY: East Lansing STATE: MI ZIP CODE: 48823
 PHONE NO.: 313-333-0211 FAX NO.: _____ P.O. NO.: _____
 E-MAIL ADDRESS: clifford.vantz@obg.com QUOTE NO.: _____

CONTACT NAME: _____
 COMPANY: _____
 ADDRESS: _____
 CITY: _____ STATE: _____ ZIP CODE: _____
 PHONE NO.: _____ E-MAIL ADDRESS: _____

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME: RACER coldwater RI LF - PFAS SAMPLER(S) - PLEASE PRINT/SIGN NAME: Karla Schneider
 TURNAROUND TIME REQUIRED: 1 DAY 2 DAYS 3 DAYS STANDARD OTHER _____
 DELIVERABLES REQUIRED: STD LEVEL II LEVEL III LEVEL IV EDD OTHER _____

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
 SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIPE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS (M2H)	Certifications		Project Locations		Special Instructions
	DATE	TIME												<input type="checkbox"/> OHIO VAP	<input type="checkbox"/> Drinking Water	<input type="checkbox"/> DoD	<input type="checkbox"/> NPDES	
94034.01	9/21/18	1137	PFW-1	GW	3	3							X					
.02	9/21/18	1327	MW-15-10	GW	3	3							X					
.03	9/21/18	1520	B-23Dr	GW	3	3							X					
.04	9/21/18	1525	FB-02-GW	QL	2	2							X					
.05	9/21/18	-	DUP-01-GW	GW	3	3							X					
.06	9/21/18	1600	GB-01-GW	QL	3	3							X					
.07	9/21/18	1605	EB-02-GW	QL	3	3							X					
<i>KBS</i>																		

RELINQUISHED BY: Clifford Vantz Sampler DATE: 9/21/18 TIME: 17:09
 RECEIVED BY: _____ DATE: 9/21/18 TIME: 17:09
 SIGNATURE/Organization: _____
 RECEIVED BY: _____ DATE: _____ TIME: _____
 SIGNATURE/Organization: _____

RELINQUISHED BY: _____ DATE: _____ TIME: _____
 RECEIVED BY: _____ DATE: _____ TIME: _____
 SIGNATURE/Organization: _____
 SEAL NO. SEAL INTACT INITIALS NOTES: TEMP. ON ARRIVAL _____
 YES NO
 SEAL NO. SEAL INTACT INITIALS
 YES NO **3.3**

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S94766.01(01)
Generated on 10/11/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S94766.01-S94766.04
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 09/24/2018 - 09/25/2018
Submitted Date/Time: 09/25/2018 15:50
Sampled by: Kevin Schneider
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S94766.01	SB-B-19Ar-GW-92	Groundwater	09/24/18 09:45
S94766.02	SB-B-7-GW-68	Groundwater	09/25/18 14:34
S94766.03	FB-09	Water	09/25/18 14:36
S94766.04	DUP-05	Groundwater	09/25/18 00:01



Analytical Laboratory Report

Lab Sample ID: S94766.01

Sample Tag: SB-B-19Ar-GW-92

Collected Date/Time: 09/24/2018 09:45

Matrix: Groundwater

COC Reference: 100621

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.7	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 10/06/18 02:22, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9724	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9724	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9724	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9724	307-24-4	
PFBS*	Not detected	10		ng/L	1.9724	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9724	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9724	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9724	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9724	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9724	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9724	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9724	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9724	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9724	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9724	375-92-8	
PFDA*	Not detected	10		ng/L	1.9724	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9724	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9724	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9724	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9724	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9724	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9724	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9724	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.9724	307-55-1	
PFDS*	Not detected	10		ng/L	1.9724	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9724	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9724	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9724	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94766.02

