

RTN 4-26179

Former Barnstable County Fire Training Academy Site

Barnstable, MA

February 2024

INTERIM PHASE II CSA STATUS REPORT #3



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Former Barnstable County Fire Training Academy Site

RTN 4-26179
Barnstable, MA

INTERIM PHASE II CSA STATUS REPORT #3

Prepared by: BETA GROUP, INC.
Prepared for: Barnstable County

February 2024



**COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT**

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number

4

- 26179

A. SITE LOCATION:

1. Site Name: 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 the disposal site that is the source of the release is Tier Classified. Check the current Tier Classification Category:

☒ a. Tier I ☐ b. Tier ID ☐ c. Tier II

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

- ☐ 1. Submit a **Phase I Completion Statement**, pursuant to 310 CMR 40.0484.
- ☐ 2. Submit a **Revised Phase I Completion Statement**, pursuant to 310 CMR 40.0484.
- ☐ 3. Submit a **Phase II Scope of Work**, pursuant to 310 CMR 40.0834.
- ☒ 4. Submit an **interim Phase II Report**. This report does not satisfy the response action deadline requirements in 310 CMR 40.0500.
- ☐ 5. Submit a **final Phase II Report and Completion Statement**, pursuant to 310 CMR 40.0836.
- ☐ 6. Submit a **Revised Phase II Report and Completion Statement**, pursuant to 310 CMR 40.0836.
- ☐ 7. Submit a **Phase III Remedial Action Plan and Completion Statement**, pursuant to 310 CMR 40.0862.
- ☐ 8. Submit a **Revised Phase III Remedial Action Plan and Completion Statement**, pursuant to 310 CMR 40.0862.
- ☐ 9. Submit a **Phase IV Remedy Implementation Plan**, pursuant to 310 CMR 40.0874.
- ☐ 10. Submit a **Modified Phase IV Remedy Implementation Plan**, pursuant to 310 CMR 40.0874.
- ☐ 11. Submit an **As-Built Construction Report**, pursuant to 310 CMR 40.0875.
- ☐ 12. Submit a **Phase IV Status Report**, pursuant to 310 CMR 40.0877.
- ☐ 13. Submit a **Phase IV Completion Statement**, pursuant to 310 CMR 40.0878 and 40.0879.

Specify the outcome of Phase IV activities: (check one)

- ☐ a. Phase V Operation, Maintenance or Monitoring of the Comprehensive Remedial Action is necessary to achieve a Permanent or Temporary Solution.
- ☐ b. The requirements of a Permanent Solution have been met. A completed Permanent Solution Statement and Report (BWSC104) will be submitted to DEP.
- ☐ c. The requirements of a Temporary Solution have been met. A completed Temporary Solution Statement and Report (BWSC104) will be submitted to DEP.



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

- ☐ 14. Submit a **Revised Phase IV Completion Statement**, pursuant to 310 CMR 40.0878 and 40.0879.
- ☐ 15. Submit a **Phase V Status Report**, pursuant to 310 CMR 40.0892.
- ☐ 16. 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 a Status Report.
- ☐ iv. A Remedial Monitoring Report(s) submitted annually, concurrent with a Status Report.
- c. Status of Site: (check one) ☐ i. Phase IV ☐ ii. Phase V ☐ iii. Remedy Operation Status ☐ iv. Temporary Solution
- d. Number of Remedial Systems and/or Monitoring Programs: _____
- A separate BWSC108A, CRA Remedial Monitoring Report, must be filled out for each Remedial System and/or Monitoring Program addressed by this transmittal form.
- ☐ 17. Submit a **Remedy Operation Status**, pursuant to 310 CMR 40.0893.
- ☐ 18. Submit a **Status Report to maintain a Remedy Operation Status**, pursuant to 310 CMR 40.0893(2).
- ☐ 19. Submit a **Transfer and/or a Modification of Persons Maintaining a Remedy Operation Status (ROS)**, pursuant to 310 CMR 40.0893(5) (check one, or both, if applicable).
- ☐ a. Submit a Transfer of Persons Maintaining an ROS (the transferee should be the person listed in Section D, "Person Undertaking Response Actions").
- ☐ b. Submit a Modification of Persons Maintaining an ROS (the primary representative should be the person listed in Section D, "Person Undertaking Response Actions").
- c. Number of Persons Maintaining an ROS not including the primary representative: _____
- ☐ 20. Submit a **Termination of a Remedy Operation Status**, pursuant to 310 CMR 40.0893(6).(check one)
- ☐ a. Submit a notice indicating ROS performance standards have not been met. A plan and timetable pursuant to 310 CMR 40.0893(6)(b) for resuming the ROS are attached.
- ☐ b. Submit a notice of Termination of ROS.
- ☐ 21. Submit a **Phase V Completion Statement**, pursuant to 310 CMR 40.0894.
- Specify the outcome of Phase V activities: (check one)
- ☐ a. The requirements of a Permanent Solution have been met. A completed Permanent Solution Statement and Report (BWSC104) will be submitted to DEP.
- ☐ b. The requirements for a Temporary Solution have been met. A completed Temporary Solution Statement and Report (BWSC104) will be submitted to DEP.
- ☐ 22. Submit a **Revised Phase V Completion Statement**, pursuant to 310 CMR 40.0894.
- ☐ 23. Submit a **Temporary Solution Status Report**, pursuant to 310 CMR 40.0898.
- ☐ 24. Submit a **Plan for the Application of Remedial Additives** near a sensitive receptor, pursuant to 310 CMR 40.0046(3).
- a. Status of Site: (check one)
- ☐ i. Phase IV ☐ ii. Phase V ☐ iii. Remedy Operation Status ☐ iv. Temporary Solution



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C. 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 indicates that a **Phase I, Phase II, Phase III, Phase IV or Phase V Completion Statement** and/or a **Termination of a Remedy Operation Status** 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;

> if Section B indicates that a **Phase II Scope of Work** or a **Phase IV Remedy Implementation 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) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> if Section B indicates that an **As-Built Construction Report**, a **Remedy Operation Status**, a **Phase IV, Phase V or Temporary Solution Status Report**, a **Status Report to Maintain a Remedy Operation Status**, a **Transfer or Modification of Persons Maintaining a Remedy Operation Status** and/or a **Remedial Monitoring Report** is 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.

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: 5083312700

5. Ext.:

6. Email:

7. Signature: ROGER P THIBAUT

8. Date: 2/29/2024

(mm/dd/yyyy)

9. LSP Stamp:





Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC 108

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D. PERSON UNDERTAKING RESPONSE ACTIONS:

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: PAUL 4. Last Name: RUSZALA
5. Street: 3195 MAIN ST 6. Title: _____
7. City/Town: BARNSTABLE 8. State: MA 9. ZIP Code: 026301105
10. Telephone: 5083756643 11. Ext: _____ 12. Email: paul.ruszala@capecod.gov

E. RELATIONSHIP TO SITE OF PERSON UNDERTAKING RESPONSE ACTIONS: ☐ Check here to change relationship

- ☒ 1. RP or PRP ☐ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter
- ☒ e. Other RP or PRP Specify: NON-SPECIFIED PRP
- ☐ 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: _____

F. REQUIRED ATTACHMENT AND SUBMITTALS:

- ☒ 1. 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 DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.
- ☒ 2. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the submittal of any Phase Reports to DEP.
- ☐ 3. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the availability of a Phase III Remedial Action Plan.
- ☐ 4. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the availability of a Phase IV Remedy Implementation Plan.
- ☐ 5. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of any field work involving the implementation of a Phase IV Remedial Action.
- ☐ 6. If submitting a Transfer of a Remedy Operation Status (as per 310 CMR 40.0893(5)), check here to certify that a statement detailing the compliance history for the person making this submittal (transferee) is attached.
- ☐ 7. If submitting a Modification of a Remedy Operation Status (as per 310 CMR 40.0893(5)), check here to certify that a statement detailing the compliance history for each new person making this submittal is attached.
- ☐ 8. 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.
- ☒ 9. Check here to certify that the LSP Opinion containing the material facts, data, and other information is attached.



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G. CERTIFICATION OF PERSON UNDERTAKING RESPONSE ACTIONS:

1. I, PAUL RUSZALA, 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 those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

>if Section B indicates that this is a **Modification of a Remedy Operation Status (ROS)**, I attest under the pains and penalties of perjury that I am fully authorized to act on behalf of all persons performing response actions under the ROS as stated in 310 CMR 40.0893(5)(d) to receive oral and written correspondence from MassDEP with respect to performance of response actions under the ROS, and to receive a statement of fee amount as per 4.03(3).

I understand that any material received by the Primary Representative from MassDEP shall be deemed received by all the persons performing response actions under the ROS, and I am 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: PAUL RUSZALA 3. Title: _____
Signature

4. For: BARNSTABLE COUNTY COMMISSIONERS 5. Date: 2/29/2024
(Name of person or entity recorded in Section D) (mm/dd/yyyy)

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

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:)

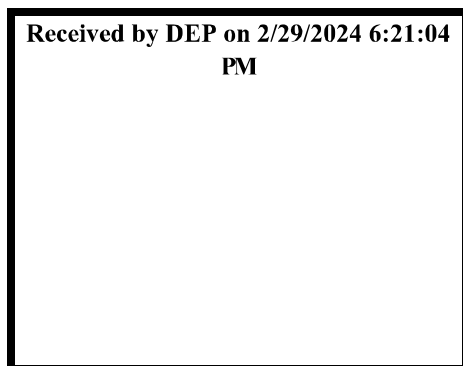


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1.0 INTRODUCTION

At the request of MassDEP, BETA Group Inc. (BETA) has prepared this Interim Phase II Comprehensive Site Assessment (CSA) Status Report #3 covering the period between July 2023 and February 2023. It summarizes recently conducted Phase II CSA activities undertaken to address a release of hazardous materials related to fire-fighting foams and attributed to the former Barnstable County Fire and Rescue Training facility (the FTA or facility) located at 155 South Flint Rock Road in Barnstable, Massachusetts. Assessment actions to date have identified elevated concentrations of the six perfluoroalkyl substances (PFAS) currently regulated by the Massachusetts Department of Environmental Protection (MassDEP) in soil, sediment, surface water, and groundwater at the facility and in adjacent areas, in particular to the east and southeast of the facility.

This document has been prepared on behalf of Barnstable County. It is being submitted to the Massachusetts Department of Environmental Protection (MassDEP) – Bureau of Waste Site Cleanup (BWSC) as an attachment to the BWSC 108 – Comprehensive Response Action Transmittal & Phase I Completion Statement Form. A copy of the draft form prior to electronic signature is included in **Appendix A**, as well as the Statement of Provisions and a copy of the Authorization for BETA to sign eDEP documents on behalf of the County.

Phase II CSA activities conducted during the current reporting period included two wide-area groundwater gauging rounds, groundwater sampling, installation of monitoring wells at the FTA and in the vicinity of Mary Dunn Road and Mary Dunn Pond, and a precision monitoring well survey. Refer to Section 5.0 for details.

As current owners of the FTA, Barnstable County, as represented by the Barnstable County Board of Regional Commissioners, have been named as the Potentially Responsible Party (PRP) for this release. The contact person for the Disposal Site is:

Paul Ruszala, P.E., Asset and Infrastructure Manager
Barnstable County
3195 Main Street
Barnstable, MA 02630

Telephone: 508-419-2860
Email: paul.ruszala@capecod.gov

BETA is performing MCP Response Actions on behalf of the Barnstable County Commissioners. The Licensed Site Professional (LSP) overseeing Response Actions for this release is:

Roger Thibault, P.E., LSP No. 1443
BETA Group Inc.
701 George Washington Highway
Lincoln, RI 02865

Telephone: 401-333-2382
Email: rthibault@beta-inc.com

2.0 GENERAL DISPOSAL SITE INFORMATION

2.1 PROPERTY AND SITE DESCRIPTION

The former Barnstable County Fire and Rescue Training FTA (FTA or facility) is located on South Flint Rock Road in the Town of Barnstable. It appears on the United States Geological Survey (USGS) Topographic Quadrangle – Hyannis, Massachusetts -**Figure 1 – Site Location** map, prepared from a portion of the referenced USGS Topographic Quadrangle map. The Site is currently zoned for industrial use.

For the purposes of this and future MCP submittals, the property on which the FTA is located will be referred to as the FTA or facility. FTA or facility will also refer to the remaining or former structures, the land, and the former functions of the FTA.

In accordance with the MCP definition, where contamination attributable to the PFAS releases associated with firefighting foams and training on the FTA have come to be located will be referred to as the Disposal Site or Site.

Following the completion of the capping and selected demolition project in November 2021, the 6.2-acre FTA is improved by one primary building, the former fire training building (with former classrooms, administrative offices, and two apparatus bays) and several ancillary structures including a wood frame former classroom building (now used for storage), two fabric Quonset-style sheds used for storage, a small concrete building housing one groundwater treatment system, a shipping container housing the second groundwater treatment system, and a small concrete block storage shed. Refer to **Figure 2A – Site Plan Detail**. The FTA is secured by chain link fencing and a locked gate.

