



February 17, 2020

Bureau of Waste Site Cleanup  
Massachusetts Department of Environmental Protection  
Southeast Regional Office  
C/o Angela Gallagher  
Site Remediation Section  
20 Riverside Drive  
Lakeville, MA 02347

RE: Immediate Response Action Status and Remedial Monitoring Report #35  
Barnstable County Fire Training FTA Facility  
155 South Flint Rock Road  
Hyannis, Massachusetts  
DEP Release Tracking No. 4-26179  
Project Number #6206

Dear Ms. Gallagher:

BETA Group, Inc. (BETA) has prepared this Immediate Response Action (IRA) Status and Remedial Monitoring Report (RMR) for the Disposal Site referenced as the Barnstable County Fire Training FTA (the BCFTA or facility) located at 155 South Flint Rock Road in Hyannis, MA (the Site) on the behalf of Barnstable County. This report was completed in accordance with Massachusetts Contingency Plan (MCP) - 310 CMR 40.0000.

This is the 35th monthly IRA RMR Status report. It documents the IRA/RMR activities being conducted to address a release of PFOS/PFOA to groundwater, soils, surface water, and sediments located at the Site. A potential Imminent Hazard (IH) condition and Condition of Substantial Release Migration were previously identified at the Site. The RMR component of this report addresses the status of the Site groundwater pumping and treatment system (GWPTS) during the monthly reporting period from October 1 through October 31, 2019. In addition, this IRA Status Report documents:

- the October 2019 Site-wide groundwater sampling event
- re-sampling of Flint Rock Pond
- efforts related to finalizing the IRA Plan Modifications first presented in a public comment draft document in August 2019
- the progress of implementing additional groundwater treatment capacity via procurement of a rented temporary treatment system

The completed BWSC105 Immediate Response Action (IRA) Transmittal Form and attached BWSC105A and BWSC105B IRA Remedial Monitoring Report Forms are being submitted to the MassDEP electronically via the eDEP system.

This letter is being submitted to the Massachusetts Department of Environmental Protection (MassDEP) as an attachment to those forms. Copies of these forms prior to electronic signature are included as Attachment A.

## REMEDIAL MONITORING REPORT – OCTOBER 2019

### Groundwater Pump and Treatment System Operations

During the October 2019 reporting period, BETA and the county continued to coordinate system operations with the O&M contractor, Groundwater Treatment & Technology of Millbury, MA. During October, the treatment system was operable for approximately 30 days. There was one unscheduled and one scheduled shutdown during this reporting period. The system was shut down on October 3, 2019 for 8 hours for the unexpected repair of the system's exterior effluent discharge piping; on October 28, 2019 the system was shut down for several hours during a vessel cleanout and backwash of one GAC vessel. See Operational Details below for additional information. On October 30, 2019, BETA collected performance samples from the treatment system, which was in operation at the time of sample collection; see below for results and discussion.

### Health Advisories and Regulatory Standards Used for Comparison

During the initial two years of GWPTS operation (July 2016 through June 2018), the USEPA revised their Health Advisory (HA) of 0.070 µg/L for two PFAS chemicals, PFOA and PFOS, was used for comparison to analytical results of GWPTS performance samples. The HA (revised downward to 0.070 µg/L in July 2016) applied to each compound individually or for the total concentration of the two. Subsequently, MassDEP adopted the EPA HA. The USEPA considers its HA to still be in effect. However, for MCP purposes it has been superseded by MassDEP guidelines and regulatory actions.

On June 11, 2018, MassDEP's Office of Research and Standards (ORS) issued an updated ORS Guideline/HA that applied to the individual concentrations or the total summed of five PFAS chemicals: PFOS, PFOA, Perfluorononanoic Acid (PFNA), Perfluorohexanesulfonic Acid (PFHxS), and Perfluoroheptanoic Acid (PFHpA). From June 11, 2018 until December 2019, individual concentrations of any of these five compounds or the total concentrations of all were compared to the MassDEP ORS HA of 0.070 µg/L.

On April 19, 2019, MassDEP released the Public Comment Draft of proposed revisions to the MCP, which include proposed Method 1 groundwater risk standards for the five PFAS compounds, plus an additional PFAS compound, Perfluorodecanoic Acid (PFDA). A Method 1 GW-1 risk standard of 0.020 µg/L was proposed for the individual concentrations of any of these six compounds or the total concentrations of all six. From May 2019 through the current reporting period, tabulated treatment system analytical results have been compared to all six PFAS compounds of concern for informational purposes.

In December 2019, MassDEP published final MCP Method 1 risk standards for PFAS with an effective date of December 27, 2019. The final MCP PFAS risk standards for groundwater include the 6 PFAS compounds of concern listed above and a 0.020 µg/L GW-1 numerical risk standard. As of the date of filing of this report, these MCP risk standards are in effect and are included in Table 1.

However, the results for this reporting period (October 2019) apply to the time period when the revised PFAS risk standards were in draft only. Therefore, the total PFAS concentrations reported and discussed for comparison purposes in this report are based on the sum of the five PFAS included in the June 2018 ORS HA and the HA of 0.070 µg/l. Results in all future status reports will be compared to the finalized MCP GW-1 risk standards for six PFAS compounds (0.020 µg/l).

### GWTS Monitoring Results

As noted, on October 30, 2019, BETA collected performance samples from the treatment system, which was in operation at the time of sample collection. Samples collected from the Influent (PRW-4), Midpoint and Effluent ports were submitted to Bureau Veritas Laboratories (formerly Maxxam Analytics) of Mississauga, Ontario (Bureau Veritas) for the laboratory analysis of Total PFAs via USEPA Method 537 M. Refer to the attached Table 1, for a summary of the GWPTS PFAS analytical data including the October 2019 system sample results. Individual concentrations of PFOS, PFOA, PFNA, PFHxS, and PFHpA from the GWP&TS performance sample collected on October 30, 2019 (and historic data) are included on Table 1. The laboratory report/certificate of analysis is included as Attachment B.

The total sum of the five regulated PFAS concentrations in the Influent sample, 4.250 µg/L, is approximately 20% lower than the September 2019 Influent results, but similar to historical concentrations detected in the groundwater at PRW-4 (the recovery well). PFAS concentrations in the treatment system Influent/PRW-4 well since approximately January 2019 have been highly variable but appear to be on a downward trend. Refer to Figure 1, which depicts the total summed concentrations of PFOA and PFOS compounds documented in the GWTS Influent/PRW-4 discharge and the system Midpoint from July 2015 to the current October 2019 sampling event. Due to the presentation of only PFOS and PFOA data in the status reports for the early years of system operation, the concentrations of the other three PFAS compounds of concern are not included in the sums depicted on Figure 1. However, since tracking of those began with the June 2018 reporting period, the concentrations of those compounds have been relatively small compared to PFOS concentrations – see Table 1.

In the October 2019 system Midpoint sample, PFAS concentrations, specifically, PFOS, PFHxS, and two unregulated compounds (PFBA and PFPeA), were detected above laboratory reporting limits (MRLs) but below the EPA/MassDEP HA in effect at that time; the PFOS concentration (51 µg/l) did exceed the new MCP GW-1 risk standard. No PFAS concentrations were reported above method detection limits (MDLs) in the October 2019 Effluent sample including the additional 17 unregulated PFAS compounds reported by the laboratory (but are not included in the summary data table); laboratory reportable detection limits (RDLs) were sufficiently low to allow comparison to the applicable EPA/MassDEP HA standards. Bureau Veritas reports the results for 23 PFAS compounds, including six (6) PFAS precursors. Refer to the attached laboratory report in Appendix B.

### GWPTS Operational Details

As noted, during the month of October 2019, the system was operable for all or portions of 30 days. There were no extended shutdowns (greater than 8 hours); however, on October 3, 2019 the system was shutdown to repair damage to the effluent discharge system piping.

The piping was inadvertently damaged while being exposed to determine its route to the north discharge basins. In addition, in order to clear the iron-oxide sludge from the sight-glass on the EQ tank and perform a backwash of the primary GAC vessel (LGAC #1), the system was shut down again for several hours on October 28, 2019. Global Cycle of Taunton, MA (Global) was on Site to remove all contents, (water and iron sediment) from the 1,500-gallon tank and four 250-gallon totes used for storing liquids from GAC vessel backwashes and discharge from the descaling of the force mains.

As noted in the September 2019 status report, operational problems were observed with the system related to flow metering and the estimation of flow rates into and through the system. A propeller-style flow meter/totalizer was installed on the GWPTS Effluent line during the July 2019 reporting period. However, during the September 2019 reporting period it became apparent that the flow rate and totalizer readings may not be reliable due to low accuracy of that meter at discharge flow rates below 40 gallons per minute (gpm). Prior to the installation of that meter, IRA Status reports and RMRs reported influent flow rate calculations based on observed time of filling of the Equalization Tank (EQ Tank). However, during September and October 2019 the influent flow rate could not be reliably estimated by that method due to the accumulation of iron-oxide precipitates at the bottom of the EQ Tank. The iron-oxide sludge blocked flow into the sight-glass on the EQ Tank that was utilized for calculating the approximate influent flow rate. To address this problem, the County contracted with Global Cycle to pump out the sludge and all contents from the EQ tank, the bag filter unit, and the backwash water collection totes in October 2019, as described above. (In November 2019, GWTT replaced the existing totalizer with a turbine / pulse type flow totalized better suited to the system's variable effluent flow rates).

For the October 2019 reporting period, the overall (average) system flow rate and gallons of groundwater treated were approximated, based on the only available information, the Effluent flow rate/net totalizer readings reported for the system by the O&M contractor. These values are considered approximations only. On this basis, approximately 0.5 million gallons of groundwater were estimated to be treated during the October 2019 reporting period, at an approximate average flow rate of 12 gpm. On this same basis, approximately 0.008 kilograms of PFAS were estimated to have been removed from the plume area during this reporting period. Refer to the attached Table 2 for a summary of the GWPTS performance details.

#### OCTOBER 2019 QUARTERLY SITE-WIDE GROUNDWATER SAMPLING AND ANALYSIS

IRA activities during the October 2019 reporting period included updated groundwater quality monitoring via a round of Site-wide groundwater gauging, sampling, and analyses and updating the hydrogeologic evaluation of Site conditions based on the groundwater gauging. Additionally, BETA conducted a Site-wide survey of the existing and viable monitoring wells and force-main piping associated with the GWPTS and collected surface water samples from Flintrock Pond.

In November 2018, BETA proposed a long-term sampling plan for Site-wide groundwater monitoring on a quarterly and annual basis. Following discussion, MassDEP approved of the sampling plan; the plan is summarized in Table 5 below. Quarterly groundwater monitoring is based on the minimum set of 12 wells shown in the table; annual monitoring is based on the minimum set of 20 wells shown – the 12 quarterly monitoring points plus an additional 8 monitoring points.

Additional monitoring points may be added to either the quarterly or annual sampling round, as warranted to meet specific objectives or provide additional coverage. BETA conducted quarterly groundwater assessment in April 2019, and July 2019. The January 2019 event was selected as the annual monitoring program for 2019 utilizing the selected 20 monitoring wells. The previous 2019 sampling events were detailed in the IRA Status Reports for the respective periods.

Table 3 Long-Term Groundwater Monitoring Program Selected Monitoring Wells & Locations				
Well ID	Location	Quarterly Sampling <sup>[1]</sup>	Annual Sampling <sup>[4]</sup>	Comments
HSW-6/HS-2(a)	FTA	X*	X	* Either / or for Quarterly Monitoring
HSW-1/HS-1(a)	FTA		X*	* Either, or for Quarterly Monitoring
PFW-1	FTA	X	X	
PFW-2	FTA		X	
OW-8A	FTA	X	X	
PFW-5	FTA	X	X	
PFW-6	FTA		X	Not sampled in October 2019.
"Primary" PFAS Plume:				
PC-1	West of PTLE <sup>(3)</sup>	X	X	
PC-6A	East of PTLE <sup>(3)</sup>	X	X	
PC-11	East of PTLE <sup>(3)</sup>	X	X	
PC-36S	SE of FTA		X	
Downgradient:				
PC-16d	East of PRW-4	X	X	
PC-18	East of PRW-4		X	
PC-30	East of PRW-4	X	X	
PC-28	East of PRW-4	X	X	
PC-9	East of PRW-4		X	See Note No. 6.
Other:				
MW-12	Easterly	X	X	East of center of FTA, north of primary plume.
MW-22	northerly	X	X	Northeast of center of FTA & primary plume.
MW-35i	northeasterly		X	Towards Mary Dunn 3 municipal well.
HW-1D	See comment		X	Near north shore of Mary Dunn Pond.
		Total = 12 <sup>[5]</sup>	Total = 20 <sup>[5]</sup>	
Notes:				
1. Monitoring wells selected for quarterly sampling are typically sampled in April, July and October of each year.				
2. FTA = within the Barnstable County Fire Training Academy facility.				
3. PTLE = Power transmission line easement located approximately 400 feet east of the FTA.				
4. Eight additional monitoring wells are included in annual sampling round, typically conducted in January.				
5. Additional wells may be included in quarterly or annual sampling rounds for specific monitoring purposes.				
6. MW PC-9 has been observed to be in only fair condition. This well may be removed from the annual program with substitution of a nearby well.				

In order to support the design of the proposed groundwater recovery expansion (an IRA Plan Modification), it was decided to move the annual monitoring round up to October 2019, and to add several wells to the sampling program. From October 28 -30, 2019, BETA conducted the larger annual groundwater sampling event based on the MassDEP approved sampling plan. Groundwater samples were collected from the selected monitoring wells indicated in the table for the annual program, with the exception of PFW-6. To supplement the program an additional five (5) wells within the Disposal Site were selected for sampling: PC-15, PC-19, PC-38, MW-30, and MW-99i. However, investigation in the field revealed that MW-30 could not be located (it is assumed to have been destroyed). In addition, monitoring well PC-19, which was sampled, was found to be only in fair condition. As described in Note No. 6 to Table 5, monitoring well PC-9 (which was sampled on October 29, 2019) was observed to be in only fair condition. This well may be removed from the annual program with substitution of a nearby well. A total of twenty-three (23) monitoring wells were sampled for laboratory analysis of total PFAS by EPA Method 537 Modified. All sampled wells and all wells located within the immediate vicinity of the FTA property were gauged prior to sampling. Refer to Figure 2A and Figure 2B for sampling locations.

Monitoring wells HSW-1, HSW-6, PFW-1, PFW-2, PFW-5, PFW-6, and OW-8a are located on the FTA property; HSW-1, HSW-6, and PFW-2 is located within the former Hot Spot remediation area and PFW-1 is located approximately 130 feet downgradient (of the former Hot Spot remediation area), PFW-5 and OW-8a are located cross-gradient of the Hot Spot area on the FTA property.

The additional wells sampled during this reporting period are located (downgradient of the FTA) on the adjacent property that is owned by the Town of Barnstable and/or by Commonwealth Electric, depending on the exact location of the property line relative to the monitoring wells. These wells were chosen based on historic and relevant groundwater PFAS concentrations identified, and inferred upgradient and downgradient locations within the Disposal Site. The further downgradient monitoring wells, between the FTA and the recovery well (PRW-4), were selected, based on previous results, to evaluate current conditions within the main PFAS plume. Monitoring wells PC-9, PC-16d, PC-18, PC-28, PC-30, MW-99i, and HW-1D are located in the probable downgradient location from the recovery well, PRW-4. Monitoring well HW-1D is the furthest inferred downgradient location and is located adjacent to the north shore of Mary Dunn Pond.

As previously mentioned, on April 19, 2019, MassDEP released the Public Comment Draft of proposed revisions to the MCP, which included proposed groundwater risk standards for six PFAS (PFOS, PFOA, PFHpA, PFNA, PFHxS, plus Perfluorodecanoic Acid (PFDA)) compounds. As of the date of filing of this report, the proposed MCP PFAS risk standards have been finalized and are effective, as of December 27, 2019, including the initially proposed 6 compounds, with a GW-1 risk standard of 20 ng/l for the total and/or any single compound. These new risk standards, for groundwater category GW-1, are included in the summary data table (Table 3). However, the results for this reporting period, (October 2019), technically apply to the earlier MassDEP ORS HA. Therefore, the total PFAS concentrations reported herein are compared in this report to the five PFAS included in the ORS HA (70 ng/L).

Refer to Table 4 for a summary of the PFAS analytical data for the monitoring wells within the Disposal Site Boundary, including the results of the most recent October 2019 sampling round. Copies of the laboratory reports/certificates of analysis are included in Appendix B.



Individual concentrations of one or more of the (now regulated) six PFAS compounds and Total Concentrations of PFAS documented from the sampled wells during the October 2019 sampling event were above the MassDEP ORS Guideline. PFOS and PFOA concentrations documented are similar to historic ranges, and historic seasonal ranges, except for southeast of the Hot Spot and FTA.

In the former Hot Spot/Phase 1 cap area, PFAS groundwater concentrations have been observed to be generally falling from historic highs since the completion of the Phase I stormwater improvements in January 2019. Figures 3A and Figure 3B depict these concentration trends observed in groundwater at monitoring wells HSW-1 and PFW-1, respectively. Since the implementation of the Phase I stormwater improvements during the winter of 2018/2019, which included installing an impermeable cap over the former Hot Spot removal area and adjacent areas and diverting stormwater, PFAS concentrations have been generally decreasing significantly, although they remain elevated.

The trend of total PFAS concentrations in groundwater at the Disposal Site has been downward overall since PFAS assessment activities started at the Site in 2015. BETA has also observed increases in PFAS concentrations with increased rainfall and higher water tables during the 2019 winter and spring seasons.

BETA's review of the October 2019 groundwater data compared to historic sampling events indicates concentrations of PFAS documented in wells located on the FTA property and immediately east continue to appear to be falling or relatively stable. See Figure 4 which depicts the PFAS concentration trend observed in groundwater monitoring well OW-8A, which is located on the northeastern portion of the FTA. Figure 5A and Figure 5B depict the stable trend in PFAS concentrations documented at monitoring wells MW-12 and MW-22 respectively.

However, PFAS concentrations documented in wells located farther southeast and downgradient of the FTA, specifically PC-11, PC-28, and PC-30, have variable trends. During the July 2019 reporting period, concentration trends from PC-6A, PC-28, and PC-30 had notably increased. Groundwater concentration trends from PC-11 and PC-30 appear to be significantly decreasing, concentrations trends from PC-6A appear to be relatively stable and concentrations from PC-28 are trending in the upward/increasing direction. Refer to Figures 6A, 6B, 6C, and 6D that depict PFAS concentration trends in PC-11, PC-6A, PC-28, and PC-30 respectively.

#### October 2019 Site-Wide Groundwater Survey and Analysis

In late October, BETA group collected new and updated elevation data from existing and viable wells throughout the Disposal Site. For monitoring wells located off the FTA facility itself, BETA used advanced global positioning system (GPS) surveying methods to acquire updated horizontal and elevation data. BETA then gauged depth to groundwater in the monitoring wells located on and within 100 feet of the FTA and in selected monitoring wells east and southeast of the FTA on October 28, 2019. Refer to Table 5 for a tabulated summary of the groundwater elevation data for selected monitoring points across the Disposal Site. Following the acquisition of field data, the GPS elevations acquired for several monitoring wells located 400 to 500 feet east and southeast of the FTA appeared to be incorrect, based on known surface topography. These data are under evaluation and are not included on the tabulated groundwater elevations shown on Table 5.

Groundwater flow is inferred to be to the south-southeasterly. The results and patterns, as well as the underlying data, continue to be evaluated. The gauging results indicate little discernible influence from the operating recovery well, PRW-4. At the time of the gauging, recovery from PRW-4 had been steadily decreasing, attributed to increasing iron fouling. [In order to mitigate that condition, the well, pump and force mains were purged, descaled and cleaned in early December 2019.] The groundwater gauging indicates an increasing downgradient slope to the groundwater towards the Mary Dunn wells No. 1 and No. 2 at approximately 1,100 feet east, southeast of the FTA, which is expected given the major groundwater withdrawals assumed to be occurring at those wells.

#### Ongoing IRA Activities

After the incorporation of public comments, the August 2019 IRA Plan Modification was finalized and submitted to MassDEP in December 2019. The IRA Plan Modification details the proposed FTA capping system and groundwater treatment system expansion designs. Additionally, sampling results, system performance details, and additional assessment work related to the ongoing response actions, such as system improvement and enhancement details, will be presented in the next IRA Status and RMR Reports.

#### Public Involvement Activities

A copy of the municipal notification to the Town Manager and other officials is included as Attachment C.

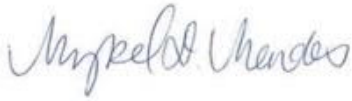
The Site has been designated a Public Involvement Plan Site under the MCP. The Draft Public Involvement Plan (PIP) was presented at a public meeting held at the Barnstable Town Hall on May 2, 2019. The final PIP was filed with MassDEP on June 30, 2019.

As previously mentioned, the public comment draft August 2019 IRA Plan Modification was finalized after a public hearing on September 28, 2019 and following receipt of written public comments. A summary of all the public comments received, comments that have been incorporated, and explanations for comments that have not been incorporated into the IRA Plan Modification will be submitted to MassDEP and made available to the public through the associated repositories.

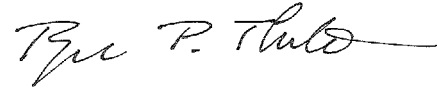


Sincerely,

BETA Group, Inc.



Mykel Mendes  
Environmental Engineer



Roger Thibault, P.E., LSP  
Senior Environmental Engineer

Copy: Jack Yunits, Barnstable County Administrator  
Steve Tebo, Assistant County Administrator

Attachments:

TABLES:

Table 1 – Summary of Groundwater Pump and Treatment System PFAS Analytical Data  
Table 2 - Summary of Groundwater Pump and Treatment System Operating and Maintenance Data  
Table 3 - Long-Term Groundwater Monitoring Program: Selected Monitoring Wells and Locations  
Table 4 - Summary of Groundwater PFAS Analytical Data  
Table 5 – Groundwater Elevation Data 2018-2019

FIGURES:

Figure 1 - BCFRTA GWPTS Influent and Midpoint PFOS Concentrations from 2015-2019  
Figure 2A - Site Plan  
Figure 2B - Site Plan Detail - BCFRTA Facility  
Figure 3A - ΣFAS Concentrations in HSW-1 from June 2018-October 2019  
Figure 3B - ΣFAS Concentrations in PFW-1 from June 2018-October 2019  
Figure 4 - ΣFAS Concentrations in OW-8A from June 2018-October 2019  
Figure 5A - ΣFAS Concentrations in MW-12 from June 2018-October 2019  
Figure 5B- ΣFAS Concentrations in MW-22 from June 2018-October 2019  
Figure 6A - ΣFAS Concentrations in PC-11 from June 2018-October 2019  
Figure 6B - ΣFAS Concentrations in PC-6A from June 2018-October 2019  
Figure 6C - ΣFAS Concentrations in PC-28 from June 2018-October 2019  
Figure 6D - ΣFAS Concentrations in PC-30 from June 2018-October 2019

APPENDICES:

A: BWSC 105, 105A, 105B Forms  
B: Laboratory Reports  
C: Municipal Notification Letter to Town Manager

TABLES

Table 1 - Summary of Groundwater Pump and Treatment System Total PFAS Analytical Data  
Barnstable Country Fire and Rescue Training Academy  
155 Flint Rock Road, Barnstable, MA  
RTN 4-26179

SAMPLE ID	INFLUENT (PRW-4)						MIDPOINT						EFFLUENT					
US EPA Method 537.2	PFOS (ng/L)	PFOA (ng/L)	PFNA (ng/L)	PFHxS (ng/L)	PFHpA (ng/L)	PFDA (ng/L)	PFOS (ng/L)	PFOA (ng/L)	PFNA (ng/L)	PFHxS (ng/L)	PFHpA (ng/L)	PFDA (ng/L)	PFOS (ng/L)	PFOA (ng/L)	PFNA (ng/L)	PFHxS (ng/L)	PFHpA (ng/L)	PFDA (ng/L)
MassDEP ORS Guideline <sup>1</sup>	70 ng/L						70 ng/L						70 ng/L					
MCP Method 1 GW-1 Standard <sup>2</sup>	20 ng/L						20 ng/L						20 ng/L					
SAMPLE DATE																		
4/1/2015	760	60	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
7/17/2015	5600	460	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
8/4/2015	5900	550	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
9/30/2015	17000	840	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
10/15/2015	9900	560	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-9.4)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	9.4	BRL (-5.8)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
11/12/2015	9000	BRL (-2000)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
1/6/2016	7600	260	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	120	75	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
1/21/2016	5200	160	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	270	16	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
2/3/2016	3500	140	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	540	26	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
2/17/2016	4500	140	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	520	24	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
3/8/2016	3700	140	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	420	19	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
3/23/2016	5000	150	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	650	39	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
4/14/2016	4800	140	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	610	26	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
4/28/2016	6300	BRL (-200)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-20)	BRL (-20)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
5/12/2016	6800	BRL (-200)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-20)	BRL (-20)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
5/25/2016	6900	BRL (-210)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
6/16/2016	7800	160	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
7/6/2016	7600	270	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	10	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
8/11/2016	13000	160	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	1600	54	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
Carbon change conducted after sample collection on 08/11/16.																		
8/18/2016	9500	210	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
9/8/2016	9500	190	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	8.5	5.3	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
10/6/2016	17000	250	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	110	8.3	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
10/20/2016	7200	130	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	1000	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
11/3/2016	7900	110	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	650	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
11/17/2016	5400	99	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	1200	NA	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	17	NA	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
12/1/2016	5300	100	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	400	14	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
12/14/2016	5700	95	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	82	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	8.1	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
1/4/2017	4900	95	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	360	15	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-3.3)	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
2/16/2017	2800	88	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	1000	39	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	25	BRL (-5.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
3/1/2017	3700	120	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	1400	47	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	150	6.5	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
3/23/2017	3800	87	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	2000	71	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	160	9.5	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
5/3/2017	2400	86	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-2.6)	BRL (-4.6)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
Carbon change conducted on 04/13/17.																		
4/19/2017	3200	110	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	160	BRL (-4.6)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-2.6)	BRL (-4.6)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
5/18/2017	3000	110	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	570	32	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-2.6)	BRL (-4.6)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
6/1/2017	3200	110	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	730	33	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	4.1	BRL (-4.6)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
6/27/2017	2600	99	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	210	15	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
7/18/2017	3500	97	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	2300	72	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	49	25	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
Carbon change conducted on 8/09/17																		
8/16/2017	3000	110	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-2.3)	BRL (-4.1)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-2.3)	BRL (-4.1)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
8/28/2017	2900	100	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	27	BRL (-20)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
10/2/2017	3200	85	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	510	25	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-2.6)	BRL (-4.6)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
10/12/2017	4500	110	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	960	29	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-2.6)	BRL (-4.6)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
11/9/2017	2400	77	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	--	--	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-6.0)	BRL (-3.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
11/20/2017	2000	64	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	520	15	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-6.0)	BRL (-3.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
12/7/2017	1600	64	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	780	34	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	11	BRL (-3.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
2/5/2018	2100	27	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	390	13	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-6.0)	BRL (-3.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
2/14/2018	2100	30	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	850	27	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	11	BRL (-3.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
System shutdown on 2/14/18 due to transfer pump failure; system restart on 4/9/18.																		
4/9/2018	2,600	79	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	990	25	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-20)	BRL (-20)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
4/13/2018	3100	62	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	1500	35	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	30	BRL (-3.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
5/9/2018	1800	73	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	490	26	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	BRL (-6.0)	BRL (-3.3)	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>	.. <sup>A</sup>
System shutdown on 5/9/18 after sampling collection due to carbon breakthrough and influent pump alarm fail.																		
Carbon change conducted on 06/05/18; system restarted on 06/07/18.																		
6/14/2018	2800	120	79	540	110	.. <sup>A</sup>	200	9.4	BRL (-8.7)	38	11	.. <sup>A</sup>	BRL (-6.0)	BRL (-3.3)	BRL (-8.7)	BRL (-5.6)	BRL (-7.4)	.. <sup>A</sup>
7/13/2018	2400	100	73	600	90	.. <sup>A</sup>	1100	44	27	24	35	.. <sup>A</sup>	BRL (-20)	BRL (-20)	BRL (-20)	BRL (-20)	BRL (-20)	.. <sup>A</sup>
8/7/2018	2900	95	73	460	86	.. <sup>A</sup>	630	31	22	130	34	.. <sup>A</sup>	27	5.3	BRL (-8.7)	9.1	BRL (-7.4)	.. <sup>A</sup>
9/27/2018	4300	69	50	360	190	.. <sup>A</sup>	3600	69	49	330	65	.. <sup>A</sup>	81	BRL (-3.3)	BRL (-8.7)	14	BRL (-7.4)	.. <sup>A</sup>
Carbon change conducted on 09/28/18; system restarted on 09/29/18.																		
10/30/2018	2800	65	46	320	71	.. <sup>A</sup>	100	6	8.7	16	78	.. <sup>A</sup>	BRL (-6.0)	BRL (-3.3)	BRL (-8.7)	BRL (-5.6)	BRL (-7.4)	.. <sup>A</sup>
11/16/2018	2900	62	50	290	77	.. <sup>A</sup>	460	24	19	94	26	.. <sup>A</sup>	BRL (-6.0)	BRL (-3.3)	BRL (-8.7)	BRL (-5.6)	BRL (-7.4)	.. <sup>A</sup>
12/14/2018	1900	62	49	300	70	.. <sup>A</sup>	1200	40	30	180	45	.. <sup>A</sup>	BRL (-6.0)	BRL (-3.3)	BRL (-8.7)	BRL (-5.6)	BRL (-7.4)	.. <sup>A</sup>
1/10/2019	2400	84	68	410	96	.. <sup>A</sup>	2200	71	54	360	82	.. <sup>A</sup>	21	BRL (-3.3)	BRL (-8.7)	BRL (-5.6)	BRL (-7.4)	.. <sup>A</sup>
Carbon change conducted on 2/4/19; system restarted on 2/5/19.																		
CP Method 1 GW-1 Standard																		
2/15/2019	4600	130	120	550	110	.. <sup>A</sup>	560	14	14	62	14	.. <sup>A</sup>	BRL (-6.0)	BRL (-3.3)	BRL (-8.7)	BRL (-6.2)	BRL (-7.4)	.. <sup>A</sup>
3/11/2019	5600	120	120	520	98	.. <sup>A</sup>	63	BRL (-3.3)	BRL (-4.9)	BRL (-5.6)	BRL (-7.1)	.. <sup>A</sup>	BRL (-6.0)	BRL (-3.3)	BRL (-4.9)	BRL (-5.6)	BRL (-7.1)	.. <sup>A</sup>
Iron sediments pumped out of influent tank and associated piping.																		
4/9/2019	6600	140	180	580	99	.. <sup>A</sup>	400	7.4	9.9	31	BRL (-7.1)	.. <sup>A</sup>	BRL (-5.2)	BRL (-7.4)	BRL (-4.9)	BRL (-5.2)	BRL (-7.1)	.. <sup>A</sup>
5/21/2019	2500	83	59	290	100	8.6	3400	72	69	260	7.8	12	BRL (-7.1)	BRL (-7.4)	BRL (-4.9)	BRL (-5.2)	BRL (-7.1)	BRL (-4.1)
Carbon change conducted on 06/13/19; system restarted on 06/14/19.																		
6/27/2019	8400	86	120	340	68	26	BRL (-5.2)	BRL (-7.4)	BRL (-4.9)	BRL (-5.2)	BRL (-7.1)	BRL (-4.1)	BRL (-5.2)	BRL (-7.4)	BRL (-4.9)	BRL (-5.2)	BRL (-7.1)	BRL (-4.1)
7/29/2019	9500	78	100	290	72	16	BRL (-5.2)	BRL (-7.4)	BRL (-4.9)	BRL (-5.2)	BRL (-7.1)	BRL (-4.1)	BRL (-5					

Table 2 - Summary of Groundwater Pump and Treatment System Operating and Maintenance Data  
Barnstable Country Fire and Rescue Training Academy  
155 Flint Rock Road, Barnstable, MA  
RTN 4-26179

Date	Operator <sup>1</sup>	System Operating on Arrival	Influent Bag Filter Differential Pressure (psi) <sup>6</sup>		Pre-Filter Changeout Differential Pressure (psi)		Post-Filter Changeout Differential Pressure (psi)		6" Influent Tank Fill Rate (min)	Estimated Influent Flow Rate (GPM) <sup>2</sup>	Days System Operating	Effluent				Estimated Total PFAs Removal (kg) <sup>3</sup>	System Operating on Departure	System Sampled	Comments
			Pre	Post	Gauge: P1	Gauge: P2	Gauge: P1	Gauge: P2				Effluent Flow Rate (GPM) <sup>4</sup>	Totalizer (Gal)	Total Gallons Treated	Average Effluent Flow Rate (GPM) <sup>5</sup>				
4/9/2018	CE	No	75	NA	NA	NA	75	NA			0	--	--	--	--		Yes	Yes	Conducted system pressure checks after restart.
4/10/2018	CE	Yes	94	74	NA	NA	77	74	2.07	59.3	1	--	--	--	--	0.001	Yes	No	Changed 3 bag filters (5 µm) and conducted system pressure checks.
4/11/2018	CE	Yes	76	NA	NA	NA	76	NA	2.78	44.0	2	--	--	--	--	0.001	Yes	No	PRW-4 well pump is operating at high level, high level float is not triggering pump to shut off. CS turned off PRW-4 manually at 1243 and restarted at 14:32. Carbon vessels were backwashed individually from 1313 to 1427.
4/12/2018	CE	Yes	NA	NA	NA	NA	75	75	2.78	44.0	3	--	--	--	--	0.002	Yes	No	Transfer pump is drawing down influent/holding tank faster than PRW-4 well is filling tank. No bag filter changes.
4/13/2018	CE	Yes	88	74	NA	NA	75	74	2.80	43.8	4	--	--	--	--	0.003	Yes	Yes	Changed 3 bag filters (5 µm) and conducted system pressure checks.
4/16/2018	CE	Yes	86	74	NA	NA	74	74	2.83	43.2	7	--	--	--	--	0.005	Yes	No	Pressure differential at 8 psi, no bags change. PRW-4 well high level float not triggering pump to shut off. Changed 3 bag filters (5 µm) and conducted system pressure checks.
4/19/2018	CE	Yes	83		NA	NA	75		NA	NA	10	--	--	--	--	NA	Yes	No	Transfer pump is maintaining drawdown and flow through system ahead of the PRW-4 well pump, no bag changes.
4/20/2018	CE	Yes	89	75	NA	NA	75	75	3.07	39.9	11	--	--	--	--	0.007	Yes	No	Changed 3 bag filters (5 µm) and conducted system pressure checks.
4/23/2018	CE	Yes	92	76	NA	NA	77	76	3.18	38.5	14	--	--	--	--	0.009	Yes	No	High level float not triggering PRW-4 to shut down. Sean ( B&B Electric) on site to inspect high float electrical issues. PRW-4 shut off at 13:40 to inspect control panel, PRW-4 restarted at 14:55. Transfer pump maintaining flow ahead of PRW-4 well pump. Both carbon vessels backwashed. Changed 3 bag filters (5 um).
4/24/2018	CE	Yes	74	NA	NA	NA	76		3.18	38.5	15	--	--	--	--	0.009	Yes	No	No bag change, conducted system pressure checks.
4/25/2018	CE	Yes	79	NA	NA	NA	75		3.30	37.1	16	--	--	--	--	0.009	Yes	No	Pressure differential of 4 psi, no bag filter change, transfer pump is maintaining flow ahead of the PRW-4 well pump.
4/26/2018	CE	Yes	83	NA	NA	NA	76		3.37	36.4	17	--	--	--	--	0.010	Yes	No	Pressure differential of 7 psi, no bag filter change, transfer pump is maintaining flow ahead of the PRW-4 well pump. While both the system transfer pump and PRW-4 well pump are on and operating, treatment takes 28 seconds to drawn down 1 inch in influent tank (~17.5 gallons)
4/27/2018	CE	Yes	84	73	NA	NA	75	75	3.42	35.8	18	--	--	--	--	0.010	Yes	No	Changed 3 bag filters (5 µm) and conducted system pressure checks.
4/30/2018	CE	Yes	87	73	NA	NA	75	75	3.53	34.7	21.00	--	--	--	--	0.012	Yes	No	Changed 3 bag filters (5 µm) and conducted system pressure checks.
Totals for April 2018							Average Flow Rate (gpm)		41.3	21.00						0.014			
5/1/2018	CS	Yes	83		NA	NA	75		3.83	32.0	0.00	--	--	--	--	0.0000	Yes	No	Adjusted /increased VFD of transfer pump from 35 psi to 40 psi to maintain drawdown ahead of PRW-4 well pump. No bag change. 1" drawdown -
5/2/2018	CS	Yes	94	75	NA	NA	80	75	3.63	33.7	1.00	--	--	--	--	0.0006	Yes	No	Changed 3 bag filters (5 µm) and conducted system pressure checks. Conducted a backwash on both carbon vessels, PRW-4 well pump would not shut off, float switch relay stuck in on position, PRW-4 shutoff at 0733 and restarted at 08:26 with float switch working properly. Adjusted transfer pump rate back to 35 psi.
5/4/2018	JES	Yes	110	73	NA	NA	73	75	3.65	33.6	3.00	--	--	--	--	0.0017	Yes	No	Changed 3 bag filters (10 um) and conducted system pressure checks.
5/7/2018	JES	Yes	110	73	NA	NA	74	74	3.7	33.1	6.00	--	--	--	--	0.0034	Yes	No	Changed 3 bag filters (5 um) and conducted system pressure checks.
Totals for May 2018							Average Flow Rate (gpm)		33.1	8.00						0.004			
6/5/2018	CE/MM	No	--	--	NR	NR	NR	NR	--	--	0	--	--	--	--	0	--	--	Carbon Change out- filled vessels with water and let to sit for ~24 hours, changed 3 bag filters (5 um)
6/6/2018	CE	Yes	--	--	NR	NR	NR	NR	3.45	35.5	1	--	--	--	--	0.001	Yes	No	Pump floats not operating correctly, low float turns pump off and when low float is in water again, transfer pump starts. System remained off.
6/7/2018	CE	Yes	62	52	NR	NR	NR	NR	3.18	38.5	2	--	--	--	--	0.001	Yes	No	Electrician on site in morning to correct float error: system operating normally.
6/11/2018	CE	Yes	56	61	NR	NR	NR	NR	3.63	33.7	6	--	--	--	--	0.003	Yes	No	No bag change, conducted system pressure checks.
6/12/2018	CE	Yes	56	63	NR	NR	NR	NR	3.68	33.3	7	--	--	--	--	0.004	Yes	No	No bag change, conducted system pressure checks.
6/13/2018	CE	Yes	58	54	NR	NR	NR	NR	3.46	35.4	8	--	--	--	--	0.005	Yes	No	Changed 3 bag filters.
6/13/2018	MM	Yes	--	--	NR	NR	NR	NR	--	--	8	--	--	--	--	--	--	Yes	Did not collect system data, only collected samples from Influent, Midpoint, and Effluent sample ports/locations.
6/16/2018	CE	Yes	77	60	NR	NR	NR	NR	--	--	11	--	--	--	--	--	--	No	Changed 3 bag filters.
6/19/2018	CE	Yes	92	65	NR	NR	NR	NR	--	--	14	--	--	--	--	--	No	No	Changed 3 bag filters and repaired holding basket for bags. Recovery well was not running, went out to the well and checked power, turned power to well on/off and did not hear contact relay pull in. System remained off until electrical issue in recovery well is fixed. Fixed at 15:45
6/20/2018	CE	Yes	72	60	NR	NR	NR	NR	3.73	32.8	15	--	--	--	--	0.008	Yes	No	No bag change, conducted system pressure checks.
6/21/2018	CE	Yes	79	60	NR	NR	NR	NR	--	--	16	--	--	--	--				No bag change, conducted system pressure checks. Worked by phone with Bob Simmonds on Control panel for transfer pump, pump will not change speed.
6/22/2018	CE	Yes	87	67	NR	NR	NR	NR	3.72	32.9	17	--	--	--	--	0.009	Yes	No	Changed 3 bag filters, conducted system pressure checks.
6/25/2018	CE	Yes	81	68	NR	NR	NR	NR	3.77	32.5	20	--	--	--	--	0.011	Yes	No	Changed 3 bag filters, conducted system pressure checks.
6/27/2018	CE	Yes	79	68	NR	NR	NR	NR	3.73	32.8	22	--	--	--	--	0.012	Yes	No	Changed 3 bag filters, conducted system pressure checks.
6/29/2018	CE	Yes	78	68	NR	NR	NR	NR	3.68	33.3	24	--	--	--	--	0.014	Yes	No	Changed 3 bag filters, conducted system pressure checks.
Totals for June 2018							Average Flow Rate (gpm)		33.9	24						0.013			
7/2/2018	CE	Yes	83	69	NR	NR	NR	NR	3.95	31.0	2	--	--	--	--	0.001	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/5/2018	CE	No	--	--	NR	NR	NR	NR	--	--	5	--	--	--	--	--	No	No	No power supplied to the recovery well.
7/6/2018	CE	Yes	86	69	NR	NR	NR	NR	3.87	31.7	5	--	--	--	--	0.003	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/9/2018	CE	Yes	89	72	NR	NR	NR	NR	3.77	32.5	8	--	--	--	--	0.004	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/11/2018	CE	Yes	88	72	NR	NR	NR	NR	3.85	31.8	10	--	--	--	--	0.005	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/13/2018	CE	Yes	89	72	NR	NR	NR	NR	4.08	30.0	12	--	--	--	--	0.006	Yes	Yes	Changed 3 bag filters, conducted system pressure checks.
7/16/2018	CE	Yes	98	70	NR	NR	NR	NR	3.97	30.9	15	--	--	--	--	0.007	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/18/2018	CE	No	--	--	NR	NR	NR	NR	--	--	--	--	--	--	--	--	No	No	No power supplied to the recovery well. Contact relay at recovery well pump out.
7/19/2018	CE	Yes	94	72	NR	NR	NR	NR	4.03	30.4	17	--	--	--	--	0.008	Yes	No	Electrician replaced the contact relay: recovery well operating again. Changed 3 bag filters and collected system pressure checks.
7/20/2018	CE	Yes	81	72	NR	NR	NR	NR	--	--	--	--	--	--	--	--	Yes	No	Changed 3 bag filters, conducted system pressure checks. Backwashed carbon vessels.
7/23/2018	CE	Yes	84	72	NR	NR	NR	NR	4.47	27.4	21	--	--	--	--	0.009	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/25/2018	CE	Yes	84	72	NR	NR	NR	NR	--	--	--	--	--	--	--	--	Yes	No	Collected system pressure checks.
7/26/2018	CE	Yes	90	72	NR	NR	NR	NR	--	--	--	--	--	--	--	--	Yes	No	Collected system pressure checks.
7/27/2018	CE	Yes	88	72	NR	NR	NR	NR	4.8	25.5	25	--	--	--	--	0.010	Yes	No	Changed 3 bag filters, conducted system pressure checks.
7/30/2018	CE	Yes	91	71	NR	NR	NR	NR	4.95	24.7	28	--	--	--	--	0.011	Yes	No	Changed 3 bag filters, conducted system pressure checks.
Totals for July 2018							Average Flow Rate (gpm)		29.6	28						0.015			
8/2/2018	CE	Yes	89	70	NR	NR	NR	NR	5.17	23.7	2	--	--	--	--	0.001	Yes	No	Changed 3 bag filters, conducted system pressure checks.
8/6/2018	CE	Yes	94	72	NR	NR	NR	NR	5.22	23.5	6	--	--	--	--	0.003	Yes	No	Changed 3 bag filters, conducted system pressure checks.
8/10/2018	CE	Yes	98	72	NR	NR	NR	NR	4.32	28.4	10	--	--	--	--	0.006	Yes	No	Changed 3 bag filters, conducted system pressure checks. System was sampled on August 7, 2018.
8/14/2018	CE	Yes	82	69	NR	NR	NR	NR	4.8	25.5	14	--	--	--	--	0.007	Yes	No	Changed 3 bag filters, conducted system pressure checks.
8/17/2018	CE	Yes	81	64	NR	NR	NR	NR	5.0	24.5	17	--	--	--	--	0.008	Yes	No	Changed 3 bag filters, conducted system pressure checks. Backwashed carbon vessels.
8/21/2018	CE	No	78	68	NR	NR	NR	NR	5.2	23.6	20	--	--	--	--	0.009	Yes	No	Recovery well down, due to contactor burnout/failure. System restarted at 14:45.
8/24/2018	CE	Yes	77	68	NR	NR	NR	NR	5.32	23.0	23	--	--	--	--	0.010	Yes	No	Changed 3 bag filters, conducted system pressure checks.
8/28/2018	CE	Yes	89	69	NR	NR	NR	NR	6.03	20.3	27	--	--	--	--	0.011	Yes	No	Changed 3 bag filters, conducted system pressure checks.
Totals for August 2018							Average Flow Rate (gpm)		24.1	30						0.014			