Sample Tag: SB-B-7-GW-68

Collected Date/Time: 09/25/2018 14:34

Matrix: Groundwater

COC Reference: 100621

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.7	IR
1	250ml Plastic	None	Yes	4.7	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 10/06/18 02:41, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9469	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9469	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9469	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9469	307-24-4	
PFBS*	Not detected	10		ng/L	1.9469	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9469	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9469	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9469	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9469	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9469	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9469	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9469	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9469	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9469	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9469	375-92-8	
PFDA*	Not detected	10		ng/L	1.9469	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9469	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9469	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9469	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9469	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9469	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9469	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9469	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9469	307-55-1	
PFDS*	Not detected	10		ng/L	1.9469	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9469	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9469	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9469	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94766.03

Sample Tag: FB-09

Collected Date/Time: 09/25/2018 14:36

Matrix: Water

COC Reference: 100621

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.7	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 10/06/18 03:01, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0492	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0492	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0492	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0492	307-24-4	
PFBS*	Not detected	10		ng/L	2.0492	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0492	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0492	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0492	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0492	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0492	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0492	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0492	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0492	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0492	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0492	375-92-8	
PFDA*	Not detected	10		ng/L	2.0492	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0492	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0492	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0492	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0492	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0492	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0492	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0492	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.0492	307-55-1	
PFDS*	Not detected	10		ng/L	2.0492	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0492	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0492	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0492	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S94766.04

Sample Tag: DUP-05

Collected Date/Time: 09/25/2018 00:01

Matrix: Groundwater

COC Reference: 100621

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.7	IR
1	250ml Plastic	None	Yes	4.7	IR

Organics

24 PFAs, Method: ASTM7979-17M, Run Date: 10/06/18 03:20, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.1113	375-22-4	
PFPeA*	Not detected	10		ng/L	2.1113	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.1113	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.1113	307-24-4	
PFBS*	Not detected	10		ng/L	2.1113	375-73-5	
PFHpA*	Not detected	10		ng/L	2.1113	375-85-9	
PFPeS*	Not detected	10		ng/L	2.1113	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.1113	27619-97-2	
PFOA*	Not detected	10		ng/L	2.1113	335-67-1	
PFHxS*	Not detected	10		ng/L	2.1113	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.1113	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.1113	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.1113	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.1113	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.1113	375-92-8	
PFDA*	Not detected	10		ng/L	2.1113	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.1113	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.1113	2991-50-6	
PFOS*	Not detected	10		ng/L	2.1113	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.1113	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.1113	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.1113	2058-94-8	
PFNS*	Not detected	10		ng/L	2.1113	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.1113	307-55-1	
PFDS*	Not detected	10		ng/L	2.1113	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.1113	72629-94-8	
FOSA*	Not detected	10		ng/L	2.1113	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.1113	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S94766

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted:09/25/2018 15:50 Login User: MMC

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.7 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



Analytical Laboratory Report

Report ID: S95786.01(01)
Generated on 10/31/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:

John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S95786.01-S95786.04
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 10/19/2018
Submitted Date/Time: 10/19/2018 14:15
Sampled by: Kevin Schneider
P.O. #: PO

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (4 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S95786.01	OBG MW-13	Groundwater	10/19/18 08:54
S95786.02	OBG MW-14	Groundwater	10/19/18 09:18
S95786.03	OBG MW-18D	Groundwater	10/19/18 00:01
S95786.04	FB-01	Water	10/19/18 00:01



Analytical Laboratory Report

Lab Sample ID: S95786.01

Sample Tag: OBG MW-13

Collected Date/Time: 10/19/2018 08:54

Matrix: Groundwater

COC Reference: 81845

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.2	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 10/30/18 11:12, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9231	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9231	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9231	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9231	307-24-4	
PFBS*	Not detected	10		ng/L	1.9231	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9231	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9231	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9231	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9231	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9231	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9231	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9231	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9231	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9231	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9231	375-92-8	
PFDA*	Not detected	20		ng/L	1.9231	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9231	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9231	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9231	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9231	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9231	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9231	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9231	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9231	307-55-1	
PFDS*	Not detected	10		ng/L	1.9231	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9231	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9231	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9231	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S95786.02