The FTA is listed on the Town of Barnstable Assessor's on-line records as Map 313, Lot 007. Refer to **Figure 3 – Parcel Map** for details. The FTA was first constructed on land donated to the Town of Barnstable by the Cobb Trust in 1955. The current owner-of-record is the County of Barnstable, who acquired the facility from the Town of Barnstable in 1983 by deed recorded June 3, 1983, Barnstable Registry of Deeds, Book 3759, Page 39. Utilities servicing the FTA include municipal water, an underground septic system, aboveground electricity, and telecommunications.

The FTA had been used for public safety training since the 1950's. The FTA was formerly used for public safety training by fire departments and fire districts from throughout Barnstable County, fire departments outside of Barnstable County, and other public and private institutions. Live fire training using firefighting foams, including aqueous film forming foams (AFFF), was conducted at the FTA for decades by fire districts and departments that used their own foam brought to the FTA in the apparatus of the organization participating in the training. Foam training exercises at the FTA ceased in 2009 according to FTA officials. Water training activities ceased in June 2019. As noted, all former live fire training structures and props have been demolished and/or removed from the Site.

Land surrounding the FTA is primarily undeveloped, wooded land within public water supply protection areas. Flintrock Pond occupies approximately 6 acres directly to the west of the FTA. The land to the east, southeast of the FTA is owned by the Town of Barnstable, which is crossed by two electric power transmission lines running presumably within easements. Private industrial properties and related structures are located approximately 500 to 1,000 feet south of the Site. The Barnstable Municipal Airport is located to the west (runway 15 – 33) and south of the Site and the FTA. Several public water supply wells and their related facilities are located to the east, southeast, and west of the FTA. Refer to **Figure 2 – Overall Site Plan** for further details.

At this time, the preliminary MCP Disposal Site (the Site) associated with RTN 4-26179 is considered to comprise all the FTA, the westerly adjacent Flintrock Pond, and areas to the east, southeast of the FTA extending to east end of Airport Way and Mary Dunn Pond. Elevated PFAS concentrations have also been detected in groundwater at areas to the south and southwest of the FTA along the Airport Way. However, recent and historical groundwater contour mapping has indicated that Airport Way is most likely located in a hydrogeologically crossgradient location relative to the FTA and these impacts may not be associated with the RTN 4-26179 Disposal Site. Refer to **Figures 5A-5D** and **Table 1A** for details. Further investigation of PFAS6 impacts to groundwater along the western and central portions of Airport Way is not currently planned as part of the on-going Phase II CSA for RTN 4-26179.

The nearest residential properties (apartment complexes) are located approximately ¼ mile to the north of the Site. Based on 2010 U.S. Census data, the residential population located within a ½ mile radius of the Site was estimated to be less than 150 people. However, due to the construction of several multi-unit apartment buildings in the vicinity of Independence Drive within approximately the last 5 years, it is assumed that the residential population between ¼ and ½ mile to the north of the Site has grown significantly. There are no known Institutions located within 500 feet of the Site. The municipal well pumping facilities referenced above (not part of the FTA) are not staffed full-time.

2.2 LATITUDE AND LONGITUDE / UNIVERSAL TRANSVERSE MERCATOR'S

The coordinates for the Site are shown below. For simplicity, these coordinates are for the southerly end of the FTA.

<u>Latitude/Longitude</u>	Latitude: 41° 40' 41.53"N
	Longitude: 70° 17' 7.82"E
<u>UTM Coordinates</u>	Easting: 393,002
	Northing: 4,614,847
	Zone 19

2.3 MCP METHOD 1 CATEGORIES

2.3.1 GROUND WATER CATEGORY

As noted, the Site is located within a Zone II Public Water Supply Protection Area and a Medium-Yield Sole Source Aquifer. Therefore, MCP Method 1 Ground Water Category 1 (GW-1) applies to the Site. Groundwater at the FTA facility itself Site is also categorized as Method 1 GW-2 because groundwater has been measured at depths less than 15 feet below grade and an occupied building is located within the FTA facility. All ground waters within the Commonwealth are considered a potential source of discharge to surface waters and shall be categorized, at a minimum, as Method 1 GW-3. Therefore, the applicable Method 1 Ground Water Categories for the Site are GW-1, GW-2, and GW-3.

2.3.2 SOIL CATEGORY

Soil categorization is based upon the type of human receptor and three potential exposure criteria: frequency of use, intensity of use, and accessibility of soil. The FTA portion of the Site is occupied by a former fire and rescue training facility. Based on the nature of the facility, children are assumed to be "not present." Adults who work at the site as staff members are assumed to be present at "high frequency" based on the MCP definition. However, since training ceased at the FTA, only limited staff are currently assigned to the former FTA – see below. Other County personnel periodically visit the facility, but only reportedly for short periods of time; therefore, their presence is considered to "low frequency." Recent Phase II CSA activities have identified soil near to, but outside of the fenced FTA compound with levels of PFAS 6 compounds above applicable MCP risk standards. This soil is adjacent to South Flint Rock Road or in wooded areas immediately east and south of the FTA fence line. Since these areas are undeveloped but unfenced, children and adults may be present at low frequencies.

Impacted soils have been identified in unpaved areas within the FTA, wooded areas outside the fence, and beneath recently paved areas at depths ranging from near the surface to approximately 15 feet below the ground surface. Therefore, impacted soils at the FTA are considered "accessible" (remaining unpaved areas) and "potentially accessible" (paved areas or deeper soil).

Only groundwater impacts at significant depths below the ground surface have been identified at the remainder of the Site (outside of the FTA or at distances greater than 50 feet from the fence line), which consists of undeveloped, industrially zoned land, a portion of a utility easement, and three unmanned public water supply well stations.

Intensity of use in regard to soil disturbance by adults at the Site may be conservatively considered to be “high” because the area of impact at the FTA could potentially be disturbed during FTA facility maintenance activities. However, the high use designation described in previous MCP submittals applied primarily to former on-Site training activities, which were of relatively short duration but with high intensity. Current exterior FTA facility activities are only maintenance-related (e.g., lawn mowing) and are similar in terms of duration to previous uses. Maintenance of equipment is performed at the FTA periodically, but that work is conducted inside the remaining main building. Therefore, current maintenance activities are only of low intensity. Intensity of use by children only applies to incidental “use” of the areas on the shoulder of Flint Rock Road near the FTA or to the wooded areas within approximately 100 feet of the fence line. Based on these locations, intensity of use for children would be considered “low.”

Based on all of the factors described above, for current Site uses, soils at the Site are categorized as Soil Category S-2. The applicable Soil Categories for current Site uses have been identified as S-2/GW-1, S-2/GW-2, and S-2/GW-3.

The applicable Soil Categories for unrestricted future Site uses are S-1/GW-1, S-1/GW-2, and S-1/GW-3.

2.4 ENVIRONMENTAL SETTING AND SENSITIVE RECEPTORS

A review of the Massachusetts GIS Priority Resources (21E) mapping (included in all previous MCP submittals) identifies the Site being located within a Zone II Public Water Supply Protection Area and a Medium-Yield Sole Source Aquifer. The FTA is situated to the west and upgradient of the Mary Dunn public water supply wells 1, 2, and 3 (MD 1, MD-2, and MD-3). Mary Dunn Wells 1, 2, and 3, owned by the Town of Barnstable through the Hyannis Water Supply Division (HWSD) of the Barnstable Department of Public Works (DPW), are located within the Disposal Site boundary due to the detections of PFAS in the groundwater at those wells. There are no known private potable water wells located within the preliminary Disposal Site.

Mary Dunn Well 3 (MD-3) is located approximately 1,000 feet east of the FTA; it is the nearest public water supply well to the facility. MD-3 reportedly has been pumped at an average rate of 380 to 450 gallons per minute (gpm). Mary Dunn Wells 1 and 2 (MD-1 and MD-2) are located approximately 1600 feet and 1700 feet, respectively, southeast of the FTA. These wells have been reported to pump at rates of 400 gpm each. Airport Well 1, also owned by HWSD, is located further to the southeast of the FTA, south of Mary Dunn Pond.

Two other public water supply wells, identified as Barnstable Fire District (BFD) wells BFD-2 and BFD-5, are located to the west and upgradient of the Site. The BFD wells are operated by Barnstable Fire District Water Department.

The location of the abovementioned public water supply wells are shown on **Figure 2**.

Based on available USGS and MassGIS topographic data, elevations at the Site are approximately 30 to 50 feet above mean sea level (MSL). Surveyed elevations on the FTA itself range from approximately 32 to 40 feet above MSL, NAVD88 datum.

The FTA itself is relatively flat, with the exception of the western portion of the facility, which slopes downward to the west towards Flintrock Pond, and the northern and southeast quadrants of the FTA that slope downward towards adjacent wooded areas. The central portion of the FTA was most likely re-worked to its current grades during the original construction of the facility,

Topography of the overall Site can be categorized as generally level with slight to moderate slopes downward to the west and southeast, toward Flintrock Pond and Mary Dunn Pond, respectively. However, this is the general trend of the area. The wooded areas of the Site to the east and southeast of the FTA are characterized by typical, hilly topography of the mid-Cape with its widely varying terrain. The Site is punctuated with small depressions, some intermittently filled with water, typical of the post-glacial Cape terrain.

The nearest surface water bodies to the Site are Flintrock Pond and an unnamed pond; Flintrock Pond is located west adjacent to the FTA and the unnamed pond is located northeast of the FTA (as depicted in **Figure 2**). Flintrock Pond is located within the preliminary MCP Disposal Site Boundary based on the detection of PFAS in sediment and surface water. The unnamed pond to the northeast of the FTA now appears to be identified as a Natural Heritage and Endangered Species (NHESP) potential vernal pool based on the Mass Mapper GIS mapping website; this is only a preliminary determination. There are no streams or wetlands located at the Site according to MassDEP mapping. However, undocumented wetlands and other potential may be present within the Disposal Site.

3.0 DISPOSAL SITE HISTORY AND OVERVIEW

The FTA and the adjacent area to the east have historically been the subject of four MassDEP RTNs: 4-190, 4-11707, 4-20021, and 4-26179. Regulatory closure (under the MCP) has been achieved for RTNs 4-11707 and 4-20021. The original RTN, 4-190, which was assigned to legacy petroleum contamination, is managed separately.

This Interim Phase II CSA Status Report No. 3 is being submitted for RTN 4-26179 only. The disposal site history for RTN 4-26179 has been discussed extensively in IRA Status Reports and the Phase I Initial Site Investigation previously submitted to MassDEP. For completeness, a brief site history is summarized below.

In November 2013, Barnstable County personnel collected soil and groundwater samples from the FTA property due to the detection of PFOS in Mary Dunn public water supply wells MD-1, MD-2, and MD-3. Groundwater analytical results revealed that FTA groundwater was impacted by PFOS. MassDEP was subsequently notified. As a voluntary measure, in 2015 Barnstable County renovated and restarted a decommissioned groundwater pumping and treatment system (GWPTS) located at the FTA to help remediate and help contain the PFOS apparently migrating from the facility. Vessels formerly used for perchlorate removal via resin were retrofitted to contain 1,500 pounds of granular activated carbon (GAC) each for PFAS adsorption. Further Site assessment in 2015 also indicated a broad area of PFOS contamination throughout the subsurface at the FTA. The highest PFOS concentrations were detected near the southwestern corner of the FTA in a location subsequently referred to as the Hot Spot.

On August 4, 2016 MassDEP issued a Notice of Responsibility (NOR) to Barnstable County.

As summarized in the NOR, based on the detected PFAS concentrations in soil and groundwater at the FTA and the inferred groundwater flow direction being to the east and southeast (toward the Mary Dunn wells), MassDEP determined that the releases of PFAS from training with AFFF at the FTA was a source of PFAS detected in the Mary Dunn wells.

On September 27, 2016, on behalf of Barnstable County, the Cape Cod Commission submitted an IRA Plan to MassDEP to address the PFOS/PFOA impacts. The IRA Plan included an evaluation of imminent hazards to downgradient public and private water supplies, a Hot Spot soil removal plan, and plans for an interim expansion of the existing groundwater pump and treatment system.

Between December 2016 and February 2018, the Cape Cod Commission submitted monthly IRA Status and Remedial Monitoring Reports (RMRs) to MassDEP for the PFAS release.

The RMRs reported on the FTA GWPTS, which was intended to reduce PFAS concentrations in the aquifer before it reached the Mary Dunn municipal wells and treatment systems. The Hot Spot soil was removed in January 2017, reducing the primary source of PFOS contamination leaching into groundwater. However, post-removal grading and settling of the backfill in the Hot Spot area left it prone to infiltration of runoff from the southern portion of the FTA. From December 2018 through February 2019, the former Hot Spot area was regraded and temporarily capped to limit infiltration. This local capping, designated as the Phase 1 cap, was mandated by MassDEP and conducted under an IRA Plan Modification.