Table 2 - Summary of Groundwater Pump and Treatment System Operating and Maintenance Data  
Barnstable Country Fire and Rescue Training Academy  
155 Flint Rock Road, Barnstable, MA  
RTN 4-26179

Date	Operator <sup>1</sup>	System Operating on Arrival	Influent Bag Filter Differential Pressure (psi) <sup>6</sup>		Pre-Filter Changeout Differential Pressure (psi)		Post-Filter Changeout Differential Pressure (psi)		6" Influent Tank Fill Rate (min)	Estimated Influent Flow Rate (GPM) <sup>7</sup>	Days System Operating	Effluent				Estimated Total PFAs Removal (kg) <sup>3</sup>	System Operating on Departure	System Sampled	Comments	
			Pre	Post	Gauge: P1	Gauge: P2	Gauge: P1	Gauge: P2				Effluent Flow Rate (GPM) <sup>2</sup>	Totalizer (Gal)	Total Gallons Treated	Average Effluent Flow Rate (GPM) <sup>9</sup>					
9/4/2018	CE	Yes	89	67	NR	NR	NR	NR	5.87	20.9	4	--	--	--	--	0.002	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
9/7/2018	CE	Yes	82	70	NR	NR	NR	NR	6.52	18.8	7	--	--	--	--	0.004	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
9/11/2018	CE	Yes	88	70	NR	NR	NR	NR	7.03	17.4	11	--	--	--	--	0.005	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
9/14/2018	CE	Yes	86	70	NR	NR	NR	NR	7.18	17.1	14	--	--	--	--	0.006	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
9/18/2018	CE	Yes	91	74	NR	NR	NR	NR	8.02	15.3	18	--	--	--	--	0.007	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
9/21/2018	CE	No	74	70	NR	NR	NR	NR	--	--	--	--	--	--	--	--	No	No	Recovery well down.	
9/24/2018	CE	Yes	94	70	NR	NR	NR	NR	8.03	15.3	23	--	--	--	--	0.010	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
9/28/2018	CE	Yes	--	--	NR	NR	NR	NR	--	--	--	--	--	--	--	--	--	--	Carbon Change out- filled vessels with water and let to sit for ~24 hours, changed 3 bag filters (5 um), system sampled on 09/27/18.	
Totals for September 2018									Average Flow Rate (gpm)			17.4	28				0.010			
10/1/2018	CE	No	78	57	NR	NR	NR	NR	5.83	21.0	1	--	--	--	--	0.000	Yes	No	System restarted after scheduled shutdown for carbon exchange. Changed 3 bag filters, conducted system pressure checks.	
10/5/2018	CE	Yes	65	55	NR	NR	NR	NR	6.35	19.3	5	--	--	--	--	0.002	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
10/10/2018	CE	Yes	56	57	NR	NR	NR	NR	6.95	17.6	10	--	--	--	--	0.003	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
10/12/2018	CE	Yes	60	55	NR	NR	NR	NR	--	--	12	--	--	--	--	--	Yes	No	No bag change necessary.	
10/15/2018	CE	Yes	70	60	NR	NR	NR	NR	6.9	17.8	15	--	--	--	--	0.005	Yes	No	Changed 3 bag filters, conducted system pressure checks. Repaired filter basket.	
10/19/2018	CE	Yes	71	60	NR	NR	NR	NR	7.12	17.2	19	--	--	--	--	0.006	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
10/23/2018	CE	Yes	76	63	NR	NR	NR	NR	7.73	15.8	23	--	--	--	--	0.007	Yes	No	Changed 3 bag filters, conducted system pressure checks. Repaired holding basket in filter vessel.	
10/26/2018	CE	Yes	72	64	NR	NR	NR	NR	8.83	13.9	26	--	--	--	--	0.007	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
10/30/2018	CE	Yes	80	65	NR	NR	NR	NR	7.52	16.3	30	--	--	--	--	0.009	Yes	Yes	Changed 3 bag filters, conducted system pressure checks. Repaired bag holder (basket) in filter vessel.	
Totals for October 2018									Average Flow Rate (gpm)			17.4	31				0.011			
11/2/2018	CE	Yes	71	62	NR	NR	NR	NR	7.86	15.6	2	--	--	--	--	0.001	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
11/6/2018	CE	Yes	71	62	NR	NR	NR	NR	--	--	6	--	--	--	--	--	No	No	Changed 3 bag filters, conducted system pressure checks. Backwashed both carbon vessels. System shutdown at 10:00 for force main descaling and flush.	
11/8/2018	CE	Yes	65	45	NR	NR	NR	NR	5.25	23.3	6	--	--	--	--	0.004	Yes	No	Changed 3 bag filters, conducted system pressure checks. System restarted at 12:40 following the completion of the force main descaling.	
11/9/2018	CE	Yes	55	44	NR	NR	NR	NR	5.2	23.6	7	--	--	--	--	0.004	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
11/12/2018	CE	Yes	51	47	NR	NR	NR	NR	5.03	24.4	10	--	--	--	--	0.007	Yes	No	Conducted system pressure checks.	
11/13/2018	CE	Yes	52	47	NR	NR	NR	NR	4.88	25.1	11	--	--	--	--	0.007	Yes	No	Conducted system pressure checks.	
11/14/2018	CE	Yes	54	47	NR	NR	NR	NR	4.92	24.9	12	--	--	--	--	0.008	Yes	No	Conducted system pressure checks.	
11/15/2018	CE	Yes	55	47	NR	NR	NR	NR	--	--	13	--	--	--	--	--	Yes	No	Conducted system pressure checks.	
11/16/2018	CE	Yes	54	50	NR	NR	NR	NR	4.63	26.5	14	--	--	--	--	0.010	Yes	Yes	Changed 3 bag filters, conducted system pressure checks.	
11/21/2018	CE	Yes	63	53	NR	NR	NR	NR	5.08	24.1	19	--	--	--	--	0.012	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
11/27/2018	CE	Yes	69	55	NR	NR	NR	NR	5.75	21.3	25	--	--	--	--	0.014	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
11/30/2018	CE	Yes	77	58	NR	NR	NR	NR	5.85	20.9	28	--	--	--	--	0.016	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
Totals for November 2018									Average Flow Rate (gpm)			23.0	28				0.012			
12/3/2018	CE	Yes	63	62	NR	NR	NR	NR	5.33	23.0	3	--	--	--	--	0.001	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
12/7/2018	CE	Yes	83	67	NR	NR	NR	NR	5.58	22.0	7	--	--	--	--	0.002	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
12/11/2018	CE	Yes	75	65	NR	NR	NR	NR	5.8	21.1	11	--	--	--	--	0.003	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
12/14/2018	CE	Yes	70	63	NR	NR	NR	NR	5.4	22.7	14	--	--	--	--	0.004	Yes	Yes	Changed 3 bag filters, conducted system pressure checks.	
12/18/2018	CE	Yes	70	65	NR	NR	NR	NR	6.72	18.2	18	--	--	--	--	0.004	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
12/21/2018	CE	Yes	70	67	NR	NR	NR	NR	6.7	18.3	21	--	--	--	--	0.005	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
12/26/2018	CE	Yes	78	71	NR	NR	NR	NR	7.38	16.6	26	--	--	--	--	0.006	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
12/28/2018	CE	Yes	82	70	NR	NR	NR	NR	7.35	16.7	28	--	--	--	--	0.006	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
12/31/2018	CE	Yes	82	71	NR	NR	NR	NR	7.38	16.6	31	--	--	--	--	0.007	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
Totals for December 2018									Average Flow Rate (gpm)			19.5	31				0.008			
1/4/2019	RPT	Yes	72	72	NR	NR	NR	NR	6.5	18.8	4	--	--	--	--	0.001	Yes	No	Changed 3 bag filters, conducted system pressure checks, observed hole in pre-filter basket.	
1/7/2019	PCB	Yes	80	71	NR	NR	NR	NR	6.2	19.8	7	--	--	--	--	0.002	Yes	No	Change 3 bag filters, conducted system pressure checks.	
1/10/2019	RPT	Yes	75	70	NR	NR	NR	NR	7.03	17.4	10	--	--	--	--	0.003	Yes	No	Conducted system pressure checks.	
1/11/2019	MDM	Yes	79	71	NR	NR	NR	NR	7.62	16.1	11	--	--	--	--	0.003	Yes	Yes	Change 3 bag filters, conducted system pressure checks.	
1/14/2019	PCB	Yes	76	71	NR	NR	NR	NR	--	--	14	--	--	--	--	--	Yes	No	Conducted system pressure checks.	
1/15/2019	PCB	Yes	80	71	NR	NR	NR	NR	--	--	15	--	--	--	--	--	Yes	No	Change 3 bag filters, conducted system pressure checks.	
1/18/2019	PCB	Yes	76	71	NR	NR	NR	NR	8.65	14.2	18	--	--	--	--	0.004	Yes	No	Change 3 bag filters, conducted system pressure checks.	
1/21/2019	SCT	Yes	80	71	NR	NR	NR	NR	8.15	15.0	21	--	--	--	--	0.005	Yes	No	Change 3 bag filters, conducted system pressure checks.	
1/24/2019	SCT	Yes	85	69	NR	NR	NR	NR	9.1	13.5	24	--	--	--	--	0.005	Yes	No	Change 3 bag filters, conducted system pressure checks.	
1/27/2019	SCT	Yes	85	68	NR	NR	NR	NR	8.25	14.8	27	--	--	--	--	0.007	Yes	No	Change 3 bag filters, conducted system pressure checks.	
1/30/2019	PCB	Yes	86	71	NR	NR	NR	NR	9	13.6	30	--	--	--	--	0.007	Yes	No	Change 3 bag filters, conducted system pressure checks.	
1/31/2019	PCB	Yes	83	71	NR	NR	NR	NR	--	--	31	--	--	--	--	--	Yes	No	Change 3 bag filters, conducted system pressure checks.	
Totals for January 2019									Average Flow Rate (gpm)			14.5	31				0.008			
2/4/2019	RPT	Yes	--	--	--	NR	NR	NR	--	--	--	--	--	--	--	--	--	No	Carbon Change out- filled vessels with water and let to sit for ~24 hours, changed 3 bag filters (5 um).	
2/5/2019	RPT	No	52	35	NR	NR	NR	NR	7.33	16.7	4	--	--	--	--	0.002	Yes	No	System restarted after scheduled shutdown for carbon exchange. Changed bag filters and conducted system pressure checks.	
2/11/2019	PCB	Yes	83	45	NR	NR	NR	NR	11.58	10.6	10	--	--	--	--	--	Yes	No	Changed 3 bag filters, conducted system pressure checks.	
2/13/2019	ST	Yes	55	43	--	NR	NR	NR	8.12	15.1	12	--	--	--	--	--	Yes	No	Changed 3 bag filters, conducted system checks.	
2/15/2019	MDM	Yes	--	--	--	NR	NR	NR	7.5	16.3	14	131.7	--	--	--	0.007	Yes	Yes	Sampled system and collected system pressure checks.	
2/22/2019	ST	Yes	--	--	--	NR	NR	NR	10.75	11.4	21	43.75	--	--	--	0.007	Yes	No	Changed 3 bag filters, repaired filter basket, adjusted and lowered the speed drive on the transfer/discharge pump.	
2/25/2019	MDM	Yes	25	15	NR	NR	NR	NR	7.5	16.3	23	--	--	--	--	--	Yes	No	System shutdown at 09:33 for the replacement of the submersible pump at PRW-4 and restarted at 14:04.	
Totals for February 2019									Average Flow Rate (gpm)			14.4	26	132.7				0.011	Yes	No
3/1/2019	ST	Yes	43	40	NR	NR	NR	NR	7.55	16.2	1	76.6	--	--	--	0.001	Yes	No	Conducted system pressure checks.	
3/3/2019	ST	Yes	45	40	NR	NR	NR	NR	--	--	3	--	--	--	--	--	Yes	No	Conducted system pressure checks, changed bag filters, installed/replaced filters baskets with new stainless steel filter baskets.	
3/5/2019	PCB	Yes	46	40	NR	NR	NR	NR	--	--	5	--	--	--	--	--	Yes	No	Conducted system pressure checks.	
3/7/2019	PCB/ST	Yes	50	40	NR	NR	NR	NR	8.16	15.0	7	--	--	--	--	0.004	Yes	No	Conducted system pressure checks and changed bag filters.	
3/9/2019	ST	Yes	44	41	NR	NR	NR	NR	7.75	15.8	9	--	--	--	--	0.005	Yes	No	Changed bag filters.	
3/11/2019	ST	Yes	58	50	NR	NR	NR	NR	7.92	15.5	11	68.1	--	--	--	0.006	Yes	Yes	Changed bag filters	
3/13/2019	ST	Yes	65	50	NR	NR	NR	NR	4.62	26.5	13	--	--	--	--	--	Yes	No	Notified low speed on transfer pump, adjusted VFD to increase pump speed to 55 Hz. Changed 3 bag filters twice.	
3/14/2019	ST	Yes	75	50	NR	NR	NR	NR	5.16	23.7	14	70.0	--	--	--	0.012	Yes	No	Conducted system pressure checks and collected samples from EQ tank for analysis at County lab for disposal criteria.	
3/16/2019	PCB	No	62	60	NR	NR	NR	NR	--	--	15	--	--	--	--	--	Yes	No	Pump at PRW-4 shut off upon arrival to system, contact relay failure, possibly due to power surge from thunderstorm. Restarted system after contact relay was replaced.	
3/22/2019	ST	Yes	28	20	NR	NR	NR	NR	2.38	51.5	21	51.5	--	--	--	0.038	Yes	No	Replaced VFD drive for effluent transfer pump inside system shed.	
3/23/2019	ST	Yes	23	20	NR	NR	NR	NR	--	--	22	--	--	--	--	--	No	No	Changed bag filters before system shutdown. System shutdown due to slow flow rate from transfer pump as a result of accumulating iron sediments in EQ tank from slow influent flow rate as a result of a the failing PRW-4 well pump.	
3/29/2019	RPT/ST	No	--	--	NR	NR	NR	NR	--	--	23	--	--	--	--	--	Yes	No	Removed/pumped out the contents of the influent equalization (EQ) tank, repaired the system's pump electrical components, adjusted VFD on transfer pump, installed unions on influent piping manifold, replaced bag filters at discharge into the EQ tank, and restarted the system at 1645.	
Totals for March 2019									Average Flow Rate (gpm)			29.3	25	63.2				0.022		

Table 2 - Summary of Groundwater Pump and Treatment System Operating and Maintenance Data  
Barnstable Country Fire and Rescue Training Academy  
155 Flint Rock Road, Barnstable, MA  
RTN 4-26179

Date	Operator <sup>1</sup>	System Operating on Arrival	Influent Bag Filter Differential Pressure (psi) <sup>6</sup>		Pre-Filter Changeout Differential Pressure (psi)		Post-Filter Changeout Differential Pressure (psi)		6" Influent Tank Fill Rate (min)	Estimated Influent Flow Rate (GPM) <sup>2</sup>	Days System Operating	Effluent				Estimated Total PFAs Removal (kg) <sup>3</sup>	System Operating on Departure	System Sampled	Comments
			Pre	Post	Gauge: P1	Gauge: P2	Gauge: P1	Gauge: P2				Effluent Flow Rate (GPM) <sup>7</sup>	Totalizer (Gal)	Total Gallons Treated	Average Effluent Flow Rate (GPM) <sup>8</sup>				
4/1/2019	ST	Yes	--	--	40	28	40	39	2.25	54.4	1	--	--	--	--	0.002	Yes	No	Conducted system pressure checks and changed bag filters.
4/3/2019	ST	Yes	--	--	40	39	--	--	--	--	3	--	--	--	--	--	Yes	No	Conducted system pressure checks.
4/6/2019	ST	Yes	--	--	50	41	50	50	2.23	54.9	6	--	--	--	--	0.014	Yes	No	Conducted system pressure checks and changed bag filters.
4/9/2019	GWTT	Yes	--	--	40	50	--	--	1.6	76.6	9	18.85	--	--	--	0.029	Yes	Yes	Conducted system pressure checks, backwashed the primary carbon vessel for ~30 minutes; inspected the transfer pump and removed excess iron oxide sedimentation from the inlet piping.
4/10/2019	ST	Yes	--	--	50	15	23	25	--	--	10	--	--	--	--	--	Yes	No	Conducted system pressure checks and changed bag filters.
4/11/2019	ST	Yes	--	--	40	35	35	35	--	--	11	--	--	--	--	--	Yes	No	Conducted system pressure checks and changed bag filters.
4/12/2019	GWTT	Yes	--	--	50	40	44	46	3	40.8	12	--	--	--	--	0.020	Yes	No	Conducted system pressure checks and changed bag filters.
4/15/2019	GWTT	Yes	--	--	55	45	55	55	4.08	30.0	15	--	--	--	--	0.019	Yes	No	Conducted system pressure checks and changed bag filters.
4/19/2019	GWTT	Yes	--	--	58	55	35	40	2.5	49.0	19	--	--	--	--	0.039	Yes	No	Conducted system pressure checks and changed bag filters.
4/23/2019	GWTT	Yes	--	--	48	47	50	55	4.00	30.6	23	33.4	--	--	--	0.029	Yes	No	Conducted system pressure checks and changed bag filters.
4/26/2019	GWTT	Yes	--	--	58	50	55	60	--	--	26	20.3	--	--	--	--	Yes	No	Conducted system pressure checks and changed bag filters, conducted general housekeeping duties.
4/30/2019	GWTT	No	--	--	--	--	--	--	--	--	29	--	--	--	--	--	--	Yes	System off on arrival due to contact relay failure for transfer pump operation: system restarted at 16:29 after contact relay was replaced.
Totals of April 2019			Average Flow Rate (gpm)								48.1	29	24.2			0.058			
5/3/2019	GWTT	Yes	--	--	55	35	45	50	2.18	56.2	3	32.93	--	--	--	0.003	Yes	No	Conducted system pressure checks and changed bag filters.
5/7/2019	GWTT	Yes	--	--	58	38	50	55	2.05	59.8	7	31.57	--	--	--	0.007	Yes	No	Conducted system pressure checks and changed bag filters.
5/10/2019	GWTT	No	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	System down as a result of failed VFD for transfer pump operation, changed bag filters.
5/17/2019	GWTT	No	--	--	55	38	--	--	--	--	10	--	--	--	--	--	Yes	No	Installed new VFD drive, system shutdown due to power surge from thunderstorm. Electrician added 15 minute- electrical control delay at the control panel in the system shed; creating a 15 minute delay before the pump at PRW-4 powers on at the "high level" float switch.
5/21/2019	MDM	No	--	--	57	30	57	60	1.83	66.9	14	33.38	--	--	--	0.016	Yes	Yes	Power surge from rogue ground voltage at electrical easement "fried" the electrical delay at control panel in system shed. Electrician bypassed delay to allow system restart at 11:15. Electrician will change coil at PRW-4 panel to lower voltage at later date. Conducted system pressure checks and changed bag filters.
5/24/2019	GWTT	Yes	--	--	58	35	58	60	2.083	58.8	17	25.36	--	--	--	0.017	Yes	No	Conducted system pressure checks and changed bag filters. Bypass installed to allow 15 minute delay on PRW-4 submersible pump float switch.
5/28/2019	GWTT	Yes	--	--	56	46	55	60	2.65	46.2	21	52.10	--	--	--	0.016	Yes	No	Conducted system pressure checks and changed bag filters twice. Backwashed both carbon vessels.
5/31/2019	GWTT	Yes	--	--	58	35	55	60	2.17	56.5	24	36.90	--	--	--	0.022	Yes	No	Conducted system pressure checks and changed bag filters, 3" butterfly valve on INF of LGACS #2 replaced. Installed a 3 inch flow totalizer and meter
Totals of May 2019			Average Flow Rate (gpm)								57.4	24	35.4			0.023			
6/4/2019	GWTT	Yes	--	--	57	48	57	62	2.46	49.8	4	20.2	--	--	--	0.010	Yes	No	Conducted system pressure checks and changed bag filter. Replaced in-kind flow meter previously installed on 5/31/19.
6/7/2019	GWTT	Yes	--	--	57	45	57	62	2.43	50.4	7	16.2	--	--	--	0.017	Yes	No	Conducted system pressure checks and changed bag filters.
6/11/2019	GWTT	Yes	--	--	76	78	70	82	2.53	48.4	11	17.3	--	--	--	0.026	Yes	No	Conducted system pressure checks and changed bag filters. System shutdown due to high pressure measurement on the LGAC vessels, (from iron fouling): carbon change to occur on 6/13/19.
6/13/2019	MDM	No	--	--	--	--	--	--	--	--	11	--	--	--	--	--	No	No	System off for carbon change out.
6/14/2019	GWTT	No	--	--	--	--	25	28	2.3	53.3	12	167.1	--	--	--	0.032	Yes	No	System restarted at 13:00; adjusted flow rate via VFD to 55 Hz. GWTT recorded Effluent flow rate from drop in site glass to be 44 seconds, immediately after adjusting the VFD.
6/18/2019	GWTT	Yes	--	--	25	10	11	15	2.23	54.9	16	56.2	--	--	--	0.043	Yes	No	Conducted system checks, changed bag filters, adjusted VFD to 55 GPM.
6/21/2019	GWTT	Yes	--	--	17	15	17	20	2.12	57.8	19	58.6	--	--	--	0.054	Yes	No	Conducted system checks, changed bag filters, adjusted VFD to 28 Hz.
6/25/2019	GWTT	Yes	--	--	20	18	20	25	2.3	53.3	23	59.0	--	--	--	0.060	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 28 to 35 Hz.
6/27/2019	MDM	Yes	--	--	33	21	--	--	3.2	38.3	25	17.5	--	--	--	0.047	Yes	Yes	Conducted system checks, system VFD at 35 Hz; pressure gauges at LGAC 2 are 0 psi.
6/28/2019	GWTT	Yes	--	--	33	22	30	35	2.4	51.0	26	60.9	--	--	--	0.065	Yes	No	Conducted system checks, changed bag filters, VFD at 35 Hz. Effluent flow rate increased after bag filter changeout.
Totals of June 2019			Average Flow Rate (gpm)								50.8	27	62.4			0.068			
7/2/2019	GWTT	Yes	--	--	32	20	30	32	2.52	48.6	2	52.6	20575	--	--	0.005	Yes	No	Conducted system checks, changed bag filters.
7/5/2019	GWTT	Yes	--	--	25	23	30	35	2.53	48.4	5	52.6	242970	222395	--	0.013	Yes	No	Conducted system checks, changed bag filters, VFD at 35 Hz. Effluent flow rate increased after bag filter changeout.
7/9/2019	GWTT	Yes	--	--	32	25	36	40	2.35	52.1	9	58.6	311680	68710	--	0.026	Yes	No	Conducted system checks, changed bag filters, VFD at 35 Hz. Effluent flow rate increased after bag filter changeout. Primary LGAC vessel requires a
7/12/2019	GWTT	Yes	--	--	39	35	39	43	2.42	50.6	12	55.7	407920	96240	--	0.033	Yes	No	Conducted system checks, changed bag filters, adjusted VFD to 42 Hz.
7/15/2019	GWTT	Yes	--	--	46	40	35	50	3.00	40.8	15	55.7	587740	179820	--	0.034	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 42 Hz to 40 Hz.
7/18/2019	GWTT	Yes	--	--	45	28	55	60	2.83	43.3	18	47.48	NR	NR	--	0.043	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 40 Hz to 45 Hz.
7/23/2019	GWTT	Yes	--	--	56	43	55	61	3.22	38.0	23	25.63	717580	129840	--	0.048	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 40 Hz to 45 Hz.
7/26/2019	GWTT	Yes	--	--	56	50	56	60	--	--	26	11.93	722700	5120	--	--	Yes	No	Conducted system checks, changed bag filters.
7/29/2019	GWTT	Yes	--	--	--	--	56	60	2.50	49.0	29	53.3	723360	660	--	0.078	Yes	Yes	Pumped out contents of exterior totes and conducted backwash of system (6,800 gallons removed by Global). Shutdown system for ~2 hours. VFD at 23 Hz on departure.
Totals of July 2019			Average Flow Rate (gpm)								46.9	31	45.1			0.079			
8/2/2019	GWTT	Yes	--	--	15	5	18	9	2.68	50.6	2	19.68	723960	0	0.0	0.006	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 23 Hz to 28 Hz.
8/5/2019	GWTT	Yes	--	--	21	8	16	20	2.50	52.8	5	49.00	726280	2320	0.5	0.014	Yes	No	Conducted system checks, changed bag filters, VFD at 28 Hz.
8/8/2019	GWTT	Yes	--	--	20	19	22	27	2.23	54.9	8	53.50	729450	3170	0.7	0.024	Yes	No	Conducted system checks, changed bag filters, adjusted VFD to 32 Hz and 31 Hz. Visability of site glass impaired due to iron fouling, possible obstruction in site glass causing error in flow calculations.
8/13/2019	GWTT	Yes	--	--	27	23	28	30	2.17	56.5	13	56.45	738390	8940	1.2	0.040	Yes	No	Conducted system checks, changed bag filters, adjusted VFD to 23 Hz. Obstruction in site glass seems apparent, affecting flow rate calculations.
8/16/2019	GWTT	Yes	--	--	32	26	30	35	1.04	117.8	16	34.83	744020	5630	1.3	0.103			Conducted system checks, changed bag filters, adjusted VFD from 23 Hz to 28 Hz.
8/20/2019	GWTT	Yes	--	--	40	27	36	38	NR	NR	20	NR	757990	13970	2.4	--	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 38 Hz to 39 Hz. Could not calculate influent flow rate due to obstruction in site glass
8/23/2019	GWTT	Yes	--	--	41	29	38	44	--	--	23	50.00	790720	32730	7.6	0.063	Yes	Yes	Conducted system checks, changed bag filters, and adjusted VFD from 39 Hz to 40 Hz. Collected montly system samples on 8/22/19.
8/27/2019	GWTT	Yes	--	--	45	35	44	49	--	--	27	50.00	873750	83030	14.4	0.074	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 40 Hz to 42 Hz.
8/30/2019	GWTT	Yes	--	--	49	37	8	10	--	--	30	49.00	976540	102790	23.8	0.081	Yes	No	Conducted system checks, changed bag filters after backwash of primary vessel.
Totals of August 2019			Average Flow Rate (gpm)								66.5	31	49.0	252580		0.113			
9/3/2019	GWTT	Yes	--	--	18	7	10	14	NA	NA	3	NR	1044190	67650	15.7	0.001	Yes	No	Conducted system checks, changed bag filters, "High High Level" Alarm indicated, adjusted VFD, site glass plugged due to iron oxide sludge build up at bottom of EQ tank, could not collect influent flow rate.
9/6/2019	GWTT	Yes	--	--	27	14	22	25	NA	NA	6	NR	NR	NR	NR	--	Yes	No	Conducted system checks, changed bag filters, "High High Level" Alarm indicated, adjusted VFD to 35 Hz from 31 Hz.
9/10/2019	GWTT	Yes	--	--	35	18	30	35	NA	NA	10	NR	1203690	159500	27.7	0.008	Yes	No	
9/13/2019	GWTT	Yes	--	--	40	25	40	42	NA	NA	13	NR	1311290	107600	24.9	0.009	Yes	No	Conducted system checks, changed bag filters, observed approximately 20 in. of sludge in EQ Tank, and adjusted VFD to 40 Hz from 38 Hz.
9/16/2019	GWTT	Yes	--	--	45	26	44	48	NA	NA	16	NR	1413970	102680	23.8	0.011	Yes	No	Conducted system checks, changed bag filters, and adjusted VFD to 48 Hz.
9/20/2019	GWTT	Yes	--	--	68	35	12	14	NA	NA	20	NR	1543040	129070	22.4	0.013	Yes	No	Conducted system checks, changed bag filters, backwashed primary GAC vessel, and adjusted VFD to 29 Hz.
9/23/2019	GWTT	Yes	--	--	24	8	23	27	NA	NA	23	NR	1563850	20810	4.8	0.003	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 29 Hz to 34 Hz.
9/27/2019	GWTT	Yes	--	--	32	17	42	44	NA	NA	27	NR	1577890	14040	2.4	0.002	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 34 Hz to 42 Hz, system samples collected on 9/26/19.
Totals of September 2019 <sup>10</sup>			Average Flow Rate (gpm) <sup>7</sup>								NA	30	NR	601350	17.4	0.015			



Table 2 - Summary of Groundwater Pump and Treatment System Operating and Maintenance Data  
Barnstable Country Fire and Rescue Training Academy  
155 Flint Rock Road, Barnstable, MA  
RTN 4-26179

Date	Operator <sup>1</sup>	System Operating on Arrival	Influent Bag Filter Differential Pressure (psi) <sup>6</sup>		Pre-Filter Changeout Differential Pressure (psi)		Post-Filter Changeout Differential Pressure (psi)		6" Influent Tank Fill Rate (min)	Estimated Influent Flow Rate (GPM) <sup>2</sup>	Days System Operating	Effluent				Estimated Total PFAs Removal (kg) <sup>3</sup>	System Operating on Departure	System Sampled	Comments
			Pre	Post	Gauge: P1	Gauge: P2	Gauge: P1	Gauge: P2				Effluent Flow Rate (GPM) <sup>7</sup>	Totalizer (Gal)	Total Gallons Treated	Average Effluent Flow Rate (GPM) <sup>8</sup>				
10/1/2019	GWTT	Yes	--	--	50	28	18	19	NA	NA	1	NR	1620400	--	--	--	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 42 Hz to 31 Hz. Operator noticed a loud sound on discharge pipes at LGAC #1 as well as a pressure drop across the entire system, system was instantly turned off and restarted after the VFD was adjusted. Operator assumed an
10/3/2019	GWTT	Yes	--	--	--	--	--	--	NA	NA	3	NR	1639940	19540	6.8	0.0005	Yes	No	System was shut off at 8:00 during excavation of the effluent discharge piping. The discharge piping was repaired and the system was restarted at 16:00. The bag filters were changed.
10/7/2019	GWTT	Yes	--	--	27	14	22	20	NA	NA	6	NR	1645550	5610	1.3	0.0002	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 31 Hz to 35 Hz.
10/11/2019	GWTT	Yes	--	--	32	30	19	20	NA	NA	10	NR	1683870	38320	6.7	0.0015	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 35 Hz to 32 Hz.
10/15/2019	GWTT	Yes	--	--	29	20	27	30	NA	NA	14	NR	1755270	71400	12.4	0.0040	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 32 Hz to 39 Hz.
10/18/2019	GWTT	Yes	--	--	38	22	30	35	NA	NA	18	NR	1867270	112000	19.4	0.0082	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 39 Hz to 35 Hz.
10/22/2019	GWTT	Yes	--	--	34	13	31	35	NA	NA	21	NR	1946590	79320	18.4	0.0090	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 35 Hz to 43 Hz.
10/25/2019	GWTT	Yes	--	--	44	34	35	42	NA	NA	24	NR	2043780	97190	22.5	0.0126	Yes	No	Conducted system checks, changed bag filters, adjusted VFD from 43 Hz to 40 Hz.
10/28/2019	GWTT	Yes	--	--	44	34	35	42	5.38	22.8	27	NR	2123880	80100	18.5	0.0117	Yes	No	Conducted system checks, changed bag filters, Global Cycle on site to vacuum pump out the contents from the EQ tank, bag filter unit, totes containing water from GAC vessel backwashes. The VFD was adjusted from 40 Hz to 24 Hz. Pressure gauge at P5 was replaced. System sampled on 10/30/19.
Totals of October 2019									Average Flow Rate (gpm) <sup>7</sup>	NA	30	NR		503480	11.7	0.008			

Notes:

1. CE - Coastal Engineering. GWTT - Groundwater Treatment Technologies

2. The estimated influent (INF) and effluent (EFF) flow rates are calculated based on the cross-sectional volume per vertical foot of the influent tank and the measured/timed filling (INF) rate or draining (EFF) of the tank. The diameter of the influent tank is approximately 78 inches. The cross-sectional volume of the tank is approximately 33.1 cubic feet per vertical linear foot. Therefore the flow rate calculation factor is approximately 122.5 gallons per 6 inches.

3. Total mass of PFAs removed is calculated based on the calcuated influent flow rate, the number of days the system has been operating, and the average total Influent PFAs concentration for the month. For the month of October, the average Influent PFAs concentration was 4,269 ng/L.

4. NA or -- Not Applicable.

5. NR - Not Reported

6. As of April 1, 2019, the system's O&M data reporting was changed to include the differential pressure readings from the bag filter unit's pressure gauges before and after the bag filters are changed/replaced, if applicable.

7. The influent flow rate could not reliably be calculated/measured from September to (most of) October due to a blockage in the site glass on the EQ tank from accumulated iron-oxide precipitates in the bottom of the tank. The iron-oxide precipitates were removed from the EQ tank on Oct. 28, 2019.

8. Instantaneous Effluent Flow Rate is recorded as the instantaneous flow rate as calculated or indicated from the totalizer flow meter on the system's effluent discharge piping.

9. The Average Flow Rate is calculated from the net gallons obtained from the system's totalizer flow meter and days that the system was in operation.

10. Calculated average effluent flow rates and the estimated PFAS removed total for the months of July to October 2019 were calculated based on the reported totalizer readings. However, the totalizer flow meter on the effluent discharge piping may not be accurate at flow rates less than 40 GPM. Therefore the data are shaded to indicate that they are approximations only and for this reason the July through October data are also considered approximates.

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	HSW-6/HS-2(a)										HSW-1/HS-1(a)									
SAMPLING DATE				1/21/2016	3/30/2016	8/11/2016	4/10/2017	7/27/2017	11/17/2017	2/9/2018	6/26/2018	1/9/2019	10/28/2019	1/21/2016	8/11/2016	4/10/2017	7/27/2017	11/17/2017	2/9/2018	1/9/2019	4/23/2019	7/22/2019	10/28/2019
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																							
PFOS (ng/L)	70	70	NE	77,000	320,000	41,000	28,000	21,000	45,000	25,000	950	1,300	3,600	110,000	56,000	38,000	24,000	25,000	13,000	1,800	2,000	1,100	1,800
PFOA (ng/L)	70	70	NE	--	--	--	660	--	320	160	15	94	79	--	--	1,000	350	1,300	320	840	100	64	46
PFNA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	BRL (<87)	26	46	--	--	--	--	--	--	43	65	43	33
PFHxS (ng/L)	NE	70	NE	--	--	--	--	--	--	--	26	140	310	--	--	--	--	--	--	1,700	300	170	150
PFHpA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	15	66	100	--	--	--	--	--	--	510	67	52	43
PFDA (ng/L)	NE	NE	NE	--	--	--	--	--	--	--	--	--	30	--	--	--	--	--	--	--	55	19	13
TOTAL PFAs	70	70	20	77,000	320,000	41,000	28,660	21,000	45,320	25,160	1,006	1,626	4,165	110,000	56,000	39,000	24,350	26,300	13,320	4,893	2,587	1,448	2,085

- Notes:
1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.
  2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.
  3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.
  4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.
  5. BRL - Below Laboratory Detection Limits
  6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
  7. Concentrations in bold exceed applicable Health Advisory Limit
  8. PFOS - Perfluorooctanesulfonate
  9. PFOA - Perfluorooctanoic Acid
  10. PFNA - Perfluorononanoic Acid
  11. PFHxS - Perfluorohexanesulfonic Acid
  12. PFHpA - Perfluoroheptanoic Acid
  13. PFDA - Perfluorodecanoic Acid
  14. NA - Concentration data not available
  15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.
  16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	HS-1 <sup>13</sup>		HS-6 <sup>13</sup>	HS-2 <sup>13</sup>	HS-2S <sup>13</sup>		PFW-1											
SAMPLING DATE				8/11/2016	12/8/2016	8/11/2016	7/27/2017	8/18/2016	5/3/2017	4/1/2015	10/7/2015	3/8/2016	3/30/2016	8/11/2016	4/10/2017	2/9/2018	6/26/2018	1/9/2019	4/23/2019	7/22/2019	10/28/2019
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																					
PFOS (ng/L)	70	70	NE	56,000	36,000	41,000	21,000	300	150	8,400	60,000	7,000	56,000	3,500	4,100	8,100	76,000	38,000	20,000	24,000	16,000
PFOA (ng/L)	70	70	NE	460	1,800	450	370	BRL (<5.3)	8	360	800	--	--	--	--	470	1,500	160	300	560	130
PFNA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	--	--	--	3,900	330	360	210	570
PFHxS (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	--	--	--	7,400	960	1,500	4,800	910
PFHpA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	--	--	--	610	140	290	500	150
PFDA (ng/L)	NE	NE	NE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	110	160	120
TOTAL PFAs	70	70	20	56,460	37,800	41,450	21,370	300	158	8,760	60,800	7,000	56000	3500	4,100	8,570	89,410	39,590	22,560	30,230	17,880

Notes:

1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.
2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.
3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.
4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.
5. BRL - Below Laboratory Detection Limits
6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
7. Concentrations in bold exceed applicable Health Advisory Limit
8. PFOS - Perfluorooctanesulfonate
9. PFOA - Perfluorooctanoic Acid
10. PFNA - Perfluorononanoic Acid
11. PFHxS - Perfluorohexanesulfonic Acid
12. PFHpA - Perfluoroheptanoic Acid
13. PFDA - Perfluorodecanoic Acid
14. NA - Concentration data not available
15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.
16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Heaith Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	PFW-2												PFW-3			PFW-4	
SAMPLING DATE				4/1/2015	6/18/2015	10/27/2015	1/21/2016	3/30/2016	8/11/2016	12/8/2016	4/10/2017	7/27/2017	11/17/2017	2/9/2018	1/9/2019	10/28/2019	4/1/2015	10/15/2015	4/18/2017	4/1/2015
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																				
PFOS (ng/L)	70	70	NE	220,000	200,000	32,000	39,000	120,000	65,000	13,000	17,000	73,000	25,000	32,000	5,200	2,100	2,700	3,800	3,400	3,300
PFOA (ng/L)	70	70	NE	5200	BRL (<800)	--	1,100	2,100	--	--	970	910	400	400	720	74	140	170	230	420
PFNA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	--	110	64	--	--	--	--
PFHxS (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	--	1,800	230	--	--	--	--
PFHpA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	--	470	68	--	--	--	--
PFDA (ng/L)	NE	NE	NE	--	--	--	--	--	--	--	--	--	--	--	--	27	--	--	--	--
TOTAL PFAs	70	70	20	225,200	200,000	32,000	40,100	122,100	65,000	13,000	17,970	73,910	25,400	32,400	8,300	2,536	2,840	3,970	3,630	3,720

- Notes:
1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.
  2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.
  3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.
  4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.
  5. BRL - Below Laboratory Detection Limits
  6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
  7. Concentrations in bold exceed applicable Health Advisory Limit
  8. PFOS - Perfluorooctanesulfonate
  9. PFOA - Perfluorooctanoic Acid
  10. PFNA - Perfluorononanoic Acid
  11. PFHxS - Perfluorohexanesulfonic Acid
  12. PFHpA - Perfluoroheptanoic Acid
  13. PFDA - Perfluorodecanoic Acid
  14. NA - Concentration data not available
  15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.
  16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	PFW-5						PFW-6				PRW-1	PRW-4 <sup>3</sup>						
SAMPLING DATE				3/31/2015	4/11/2017	1/9/2019	4/23/2019	7/22/2019	10/28/2019	4/1/2015	3/8/2016	4/18/2016	1/9/2019	4/1/2015	4/1/2015	8/4/2015	11/12/2015	1/6/2016	4/28/2016	8/11/2016	11/16/2016
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																					
PFOS (ng/L)	70	70	NE	2,700	2,100	1,100	1,900	1,600	2,400	3,400	2,400	850	1,500	1,600	760	5,900	9,000	7,600	6,300	9,500	5,400
PFOA (ng/L)	70	70	NE	250	170	64	150	120	26	350	470	19	400	150	60	550	BRL (<2000)	260	BRL (<200)	210	99
PFNA (ng/L)	NE	70	NE	--	--	BRL (<8.7)	25	16	BRL (<4.9)	--	--	--	140	--	--	--	--	--	--	--	--
PFHxS (ng/L)	NE	70	NE	--	--	240	680	630	260	--	--	--	1,100	--	--	--	--	--	--	--	--
PFHpA (ng/L)	NE	70	NE	--	--	30	82	54	22	--	--	--	220	--	--	--	--	--	--	--	--
PFDA (ng/L)	NE	NE	NE	--	--	--	12	11	BRL (<4.1)	--	--	--	--	--	--	--	--	--	--	--	--
TOTAL PFAs	70	70	20	2,950	2,270	1,434	2,849	2,431	2,708	3,750	2,870	869	3,360	1,750	820	6,450	9,000	7,860	6,300	9,710	5,499

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	PRW-4 <sup>3</sup>							PC-0		PC-1										
SAMPLING DATE				1/4/2017	4/19/2017	8/28/2017	11/20/2017	2/14/2018	4/9/2018	6/14/2018	4/2/2015	4/24/2017	8/20/2014	6/17/2015	10/7/2015	3/30/2016	4/24/2017	2/6/2018	6/26/2018	1/11/2019	4/24/2019	7/23/2019	10/29/2019
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																							
PFOS (ng/L)	70	70	NE	4,900	3,200	2,900	2,000	2,100	2,600	2,800	110	930	320	48,000	2,000	56,000	5,700	9,000	10,000	1,700	8,000	4,300	1,600
PFOA (ng/L)	70	70	NE	95	110	100	64	27	79	120	BRL (<20)	58	--	1,100	BRL (<800)	1,200	--	370	190	140	300	150	72
PFNA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	140	62	150	140	75
PFHxS (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	850	380	650	430	380
PFHpA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	200	200	180	230	150
PFDA (ng/L)	NE	NE	NE	--	--	--	--	--	--	--											78	67	19
TOTAL PFAs	70	70	20	4,995	3,310	3,000	2,064	2,127	2,679	2,920	110	988	320	49,100	2,000	57,200	5,700	9,370	11,380	2,482	9,358	5,317	2,296

Notes:

1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.
2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.
3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.
4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.
5. BRL - Below Laboratory Detection Limits
6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
7. Concentrations in bold exceed applicable Health Advisory Limit
8. PFOS - Perfluorooctanesulfonate
9. PFOA - Perfluorooctanoic Acid
10. PFNA - Perfluorononanoic Acid
11. PFHxS - Perfluorohexanesulfonic Acid
12. PFHpA - Perfluoroheptanoic Acid
13. PFDA - Perfluorodecanoic Acid
14. NA - Concentration data not available
15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.
16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.



Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	PC-2		PC-3		PC-4		PC-6A							PC-7				
SAMPLING DATE				6/17/2015	4/24/2017	8/20/2014	6/17/2015	6/17/2015	3/8/2016	3/9/2016	4/27/2017	6/26/2018	1/10/2019	4/24/2019	7/23/2019	10/29/2019	4/2/2015	6/17/2015	10/7/2015	3/8/2016	4/27/2017
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																					
PFOS (ng/L)	70	70	NE	3,800	2,200	3,100	4,700	2,200	4,600	1,300	3,200	1,300	1,800	1,900	940	1,100	17,000	500	700	1,700	2,900
PFOA (ng/L)	70	70	NE	220	110	180	200	79	160	110	150	60	30	68	33	62	3,500	27	98	140	130
PFNA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	55	25	60	36	48	--	--	--	--	--
PFHxS (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	300	190	310	150	290	--	--	--	--	--
PFHpA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	75	37	83	45	86	--	--	--	--	--
PFDA (ng/L)	NE	NE	NE											10	BRL (<4.1)	7.4					
TOTAL PFAS	70	70	20	4,020	2,310	3,280	4,900	2,279	4,760	1,410	3,350	1,790	2,082	2,431	1,204	1,593	20,500	527	798	1,840	3,030

Notes:

1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.

2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.

3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.

4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.

5. BRL - Below Laboratory Detection Limits

6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion

7. Concentrations in bold exceed applicable Health Advisory Limit

8. PFOS - Perfluorooctanesulfonate

9. PFOA - Perfluorooctanoic Acid

10. PFNA - Perfluorononanoic Acid

11. PFHxS - Perfluorohexanesulfonic Acid

12. PFHpA - Perfluoroheptanoic Acid

13. PFDA - Perfluorodecanoic Acid

14. NA - Concentration data not available

15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.

16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	PC-8					PC-9						PC-10		PC-11									
SAMPLING DATE				6/17/2015	10/7/2015	3/8/2016	4/24/2017	2/6/2018	4/1/2015	10/7/2015	3/9/2016	3/30/2016	4/28/2017	1/10/2019	10/30/2019	4/6/2015	4/28/2017	4/2/2015	5/12/2016	4/24/2017	2/6/2018	6/26/2018	1/10/2019	4/24/2019	7/23/2019	10/29/2019
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																										
PFOS (ng/L)	70	70	NE	15,000	500	1,600	36,000	1,000	580	510	5,300	8,100	280	1,700	2,300	790	560	4,400	32,000	3,600	4,000	9,600	14,000	200,000	68,000	22,000
PFOA (ng/L)	70	70	NE	2,800	370	97	--	71	30	40	1,200	1,600	31	64	100	50	67	550	430	250	180	250	410	640	BRL (<240)	150
PFNA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	53	90	--	--	--	--	--	--	230	190	1,700	540	320
PFHxS (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	360	420	--	--	--	--	--	--	1,500	1,500	2,400	1,200	800
PFHpA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	81	120	--	--	--	--	--	--	200	310	210	BRL (<210)	160
PFDA (ng/L)	NE	NE	NE		--	--	--	--	--	--	--	--	--	--	15	--	--	--	--	--	--	--	--	450	BRL (<260)	73
TOTAL PFAs	70	70	20	17800	870	1697	36000	1071	610	550	6500	9700	311	2258	3,030	840	627	4950	32430	3850	4180	11,780	16,410	204,950	69,740	23,503

Notes:

1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.

2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.

3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.

4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.

5. BRL - Below Laboratory Detection Limits

6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion

7. Concentrations in bold exceed applicable Health Advisory Limit

8. PFOS - Perfluorooctanesulfonate

9. PFOA - Perfluorooctanoic Acid

10. PFNA - Perfluorononanoic Acid

11. PFHxS - Perfluorohexanesulfonic Acid

12. PFHpA - Perfluoroheptanoic Acid

13. PFDA - Perfluorodecanoic Acid

14. NA - Concentration data not available

15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.

16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	PC-12			PC-13		PC-14			PC-15			PC-16d							
SAMPLING DATE				6/17/2015	5/12/2016	4/26/2017	6/17/2015	4/24/2017	8/20/2014	3/30/2016	4/28/2017	4/2/2015	4/28/2017	10/30/2019	4/2/2015	10/7/2015	2/6/2018	6/26/2018	1/10/2019	4/24/2019	7/23/2019	10/29/2019
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																						
PFOS (ng/L)	70	70	NE	1,300	1,700	1,600	2,400	2,800	550	2,100	1,600	1,300	780	970	700	560	980	1,900	1,600	2,000	1,400	1,300
PFOA (ng/L)	70	70	NE	140	150	150	280	170	40	250	160	100	80	55	70	84	64	150	9.3	140	33	75
PFNA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	52	--	--	--	100	BRL (<8.7)	110	36	79
PFHxS (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	290	--	--	--	670	60	520	270	220
PFHpA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	77	--	--	--	170	13	140	74	80
PFDA (ng/L)	NE	NE	NE	--	--	--	--	--	--	--	--	--	--	4.9	--	--	--	--	--	9	BRL (<4.1)	7.2
TOTAL PFAS	70	70	20	1440	1850	1750	2680	2,970	590	2,350	1,760	1,400	860	1,444	770	644	1044	2,990	1,682	2,919	1,813	1,761

- Notes:
- Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.
  - The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.
  - The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.
  - (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.
  - BRL - Below Laboratory Detection Limits
  - Concentrations presented in ng/L - nanograms per Liter - parts per trillion
  - Concentrations in bold exceed applicable Health Advisory Limit
  - PFOS - Perfluorooctanesulfonate
  - PFOA - Perfluorooctanoic Acid
  - PFNA - Perfluorononanoic Acid
  - PFHxS - Perfluorohexanesulfonic Acid
  - PFHpA - Perfluoroheptanoic Acid
  - PFDA - Perfluorodecanoic Acid
  - NA - Concentration data not available
  - Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.
  - Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	PC-17			PC-18						PC-19				PC-20D	PC-21D	PC-22	
SAMPLING DATE				8/20/2014	10/7/2015	2/6/2018	6/17/2015	10/7/2015	4/27/2017	2/6/2018	1/10/2019	10/29/2019	4/2/2015	3/30/2016	4/27/2017	10/30/2019	3/9/2016	3/9/2016	4/2/2015	4/28/2017
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																				
PFOS (ng/L)	70	70	NE	140	230	140	1,200	900	580	890	1,500	1,500	3,300	1,600	2,000	1,900	3,200	230	1,200	1,400
PFOA (ng/L)	70	70	NE	BRL	24	17	110	590	--	70	110	75	260	120	290	170	200	19	100	170
PFNA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	130	79	--	--	--	130	--	--	--	--
PFHxS (ng/L)	NE	70	NE	--	--	--	--	--	--	--	540	220	--	--	--	450	--	--	--	--
PFHpA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	140	80	--	--	--	95	--	--	--	--
PFDA (ng/L)	NE	NE	NE	--	--	--	--	--	--	--	--	7.2	--	--	--	14	--	--	--	--
TOTAL PFAs	70	70	20	140	254	157	1310	1490	580	960	2420	1,954	3560	1720	2290	2745	3,400	249	1300	1,570

Notes:

1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.

2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.

3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.

4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.

5. BRL - Below Laboratory Detection Limits

6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion

7. Concentrations in bold exceed applicable Health Advisory Limit

8. PFOS - Perfluorooctanesulfonate

9. PFOA - Perfluorooctanoic Acid

10. PFNA - Perfluorononanoic Acid

11. PFHxS - Perfluorohexanesulfonic Acid

12. PFHpA - Perfluoroheptanoic Acid

13. PFDA - Perfluorodecanoic Acid

14. NA - Concentration data not available

15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.

16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	PC-23D	PC-24		PC-25	PC-26				PC-28						PC-29
SAMPLING DATE				6/17/2015	3/30/2016	4/28/2017	6/17/2015	6/17/2015	10/8/2015	3/8/2016	4/24/2017	3/9/2016	4/28/2017	1/10/2019	4/24/2019	7/23/2019	10/28/2019	4/28/2017
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																		
PFOS (ng/L)	70	70	NE	1,000	420	320	2,300	1,000	1,900	1,200	380	400	770	38	18	82	270	1,400
PFOA (ng/L)	70	70	NE	73	22	33	260	210	190	98	21	27	61	BRL (<3.3)	BRL (<7.4)	190	12	BRL (<4.6)
PFNA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	BRL (<8.7)	BRL (<4.9)	BRL (<4.9)	8.6	--
PFHxS (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	17	15	30	94	--
PFHpA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	20	24	25	33	--
PFDA (ng/L)	NE	NE	NE	--	--	--	--	--	--	--	--	--	--	--	BRL (<4.1)	BRL (<4.1)	BRL (<4.1)	--
TOTAL PFAs	70	70	20	1073	442	353	2,560	1,210	2,090	1,298	401	427	831	75	57	327	418	1400

Notes:

1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.
2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.
3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.
4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.
5. BRL - Below Laboratory Detection Limits
6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
7. Concentrations in bold exceed applicable Health Advisory Limit
8. PFOS - Perfluorooctanesulfonate
9. PFOA - Perfluorooctanoic Acid
10. PFNA - Perfluorononanoic Acid
11. PFHxS - Perfluorohexanesulfonic Acid
12. PFHpA - Perfluoroheptanoic Acid
13. PFDA - Perfluorodecanoic Acid
14. NA - Concentration data not available
15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.
16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	PC-30								PC-31		PC-32		PC-33		PC-34S	PC-34D	
SAMPLING DATE				3/9/2016	4/27/2017	2/6/2018	6/26/2018	1/10/2019	4/24/2019	7/23/2019	10/29/2019	3/8/2016	4/27/2017	3/30/2016	4/27/2017	3/30/2016	4/27/2017	4/14/2016	4/14/2016	4/28/2017
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																				
PFOS (ng/L)	70	70	NE	980	2,500	1,900	1,600	2,200	1,200	4,300	960	1,200	12,000	1,200	960	2,700	2,100	1,300	1,400	1,500
PFOA (ng/L)	70	70	NE	88	--	98	99	85	85	79	55	110	160	130	54	250	210	72	150	130
PFNA (ng/L)	NE	70	NE	--	--	--	80	88	100	100	61	--	--	--	--	--	--	--	--	--
PFHxS (ng/L)	NE	70	NE	--	--	--	510	390	340	300	220	--	--	--	--	--	--	--	--	--
PFHpA (ng/L)	NE	70	NE	--	--	--	130	110	110	96	71	--	--	--	--	--	--	--	--	--
PFDA (ng/L)	NE	NE	NE	--	--	--	--	--	12	BRL (<4.1)	6.0	--	--	--	--	--	--	--	--	--
TOTAL PFAs	70	70	20	1068	2500	1998	2,419	2,873	1,847	4,875	1,373	1310	12160	1330	1014	2950	2310	1372	1550	1630

- Notes:
1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.
  2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.
  3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.
  4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.
  5. BRL - Below Laboratory Detection Limits
  6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
  7. Concentrations in bold exceed applicable Health Advisory Limit
  8. PFOS - Perfluorooctanesulfonate
  9. PFOA - Perfluorooctanoic Acid
  10. PFNA - Perfluorononanoic Acid
  11. PFHxS - Perfluorohexanesulfonic Acid
  12. PFHpA - Perfluoroheptanoic Acid
  13. PFDA - Perfluorodecanoic Acid
  14. NA - Concentration data not available
  15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.
  16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.



Table 4 - Summary of Groundwater PFAS Analytical Data  
Barnstable Country Fire and Rescue Training Academy 155  
Flint Rock Road, Barnstable, MA  
RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	PC-35S	PC-35D		PC-36S			PC-36D		PC-37	PC-38		PC-39	MW-1			MW-3S	
SAMPLING DATE				4/14/2016	4/14/2016	4/28/2017	4/14/2016	1/11/2019	10/29/2019	4/14/2016	4/24/2017	4/10/2017	4/24/2017	10/29/2019	4/24/2017	11/22/2013	6/3/2014	4/28/2017	6/3/2014	8/18/2016
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																				
PFOS (ng/L)	70	70	NE	1,700	2,000	1,700	35	64	1,200	3,100	2,500	45	BRL (<2.6)	BRL (<5.2)	1,200	3,900	4,400	2,600	4,900	1,900
PFOA (ng/L)	70	70	NE	130	140	97	BRL (<5.3)	BRL (<3.3)	54	150	120	BRL (<20)	BRL (<4.6)	BRL (<7.4)	46	320	880	290	530	690
PFNA (ng/L)	NE	70	NE	--	--	--	--	BRL (<8.7)	80	--	--	--	--	BRL (<4.9)	--	--	--	--	--	--
PFHxS (ng/L)	NE	70	NE	--	--	--	--	38	120	--	--	--	--	6.1	--	--	--	--	--	--
PFHpA (ng/L)	NE	70	NE	--	--	--	--	BRL (<7.4)	62	--	--	--	--	BRL (<7.1)	--	--	--	--	--	--
PFDA (ng/L)	NE	NE	NE	--	--	--	--	--	11	--	--	--	--	BRL (<4.1)	--	--	--	--	--	--
TOTAL PFAs	70	70	20	1830	2140	1797	35	102	1,516	3250	2620	45	BRL	6.1	1,246	4,220	5,280	2,890	5,430	2,590

Notes:

1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.

2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.

3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.

4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.

5. BRL - Below Laboratory Detection Limits

6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion

7. Concentrations in bold exceed applicable Health Advisory Limit

8. PFOS - Perfluorooctanesulfonate

9. PFOA - Perfluorooctanoic Acid

10. PFNA - Perfluorononanoic Acid

11. PFHxS - Perfluorohexanesulfonic Acid

12. PFHpA - Perfluoroheptanoic Acid

13. PFDA - Perfluorodecanoic Acid

14. NA - Concentration data not available

15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.

16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	MW-3D	SBV-3	MW-6		MW-7	MW-10		MW-12i	MW-12							MW-15	MW-15D	MW-19i
SAMPLING DATE				8/18/2016	11/22/2013	4/1/2015	4/25/2017	11/22/2013	11/22/2013	4/18/2016	4/24/2017	8/20/2014	4/1/2015	6/26/2018	1/11/2019	4/23/2019	7/23/2019	10/29/2019	4/24/2017	4/2/2015	8/20/2014
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																					
PFOS (ng/L)	70	70	NE	98	1,100	5,700	2,400	3,100	2,000	1,700	490	2,500	4,800	3,000	2,700	2,800	2,800	2,300	19	60	BRL
PFOA (ng/L)	70	70	NE	10	350	510	140	580	670	440	36	400	470	280	650	920	250	380	27	60	BRL
PFNA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	56	64	92	87	80	--	--	--
PFHxS (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	1,200	1,500	1,700	880	1,300	--	--	--
PFHpA (ng/L)	NE	70	NE	--	--	--	--	--	--	--	--	--	--	130	490	440	170	310	--	--	--
PFDA (ng/L)	NE	NE	NE	--	--	--	--	--	--	--	--	--	--	--	--	16	11	9.7	--	--	--
TOTAL PFAs	70	70	20	108	1,450	6,210	2,540	3,680	2,670	2,140	526	2,900	5,270	4,666	5,404	5,968	4,198	4,380	46	120	BRL

Notes:

1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.

2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.

3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.

4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.

5. BRL - Below Laboratory Detection Limits

6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion

7. Concentrations in bold exceed applicable Health Advisory Limit

8. PFOS - Perfluorooctanesulfonate

9. PFOA - Perfluorooctanoic Acid

10. PFNA - Perfluorononanoic Acid

11. PFHxS - Perfluorohexanesulfonic Acid

12. PFHpA - Perfluoroheptanoic Acid

13. PFDA - Perfluorodecanoic Acid

14. NA - Concentration data not available

15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.

16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	MW-22							MW-28S	MW-30	MW-31	MW-32	MW-35i				MW-36D	MW-37	MW-37D	MW-99i		
SAMPLING DATE				6/3/2014	4/1/2015	6/26/2018	1/11/2019	4/23/2019	7/23/2019	10/29/2019	4/1/2015	4/1/2015	8/18/2016	5/3/2017	8/20/2014	5/3/2017	1/10/2019	10/30/2019	4/6/2015	4/26/2017	4/2/2015	4/6/2015	4/26/2017	10/29/2019
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																								
PFOS (ng/L)	70	70	NE	4,900	600	320	350	320	410	510	2,100	1,400	3,200	240	60	42	BRL (<6)	BRL (<5.2)	140	77	60	730	240	630
PFOA (ng/L)	70	70	NE	530	90	30	140	160	190	150	90	130	170	36	BRL	14	BRL (<3.3)	BRL (<7.4)	<20	77	90	70	18	50
PFNA (ng/L)	NE	70	NE	--	--	9	BRL (<8.7)	81	8	8.3	--	--	--	--	--	--	BRL (<8.7)	BRL (<4.9)	--	--	--	--	--	58
PFHxS (ng/L)	NE	70	NE	--	--	130	680	600	520	690	--	--	--	--	--	--	BRL (<5.6)	6.0	--	--	--	--	--	340
PFHpA (ng/L)	NE	70	NE	--	--	13	69	49	33	61	--	--	--	--	--	--	BRL (<7.4)	BRL (<7.1)	--	--	--	--	--	46
PFDA (ng/L)	NE	NE	NE	--	--	--	--	BRL (<4.1)	BRL (<4.1)	BRL (<4.1)	--	--	--	--	--	--	--	BRL (<4.1)	--	--	--	--	--	5.5
TOTAL PFAs	70	70	20	5,430	690	502	1,239	1,210	1,161	1,419	2,190	1,530	3,370	276	60	56	BRL	6.0	140	154	150	800	258	1,130

Notes:

1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.
2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.
3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.
4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.
5. BRL - Below Laboratory Detection Limits
6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
7. Concentrations in bold exceed applicable Health Advisory Limit
8. PFOS - Perfluorooctanesulfonate
9. PFOA - Perfluorooctanoic Acid
10. PFNA - Perfluorononanoic Acid
11. PFHxS - Perfluorohexanesulfonic Acid
12. PFHpA - Perfluoroheptanoic Acid
13. PFDA - Perfluorodecanoic Acid
14. NA - Concentration data not available
15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.
16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.

Table 4 - Summary of Groundwater PFAS Analytical Data

Barnstable Country Fire and Rescue Training Academy

155 Flint Rock Road, Barnstable, MA

RTN 4-26179

SAMPLE ID	USEPA <sup>1,2</sup> Health Advisory	MassDEP ORS Guideline	Method 1 GW-1 Standard <sup>4</sup>	OW-8A									FS-1SA	FS-1	RW-1		HW-1D <sup>14</sup>			HW-2S	OW-2A	OW-2S	OW-2D
SAMPLING DATE				11/22/2013	6/3/2014	4/11/2017	8/16/2017	6/26/2018	1/9/2019	4/23/2019	7/22/2019	10/28/2019	6/16/2016	4/11/2017	4/1/2015	4/11/2017	5/3/2017	1/10/2019	10/28/2019	5/3/2017	6/3/2014	4/14/2016	4/14/2016
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.2)																							
PFOS (ng/L)	70	70	NE	2,700	8,600	1,700	770	2,800	990	880	780	220	1,700	1,700	2,300	1,000	25	BRL (<6)	BRL (<5.2)	15	1,300	2,400	6
PFOA (ng/L)	70	70	NE	430	1,000	2,000	120	65	420	66	55	130	550	730	240	58	8	BRL (<3.3)	BRL (<7.4)	8.2	150	250	BRL (<5.3)
PFNA (ng/L)	NE	70	NE	--	--	--	--	310	150	120	78	10	--	--	--	--	--	BRL (<8.7)	BRL (<4.9)	--	--	--	--
PFHxS (ng/L)	NE	70	NE	--	--	--	--	250	890	140	100	750	--	--	--	--	--	BRL (<5.6)	BRL (<5.2)	--	--	--	--
PFHpA (ng/L)	NE	70	NE	--	--	--	--	43	210	40	26	190	--	--	--	--	--	BRL (<7.4)	BRL (<7.1)	--	--	--	--
PFDA (ng/L)	NE	NE	NE	--	--	--	--	--	--	15	18	14	--	--	--	--	--	--	BRL (<4.1)	--	--	--	--
TOTAL PFAs	70	70	20	3,130	9,600	3,700	890	3,468	2,660	1,261	1,057	1,314	2,250	2,430	2,540	1,058	33	BRL	BRL	23.2	1,450	2,650	6

Notes:

1. Prior to June 11, 2018, the USEPA established the EPA Health Advisory for two PFAS chemicals, PFOA and PFOS, which was 70 ng/L. Subsequently, MassDEP's Office of Research and Standards (ORS) expanded on this Health Advisory and created the ORS Guideline that applies to the total summed of five PFAS chemicals, PFOS, PFOA, PFNA, PFHxS, and PFHpA, effective June 11, 2018.
2. The USEPA and MassDEP ORS Guideline applies to five PFAS chemicals of concern (PFOS, PFOA, PFNA, PFHpA, and PFHxS) individually as well as the sum of the five PFAS of concern.
3. The complete PFAS concentration data set collected from PRW-4 is detailed in the data table titled "Summary of Groundwater Pump and Treatment System PFOS/PFOA Analytical Data." Data presented herein is summarized and data was selected based on quarterly sampling events.
4. (--) Concentrations of the three additional PFAS chemicals, PFNA, PFHxS, and PFHpA were not presented because the MassDEP ORS Guideline was not in effect and PFAS concentrations were regulated by the USEPA Health Advisory prior to 6.11.18. Concentrations of PFDA were not presented prior to April 19, 2019. MassDEP released drafted Method 1 groundwater standards for PFAS on April 19, 2019 that applies to the total sum of six PFAS compounds (PFOS, PFOA, PFNA, PFHxS, PFHpA, and PFDA), which is 20 ng/L. These drafted groundwater standards were finalized and became effective on December 27, 2019.
5. BRL - Below Laboratory Detection Limits
6. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
7. Concentrations in bold exceed applicable Health Advisory Limit
8. PFOS - Perfluorooctanesulfonate
9. PFOA - Perfluorooctanoic Acid
10. PFNA - Perfluorononanoic Acid
11. PFHxS - Perfluorohexanesulfonic Acid
12. PFHpA - Perfluoroheptanoic Acid
13. PFDA - Perfluorodecanoic Acid
14. NA - Concentration data not available
15. Monitoring well HS-1 was destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The well was replaced with HSW-1/HS-1a as post-exacavation activities.
16. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.

Table 5 - Groundwater Elevation and Gauging Data 2018-2019  
 Barnstable Country Fire and Rescue Training Academy  
 155 Flint Rock Road, Barnstable, MA  
 RTN 4-26179

Well ID	Location (From Academy )	Elev (TOC) (Feet)	Groundwater Level from TOC (Feet)					Groundwater Elevation (Feet)				
			Date					Date				
			6/26/2018	1/9/2019	4/23/2019	7/22/2019	10/28/2019	6/26/2018	1/9/2019	4/23/2019	7/22/2019	10/28/2019
FS-1sa2 (surveyed in 2018)	Academy	41.84	--	12.45	10.96	11.78	--	--	29.39	30.88	30.06	--
FS-1sa2	Academy	42.56	--	--	--	--	--	--	--	--	--	--
HSW-1/HS-1(a)	Academy	40.012	--	9.61	8.78	8.02	11.67	--	30.402	31.232	31.992	28.342
HSW-6/HS-2(a)	Academy	39.305	9.37	10.35	8.02	8.02	10.76	29.935	28.955	31.285	31.285	28.545
OW-2D	Academy	37.36	--	7.91	6.39	6.39	8.76	--	29.45	30.97	30.97	28.6
OW-2S	Academy	37.532	--	8.33	6.22	7.93	9.59	--	29.202	31.312	29.602	27.942
OW-4	Not Located	NS	--	--	--	--	--	--	--	--	--	--
OW-8A	Academy	42.471	12.33	13.24	11.75	12.59	14.37	30.141	29.231	30.721	29.881	28.101
OW-8i	Academy	42.579	--	--	--	--	--	--	--	--	--	--
PFW-1	Academy	41.83	11.67	12.53	11.02	11.83	13.78	30.16	29.3	30.81	30	28.05
PFW-2	Academy	40.019	--	10.48	8.95	9.72	11.53	--	29.539	31.069	30.299	28.489
PFW-3	Academy	37.832	--	8.2	6.67	7.5	9.29	--	29.632	31.162	30.332	28.542
PFW-4	Academy	39.344	--	9.78	8.21	9.07	10.98	--	29.564	31.134	30.274	28.364
PFW-5	Academy	42.017	--	12.38	11.29	11.79	13.56	--	29.637	30.727	30.227	28.457
PFW-6	Academy	40.577	--	11.27	9.75	10.59	--	--	29.307	30.827	29.987	--
MW-1	Adjacent Academy	42.584	--	--	12.06	12.54	14.46	--	--	20.79	30.044	28.124
MW-2	Adjacent Academy	42.72	--	--	--	--	14.79	--	--	--	--	27.93
MW-3D	Adjacent Academy	43.654	--	--	--	--	--	--	--	--	--	--
MW-3i	Adjacent Academy	43.823	--	13.8	12.31	13.14	15.04	--	29.24	30.73	29.9	28.783
MW-3S	Adjacent Academy -SE	43.535	--	13.7	12.17	12.99	14.89	--	29.22	30.75	29.93	28.645
MW-6	Adjacent Academy -SE	41.432	--	--	--	--	13.58	--	--	--	--	27.852
MW-7	Adjacent Academy -SE	43.126	--	--	12.8	13.6	15.59	--	--	30.326	27.536	27.536
MW-8	Adjacent Academy -SE	48.721	--	--	13.46	14.28	16.22	--	--	--	--	32.501
MW-9D	Adjacent Academy -SE	45.079	--	--	14.21	--	17.08	--	--	30.869	--	27.999
MW-9S	Adjacent Academy -SE	44.629	--	--	--	--	--	--	--	--	--	--
MW-10	Adjacent Academy	44.212	--	14.9	13.43	14.26	16.23	--	29.312	30.782	29.952	27.982
MW-11	Adjacent Academy/Destroyed	NS	--	--	--	--	15.5	--	--	--	--	--
MW-12s	DG -E	43.421	14.62	13.7	13.3	14.29	16.1	28.801	29.721	30.121	29.131	27.321
MW-12i		43.448	--	--	--	--	--	--	--	--	--	--
MW-13s	DG -E	43.404	--	--	--	--	--	--	--	--	--	--
MW-15D	DG -E	43.591	--	--	--	--	--	--	--	--	--	--
MW-15S	DG -E	43.458	--	--	--	--	--	--	--	--	--	--
MW-17	DG -E	NA	--	--	--	--	--	--	--	--	--	--
MW-19A	DG- NE	44.06	--	--	--	--	--	--	--	--	--	--
MW-19B	DG- NE	44.146	--	--	--	--	--	--	--	--	--	--
MW-21	DG-NE	41.23	--	--	--	--	--	--	--	--	--	--
MW-22	DG-NE	43.46	14.3	15.06	13.5	14.4	16.35	29.16	28.4	29.96	29.06	27.11
MW-23	DG-NE	49.491	--	--	--	--	--	--	--	--	--	--
MW-27	DG-NE	41.909	--	--	--	--	--	--	--	--	--	--
MW-28S	DG- NE	NA	--	--	--	--	12.95	--	--	--	--	NA
MW-28D		NA	--	--	--	--	--	--	--	--	--	--
MW-32		41.984	--	--	--	--	--	--	--	--	--	--
MW-33		NA	--	--	--	--	--	--	--	--	--	--
MW-35i	DG-E	NA	--	27.32	--	--	29.08	--	NA	--	--	NA
MW-35s	DG-E	NA	--	--	--	--	--	--	--	--	--	--
MW-36A	DG-E	NA	--	--	--	--	--	--	--	--	--	--
MW-36B	DG-E	NA	--	--	--	--	--	--	--	--	--	--
MW-36D	DG-E	NA	--	--	--	--	--	--	--	--	--	--
MW-37D	DG-E	NA	--	--	--	--	--	--	--	--	--	--
MW-37i	DG-E	NA	--	--	--	--	--	--	--	--	--	--
MW-37s	DG-E	NA	--	--	--	--	--	--	--	--	--	--
MW-99i	north of	NA	--	--	--	--	22.94	--	--	--	--	NA
PC-0	DG-SE	58.276	--	--	--	--	--	--	--	--	--	--
PC-1	DG-SE	54.57	26.14	26.81	25.36	26.22	28.34	28.43	27.76	29.21	28.35	26.23
PC-2	DG-SE	51.776	--	--	--	--	--	--	--	--	--	--
PC-3	DG-SE	52.047	--	--	--	--	--	--	--	--	--	--
PC-4	DG-SE	NS	--	--	--	--	--	--	--	--	--	--
PC-5	DG-SE	NS	--	--	--	--	--	--	--	--	--	--
PC-6A	DG- Far east	59.467	31.05	31.52	30.13	31	33.2	28.417	27.947	29.337	28.467	26.267
PC-7	DG- Far east	57.763	--	--	--	--	--	--	--	--	--	--
PC-8	DG- Far east	NA	--	--	--	--	--	--	--	--	--	--
PC-9	DG- Far east /fair condition	NS	--	17.6	--	--	19.1	--	--	--	--	--
PC-10	DG- Far east	51.099	--	--	--	--	--	--	--	--	--	--

Table 5 - Groundwater Elevation and Gauging Data 2018-2019  
 Barnstable Country Fire and Rescue Training Academy  
 155 Flint Rock Road, Barnstable, MA  
 RTN 4-26179

Well ID	Location (From Academy )	Elev (TOC) (Feet)	Groundwater Level from TOC (Feet)					Groundwater Elevation (Feet)				
			Date					Date				
			6/26/2018	1/9/2019	4/23/2019	7/22/2019	10/28/2019	6/26/2018	1/9/2019	4/23/2019	7/22/2019	10/28/2019
PC-11	DG- Far east	55.383	27.25	27.7	26.35	27.18	29.35	28.133	27.683	29.033	26.033	27.25
PC-12	DG- Far east	54.456	--	--	--	--	--	--	--	--	--	--
PC-13	DG- Far east	49.386	--	--	--	--	--	--	--	--	--	--
PC-14	DG- Far east	48.022	--	--	--	--	--	--	--	--	--	--
PC-15	DG- Far east	61.704	--	--	--	--	29.22	--	--	--	--	32.484
PC-16d	DG- Far east	NA	29.53	29.75	28.4	29.35	31.4	NA	NA	NA	NA	NA
PC-16s	DG- Far east	NA	--	--	--	--	--	--	--	--	--	--
PC-17	DG- Far east/not located in	NS	--	--	--	--	--	--	--	--	--	--
PC-18	DG- Far east	NA	--	28.67	--	--	30.4	--	NA	--	--	NA
PC-19	DG- Far east	55.285	--	--	--	--	29.1	--	--	--	--	26.185
PC-20s	DG- Far east	NA	--	--	--	--	--	--	--	--	--	--
PC-21s	DG- Far east	NA	--	--	--	--	--	--	--	--	--	--
PC-22	DG- Far east	NA	--	--	--	--	--	--	--	--	--	--
PC-23D	DG- Far east	42.433	--	--	--	--	--	--	--	--	--	--
PC-23s	DG- Far east	41.275	--	--	--	--	--	--	--	--	--	--
PC-24	DG- Far east	50.022	--	--	--	--	--	--	--	--	--	--
PC-25	DG- Far east	NA	--	--	--	--	--	--	--	--	--	--
PC-26	DG- Far east	58.338	--	--	--	--	--	--	--	--	--	--
PC-28	DG- Far east	NA	--	15.85	13.59	13.53	16.7	--	NA	NA	NA	NA
PC-29	DG- Far east	42.169	--	--	--	--	--	--	--	--	--	--
PC-30	DG- Far east	NA	30	30.33	29.95	29.95	32.11	NA	NA	NA	NA	NA
PC-31	DG- Far east	NA	--	--	--	--	--	--	--	--	--	--
PC-32	DG- Far east	56.901	--	--	--	--	--	--	--	--	--	--
PC-33	DG- Far east	NA	--	--	--	--	--	--	--	--	--	--
PC-34S	Adjacent Academy -SE	NA	--	--	--	--	9.32	--	--	--	--	NA
PC-34D	Adjacent Academy -SE	NA	--	--	--	--	9.84	--	--	--	--	NA
PC-35S	Adjacent to Academy-S	NA	--	--	6.42	7.26	9.26	--	--	NA	NA	NA
PC-35D	Adjacent to Academy-S	NA	--	--	--	--	9.62	--	--	--	--	NA
PC-36S	Adjacent to Academy-S	NA	--	--	16.7	--	18.15	--	--	NA	--	NA
PC-36D	Adjacent to Academy-S	NA	--	--	--	--	--	--	--	--	--	--
PC-37	Adjacent to Academy-S	33.732	--	4.0	2.48	3.33	4.94	--	29.7	31.3	30.4	28.792
PC-38	Adjacent to Academy-S	58.567	--	--	--	--	32.28	--	--	--	--	26.287
PC-39	Adjacent to Academy-S	NA	--	--	--	--	--	--	--	--	--	--
HW-1D	Mary Dunn Pond (DG)	30.15	--	4.22	--	--	6.07	--	25.9	--	--	24.08
HW-1S	Mary Dunn Pond (DG)	33.54	--	--	--	--	--	--	--	--	--	--
W-9	Not Located	NS	--	--	--	--	--	--	--	--	--	--
PRW-1	Recovery Well -OFF	NA	--	--	--	--	--	--	--	--	--	--
PRW-2	Recovery Well -OFF	NA	--	--	--	--	--	--	--	--	--	--
PRW-3	Recovery Well -OFF	NA	--	--	--	--	--	--	--	--	--	--
PRW-4	Recovery Well -ON	NA	--	--	--	--	--	--	--	--	--	--
RW-1	Recovery Well	44.815	--	--	--	--	--	--	--	--	--	--
TW80-9	Piezometer- West of FP Pond	36.594	--	--	--	--	--	--	--	--	--	--
WH-2D	Mary Dunn Pond (DG)	33.263	--	--	--	--	--	--	--	--	--	--
WH-2S	Mary Dunn Pond (DG)	33.17	--	--	--	--	--	--	--	--	--	--
WS-101		36.529	--	--	--	--	--	--	--	--	--	--
Pond Gauge <sup>5</sup>	Flintrock Pond	30.97	--	--	4.5	3.8	--	--	--	35.47	34.77	--

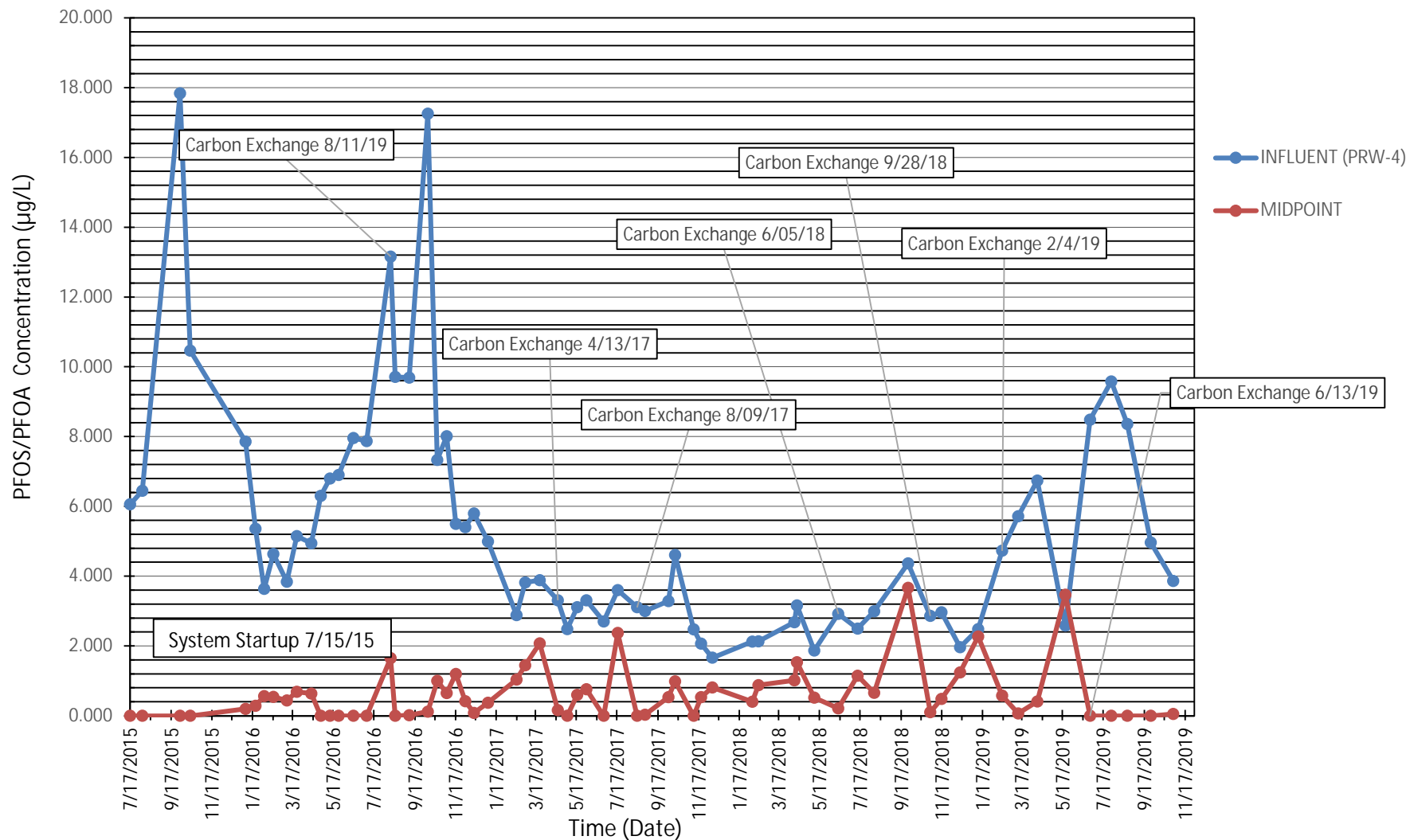
- Notes:
1. "--" : Indicates monitoring well has not been surveyed and/or is not gauged regularly.
  2. DG: Downgradient
  3. All monitoring wells located on the Academy property were surveyed in 2018.
  4. Monitoring wells located off Academy property were surveyed in 2007 by Cape Cod Commission.
  5. Pond Gauge was installed in April 2019.
  6. NS- Not Surveyed; unable to locate, not deemed a viable well.
  7. NA- Not Available; survey data is unavailable as it's being re-evaluated.