Sample Tag: OBG MW-14

Collected Date/Time: 10/19/2018 09:18

Matrix: Groundwater

COC Reference: 81845

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.2	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 10/30/18 11:32, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9064	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9064	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9064	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9064	307-24-4	
PFBS*	10	10		ng/L	1.9064	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9064	375-85-9	
PFPeS*	20	10		ng/L	1.9064	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9064	27619-97-2	
PFOA*	20	10		ng/L	1.9064	335-67-1	
PFHxS*	100	10		ng/L	1.9064	355-46-4	
PFHxS-LN*	100	10		ng/L	1.9064	355-46-4-LN	
PFHxS-BR*	10	10		ng/L	1.9064	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9064	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9064	39108-34-4	
PFHpS*	20	10		ng/L	1.9064	375-92-8	
PFDA*	Not detected	20		ng/L	1.9064	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9064	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9064	2991-50-6	
PFOS*	540	10		ng/L	1.9064	1763-23-1	
PFOS-LN*	230	10		ng/L	1.9064	1763-23-1-LN	
PFOS-BR*	300	10		ng/L	1.9064	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9064	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9064	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.9064	307-55-1	
PFDS*	Not detected	10		ng/L	1.9064	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9064	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9064	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9064	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S95786.03

Sample Tag: OBG MW-18D

Collected Date/Time: 10/19/2018 00:01

Matrix: Groundwater

COC Reference: 81845

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.2	IR

Organics

24 PFAs, Method: ASTM D7979-17M, Run Date: 10/30/18 11:51, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.8349	375-22-4	
PFPeA*	Not detected	10		ng/L	1.8349	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.8349	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.8349	307-24-4	
PFBS*	Not detected	10		ng/L	1.8349	375-73-5	
PFHpA*	Not detected	10		ng/L	1.8349	375-85-9	
PFPeS*	Not detected	10		ng/L	1.8349	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.8349	27619-97-2	
PFOA*	Not detected	10		ng/L	1.8349	335-67-1	
PFHxS*	Not detected	10		ng/L	1.8349	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.8349	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.8349	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.8349	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.8349	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.8349	375-92-8	
PFDA*	Not detected	20		ng/L	1.8349	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.8349	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.8349	2991-50-6	
PFOS*	Not detected	10		ng/L	1.8349	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.8349	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.8349	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.8349	2058-94-8	
PFNS*	Not detected	10		ng/L	1.8349	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.8349	307-55-1	
PFDS*	Not detected	10		ng/L	1.8349	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.8349	72629-94-8	
FOSA*	Not detected	10		ng/L	1.8349	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.8349	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S95786.04

Sample Tag: FB-01

Collected Date/Time: 10/19/2018 00:01

Matrix: Water

COC Reference: 81845

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.2	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 10/30/18 12:11, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.008	375-22-4	
PFPeA*	Not detected	10		ng/L	2.008	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.008	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.008	307-24-4	
PFBS*	Not detected	10		ng/L	2.008	375-73-5	
PFHpA*	Not detected	10		ng/L	2.008	375-85-9	
PFPeS*	Not detected	10		ng/L	2.008	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.008	27619-97-2	
PFOA*	Not detected	10		ng/L	2.008	335-67-1	
PFHxS*	Not detected	10		ng/L	2.008	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.008	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.008	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.008	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.008	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.008	375-92-8	
PFDA*	Not detected	20		ng/L	2.008	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.008	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.008	2991-50-6	
PFOS*	Not detected	10		ng/L	2.008	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.008	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.008	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.008	2058-94-8	
PFNS*	Not detected	10		ng/L	2.008	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.008	307-55-1	
PFDS*	Not detected	10		ng/L	2.008	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.008	72629-94-8	
FOSA*	Not detected	10		ng/L	2.008	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.008	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S95786

Attention: Clifford Yantz
Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted: 10/19/2018 14:15 Login User: MMC

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.2 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

OBG

THERE'S A WAY