The Mary Dunn wells were equipped with large GAC treatment systems by the Hyannis Water Division to remove PFAS. Those systems are actively preventing a potential Imminent Hazard to the Hyannis community by removing the PFAS compounds from the water supply. A Settlement Agreement between the Town of Barnstable and Barnstable County requires the County to fund a portion of the costs for operating the Mary Dunn wells treatment systems as well as a portion of the capital costs to install the GAC systems.

On behalf of Barnstable County, BETA submitted monthly IRA Status Reports and RMRs from March 2018 through June 2023. The IRA Status and RMR Reports summarized groundwater monitoring across the Disposal Site and GWPTS performance. IRA status reports are now filed on a six-month basis.

In 2020 to 2021, final design was completed for capping of the majority of the former Fire Training Academy and the demolition of former live-fire training buildings and all training props at the Site. This capping was also mandated by MassDEP and conducted under an IRA Plan Modification. Demolition and cap construction began in August 2021 and was substantially completed in October 2021. The former live fire training buildings and other fire training props and features were demolished and disposed of off-Site. Approximately 650 tons of PFAS contaminated demolition debris and materials associated with these structures were transported to and disposed at the US Ecology / Wayne Disposal, Inc. secure landfill facility in Belleville, MI in September 2021. Approximately 59,000 square feet (SF) of unpaved portions of the FTA were capped with 3.5-inches of hot mix asphalt pavement following installation of a stormwater management system and regrading of the facility. Additional details, photographic documentation of the completed cap, and waste disposal documentation were provided in IRA Status Report No. 60 for the November 2021 reporting period.

4.0 SUMMARY OF PHASE II CSA SCOPE OF WORK

BETA submitted a Phase II Comprehensive Site Assessment (CSA) Scope of Work (SOW) to MassDEP in March 2022 on behalf of Barnstable County.

The Phase II CSA SOW detailed multiple comprehensive Site assessment tasks that are currently focusing on addressing several data gaps across the Site. The identified data gaps include:

- i. Potential PFAS groundwater impacts at large distances to the south and southeast of the FTA source area and to the west of Flintrock Pond;
- ii. soil impacts at and in close proximity to the FTA itself;
- iii. contaminant conditions in Flintrock Pond, Mary Dunn Pond and a small unnamed water body/wetland northeast of the FTA.

The planned assessment activities outlined in the Phase II CSA SOW involved expanded groundwater assessment to further characterize the nature and extent of the identified PFAS plume, numerical modeling of groundwater flow, evaluation of site-specific PFAS fate and transport characteristics, pond assessments and further shallow and vadose zone soil assessment.

Phase II CSA activities are tentatively expected to be completed in 2025. Significant progress has been made to the program. Phase II CSA activities conducted during the period between July 2022 and December 2023 were previously summarized in the combined IRA Status & RMR No. 64 & Interim Phase II CSA Status Report dated April 2023. Phase II CSA activities conducted during the period between January 2023 and July 2023 were previously summarized in the Interim Phase II CSA Status Report #2 dated September 2023. . Phase II CSA activities conducted during the current reporting period of July 2023 to February 2024 are summarized in Section 5.0.

Upon submission of this report, the Phase II CSA activities will be temporarily on hold. Due to procurement policy, Barnstable County is required to solicit proposals for completion of expanded Phase II CSA scope of work. Proposals are pending where Phase II CSA activities are anticipated to recommence in April 2024.

5.0 PHASE II CSA ACTIVITIES CONDUCTED DURING CURRENT REPORTING PERIOD

Phase II CSA activities conducted during the current reporting period included:

- Two wide-area groundwater gauging rounds at the Former FTA, Barnstable Fire District property west of Flintrock Pond and/or Cape Cod Gateway Airport (RTN 4-26347)
- monitoring well installations
- groundwater sampling
- Updated precision survey of selected monitoring wells

Refer to the following subsections for details.

5.1 MW-404S/D INSTALLATION & GROUNDWATER SAMPLING

Monitoring Well Installation

BETA oversaw the installation of one monitoring well couplet identified as MW-404S and MW-404D from October 12th-13th, 2023. It was installed in a wooded area between Mary Dunn Road and Mary Dunn Pond on the parcel identified as 520 Mary Dunn Road (Parcel ID: 330009). This location was chosen based on previous groundwater screening analytical results and accessibility of drilling locations on Town of Barnstable parcels where prior approval to drill had been obtained. Refer to **Figures 3 and 4** for the location of MW-404S/D.

The monitoring wells were completed by Desmond Well Drilling of Orleans, MA using a hollow-stem auger (HSA) tooling and a track-mounted, rotary drill rig (CME45C) under BETA oversight.

The deep soil boring associated with MW-404D was advanced first to log soil strata. In order to advance the deep borings efficiently, soil sampling was not conducted until the borehole was advanced to the anticipated depth to groundwater based on conditions detected during groundwater screening or gauging data from existing nearby wells. Split spoon soil samples were then collected at 5-foot or 10-foot intervals for soil characterization purposes once encountering the saturated zone. Continuous soil samples were then collected when approaching the expected depth of a lower permeability/finer grained soil strata observed in all Phase II CSA borings southeast of the FTA. This strata, which is believed to potentially isolate the shallow aquifer above or impede vertical migration, was previously encountered at approximately 50 feet below the ground surface (bgs) at MW-401, located approximately 400 feet northwest of MW-404.

At MW-404D, the lower permeability/finer grained soil strata (gray clay) was also encountered at a depth of approximately 50 feet bgs. MW-404D was then constructed with 5 feet of well screen above the gray clay strata. The accompanying shallow monitoring well, identified as MW-404S, was installed approximately 5 feet from MW-404D with 10 feet of well screen across the top of the groundwater at the time of drilling. As noted, soil samples were not collected during the advancement of MW-404S due to its close proximity to MW-404D. Due to the relatively thin saturated zone, an intermediately screened well was not installed. Both monitoring wells were constructed using 2-inch PVC solid riser and well screen utilizing threaded couplings or joints and standard 0.010 slot PVC well screen. A sand pack was installed in the screened zone with a bentonite seal installed above the screened zone. Steel protective casings were installed at the top of each well. The casings are equipped with padlocks. Refer to **Appendix B – Soil Boring Logs** for further details on soil logging and well construction.

In order to advance the HSA tooling below the water table in the sandy soils present at the site, it was necessary for the driller to use municipal water within the augers to prevent running sands once the deep boring was advanced to near the anticipated water table. Desmond Drilling used water transported in their tanks from the Town of Orleans water system. Based on the analytical results from BETA's previous sampling of the tank water, which did not reveal detectable concentrations of PFAS, and the Town of Orleans monitoring of its water supply, the use of water from this source was deemed acceptable. The analytical report associated with tank water was previously included as an attachment to the Phase II CSA Status Report #2 submittal to MassDEP. BETA estimated approximately 100 gallons of this water were used during the advancement of MW-404D.

Following installation, each well was developed by Desmond to reduce fine sediment and turbidity in the monitoring well and develop the well pack. In addition, the development pumping served to remove as much water as was introduced into the deep boring during HSA drilling.

Groundwater Sampling & Analysis

On November 3rd, 2023, groundwater samples were collected from MW-404S and MW-404D in accordance with EPA low-flow groundwater sampling procedures. Both groundwater samples were submitted to Pace for laboratory analysis of PFAS using Standard Operating Procedure (SOP) 454, a Pace Analytical PFAS analytical method using an isotope dilution quantification method. The analytical results are summarized on **Table 2 – Summary of Phase II CSA Groundwater Analytical Results**. A copy of the complete laboratory report is included in **Appendix C**.

MW-404S analytical results revealed a PFAS6 concentration of 21 nanograms per liter (ng/L) comprising only PFHxS.

The deep groundwater sample from MW-404D revealed a significantly higher total PFAS6 concentration of 342.3 ng/L. All six regulated PFAS compounds were detected in this sample. See Table 2.

5.2 MONITORING WELL SURVEY

In November 2023, Green Seal Environmental, LLC (GSE) performed a survey of selected monitoring wells across the FTA monitoring well network. The objective of the survey was to determine elevations of several recently installed monitoring wells installed as part of the Phase II CSA as well as refine the accuracy of existing monitoring well elevations. The survey was conducted by running level surveys from existing control points of known elevation, where feasible, supplemented by GPS-based Javad LS+ Receiver/Javad Triump-3 Base Station set on a known elevation and a Javad LS+ receiver. The surveyed monitoring well measuring point elevations are presented on **Table 1A** (attached).

5.3 INSTALLATION OF MONITORING WELLS MW-405 & MW-406

BETA supervised the advancement of two deep monitoring wells identified as MW-405 and MW-406 at the Site on November 9th, 2023. The monitoring wells were installed in order to gather additional soil strata information at the FTA and further define deep groundwater quality and flow directions. MW-405 was installed in the northwestern portion of the FTA near the north fence; MW-406 was installed approximately 75 feet southeast of the southeast corner of the FTA; refer to **Figure 4** for monitoring well locations. The monitoring wells were installed by Bronson Drilling using a Geoprobe direct-push drill rig mounted on a small, tracked vehicle.

Soil samples were collected from the MW-405 boring at continuous intervals. In the MW-406 boring, soil sampling was only conducted from 0 to 15 feet bgs due to deteriorating weather conditions, difficulties with the drilling method, and time constraints. Similar to the other deep monitoring wells installed at the Site, both MW-405 and MW-406 were planned to be installed directly above the lower permeability/finer grained soil strata. However, this strata was not encountered at depths up to 50 feet during the advancement of MW-405. Therefore, both monitoring wells are constructed with 5 feet of well screen at depths between 40-50 feet. Refer to **Appendix B – Soil Boring Logs** for further details.

Soil samples were collected at a depth of 5 feet and the vadose zone for laboratory analysis at each location. Each sample was submitted for Alpha Analytical for PFAS using a proprietary isotope dilution liquid chromatography tandem mass spectrometry method. Analytical results are summarized on **Table 3** (attached). MW-406 5' analysis revealed PFOS at 22.23 nanograms per gram (ng/g), PFOA at 0.371 ng/g and PFNA at 0.364 ng/g. Both the PFOS and PFNA concentrations exceed applicable Method 1 S-2/GW-1 Soil Standards. The vadose zone sample from this location, MW-406 13', also identified PFOS at 4.27 ng/g exceeding the Method 1 S-2/GW-1 Soil Standards. The remaining samples MW-405 5' and MW-405 12' did not reveal PFAS6 above laboratory reporting limits.

No other non-regulated PFAS compounds were detected above laboratory reporting with the exception of perfluoropentanoic acid (PFPeA) at 0.514 ng/g within sample MW-406 5'.

A copy of the laboratory analytical report is included within **Appendix C**. Please note that several surrogate recoveries were below the specified acceptance criteria. Therefore, the reported PFAS concentrations may be biased low for the samples noted above.

5.4 MULTI-SITE GROUNDWATER GAUGING EVENT

On November 29th, 2023 BETA gauged depth to groundwater at selected monitoring wells on and downgradient of the FTA, the westerly adjacent Barnstable Fire District property, the Cape Cod Gateway Airport and surrounding properties. Following coordination with officials the Cape Cod Gateway Airport (Gateway Airport), a representative of the Horsley Witten Group (HWG – consultant to the Gateway Airport) was present to assist and oversee gauging of monitoring wells on and associated with the Gateway Airport and related PFAS release under RTN 4-26347.

Groundwater gauging results and calculated elevations for monitoring wells are presented on **Tables 1A-1C** (attached). Refer to Table 1A for FTA-related monitoring wells, Table 1B for monitoring wells located to the west of Flintrock Pond on Barnstable Fire District property and Table 1C for data for the monitoring wells associated with Cape Cod Gateway Airport and RTN 4-26347.

The November 2023 gauging data and calculated groundwater elevations were used to prepare deep and shallow groundwater contours for an area extending west of Flintrock Pond, south of the FTA to Airport Way and east to Mary Dunn Pond. Additionally, BETA has revised the previously presented April 2023 shallow groundwater contour mapping using the updated November 2023 monitoring well elevation survey data. Deep groundwater contours were also generated for April 2023. The attached **Figures 5A-5D** depict the calculated groundwater contours. Groundwater contours were inferred and calculated using Surfer™ groundwater software. Please note that gauging data collected from monitoring wells located west of Barnstable Fire District production wells BFD#2 and BFD#5 were not included in the data set to generate groundwater contours. This is primarily due to uncertainty with monitoring well construction information (screen depth, etc.) for these wells as well as the lack of groundwater pumping data for BFD#2 and BFD#5. However, the locations of the monitoring wells and old test wells identified in the field on the BFD property continue to be shown for informational purposes on **Figure 4**.