## FIGURES



Figure 1 -BCFRTA GWPTS Influent and Midpoint PFAS Concentrations from 2015-2019



Barnstable County Fire & Rescue Training Academy  
155 South Flint Rock Road, Barnstable, MA  
RTN 4-26179

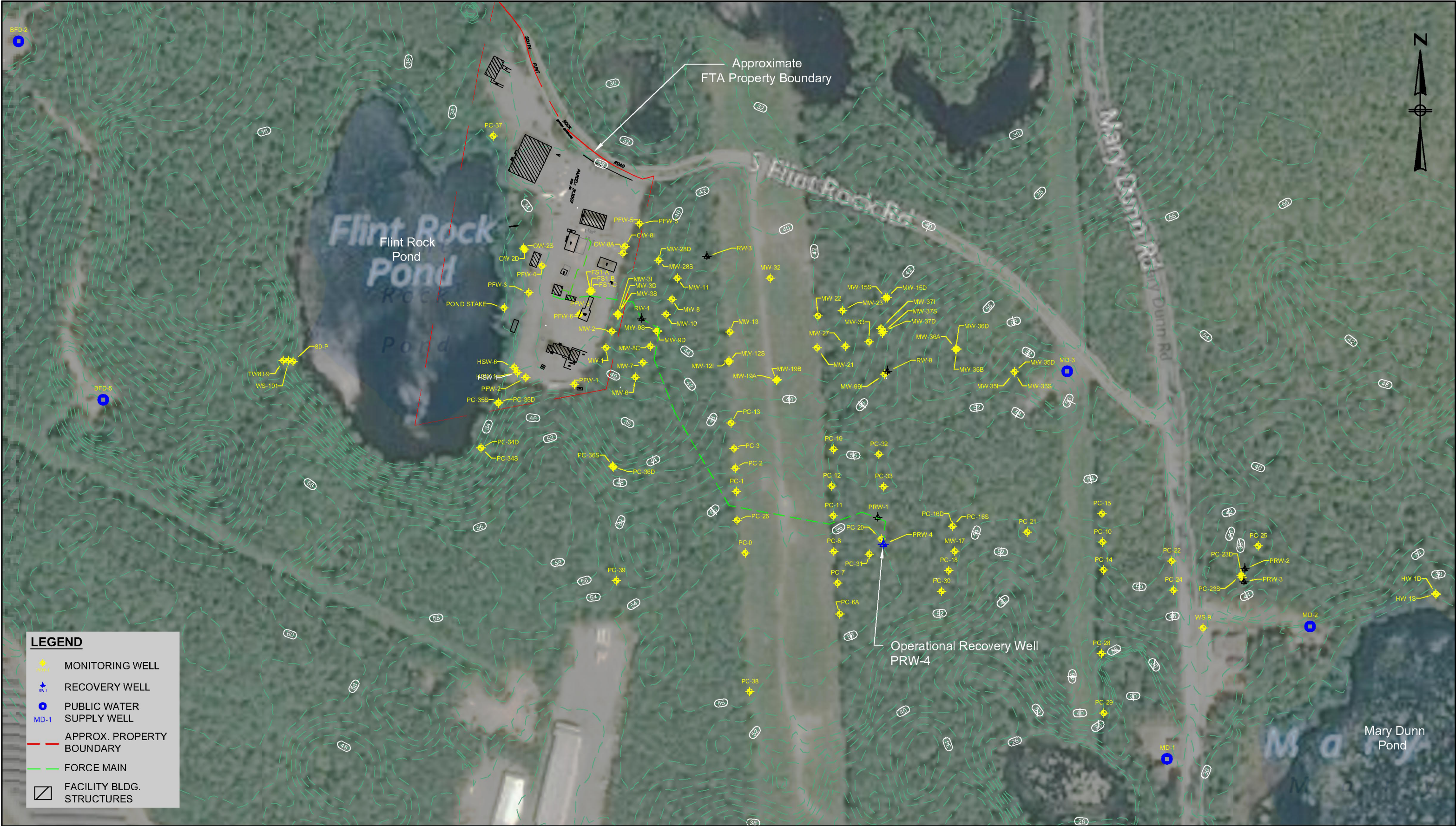


Notes:

1. Concentrations depicted represent the sum of the perfluorooctanesulfonic acid (PFOS) and the perfluorooctanoic acid (PFOA) compounds in micrograms per liter (µg/L).
2. Concentration data points at 0 µg/L from Midpoint sample location, indicate a sample was not collected from the Midpoint location on that date or was detected below laboratory reporting limits.



K:\6206 BARNSTABLE COUNTY\MCP LSP BASE SERVICES FMRLY 2018-2019 SERVICES\DRAWINGFILES\GW CONTOUR\6206\_EX\_BASE\_MM\_2.DWG



**LEGEND**

- MONITORING WELL
- RECOVERY WELL
- PUBLIC WATER SUPPLY WELL
- APPROX. PROPERTY BOUNDARY
- FORCE MAIN
- FACILITY BLDG. STRUCTURES

**BETA**  
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**FIGURE 2A- SITE PLAN**  
**Barnstable County Fire & Rescue Training Academy**  
**155 South Flint Rock Road, Barnstable, MA**  
*Plot Date: 02/06/2020*

200 100 0 100 200 400  
1 inch = 200 ft.



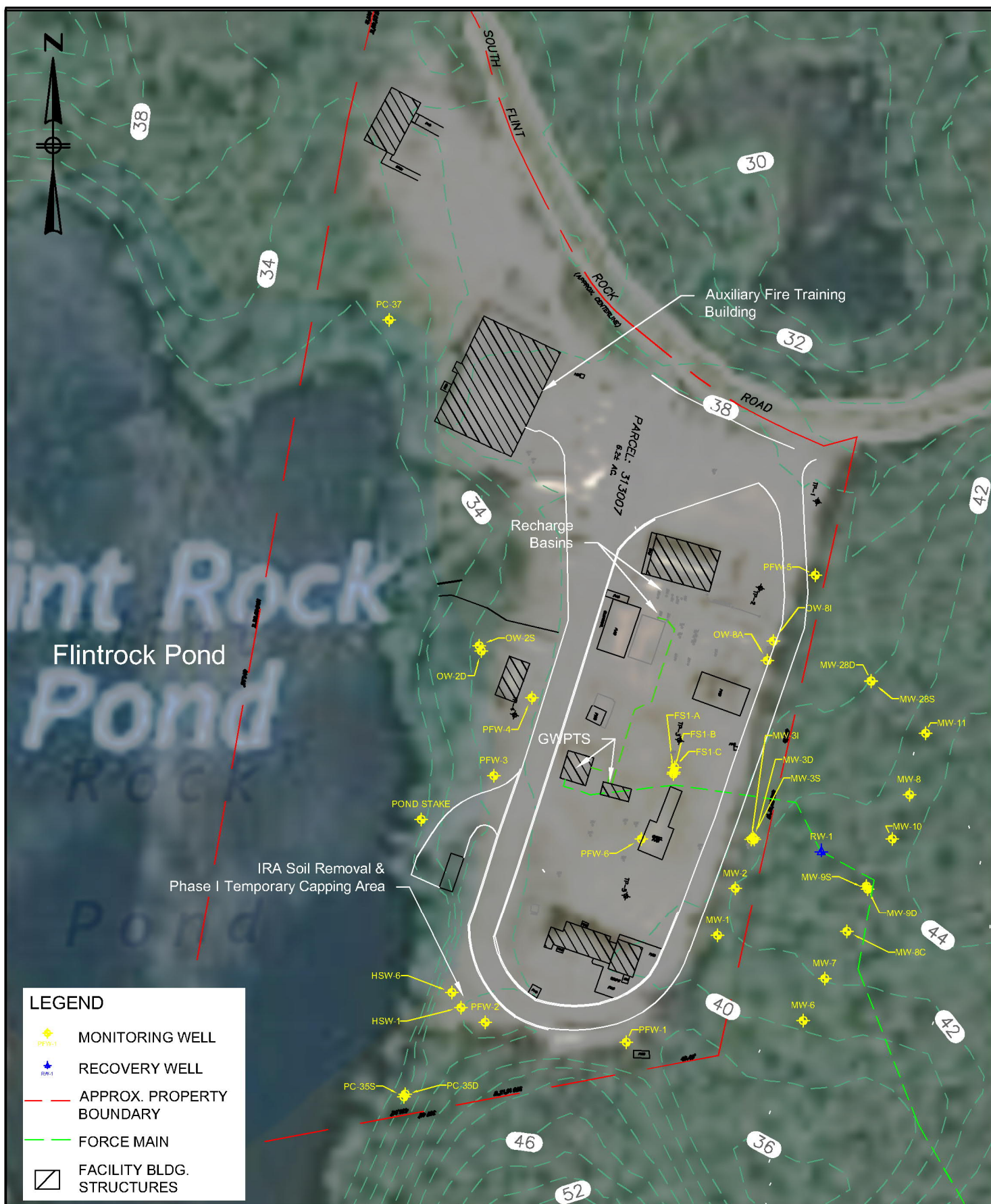
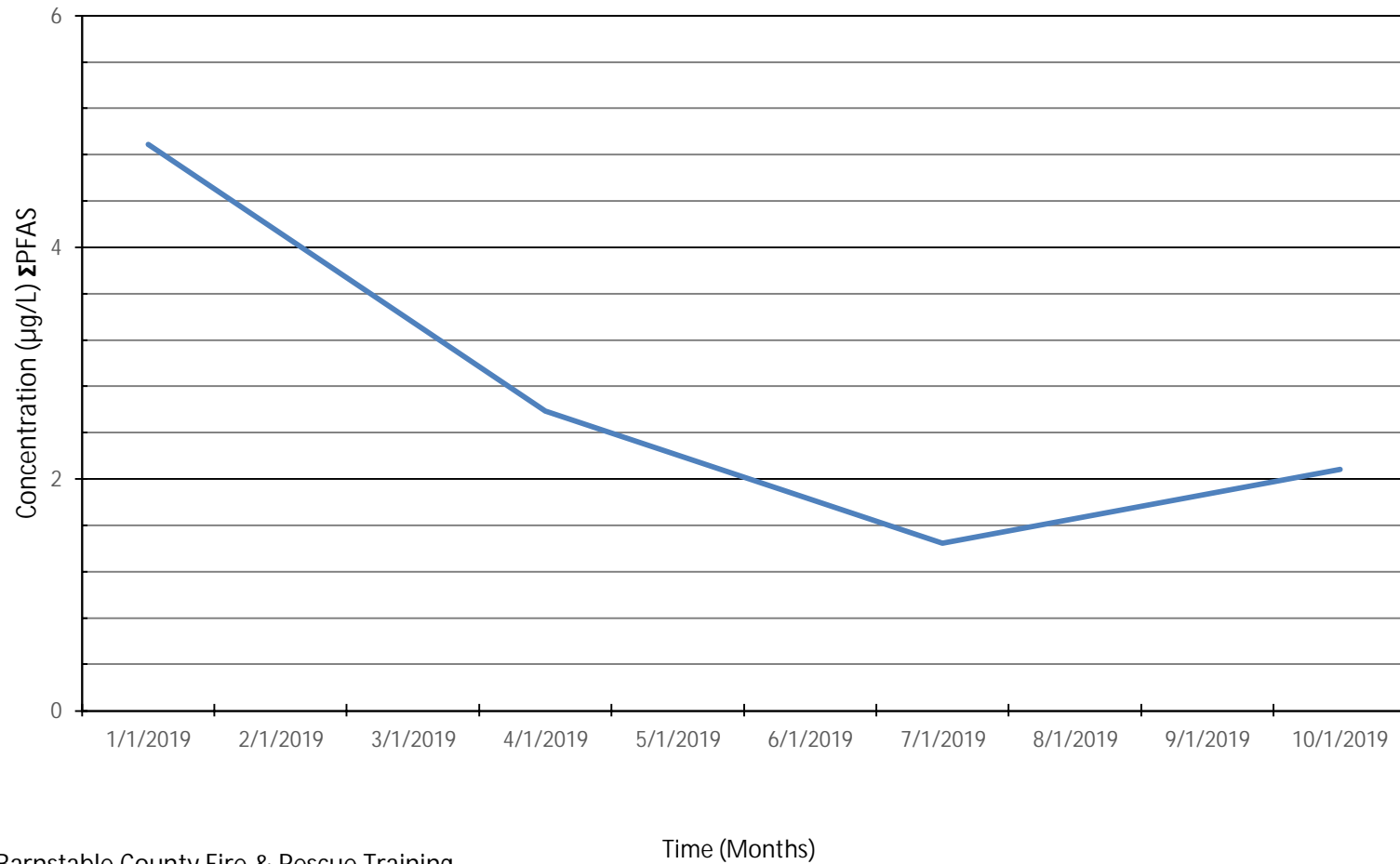


Figure 3A -  $\Sigma$ PFAS Concentrations in HSW-1 from January 2019-October 2019



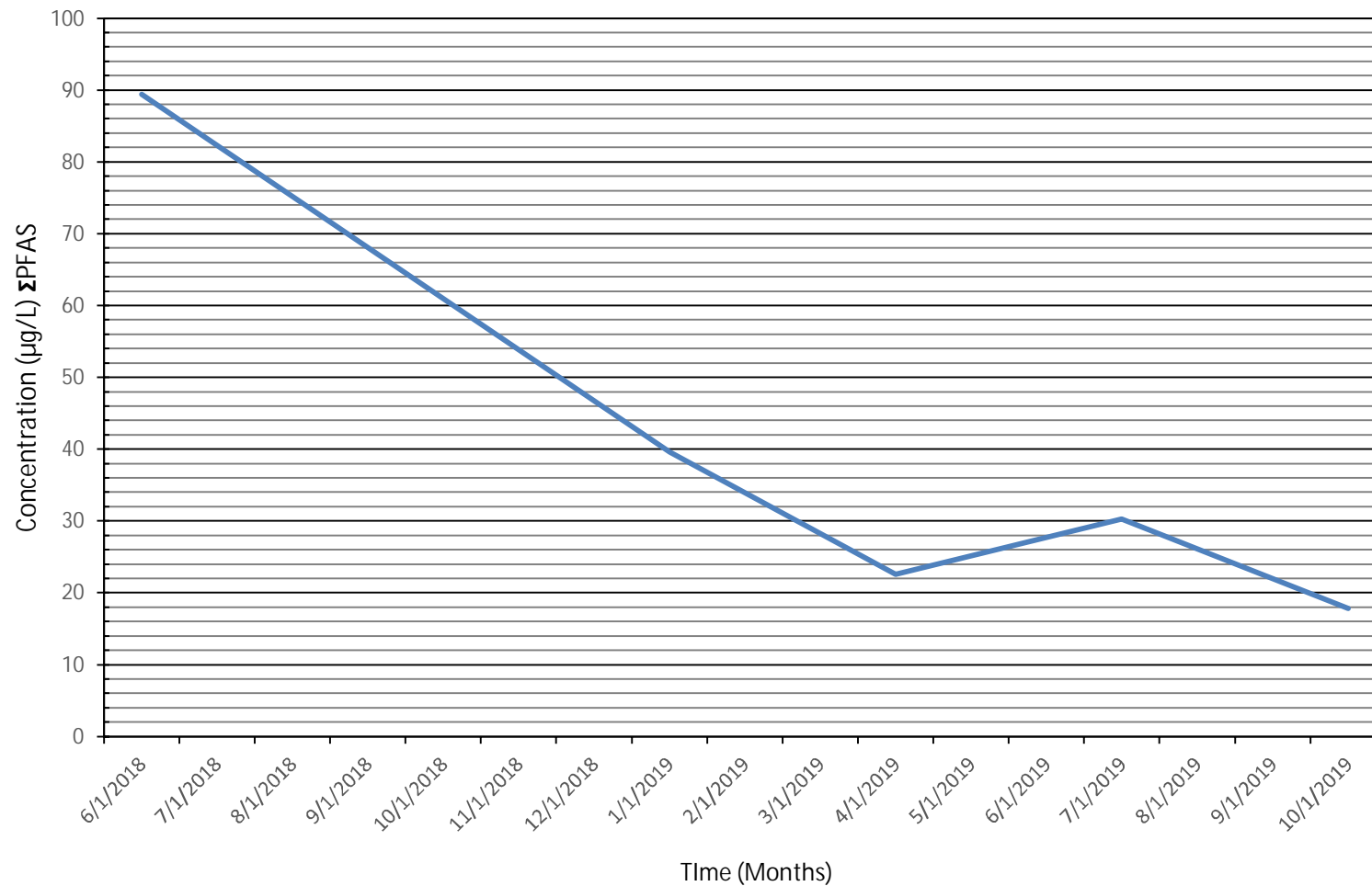
Barnstable County Fire & Rescue Training  
Academy  
155 South Flint Rock Road, Barnstable, MA  
RTN 4-26179



Notes:

1. Concentrations depicted represent the sum of the the five (5) PFAS compounds, PFOS, PFOA, PFHpA, PFHxS, and PFNA from June 2018 to October 2019. Concentrations depicted from April 2019 to July 2019 represent the sum of the six (6) PFAS compounds PFOS, PFOA, PFHpA, PFHxS, PFNA, and PFDA.
2. Concentrations are in in micrograms per liter (µg/L) .
3. HSW-1 was not sampled in June 2018.

Figure 3B -  $\Sigma$ PFAS Concentrations in PFW-1 from June 2018-October 2019



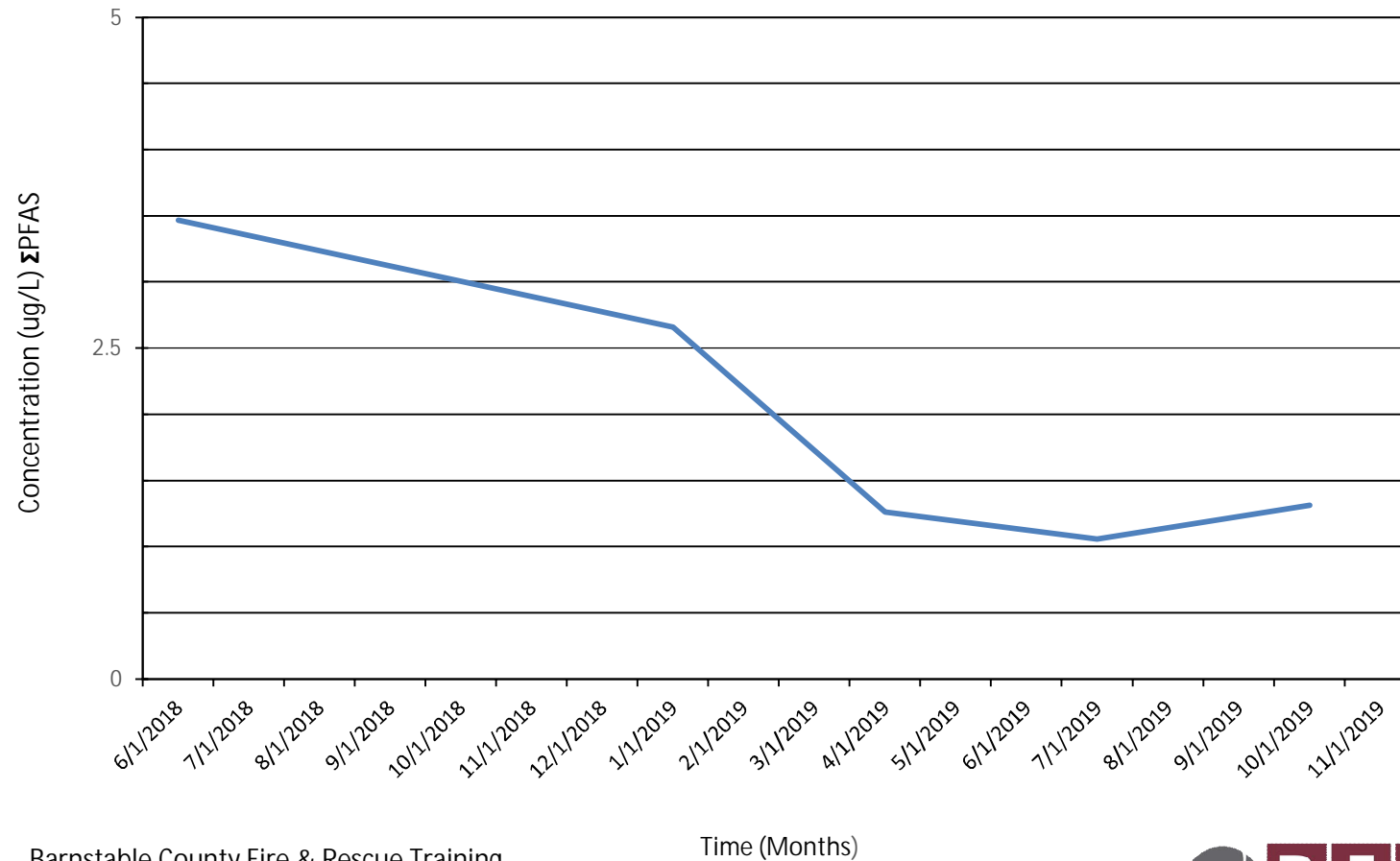
Barnstable County Fire & Rescue Training Academy  
155 South Flint Rock Road, Barnstable, MA  
RTN 4-26179



Notes:

1. Concentrations depicted represent the sum of the five (5) PFAS compounds, PFOS, PFOA, PFHpA, PFHxS, and PFNA from June 2018 to October 2019. Concentrations depicted from April 2019 to October 2019 represent the sum of the six (6) PFAS compounds PFOS, PFOA, PFHpA, PFHxS, PFNA, and PFDA.
2. Concentrations are in micrograms per liter (µg/L)

Figure 4 -  $\Sigma$ PFAS Concentrations in OW-8A from January 2019-October 2019



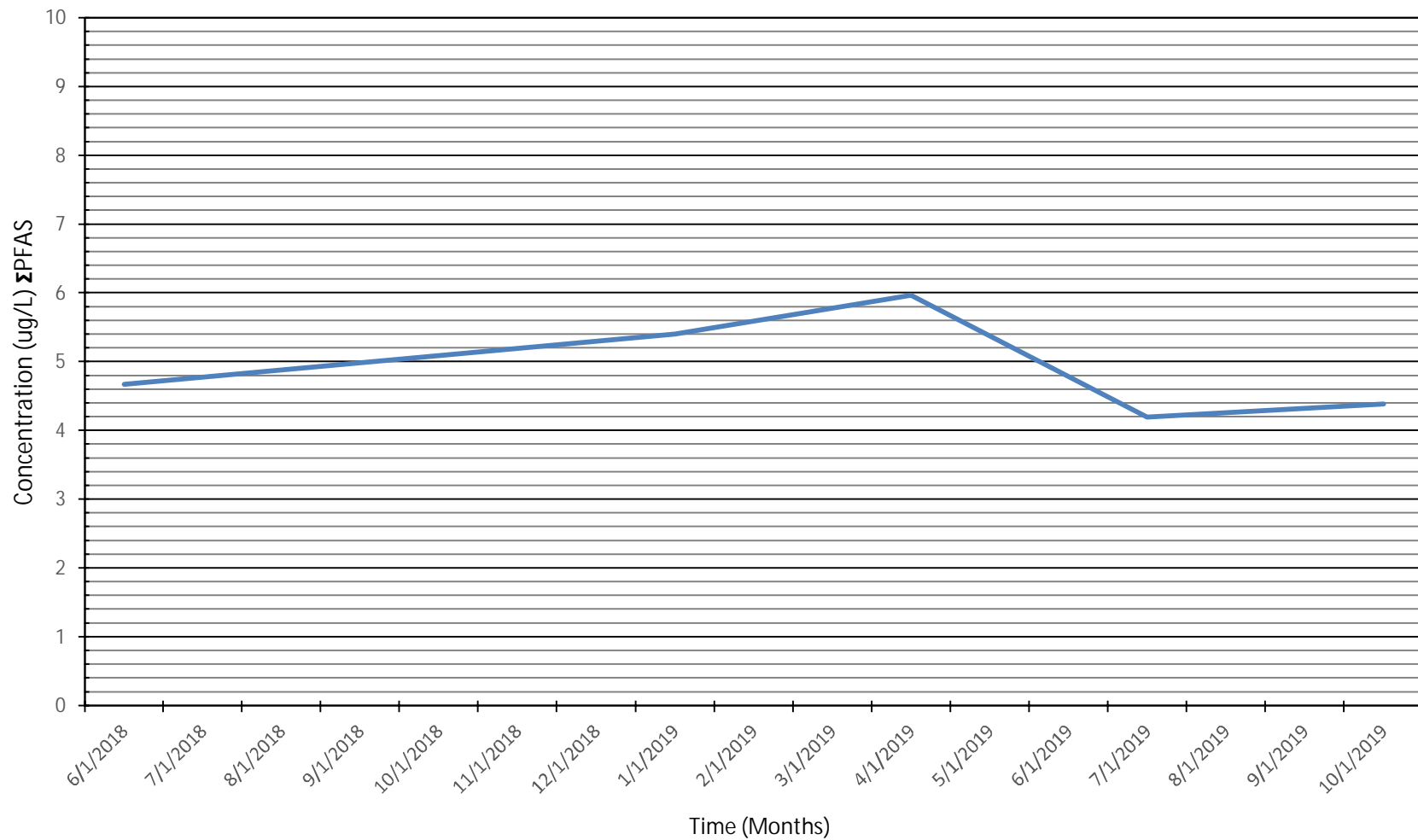
Barnstable County Fire & Rescue Training  
Academy  
155 South Flint Rock Road, Barnstable, MA  
RTN 4-26179



Notes:

1. Concentrations depicted represent the sum of the the five (5) PFAS compounds, PFOS, PFOA, PFHpA, PFHxS, and PFNA from June 2018 to April 2019. Concentrations depicted from April 2019 to October 2019 represent the sum of the six (6) PFAS compounds: PFOS, PFOA, PFHpA, PFHxS, PFNA, and PFDA.
2. Concentrations are in in micrograms per liter ( $\mu$ g/L) or parts per billion (ppb) .

Figure 5A -  $\Sigma$ PFAS Concentrations in MW-12 from June 2018-October 2019



Barnstable County Fire & Rescue Training Academy  
155 South Flint Rock Road, Barnstable, MA  
RTN 4-26179

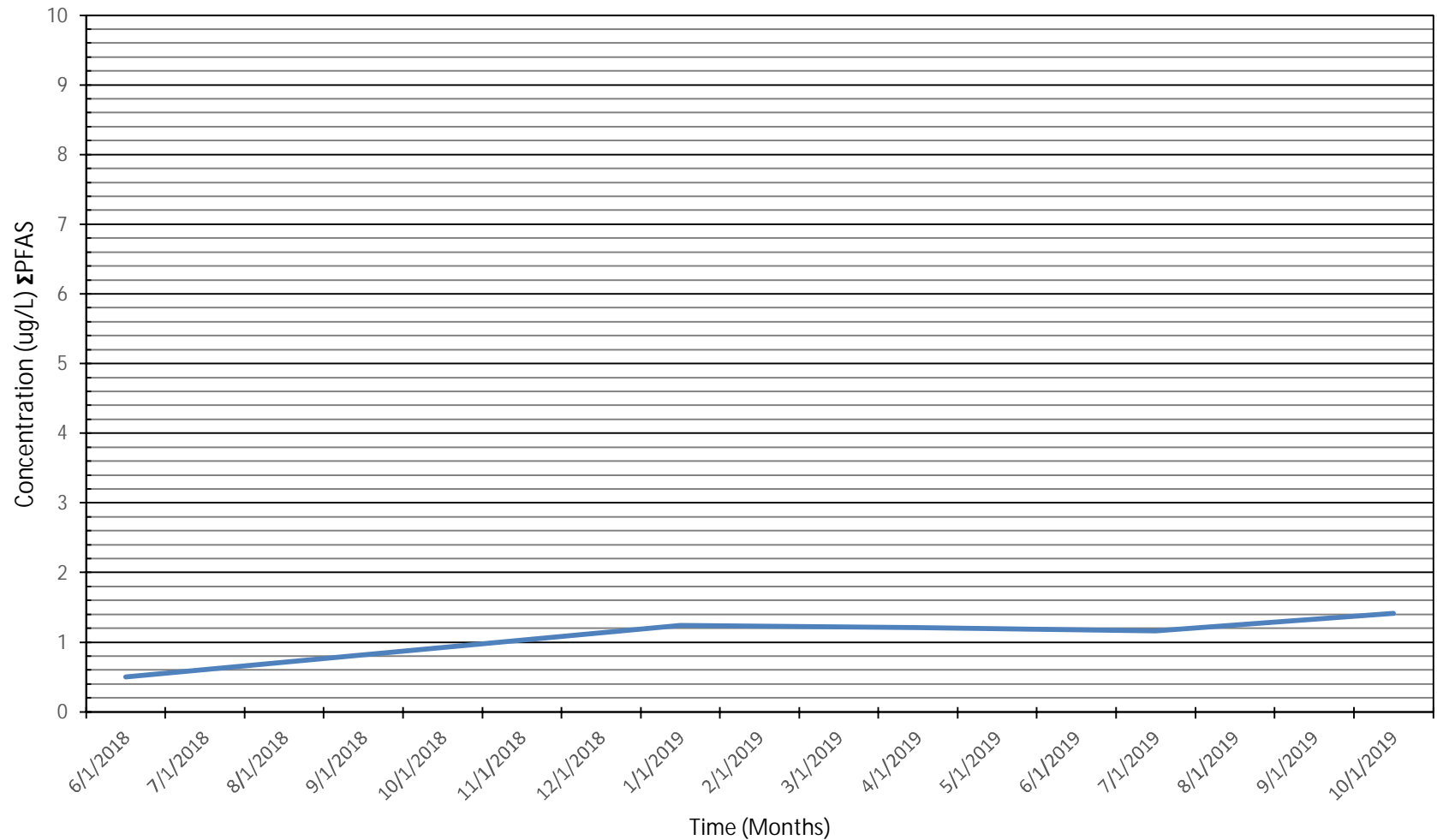


Notes:

1. Concentrations depicted represent the sum of the five (5) PFAS compounds, PFOS, PFOA, PFHpA, PFHxS, and PFNA from June 2018 to April 2019. Concentrations depicted from April 2019 to October 2019 represent the sum of the six (6) PFAS compounds PFOS, PFOA, PFHpA, PFHxS, PFNA, and PFDA.
2. Concentrations are in micrograms per liter ( $\mu\text{g/L}$ ) or parts per billion (ppb).



Figure 5B -  $\Sigma$ PFAS Concentrations in MW-22 from June 2018-October 2019



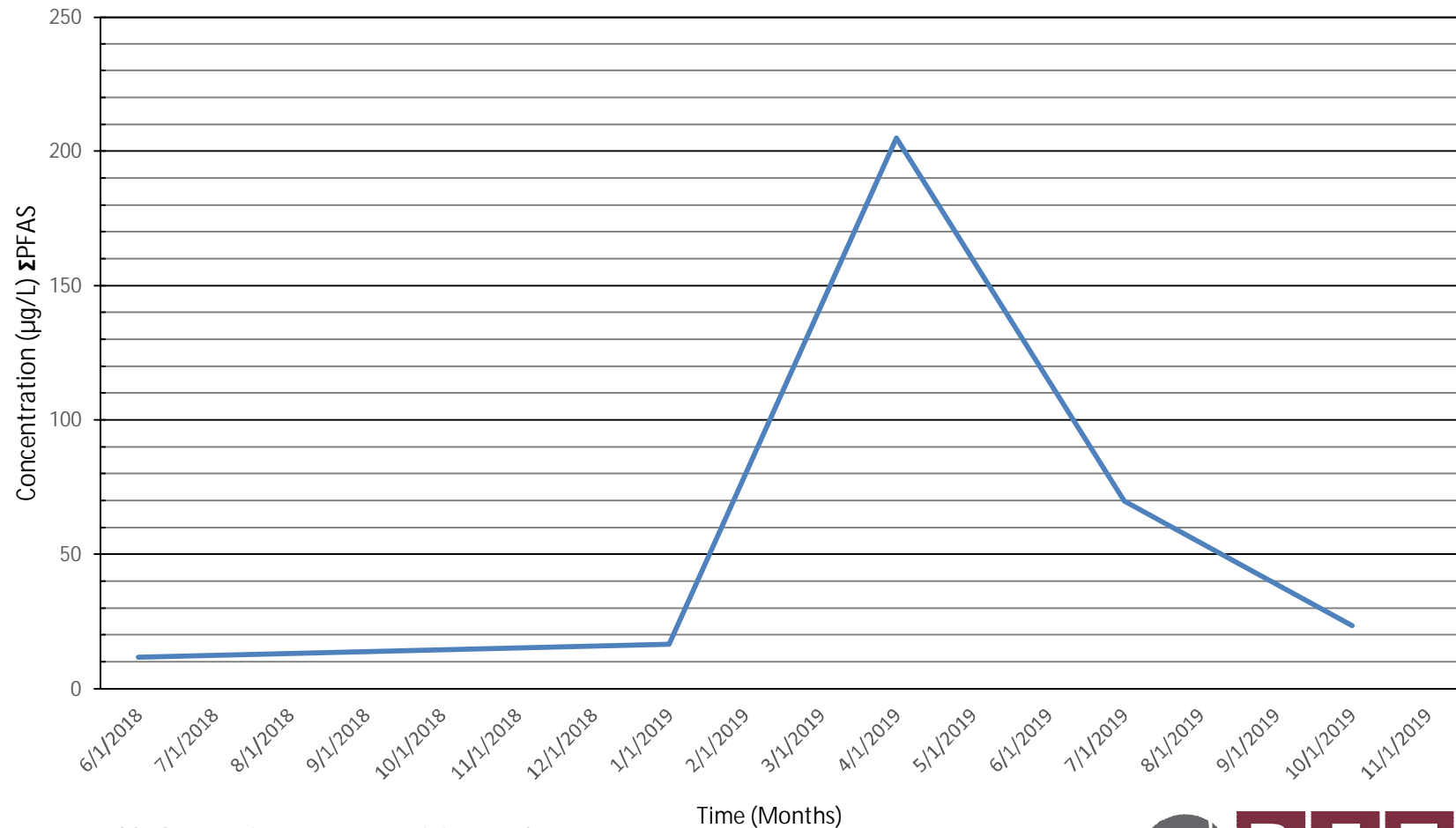
Barnstable County Fire & Rescue Training Academy  
155 South Flint Rock Road, Barnstable, MA  
RTN 4-26179



Notes:

1. Concentrations depicted represent the sum of the the five (5) PFAS compounds, PFOS, PFOA, PFHpA, PFHxS, and PFNA from June 2018 to April 2019. Concentrations depicted from April 2019 to October 2019 represent the sum of the six (6) PFAS compounds PFOS, PFOA, PFHpA, PFHxS, PFNA, and PFDA.
2. Concentrations are in in micrograms per liter ( $\mu\text{g/L}$ ) or parts per billion (ppb).

Figure 6A -  $\Sigma$ PFAS Concentrations in PC-11 from June 2018-October 2019



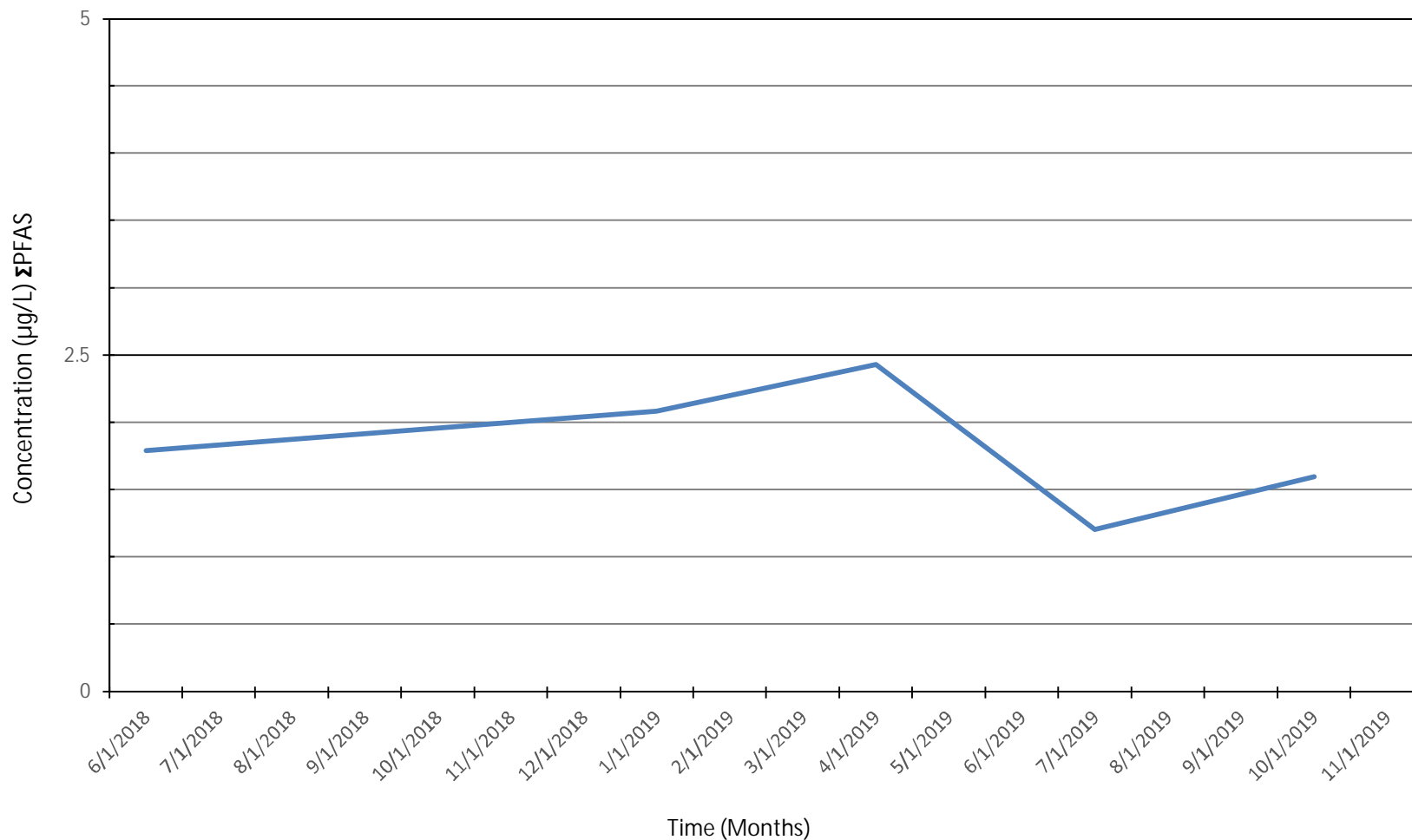
Barnstable County Fire & Rescue Training Academy  
155 South Flint Rock Road, Barnstable, MA  
RTN 4-26179



Notes:

1. Concentrations depicted represent the sum of the the five (5) PFAS compounds, PFOS, PFOA, PFHpA, PFHxS, and PFNA from June 2018 to April 2019. Concentrations depicted from April 2019 to October 2019 represent the sum of the six (6) PFAS compounds PFOS, PFOA, PFHpA, PFHxS, PFNA, and PFDA.
2. Concentrations are in in micrograms per liter (µg/L) or parts per billion (ppb).

Figure 6B -  $\Sigma$ PFAS Concentrations in PC-6A from June 2018-October 2019



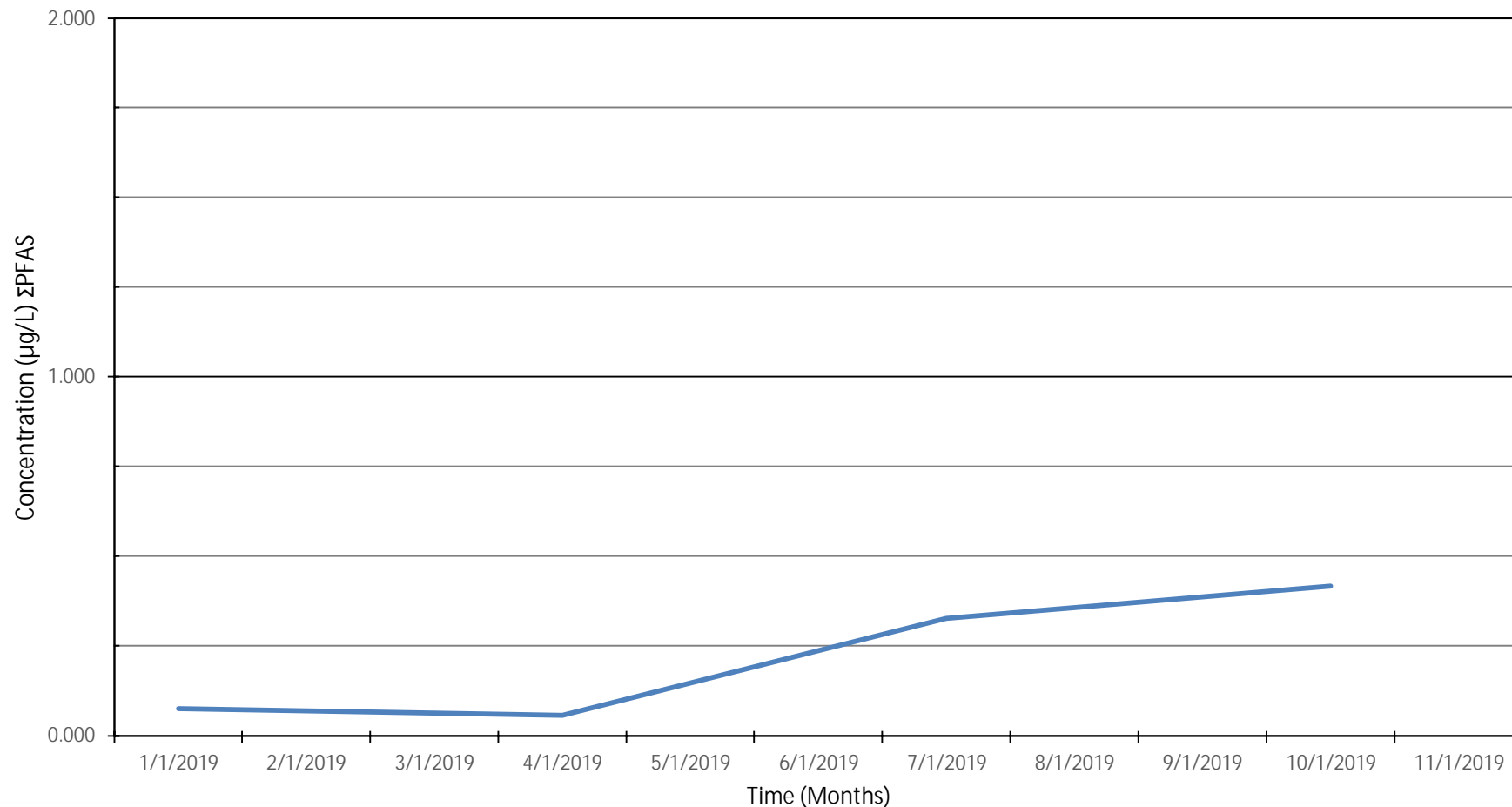
Barnstable County Fire & Rescue Training Academy  
155 South Flint Rock Road, Barnstable, MA  
RTN 4-26179



Notes:

1. Concentrations depicted represent the sum of the five (5) PFAS compounds, PFOS, PFOA, PFHpA, PFHxS, and PFNA from June 2018 to April 2019. Concentrations depicted from April 2019 to October 2019 represent the sum of the six (6) PFAS compounds PFOS, PFOA, PFHpA, PFHxS, PFNA, and PFDA.
2. Concentrations are in micrograms per liter (µg/L) or parts per billion (ppb).