Figures 5A and **5B** depict shallow and deep groundwater spot elevations and elevation contours, respectively, based on gauging performed on November 29, 2023. The contour interval is 0.4 feet. The elevations shown are feet above mean sea level, based on the NAVD 1988 vertical datum. Based on a review of **Figure 5A**, shallow groundwater is inferred to flow primarily east, southeast towards the Mary Dunn production wells, the area north of Mary Dunn Pond, and Mary Dunn Pond. There are some local variations to groundwater contours in areas immediately east of the central portion of the FTA towards the Eversource easement that show groundwater flowing north or south away from a mound near MW-12S and MW-9S. However, these variations may be due to small potential errors with gauging point elevations or the gauging data for these wells and MW-22. Additionally, a groundwater depression is shown surrounding MD#3 indicating its potentially strong influence on local groundwater flow under pumping conditions. [Please note that the physical location of MD #3 is obscured on **Figure 5A** by the label for MW-22.] BETA requested 2023 pumping records for the Mary Dunn wells from Hyannis Water Division in order to evaluate the probable influence of pumping on or near the gauging date; however, as of the finalization of this status report, those data had not been received.

Please note that the surveyed Flintrock Pond elevation on November 29, 2023 (El. 26.43 as listed on Table 1A) was not used as part of the shallow groundwater data set. The Surfer software program was allowed to compute groundwater contours across the area of the pond as if it was absent. As result, the depicted groundwater contours that cross Flintrock Pond from north to south, e.g., elevation contours 25.6 feet and 26.0 feet, may be misrepresented. Careful evaluation of the conditions of and around Flintrock Pond on the November 2023 gauging date has shown that the surface water elevation was measurably higher than the elevations of the surrounding shallow groundwater.

This is depicted by the groundwater measurements shown at monitoring wells to the west and east (beneath the FTA itself) of the pond and confirmed by the elevations of the groundwater measured in the 3 piezometers placed by BETA through the pond sediment – see Table 1A. Similar conditions were anecdotally observed in November 2022 during the installation of monitoring wells west of Flintrock Pond, but the overall survey data were not yet available to document the conditions. At this time, the hypothesis is that the thick, fine-grained sediment present at the bottom of the pond limits the vertical migration of water in the pond to the groundwater immediately beneath it during certain times of the year or hydrologic conditions.

Deep groundwater contours and spot elevations are shown on **Figure 5B** based on in gauging performed on November 29, 2023. The contour interval is 0.4 feet. Based on a review of **Figure 5B** deeper groundwater is inferred shown to flow primarily east, similar to the shallow groundwater flow direction. Similar to the November 2023 shallow groundwater mapping, neither Flintrock Pond surface water elevation nor piezometer data was used to compute the November 2023 deep groundwater contours. Overall, the November 2023 groundwater contours are consistent with historical results.

The revised April 2023 shallow groundwater elevations contours are presented on **Figures 5C**. Groundwater elevations have been revised for the gauging results of April 18, 2023 based on updated monitoring well survey (see section 5.2) and corrections to some historical measuring points. Revised Groundwater Contours shown on **Figure 5C** here are based on the original gauging measurements of April 18, 2023 included in the Interim Phase II CSA Status Report No. 2. In contrast to the November 29, 2023 groundwater contouring (Fig. 5A), please note that the surveyed Flintrock Pond elevation on April 18, 2023 (El. 28.13 as listed on Table 1A) was used as part of the shallow groundwater data set; the water surface elevation of 28.13 feet was input to the Surfer program as a “breakline” along the edge of the pond’s approximate edge of water on that date. The decision to include the pond elevation was based on the measurement of the water surface elevation in relationship to those of the shallow groundwater immediately west and east of the pond. These data together present a relatively consistent model of shallow groundwater and surface water elevations and inferred flow from the west of the pond (upgradient - on the BFD property) through the pond and then to the east beneath the FTA – the downgradient side.

The April 2023 shallow contours infer a primarily easterly groundwater flow direction from west of Flintrock Pond to the area immediately east of the FTA. Groundwater then is shown to flow in a more southeasterly direction towards the Mary Dunn production wells and Mary Dunn Pond. Additionally, the revised April 2023 shallow groundwater contours no longer show a northerly component of groundwater flow direction from the northern portion of the FTA. These changes are the result of the improved accuracy of monitoring well elevations on the northern portion of the FTA.

BETA also prepared a deep groundwater contour mapping using the limited April 2023 gauging data and updated monitoring well elevation survey data. Neither the water surface elevation of Flintrock Pond nor the piezometer groundwater elevations in Flintrock Pond were used for this mapping. As shown on **Figure 5D**, deep groundwater flow is inferred to flow primarily east to west towards the Mary Dunn production wells, in particular MD #3. Please note that both the revised April 2023 shallow and deep groundwater contours do not extend to or past Mary Dunn Pond as monitoring wells were yet to be installed or were not gauged during the April 2023 gauging round.

It should be noted that the gauging on all dates discussed in this section does not include water levels in the Mary Dunn municipal wells or any town-owned monitoring wells in close proximity to those wells; those data are not available to BETA. Additionally, monitoring wells located to the west of Barnstable Fire

District production wells BFD-5 and BFD-2 were not included in the data set for the November 2023 contours. This is primarily due to the lack of groundwater pumping and gauging data available for these production wells during the gauging period.

5.5 HW-2S & HW-2D GROUNDWATER SAMPLING & ANALYSIS

On November 21, 2023 BETA collected groundwater samples from an existing, older monitoring well couplet identified as HW-2S & HW-2D located immediately south of Mary Dunn Pond. Prior to sampling, HW-2D was observed to be missing a well plug and had to be cleared of various organic matter debris that had accumulated in and below the top of well casing. Due to the accumulated debris and the unknown period of time between sampling events, BETA purged approximately 20 gallons of groundwater from the well prior to initiating low-flow sampling.

Both groundwater samples were submitted to Pace for laboratory analysis of PFAS using Standard Operating Procedure (SOP) 454, a Pace Analytical PFAS analytical method using an isotope dilution quantification method. The analytical results are presented on **Table 2** (attached) and summarized below. A copy of the laboratory analytical report is included within **Appendix C**. Please note that HW-2S was misidentified by the laboratory as HW-25.

Analytical results identified a total PFAS6 concentration of 192.6 ng/L at HW-2S and 268.2 ng/L at HW-2D. The majority of detected PFAS6 concentrations are related to PFOS, which is typical of other monitoring wells on and downgradient of the FTA.

The HW-2S analytical results are notable when compared to BETA's Mary Dunn Pond surface water sampling in June 2023. Mary Dunn Pond surface water analytical results identified PFAS6 concentrations between 29.2 ng/L and 44.1 ng/L, significantly lower than the recent HW-2S results. Shallow kettle ponds like Mary Dunn Pond are typically considered to be hydraulically connected to adjacent shallow groundwater. Although HW-2S may not be directly hydrologically downgradient of groundwater flow in the area, the HW-2S results were expected to be similar to the Mary Dunn Pond surface water results. This may indicate that the outer edges of the plume originating from the FTA are impacting Mary Dunn Pond and the majority of the plume is traveling further south, around Mary Dunn Pond. Additional investigation is warranted.

5.6 MW-407 & MW-408 INSTALLATION

MW-407S/D Installation

BETA oversaw the installation of one monitoring well couplet identified as MW-407S and MW-407D on February 5th and 6th, 2024. It was installed on the edge of an existing access road to the east of Mary Dunn Pond on the parcel identified as 0 Mary Dunn Road/Parcel ID: 347002001, owned by the Massachusetts Department of Fish and Wildlife (Mass F&W). Refer to **Figure 4** for the location of the new monitoring wells. This parcel is part of the Hyannis Ponds Wildlife Management Area. All work was completed under a license agreement between Mass F&W and Barnstable County.

This location was chosen based on previous groundwater screening analytical results, Mary Dunn assessment results and accessibility of drilling locations using existing trails where prior approval to drill had been obtained. Monitoring wells were completed by Desmond Well Drilling of Orleans, MA using a hollow-stem auger (HSA) tooling and a track-mounted rotary drill rig (CME45C) under BETA oversight.

The deep soil boring associated with MW-407D was advanced first to log soil strata.

In order to advance the deep borings efficiently, soil sampling was not conducted until the borehole was advanced to the anticipated depth to groundwater based on conditions detected during groundwater screening or gauging data from existing nearby wells. Split spoon soil samples were then collected at 5-foot intervals for soil characterization purposes until approaching the expected depth of a lower permeability/finer grained soil strata. This strata, which is believed to potentially isolate the shallow aquifer above or impede vertical migration, was previously encountered at approximately 50 feet below the ground surface (bgs) during the installation of MW-401 and MW-404 on the east side of Mary Dunn Pond. No soil samples were collected for laboratory analysis during the installation of either MW-407S or MW-407D.

At MW-407D, the lower permeability/finer grained soil strata (gray clay) was encountered at a depth of approximately 46.0 feet bgs. MW-404D was then installed with 5 feet of well screen above the fine sands and gray clay strata. The accompanying shallow monitoring well, identified as MW-404S, was installed using 10 feet of well screen across the top of the groundwater at the time of drilling. As noted, soil samples were not collected during the advancement of MW-404S due to its close proximity to MW-404D.

Due to the relatively thin saturated zone, an intermediately screened well was not installed. Both monitoring wells were constructed using a 2-inch PVC solid riser and well screen utilizing threaded couplings or joints and standard 0.010 slot PVC well screen. A sand pack was installed in the screened zone with a bentonite seal installed above the screened zone. In accordance with Mass F&W requests, the monitoring wells were finished with 8-inch, cast aluminum flush mounted road boxes secured with bolts. Refer to **Appendix B – Soil Boring Logs** for further details on soil logging and well construction.

In order to advance the HAS tooling below the water table in the sandy soils present at the site, it was necessary for the driller to use municipal water within the augers to prevent running sands once the boring was advanced to near the anticipated water table. Desmond Drilling used water transported in their tanks from the Town of Orleans water system. Based on the analytical results from BETA's previous sampling of the tank water, which did not reveal detectable concentrations of PFAS, and the Town of Orleans monitoring of its water supply, the use of water from this source was deemed acceptable. The analytical report associated with tank water was previously included as an attachment to the Phase II CSA Status Report #2 submittal to MassDEP. BETA estimated approximately 100 gallons of this water was used during the advancement of MW-407D.

Following installation, each well was developed by Desmond to reduce fine sediment and turbidity in the monitoring well and develop the well pack. In addition, the development pumping served to remove as much water as was introduced into the deep boring during HSA drilling

MW-408 S/D Installation

BETA supervised the advancement of one monitoring well couplet identified as MW-408S and MW-408D on February 9th, 2024. It was installed on the northwestern portion of the Mass F&W parcel identified as 523 Mary Dunn Road/Parcel ID: 330008001. Refer to **Figure 4** for the location of MW-408S/D. All work was completed under the license agreement between Mass F&W and Barnstable County.

The monitoring wells were installed by Bronson Drilling using a Geoprobe direct-push drill rig mounted on a small, tracked vehicle. Continuous soil sampling was not conducted based on the known soil strata and lower permeability layer encountered at approximately 50 feet bgs during the installation of MW-401D and MW-404D in the surrounding area. Only one soil sample was collected from MW-408D from 45-50 feet bgs to investigate the presence of the lower permeability layer. Soils at this depth were observed to consist of tan, fine to medium sand with little fine gravel. The lower permeability layer was not encountered. No soil samples were submitted for laboratory analysis.

MW-408D was installed as deep monitoring utilizing 5 feet of 1-inch diameter PVC well screen set from 45-50 feet bgs. Following completion of MW-408D, the shallow monitoring well identified as MW-408S was installed approximately 5 feet to the south with 10 feet of 1-inch diameter PVC well screen across the groundwater table. Groundwater was encountered at approximately 28.5 feet bgs. Refer to **Appendix B – Soil Boring Logs** for further details.

6.0 SUMMARY OF GROUNDWATER MONITORING RESULTS

Groundwater monitoring related to the PFAS Release on Site have been ongoing since November 2013. BETA, formerly Nover-Armstrong Associates, has conducted groundwater monitoring activities since June 2018 as an Immediate Response Action (IRA). Since 2019, IRA Site-wide groundwater monitoring has been conducted on a quarterly and annual basis.

This section summarizes the current extent of the PFAS6 groundwater plume associated with the FTA based on the results of BETA's recent groundwater monitoring events and Phase II CSA activities to date. Section 6.1 reviews the findings from the IRA November 2023 quarterly groundwater monitoring event was conducted during the current reporting period. The November round of sampling is also referred to as the "annual" round due to the inclusion of 20 selected monitoring wells across the Site. During the November 2023 annual monitoring round, an additional six (6) monitoring wells were sampled as part of Phase II CSA activities to provide additional groundwater data in close proximity to the FTA as well as in areas near Mary Dunn Road and Mary Dunn Pond. The additional Phase II CSA sampling points included MW-404S/D discussed in section 5.1. In addition, later in November existing older monitoring wells HW-2S/D were also sampled to support the Phase II CSA, as discussed in section 5.5. The results of the November 2023 sampling events were also discussed in detail in IRA Status Reports No. 66, which was recently submitted to MassDEP. The Phase II CSA and long-term groundwater analytical results are presented on **Tables 2 and 4** (attached).

6.1 NOVEMBER 2023 QUARTERLY AND PHASE II CSA GROUNDWATER MONITORING RESULTS

6.1.1 General

Groundwater monitoring activities were conducted from November 1, 2023 to November 3, 2023. In total, twenty-four (24) monitoring wells (plus MW-404S/D) were sampled during this period. They included HSW-6, PFW-1, PFW-2, PFW-5, MW-3S, MW-304, MW-311, MW-12S, MW-15D, MW-22, MW-35I, PC-1, PC-6A, PC-11, PC-14, PC-16D, PC-29, PC-30, PC-34S, PC-36S, PC-37, PC-38, HW-1S, and HW-1D. PC-1 was later resampled on November 21, 2023 due the original sample being lost during transit to the laboratory. The selected annual monitoring wells are distributed across the FTA and downgradient areas in an attempt to monitor the current extent of the PFAS plume. **Figure 4** depicts the sampling locations. The analytical results and trends of the data are discussed in the following subsections. The results discussion is loosely organized according to the general locations of the subject monitoring wells.

Groundwater samples were collected in accordance with EPA low-flow groundwater sampling procedures with dedicated tubing. Groundwater quality parameters were collected and allowed to stabilize prior to sample collection. Each groundwater sample was submitted for laboratory analysis of total PFAS by Pace using an isotope dilution method via their internal SOP 454, PFAS for aqueous sample analysis.

In addition, two equipment blank (EB) samples were collected from the water level meters during each monitoring event to assess current decontamination practices and potential cross contamination between monitoring wells. Each EB sample was submitted to Pace for PFAS analysis via SOP 454. The analyses did not identify detectable concentration of PFAS6. Refer to **Appendix C** for further details.

6.1.2 ANALYTICAL RESULTS

The long-term groundwater PFAS analytical data for the November 2023 sampling round are summarized on **Table 4**. Analytical results for MW-300 and MW-400 series monitoring wells installed as part of Phase II CSA activities are summarized on **Table 2**. Both tables present the analytical results for the PFAS6 compounds and the sum of their concentrations with comparison of those results to the current MCP GW-1 risk standards. Pace Laboratory report no. 2K1079 and report number 23K2978 in **Appendix C** presents all analytical results for all reported PFAS compounds for the November 2023 annual sampling, including quality control samples, and lists the laboratory detection and reporting limits.

FTA Property Monitoring Wells – PC-37, HSW-6, PFW-1 and PFW-5

The November 2023 analytical results revealed PFAS6 concentrations of 148.1 ng/L at PC-37, 1,499 ng/L at PFW-5, 4,184 ng/L at HSW-6 and 21,955 ng/L at PFW-1. Similar to historical results, the highest PFAS6 groundwater concentrations are found within and immediately downgradient of the former Hot Spot area as represented by the recent HSW-6 and PFW-1 analytical results. **Figures 6 and 6A**, reprinted from IRA Status Report No. 66 and included in Appendix D, depict the concentration trends observed in groundwater at monitoring wells PFW-1 (Fig. 6) and HSW-6 (Fig. 6A). These data show a continuing trend of increasing PFAS6 concentrations to similar levels found shortly after the Hot Spot removal in 2017. Comparison of the November 2023 results to the November 2022 results revealed a 62% increase in PFAS6 concentrations at HSW-6 and a 164% increase at PFW-1. The increase in PFAS6 concentrations during this time period are primarily related to increases in PFOS concentrations. Evaluation of the groundwater trends in this area of the Site and potential causes is on-going. BETA's preliminary hypothesis is that the in-situ activated carbon application performed following the removal of the Hot Spot soils may have achieved its adsorption capacity and/or may be de-sorbing; this hypothesis has not been validated.

PFAS6 concentrations at PFW-5, located in the northwest quadrant of the FTA facility, decreased compared to the most recent sampling round in July 2023. However, they are similar to historical results found from 2021-2023, which show relatively stable concentrations, with intermittent sudden increases. The intermittent increases found at this location do not appear to be temporally or seasonally related.

PC-37 was sampled in November 2023 to support the on-going Phase II CSA. PC-37 is located near Flintrock Pond in the northwest corner of the FTA. There is limited historical groundwater data for PC-37. The previous sampling event conducted by others in 2017 identified a PFAS6 concentration of 45 ng/L (PFOS only). However, it should be noted that this PFAS6 concentration only comprised PFOS and PFOA (non-detected) which were regulated by MassDEP at that time. Additionally, 2017 laboratory reporting limits were above current MCP GW-1 Standards. Therefore, the remaining four PFAS6 compounds may have been present in low, but not insignificant concentrations. Based on the factors above and the similar PFOS concentration found in 2023, PFAS6 concentrations in groundwater in this area are believed to be similar to historical results.

PC-37 is in an area generally presumed to be upgradient of known historic activities at the FTA that may have resulted in PFAS contamination. However, definitive information on historic Site FTA operations is scant. Therefore, the PFAS6 concentrations in groundwater at PC-37 may indicate impacts from a source upgradient of the FTA or local impacts within the FTA.

However, the recent evaluations of seasonal groundwater flow patterns around Flintrock Pond (see the Phase II CSA Interim Update No. 3) indicate complex and varying flow conditions around the pond. These indicate that Flintrock Pond may also be contributing to groundwater impacts in the PC-37 area.

Downgradient Areas Immediately East and Southeast of the FTA – MW-3S, MW-311 & PC-36 Couplet

MW-3S analytical results revealed a PFAS6 concentration of 4,285 ng/L, a significant increase compared to the previous January 2023 sampling round. The November 2023 PFAS6 concentration is higher than historical concentrations starting in 2021 with the exception of the November 2022 sampling round. The recent and historical PFAS6 concentration fluctuations are primarily related to increases and decreases in PFOS concentrations.

PFAS6 was detected at 8,527 ng/L at MW-311, located approximately 100 feet east of PFW-1. Similar to the PFW-1 November 2023 analytical results, PFAS6 concentrations at MW-311 have more than doubled since the previous sampling round. The elevated PFAS6 concentrations at this location provide further evidence of a spike in the PFAS6 plume close to the southeast corner of the FTA. As noted previously, the in-situ activated carbon application performed following the removal of the Hot Spot soils may have achieved its adsorption capacity and/or may be de-sorbing.

PC-36S and PC-36D analytical results revealed PFAS6 concentrations of 310 ng/L and 743 ng/L, respectively. Both results are significantly lower than the previous sampling rounds and continue the long-term trend of decreasing PFAS6 concentrations at these locations. However, it should be noted that limited groundwater sampling has been conducted at these wells historically. The results also indicate the significantly elevated PFAS6 concentrations downgradient of the former Hot Spot likely have not impacted this location and may be migrating further north or south around the PC-36 couplet. Groundwater monitoring will continue to be conducted at other downgradient monitoring wells such as PC-1 and PC-39 to assess for further migration of the PFAS6 plume in this area.

Downgradient Area to the Northeast and East of FTA Towards Mary Dunn Well No. 3 – MW-304, MW-12S, MW-22, MW-15D and MW-35I

MW-304 analytical results identified a PFAS6 concentration of 390.4 ng/L during the November 2023 sampling round. PFHxS was detected at 160 ng/L and comprised the bulk of the PFAS6, which is unusual for the FTA. This result is higher than the previous sampling round in February 2023. MW-304 analytical results may be considered a good representation of the PFAS6 plume that is migrating east from the northern portion of the FTA.

MW-12S and MW-22 have been routinely sampled during quarterly sampling events since October 2019. **Figure 8**, reprinted from IRA Status Report No. 66 and included in Appendix D, depicts the concentration trends observed in groundwater at monitoring wells MW-12S and MW-22 since that time. November 2023 analytical results revealed PFAS6 concentrations of 1,444 ng/L at MW-12S and 250 ng/L at MW-22. The MW-12S PFAS6 concentrations decreased since the previous sampling round in July 2023, but are comparable to earlier 2023 results. MW-22, located approximately 225 feet northeast of MW-12S and 450 feet east of the FTA, continues to exhibit slight increases PFAS6 concentrations for four consecutive sampling rounds. However, PFAS6 concentrations are significantly lower than those at MW-12S. Overall, monitoring results from MW-12S and MW-22 continue to be lower than historical results prior to site-wide capping activities at the FTA.

MW-15D is located approximately 160 feet to the east, northeast of MW-22 and is not typically sampled during quarterly sampling events.

It should be noted that MW-15 is a monitoring well couplet consisting of a shallow and deep well. It was BETA's intention to sample both well as part of the couplet. However, MW-15S was dry and no sample could be obtained. MW-15D analytical results identified a PFAS6 concentration of 64.2 ng/L during the November 2023 sampling round. Similar to MW-22, PFAS6 concentrations at MW-15D are substantially lower than those at upgradient MW-12S.

Please note that well construction logs for the MW-15 monitoring well couplet are not available. Therefore, well screen depth and other features are unknown at this location.

MW-35I is located approximately 250 feet southeast of MW-15D and 80 feet west of the MD#3 production well. MW-35I analytical results revealed PFAS6 at 34 ng/L, which is slightly lower than the previous sampling round in January 2022. However, prior to January 2022 PFAS6 had not been detected above Method 1 GW-1 Standards during BETA's quarterly groundwater sampling events. The increases in PFAS6 concentrations at this location may be a result of several factors such as the pumping rates of the MD#3 production well. It should be noted that BETA has not received documentation regarding pumping rates or PFAS analytical results for MD#3 for 2023.

Downgradient Areas East and Southeast of FTA Towards Recovery Well PRW-4 – PC-1, PC-11 and PC-6A

The downgradient monitoring wells PC-1, PC-11 and PC-6A located between the FTA and the recovery well (PRW-4) or in the vicinity of PRW-4 were selected for quarterly sampling based on previous results and to evaluate current conditions within the main PFAS plume.

PC-1 analytical results revealed a PFAS6 concentration of 639.1 ng/L during the November 2023 sampling round. This result is a slight decrease from the July 2023 sampling round and generally lower than historical results, although PFAS6 concentrations have varied over a large range: 2,660 ng/l on 02.19.2020 to 264 ng/l on 02.01.2023. Overall, the 2023 sampling rounds continue the trend of decreasing PFAS6 concentration at PC-1 since late 2021.

PC-11 is located approximately 220 feet east of PC-1 and upgradient of recovery well PRW-4. **Figure 9B** depicts the concentrations trends observed in groundwater at PC-11. Figure 9B is reprinted from IRA Status Report No. 66 and included in Appendix D. Historically, PFAS6 concentrations at this location have had moderately higher concentrations compared to PC-1. November 2023 analytical results for PC-11 identified a PFAS6 concentration of 1,292 ng/L which is the lowest concentration detected at this well since groundwater monitoring for PFAS began in 2015. Historical analytical results from 2021 to July 2023 ranged from 2,105 ng/L up to 3,415 ng/L.

PC-6A is located 220 feet south of PC-11 and most likely cross-gradient of recovery well PRW-4. **Figure 9A** depicts the concentrations trends observed in groundwater at PC-6A. Figure 9A is reprinted from IRA Status Report No. 66 and included in Appendix D. Analytical results identified a PFAS6 concentration of 476 ng/L and continues the trend of decreasing PFAS6 concentrations since April 2022.

Downgradient Areas South and Southeast of the FTA – PC-34S and PC-38

Groundwater at PC 34S, located approximately 200 feet south of the FTA and directly east of Flintrock Pond, was found to have a PFAS6 concentration of 1,233 ng/L during the November 2023 sampling round. The November 2023 analytical results are lower than those of the previous sampling round (January 2023) but are consistent with historical results at this location.

The source of the elevated PFAS levels at PC-34S is not clear at this time.

It is well south of the area that Phase II CSA soil assessment identified as being impacted by elevated PFAS6 concentrations in soil; PFAS6 soil concentrations greater than S-1/GW-1 have only been identified up to 50 feet south of the FTA fence line. The hydrogeologic assessment conducted to date indicate that groundwater flow is typically east from Flintrock Pond towards PC-34, not south from the south end (and highly impacted portion) of the FTA. However, Flintrock Pond surface water sampling from 2020 through August 2022 identified PFAS6 concentrations approximately 50% lower than the recent PFAS6 concentrations at PC-34S. This may indicate Flintrock Pond surface water and sediment are not the only contributor to PFAS6 concentrations at this location and that groundwater migration may be periodically south from the FTA. Additional investigation of the potentially complex interactions between the PFAS-contaminated sediment and water in the pond and underlying and downgradient groundwater is warranted.