Figure 6C -  $\Sigma$ PFAS Concentrations in PC-28 from January 2019-October 2019



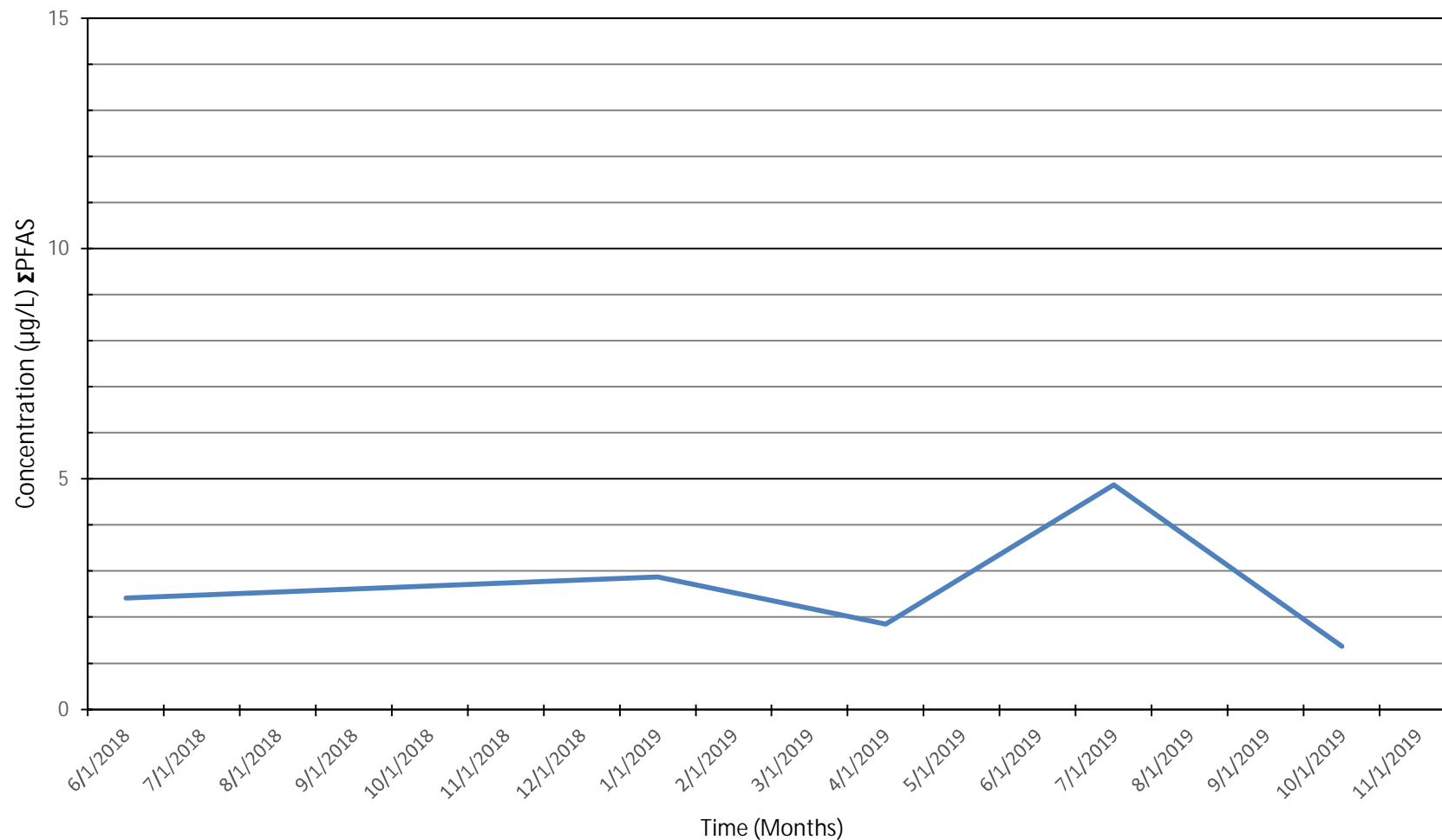
Barnstable County Fire & Rescue Training Academy  
155 South Flint Rock Road, Barnstable, MA  
RTN 4-26179



Notes:

1. Concentrations depicted represent the sum of the the five (5) PFAS compounds, PFOS, PFOA, PFHpA, PFHxS, and PFNA from June 2018 to April 2019. Concentrations depicted from April 2019 to October 2019 represent the sum of the six (6) PFAS compounds PFOS, PFOA, PFHpA, PFHxS, PFNA, and PFDA.
2. Concentrations are in in micrograms per liter (µg/L) or parts per billion (ppb).

Figure 6D -  $\Sigma$ PFAS Concentrations in PC-30 from June 2018-October 2019



Barnstable County Fire & Rescue Training Academy  
155 South Flint Rock Road, Barnstable, MA  
RTN 4-26179



Notes:

1. Concentrations depicted represent the sum of the the five (5) PFAS compounds, PFOS, PFOA, PFHpA, PFHxS, and PFNA from June 2018 to April 2019. Concentrations depicted from April 2019 to October 2019 represent the sum of the six (6) PFAS compounds PFOS, PFOA, PFHpA, PFHxS, PFNA, and PFDA.
2. Concentrations are in in micrograms per liter (µg/L) or parts per billion (ppb).

## APPENDICES

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Your Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Your C.O.C. #: 726342-03-01

**Attention: Steven Tebo**

Barnstable County  
3195 Main Street  
PO Box 427  
Barnstable, MA  
USA 02630

**Report Date: 2019/11/27**  
Report #: R5982224  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9U8253**

**Received: 2019/11/01, 15:41**

Sample Matrix: Water  
# Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
PFAS in water by SPE/LCMS (1)	3	2019/11/13	2019/11/25	CAM SOP-00894	EPA 537 m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.



Your Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Your C.O.C. #: 726342-03-01

**Attention: Steven Tebo**

Barnstable County  
3195 Main Street  
PO Box 427  
Barnstable, MA  
USA 02630

**Report Date: 2019/11/27**  
Report #: R5982224  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9U8253**

**Received: 2019/11/01, 15:41**

**Encryption Key**

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Patricia Legette, Project Manager

Email: Patricia.Legette@bvlabs.com

Phone# (905)817-5799

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.





BUREAU  
VERITAS

BV Labs Job #: B9U8253

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV369			LEV370	LEV371			
Sampling Date		2019/10/30 13:00			2019/10/30 13:00	2019/10/30 13:00			
COC Number		726342-03-01			726342-03-01	726342-03-01			
	UNITS	INFLUENT (PFW-4)	RDL	MDL	MIDPOINT	EFFLUENT	RDL	MDL	QC Batch
<b>Perfluorinated Compounds</b>									
Perfluorobutanoic acid	ug/L	0.042	0.020	0.0070	0.013	<0.0070	0.020	0.0070	6439197
Perfluoropentanoic Acid (PFPeA)	ug/L	0.13	0.020	0.0041	0.0072	<0.0041	0.020	0.0041	6439197
Perfluorohexanoic Acid (PFHxA)	ug/L	0.14	0.020	0.0064	<0.0064	<0.0064	0.020	0.0064	6439197
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.072	0.020	0.0071	<0.0071	<0.0071	0.020	0.0071	6439197
Perfluorooctanoic Acid (PFOA)	ug/L	0.063	0.020	0.0074	<0.0074	<0.0074	0.020	0.0074	6439197
Perfluorononanoic Acid (PFNA)	ug/L	0.085	0.020	0.0049	<0.0049	<0.0049	0.020	0.0049	6439197
Perfluorodecanoic Acid (PFDA)	ug/L	0.019	0.020	0.0041	<0.0041	<0.0041	0.020	0.0041	6439197
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.075	0.020	0.0043	<0.0043	<0.0043	0.020	0.0043	6439197
Perfluorododecanoic Acid (PFDoA)	ug/L	<0.0068	0.020	0.0068	<0.0068	<0.0068	0.020	0.0068	6439197
Perfluorotridecanoic Acid	ug/L	<0.0069	0.020	0.0069	<0.0069	<0.0069	0.020	0.0069	6439197
Perfluorotetradecanoic Acid	ug/L	<0.0067	0.020	0.0067	<0.0067	<0.0067	0.020	0.0067	6439197
Perfluorobutanesulfonic acid	ug/L	0.017	0.020	0.0051	<0.0051	<0.0051	0.020	0.0051	6439197
Perfluorohexanesulfonic acid	ug/L	0.23	0.020	0.0052	0.0059	<0.0052	0.020	0.0052	6439197
Perfluoroheptanesulfonic acid	ug/L	0.021	0.020	0.0033	<0.0033	<0.0033	0.020	0.0033	6439197
Perfluorooctanesulfonic acid	ug/L	3.8	0.20	0.052	0.051	<0.0052	0.020	0.0052	6439197
Perfluorodecanesulfonic acid (PFDS)	ug/L	<0.0072	0.020	0.0072	<0.0072	<0.0072	0.020	0.0072	6439197
Perfluorooctane Sulfonamide (PFOSA)	ug/L	0.0076	0.020	0.0066	<0.0066	<0.0066	0.020	0.0066	6439197
EtFOSA	ug/L	<0.0090	0.020	0.0090	<0.0090	<0.0090	0.020	0.0090	6439197
MeFOSA	ug/L	<0.0035	0.020	0.0035	<0.0035	<0.0035	0.020	0.0035	6439197
EtFOSE	ug/L	<0.0094	0.020	0.0094	<0.0094	<0.0094	0.020	0.0094	6439197
MeFOSE	ug/L	<0.0066	0.020	0.0066	<0.0066	<0.0066	0.020	0.0066	6439197
6:2 Fluorotelomer sulfonic acid	ug/L	0.17	0.020	0.0059	<0.0059	<0.0059	0.020	0.0059	6439197
8:2 Fluorotelomer sulfonic acid	ug/L	0.35	0.020	0.0059	<0.0059	<0.0059	0.020	0.0059	6439197
<b>Surrogate Recovery (%)</b>									
13C2-6:2-Fluorotelomersulfonic Acid	%	95	N/A	N/A	83	87	N/A	N/A	6439197
13C2-8:2-Fluorotelomersulfonic Acid	%	91	N/A	N/A	73	78	N/A	N/A	6439197
13C2-Perfluorodecanoic acid	%	90	N/A	N/A	72	77	N/A	N/A	6439197
13C2-Perfluorododecanoic acid	%	80	N/A	N/A	63	71	N/A	N/A	6439197
13C2-Perfluorohexanoic acid	%	102	N/A	N/A	88	89	N/A	N/A	6439197
13C2-perfluorotetradecanoic acid	%	62	N/A	N/A	34 (1)	54	N/A	N/A	6439197
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Laboratory spiked water resulted in satisfactory recovery of the extracted internal standard analyte. When considered together, these QC data suggest that matrix interferences may be increasing the variability of the associated native analyte result (Perfluorotetradecanoic acid - PFTeDA).									



BUREAU  
VERITAS

BV Labs Job #: B9U8253

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV369			LEV370	LEV371			
Sampling Date		2019/10/30 13:00			2019/10/30 13:00	2019/10/30 13:00			
COC Number		726342-03-01			726342-03-01	726342-03-01			
	UNITS	INFLUENT (PFW-4)	RDL	MDL	MIDPOINT	EFFLUENT	RDL	MDL	QC Batch
13C2-Perfluoroundecanoic acid	%	84	N/A	N/A	65	73	N/A	N/A	6439197
13C4-Perfluorobutanoic acid	%	98	N/A	N/A	87	88	N/A	N/A	6439197
13C4-Perfluoroheptanoic acid	%	98	N/A	N/A	84	88	N/A	N/A	6439197
13C4-Perfluorooctanesulfonic acid	%	80	N/A	N/A	74	79	N/A	N/A	6439197
13C4-Perfluorooctanoic acid	%	92	N/A	N/A	80	83	N/A	N/A	6439197
13C5-Perfluorononanoic acid	%	93	N/A	N/A	77	82	N/A	N/A	6439197
13C5-Perfluoropentanoic acid	%	98	N/A	N/A	87	88	N/A	N/A	6439197
13C8-Perfluorooctane Sulfonamide	%	87	N/A	N/A	58	76	N/A	N/A	6439197
18O2-Perfluorohexanesulfonic acid	%	92	N/A	N/A	78	82	N/A	N/A	6439197
D3-MeFOSA	%	70	N/A	N/A	35 (1)	60	N/A	N/A	6439197
D5-EtFOSA	%	69	N/A	N/A	27 (2)	59	N/A	N/A	6439197
D7-MeFOSE	%	78	N/A	N/A	41 (3)	69	N/A	N/A	6439197
D9-EtFOSE	%	77	N/A	N/A	37 (4)	71	N/A	N/A	6439197

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable

(1) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Laboratory spiked water resulted in satisfactory recovery of the extracted internal standard analyte. When considered together, these QC data suggest that matrix interferences may be increasing the variability of the associated native analyte result (N-Methylperfluorooctane sulfonamide - MeFOSA).

(2) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Laboratory spiked water resulted in satisfactory recovery of the extracted internal standard analyte. When considered together, these QC data suggest that matrix interferences may be increasing the variability of the associated native analyte result (N-Ethylperfluorooctane sulfonamide - EtFOSA).

(3) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Laboratory spiked water resulted in satisfactory recovery of the extracted internal standard analyte. When considered together, these QC data suggest that matrix interferences may be increasing the variability of the associated native analyte result (N-Methylperfluorooctane sulfonamidoethanol - MeFOSE).

(4) Extracted internal standard analyte recovery was below the defined lower control limit (LCL). Laboratory spiked water resulted in satisfactory recovery of the extracted internal standard analyte. When considered together, these QC data suggest that matrix interferences may be increasing the variability of the associated native analyte result (N-Ethylperfluorooctane sulfonamidoethanol - EtFOSE).



BUREAU  
VERITAS

BV Labs Job #: B9U8253

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

## TEST SUMMARY

**BV Labs ID:** LEV369  
**Sample ID:** INFLUENT (PFW-4)  
**Matrix:** Water

**Collected:** 2019/10/30  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6439197	2019/11/13	2019/11/25	Patrick Yu Peng Li

**BV Labs ID:** LEV370  
**Sample ID:** MIDPOINT  
**Matrix:** Water

**Collected:** 2019/10/30  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6439197	2019/11/13	2019/11/25	Patrick Yu Peng Li

**BV Labs ID:** LEV371  
**Sample ID:** EFFLUENT  
**Matrix:** Water

**Collected:** 2019/10/30  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6439197	2019/11/13	2019/11/25	Patrick Yu Peng Li



BUREAU  
VERITAS

BV Labs Job #: B9U8253

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### GENERAL COMMENTS

Sample LEV369 [INFLUENT (PFW-4)] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

**Results relate only to the items tested.**



BUREAU  
VERITAS

BV Labs Job #: B9U8253  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6439197	YPL	Spiked Blank	13C2-6:2-Fluorotelomersulfonic Acid	2019/11/25		100	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/11/25		95	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/11/25		95	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/11/25		86	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/11/25		100	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/11/25		78	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/11/25		89	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/11/25		104	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/11/25		100	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/11/25		97	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/11/25		97	%	50 - 150
			13C5-Perfluorononanoic acid	2019/11/25		96	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/11/25		103	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/11/25		84	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/11/25		97	%	50 - 150
			D3-MeFOSA	2019/11/25		73	%	50 - 150
			D5-EtFOSA	2019/11/25		67	%	50 - 150
			D7-MeFOSE	2019/11/25		80	%	50 - 150
			D9-EtFOSE	2019/11/25		79	%	50 - 150
			Perfluorobutanoic acid	2019/11/25		99	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2019/11/25		100	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2019/11/25		102	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2019/11/25		103	%	70 - 130
			Perfluorooctanoic Acid (PFOA)	2019/11/25		101	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2019/11/25		98	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2019/11/25		100	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2019/11/25		98	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2019/11/25		99	%	70 - 130
			Perfluorotridecanoic Acid	2019/11/25		104	%	70 - 130
			Perfluorotetradecanoic Acid	2019/11/25		99	%	70 - 130
			Perfluorobutanesulfonic acid	2019/11/25		101	%	70 - 130
			Perfluorohexanesulfonic acid	2019/11/25		103	%	70 - 130
			Perfluoroheptanesulfonic acid	2019/11/25		96	%	70 - 130
			Perfluorooctanesulfonic acid	2019/11/25		101	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2019/11/25		91	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/25		104	%	70 - 130
			EtFOSA	2019/11/25		98	%	70 - 130
			MeFOSA	2019/11/25		101	%	70 - 130
			EtFOSE	2019/11/25		96	%	70 - 130
			MeFOSE	2019/11/25		98	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2019/11/25		101	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2019/11/25		104	%	70 - 130
6439197	YPL	Spiked Blank DUP	13C2-6:2-Fluorotelomersulfonic Acid	2019/11/25		103	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/11/25		103	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/11/25		101	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/11/25		94	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/11/25		103	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/11/25		84	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/11/25		98	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/11/25		108	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/11/25		104	%	50 - 150



BUREAU  
VERITAS

BV Labs Job #: B9U8253  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6439197	YPL	RPD	13C4-Perfluorooctanesulfonic acid	2019/11/25		102	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/11/25		102	%	50 - 150
			13C5-Perfluorononanoic acid	2019/11/25		100	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/11/25		106	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/11/25		91	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/11/25		101	%	50 - 150
			D3-MeFOSA	2019/11/25		65	%	50 - 150
			D5-EtFOSA	2019/11/25		64	%	50 - 150
			D7-MeFOSE	2019/11/25		84	%	50 - 150
			D9-EtFOSE	2019/11/25		81	%	50 - 150
			Perfluorobutanoic acid	2019/11/25		96	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2019/11/25		97	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2019/11/25		101	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2019/11/25		101	%	70 - 130
			Perfluorooctanoic Acid (PFOA)	2019/11/25		98	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2019/11/25		97	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2019/11/25		99	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2019/11/25		98	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2019/11/25		96	%	70 - 130
			Perfluorotridecanoic Acid	2019/11/25		102	%	70 - 130
			Perfluorotetradecanoic Acid	2019/11/25		99	%	70 - 130
			Perfluorobutanesulfonic acid	2019/11/25		98	%	70 - 130
			Perfluorohexanesulfonic acid	2019/11/25		100	%	70 - 130
			Perfluoroheptanesulfonic acid	2019/11/25		98	%	70 - 130
			Perfluorooctanesulfonic acid	2019/11/25		100	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2019/11/25		94	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/25		102	%	70 - 130
			EtFOSA	2019/11/25		95	%	70 - 130
			MeFOSA	2019/11/25		100	%	70 - 130
			EtFOSE	2019/11/25		96	%	70 - 130
			MeFOSE	2019/11/25		96	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2019/11/25		99	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2019/11/25		103	%	70 - 130
			Perfluorobutanoic acid	2019/11/25	3.0		%	30
			Perfluoropentanoic Acid (PFPeA)	2019/11/25	2.2		%	30
			Perfluorohexanoic Acid (PFHxA)	2019/11/25	1.8		%	30
			Perfluoroheptanoic Acid (PFHpA)	2019/11/25	2.1		%	30
			Perfluorooctanoic Acid (PFOA)	2019/11/25	2.9		%	30
			Perfluorononanoic Acid (PFNA)	2019/11/25	0.41		%	30
			Perfluorodecanoic Acid (PFDA)	2019/11/25	0.81		%	30
			Perfluoroundecanoic Acid (PFUnA)	2019/11/25	0.58		%	30
			Perfluorododecanoic Acid (PFDoA)	2019/11/25	2.6		%	30
			Perfluorotridecanoic Acid	2019/11/25	1.6		%	30
			Perfluorotetradecanoic Acid	2019/11/25	0.37		%	30
			Perfluorobutanesulfonic acid	2019/11/25	2.7		%	30
			Perfluorohexanesulfonic acid	2019/11/25	2.2		%	30
			Perfluoroheptanesulfonic acid	2019/11/25	1.2		%	30
			Perfluorooctanesulfonic acid	2019/11/25	1.5		%	30
			Perfluorodecanesulfonic acid (PFDS)	2019/11/25	4.3		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/25	1.7		%	30
			EtFOSA	2019/11/25	3.3		%	30



BUREAU  
VERITAS

BV Labs Job #: B9U8253  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6439197	YPL	Method Blank	MeFOSA	2019/11/25	1.1		%	30
			EtFOSE	2019/11/25	0.19		%	30
			MeFOSE	2019/11/25	2.6		%	30
			6:2 Fluorotelomer sulfonic acid	2019/11/25	2.1		%	30
			8:2 Fluorotelomer sulfonic acid	2019/11/25	1.1		%	30
			13C2-6:2-Fluorotelomersulfonic Acid	2019/11/25		100	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/11/25		94	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/11/25		90	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/11/25		79	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/11/25		101	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/11/25		74	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/11/25		82	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/11/25		100	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/11/25		98	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/11/25		91	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/11/25		94	%	50 - 150
			13C5-Perfluorononanoic acid	2019/11/25		92	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/11/25		100	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/11/25		81	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/11/25		96	%	50 - 150
			D3-MeFOSA	2019/11/25		68	%	50 - 150
			D5-EtFOSA	2019/11/25		66	%	50 - 150
			D7-MeFOSE	2019/11/25		77	%	50 - 150
			D9-EtFOSE	2019/11/25		75	%	50 - 150
			Perfluorobutanoic acid	2019/11/25	<0.0070		ug/L	
			Perfluoropentanoic Acid (PFPeA)	2019/11/25	<0.0041		ug/L	
			Perfluorohexanoic Acid (PFHxA)	2019/11/25	<0.0064		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2019/11/25	<0.0071		ug/L	
			Perfluorooctanoic Acid (PFOA)	2019/11/25	<0.0074		ug/L	
			Perfluorononanoic Acid (PFNA)	2019/11/25	<0.0049		ug/L	
			Perfluorodecanoic Acid (PFDA)	2019/11/25	<0.0041		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2019/11/25	<0.0043		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2019/11/25	<0.0068		ug/L	
			Perfluorotridecanoic Acid	2019/11/25	<0.0069		ug/L	
			Perfluorotetradecanoic Acid	2019/11/25	<0.0067		ug/L	
			Perfluorobutanesulfonic acid	2019/11/25	<0.0051		ug/L	
			Perfluorohexanesulfonic acid	2019/11/25	<0.0052		ug/L	
			Perfluoroheptanesulfonic acid	2019/11/25	<0.0033		ug/L	
			Perfluorooctanesulfonic acid	2019/11/25	<0.0052		ug/L	
			Perfluorodecanesulfonic acid (PFDS)	2019/11/25	<0.0072		ug/L	
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/25	<0.0066		ug/L	
			EtFOSA	2019/11/25	<0.0090		ug/L	
			MeFOSA	2019/11/25	<0.0035		ug/L	
			EtFOSE	2019/11/25	<0.0094		ug/L	
			MeFOSE	2019/11/25	<0.0066		ug/L	
			6:2 Fluorotelomer sulfonic acid	2019/11/25	<0.0059		ug/L	



BUREAU  
VERITAS

BV Labs Job #: B9U8253

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
				8:2 Fluorotelomer sulfonic acid	2019/11/25	<0.0059		ug/L	
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.									
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.									
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.									
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.									





BUREAU  
VERITAS

BV Labs Job #: B9U8253

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Colm McNamara, Senior Analyst, Liquid Chromatography

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Bureau Veritas Laboratories  
6740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free 800-563-6296 Fax: (905) 817-5777 www.bvlab.com

# CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:			REPORT TO:			PROJECT INFORMATION:			Laboratory Use Only:		
Company Name: #29803 Barnstable County			Company Name: BETA Group			Quotation #: B57344			BV Labs Job #:		
Attention: Accounts Payable			Attention: Steven Tebo			P.O. #:			Bottle Order #:		
Address: 3195 Main Street PO Box 427			Address: 701 George Washington Hwy			Project: BARNSTABLE COUNTY			COC #:		
Barnstable MA 02630			Lincoln, MA 02865			Project Name: BCFRTA			Project Manager:		
Tel: (508) 362-3828 Ext: 1234 Fax:			Tel: (508) 375-6603 Fax:			Site #:			Patricia Legette		
Email: eoconnell@barnstablecounty.org, stebo@barnstableco			Email: stebo@barnstablecounty.org, rthibault@noverarmstrong			Sampled By:			C#726342-03-01		
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY											
Regulation 153 (2011)				Other Regulations				Special Instructions			
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Medium/Fine				<input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw				Field Filtered (please circle): Metals / Hg / Cr VI Total PFAS 50t m			
<input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse				<input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw							
<input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> For RSC				<input type="checkbox"/> MISA <input type="checkbox"/> Municipality							
<input type="checkbox"/> Table				<input type="checkbox"/> PWGO							
Include Criteria on Certificate of Analysis (Y/N)?											
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix							
1	INFLUENT (PRW-4)	19/10/30	1300	GW	X						
2	MIDPOINT	19/10/30	1300	GW	X						
3	EFFLUENT	19/10/30	1300	GW	X						
4											
5											
6											
7											
8											
9											
10											
* RELINQUISHED BY: (Signature/Print)				Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# Jars used and not submitted	Laboratory Use Only
Mykel Mendes				19/10/31	1500	Patricia Legette		2019/11/01	15:41		Time Sensitive
						ASIN/MA					Temperature (°C) on Receipt
											2.6/3.7/3.6
											Custody Seal
											Present
											Intact
											Yes
											No
* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.											
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.											
** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.											
SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS											
White: BV Labs Yellow: Client											
3.0/5.0/3.9											

Bureau Veritas Canada (2019) Inc.



Your Project #: BARNSTABLE COUNTY  
Site#: 6206  
Site Location: BCFRTA

**Attention: Steven Tebo**

Barnstable County  
3195 Main Street  
PO Box 427  
Barnstable, MA  
USA 02630

Your C.O.C. #: 726342-05-01, 726342-06-01, 726342-02-01, N/A

**Report Date: 2019/11/27**  
Report #: R5981982  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9U8263**

**Received: 2019/11/01, 15:41**

Sample Matrix: Water  
# Samples Received: 28

Analyses	Date		Date Analyzed	Laboratory Method	Analytical Method
	Quantity	Extracted			
PFAS in water by SPE/LCMS (1)	5	2019/11/07	2019/11/19	CAM SOP-00894	EPA 537 m
PFAS in water by SPE/LCMS (1)	11	2019/11/07	2019/11/24	CAM SOP-00894	EPA 537 m
PFAS in water by SPE/LCMS (1)	12	2019/11/12	2019/11/24	CAM SOP-00894	EPA 537 m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Per- and polyfluoroalkyl substances (PFAS) identified as surrogates on the certificate of analysis represent the extracted internal standard.



Your Project #: BARNSTABLE COUNTY  
Site#: 6206  
Site Location: BCFRTA

**Attention: Steven Tebo**

Barnstable County  
3195 Main Street  
PO Box 427  
Barnstable, MA  
USA 02630

Your C.O.C. #: 726342-05-01, 726342-06-01, 726342-02-01, N/A

**Report Date: 2019/11/27**  
Report #: R5981982  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: B9U8263**

**Received: 2019/11/01, 15:41**

Encryption Key

Patricia Legette  
Project Manager  
27 Nov 2019 12:49:29

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Patricia Legette, Project Manager  
Email: Patricia.Legette@bvlabs.com  
Phone# (905)817-5799

=====

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV423	LEV424			LEV425			
Sampling Date		2019/10/28 12:20	2019/10/28 14:15			2019/10/28 12:30			
COC Number		726342-05-01	726342-05-01			726342-05-01			
	UNITS	PFW-5	PFW-2	RDL	MDL	OW-8A	RDL	MDL	QC Batch
<b>Perfluorinated Compounds</b>									
Perfluorobutanoic acid	ug/L	<0.0070	0.042	0.020	0.0070	0.065	0.020	0.0070	6429881
Perfluoropentanoic Acid (PFPeA)	ug/L	0.019	0.16	0.020	0.0041	0.20	0.020	0.0041	6429881
Perfluorohexanoic Acid (PFHxA)	ug/L	0.029	0.21	0.020	0.0064	0.33	0.020	0.0064	6429881
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.022	0.068	0.020	0.0071	0.19	0.020	0.0071	6429881
Perfluorooctanoic Acid (PFOA)	ug/L	0.026	0.074	0.020	0.0074	0.13	0.020	0.0074	6429881
Perfluorononanoic Acid (PFNA)	ug/L	<0.0049	0.064	0.020	0.0049	0.010	0.020	0.0049	6429881
Perfluorodecanoic Acid (PFDA)	ug/L	<0.0041	0.027	0.020	0.0041	0.014	0.020	0.0041	6429881
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.0079	0.92	0.020	0.0043	0.038	0.020	0.0043	6429881
Perfluorododecanoic Acid (PFDoA)	ug/L	<0.0068	0.0083	0.020	0.0068	<0.0068	0.020	0.0068	6429881
Perfluorotridecanoic Acid	ug/L	<0.0069	<0.0069	0.020	0.0069	<0.0069	0.020	0.0069	6429881
Perfluorotetradecanoic Acid	ug/L	<0.0067	<0.0067	0.020	0.0067	<0.0067	0.020	0.0067	6429881
Perfluorobutanesulfonic acid	ug/L	<0.0051	0.010	0.020	0.0051	0.036	0.020	0.0051	6429881
Perfluorohexanesulfonic acid	ug/L	0.26	0.23	0.020	0.0052	0.75	0.020	0.0052	6429881
Perfluoroheptanesulfonic acid	ug/L	0.0054	0.014	0.020	0.0033	<0.0033	0.020	0.0033	6429881
Perfluorooctanesulfonic acid	ug/L	2.4	2.1	0.20	0.052	0.22	0.020	0.0052	6429881
Perfluorodecanesulfonic acid (PFDS)	ug/L	<0.0072	<0.0072	0.020	0.0072	<0.0072	0.020	0.0072	6429881
Perfluorooctane Sulfonamide (PFOSA)	ug/L	0.13	0.028	0.020	0.0066	<0.0066	0.020	0.0066	6429881
EtFOSA	ug/L	<0.0090	<0.0090	0.020	0.0090	<0.0090	0.020	0.0090	6429881
MeFOSA	ug/L	<0.0035	<0.0035	0.020	0.0035	<0.0035	0.020	0.0035	6429881
EtFOSE	ug/L	<0.0094	<0.0094	0.020	0.0094	<0.0094	0.020	0.0094	6429881
MeFOSE	ug/L	<0.0066	<0.0066	0.020	0.0066	<0.0066	0.020	0.0066	6429881
6:2 Fluorotelomer sulfonic acid	ug/L	0.021	0.40	0.020	0.0059	<0.0059	0.020	0.0059	6429881
8:2 Fluorotelomer sulfonic acid	ug/L	0.028	0.22	0.020	0.0059	<0.0059	0.020	0.0059	6429881
<b>Surrogate Recovery (%)</b>									
13C2-6:2-Fluorotelomersulfonic Acid	%	82	80	N/A	N/A	79	N/A	N/A	6429881
13C2-8:2-Fluorotelomersulfonic Acid	%	78	83	N/A	N/A	82	N/A	N/A	6429881
13C2-Perfluorodecanoic acid	%	71	81	N/A	N/A	76	N/A	N/A	6429881
13C2-Perfluorododecanoic acid	%	64	70	N/A	N/A	71	N/A	N/A	6429881
13C2-Perfluorohexanoic acid	%	79	84	N/A	N/A	78	N/A	N/A	6429881
13C2-perfluorotetradecanoic acid	%	63	70	N/A	N/A	74	N/A	N/A	6429881
13C2-Perfluoroundecanoic acid	%	66	69	N/A	N/A	72	N/A	N/A	6429881
13C4-Perfluorobutanoic acid	%	76	81	N/A	N/A	76	N/A	N/A	6429881
13C4-Perfluoroheptanoic acid	%	79	86	N/A	N/A	78	N/A	N/A	6429881
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
N/A = Not Applicable									



BUREAU  
VERITAS

BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV423	LEV424			LEV425			
Sampling Date		2019/10/28 12:20	2019/10/28 14:15			2019/10/28 12:30			
COC Number		726342-05-01	726342-05-01			726342-05-01			
	UNITS	PFW-5	PFW-2	RDL	MDL	OW-8A	RDL	MDL	QC Batch
13C4-Perfluorooctanesulfonic acid	%	73	74	N/A	N/A	76	N/A	N/A	6429881
13C4-Perfluorooctanoic acid	%	77	83	N/A	N/A	78	N/A	N/A	6429881
13C5-Perfluorononanoic acid	%	76	83	N/A	N/A	79	N/A	N/A	6429881
13C5-Perfluoropentanoic acid	%	76	82	N/A	N/A	76	N/A	N/A	6429881
13C8-Perfluorooctane Sulfonamide	%	64	69	N/A	N/A	70	N/A	N/A	6429881
18O2-Perfluorohexanesulfonic acid	%	75	83	N/A	N/A	75	N/A	N/A	6429881
D3-MeFOSA	%	50	55	N/A	N/A	56	N/A	N/A	6429881
D5-EtFOSA	%	50	56	N/A	N/A	56	N/A	N/A	6429881
D7-MeFOSE	%	61	66	N/A	N/A	69	N/A	N/A	6429881
D9-EtFOSE	%	58	64	N/A	N/A	66	N/A	N/A	6429881
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable									



BUREAU  
VERITAS

BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV426			LEV427			LEV428			
Sampling Date		2019/10/28 13:15			2019/10/28 14:20			2019/10/28 13:45			
COC Number		726342-05-01			726342-05-01			726342-05-01			
	UNITS	PFW-1	RDL	MDL	HSW-1	MDL	QC Batch	HSW-6	RDL	MDL	QC Batch
<b>Perfluorinated Compounds</b>											
Perfluorobutanoic acid	ug/L	0.092	0.040	0.014	0.056	0.0070	6429881	0.061	0.020	0.0070	6429945
Perfluoropentanoic Acid (PFPeA)	ug/L	0.36	0.040	0.0082	0.13	0.0041	6429881	0.24	0.020	0.0041	6429945
Perfluorohexanoic Acid (PFHxA)	ug/L	0.38	0.040	0.013	0.16	0.0064	6429881	0.33	0.020	0.0064	6429945
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.15	0.040	0.014	0.043	0.0071	6429881	0.10	0.020	0.0071	6429945
Perfluorooctanoic Acid (PFOA)	ug/L	0.13	0.040	0.015	0.046	0.0074	6429881	0.079	0.020	0.0074	6429945
Perfluorononanoic Acid (PFNA)	ug/L	0.57	0.040	0.0098	0.033	0.0049	6429881	0.046	0.020	0.0049	6429945
Perfluorodecanoic Acid (PFDA)	ug/L	0.12	0.040	0.0082	0.013	0.0041	6429881	0.030	0.020	0.0041	6429945
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.19	0.040	0.0086	0.17	0.0043	6429881	0.35	0.020	0.0043	6429945
Perfluorododecanoic Acid (PFDoA)	ug/L	<0.014	0.040	0.014	0.018	0.0068	6429881	0.013	0.020	0.0068	6429945
Perfluorotridecanoic Acid	ug/L	<0.014	0.040	0.014	0.059	0.0069	6429881	0.012	0.020	0.0069	6429945
Perfluorotetradecanoic Acid	ug/L	<0.013	0.040	0.013	<0.0067	0.0067	6429881	<0.0067	0.020	0.0067	6429945
Perfluorobutanesulfonic acid	ug/L	0.034	0.040	0.010	0.0079	0.0051	6429881	0.036	0.020	0.0051	6429945
Perfluorohexanesulfonic acid	ug/L	0.91	0.040	0.010	0.15	0.0052	6429881	0.31	0.020	0.0052	6429945
Perfluoroheptanesulfonic acid	ug/L	0.11	0.040	0.0066	0.0056	0.0033	6429881	0.0078	0.020	0.0033	6429945
Perfluorooctanesulfonic acid	ug/L	16	0.40	0.10	1.8	0.0052	6429881	3.6	0.20	0.052	6429945
Perfluorodecanesulfonic acid (PFDS)	ug/L	<0.014	0.040	0.014	<0.0072	0.0072	6429881	<0.0072	0.020	0.0072	6429945
Perfluorooctane Sulfonamide (PFOSA)	ug/L	<0.013	0.040	0.013	0.017	0.0066	6429881	0.012	0.020	0.0066	6429945
EtFOSA	ug/L	<0.018	0.040	0.018	<0.0090	0.0090	6429881	<0.0090	0.020	0.0090	6429945
MeFOSA	ug/L	<0.0070	0.040	0.0070	<0.0035	0.0035	6429881	<0.0035	0.020	0.0035	6429945
EtFOSE	ug/L	<0.019	0.040	0.019	<0.0094	0.0094	6429881	<0.0094	0.020	0.0094	6429945
MeFOSE	ug/L	<0.013	0.040	0.013	<0.0066	0.0066	6429881	<0.0066	0.020	0.0066	6429945
6:2 Fluorotelomer sulfonic acid	ug/L	0.74	0.040	0.012	0.27	0.0059	6429881	0.27	0.020	0.0059	6429945
8:2 Fluorotelomer sulfonic acid	ug/L	3.0	0.40	0.12	0.16	0.0059	6429881	0.32	0.020	0.0059	6429945
<b>Surrogate Recovery (%)</b>											
13C2-6:2-Fluorotelomersulfonic Acid	%	88	N/A	N/A	81	N/A	6429881	89	N/A	N/A	6429945
13C2-8:2-Fluorotelomersulfonic Acid	%	76	N/A	N/A	79	N/A	6429881	91	N/A	N/A	6429945
13C2-Perfluorodecanoic acid	%	83	N/A	N/A	73	N/A	6429881	86	N/A	N/A	6429945
13C2-Perfluorododecanoic acid	%	76	N/A	N/A	65	N/A	6429881	78	N/A	N/A	6429945
13C2-Perfluorohexanoic acid	%	88	N/A	N/A	83	N/A	6429881	94	N/A	N/A	6429945
13C2-perfluorotetradecanoic acid	%	78	N/A	N/A	62	N/A	6429881	77	N/A	N/A	6429945
13C2-Perfluoroundecanoic acid	%	77	N/A	N/A	66	N/A	6429881	83	N/A	N/A	6429945
13C4-Perfluorobutanoic acid	%	84	N/A	N/A	79	N/A	6429881	91	N/A	N/A	6429945
13C4-Perfluoroheptanoic acid	%	87	N/A	N/A	84	N/A	6429881	93	N/A	N/A	6429945
RDL = Reportable Detection Limit											
QC Batch = Quality Control Batch											
N/A = Not Applicable											



BUREAU  
VERITAS

BV Labs Job #: B9U8263  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV426			LEV427			LEV428			
Sampling Date		2019/10/28 13:15			2019/10/28 14:20			2019/10/28 13:45			
COC Number		726342-05-01			726342-05-01			726342-05-01			
	UNITS	PFW-1	RDL	MDL	HSW-1	MDL	QC Batch	HSW-6	RDL	MDL	QC Batch
13C4-Perfluorooctanesulfonic acid	%	71	N/A	N/A	74	N/A	6429881	120	N/A	N/A	6429945
13C4-Perfluorooctanoic acid	%	85	N/A	N/A	80	N/A	6429881	92	N/A	N/A	6429945
13C5-Perfluorononanoic acid	%	87	N/A	N/A	80	N/A	6429881	91	N/A	N/A	6429945
13C5-Perfluoropentanoic acid	%	85	N/A	N/A	79	N/A	6429881	92	N/A	N/A	6429945
13C8-Perfluorooctane Sulfonamide	%	71	N/A	N/A	65	N/A	6429881	84	N/A	N/A	6429945
18O2-Perfluorohexanesulfonic acid	%	84	N/A	N/A	80	N/A	6429881	88	N/A	N/A	6429945
D3-MeFOSA	%	51	N/A	N/A	57	N/A	6429881	69	N/A	N/A	6429945
D5-EtFOSA	%	54	N/A	N/A	57	N/A	6429881	68	N/A	N/A	6429945
D7-MeFOSE	%	67	N/A	N/A	65	N/A	6429881	73	N/A	N/A	6429945
D9-EtFOSE	%	68	N/A	N/A	63	N/A	6429881	75	N/A	N/A	6429945
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable											





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BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV429	LEV431			LEV432			
Sampling Date		2019/10/28 16:00	2019/10/28 17:00			2019/10/28 14:00			
COC Number		726342-05-01	726342-05-01			726342-05-01			
	UNITS	HW-ID	RINSATE1	RDL	MDL	DUPLICATE1	RDL	MDL	QC Batch
<b>Perfluorinated Compounds</b>									
Perfluorobutanoic acid	ug/L	<0.0070	<0.0070	0.020	0.0070	0.11	0.040	0.014	6429945
Perfluoropentanoic Acid (PFPeA)	ug/L	<0.0041	<0.0041	0.020	0.0041	0.41	0.040	0.0082	6429945
Perfluorohexanoic Acid (PFHxA)	ug/L	<0.0064	<0.0064	0.020	0.0064	0.45	0.040	0.013	6429945
Perfluoroheptanoic Acid (PFHpA)	ug/L	<0.0071	<0.0071	0.020	0.0071	0.16	0.040	0.014	6429945
Perfluorooctanoic Acid (PFOA)	ug/L	<0.0074	<0.0074	0.020	0.0074	0.16	0.040	0.015	6429945
Perfluorononanoic Acid (PFNA)	ug/L	<0.0049	<0.0049	0.020	0.0049	0.66	0.040	0.0098	6429945
Perfluorodecanoic Acid (PFDA)	ug/L	<0.0041	<0.0041	0.020	0.0041	0.14	0.040	0.0082	6429945
Perfluoroundecanoic Acid (PFUnA)	ug/L	<0.0043	<0.0043	0.020	0.0043	0.22	0.040	0.0086	6429945
Perfluorododecanoic Acid (PFDoA)	ug/L	<0.0068	<0.0068	0.020	0.0068	<0.014	0.040	0.014	6429945
Perfluorotridecanoic Acid	ug/L	<0.0069	<0.0069	0.020	0.0069	<0.014	0.040	0.014	6429945
Perfluorotetradecanoic Acid	ug/L	<0.0067	<0.0067	0.020	0.0067	<0.013	0.040	0.013	6429945
Perfluorobutanesulfonic acid	ug/L	<0.0051	<0.0051	0.020	0.0051	0.053	0.040	0.010	6429945
Perfluorohexanesulfonic acid	ug/L	<0.0052	<0.0052	0.020	0.0052	1.0	0.040	0.010	6429945
Perfluoroheptanesulfonic acid	ug/L	<0.0033	<0.0033	0.020	0.0033	0.12	0.040	0.0066	6429945
Perfluorooctanesulfonic acid	ug/L	<0.0052	<0.0052	0.020	0.0052	17	0.40	0.10	6429945
Perfluorodecanesulfonic acid (PFDS)	ug/L	<0.0072	<0.0072	0.020	0.0072	<0.014	0.040	0.014	6429945
Perfluorooctane Sulfonamide (PFOSA)	ug/L	<0.0066	<0.0066	0.020	0.0066	<0.013	0.040	0.013	6429945
EtFOSA	ug/L	<0.0090	<0.0090	0.020	0.0090	<0.018	0.040	0.018	6429945
MeFOSA	ug/L	<0.0035	<0.0035	0.020	0.0035	<0.0070	0.040	0.0070	6429945
EtFOSE	ug/L	<0.0094	<0.0094	0.020	0.0094	<0.019	0.040	0.019	6429945
MeFOSE	ug/L	<0.0066	<0.0066	0.020	0.0066	<0.013	0.040	0.013	6429945
6:2 Fluorotelomer sulfonic acid	ug/L	<0.0059	<0.0059	0.020	0.0059	0.83	0.040	0.012	6429945
8:2 Fluorotelomer sulfonic acid	ug/L	<0.0059	<0.0059	0.020	0.0059	3.2	0.40	0.12	6429945
<b>Surrogate Recovery (%)</b>									
13C2-6:2-Fluorotelomersulfonic Acid	%	132	148	N/A	N/A	111	N/A	N/A	6429945
13C2-8:2-Fluorotelomersulfonic Acid	%	137	148	N/A	N/A	117	N/A	N/A	6429945
13C2-Perfluorodecanoic acid	%	134	146	N/A	N/A	117	N/A	N/A	6429945
13C2-Perfluorododecanoic acid	%	119	131	N/A	N/A	106	N/A	N/A	6429945
13C2-Perfluorohexanoic acid	%	142	157 (1)	N/A	N/A	125	N/A	N/A	6429945
13C2-perfluorotetradecanoic acid	%	113	123	N/A	N/A	102	N/A	N/A	6429945
13C2-Perfluoroundecanoic acid	%	124	140	N/A	N/A	110	N/A	N/A	6429945
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
N/A = Not Applicable									
(1) Extracted internal standard analyte recovery was above the defined upper control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorohexanoic acid - PFHxA).									