PC-38 is located approximately 800 feet southeast of the FTA and south of PC-1. November 2023 analytical results identified PFAS6 at 3.5 ng/L (PFOS only). PFAS6 concentrations at this location have not exceeded Method 1 GW-1 Risk Standards during BETA's quarterly groundwater sampling rounds. It should be noted that in earlier MCP submittals for the FTA PFAS release Site, PC-38 was considered to be the farthest downgradient monitoring well in the southeast direction. However, the Phase II expanded groundwater assessment conducted to date via groundwater screening and installation of several widely spaced sets of new or existing monitoring wells now indicate significant concentrations of PFAS6 are present in groundwater farther east and southeast of PC-38 extending to east of Mary Dunn Road and south and southeast of Mary Dunn Pond. See additional discussion in Section 6.5.

Downgradient of Recovery Well PRW-4 – PC-16D, PC-30, PC-14 and PC-29

PC-16D is located 175 feet southeast of recovery well PRW-4 and 875 feet southeast of the FTA. Analytical results identified PFAS6 at 287 ng/L during the November 2023 sampling round. These results are consistent with other sampling rounds in 2023 with the exception of the April 2023. The higher PFAS6 concentrations found during the April 2023 and late 2022 are likely related to poor recovery well performance.

Figure 9D depicts PFAS6 concentration trends in monitoring well PC-30, located approximately 170 feet east - southeast and downgradient of recovery well PRW-4 and 100 feet south of PC-16D. Figure 9D is reprinted from IRA Status Report No. 66 and included in Appendix D. PC-30 analytical results from the recent sampling round identified PFAS6 at 1,119 ng/L. PFAS6 concentrations at PC-30 have generally been trending down from 2020 to 2022. However, the 2023 PFAS6 concentrations now indicate an increasing trend.

PC-14 is located approximately 500 feet east of recovery well PRW-4 and has been sampled on an annual basis since 2021. PFAS6 analytical results since that time have ranged between 549 ng/L in November 2023 up to 1,074 ng/L in November 2022.

PC-29 was sampled during the November 2023 sampling round instead of PC-28 to provide additional coverage further southeast of the FTA and closer to the MD#1 production well. Analytical results revealed a PFAS6 concentration of 2.1 ng/L (PFHxS only). It should be noted that PC-29 is a shallow well and is not representative of potential PFAS6 concentrations deeper into the aquifer.

MD#2 & Mary Dunn Pond Area – HW-1S & HW-1D

HW-1S and HW-1D are located approximately 275 feet east, northeast of MD#2 near the north bank of Mary Dunn Pond.

HW-1D groundwater analytical results identified a PFAS6 concentration of 29 ng/L during the November 2023 sampling round. The November 2023 analytical results show a slight decrease in PFAS6 concentrations compared to the previous November 2022 sampling round. However, PFAS6 concentrations at this location from October 2019 to November 2021 were below laboratory detection limits.

HW-1S analytical results did not identify PFAS6 above laboratory reporting limits. No other non-PFAS6 compounds were detected.

6.2 2023 QUARTERLY GROUNDWATER MONITORING RESULTS - CONCLUSIONS

Based on a review of the analytical results compiled in Table 4 for the November 2023 quarterly groundwater sampling events (and all recent, quarterly monitoring events) and Table 2 for the Phase II CSA related groundwater sampling and analyses, the following general conclusions regarding the PFAS6 groundwater plume can be made:

- A. PFAS6 concentrations continue to be above Method 1 GW-1 Risk Standards at the majority of the quarterly monitoring wells sampled in 2023. In general, PFAS6 concentrations have been increasing in areas immediately downgradient of the FTA and are stable to decreasing in areas within the central and eastern portions of the plume.
- B. The highest concentrations within the PFAS contaminant plume are in the southeast corner of the FTA (at PFW-1) and in close proximity to the FTA. The causes of the on-going increasing PFAS6 concentrations trend in this area are unknown but may be related to the Hot Spot area conditions. High PFAS6 concentrations have also been detected to the south of and in close proximity to the FTA and Flintrock Pond.
- C. Elevated PFAS6 concentrations continue to be detected east and southeast (downgradient) of the recovery well PRW-4. Quarterly groundwater results from the second half of 2023 have shown PFAS6 concentrations decreasing to comparable levels found from late 2021 to early 2022.
- D. Quarterly groundwater monitoring and Phase II CSA findings to date have not fully defined the PFAS6 plume that is most likely attributable to historic training activities at the FTA. Groundwater analytical results available to date show that the significant PFAS6 plume (groundwater concentrations greater than GW-1 risk standards) extends from the FTA (and most likely below Flintrock Pond) east to Mary Dunn Pond and the immediate surrounding area. The currently identified northern and southern extents of the PFAS6 plume are likely South Flint Rock Road on the north to Airport Way on the south.
- E. PFAS6 concentrations detected at deep monitoring wells within the eastern portion of PFAS6 plume are higher than those found at shallow monitoring wells. The vertical flow vector of groundwater is believed to be limited by a lower permeability/finer grained soil strata encountered around 50 to 55 feet below the ground surface in this area.
- F. The approximate southwestern edge of the plume originating from the FTA has not been fully defined but is likely located near PC-39/PC-39D. Further conclusions are complicated by the large gap between PC-39/PC-39D and the MW-403 couplet on Airport Way where PFAS6 has been detected above Method 1 GW-1 Standards. Additional investigation has not been conducted in

this area in favor of other areas due to difficulties obtaining access for drilling on private properties north of Airport Way and west of Mary Dunn Road.

- G. Phase II expanded groundwater assessment conducted to date via groundwater screening and installation of several widely spaced sets of new monitoring wells now indicates significant concentrations of PFAS6 are present in groundwater to the east of Mary Dunn Road and south and southeast of Mary Dunn Pond. As reported in Phase II CSA Interim Status Reports Nos. 1 and 2, groundwater screening indicated potentially significant PFAS6 impacts south to northern end of Airport Way and southeast to several locations south and southeast of Mary Dunn Pond. To date, confirmatory groundwater sampling via new monitoring wells has been conducted west, but close to Mary Dunn Rd. via the MW-401 well couplet, east of Mary Dunn Road via the MW-404 well couplet and to the south along Airport Way via the MW-403 well couplet. The analytical results for MW-401S/D and MW-403S/D were discussed in Phase II CSA Interim Status Report No. 2 and are included on Table 2. The analytical results for MW-404S/D are discussed in Section 5.1 and are also shown on Table 2. As noted, deeper groundwater exhibited elevated PFAS6 concentrations; shallow groundwater at these locations exhibit lower to very low PFAS6 concentrations with the exception of MW-403S/D where the pattern is reversed. Further complicating interpretation of the results is the apparent presence of a different profile of the PFAS6 compounds detected in MW-403S/D samples as compared to groundwater at locations farther northeast – MW-401D and MW-404D, as well as numerous groundwater screening samples collected east of MW-403S/D.

7.0 LIMITATIONS

This report was prepared for the exclusive use of Barnstable County for Phase II CSA activities. The observations made and results presented in this report are believed to be representative of current site conditions at the time of BETA's assessment to date. No other warranty is expressed, written, or implied. BETA is not responsible for independent conclusions, opinions, or recommendations made by others based on the information contained herein.

Tables

Table 1A - Summary of Wide Area Groundwater Gauging Results

Former Barnstable Fire Training Academy

Barnstable, MA

MassDEP RTN 4-26179

Monitoring Well	TOC/Gauging Point Elevation	Depth to GW (feet)		GW Elevation (feet)	
		4/18/2023	11/29/2023	4/18/2023	11/29/2023
Fire Training Academy					
PC-37	33.78	5.77	8.15	28.01	25.63
OW-2S	37.91	10.27	12.69	27.64	25.22
OW-2D	37.26	9.68	12.05	27.58	25.21
HSW-6	39.69	11.36	13.84	28.33	25.85
MW-201	37.91	---	---	---	---
MW-301	38.71	11.17	13.63	27.54	25.08
MW-302	37.85	10.39	12.83	27.46	25.02
MW-303	36.56	9.37	11.72	27.19	24.84
MW-304	34.85	7.50	9.97	27.35	24.88
MW-305	39.92	12.58	14.99	27.34	24.93
MW-306	36.81	9.24	11.69	27.57	25.12
MW-310	37.75	10.18	12.63	27.57	25.12
MW-405	37.78	---	12.72	---	25.06
OW-8A	42.33	15.30	17.51	27.03	24.82
OW-8D	42.6	15.32	17.78	27.28	24.82
PFW-1	41.52	14.32	16.76	27.20	24.76
PFW-2	40.02	12.25	14.68	27.77	25.34
PFW-3	37.54	9.99	12.43	27.55	25.11
PFW-4	39.34	11.51	13.96	27.83	25.38
PFW-5	41.54	14.23	16.72	27.31	24.82
FS1-A	41.77	14.25	16.68	27.52	25.09
Flintrock Pond					
FlintRock Pond	---	---	---	28.13	26.43
Piez-1	29.80	1.87	4.41	27.93	25.39
Piez-2	28.37	0.65	2.89	27.72	25.48
Piez-3	29.82	1.73	3.57	28.09	26.25
South/Southeast of FTA & Adj. to Flintrock Pond					
PC-34D	37.18	9.87	12.07	27.31	25.11
PC-34S	37.88	10.39	12.80	27.49	25.08
PC-35D	37.66	10.18	12.60	27.48	25.06
PC-35S	37.36	9.78	12.23	27.58	25.13
East/Southeast of FTA					
MW-3D	42.9	15.71	18.18	27.19	24.72
MW-3S	42.68	15.48	17.99	27.20	24.69
MW-3I	43.82	15.62	18.09	28.20	25.73
MW-1	42.99	15.04	17.47	27.95	25.52
MW-6	41.11	14.09	16.56	27.02	24.55
PC-36S	45.92	18.53	21.00	27.39	24.92
PC-36D	45.92	18.59	21.05	27.33	24.87
MW-311	38.42	11.45	13.91	26.97	24.51
MW-406	38.75	---	14.09	---	24.66
MW-8C	43.99	16.70	---	27.29	---
MW-9D	44.54	17.61	20.12	26.93	24.42
MW-9S	44.06	17.10	18.57	26.96	25.49
MW-10	44.21	16.76	19.26	27.45	24.95
MW-28D	40.45	13.31	15.78	27.14	24.67
MW-28S	40.7	13.59	16.06	27.11	24.64

Table 1A - Summary of Wide Area Groundwater Gauging Results

Former Barnstable Fire Training Academy

Barnstable, MA

MassDEP RTN 4-26179

Monitoring Well	TOC/Gauging Point Elevation	Depth to GW (feet)		GW Elevation (feet)	
		4/18/2023	11/29/2023	4/18/2023	11/29/2023
Eversource Easement & Recovery Well Area - East of FTA					
MW-12I	42.81	---	19.29	---	23.52
MW-12S	43.39	16.62	18.10	26.77	25.29
MW-13	43.28	---	---	---	---
PC-1	54.97	28.69	31.19	26.28	23.78
PC-38	58.08	32.66	35.08	25.42	23.00
MW-15D	43.47	---	20.01	---	23.46
MW-15S	43.05	---	dry	---	---
MW-22	43.46	16.90	18.47	26.56	24.99
MW-23	42.5	---	17.84	---	24.66
PC-6A	58.84	33.50	35.95	25.34	22.89
PC-11	55.42	29.66	32.20	25.76	23.22
PC-31	59.31	---	36.51	---	22.80
PC-16D	56.37	31.71	34.22	24.66	22.15
PC-16S	56.19	---	34.08	---	22.11
PC-30	57.22	32.40	34.82	24.82	22.40
PC-19	55.59	---	---	---	---
PC-2	51.63	---	27.56	---	24.07
PC-33	53.05	---	33.15	---	19.90
South of FTA & North of 180-210 Airport Way					
MW-402D	58.75	---	33.76	---	24.99
MW-402S	58.63	---	33.65	---	24.98
PC-39	55.65	28.50	30.95	27.15	24.70
PC-39D	55.09	---	30.53	---	---
South of Flintrock Road near Mary Dunn #3					
MW-35D	51.97	27.94	30.84	24.03	21.13
MW-35I	51.38	---	32.19	---	19.19
MW-35S	52.27	---	32.29	---	19.98
Mary Dunn Road & Mary Dunn Pond Area					
HW-1D	29.66	---	8.35	---	21.31
HW-1S	29.61	---	8.35	---	21.26
HW-2D	33.19	---	11.97	---	21.22
HW-2S	33.17	---	11.95	---	21.22
MW-401D	39.65	---	18.38	---	21.27
MW-401S	39.72	---	18.42	---	21.30
PC-15	51.01	---	29.61	---	21.40
PC-22	48.83	---	27.54	---	21.29
PC-28	41.03	17.11	19.29	23.92	21.74
PC-29	42.17	---	20.20	---	21.97
PC-23S	40.27	---	17.95	---	22.32
PC-23D	40.23	---	17.96	---	22.27
MW-404S ⁵	53.78	---	37.82	---	15.96
MW-404D ⁵	53.79	---	37.82	---	15.97
Mary Dunn Pond	---		---	---	21.47

Table 1A - Summary of Wide Area Groundwater Gauging Results

Former Barnstable Fire Training Academy

Barnstable, MA

MassDEP RTN 4-26179

Monitoring Well	TOC/Gauging Point Elevation	Depth to GW (feet)		GW Elevation (feet)	
		4/18/2023	11/29/2023	4/18/2023	11/29/2023
Airport Way					
MW-403D	46.73	---	23.18	---	23.55
MW-403S	46.86	---	23.38	---	23.48

Notes

- 1) Gauging Point Elevations are presented as feet above mean sea level (MSL), NAVD88 datum.
- 2) This table presents groundwater gauging data for two rounds of monitoring well gauging conducted in April 2023 and November 2023. The April 2023 gauging data has been revised based on the Fall 2023 monitoring well survey.
- 3) Refer to Tables 1B and 1C for gauging and monitoring well data for the Airport and Barnstable Fire District related wells.
- 4) "---" Indicates the monitoring well was not gauged or dry during the wide area gauging round.
- 5) The groundwater gauging measurement for MW-404S & MW-404D is likely a recording error and groundwater elevation should be discounted.
- 6) Monitoring wells highlighted in gray indicate there is uncertainty associated with the gauging point elevation or gauging data at this location. Therefore, these monitoring wells were not used to prepare groundwater contours as shown on Figures 5A-5D.

Table 1B - Summary of Wide Area Groundwater Gauging Results - Barnstable Fire District Wells
Former Barnstable Fire Training Academy
Barnstable, MA
MassDEP RTN 4-26179

Monitoring Well	TOC/Gauging Point Elevation	Depth to GW (feet)		GW Elevation (feet)	
		4/18/2023	11/29/2023	4/18/2023	11/29/2023
Barnstable Fire District					
M3-89	47.623	18.83	20.20	28.79	27.42
M1-89	42.984	13.38	15.67	29.60	27.31
84-3	43.972	10.53	10.58	33.44	33.39
TW-80-9aka TW-6-08	36.09	7.76	10.00	28.33	26.09
TW5-08	58.19	29.15	30.36	29.04	27.83
TW-86-5/BFD Path 1	43.318	14.23	16.52	29.09	26.80
TW-4-08	49.346	20.47	22.34	28.88	27.01
MW-307S	41.482	12.39	14.67	29.09	26.81
MW-307D	41.3	12.32	14.59	28.98	26.71
MW-308S	40.194	11.58	13.89	28.61	26.30
MW-308D	40.458	11.86	14.15	28.60	26.31
MW-309	37.661	9.23	11.58	28.43	26.08
WS-101	36.027	7.42	9.71	28.61	26.32
HW-C	69.18	37.20	39.01	31.98	30.17

Notes

- 1) Gauging Point Elevations are presented as feet above mean sea level (MSL), NAVD88 datum.
- 2) This table presents groundwater gauging data for two rounds of monitoring well gauging conducted in April 2023 and November 2023.
- 3) Refer to Tables 1A and 1C for gauging and monitoring well data for the FTA and Airport related wells.
- 4) Monitoring wells highlighted in gray indicate there is uncertainty associated with the gauging point elevation or gauging data at this location. Therefore, these monitoring wells were not used to prepare groundwater contours as shown on Figures 5A-5D.

Table 1C - Summary of Wide Area Groundwater Gauging Results - Airport Monitoring Wells
Former Barnstable Fire Training Academy
Barnstable, MA
MassDEP RTN 4-26179

Monitoring Well	TOC/Gauging Point Elevation	Depth to GW (feet)		GW Elevation (feet)	
		4/18/2023	11/29/2023	4/18/2023	11/29/2023
Zone 1. Airport Road /Attucks Lane/ Iyannough Road Area - Outside of Airport					
HW-A(D)	69.25	22.26	23.1	46.99	46.15
HW-A(s)	55.34	---	23.64	---	31.70
HW-19D	49.10	22.24	23.89	26.86	25.21
HW-O	43.46	11.67	6.41	31.79	37.05
HW-U(s)	48.90	21.61	24.45	27.29	24.45
HW-U(m)	48.76	21.63	25.32	27.13	23.44
HW-U(d)	48.80	23.45	25.15	25.35	23.65
HW-B(d)	51.81	21.79	23.54	30.02	28.27
HW-22	50.69	24.09	---	26.60	---
Zone 2. North Ramp - Airside					
HW-X(s)	not available	22.18	24.6	---	---
HW-X(m)	not available	23.13	24.99	---	---
OW-6	40.83	24.51	---	16.32	---
HW-207 (s)	52.62	24.18	dry	28.44	---
HW- 207 (d)	52.66	24.18	25.98	28.48	26.68
HW-4M	54.02	25.05	26.72	28.97	27.30
HW-5	54.98	25.35	24.05	29.63	30.93
HW-204	not available	24.93	---	---	---
Zone 3. Lewis Pond / Solar Field - Airside					
HW-G(s)	44.99	21.7	23.95	23.29	21.04
HW-G(m)	45.11	21.74	24.06	23.37	21.05
HW-G(d)	44.93	21.65	23.97	23.28	20.96
HW-D(m)	45.06	21.5	24.11	23.56	20.95
HW-D(d)	44.97	21.42	24.11	28.13	26.43
HW-D(dd)	44.96	22.13	25.11	22.83	19.85
Zone 4. ARFF Building Area - Airside					
HW-L(s)	39.07	20.96	---	18.11	---
HW-L(m)	38.98	21.05	---	17.93	---
HW-L(d)	39.15	20.91	---	18.24	---
HW-P(s)	40.51	21.55	23.39	18.96	17.12
HW-P(m)	40.64	21.66	23.44	18.98	17.20
Zone 5. Southeast of ARFF Area - Outside Airport - Mary Dunn Road & Ext. to Brooks Road Area					
HW-300	36.09	22.63	---	13.46	---
HW-301	39.52	23.85	25.49	15.67	14.03
HW-302	40.98	26.75	25.45	14.23	15.53
HW-Q (s)	37.89	20.3	22.29	17.59	15.60
HW-Q (m)	37.90	20.35	22.21	17.55	15.69
HW-K	37.70	22.57	27.4	15.13	10.30
HW-2	45.69	27.56	29.06	18.13	16.63
HW-3	40.78	25.9	---	14.88	---
RB-1 (s)	29.88	16.66	---	13.22	---
RB-1 (m)	29.91	16.75	---	13.16	---
Zone 6. Former AFFF Deployment Area - Airside					
HW-I(s)	36.48	18.34	20.4	18.14	16.08
HW-I(m)	36.28	18.15	21.19	18.13	15.09
HW-I(d)	36.16	18	20.03	18.16	16.13

Monitoring Well	TOC/Gauging Point Elevation	Depth to GW (feet)		GW Elevation (feet)	
		4/18/2023	11/29/2023	4/18/2023	11/29/2023
HW-J	37.10	18.8	20.86	18.30	16.24
HW-E	42.41	22.77	25.02	19.64	17.39
HW-F	36.32	19.45	21.64	16.87	14.68
Zone 7. Southeast of Deployment Area - Outside Airport - Mary Dunn Rd Ext. to Old Yarmouth Road					
HW-H	40.67	22.37	24.42	18.30	16.25
HW-R(s)	37.02	17.73	19.88	19.29	17.14
HW-S(s)	31.59	15	17.55	16.59	14.04
HW-S(m)	31.60	---	17.71	---	13.89
HW-T(s)	28.97	12.02	13.73	16.95	15.24
HW-T(m)	29.11	12.22	---	16.89	---
8. Maher Well Zone - Southeast of ARFF and Fmr. Deployment Areas					
OW-9 (s)	18.13	12.33	13.34	5.80	4.79
OW-9 (m)	25.89	12.57	13.79	13.32	12.10
OW-9 (d)	19.68	12.3	13.5	7.38	6.18
OW-9 (dd)	32.28	12.77	13.67	19.51	18.61
OW-18 (s)	39.03	25.55	26.67	13.48	12.36
OW-18 (m)	39.30	25.96	27.32	13.34	11.98
OW-18 (d)	38.84	25.5	---	13.34	---
HW-W (m)	39.65	28.61	---	11.04	---
HW-W (d)	39.50	28.34	---	11.16	---
HW-W-dd)	38.78	28.3	---	10.48	---

Notes

- 1) Gauging Point Elevations are presented as feet above mean sea level (MSL), NAVD88 datum.
- 2) This table presents groundwater gauging data for two rounds of monitoring well gauging conducted in April 2023 and November 2023.
- 3) Refer to Tables 1A and 1B for gauging and monitoring well data for the Fire Training Academy and Barnstable Fire District related wells.
- 4) Gauging Point northing, easting, and elevation were provided to BETA by Horsley Witten.
- 5) "---" Indicates monitoring well was not gauged due to time, not being accessible or unable to open or groundwater elevation could not be calculated.

Table 2 - Summary of Phase II CSA Groundwater Analytical Results
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	USEPA ^{1,2} HEALTH ADVISORY	Method 1 GW-1 Standards ⁴	MW-301	MW-302	MW-303	MW-304		MW-305	MW-306	MW-307S	MW-307D	MW-308S	MW-308D	MW-309	MW-310	MW-311	
SCREEN DEPTH (FEET)			5-15	5-15	5-15	5-15		5-15	5-15	10-20	35-40	10-20	35-40	30-35	5-15	6-16	
SAMPLING DATE			2/13/2023	2/13/2023	2/13/2023	2/13/2023	11/3/2023	2/13/2023	2/13/2023	11/9/2022	11/9/2022	11/9/2022	11/9/2022	11/9/2022	2/13/2023	2/13/2023	11/2/2023
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	
PFAS (Method 537.1m or PACE SOP 454)																	
PFOS	70	20	BRL (<10.0)	1400	200	70	88	1400	62	2.1	BRL (<1.9)	2.2	5.4	11	62	2400	5900
PFOA	70	20	BRL (<10.0)	12	BRL (<10.0)	23	52	250	BRL (<10.0)	BRL (<2.0)	BRL (<1.9)	BRL (<1.9)	BRL (<2.0)	BRL (<1.9)	BRL (<10.0)	160	470
PFNA	NE	20	BRL (<10.0)	BRL (<10.0)	13	BRL (<10.0)	10	95	BRL (<10.0)	BRL (<2.0)	BRL (<1.9)	BRL (<1.9)	BRL (<2.0)	BRL (<1.9)	BRL (<10.0)	54	190
PFHxS	NE	20	BRL (<10.0)	340	45	47	160	960	33	BRL (<2.0)	BRL (<1.9)	BRL (<1.9)	BRL (<2.0)	4.6	48	840	1600
PFHpA	NE	20	BRL (<10.0)	BRL (<10.0)	BRL (<10.0)	24	78	250	BRL (<10.0)	BRL (<2.0)	BRL (<1.9)	BRL (<1.9)	BRL (<2.0)	BRL (<1.9)	BRL (<10.0)	170	300
PFDA	NE	20	BRL (<10.0)	BRL (<10.0)	BRL (<10.0)	BRL (<10.0)	2.4	BRL (<10.0)	BRL (<10.0)	BRL (<2.0)	BRL (<1.9)	BRL (<1.9)	BRL (<2.0)	BRL (<1.9)	BRL (<10.0)	BRL (<10.0)	67
TOTAL Σ 6 PFAS	70	20	BRL (<10.0)	1752	258	164	390.4	2955	95	2.1	BRL (<1.9)	2.2	5.4	15.6	110	3624	8527

Notes:
1. Current Massachusetts Contingency Plan GW-1 Risk Stands, finalized on 12.27.2019 and Massachusetts maximum contaminant level.
2. BRL - Below Laboratory Detection Limits
3. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
4. Concentrations in bold exceed applicable MCP Method 1 GW-1 Standard
5. PFOS - Perfluorooctanesulfonate
6. PFOA - Perfluorooctanoic Acid
6. PFNA - Perfluorononanoic Acid
7. PFHxS - Perfluorohexanesulfonic Acid
8. PFHpA - Perfluoroheptanoic Acid
9. PFDA - Perfluorodecanoic Acid