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BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV429	LEV431			LEV432			
Sampling Date		2019/10/28 16:00	2019/10/28 17:00			2019/10/28 14:00			
COC Number		726342-05-01	726342-05-01			726342-05-01			
	UNITS	HW-ID	RINSATE1	RDL	MDL	DUPLICATE1	RDL	MDL	QC Batch
13C4-Perfluorobutanoic acid	%	132	148	N/A	N/A	122	N/A	N/A	6429945
13C4-Perfluoroheptanoic acid	%	139	153 (1)	N/A	N/A	125	N/A	N/A	6429945
13C4-Perfluorooctanesulfonic acid	%	126	141	N/A	N/A	109	N/A	N/A	6429945
13C4-Perfluorooctanoic acid	%	136	149	N/A	N/A	121	N/A	N/A	6429945
13C5-Perfluorononanoic acid	%	136	151 (2)	N/A	N/A	121	N/A	N/A	6429945
13C5-Perfluoropentanoic acid	%	139	154 (3)	N/A	N/A	124	N/A	N/A	6429945
13C8-Perfluorooctane Sulfonamide	%	125	136	N/A	N/A	109	N/A	N/A	6429945
18O2-Perfluorohexanesulfonic acid	%	128	140	N/A	N/A	112	N/A	N/A	6429945
D3-MeFOSA	%	90	101	N/A	N/A	89	N/A	N/A	6429945
D5-EtFOSA	%	85	99	N/A	N/A	88	N/A	N/A	6429945
D7-MeFOSE	%	106	114	N/A	N/A	99	N/A	N/A	6429945
D9-EtFOSE	%	104	113	N/A	N/A	93	N/A	N/A	6429945

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable

(1) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluoroheptanoic acid - PFHpA).

(2) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorononanoic acid - PFNA).

(3) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluoropentanoic acid - PFPeA).



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BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV433			LEV434			LEV435			
Sampling Date		2019/10/29 14:55			2019/10/29 15:10			2019/10/29 13:00			
COC Number		726342-06-01			726342-06-01			726342-06-01			
	UNITS	MW-12	RDL	MDL	MW-22	RDL	MDL	PC-30	RDL	MDL	QC Batch

#### Perfluorinated Compounds

Perfluorobutanoic acid	ug/L	0.19	0.020	0.0070	0.029	0.020	0.0070	0.038	0.020	0.0070	6429945
Perfluoropentanoic Acid (PFPeA)	ug/L	0.74	0.020	0.0041	0.097	0.020	0.0041	0.10	0.020	0.0041	6429945
Perfluorohexanoic Acid (PFHxA)	ug/L	0.49	0.020	0.0064	0.16	0.020	0.0064	0.13	0.020	0.0064	6429945
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.31	0.020	0.0071	0.061	0.020	0.0071	0.071	0.020	0.0071	6429945
Perfluorooctanoic Acid (PFOA)	ug/L	0.38	0.020	0.0074	0.15	0.020	0.0074	0.055	0.020	0.0074	6429945
Perfluorononanoic Acid (PFNA)	ug/L	0.080	0.020	0.0049	0.0083	0.020	0.0049	0.061	0.020	0.0049	6429945
Perfluorodecanoic Acid (PFDA)	ug/L	0.0097	0.020	0.0041	<0.0041	0.020	0.0041	0.0060	0.020	0.0041	6429945
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.012	0.020	0.0043	<0.0043	0.020	0.0043	0.031	0.020	0.0043	6429945
Perfluorododecanoic Acid (PFDoA)	ug/L	<0.0068	0.020	0.0068	<0.0068	0.020	0.0068	<0.0068	0.020	0.0068	6429945
Perfluorotridecanoic Acid	ug/L	<0.0069	0.020	0.0069	<0.0069	0.020	0.0069	<0.0069	0.020	0.0069	6429945
Perfluorotetradecanoic Acid	ug/L	<0.0067	0.020	0.0067	<0.0067	0.020	0.0067	<0.0067	0.020	0.0067	6429945
Perfluorobutanesulfonic acid	ug/L	0.029	0.020	0.0051	0.019	0.020	0.0051	0.016	0.020	0.0051	6429945
Perfluorohexanesulfonic acid	ug/L	1.3	0.20	0.052	0.69	0.020	0.0052	0.22	0.020	0.0052	6429945
Perfluoroheptanesulfonic acid	ug/L	0.030	0.020	0.0033	0.0056	0.020	0.0033	0.011	0.020	0.0033	6429945
Perfluorooctanesulfonic acid	ug/L	2.3	0.20	0.052	0.51	0.020	0.0052	0.96	0.20	0.052	6429945
Perfluorodecanesulfonic acid (PFDS)	ug/L	<0.0072	0.020	0.0072	<0.0072	0.020	0.0072	<0.0072	0.020	0.0072	6429945
Perfluorooctane Sulfonamide (PFOSA)	ug/L	0.15	0.020	0.0066	0.014	0.020	0.0066	<0.0066	0.020	0.0066	6429945
EtFOSA	ug/L	<0.0090	0.020	0.0090	<0.0090	0.020	0.0090	<0.0090	0.020	0.0090	6429945
MeFOSA	ug/L	<0.0035	0.020	0.0035	<0.0035	0.020	0.0035	<0.0035	0.020	0.0035	6429945
EtFOSE	ug/L	<0.0094	0.020	0.0094	<0.0094	0.020	0.0094	<0.0094	0.020	0.0094	6429945
MeFOSE	ug/L	<0.0066	0.020	0.0066	<0.0066	0.020	0.0066	<0.0066	0.020	0.0066	6429945
6:2 Fluorotelomer sulfonic acid	ug/L	1.2	0.20	0.059	<0.0059	0.020	0.0059	0.030	0.020	0.0059	6429945
8:2 Fluorotelomer sulfonic acid	ug/L	0.017	0.020	0.0059	<0.0059	0.020	0.0059	0.0073	0.020	0.0059	6429945

#### Surrogate Recovery (%)

13C2-6:2-Fluorotelomersulfonic Acid	%	110	N/A	N/A	99	N/A	N/A	163 (1)	N/A	N/A	6429945
13C2-8:2-Fluorotelomersulfonic Acid	%	97	N/A	N/A	98	N/A	N/A	168 (2)	N/A	N/A	6429945
13C2-Perfluorodecanoic acid	%	95	N/A	N/A	94	N/A	N/A	169 (3)	N/A	N/A	6429945

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable

(1) Extracted internal standard analyte recovery was above the defined upper control limit (UCL) which may result in increased variability of the associated native analyte result (6:2 Fluorotelomer sulfonic acid - 6:2-FTS).

(2) Extracted internal standard analyte recovery was above the defined upper control limit (UCL) which may result in increased variability of the associated native analyte result (8:2 Fluorotelomer sulfonic acid - 8:2-FTS).

(3) Extracted internal standard analyte recovery was above the defined upper control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorodecanoic acid - PFDA).



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BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV433			LEV434			LEV435			
Sampling Date		2019/10/29 14:55			2019/10/29 15:10			2019/10/29 13:00			
COC Number		726342-06-01			726342-06-01			726342-06-01			
	UNITS	MW-12	RDL	MDL	MW-22	RDL	MDL	PC-30	RDL	MDL	QC Batch
13C2-Perfluorododecanoic acid	%	84	N/A	N/A	88	N/A	N/A	156 (1)	N/A	N/A	6429945
13C2-Perfluorohexanoic acid	%	101	N/A	N/A	106	N/A	N/A	181 (2)	N/A	N/A	6429945
13C2-perfluorotetradecanoic acid	%	86	N/A	N/A	81	N/A	N/A	148	N/A	N/A	6429945
13C2-Perfluoroundecanoic acid	%	89	N/A	N/A	90	N/A	N/A	161 (3)	N/A	N/A	6429945
13C4-Perfluorobutanoic acid	%	96	N/A	N/A	97	N/A	N/A	166 (4)	N/A	N/A	6429945
13C4-Perfluoroheptanoic acid	%	99	N/A	N/A	102	N/A	N/A	179 (5)	N/A	N/A	6429945
13C4-Perfluorooctanesulfonic acid	%	98	N/A	N/A	93	N/A	N/A	244 (6)	N/A	N/A	6429945
13C4-Perfluorooctanoic acid	%	99	N/A	N/A	100	N/A	N/A	175 (7)	N/A	N/A	6429945
13C5-Perfluorononanoic acid	%	99	N/A	N/A	99	N/A	N/A	174 (8)	N/A	N/A	6429945
13C5-Perfluoropentanoic acid	%	99	N/A	N/A	101	N/A	N/A	180 (9)	N/A	N/A	6429945
13C8-Perfluorooctane Sulfonamide	%	92	N/A	N/A	93	N/A	N/A	167 (10)	N/A	N/A	6429945
18O2-Perfluorohexanesulfonic acid	%	101	N/A	N/A	93	N/A	N/A	165 (11)	N/A	N/A	6429945
D3-MeFOSA	%	74	N/A	N/A	70	N/A	N/A	116	N/A	N/A	6429945
D5-EtFOSA	%	69	N/A	N/A	71	N/A	N/A	116	N/A	N/A	6429945

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable

(1) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorododecanoic acid - PFDoA).

(2) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorohexanoic acid - PFHxA).

(3) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluoroundecanoic acid - PFUnA).

(4) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorobutanoic acid - PFBA).

(5) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluoroheptanoic acid - PFHpA).

(6) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorooctane sulfonic acid - PFOS).

(7) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorooctanoic acid - PFOA).

(8) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorononanoic acid - PFNA).

(9) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluoropentanoic acid - PFPeA).

(10) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorooctane sulfonamide - PFOSA).

(11) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorohexane sulfonic acid - PFHxS).



**BUREAU**  
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BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV433			LEV434			LEV435			
Sampling Date		2019/10/29 14:55			2019/10/29 15:10			2019/10/29 13:00			
COC Number		726342-06-01			726342-06-01			726342-06-01			
	UNITS	MW-12	RDL	MDL	MW-22	RDL	MDL	PC-30	RDL	MDL	QC Batch
D7-MeFOSE	%	80	N/A	N/A	79	N/A	N/A	138	N/A	N/A	6429945
D9-EtFOSE	%	77	N/A	N/A	77	N/A	N/A	133	N/A	N/A	6429945
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable											



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BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV436			LEV437	LEV438			
Sampling Date		2019/10/29 11:30			2019/10/29 09:45	2019/10/29 10:00			
COC Number		726342-06-01			726342-06-01	726342-06-01			
	UNITS	PC-11	RDL	MDL	PC-1	PC-36S	RDL	MDL	QC Batch
<b>Perfluorinated Compounds</b>									
Perfluorobutanoic acid	ug/L	0.10	0.10	0.035	0.066	0.027	0.020	0.0070	6429945
Perfluoropentanoic Acid (PFPeA)	ug/L	0.37	0.10	0.021	0.22	0.052	0.020	0.0041	6429945
Perfluorohexanoic Acid (PFHxA)	ug/L	0.36	0.10	0.032	0.19	0.079	0.020	0.0064	6429945
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.16	0.10	0.036	0.15	0.062	0.020	0.0071	6429945
Perfluorooctanoic Acid (PFOA)	ug/L	0.15	0.10	0.037	0.072	0.054	0.020	0.0074	6429945
Perfluorononanoic Acid (PFNA)	ug/L	0.32	0.10	0.025	0.075	0.080	0.020	0.0049	6429945
Perfluorodecanoic Acid (PFDA)	ug/L	0.073	0.10	0.021	0.019	0.011	0.020	0.0041	6429945
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.27	0.10	0.022	0.45	0.055	0.020	0.0043	6429945
Perfluorododecanoic Acid (PFDoA)	ug/L	<0.034	0.10	0.034	<0.0068	<0.0068	0.020	0.0068	6429945
Perfluorotridecanoic Acid	ug/L	<0.035	0.10	0.035	<0.0069	<0.0069	0.020	0.0069	6429945
Perfluorotetradecanoic Acid	ug/L	<0.034	0.10	0.034	<0.0067	<0.0067	0.020	0.0067	6429945
Perfluorobutanesulfonic acid	ug/L	0.041	0.10	0.026	0.027	0.0064	0.020	0.0051	6429945
Perfluorohexanesulfonic acid	ug/L	0.80	0.10	0.026	0.38	0.12	0.020	0.0052	6429945
Perfluoroheptanesulfonic acid	ug/L	0.059	0.10	0.017	0.0073	0.0070	0.020	0.0033	6429945
Perfluorooctanesulfonic acid	ug/L	22	1.0	0.26	1.6	1.2	0.20	0.052	6429945
Perfluorodecanesulfonic acid (PFDS)	ug/L	<0.036	0.10	0.036	<0.0072	<0.0072	0.020	0.0072	6429945
Perfluorooctane Sulfonamide (PFOSA)	ug/L	<0.033	0.10	0.033	0.0083	<0.0066	0.020	0.0066	6429945
EtFOSA	ug/L	<0.045	0.10	0.045	<0.0090	<0.0090	0.020	0.0090	6429945
MeFOSA	ug/L	<0.018	0.10	0.018	<0.0035	<0.0035	0.020	0.0035	6429945
EtFOSE	ug/L	<0.047	0.10	0.047	<0.0094	<0.0094	0.020	0.0094	6429945
MeFOSE	ug/L	<0.033	0.10	0.033	<0.0066	<0.0066	0.020	0.0066	6429945
6:2 Fluorotelomer sulfonic acid	ug/L	0.86	0.10	0.030	0.10	0.021	0.020	0.0059	6429945
8:2 Fluorotelomer sulfonic acid	ug/L	1.4	0.10	0.030	0.38	0.015	0.020	0.0059	6429945
<b>Surrogate Recovery (%)</b>									
13C2-6:2-Fluorotelomersulfonic Acid	%	148	N/A	N/A	99	117	N/A	N/A	6429945
13C2-8:2-Fluorotelomersulfonic Acid	%	155 (1)	N/A	N/A	97	121	N/A	N/A	6429945
13C2-Perfluorodecanoic acid	%	155 (2)	N/A	N/A	98	114	N/A	N/A	6429945
13C2-Perfluorododecanoic acid	%	149	N/A	N/A	90	103	N/A	N/A	6429945
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable (1) Extracted internal standard analyte recovery was above the defined upper control limit (UCL) which may result in increased variability of the associated native analyte result (8:2 Fluorotelomer sulfonic acid - 8:2-FTS). (2) Extracted internal standard analyte recovery was above the defined upper control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorodecanoic acid - PFDA).									



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BV Labs Job #: B9U8263  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV436			LEV437	LEV438			
Sampling Date		2019/10/29 11:30			2019/10/29 09:45	2019/10/29 10:00			
COC Number		726342-06-01			726342-06-01	726342-06-01			
	UNITS	PC-11	RDL	MDL	PC-1	PC-36S	RDL	MDL	QC Batch
13C2-Perfluorohexanoic acid	%	168 (1)	N/A	N/A	106	126	N/A	N/A	6429945
13C2-perfluorotetradecanoic acid	%	147	N/A	N/A	85	95	N/A	N/A	6429945
13C2-Perfluoroundecanoic acid	%	150	N/A	N/A	90	108	N/A	N/A	6429945
13C4-Perfluorobutanoic acid	%	159 (2)	N/A	N/A	98	116	N/A	N/A	6429945
13C4-Perfluoroheptanoic acid	%	162 (3)	N/A	N/A	104	121	N/A	N/A	6429945
13C4-Perfluorooctanesulfonic acid	%	125	N/A	N/A	118	117	N/A	N/A	6429945
13C4-Perfluorooctanoic acid	%	155 (4)	N/A	N/A	102	120	N/A	N/A	6429945
13C5-Perfluorononanoic acid	%	150	N/A	N/A	101	116	N/A	N/A	6429945
13C5-Perfluoropentanoic acid	%	165 (5)	N/A	N/A	102	122	N/A	N/A	6429945
13C8-Perfluorooctane Sulfonamide	%	134	N/A	N/A	94	111	N/A	N/A	6429945
18O2-Perfluorohexanesulfonic acid	%	150	N/A	N/A	97	110	N/A	N/A	6429945
D3-MeFOSA	%	75	N/A	N/A	72	75	N/A	N/A	6429945
D5-EtFOSA	%	77	N/A	N/A	70	76	N/A	N/A	6429945
D7-MeFOSE	%	121	N/A	N/A	80	91	N/A	N/A	6429945
D9-EtFOSE	%	120	N/A	N/A	80	92	N/A	N/A	6429945

RDL = Reportable Detection Limit  
QC Batch = Quality Control Batch  
N/A = Not Applicable

(1) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorohexanoic acid - PFHxA).

(2) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorobutanoic acid - PFBA).

(3) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluoroheptanoic acid - PFHpA).

(4) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorooctanoic acid - PFOA).

(5) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluoropentanoic acid - PFPeA).





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BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV439			LEV440			LEV441			
Sampling Date		2019/10/29 11:55			2019/10/29 15:25			2019/10/29 12:25			
COC Number		726342-05-01			726342-05-01			726342-05-01			
	UNITS	PC-6A	RDL	MDL	MW-99	RDL	MDL	PC-16D	RDL	MDL	QC Batch

#### Perfluorinated Compounds

Perfluorobutanoic acid	ug/L	0.044	0.020	0.0070	0.035	0.020	0.0070	0.048	0.020	0.0070	6437203
Perfluoropentanoic Acid (PFPeA)	ug/L	0.13	0.020	0.0041	0.098	0.020	0.0041	0.14	0.020	0.0041	6437203
Perfluorohexanoic Acid (PFHxA)	ug/L	0.15	0.020	0.0064	0.090	0.020	0.0064	0.17	0.020	0.0064	6437203
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.086	0.020	0.0071	0.046	0.020	0.0071	0.090	0.020	0.0071	6437203
Perfluorooctanoic Acid (PFOA)	ug/L	0.062	0.020	0.0074	0.050	0.020	0.0074	0.091	0.020	0.0074	6437203
Perfluorononanoic Acid (PFNA)	ug/L	0.048	0.020	0.0049	0.058	0.020	0.0049	0.065	0.020	0.0049	6437203
Perfluorodecanoic Acid (PFDA)	ug/L	0.0074	0.020	0.0041	0.0055	0.020	0.0041	<0.0041	0.020	0.0041	6437203
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.049	0.020	0.0043	0.0047	0.020	0.0043	0.024	0.020	0.0043	6437203
Perfluorododecanoic Acid (PFDoA)	ug/L	<0.0068	0.020	0.0068	<0.0068	0.020	0.0068	<0.0068	0.020	0.0068	6437203
Perfluorotridecanoic Acid	ug/L	<0.0069	0.020	0.0069	<0.0069	0.020	0.0069	<0.0069	0.020	0.0069	6437203
Perfluorotetradecanoic Acid	ug/L	<0.0067	0.020	0.0067	<0.0067	0.020	0.0067	<0.0067	0.020	0.0067	6437203
Perfluorobutanesulfonic acid	ug/L	0.014	0.020	0.0051	0.012	0.020	0.0051	0.019	0.020	0.0051	6437203
Perfluorohexanesulfonic acid	ug/L	0.29	0.020	0.0052	0.34	0.020	0.0052	0.25	0.020	0.0052	6437203
Perfluoroheptanesulfonic acid	ug/L	0.010	0.020	0.0033	0.011	0.020	0.0033	0.018	0.020	0.0033	6437203
Perfluorooctanesulfonic acid	ug/L	1.1	0.20	0.052	0.63	0.020	0.0052	1.3	0.20	0.052	6437203
Perfluorodecanesulfonic acid (PFDS)	ug/L	<0.0072	0.020	0.0072	<0.0072	0.020	0.0072	<0.0072	0.020	0.0072	6437203
Perfluorooctane Sulfonamide (PFOSA)	ug/L	<0.0066	0.020	0.0066	0.011	0.020	0.0066	0.020	0.020	0.0066	6437203
EtFOSA	ug/L	<0.0090	0.020	0.0090	<0.0090	0.020	0.0090	<0.0090	0.020	0.0090	6437203
MeFOSA	ug/L	<0.0035	0.020	0.0035	<0.0035	0.020	0.0035	<0.0035	0.020	0.0035	6437203
EtFOSE	ug/L	<0.0094	0.020	0.0094	<0.0094	0.020	0.0094	<0.0094	0.020	0.0094	6437203
MeFOSE	ug/L	<0.0066	0.020	0.0066	<0.0066	0.020	0.0066	<0.0066	0.020	0.0066	6437203
6:2 Fluorotelomer sulfonic acid	ug/L	0.011	0.020	0.0059	0.010	0.020	0.0059	0.047	0.020	0.0059	6437203
8:2 Fluorotelomer sulfonic acid	ug/L	<0.0059	0.020	0.0059	0.054	0.020	0.0059	0.023	0.020	0.0059	6437203

#### Surrogate Recovery (%)

13C2-6:2-Fluorotelomersulfonic Acid	%	125	N/A	N/A	112	N/A	N/A	109	N/A	N/A	6437203
13C2-8:2-Fluorotelomersulfonic Acid	%	107	N/A	N/A	92	N/A	N/A	103	N/A	N/A	6437203
13C2-Perfluorodecanoic acid	%	99	N/A	N/A	95	N/A	N/A	91	N/A	N/A	6437203
13C2-Perfluorododecanoic acid	%	88	N/A	N/A	88	N/A	N/A	80	N/A	N/A	6437203
13C2-Perfluorohexanoic acid	%	121	N/A	N/A	112	N/A	N/A	110	N/A	N/A	6437203
13C2-perfluorotetradecanoic acid	%	90	N/A	N/A	85	N/A	N/A	50	N/A	N/A	6437203
13C2-Perfluoroundecanoic acid	%	89	N/A	N/A	85	N/A	N/A	81	N/A	N/A	6437203
13C4-Perfluorobutanoic acid	%	116	N/A	N/A	104	N/A	N/A	102	N/A	N/A	6437203
13C4-Perfluoroheptanoic acid	%	120	N/A	N/A	110	N/A	N/A	108	N/A	N/A	6437203

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable





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BV Labs Job #: B9U8263  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV439			LEV440			LEV441			
Sampling Date		2019/10/29 11:55			2019/10/29 15:25			2019/10/29 12:25			
COC Number		726342-05-01			726342-05-01			726342-05-01			
	UNITS	PC-6A	RDL	MDL	MW-99	RDL	MDL	PC-16D	RDL	MDL	QC Batch
13C4-Perfluorooctanesulfonic acid	%	126	N/A	N/A	97	N/A	N/A	114	N/A	N/A	6437203
13C4-Perfluorooctanoic acid	%	118	N/A	N/A	107	N/A	N/A	108	N/A	N/A	6437203
13C5-Perfluorononanoic acid	%	114	N/A	N/A	106	N/A	N/A	104	N/A	N/A	6437203
13C5-Perfluoropentanoic acid	%	119	N/A	N/A	108	N/A	N/A	106	N/A	N/A	6437203
13C8-Perfluorooctane Sulfonamide	%	99	N/A	N/A	90	N/A	N/A	83	N/A	N/A	6437203
18O2-Perfluorohexanesulfonic acid	%	118	N/A	N/A	110	N/A	N/A	110	N/A	N/A	6437203
D3-MeFOSA	%	86	N/A	N/A	74	N/A	N/A	76	N/A	N/A	6437203
D5-EtFOSA	%	91	N/A	N/A	78	N/A	N/A	78	N/A	N/A	6437203
D7-MeFOSE	%	96	N/A	N/A	86	N/A	N/A	81	N/A	N/A	6437203
D9-EtFOSE	%	90	N/A	N/A	87	N/A	N/A	78	N/A	N/A	6437203

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable



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BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV442			LEV444			LEV445			
Sampling Date		2019/10/29 13:45			2019/10/30 12:00			2019/10/30 12:00			
COC Number		726342-05-01			726342-02-01			726342-02-01			
	UNITS	PC-18	RDL	MDL	MW-35I	RDL	MDL	PC-19	RDL	MDL	QC Batch

#### Perfluorinated Compounds

Perfluorobutanoic acid	ug/L	0.044	0.020	0.0070	<0.0070	0.020	0.0070	0.047	0.020	0.0070	6437203
Perfluoropentanoic Acid (PFPeA)	ug/L	0.12	0.020	0.0041	<0.0041	0.020	0.0041	0.14	0.020	0.0041	6437203
Perfluorohexanoic Acid (PFHxA)	ug/L	0.15	0.020	0.0064	<0.0064	0.020	0.0064	0.16	0.020	0.0064	6437203
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.080	0.020	0.0071	<0.0071	0.020	0.0071	0.095	0.020	0.0071	6437203
Perfluorooctanoic Acid (PFOA)	ug/L	0.075	0.020	0.0074	<0.0074	0.020	0.0074	0.17	0.020	0.0074	6437203
Perfluorononanoic Acid (PFNA)	ug/L	0.079	0.020	0.0049	<0.0049	0.020	0.0049	0.13	0.020	0.0049	6437203
Perfluorodecanoic Acid (PFDA)	ug/L	0.0072	0.020	0.0041	<0.0041	0.020	0.0041	0.014	0.020	0.0041	6437203
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.0076	0.020	0.0043	<0.0043	0.020	0.0043	0.0066	0.020	0.0043	6437203
Perfluorododecanoic Acid (PFDoA)	ug/L	<0.0068	0.020	0.0068	<0.0068	0.020	0.0068	<0.0068	0.020	0.0068	6437203
Perfluorotridecanoic Acid	ug/L	<0.0069	0.020	0.0069	<0.0069	0.020	0.0069	<0.0069	0.020	0.0069	6437203
Perfluorotetradecanoic Acid	ug/L	<0.0067	0.020	0.0067	<0.0067	0.020	0.0067	<0.0067	0.020	0.0067	6437203
Perfluorobutanesulfonic acid	ug/L	0.018	0.020	0.0051	<0.0051	0.020	0.0051	0.018	0.020	0.0051	6437203
Perfluorohexanesulfonic acid	ug/L	0.22	0.020	0.0052	0.0060	0.020	0.0052	0.45	0.020	0.0052	6437203
Perfluoroheptanesulfonic acid	ug/L	0.019	0.020	0.0033	<0.0033	0.020	0.0033	0.022	0.020	0.0033	6437203
Perfluorooctanesulfonic acid	ug/L	1.5	0.20	0.052	<0.0052	0.020	0.0052	1.9	0.20	0.052	6437203
Perfluorodecanesulfonic acid (PFDS)	ug/L	<0.0072	0.020	0.0072	<0.0072	0.020	0.0072	<0.0072	0.020	0.0072	6437203
Perfluorooctane Sulfonamide (PFOSA)	ug/L	<0.0066	0.020	0.0066	<0.0066	0.020	0.0066	<0.0066	0.020	0.0066	6437203
EtFOSA	ug/L	<0.0090	0.020	0.0090	<0.0090	0.020	0.0090	<0.0090	0.020	0.0090	6437203
MeFOSA	ug/L	<0.0035	0.020	0.0035	<0.0035	0.020	0.0035	<0.0035	0.020	0.0035	6437203
EtFOSE	ug/L	<0.0094	0.020	0.0094	<0.0094	0.020	0.0094	<0.0094	0.020	0.0094	6437203
MeFOSE	ug/L	<0.0066	0.020	0.0066	<0.0066	0.020	0.0066	<0.0066	0.020	0.0066	6437203
6:2 Fluorotelomer sulfonic acid	ug/L	0.021	0.020	0.0059	<0.0059	0.020	0.0059	0.11	0.020	0.0059	6437203
8:2 Fluorotelomer sulfonic acid	ug/L	0.014	0.020	0.0059	<0.0059	0.020	0.0059	0.0087	0.020	0.0059	6437203

#### Surrogate Recovery (%)

13C2-6:2-Fluorotelomersulfonic Acid	%	114	N/A	N/A	116	N/A	N/A	116	N/A	N/A	6437203
13C2-8:2-Fluorotelomersulfonic Acid	%	107	N/A	N/A	99	N/A	N/A	98	N/A	N/A	6437203
13C2-Perfluorodecanoic acid	%	99	N/A	N/A	93	N/A	N/A	90	N/A	N/A	6437203
13C2-Perfluorododecanoic acid	%	86	N/A	N/A	79	N/A	N/A	83	N/A	N/A	6437203
13C2-Perfluorohexanoic acid	%	112	N/A	N/A	118	N/A	N/A	118	N/A	N/A	6437203
13C2-perfluorotetradecanoic acid	%	81	N/A	N/A	83	N/A	N/A	94	N/A	N/A	6437203
13C2-Perfluoroundecanoic acid	%	88	N/A	N/A	81	N/A	N/A	77	N/A	N/A	6437203
13C4-Perfluorobutanoic acid	%	104	N/A	N/A	108	N/A	N/A	109	N/A	N/A	6437203
13C4-Perfluoroheptanoic acid	%	110	N/A	N/A	114	N/A	N/A	117	N/A	N/A	6437203

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable



BUREAU  
VERITAS

BV Labs Job #: B9U8263  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV442			LEV444			LEV445			
Sampling Date		2019/10/29 13:45			2019/10/30 12:00			2019/10/30 12:00			
COC Number		726342-05-01			726342-02-01			726342-02-01			
	UNITS	PC-18	RDL	MDL	MW-35I	RDL	MDL	PC-19	RDL	MDL	QC Batch
13C4-Perfluorooctanesulfonic acid	%	126	N/A	N/A	101	N/A	N/A	93	N/A	N/A	6437203
13C4-Perfluorooctanoic acid	%	109	N/A	N/A	110	N/A	N/A	116	N/A	N/A	6437203
13C5-Perfluorononanoic acid	%	107	N/A	N/A	106	N/A	N/A	112	N/A	N/A	6437203
13C5-Perfluoropentanoic acid	%	109	N/A	N/A	113	N/A	N/A	115	N/A	N/A	6437203
13C8-Perfluorooctane Sulfonamide	%	93	N/A	N/A	95	N/A	N/A	89	N/A	N/A	6437203
18O2-Perfluorohexanesulfonic acid	%	109	N/A	N/A	113	N/A	N/A	115	N/A	N/A	6437203
D3-MeFOSA	%	77	N/A	N/A	79	N/A	N/A	83	N/A	N/A	6437203
D5-EtFOSA	%	79	N/A	N/A	83	N/A	N/A	82	N/A	N/A	6437203
D7-MeFOSE	%	91	N/A	N/A	88	N/A	N/A	85	N/A	N/A	6437203
D9-EtFOSE	%	85	N/A	N/A	87	N/A	N/A	77	N/A	N/A	6437203
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable											



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BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV446			LEV447			LEV448			
Sampling Date		2019/10/30 10:40			2019/10/30 11:00			2019/10/30 12:30			
COC Number		726342-02-01			726342-02-01			726342-02-01			
	UNITS	PC-15	RDL	MDL	DUPLICATE2	RDL	MDL	RINSATE3	RDL	MDL	QC Batch

#### Perfluorinated Compounds

Perfluorobutanoic acid	ug/L	0.036	0.020	0.0070	0.068	0.020	0.0070	<0.0070	0.020	0.0070	6437203
Perfluoropentanoic Acid (PFPeA)	ug/L	0.12	0.020	0.0041	0.20	0.020	0.0041	<0.0041	0.020	0.0041	6437203
Perfluorohexanoic Acid (PFHxA)	ug/L	0.16	0.020	0.0064	0.30	0.020	0.0064	<0.0064	0.020	0.0064	6437203
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.077	0.020	0.0071	0.12	0.020	0.0071	<0.0071	0.020	0.0071	6437203
Perfluorooctanoic Acid (PFOA)	ug/L	0.055	0.020	0.0074	0.11	0.020	0.0074	<0.0074	0.020	0.0074	6437203
Perfluorononanoic Acid (PFNA)	ug/L	0.052	0.020	0.0049	0.096	0.020	0.0049	<0.0049	0.020	0.0049	6437203
Perfluorodecanoic Acid (PFDA)	ug/L	0.0049	0.020	0.0041	0.016	0.020	0.0041	<0.0041	0.020	0.0041	6437203
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.016	0.020	0.0043	0.048	0.020	0.0043	<0.0043	0.020	0.0043	6437203
Perfluorododecanoic Acid (PFDoA)	ug/L	<0.0068	0.020	0.0068	<0.0068	0.020	0.0068	<0.0068	0.020	0.0068	6437203
Perfluorotridecanoic Acid	ug/L	<0.0069	0.020	0.0069	<0.0069	0.020	0.0069	<0.0069	0.020	0.0069	6437203
Perfluorotetradecanoic Acid	ug/L	<0.0067	0.020	0.0067	<0.0067	0.020	0.0067	<0.0067	0.020	0.0067	6437203
Perfluorobutanesulfonic acid	ug/L	0.025	0.020	0.0051	0.045	0.020	0.0051	<0.0051	0.020	0.0051	6437203
Perfluorohexanesulfonic acid	ug/L	0.29	0.020	0.0052	0.44	0.020	0.0052	<0.0052	0.020	0.0052	6437203
Perfluoroheptanesulfonic acid	ug/L	0.017	0.020	0.0033	0.039	0.020	0.0033	<0.0033	0.020	0.0033	6437203
Perfluorooctanesulfonic acid	ug/L	0.97	0.020	0.0052	2.4	0.20	0.052	<0.0052	0.020	0.0052	6437203
Perfluorodecanesulfonic acid (PFDS)	ug/L	<0.0072	0.020	0.0072	<0.0072	0.020	0.0072	<0.0072	0.020	0.0072	6437203
Perfluorooctane Sulfonamide (PFOSA)	ug/L	0.0069	0.020	0.0066	0.0086	0.020	0.0066	<0.0066	0.020	0.0066	6437203
EtFOSA	ug/L	<0.0090	0.020	0.0090	<0.0090	0.020	0.0090	<0.0090	0.020	0.0090	6437203
MeFOSA	ug/L	<0.0035	0.020	0.0035	<0.0035	0.020	0.0035	<0.0035	0.020	0.0035	6437203
EtFOSE	ug/L	0.014	0.020	0.0094	<0.0094	0.020	0.0094	<0.0094	0.020	0.0094	6437203
MeFOSE	ug/L	0.010	0.020	0.0066	<0.0066	0.020	0.0066	<0.0066	0.020	0.0066	6437203
6:2 Fluorotelomer sulfonic acid	ug/L	0.11	0.020	0.0059	0.036	0.020	0.0059	<0.0059	0.020	0.0059	6437203
8:2 Fluorotelomer sulfonic acid	ug/L	0.0096	0.020	0.0059	0.015	0.020	0.0059	<0.0059	0.020	0.0059	6437203

#### Surrogate Recovery (%)

13C2-6:2-Fluorotelomersulfonic Acid	%	109	N/A	N/A	119	N/A	N/A	117	N/A	N/A	6437203
13C2-8:2-Fluorotelomersulfonic Acid	%	102	N/A	N/A	114	N/A	N/A	110	N/A	N/A	6437203
13C2-Perfluorodecanoic acid	%	97	N/A	N/A	112	N/A	N/A	108	N/A	N/A	6437203
13C2-Perfluorododecanoic acid	%	80	N/A	N/A	88	N/A	N/A	101	N/A	N/A	6437203
13C2-Perfluorohexanoic acid	%	110	N/A	N/A	121	N/A	N/A	114	N/A	N/A	6437203
13C2-perfluorotetradecanoic acid	%	75	N/A	N/A	86	N/A	N/A	95	N/A	N/A	6437203
13C2-Perfluoroundecanoic acid	%	83	N/A	N/A	95	N/A	N/A	101	N/A	N/A	6437203
13C4-Perfluorobutanoic acid	%	103	N/A	N/A	112	N/A	N/A	110	N/A	N/A	6437203
13C4-Perfluoroheptanoic acid	%	110	N/A	N/A	120	N/A	N/A	114	N/A	N/A	6437203

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable



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VERITAS

BV Labs Job #: B9U8263  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV446			LEV447			LEV448			
Sampling Date		2019/10/30 10:40			2019/10/30 11:00			2019/10/30 12:30			
COC Number		726342-02-01			726342-02-01			726342-02-01			
	UNITS	PC-15	RDL	MDL	DUPLICATE2	RDL	MDL	RINSATE3	RDL	MDL	QC Batch
13C4-Perfluorooctanesulfonic acid	%	99	N/A	N/A	120	N/A	N/A	110	N/A	N/A	6437203
13C4-Perfluorooctanoic acid	%	109	N/A	N/A	118	N/A	N/A	110	N/A	N/A	6437203
13C5-Perfluorononanoic acid	%	108	N/A	N/A	122	N/A	N/A	111	N/A	N/A	6437203
13C5-Perfluoropentanoic acid	%	107	N/A	N/A	116	N/A	N/A	111	N/A	N/A	6437203
13C8-Perfluorooctane Sulfonamide	%	87	N/A	N/A	90	N/A	N/A	101	N/A	N/A	6437203
18O2-Perfluorohexanesulfonic acid	%	107	N/A	N/A	121	N/A	N/A	113	N/A	N/A	6437203
D3-MeFOSA	%	71	N/A	N/A	79	N/A	N/A	71	N/A	N/A	6437203
D5-EtFOSA	%	73	N/A	N/A	81	N/A	N/A	68	N/A	N/A	6437203
D7-MeFOSE	%	83	N/A	N/A	89	N/A	N/A	92	N/A	N/A	6437203
D9-EtFOSE	%	80	N/A	N/A	84	N/A	N/A	91	N/A	N/A	6437203

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

N/A = Not Applicable

BUREAU  
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BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

**PERFLUOROALKYL SUBSTANCES (WATER)**

BV Labs ID		LEV449	LEV647			LEV648			
Sampling Date		2019/10/29 15:45	2019/10/29 10:10			2019/10/30 09:10			
COC Number		726342-02-01	N/A			726342-02-01			
	UNITS	RINSATE2	PC-38	RDL	MDL	PC-9	RDL	MDL	QC Batch
<b>Perfluorinated Compounds</b>									
Perfluorobutanoic acid	ug/L	<0.0070	<0.0070	0.020	0.0070	0.065	0.020	0.0070	6437203
Perfluoropentanoic Acid (PFPeA)	ug/L	<0.0041	<0.0041	0.020	0.0041	0.19	0.020	0.0041	6437203
Perfluorohexanoic Acid (PFHxA)	ug/L	<0.0064	<0.0064	0.020	0.0064	0.29	0.020	0.0064	6437203
Perfluoroheptanoic Acid (PFHpA)	ug/L	<0.0071	<0.0071	0.020	0.0071	0.12	0.020	0.0071	6437203
Perfluorooctanoic Acid (PFOA)	ug/L	<0.0074	<0.0074	0.020	0.0074	0.10	0.020	0.0074	6437203
Perfluorononanoic Acid (PFNA)	ug/L	<0.0049	<0.0049	0.020	0.0049	0.090	0.020	0.0049	6437203
Perfluorodecanoic Acid (PFDA)	ug/L	<0.0041	<0.0041	0.020	0.0041	0.015	0.020	0.0041	6437203
Perfluoroundecanoic Acid (PFUnA)	ug/L	<0.0043	<0.0043	0.020	0.0043	0.045	0.020	0.0043	6437203
Perfluorododecanoic Acid (PFDoA)	ug/L	<0.0068	<0.0068	0.020	0.0068	<0.0068	0.020	0.0068	6437203
Perfluorotridecanoic Acid	ug/L	<0.0069	<0.0069	0.020	0.0069	<0.0069	0.020	0.0069	6437203
Perfluorotetradecanoic Acid	ug/L	<0.0067	<0.0067	0.020	0.0067	<0.0067	0.020	0.0067	6437203
Perfluorobutanesulfonic acid	ug/L	<0.0051	<0.0051	0.020	0.0051	0.041	0.020	0.0051	6437203
Perfluorohexanesulfonic acid	ug/L	<0.0052	0.0061	0.020	0.0052	0.42	0.020	0.0052	6437203
Perfluoroheptanesulfonic acid	ug/L	<0.0033	<0.0033	0.020	0.0033	0.035	0.020	0.0033	6437203
Perfluorooctanesulfonic acid	ug/L	0.051	<0.0052	0.020	0.0052	2.3	0.20	0.052	6437203
Perfluorodecanesulfonic acid (PFDS)	ug/L	<0.0072	<0.0072	0.020	0.0072	<0.0072	0.020	0.0072	6437203
Perfluorooctane Sulfonamide (PFOSA)	ug/L	<0.0066	<0.0066	0.020	0.0066	0.0080	0.020	0.0066	6437203
EtFOSA	ug/L	<0.0090	<0.0090	0.020	0.0090	<0.0090	0.020	0.0090	6437203
MeFOSA	ug/L	<0.0035	<0.0035	0.020	0.0035	<0.0035	0.020	0.0035	6437203
EtFOSE	ug/L	<0.0094	<0.0094	0.020	0.0094	<0.0094	0.020	0.0094	6437203
MeFOSE	ug/L	<0.0066	<0.0066	0.020	0.0066	<0.0066	0.020	0.0066	6437203
6:2 Fluorotelomer sulfonic acid	ug/L	<0.0059	<0.0059	0.020	0.0059	0.034	0.020	0.0059	6437203
8:2 Fluorotelomer sulfonic acid	ug/L	<0.0059	<0.0059	0.020	0.0059	0.016	0.020	0.0059	6437203
<b>Surrogate Recovery (%)</b>									
13C2-6:2-Fluorotelomersulfonic Acid	%	94	124	N/A	N/A	118	N/A	N/A	6437203
13C2-8:2-Fluorotelomersulfonic Acid	%	140	118	N/A	N/A	106	N/A	N/A	6437203
13C2-Perfluorodecanoic acid	%	110	113	N/A	N/A	103	N/A	N/A	6437203
13C2-Perfluorododecanoic acid	%	108	101	N/A	N/A	84	N/A	N/A	6437203
13C2-Perfluorohexanoic acid	%	105	122	N/A	N/A	116	N/A	N/A	6437203
13C2-perfluorotetradecanoic acid	%	93	93	N/A	N/A	86	N/A	N/A	6437203
13C2-Perfluoroundecanoic acid	%	104	102	N/A	N/A	88	N/A	N/A	6437203
13C4-Perfluorobutanoic acid	%	100	114	N/A	N/A	108	N/A	N/A	6437203
13C4-Perfluoroheptanoic acid	%	103	120	N/A	N/A	116	N/A	N/A	6437203
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
N/A = Not Applicable									



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BV Labs Job #: B9U8263  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LEV449	LEV647			LEV648			
Sampling Date		2019/10/29 15:45	2019/10/29 10:10			2019/10/30 09:10			
COC Number		726342-02-01	N/A			726342-02-01			
	UNITS	RINSATE2	PC-38	RDL	MDL	PC-9	RDL	MDL	QC Batch
13C4-Perfluorooctanesulfonic acid	%	111	115	N/A	N/A	129	N/A	N/A	6437203
13C4-Perfluorooctanoic acid	%	106	120	N/A	N/A	115	N/A	N/A	6437203
13C5-Perfluorononanoic acid	%	99	120	N/A	N/A	116	N/A	N/A	6437203
13C5-Perfluoropentanoic acid	%	102	118	N/A	N/A	112	N/A	N/A	6437203
13C8-Perfluorooctane Sulfonamide	%	101	107	N/A	N/A	91	N/A	N/A	6437203
18O2-Perfluorohexanesulfonic acid	%	103	120	N/A	N/A	113	N/A	N/A	6437203
D3-MeFOSA	%	77	90	N/A	N/A	75	N/A	N/A	6437203
D5-EtFOSA	%	76	92	N/A	N/A	78	N/A	N/A	6437203
D7-MeFOSE	%	93	103	N/A	N/A	87	N/A	N/A	6437203
D9-EtFOSE	%	92	100	N/A	N/A	86	N/A	N/A	6437203
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable									



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BV Labs Job #: B9U8263

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Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LFA824			
Sampling Date		2019/10/28 15:45			
COC Number		726342-05-01			
	UNITS	PC-28	RDL	MDL	QC Batch
<b>Perfluorinated Compounds</b>					
Perfluorobutanoic acid	ug/L	0.013	0.020	0.0070	6429945
Perfluoropentanoic Acid (PFPeA)	ug/L	0.033	0.020	0.0041	6429945
Perfluorohexanoic Acid (PFHxA)	ug/L	0.035	0.020	0.0064	6429945
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.033	0.020	0.0071	6429945
Perfluorooctanoic Acid (PFOA)	ug/L	0.012	0.020	0.0074	6429945
Perfluorononanoic Acid (PFNA)	ug/L	0.0086	0.020	0.0049	6429945
Perfluorodecanoic Acid (PFDA)	ug/L	<0.0041	0.020	0.0041	6429945
Perfluoroundecanoic Acid (PFUnA)	ug/L	0.0049	0.020	0.0043	6429945
Perfluorododecanoic Acid (PFDoA)	ug/L	<0.0068	0.020	0.0068	6429945
Perfluorotridecanoic Acid	ug/L	<0.0069	0.020	0.0069	6429945
Perfluorotetradecanoic Acid	ug/L	<0.0067	0.020	0.0067	6429945
Perfluorobutanesulfonic acid	ug/L	0.0077	0.020	0.0051	6429945
Perfluorohexanesulfonic acid	ug/L	0.094	0.020	0.0052	6429945
Perfluoroheptanesulfonic acid	ug/L	<0.0033	0.020	0.0033	6429945
Perfluorooctanesulfonic acid	ug/L	0.27	0.020	0.0052	6429945
Perfluorodecanesulfonic acid (PFDS)	ug/L	<0.0072	0.020	0.0072	6429945
Perfluorooctane Sulfonamide (PFOSA)	ug/L	0.0089	0.020	0.0066	6429945
EtFOSA	ug/L	<0.0090	0.020	0.0090	6429945
MeFOSA	ug/L	<0.0035	0.020	0.0035	6429945
EtFOSE	ug/L	<0.0094	0.020	0.0094	6429945
MeFOSE	ug/L	<0.0066	0.020	0.0066	6429945
6:2 Fluorotelomer sulfonic acid	ug/L	0.013	0.020	0.0059	6429945
8:2 Fluorotelomer sulfonic acid	ug/L	0.0067	0.020	0.0059	6429945
<b>Surrogate Recovery (%)</b>					
13C2-6:2-Fluorotelomersulfonic Acid	%	108	N/A	N/A	6429945
13C2-8:2-Fluorotelomersulfonic Acid	%	109	N/A	N/A	6429945
13C2-Perfluorodecanoic acid	%	104	N/A	N/A	6429945
13C2-Perfluorododecanoic acid	%	95	N/A	N/A	6429945
13C2-Perfluorohexanoic acid	%	115	N/A	N/A	6429945
13C2-perfluorotetradecanoic acid	%	92	N/A	N/A	6429945
13C2-Perfluoroundecanoic acid	%	100	N/A	N/A	6429945
13C4-Perfluorobutanoic acid	%	106	N/A	N/A	6429945
13C4-Perfluoroheptanoic acid	%	111	N/A	N/A	6429945
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					
N/A = Not Applicable					





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BV Labs Job #: B9U8263

Report Date: 2019/11/27

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Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### PERFLUOROALKYL SUBSTANCES (WATER)

BV Labs ID		LFA824			
Sampling Date		2019/10/28 15:45			
COC Number		726342-05-01			
	UNITS	PC-28	RDL	MDL	QC Batch
13C4-Perfluorooctanesulfonic acid	%	99	N/A	N/A	6429945
13C4-Perfluorooctanoic acid	%	110	N/A	N/A	6429945
13C5-Perfluorononanoic acid	%	107	N/A	N/A	6429945
13C5-Perfluoropentanoic acid	%	111	N/A	N/A	6429945
13C8-Perfluorooctane Sulfonamide	%	102	N/A	N/A	6429945
18O2-Perfluorohexanesulfonic acid	%	103	N/A	N/A	6429945
D3-MeFOSA	%	73	N/A	N/A	6429945
D5-EtFOSA	%	74	N/A	N/A	6429945
D7-MeFOSE	%	87	N/A	N/A	6429945
D9-EtFOSE	%	84	N/A	N/A	6429945
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable					



BUREAU  
VERITAS

BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

## TEST SUMMARY

**BV Labs ID:** LEV423  
**Sample ID:** PFW-5  
**Matrix:** Water

**Collected:** 2019/10/28  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429881	2019/11/07	2019/11/19	Marian Godax

**BV Labs ID:** LEV424  
**Sample ID:** PFW-2  
**Matrix:** Water

**Collected:** 2019/10/28  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429881	2019/11/07	2019/11/19	Marian Godax

**BV Labs ID:** LEV425  
**Sample ID:** OW-8A  
**Matrix:** Water

**Collected:** 2019/10/28  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429881	2019/11/07	2019/11/19	Marian Godax

**BV Labs ID:** LEV426  
**Sample ID:** PFW-1  
**Matrix:** Water

**Collected:** 2019/10/28  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429881	2019/11/07	2019/11/19	Marian Godax

**BV Labs ID:** LEV427  
**Sample ID:** HSW-1  
**Matrix:** Water

**Collected:** 2019/10/28  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429881	2019/11/07	2019/11/19	Marian Godax

**BV Labs ID:** LEV428  
**Sample ID:** HSW-6  
**Matrix:** Water

**Collected:** 2019/10/28  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429945	2019/11/07	2019/11/24	Adnan Khan

**BV Labs ID:** LEV429  
**Sample ID:** HW-ID  
**Matrix:** Water

**Collected:** 2019/10/28  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429945	2019/11/07	2019/11/24	Adnan Khan



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BV Labs Job #: B9U8263  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

## TEST SUMMARY

**BV Labs ID:** LEV431  
**Sample ID:** RINSATE1  
**Matrix:** Water

**Collected:** 2019/10/28  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429945	2019/11/07	2019/11/24	Adnan Khan

**BV Labs ID:** LEV432  
**Sample ID:** DUPLICATE1  
**Matrix:** Water

**Collected:** 2019/10/28  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429945	2019/11/07	2019/11/24	Adnan Khan

**BV Labs ID:** LEV433  
**Sample ID:** MW-12  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429945	2019/11/07	2019/11/24	Adnan Khan

**BV Labs ID:** LEV434  
**Sample ID:** MW-22  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429945	2019/11/07	2019/11/24	Adnan Khan

**BV Labs ID:** LEV435  
**Sample ID:** PC-30  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429945	2019/11/07	2019/11/24	Adnan Khan

**BV Labs ID:** LEV436  
**Sample ID:** PC-11  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429945	2019/11/07	2019/11/24	Adnan Khan

**BV Labs ID:** LEV437  
**Sample ID:** PC-1  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429945	2019/11/07	2019/11/24	Adnan Khan



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BV Labs Job #: B9U8263  
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Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

## TEST SUMMARY

**BV Labs ID:** LEV438  
**Sample ID:** PC-36S  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429945	2019/11/07	2019/11/24	Adnan Khan

**BV Labs ID:** LEV439  
**Sample ID:** PC-6A  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6437203	2019/11/12	2019/11/24	Adnan Khan

**BV Labs ID:** LEV440  
**Sample ID:** MW-99  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6437203	2019/11/12	2019/11/24	Adnan Khan

**BV Labs ID:** LEV441  
**Sample ID:** PC-16D  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6437203	2019/11/12	2019/11/24	Adnan Khan

**BV Labs ID:** LEV442  
**Sample ID:** PC-18  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6437203	2019/11/12	2019/11/24	Adnan Khan

**BV Labs ID:** LEV444  
**Sample ID:** MW-35I  
**Matrix:** Water

**Collected:** 2019/10/30  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6437203	2019/11/12	2019/11/24	Adnan Khan

**BV Labs ID:** LEV445  
**Sample ID:** PC-19  
**Matrix:** Water

**Collected:** 2019/10/30  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6437203	2019/11/12	2019/11/24	Adnan Khan



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Barnstable County  
Client Project #: BARNSTABLE COUNTY  
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Sampler Initials: MM

## TEST SUMMARY

**BV Labs ID:** LEV446  
**Sample ID:** PC-15  
**Matrix:** Water

**Collected:** 2019/10/30  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6437203	2019/11/12	2019/11/24	Adnan Khan

**BV Labs ID:** LEV447  
**Sample ID:** DUPLICATE2  
**Matrix:** Water

**Collected:** 2019/10/30  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6437203	2019/11/12	2019/11/24	Adnan Khan

**BV Labs ID:** LEV448  
**Sample ID:** RINSATE3  
**Matrix:** Water

**Collected:** 2019/10/30  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6437203	2019/11/12	2019/11/24	Adnan Khan

**BV Labs ID:** LEV449  
**Sample ID:** RINSATE2  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6437203	2019/11/12	2019/11/24	Adnan Khan

**BV Labs ID:** LEV647  
**Sample ID:** PC-38  
**Matrix:** Water

**Collected:** 2019/10/29  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6437203	2019/11/12	2019/11/24	Adnan Khan

**BV Labs ID:** LEV648  
**Sample ID:** PC-9  
**Matrix:** Water

**Collected:** 2019/10/30  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6437203	2019/11/12	2019/11/24	Adnan Khan

**BV Labs ID:** LFA824  
**Sample ID:** PC-28  
**Matrix:** Water

**Collected:** 2019/10/28  
**Shipped:**  
**Received:** 2019/11/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
PFAS in water by SPE/LCMS	LCMS	6429945	2019/11/07	2019/11/24	Adnan Khan



## GENERAL COMMENTS

Sample LEV423 [PFW-5] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV424 [PFW-2] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV426 [PFW-1] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV427 [HSW-1] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV428 [HSW-6] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV432 [DUPLICATE1] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV433 [MW-12] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV435 [PC-30] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV436 [PC-11] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV437 [PC-1] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV438 [PC-36S] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV439 [PC-6A] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV441 [PC-16D] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV442 [PC-18] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV445 [PC-19] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV447 [DUPLICATE2] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

Sample LEV648 [PC-9] : Per- and polyfluoroalkyl substances (PFAS): Due to high concentrations of the target analytes, a reduced sample volume was extracted and analyzed. Detection limits were adjusted accordingly.

**Results relate only to the items tested.**



BUREAU  
VERITAS

BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM



BUREAU  
VERITAS

BV Labs Job #: B9U8263  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6429881	M_G	Spiked Blank	13C2-6:2-Fluorotelomersulfonic Acid	2019/11/19		78	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/11/19		77	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/11/19		75	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/11/19		67	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/11/19		77	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/11/19		63	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/11/19		72	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/11/19		77	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/11/19		77	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/11/19		75	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/11/19		76	%	50 - 150
			13C5-Perfluorononanoic acid	2019/11/19		77	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/11/19		77	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/11/19		69	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/11/19		76	%	50 - 150
			D3-MeFOSA	2019/11/19		51	%	50 - 150
			D5-EtFOSA	2019/11/19		50	%	50 - 150
			D7-MeFOSE	2019/11/19		62	%	50 - 150
			D9-EtFOSE	2019/11/19		61	%	50 - 150
			Perfluorobutanoic acid	2019/11/19		105	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2019/11/19		103	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2019/11/19		106	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2019/11/19		105	%	70 - 130
			Perfluorooctanoic Acid (PFOA)	2019/11/19		104	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2019/11/19		105	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2019/11/19		107	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2019/11/19		105	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2019/11/19		105	%	70 - 130
			Perfluorotridecanoic Acid	2019/11/19		107	%	70 - 130
			Perfluorotetradecanoic Acid	2019/11/19		109	%	70 - 130
			Perfluorobutanesulfonic acid	2019/11/19		102	%	70 - 130
			Perfluorohexanesulfonic acid	2019/11/19		103	%	70 - 130
			Perfluoroheptanesulfonic acid	2019/11/19		99	%	70 - 130
			Perfluorooctanesulfonic acid	2019/11/19		106	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2019/11/19		99	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/19		100	%	70 - 130
			EtFOSA	2019/11/19		102	%	70 - 130
			MeFOSA	2019/11/19		99	%	70 - 130
			EtFOSE	2019/11/19		106	%	70 - 130
			MeFOSE	2019/11/19		103	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2019/11/19		103	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2019/11/19		103	%	70 - 130
6429881	M_G	Spiked Blank DUP	13C2-6:2-Fluorotelomersulfonic Acid	2019/11/19		76	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/11/19		77	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/11/19		73	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/11/19		63	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/11/19		76	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/11/19		61	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/11/19		69	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/11/19		75	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/11/19		74	%	50 - 150





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Barnstable County

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Site Location: BCFRTA

Sampler Initials: MM

## QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6429881	M_G	RPD	13C4-Perfluorooctanesulfonic acid	2019/11/19		74	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/11/19		73	%	50 - 150
			13C5-Perfluorononanoic acid	2019/11/19		73	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/11/19		74	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/11/19		64	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/11/19		72	%	50 - 150
			D3-MeFOSA	2019/11/19		47 (1)	%	50 - 150
			D5-EtFOSA	2019/11/19		48 (1)	%	50 - 150
			D7-MeFOSE	2019/11/19		59	%	50 - 150
			D9-EtFOSE	2019/11/19		60	%	50 - 150
			Perfluorobutanoic acid	2019/11/19		104	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2019/11/19		103	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2019/11/19		103	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2019/11/19		107	%	70 - 130
			Perfluorooctanoic Acid (PFOA)	2019/11/19		105	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2019/11/19		106	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2019/11/19		106	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2019/11/19		106	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2019/11/19		108	%	70 - 130
			Perfluorotridecanoic Acid	2019/11/19		107	%	70 - 130
			Perfluorotetradecanoic Acid	2019/11/19		108	%	70 - 130
			Perfluorobutanesulfonic acid	2019/11/19		104	%	70 - 130
			Perfluorohexanesulfonic acid	2019/11/19		104	%	70 - 130
			Perfluoroheptanesulfonic acid	2019/11/19		99	%	70 - 130
			Perfluorooctanesulfonic acid	2019/11/19		101	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2019/11/19		99	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/19		102	%	70 - 130
			EtFOSA	2019/11/19		102	%	70 - 130
			MeFOSA	2019/11/19		101	%	70 - 130
			EtFOSE	2019/11/19		102	%	70 - 130
			MeFOSE	2019/11/19		103	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2019/11/19		104	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2019/11/19		100	%	70 - 130
			Perfluorobutanoic acid	2019/11/19	0.30		%	30
			Perfluoropentanoic Acid (PFPeA)	2019/11/19	0.32		%	30
			Perfluorohexanoic Acid (PFHxA)	2019/11/19	2.2		%	30
			Perfluoroheptanoic Acid (PFHpA)	2019/11/19	2.1		%	30
			Perfluorooctanoic Acid (PFOA)	2019/11/19	0.53		%	30
			Perfluorononanoic Acid (PFNA)	2019/11/19	0.92		%	30
			Perfluorodecanoic Acid (PFDA)	2019/11/19	0.55		%	30
			Perfluoroundecanoic Acid (PFUnA)	2019/11/19	0.65		%	30
			Perfluorododecanoic Acid (PFDoA)	2019/11/19	3.4		%	30
			Perfluorotridecanoic Acid	2019/11/19	0.43		%	30
			Perfluorotetradecanoic Acid	2019/11/19	0.83		%	30
			Perfluorobutanesulfonic acid	2019/11/19	2.8		%	30
			Perfluorohexanesulfonic acid	2019/11/19	0.92		%	30
			Perfluoroheptanesulfonic acid	2019/11/19	0.098		%	30
			Perfluorooctanesulfonic acid	2019/11/19	3.9		%	30
			Perfluorodecanesulfonic acid (PFDS)	2019/11/19	0.037		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/19	1.7		%	30
			EtFOSA	2019/11/19	0.46		%	30



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Barnstable County  
Client Project #: BARNSTABLE COUNTY  
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Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6429881	M_G	Method Blank	MeFOSA	2019/11/19	2.0		%	30
			EtFOSE	2019/11/19	3.7		%	30
			MeFOSE	2019/11/19	0.032		%	30
			6:2 Fluorotelomer sulfonic acid	2019/11/19	0.19		%	30
			8:2 Fluorotelomer sulfonic acid	2019/11/19	2.8		%	30
			13C2-6:2-Fluorotelomersulfonic Acid	2019/11/19		83	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/11/19		80	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/11/19		75	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/11/19		69	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/11/19		81	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/11/19		64	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/11/19		70	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/11/19		79	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/11/19		81	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/11/19		75	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/11/19		76	%	50 - 150
			13C5-Perfluorononanoic acid	2019/11/19		78	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/11/19		78	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/11/19		68	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/11/19		74	%	50 - 150
			D3-MeFOSA	2019/11/19		55	%	50 - 150
			D5-EtFOSE	2019/11/19		56	%	50 - 150
			D7-MeFOSE	2019/11/19		65	%	50 - 150
			D9-EtFOSE	2019/11/19		64	%	50 - 150
			Perfluorobutanoic acid	2019/11/19	<0.0070		ug/L	
			Perfluoropentanoic Acid (PFPeA)	2019/11/19	<0.0041		ug/L	
			Perfluorohexanoic Acid (PFHxA)	2019/11/19	<0.0064		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2019/11/19	<0.0071		ug/L	
			Perfluorooctanoic Acid (PFOA)	2019/11/19	<0.0074		ug/L	
			Perfluorononanoic Acid (PFNA)	2019/11/19	<0.0049		ug/L	
			Perfluorodecanoic Acid (PFDA)	2019/11/19	<0.0041		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2019/11/19	<0.0043		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2019/11/19	<0.0068		ug/L	
			Perfluorotridecanoic Acid	2019/11/19	<0.0069		ug/L	
			Perfluorotetradecanoic Acid	2019/11/19	<0.0067		ug/L	
			Perfluorobutanesulfonic acid	2019/11/19	<0.0051		ug/L	
			Perfluorohexanesulfonic acid	2019/11/19	<0.0052		ug/L	
			Perfluoroheptanesulfonic acid	2019/11/19	<0.0033		ug/L	
			Perfluorooctanesulfonic acid	2019/11/19	<0.0052		ug/L	
			Perfluorodecanesulfonic acid (PFDS)	2019/11/19	<0.0072		ug/L	
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/19	<0.0066		ug/L	
			EtFOSE	2019/11/19	<0.0090		ug/L	
			MeFOSA	2019/11/19	<0.0035		ug/L	
			EtFOSE	2019/11/19	<0.0094		ug/L	
			MeFOSE	2019/11/19	<0.0066		ug/L	
			6:2 Fluorotelomer sulfonic acid	2019/11/19	<0.0059		ug/L	
			8:2 Fluorotelomer sulfonic acid	2019/11/19	<0.0059		ug/L	
6429945	AKH	Spiked Blank	13C2-6:2-Fluorotelomersulfonic Acid	2019/11/24		157 (2)	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/11/24		160 (3)	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/11/24		168 (4)	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/11/24		151 (5)	%	50 - 150



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Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC								
Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6429945	AKH	Spiked Blank DUP	13C2-Perfluorohexanoic acid	2019/11/24		162 (6)	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/11/24		153 (7)	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/11/24		158 (8)	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/11/24		169 (9)	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/11/24		169 (10)	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/11/24		160 (11)	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/11/24		170 (12)	%	50 - 150
			13C5-Perfluorononanoic acid	2019/11/24		171 (13)	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/11/24		169 (14)	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/11/24		155 (15)	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/11/24		162 (16)	%	50 - 150
			D3-MeFOSA	2019/11/24		125	%	50 - 150
			D5-EtFOSA	2019/11/24		121	%	50 - 150
			D7-MeFOSE	2019/11/24		141	%	50 - 150
			D9-EtFOSE	2019/11/24		140	%	50 - 150
			Perfluorobutanoic acid	2019/11/24		103	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2019/11/24		102	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2019/11/24		104	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2019/11/24		105	%	70 - 130
			Perfluorooctanoic Acid (PFOA)	2019/11/24		103	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2019/11/24		105	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2019/11/24		101	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2019/11/24		103	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2019/11/24		103	%	70 - 130
			Perfluorotridecanoic Acid	2019/11/24		102	%	70 - 130
			Perfluorotetradecanoic Acid	2019/11/24		105	%	70 - 130
			Perfluorobutanesulfonic acid	2019/11/24		105	%	70 - 130
			Perfluorohexanesulfonic acid	2019/11/24		105	%	70 - 130
			Perfluoroheptanesulfonic acid	2019/11/24		100	%	70 - 130
			Perfluorooctanesulfonic acid	2019/11/24		104	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2019/11/24		93	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/24		106	%	70 - 130
			EtFOSA	2019/11/24		106	%	70 - 130
			MeFOSA	2019/11/24		103	%	70 - 130
			EtFOSE	2019/11/24		104	%	70 - 130
			MeFOSE	2019/11/24		104	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2019/11/24		103	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2019/11/24		106	%	70 - 130
			13C2-6:2-Fluorotelomersulfonic Acid	2019/11/24		99	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/11/24		101	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/11/24		97	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/11/24		88	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/11/24		101	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/11/24		88	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/11/24		94	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/11/24		101	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/11/24		101	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/11/24		93	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/11/24		100	%	50 - 150
			13C5-Perfluorononanoic acid	2019/11/24		100	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/11/24		100	%	50 - 150



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### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6429945	AKH	RPD	13C8-Perfluorooctane Sulfonamide	2019/11/24		91	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/11/24		92	%	50 - 150
			D3-MeFOSA	2019/11/24		69	%	50 - 150
			D5-EtFOSA	2019/11/24		65	%	50 - 150
			D7-MeFOSE	2019/11/24		79	%	50 - 150
			D9-EtFOSE	2019/11/24		79	%	50 - 150
			Perfluorobutanoic acid	2019/11/24		108	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2019/11/24		108	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2019/11/24		107	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2019/11/24		109	%	70 - 130
			Perfluorooctanoic Acid (PFOA)	2019/11/24		109	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2019/11/24		110	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2019/11/24		109	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2019/11/24		109	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2019/11/24		109	%	70 - 130
			Perfluorotridecanoic Acid	2019/11/24		107	%	70 - 130
			Perfluorotetradecanoic Acid	2019/11/24		108	%	70 - 130
			Perfluorobutanesulfonic acid	2019/11/24		113	%	70 - 130
			Perfluorohexanesulfonic acid	2019/11/24		111	%	70 - 130
			Perfluoroheptanesulfonic acid	2019/11/24		100	%	70 - 130
			Perfluorooctanesulfonic acid	2019/11/24		110	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2019/11/24		98	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/24		107	%	70 - 130
			EtFOSA	2019/11/24		108	%	70 - 130
			MeFOSA	2019/11/24		106	%	70 - 130
			EtFOSE	2019/11/24		102	%	70 - 130
			MeFOSE	2019/11/24		111	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2019/11/24		108	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2019/11/24		104	%	70 - 130
			Perfluorobutanoic acid	2019/11/24	4.7		%	30
			Perfluoropentanoic Acid (PFPeA)	2019/11/24	4.9		%	30
			Perfluorohexanoic Acid (PFHxA)	2019/11/24	3.0		%	30
			Perfluoroheptanoic Acid (PFHpA)	2019/11/24	4.1		%	30
			Perfluorooctanoic Acid (PFOA)	2019/11/24	5.4		%	30
			Perfluorononanoic Acid (PFNA)	2019/11/24	4.6		%	30
			Perfluorodecanoic Acid (PFDA)	2019/11/24	7.7		%	30
			Perfluoroundecanoic Acid (PFUnA)	2019/11/24	5.6		%	30
			Perfluorododecanoic Acid (PFDoA)	2019/11/24	6.0		%	30
			Perfluorotridecanoic Acid	2019/11/24	4.0		%	30
			Perfluorotetradecanoic Acid	2019/11/24	2.8		%	30
			Perfluorobutanesulfonic acid	2019/11/24	7.0		%	30
			Perfluorohexanesulfonic acid	2019/11/24	4.9		%	30
			Perfluoroheptanesulfonic acid	2019/11/24	0.50		%	30
			Perfluorooctanesulfonic acid	2019/11/24	5.6		%	30
			Perfluorodecanesulfonic acid (PFDS)	2019/11/24	5.1		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/24	0.83		%	30
			EtFOSA	2019/11/24	2.0		%	30
			MeFOSA	2019/11/24	3.1		%	30
			EtFOSE	2019/11/24	2.1		%	30
			MeFOSE	2019/11/24	6.6		%	30
			6:2 Fluorotelomer sulfonic acid	2019/11/24	5.1		%	30



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Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6429945	AKH	Method Blank	8:2 Fluorotelomer sulfonic acid	2019/11/24	2.0		%	30
			13C2-6:2-Fluorotelomersulfonic Acid	2019/11/24		111	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/11/24		104	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/11/24		102	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/11/24		95	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/11/24		113	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/11/24		86	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/11/24		99	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/11/24		108	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/11/24		110	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/11/24		98	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/11/24		108	%	50 - 150
			13C5-Perfluorononanoic acid	2019/11/24		107	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/11/24		109	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/11/24		96	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/11/24		102	%	50 - 150
			D3-MeFOSA	2019/11/24		65	%	50 - 150
			D5-EtFOSA	2019/11/24		64	%	50 - 150
			D7-MeFOSE	2019/11/24		87	%	50 - 150
			D9-EtFOSE	2019/11/24		80	%	50 - 150
			Perfluorobutanoic acid	2019/11/24	<0.0070		ug/L	
			Perfluoropentanoic Acid (PFPeA)	2019/11/24	<0.0041		ug/L	
			Perfluorohexanoic Acid (PFHxA)	2019/11/24	<0.0064		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2019/11/24	<0.0071		ug/L	
			Perfluorooctanoic Acid (PFOA)	2019/11/24	<0.0074		ug/L	
			Perfluorononanoic Acid (PFNA)	2019/11/24	<0.0049		ug/L	
			Perfluorodecanoic Acid (PFDA)	2019/11/24	<0.0041		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2019/11/24	<0.0043		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2019/11/24	<0.0068		ug/L	
			Perfluorotridecanoic Acid	2019/11/24	<0.0069		ug/L	
			Perfluorotetradecanoic Acid	2019/11/24	<0.0067		ug/L	
			Perfluorobutanesulfonic acid	2019/11/24	<0.0051		ug/L	
			Perfluorohexanesulfonic acid	2019/11/24	<0.0052		ug/L	
			Perfluoroheptanesulfonic acid	2019/11/24	<0.0033		ug/L	
			Perfluorooctanesulfonic acid	2019/11/24	<0.0052		ug/L	
			Perfluorodecanesulfonic acid (PFDS)	2019/11/24	<0.0072		ug/L	
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/24	<0.0066		ug/L	
			EtFOSA	2019/11/24	<0.0090		ug/L	
			MeFOSA	2019/11/24	<0.0035		ug/L	
			EtFOSE	2019/11/24	<0.0094		ug/L	
			MeFOSE	2019/11/24	<0.0066		ug/L	
			6:2 Fluorotelomer sulfonic acid	2019/11/24	<0.0059		ug/L	
			8:2 Fluorotelomer sulfonic acid	2019/11/24	<0.0059		ug/L	
6437203	AKH	Spiked Blank	13C2-6:2-Fluorotelomersulfonic Acid	2019/11/23		123	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/11/23		122	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/11/23		123	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/11/23		116	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/11/23		124	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/11/23		109	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/11/23		118	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/11/23		121	%	50 - 150



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Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

## QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6437203	AKH	Spiked Blank DUP	13C4-Perfluoroheptanoic acid	2019/11/23		124	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/11/23		124	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/11/23		124	%	50 - 150
			13C5-Perfluorononanoic acid	2019/11/23		125	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/11/23		125	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/11/23		111	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/11/23		126	%	50 - 150
			D3-MeFOSA	2019/11/23		71	%	50 - 150
			D5-EtFOSA	2019/11/23		71	%	50 - 150
			D7-MeFOSE	2019/11/23		102	%	50 - 150
			D9-EtFOSE	2019/11/23		99	%	50 - 150
			Perfluorobutanoic acid	2019/11/23		100	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2019/11/23		97	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2019/11/23		98	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2019/11/23		100	%	70 - 130
			Perfluorooctanoic Acid (PFOA)	2019/11/23		97	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2019/11/23		97	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2019/11/23		102	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2019/11/23		100	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2019/11/23		95	%	70 - 130
			Perfluorotridecanoic Acid	2019/11/23		92	%	70 - 130
			Perfluorotetradecanoic Acid	2019/11/23		90	%	70 - 130
			Perfluorobutanesulfonic acid	2019/11/23		99	%	70 - 130
			Perfluorohexanesulfonic acid	2019/11/23		99	%	70 - 130
			Perfluoroheptanesulfonic acid	2019/11/23		98	%	70 - 130
			Perfluorooctanesulfonic acid	2019/11/23		98	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2019/11/23		92	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/23		95	%	70 - 130
			EtFOSA	2019/11/23		74	%	70 - 130
			MeFOSA	2019/11/23		74	%	70 - 130
			EtFOSE	2019/11/23		86	%	70 - 130
			MeFOSE	2019/11/23		89	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2019/11/23		98	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2019/11/23		100	%	70 - 130
			13C2-6:2-Fluorotelomersulfonic Acid	2019/11/23		127	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/11/23		130	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/11/23		131	%	50 - 150
			13C2-Perfluorododecanoic acid	2019/11/23		123	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/11/23		130	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/11/23		113	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/11/23		125	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/11/23		130	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/11/23		130	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/11/23		130	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/11/23		131	%	50 - 150
			13C5-Perfluorononanoic acid	2019/11/23		132	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/11/23		132	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/11/23		117	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/11/23		133	%	50 - 150
			D3-MeFOSA	2019/11/23		73	%	50 - 150
			D5-EtFOSA	2019/11/23		73	%	50 - 150



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Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
6437203	AKH	RPD	D7-MeFOSE	2019/11/23		108	%	50 - 150
			D9-EtFOSE	2019/11/23		105	%	50 - 150
			Perfluorobutanoic acid	2019/11/23		97	%	70 - 130
			Perfluoropentanoic Acid (PFPeA)	2019/11/23		97	%	70 - 130
			Perfluorohexanoic Acid (PFHxA)	2019/11/23		98	%	70 - 130
			Perfluoroheptanoic Acid (PFHpA)	2019/11/23		100	%	70 - 130
			Perfluorooctanoic Acid (PFOA)	2019/11/23		97	%	70 - 130
			Perfluorononanoic Acid (PFNA)	2019/11/23		98	%	70 - 130
			Perfluorodecanoic Acid (PFDA)	2019/11/23		100	%	70 - 130
			Perfluoroundecanoic Acid (PFUnA)	2019/11/23		98	%	70 - 130
			Perfluorododecanoic Acid (PFDoA)	2019/11/23		93	%	70 - 130
			Perfluorotridecanoic Acid	2019/11/23		94	%	70 - 130
			Perfluorotetradecanoic Acid	2019/11/23		91	%	70 - 130
			Perfluorobutanesulfonic acid	2019/11/23		99	%	70 - 130
			Perfluorohexanesulfonic acid	2019/11/23		99	%	70 - 130
			Perfluoroheptanesulfonic acid	2019/11/23		97	%	70 - 130
			Perfluorooctanesulfonic acid	2019/11/23		96	%	70 - 130
			Perfluorodecanesulfonic acid (PFDS)	2019/11/23		90	%	70 - 130
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/23		95	%	70 - 130
			EtFOSA	2019/11/23		76	%	70 - 130
			MeFOSA	2019/11/23		75	%	70 - 130
			EtFOSE	2019/11/23		85	%	70 - 130
			MeFOSE	2019/11/23		89	%	70 - 130
			6:2 Fluorotelomer sulfonic acid	2019/11/23		99	%	70 - 130
			8:2 Fluorotelomer sulfonic acid	2019/11/23		100	%	70 - 130
			Perfluorobutanoic acid	2019/11/23	2.6		%	30
			Perfluoropentanoic Acid (PFPeA)	2019/11/23	0.52		%	30
			Perfluorohexanoic Acid (PFHxA)	2019/11/23	0.089		%	30
			Perfluoroheptanoic Acid (PFHpA)	2019/11/23	0.0037		%	30
			Perfluorooctanoic Acid (PFOA)	2019/11/23	0.091		%	30
			Perfluorononanoic Acid (PFNA)	2019/11/23	0.87		%	30
			Perfluorodecanoic Acid (PFDA)	2019/11/23	2.1		%	30
			Perfluoroundecanoic Acid (PFUnA)	2019/11/23	1.6		%	30
			Perfluorododecanoic Acid (PFDoA)	2019/11/23	2.0		%	30
			Perfluorotridecanoic Acid	2019/11/23	2.3		%	30
			Perfluorotetradecanoic Acid	2019/11/23	1.1		%	30
			Perfluorobutanesulfonic acid	2019/11/23	0.020		%	30
			Perfluorohexanesulfonic acid	2019/11/23	0.37		%	30
			Perfluoroheptanesulfonic acid	2019/11/23	0.52		%	30
			Perfluorooctanesulfonic acid	2019/11/23	1.7		%	30
			Perfluorodecanesulfonic acid (PFDS)	2019/11/23	2.3		%	30
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/23	0.68		%	30
			EtFOSA	2019/11/23	1.7		%	30
			MeFOSA	2019/11/23	0.60		%	30
			EtFOSE	2019/11/23	1.5		%	30
			MeFOSE	2019/11/23	0.090		%	30
			6:2 Fluorotelomer sulfonic acid	2019/11/23	1.0		%	30
			8:2 Fluorotelomer sulfonic acid	2019/11/23	0.039		%	30
6437203	AKH	Method Blank	13C2-6:2-Fluorotelomersulfonic Acid	2019/11/23		139	%	50 - 150
			13C2-8:2-Fluorotelomersulfonic Acid	2019/11/23		121	%	50 - 150
			13C2-Perfluorodecanoic acid	2019/11/23		121	%	50 - 150





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BV Labs Job #: B9U8263  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			13C2-Perfluorododecanoic acid	2019/11/23		107	%	50 - 150
			13C2-Perfluorohexanoic acid	2019/11/23		143	%	50 - 150
			13C2-perfluorotetradecanoic acid	2019/11/23		103	%	50 - 150
			13C2-Perfluoroundecanoic acid	2019/11/23		106	%	50 - 150
			13C4-Perfluorobutanoic acid	2019/11/23		136	%	50 - 150
			13C4-Perfluoroheptanoic acid	2019/11/23		137	%	50 - 150
			13C4-Perfluorooctanesulfonic acid	2019/11/23		126	%	50 - 150
			13C4-Perfluorooctanoic acid	2019/11/23		133	%	50 - 150
			13C5-Perfluorononanoic acid	2019/11/23		133	%	50 - 150
			13C5-Perfluoropentanoic acid	2019/11/23		138	%	50 - 150
			13C8-Perfluorooctane Sulfonamide	2019/11/23		117	%	50 - 150
			18O2-Perfluorohexanesulfonic acid	2019/11/23		134	%	50 - 150
			D3-MeFOSA	2019/11/23		98	%	50 - 150
			D5-EtFOSA	2019/11/23		97	%	50 - 150
			D7-MeFOSE	2019/11/23		112	%	50 - 150
			D9-EtFOSE	2019/11/23		109	%	50 - 150
			Perfluorobutanoic acid	2019/11/23	<0.0070		ug/L	
			Perfluoropentanoic Acid (PFPeA)	2019/11/23	<0.0041		ug/L	
			Perfluorohexanoic Acid (PFHxA)	2019/11/23	<0.0064		ug/L	
			Perfluoroheptanoic Acid (PFHpA)	2019/11/23	<0.0071		ug/L	
			Perfluorooctanoic Acid (PFOA)	2019/11/23	<0.0074		ug/L	
			Perfluorononanoic Acid (PFNA)	2019/11/23	<0.0049		ug/L	
			Perfluorodecanoic Acid (PFDA)	2019/11/23	<0.0041		ug/L	
			Perfluoroundecanoic Acid (PFUnA)	2019/11/23	<0.0043		ug/L	
			Perfluorododecanoic Acid (PFDoA)	2019/11/23	<0.0068		ug/L	
			Perfluorotridecanoic Acid	2019/11/23	<0.0069		ug/L	
			Perfluorotetradecanoic Acid	2019/11/23	<0.0067		ug/L	
			Perfluorobutanesulfonic acid	2019/11/23	<0.0051		ug/L	
			Perfluorohexanesulfonic acid	2019/11/23	<0.0052		ug/L	
			Perfluoroheptanesulfonic acid	2019/11/23	<0.0033		ug/L	
			Perfluorooctanesulfonic acid	2019/11/23	<0.0052		ug/L	
			Perfluorodecanesulfonic acid (PFDS)	2019/11/23	<0.0072		ug/L	
			Perfluorooctane Sulfonamide (PFOSA)	2019/11/23	<0.0066		ug/L	
			EtFOSA	2019/11/23	<0.0090		ug/L	
			MeFOSA	2019/11/23	<0.0035		ug/L	
			EtFOSE	2019/11/23	<0.0094		ug/L	
			MeFOSE	2019/11/23	<0.0066		ug/L	
			6:2 Fluorotelomer sulfonic acid	2019/11/23	<0.0059		ug/L	





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BV Labs Job #: B9U8263  
Report Date: 2019/11/27

Barnstable County  
Client Project #: BARNSTABLE COUNTY  
Site Location: BCFRTA  
Sampler Initials: MM

## QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	% Recovery	UNITS	QC Limits
			8:2 Fluorotelomer sulfonic acid	2019/11/23	<0.0059		ug/L	
<p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.</p> <p>(2) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (6:2 Fluorotelomer sulfonic acid - 6:2-FTS).</p> <p>(3) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (8:2 Fluorotelomer sulfonic acid - 8:2-FTS).</p> <p>(4) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorodecanoic acid - PFDA).</p> <p>(5) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorododecanoic acid - PFDoA).</p> <p>(6) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorohexanoic acid - PFHxA).</p> <p>(7) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorotetradecanoic acid - PFTeDA).</p> <p>(8) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluoroundecanoic acid - PFUnA).</p> <p>(9) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorobutanoic acid - PFBA).</p> <p>(10) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluoroheptanoic acid - PFHpA).</p> <p>(11) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorooctane sulfonic acid - PFOS).</p> <p>(12) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorooctanoic acid - PFOA).</p> <p>(13) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorononanoic acid - PFNA).</p> <p>(14) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluoropentanoic acid - PFPeA).</p> <p>(15) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorooctane sulfonamide - PFOSA).</p> <p>(16) Extracted internal standard analyte recovery was above the defined upperr control limit (UCL) which may result in increased variability of the associated native analyte result (Perfluorohexane sulfonic acid - PFHxS).</p>								



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BV Labs Job #: B9U8263

Report Date: 2019/11/27

Barnstable County

Client Project #: BARNSTABLE COUNTY

Site Location: BCFRTA

Sampler Initials: MM

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Adam Robinson, Supervisor, LC/MS/MS

Colm McNamara, Senior Analyst, Liquid Chromatography

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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# CHAIN OF CUSTODY RECORD

Page 1 of 3

INVOICE TO:			REPORT TO:			PROJECT INFORMATION:			Laboratory Use Only:		
Company Name: #29803 Barnstable County			Company Name: <u>BETA Group Inc</u>			Quotation #: <u>B57344</u>			BV Labs Job #:		
Attention: Accounts Payable			Attention: <u>Steven Tebo / Roger Thibault</u>			P.O. #:			Bottle Order #:		
Address: 3195 Main Street PO Box 427			Address: <u>701 George Washington Hwy</u>			Project: <u>BARNSTABLE COUNTY</u>			COC #:		
Barnstable MA 02630			Lincoln RI 02865			Project Name:			Project Manager:		
Tel: (508) 362-3828 Ext: 1234 Fax:			Tel: (508) 375-6603 Fax: <u>beta-inc.com</u>			Site #: <u>BCFRTA / #6206</u>			Patricia Legette		
Email: eoconnell@barnstablecounty.org, stebo@barnstableco			Email: stebo@barnstablecounty.org, rthibault@noveramstrong			Sampled By: <u>M. Mendes</u>			C#726342-05-01		
<b>MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY</b>										<b>Turnaround Time (TAT) Required:</b> Please provide advance notice for rush projects	
<b>Regulation 153 (2011)</b>			<b>Other Regulations</b>			<b>Special Instructions</b>			<b>Regular (Standard) TAT:</b> (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.		
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Medium/Fine			<input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw			<b>Field Filled (please circle):</b> Metals / Hg / Cr VI <u>TOTAL PFAS - USCA</u> <u>537 m</u>			<input checked="" type="checkbox"/> <b>Job Specific Rush TAT (if applies to entire submission)</b>		
<input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse			<input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw						Date Required: Time Required:		
<input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> For RSC			<input type="checkbox"/> MISA Municipality						Rush Confirmation Number: (call lab for #)		
<input type="checkbox"/> Table:			<input type="checkbox"/> PWQO						# of Bottles: Comments:		
<input checked="" type="checkbox"/> Other <u>US EPA / MASS DEP</u>											
<b>Include Criteria on Certificate of Analysis (Y/N)?</b>											
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix							
1	PFW-5	19/10/28	1220	GW						2	
2	PFW-2	19/10/28	1415							2	
3	OW-8A	19/10/28	1230							2	
4	PFW-1	19/10/28	1315							2	
5	HSW-1	19/10/28	1420 <sup>(2:20)</sup>							2	
6	HSW-6	19/10/28	1345							2	
7	HW-1D	19/10/28	1600	GW						2	
8	PC-28	19/10/28	1545	GW						2	
9	Pinsate 1	19/10/28	1700	GW						2	
10	Duplicate 1	19/10/28	1400	GW						2	
* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# jars used and not submitted		Laboratory Use Only	
<u>Angela Mendes / Mikel Mendes</u>		19/10/28	1520	<u>Ashtin Sukerman</u>		20/11/01	15:41			Time Sensitive	Temperature (°C) on Receipt
										2.6/3.7/3.6	Custody Seal Present
											Intact
										White: BV Labs	Yellow: Client
										3.0/5.0/3.9	

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

\*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

Bureau Veritas Canada (2019) Inc.




Bureau Veritas Laboratories  
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free 800-563-6266 Fax: (905) 817-5777 [www.bvlabs.com](http://www.bvlabs.com)

<b>BUREAU VERITAS</b>		6740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Fax: (905) 817-5701		<b>INVOICE TO:</b> Company Name: #29803 Barnstable County Attention: Accounts Payable Address: 3195 Main Street PO Box 427 Barnstable MA 02630 Tel: (508) 362-3828 Ext: 1234 Fax: _____ Email: ecoconnell@barnstablecounty.org, stebo@barnstableco		<b>REPORT TO:</b> Company Name: <u>BGTA Group</u> Attention: <u>Steven Tebo</u> Address: <u>701 George Washington Hwy</u> <u>Lincoln, MA 02865</u> Tel: (508) 375-6603 Fax: _____ Email: <u>stebo@barnstablecounty.org, rthibault@noverarmstrong</u>		<b>PROJECT INFORMATION:</b> Quotation #: <u>B57344</u> P.O. #: _____ Project: <u>BARNSTABLE COUNTY</u> Project Name: <u>BCFRTA</u> Site #: <u>#1206</u> Sampled By: <u>M. Mendes</u>		<b>Laboratory Use Only:</b> BV Labs Job #: _____ Bottle Order #: _____ 726342 COC #: _____ Project Manager: _____  C#726342-06-01 Patricia Legette									
<b>MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY</b>						<b>ANALYSIS REQUESTED (PLEASE BE SPECIFIC)</b>						Turnaround Time (TAT) Required: Please provide advance notice for rush projects							
<b>Regulation 153 (2011)</b> <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Medium/Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> For RSC <input type="checkbox"/> Table _____						<b>Other Regulations</b> <input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> MISA Municipality _____ <input type="checkbox"/> PWQO <input type="checkbox"/> Other _____						<b>Special Instructions</b>						<b>Regular (Standard) TAT:</b> (will be applied if Rush TAT is not specified): Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details. <b>Job Specific Rush TAT (if applies to entire submission)</b> Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)	
<b>Include Criteria on Certificate of Analysis (Y/N)?</b>						Field Filtered (please circle): Metals / Hg / Cr / V Total PFAS 16 Sept 537 m						<input checked="" type="checkbox"/>							
Sample Barcode Label		Sample (Location) Identification		Date Sampled	Time Sampled	Matrix							# of Bottles	Comments					
		MW-12		19/10/29	1455	GW							2						
		MW-22		19/10/29	1510	GW							2						
		PC-30		19/10/29	1300	GW							2						
		PC-11		19/10/29	1130	GW							2						
		PC-1		19/10/29	0945	GW							2						
		PC-36S		19/10/29	1000	GW							2						
		PC-6A		19/10/29	1155	GW							2						
		MW-99		19/10/29	1525	GW							2						
		PC-16D		19/10/29	1225	GW							2						
		PC-18		19/10/29	1345	GW							2						
* RELINQUISHED BY: (Signature/Print) <u>Miguel Mendes</u>				Date: (YY/MM/DD) <u>19/10/31</u>	Time <u>150</u>	RECEIVED BY: (Signature/Print) <u>See Page 1</u>				Date: (YY/MM/DD)	Time	# jars used and not submitted	<b>Laboratory Use Only</b> Time Sensitive Temperature (°C) on Rece: _____		Custody Seal Present Intact	Yes	No		
* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS. * IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS. ** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.																			



Page **3.3**



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CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name: #29803 Barnstable County		Company Name: <b>BCTA Group</b>		Quotation #: B57344		BV Labs Job #:	
Attention: Accounts Payable		Attention: Steven Tebo / Roger Thibault		P.O. #:		Bottle Order #:	
Address: 3195 Main Street PO Box 427		Address: 701 George Washington Hwy		Project: BARNSTABLE COUNTY		COC #:	
Barnstable MA 02630		Unidn. RI 02816		Project Name: BCFRTA / #6206		Project Manager: Patricia Legette	
Tel: (508) 362-3828 Ext: 1234 Fax:		Tel: (508) 375-6603 Fax:		Site #:		C#726342-02-01	
Email: eoconnell@barnstablecounty.org, stebo@barnstableco		Email: stebo@barnstablecounty.org, thibault@barnstableco		Sampled By: M. Mendes			

**MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY**

Regulation 153 (2011)	Other Regulations	Special Instructions
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Medium/Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> For RSC <input type="checkbox"/> Table _____	<input type="checkbox"/> CCME <input type="checkbox"/> Sanitary Sewer Bylaw <input type="checkbox"/> Reg 558 <input type="checkbox"/> Storm Sewer Bylaw <input type="checkbox"/> MISA Municipality _____ <input type="checkbox"/> PWOO <input type="checkbox"/> Other _____	

Include Criteria on Certificate of Analysis (Y/N)? \_\_\_\_\_

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle) Metals / Hg / Cr / VI	ANALYSIS REQUESTED (PLEASE BE SPECIFIC)	Turnaround Time (TAT) Required Please provide advance notice for rush projects
1	PC-9	19/10/30	0910	GW	X	PEAS - USECA Total 507m	Regular (Standard) TAT: (will be applied if Rush TAT is not specified) Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #) # of Bottles: 2
2	MW-35j	19/10/30	1200	GW	X		2
3	PC-19	19/10/30	1200	GW	X		2
4	PC-15	19/10/30	1040	GW	X		2
5	Duplicate 2	19/10/30	1100	GW	X		2
6	Rinsate 3	19/10/30	1230	AQ	X		1
7	Rinsate 2	19/10/29	1545	AQ	X		1
8							
9							
10							

* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)		Time		RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)		Time		# jars used and not submitted		Laboratory Use Only	
Miguel Mendes / Miguel Mendes		19/10/31		1500		See Page 1								Time Sensitive: _____ Temperature (°C) on Recd: _____ Custody Seal: Present _____ Intact _____ Yes _____ No _____	

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

\* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

\*\* SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

White: BV Labs      Yellow: Client



Massachusetts Department of Environmental Protection

## **eDEP Transaction Copy**

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**Massachusetts Department of Environmental Protection**  
*Bureau of Waste Site Cleanup*

**BWSC 105**

**Immediate Response Action (IRA) Transmittal Form**

Pursuant to 310 CMR 40.0424 - 40.0427 (Subpart D)

Release Tracking Number

4 - 26179

**A. SITE LOCATION:**

1. Release Name/Location Aid: BARNSTABLE COUNTY FIRE TRAINING ACADEMY
2. Street Address: 155 SOUTH FLINT ROCK ROAD
3. City/Town: BARNSTABLE 4. Zip Code: 026300000
- ☐ 5. Check here if this location is Adequately Regulated, pursuant to 310 CMR 40.0110-0114.
- ☐ a. CERCLA ☐ b. HSWA Corrective Action ☐ c. Solid Waste Management
- ☐ d. RCRA State Program (21C Facilities)

**B. THIS FORM IS BEING USED TO: (check all that apply)**

1. List Submittal Date of Initial IRA Written Plan (if previously submitted): 9/26/2016
- ☐ 2. Submit an **Initial IRA Plan**.
- ☐ 3. Submit a **Modified IRA Plan** of a previously submitted written IRA Plan.
- ☐ 4. Submit an **Imminent Hazard Evaluation**. (check one)
- ☐ a. An Imminent Hazard exists in connection with this Release or Threat of Release.
- ☐ b. An Imminent Hazard does not exist in connection with this Release or Threat of Release.
- ☐ c. It is unknown whether an Imminent Hazard exists in connection with this Release or Threat of Release, and further assessment activities will be undertaken.
- ☐ d. It is unknown whether an Imminent Hazard exists in connection with this Release or Threat of Release. However, response actions will address those conditions that could pose an Imminent Hazard.
- ☐ 5. Submit a request to **Terminate an Active Remedial System or Response Action(s) Taken to Address an Imminent Hazard**.
- ☒ 6. Submit an **IRA Status Report**
- ☒ 7. Submit a **Remedial Monitoring Report**. (This report can only be submitted through eDEP.)
- a. Type of Report: (check one) ☐ i. Initial Report ☒ ii. Interim Report ☐ iii. Final Report
- b. Frequency of Submittal: (check all that apply)
- ☒ i. A Remedial Monitoring Report(s) submitted monthly to address an Imminent Hazard.
- ☐ ii. A Remedial Monitoring Report(s) submitted monthly to address a Condition of Substantial Release Migration.
- ☐ iii. A Remedial Monitoring Report(s) submitted every six months, concurrent with an IRA Status Report.
- ☐ iv. A Remedial Monitoring Report(s) submitted annually, concurrent with an IRA Status Report.
- c. Number of Remedial Systems and/or Monitoring Programs: 1

A separate BWSC105A, IRA Remedial Monitoring Report, must be filled out for each Remedial System and/or Monitoring Program addressed by this transmittal form.



Massachusetts Department of Environmental Protection  
Bureau of Waste Site Cleanup

BWSC 105

Immediate Response Action (IRA) Transmittal Form

Pursuant to 310 CMR 40.0424 - 40.0427 (Subpart D)

Release Tracking Number

4 - 26179

☐ 8. Submit an **IRA Completion Statement**.

☐ a. Check here if future response actions addressing this Release or Threat of Release notification condition will be conducted as part of the Response Actions planned or ongoing at a Site that has already been Tier Classified under a different Release Tracking Number (RTN)

b. Provide Release Tracking Number of Tier Classified Site (Primary RTN): \_\_\_\_\_

These additional response actions must occur according to the deadlines applicable to the Primary RTN. Use the Primary RTN when making all future submittals for the site unless specifically relating to this Immediate Response Action.

☐ 9. Submit a **Revised IRA Completion Statement**.

☐ 10. Submit a **Plan for the Application of Remedial Additives** near a sensitive receptor, pursuant to 310 CMR 40.0046(3).

(All sections of this transmittal form must be filled out unless otherwise noted above)

**C. RELEASE OR THREAT OF RELEASE CONDITIONS THAT WARRANT IRA:**

1. Media Impacted and Receptors Affected: (check all that apply)

☐ a. Paved Surface ☐ b. Basement ☐ c. School

☒ d. Public Water Supply ☒ e. Surface Water ☒ f. Zone 2 ☒ g. Private Well ☐ h. Residence ☒ i. Soil

☒ j. Groundwater ☒ k. Sediments ☐ l. Wetland ☐ m. Storm Drain ☐ n. Indoor Air ☐ o. Air

☐ p. Soil Gas ☐ q. Sub-Slab Soil Gas ☐ r. Critical Exposure Pathway ☐ s. NAPL ☐ t. Unknown

☐ r. Others Specify: \_\_\_\_\_

2. Sources of the Release or TOR: (check all that apply)

☐ a. Transformer ☐ b. Fuel Tank ☐ c. Pipe

☐ d. OHM Delivery ☐ e. AST ☐ f. Drums ☐ g. Tanker Truck ☐ h. Hose ☐ i. Line

☐ j. UST Describe: \_\_\_\_\_ ☐ k. Vehicle ☐ l. Boat/Vessel

☐ m. Unknown ☒ n. Other: FIRE TRAINING FOAM

3. Type of Release or TOR: (check all that apply)

☐ a. Dumping ☐ b. Fire ☐ c. AST Removal ☐ d. Overfill

☐ e. Rupture ☐ f. Vehicle Accident ☐ g. Leak ☐ h. Spill ☐ i. Test failure ☐ j. TOR Only

☐ k. UST Removal Describe: \_\_\_\_\_

☐ l. Unknown ☒ m. Other: HISTORIC USE OF FOAM

4. Identify Oils and Hazardous Materials Released: (check all that apply)

☐ a. Oils ☐ b. Chlorinated Solvents

☐ c. Heavy Metals ☒ d. Others Specify: PFAS

**D. DESCRIPTION OF RESPONSE ACTIONS:** (check all that apply, for volumes list cumulative amounts)

☒ 1. Assessment and/or Monitoring Only

☐ 2. Temporary Covers or Caps

☐ 3. Deployment of Absorbent or Containment Materials

☐ 4. Temporary Water Supplies

☐ 5. Structure Venting System/HVAC Modification System

☐ 6. Temporary Evacuation or Relocation of Residents

☐ 7. Product or NAPL Recovery

☐ 8. Fencing and Sign Posting

☒ 9. Groundwater Treatment Systems

☐ 10. Soil Vapor Extraction

☐ 11. Remedial Additives

☐ 12. Air Sparging

☐ 13. Active Exposure Pathway Mitigation System

☐ 14. Passive Exposure Pathway Mitigation System





Massachusetts Department of Environmental Protection  
*Bureau of Waste Site Cleanup*

**Immediate Response Action (IRA) Transmittal Form**  
Pursuant to 310 CMR 40.0424 - 40.0427 (Subpart D)

**BWSC 105**

Release Tracking Number

4 - 26179

**D. DESCRIPTION OF RESPONSE ACTIONS: (cont.)**

☒ 15. Excavation of Contaminated Soils.

☐ a. Re-use, Recycling or Treatment ☐ i. On Site Estimated volume in cubic yards \_\_\_\_\_

☐ ii. Off Site Estimated volume in cubic yards \_\_\_\_\_

iiia. Receiving Facility: \_\_\_\_\_ Town: \_\_\_\_\_ State: \_\_\_\_\_

iiib. Receiving Facility: \_\_\_\_\_ Town: \_\_\_\_\_ State: \_\_\_\_\_

iiic. Describe: \_\_\_\_\_

☐ b. Store ☐ i. On Site Estimated volume in cubic yards \_\_\_\_\_

☐ ii. Off Site Estimated volume in cubic yards \_\_\_\_\_

iiia. Receiving Facility: \_\_\_\_\_ Town: \_\_\_\_\_ State: \_\_\_\_\_

iiib. Receiving Facility: \_\_\_\_\_ Town: \_\_\_\_\_ State: \_\_\_\_\_

☒ c. Landfill ☐ i. Cover Estimated volume in cubic yards \_\_\_\_\_

Receiving Facility: \_\_\_\_\_ Town: \_\_\_\_\_ State: \_\_\_\_\_

☒ ii. Disposal Estimated volume in cubic yards 200

Receiving Facility: TAUNTON LANDFILL Town: TAUNTON State: MA

☐ 16. Removal of Drums, Tanks, or Containers:

a. Describe Quantity and Amount: \_\_\_\_\_

b. Receiving Facility: \_\_\_\_\_ Town: \_\_\_\_\_ State: \_\_\_\_\_

c. Receiving Facility: \_\_\_\_\_ Town: \_\_\_\_\_ State: \_\_\_\_\_

☐ 17. Removal of Other Contaminated Media:

a. Specify Type and Volume: \_\_\_\_\_

☐ 18. Other Response Actions:

Describe: \_\_\_\_\_

☐ 19. Use of Innovative Technologies:

Describe: \_\_\_\_\_



Massachusetts Department of Environmental Protection  
*Bureau of Waste Site Cleanup*

**BWSC 105**

**Immediate Response Action (IRA) Transmittal Form**

Pursuant to 310 CMR 40.0424 - 40.0427 (Subpart D)

Release Tracking Number

4 - 26179

**E. LSP SIGNATURE AND STAMP:**

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and 309 CMR 4.03(2), and (iii) the provisions of 309 CMR 4.03(3), to the best of my knowledge, information and belief,

> if Section B of this form indicates that an **Immediate Response Action Plan** is being submitted, the response action(s) that is(are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is(are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> if Section B of this form indicates that an **Imminent Hazard Evaluation** is being submitted, this Imminent Hazard Evaluation was developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and the assessment activity(ies) undertaken to support this Imminent Hazard Evaluation comply(ies) with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000;

> if Section B of this form indicates that an **Immediate Response Action Status Report** and/or a **Remedial Monitoring Report** is(are) being submitted, the response action(s) that is (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> if Section B of this form indicates that an **Immediate Response Action Completion Statement** or a request to **Terminate an Active Remedial System or Response Action(s) Taken to Address an Imminent Hazard** is being submitted, the response action(s) that is(are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is(are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal.

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

1. LSP #: 1443

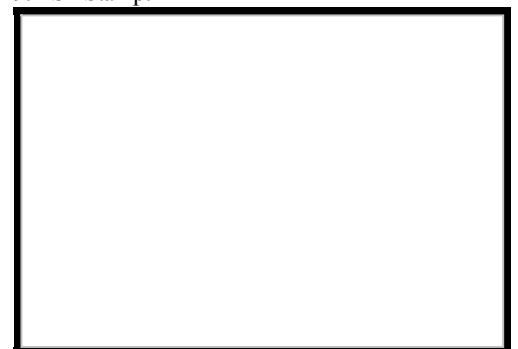
2. First Name: ROGER P 3. Last Name: THIBAUT

4. Telephone: 508-331-2700 5. Ext:  6. Email:

7. Signature:

8. Date:  (mm/dd/yyyy)

9. LSP Stamp:





**Massachusetts Department of Environmental Protection**  
*Bureau of Waste Site Cleanup*

**BWSC 105**

**Immediate Response Action (IRA) Transmittal Form**

Pursuant to 310 CMR 40.0424 - 40.0427 (Subpart D)

Release Tracking Number

4 - 26179

**F. PERSON UNDERTAKING IRA:**

1. Check all that apply: ☐ a. change in contact name ☐ b. change of address ☐ c. change in the person undertaking response actions
2. Name of Organization: BARNSTABLE COUNTY COMMISSIONERS
3. Contact First Name: JACK 4. Last Name: YUNITS
5. Street: 3195 MAIN ST 6. Title: \_\_\_\_\_
7. City/Town: BARNSTABLE 8. State: MA 9. Zip Code: 026301105
10. Telephone: 508-375-6643 11. Ext: \_\_\_\_\_ 12. Email: JYUNITS@BARNSTABLECOUNTY.ORG

**G. RELATIONSHIP TO RELEASE OR THREAT OF RELEASE OF PERSON UNDERTAKING IRA:**

- ☐ Check here to change relationship
- ☒ 1. RP or PRP ☒ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter  
☐ e. Other RP or PRP Specify Relationship: \_\_\_\_\_
- ☐ 2. Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)
- ☐ 3. Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))
- ☐ 4. Any Other Person Undertaking Response Actions: Specify Relationship: \_\_\_\_\_

**H. REQUIRED ATTACHMENT AND SUBMITTALS:**

- ☐ 1. Check here if any Remediation Waste, generated as a result of this IRA, will be stored, treated, managed, recycled or reused at the site following submission of the IRA Completion Statement. If this box is checked, you must submit one of the following plans, along with the appropriate transmittal form.  
☐ a. A Release Abatement Measure (RAM) Plan (BWSC106) ☐ b. Phase IV Remedy Implementation Plan (BWSC108)
- ☒ 2. Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by MassDEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.
- ☒ 3. Check here to certify that the Chief Municipal Officer and the Local Board of Health were notified of the implementation of an Immediate Response Action taken to control, prevent, abate or eliminate an Imminent Hazard.
- ☐ 4. Check here to certify that the Chief Municipal Officer and the Local Board of Health were notified of the submittal of a Completion Statement for an Immediate Response Action taken to control, prevent, abate or eliminate an Imminent Hazard.
- ☐ 5. Check here if any non-updatable information provided on this form is incorrect, e.g. Release Address/Location Aid. Send corrections to BWSC.eDEP@state.ma.us.
- ☒ 6. Check here to certify that the LSP Opinion containing the material facts, data, and other information is attached.



**Massachusetts Department of Environmental Protection**  
*Bureau of Waste Site Cleanup*

**BWSC 105**

**Immediate Response Action (IRA) Transmittal Form**

Pursuant to 310 CMR 40.0424 - 40.0427 (Subpart D)

Release Tracking Number

4 - 26179

**I. CERTIFICATION OF PERSON UNDERTAKING IRA:**

1. I, \_\_\_\_\_, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form; (ii) that, based on my inquiry of the/those individual(s) immediately responsible for obtaining the information, the material information contained herein is, to the best of my knowledge, information and belief, true, accurate and complete; (iii) that, to the best of my knowledge, information and belief, I/the person(s) or entity(ies) on whose behalf this submittal is made satisfy(ies) the criteria in 310 CMR 40.0183(2); (iv) that I/the person(s) or entity(ies) on whose behalf this submittal is made have provided notice in accordance with 310 CMR 40.0183(5); and (v) that I am fully authorized to make this attestation on behalf of the person(s) or entity(ies) legally responsible for this submittal. I/the person(s) or entity(ies) on whose behalf this submittal is made is/are aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

2. By: \_\_\_\_\_ 3. Title: \_\_\_\_\_

4. For: BARNSTABLE COUNTY COMMISSIONERS 5. Date: \_\_\_\_\_ (mm/dd/yyyy)

☐ 6. Check here if the address of the person providing certification is different from address recorded in Section F.

7. Street: \_\_\_\_\_

8. City/Town: \_\_\_\_\_ 9. State: \_\_\_\_\_ 10. Zip Code: \_\_\_\_\_

11. Telephone: \_\_\_\_\_ 12. Ext: \_\_\_\_\_ 13. Email: \_\_\_\_\_

YOU ARE SUBJECT TO AN ANNUAL COMPLIANCE ASSURANCE FEE OF UP TO \$10,000 PER BILLABLE YEAR FOR THIS DISPOSAL SITE. YOU MUST LEGIBLY COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Date Stamp (DEP USE ONLY:)



**Massachusetts Department of Environmental Protection**  
**Bureau of Waste Site Cleanup**  
**IRA REMEDIAL MONITORING REPORT**

BWSC105 -A

Pursuant to 310 CMR 40.0400 ( SUBPART D )

Release Tracking Number

Remedial System or Monitoring Program:  of:

-

**A. DESCRIPTION OF ACTIVE OPERATION AND MAINTENANCE ACTIVITY:**

1. Type of Active Operation and Maintenance Activity: (check all that apply)

☒ a. Active Remedial System: (check all that apply)

☐ i. NAPL Recovery

☐ ii. Soil Vapor Extraction/Bioventing

☐ iii. Vapor-phase Carbon Adsorption

☒ iv. Groundwater Recovery

☐ v. Dual/Multi-phase Extraction

☐ vi. Aqueous-phase Carbon Adsorption

☐ vii. Air Stripping

☐ viii. Sparging/Biosparging

☐ ix. Cat/Thermal Oxidation

☐ x. Other Describe: \_\_\_\_\_

☐ b. Active Exposure Pathway Elimination Measure

Active Exposure Pathway Mitigation System to address (check one): ☐ i. Indoor Air ☐ ii. Drinking Water

☐ c. Application of Remedial Additives: (check all that apply)

☐ i. To the Subsurface

☐ ii. To Groundwater (Injection)

☐ iii. To the Surface

☐ d. Active Remedial Monitoring Program Without the Application of Remedial Additives: (check all that apply; Sections C, D and E are not required; attach supporting information, data, maps and/or sketches needed by checking Section G5)

☐ i. Reactive Wall

☐ ii. Natural Attenuation

☐ iii. Other

Describe: \_\_\_\_\_

2. Mode of Operation: (check one)

☒ a. Continuous

☐ b. Intermittent

☐ c. Pulsed

☐ d. One-time Event Only

☐ e. Other: \_\_\_\_\_

3. System Effluent/Discharge: (check all that apply)

☐ a. Sanitary Sewer/POTW

☒ b. Groundwater Re-infiltration/Re-injection: (check one)

☐ i. Downgradient

☒ ii. Upgradient

☐ c. Vapor-phase Discharge to Ambient Air: (check one)

☐ i. Off-gas Controls

☐ ii. No Off-gas Controls

☐ d. Drinking Water Supply

☐ e. Surface Water (including Storm Drains)

☐ f. Other Describe: \_\_\_\_\_

**B. MONITORING FREQUENCY:**

1. Reporting period that is the subject of this submittal:

From: 10/1/2019

To: 10/31/2019

(mm/dd/yyyy)

(mm/dd/yyyy)

2. Number of monitoring events during the reporting period: (check one)

☐ a. System Startup: (if applicable)

☐ i. Days 1, 3, 6, and then weekly thereafter, for the first month.

☐ ii. Other Describe: \_\_\_\_\_

☒ b. Post-system Startup (after first month) or Monitoring Program:

☒ i. Monthly

☐ ii. Quarterly

☐ iii. Annually

☐ iv. Other Describe: \_\_\_\_\_

☒ 3. Check here to certify that the number of required monitoring events were conducted during the reporting period.

**C. EFFLUENT/DISCHARGE REGULATION:** (check one to indicate how the effluent/discharge limits were established)

☐ 1. NPDES: (check one)

☐ a. Remediation General Permit

☐ b. Individual Permit

☐ c. Emergency Exclusion

Effective Date of Permit: \_\_\_\_\_

(mm/dd/yyyy)

☐ 2. MCP Performance Standard

MCP Citations(s): \_\_\_\_\_

☒ 3. DEP Approval Letter

Date of Letter: 11/18/2016

(mm/dd/yyyy)

☐ 4. Other Describe: \_\_\_\_\_



Massachusetts Department of Environmental Protection  
Bureau of Waste Site Cleanup

**IRA REMEDIAL MONITORING REPORT**

Pursuant to 310 CMR 40.0400 ( SUBPART D )

Remedial System or Monitoring Program: 1 of 1

BWSC105 -A

Release Tracking Number

4 - 26179

**D. WASTEWATER TREATMENT PLANT OPERATOR:** (check one)

☒ 1. Required due to Remedial Wastewater Treatment Plant in place for more than 30 days.

a. Name: TJMCGOFF

b. Grade: 4

c. License No: 15570

d. License Exp. Date: 12/31/2019

(mm/dd/yyyy)

☐ 2. Not Required

☐ 3. Not Applicable

**E. STATUS OF ACTIVE REMEDIAL SYSTEM OR ACTIVE REMEDIAL MONITORING PROGRAM DURING REPORTING PERIOD:** (check all that apply)

☒ 1. The Active Remedial System was functional one or more days during the Reporting Period.

a. Days System was Fully Functional: 30

b. GW Recovered (gals): 503480

c. NAPL Recovered (gals):

d. GW Discharged (gals): 503480

e. Avg. Soil Gas Recovery Rate (scfm):

f. Avg. Sparging Rate (scfm):

☐ 2. Remedial Additives: (check all that apply)

☐ a. No Remedial Additives applied during the Reporting Period.

☐ b. Enhanced Bioremediation Additives applied: (total quantity applied at the site for the current reporting period)

☐ i. Nitrogen/Phosphorus:

☐ ii. Peroxides:

Name of Additive	Date	Quantity	Units

Name of Additive	Date	Quantity	Units

☐ iii. Microorganisms:

☐ iv. Other:

Name of Additive	Date	Quantity	Units

Name of Additive	Date	Quantity	Units

☐ c. Chemical oxidation/reduction additives applied: (total quantity applied at the site for the current reporting period)

☐ i. Permanganates:

☐ ii. Peroxides:

Name of Additive	Date	Quantity	Units

Name of Additive	Date	Quantity	Units

☐ iii. Persulfates:

☐ iv. Other:

Name of Additive	Date	Quantity	Units

Name of Additive	Date	Quantity	Units



Massachusetts Department of Environmental Protection  
Bureau of Waste Site Cleanup

**IRA REMEDIAL MONITORING REPORT**

Pursuant to 310 CMR 40.0400 ( SUBPART D )

Remedial System or Monitoring Program: 1 of 1

BWSC105 -A

Release Tracking Number

4 - 26179

**E. STATUS OF ACTIVE REMEDIAL SYSTEM OR ACTIVE REMEDIAL MONITORING PROGRAM DURING REPORTING PERIOD: (cont.)**

☐ d. Other additives applied: (total quantity applied at the site for the current reporting period)

Name of Additive	Date	Quantity	Units

Name of Additive	Date	Quantity	Units

☐ e. Check here if any additional Remedial Additives were applied. Attach list of additional additives and include Name of Additive, Date Applied, Quantity Applied and Units (in gals. or lbs.)

**F. SHUTDOWNS OF ACTIVE REMEDIAL SYSTEM OR ACTIVE REMEDIAL MONITORING PROGRAM: (check all that apply)**

☒ 1. The Active Remedial System had unscheduled shutdowns on one or more occasions during the Reporting Period.

a. Number of Unscheduled Shutdowns: 1 b. Total Number of Days of Unscheduled Shutdowns: 0.5

c. Reason(s) for Unscheduled Shutdowns: REPAIR OF EXTERIOR SYSTEM EFFLUENT PIPING

☒ 2. The Active Remedial System had scheduled shutdowns on one or more occasions during the Reporting Period.

a. Number of Scheduled Shutdowns: 1 b. Total Number of Days of Scheduled Shutdowns: 0.5

c. Reason(s) for Scheduled Shutdowns: CARBON VESSEL BACKWASH

☐ 3. The Active Remedial System or Active Remedial Monitoring Program was permanently shutdown/discontinued during the Reporting Period.

a. Date of Final System or Monitoring Program Shutdown: (mm/dd/yyyy)

☐ b. No Further Effluent Discharges.

☐ c. No Further Application of Remedial Additives planned; sufficient monitoring completed to demonstrate compliance with 310 CMR 40.0046.

☐ d. No Further Submittals Planned.

☐ e. Other: Describe:

**G. SUMMARY STATEMENTS: (check all that apply for the current reporting period)**

☒ 1. All Active Remedial System checks and effluent analyses required by the approved plan and/or permit were performed when applicable.

☒ 2. There were no significant problems or prolonged (>25% of reporting period) unscheduled shutdowns of the Active Remedial System.

☒ 3. The Active Remedial System or Active Remedial Monitoring Program operated in conformance with the MCP, and all applicable approval conditions and/or permits.

4. Indicate any Operational Problems or Notes:

☐ 5. Check here if additional/supporting Information, data, maps, and/or sketches are attached to the form.



**Massachusetts Department of Environmental Protection**  
*Bureau of Waste Site Cleanup*  
**IRA REMEDIAL MONITORING REPORT**  
**MEASUREMENTS**

BWSC105 -B

Pursuant to 310 CMR 40.0400 ( SUBPART D )

Remedial System or Monitoring Program:  of

Release Tracking Number

For each Point of Measurement, related to concentration indicate the highest concentration detected during the reporting period, of each oil, hazardous material and/or remedial additive.

For each Point of Measurement for pressure differentials, indicate the lowest pressure differential detected during the reporting period.

Point of Measurement	Date (mm/dd/yyyy)	Contaminant, Measurement and/or Indicator Parameter	Influent Concentration (where applicable)	Midpoint Concentration (where applicable)	(check one)	Check here, if ND/BDL	Permissible Concentration or Pressure Differential	Units	Within Permissible Limits? (Y/N)
					<input checked="" type="checkbox"/> Discharge <input type="checkbox"/> GroundWater Concentration <input type="checkbox"/> Pressure Differential				
SYSTEM	10/30/2019	PFAS	4.25	0.057		<input checked="" type="checkbox"/>	0.070	UG/L	YES

☐ Check here if any additional BWSC105 B, Measurements Form(s), are needed.





February 2020

Mark S. Ells, Town Manager  
Town of Barnstable  
200 Main Street  
Hyannis, MA 02601

RE: Immediate Response Action Status and Remedial Monitoring Report #35  
Barnstable County Fire and Rescue Training Academy  
155 South Flint Rock Road  
Barnstable, Massachusetts  
DEP Release Tracking No. 4-26179  
Project File #6206

Dear Mr. Ells,

As required by the Massachusetts Contingency Plan (MCP) 310 CMR 40.1403(3)(e) and 40.1403(6), BETA Group, Inc. (BETA) is notifying you on behalf of our client, Barnstable County, that an Immediate Response Action (IRA) Status and Remedial Monitoring Report (RMR) No. 35 is being submitted to the Massachusetts Department of Environmental Protection – Bureau of Waste Site Cleanup (MassDEP – BWSC) for the release site referenced as the Barnstable County Fire and Rescue Training Academy (BCFRTA) located at 155 South Flint Rock Road in Barnstable, Massachusetts (the site). This Report summarizes the IRA activities that occurred from October 1 to October 31, 2019.

Pursuant to the Massachusetts Contingency Plan (310 CMR 40.0480), an Initial Site Investigation has been performed at the site. A release of oils and/or hazardous materials has occurred at the site. In August 2016, MassDEP Southeast Regional Office issued a Notice of Responsibility (NOR) to Barnstable County, as current owner and operator of the Barnstable County Fire and Rescue Training Academy (BCFRTA), that the detection of elevated concentrations of poly- and perfluoralkyl substances (PFAS) in groundwater at the site constituted a release under the MCP. MassDEP issued Release Tracking Number (RTN) 4-26179 to this release. As summarized in the NOR, based on the detected PFAS concentrations in soil and groundwater at the BCFRTA and the inferred groundwater flow, MassDEP determined that the releases of PFAS from the use of aqueous film-forming foam (AFFF) at the BCFRTA is a source of PFAS detected in the Mary Dunn wells.

During the October 2019 reporting period, the treatment system was operable for 30 days. Approximately 0.6 million gallons of groundwater were treated at an average, estimated (effluent) flow rate of 12 gpm and 0.008 kilograms of PFAs were estimated to have been removed from the plume area during this reporting period. PFAs breakthrough into the effluent from the activated carbon treatment system was not observed.

At this time, IRA activities are ongoing. Continuing IRA activities will include operation and monitoring the on-Site Groundwater Pump and Treatment System (GWPTS), including performance sampling of GWPTS, review and evaluation of the on-Site GWPTS operation and maintenance activities as they affect groundwater treatment, and periodic groundwater monitoring. Additional details regarding the October 2019 groundwater monitoring event are provided in the IRA Status and RMR No. 35. Continuing IRA activities are included in the IRA Status and RMR No. 36 report document.

The IRA Status and RMR document is available electronically via the searchable sites database of the MassGOV / MassDEP website via the following link:

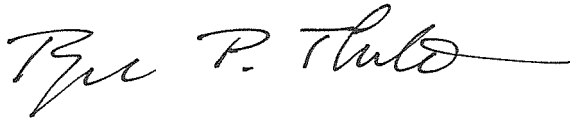
<https://eeaonline.eea.state.ma.us/portal#!/wastesite/4-0026179>.

A copy of the Report is available upon request by contacting the undersigned at BETA at (508) 866.8383. It is also available for review at MassDEP Southeast Regional Office (SERO), 20 Riverside Drive in Lakeville, Massachusetts 02347. You also have the right to request additional Public Involvement activities under 310 CMR 40.1403(9).

If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

BETA Group, Inc.

A handwritten signature in black ink, appearing to read "Roger P. Thibault", with a long horizontal flourish extending to the right.

Roger P. Thibault, P.E., LSP  
Senior Environmental Engineer

Enclosures

CC: Mass Department of Environmental Protection  
Southeast Regional Office  
20 Riverside Drive  
Lakeville, MA 02347

Thomas Mckean, Director  
Town of Barnstable Health Division  
200 Main Street  
Hyannis, MA 02601

Hans Keijser, Supervisor  
Town of Barnstable Water Supply Division  
47 Old Yarmouth Road  
Hyannis, MA 02601