10. Monitoring well logs could not be located for WS-101, HW-2S & HW-2D. Therefore well screen details are unknown.

Table 2 - Summary of Phase II CSA Groundwater Analytical Results
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	USEPA ^{1,2} HEALTH ADVISORY	Method 1 GW-1 Standards ⁴	WS-101	PC-39D	MW-401S	MW-401D	MW-402S	MW-402D	MW-403S	MW-403D	MW-404S	MW-404D	HW-2S	HW-2D
SCREEN DEPTH (FEET)			---	46-51	14-24	45-50	29.5-39.5	51-56	18.5-28.5	43-48	29.5-39.5	45-50	---	---
SAMPLING DATE			11/11/2022	7/26/2023	7/26/2023	7/26/2023	7/26/2023	7/26/2023	7/26/2023	7/26/2023	11/2/2023	11/2/2023	11/21/2023	11/21/2023
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
PFAS (Method 537.1m or PACE SOP 454)														
PFOS	70	20	BRL (<1.9)	29	BRL (<1.8)	9.1	BRL (<4.1)	BRL (<1.9)	9.4	20	BRL (<2.0)	220	150	170
PFOA	70	20	BRL (<1.9)	BRL (<1.9)	BRL (<1.8)	7.1	BRL (<4.1)	BRL (<1.9)	49	8.6	BRL (<2.0)	16	3	23
PFNA	NE	20	BRL (<1.9)	2.8	BRL (<1.8)	3.3	BRL (<4.1)	BRL (<1.9)	12	BRL (<1.9)	BRL (<2.0)	3.8	22	3.2
PFHxS	NE	20	BRL (<1.9)	6.5	BRL (<1.8)	22	BRL (<4.1)	3.9	14	13	21	89	14	61
PFHpA	NE	20	BRL (<1.9)	2.1	BRL (<1.8)	4.4	BRL (<4.1)	BRL (<1.9)	57	3.9	BRL (<2.0)	11	3.6	11
PFDA	NE	20	BRL (<1.9)	BRL (<1.9)	BRL (<1.8)	BRL (<1.8)	BRL (<4.1)	BRL (<1.9)	BRL (<1.8)	BRL (<1.9)	BRL (<2.0)	2.5	BRL(<1.9)	BRL(<2.1)
TOTAL Σ 6 PFAS	70	20	BRL (<1.9)	40.4	BRL (<1.8)	45.9	BRL (<4.1)	3.9	141.4	45.5	21	342.3	192.6	268.2

Notes:
1. Current Massachusetts Contingency Plan GW-1 Risk Stands, finalized on 12.27.2019 and Massachusetts maximum contaminant level.
2. BRL - Below Laboratory Detection Limits
3. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
4. Concentrations in bold exceed applicable MCP Method 1 GW-1 Standard
5. PFOS - Perfluorooctanesulfonate
6. PFOA - Perfluorooctanoic Acid
6. PFNA - Perfluorononanoic Acid
7. PFHxS - Perfluorohexanesulfonic Acid
8. PFHpA - Perfluoroheptanoic Acid
9. PFDA - Perfluorodecanoic Acid

10. Monitoring well logs could not be located for WS-101, HW-2S & HW-2D. Therefore well screen details are unknown.

Table 3-Summary of Phase II CSA Soil Boring PFAS Analytical Data-MW-400 Series/PC-39D
Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	MCP Method 1 S-1/GW-1 Soil	MCP Method 1 S-1/GW-3	MCP Method 1 S-2/GW-1	MCP Method 1 S-3/GW-1	PC-39D	MW-401D	MW-402D	MW-403D	MW-405 5'	MW-405 12'	MW-406 5'	MW-405 13'
SAMPLE DEPTH (FT)	Standards	Soil Standards	Soil Standards	Soil Standards	28-30'	50-52'	34-35'	18-20'	5	12	5	13
SAMPLING DATE					7/10/2023	7/11/2023	7/12/2023	7/14/2023	11/9/2023	11/9/2023	11/9/2023	11/9/2023
UNITS	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	ng/g	ng/g	ng/g	ng/g
PFAS (PACE SOP 466 & Alpha 134, LCMSMS-ID)												
PFOS	2	300	2	2	BRL(<0.50)	BRL(<0.54)	BRL(<0.52)	BRL(<0.45)	BRL(<0.231)	BRL(<0.227)	22.3	4.27
PFOA	0.72	300	0.72	0.72	BRL(<0.50)	BRL(<0.54)	BRL(<0.52)	BRL(<0.45)	BRL(<0.231)	BRL(<0.227)	0.371	BRL(<0.234)
PFHpA	0.5	300	0.5	0.5	BRL(<0.50)	BRL(<0.54)	BRL(<0.52)	BRL(<0.45)	BRL(<0.231)	BRL(<0.227)	BRL(<0.252)	BRL(<0.234)
PFNA	0.32	300	0.32	0.32	BRL(<0.50)	BRL(<0.54)	BRL(<0.52)	BRL(<0.45)	BRL(<0.231)	BRL(<0.227)	0.364	BRL(<0.234)
PFHxS	0.3	300	0.3	0.3	BRL(<0.50)	BRL(<0.54)	BRL(<0.52)	BRL(<0.45)	BRL(<0.231)	BRL(<0.227)	BRL(<0.252)	BRL(<0.234)
PFDA	0.3	300	0.3	0.3	BRL(<0.50)	BRL(<0.54)	BRL(<0.52)	BRL(<0.45)	BRL(<0.231)	BRL(<0.227)	BRL(<0.252)	BRL(<0.234)
Total Solids												
% Solids	NE	NE	NE	NE	87.2	81.3	83.9	98.1	95	97	94	94

- Notes:
1. PFOS: Perfluorooctanesulfonic acid (PFOS)
 2. PFOA: Perfluoro-n-Octanoic Acid
 3. PFHpA: Perfluoroheptanoic Acid (PFHpA)
 4. PFHxS: Perfluorohexane Sulfonate
 5. PFNA: Perfluorononanoic Acid
 6. PFDA: Perfluorodecanoic acid
 7. Concentrations in micrograms per kilogram (µg/kg) or nanograms per gram (ng/L)
 8. (BRL <0.14) - Below Laboratory Detection Limit shown in parentheses.
 9. MassDEP finalized and established standards for 6 individual PFAS compounds in soil on December 27, 2019.
(PFOS, PFOA, PFHpA, PFNA, PFHxS, and PFDA) compounds.
 10. Bolded values indicate concentrations above the MCP applicable Method 1 S-1 Soil Standards
 11. NE - Not Established

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ⁴	HSW-6/HS-2(a)																			HSW-1/HS-1(a)														
SCREEN DEPTH (FEET)		Unknown ¹⁶																			Unknown ¹⁶														
WELL DIAMETER (INCHES)		2																			2														
WELL STATUS		Viable																			Viable														
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	7/28/2020	10/20/2020	1/26/2021	5/20/2021	7/28/2021	11/2/2021	1/25/2022	11/9/2022	11/2/2023	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	2/18/2020	5/11/2020	11/2/2021		
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	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L			
PFAS (Method 537.1m or PACE SOP 454)																																			
PFOS	20	77,000	320,000	41,000	28,000	21,000	45,000	25,000	950	1,300	3,600	2,300	5,700	2,800	2,700	1,500	1,900	1,600	1,700	3,200	110,000	56,000	38,000	24,000	25,000	13,000	1,800	2,000	1,100	1,800	740	1,300	1,800		
PFOA	20	--	--	--	660	--	320	160	15	94	79	80	48	320	180	45	550	170	160	160	--	--	1,000	350	1,300	320	840	100	64	46	36	100	470		
PFNA	20	--	--	--	--	--	--	--	BRL (<87)	26	46	40	52	35	47	57	65	46	150	170	--	--	--	--	--	--	43	65	43	33	22	57	46		
PFHxS	20	--	--	--	--	--	--	--	26	140	310	350	71	1,400	440	100	2,500	410	350	430	--	--	--	--	--	--	1,700	300	170	150	66	300	1,600		
PFHpA	20	--	--	--	--	--	--	--	15	66	100	69	56	640	150	49	870	160	200	190	--	--	--	--	--	--	510	67	52	43	32	63	430		
PFDA	20	--	--	--	--	--	--	--	--	--	30	18	23	21	19	13	12	7	19	34	--	--	--	--	--	--	--	55	19	13	9.1	37	12		
TOTAL 16 PFAS	20	77,000	320,000	41,000	28,660	21,000	45,320	25,160	1,006	1,626	4,165	2,857	5,950	5,216	3,536	1,764	5,897	2,393	2,579	4,184	110,000	56,000	39,000	24,350	26,300	13,320	4,893	2,587	1,448	2,085	905	1,857	4,358		

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.

2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and invidual concentrations of the six PFAS compounds presented above.

3. BRL - Below Laboratory Detection Limits

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

7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard

5. PFOS - Perfluorooctanesulfonate

6. PFOA - Perfluorooctanoic Acid

7. PFNA - Perfluorononanoic Acid

8. PFHxS - Perfluorohexanesulfonic Acid

9. PFHpA - Perfluoroheptanoic Acid

10. PFDA - Perfluorodecanoic Acid

11. NA - Concentration data not available

12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.

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

14. NE- Not Established

15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.

16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ¹	PFW-1																											
SCREEN DEPTH (FEET)		10-19																											
WELL DIAMETER (INCHES)		2																											
WELL STATUS		Viable																											
SAMPLING DATE		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	2/18/2020	5/11/2020	7/28/2020	10/20/2020	1/26/2021	5/20/2021	7/28/2021	11/2/2021	1/25/2022	4/21/2022	7/27/2022	11/9/2022	1/31/2023	4/4/2023	7/25/2023	11/2/2023
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	ng/L	ng/L	ng/L
PFAS (Method 537.1m or PACE SOP 454)																													
PFOs	20	8,400	60,000	7,000	56,000	3,500	4,100	8,100	76,000	38,000	20,000	24,000	16,000	22,000	6,000	5,200	4,000	3,400	3,100	3,300	3,900	4,400	4,500	7,600	7,100	15,000	15,000	15,000	20,000
PFOA	20	360	800	--	--	--	--	470	1,500	160	300	560	130	220	250	210	110	150	160	330	170	270	260	540	500	330	200	730	370
PFNA	20	--	--	--	--	--	--	--	3,900	330	360	210	570	230	94	110	80	94	66	50	69	120	74	99	170	210	150	290	260
PFHxS	20	--	--	--	--	--	--	--	7,400	960	1,500	4,800	910	1,000	890	820	450	750	750	2,500	870	1,000	1,500	3,300	2,000	1,500	910	2,500	1,000
PFHpA	20	--	--	--	--	--	--	--	610	140	290	500	150	200	220	160	82	200	250	440	190	390	350	660	330	370	160	390	230
PFDA	20	--	--	--	--	--	--	--	--	--	110	160	120	200	81	89	37	69	45	28	54	36	36	38	42	78	79	92	95
TOTAL 16 PFAS	20	8,760	60,800	7,000	56000	3500	4,100	8,570	89,410	39,590	22,560	30,230	17,880	23,850	7,535	6,589	4,759	4,663	4,371	6,648	5,253	6,216	6,720	12,237	10,142	17,488	16,499	19,002	21,955

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.
2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and invidual concentrations of the six PFAS compounds presented above.
3. BRL - Below Laboratory Detection Limits
4. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard
5. PFOS - Perfluorooctanesulfonate
6. PFOA - Perfluorooctanoic Acid
7. PFNA - Perfluorononanoic Acid
8. PFHxS - Perfluorohexanesulfonic Acid
9. PFHpA - Perfluoroheptanoic Acid
10. PFDA - Perfluorodecanoic Acid
11. NA - Concentration data not available
12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.
13. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.
14. NE- Not Established
15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.
16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ⁴	PFW-2																					
SCREEN DEPTH (FEET)		10-20																					
WELL DIAMETER (INCHES)		2																					
WELL STATUS		Viable																					
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	5/11/2020	10/20/2020	11/2/2021	4/21/2022	7/27/2022	11/9/2022	1/31/2023	4/2/2023	7/25/2023
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 537.1m or PACE SOP 454)																							
PFOS	20	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	690	1,700	1,200	630	2,600	1,900	1,600	1,100	3,300
PFOA	20	5200	BRL(<800)	--	1,100	2,100	--	--	970	910	400	400	720	74	48	30	170	620	190	110	250	730	240
PFNA	20	--	--	--	--	--	--	--	--	--	--	--	110	64	39	52	32	64	140	86	64	160	160
PFHxS	20	--	--	--	--	--	--	--	--	--	--	--	1,800	230	140	71	650	940	470	310	620	1,000	640
PFHpA	20	--	--	--	--	--	--	--	--	--	--	--	470	68	45	31	270	250	130	180	190	32	150
PFDA	20	--	--	--	--	--	--	--	--	--	--	--	--	27	14	23	4	6.8	15.0	27	BRL (<20)	11	42
TOTAL 16 PFAS	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	2,563	976	1,907	2,326	2,511	3,545	2,613	2,724	3,033	4,532

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.

2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and individual concentrations of the six PFAS compounds presented above.

3. BRL - Below Laboratory Detection Limits

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

7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard

5. PFOS - Perfluorooctanesulfonate

6. PFOA - Perfluorooctanoic Acid

7. PFNA - Perfluorononanoic Acid

8. PFHxS - Perfluorohexanesulfonic Acid

9. PFHpA - Perfluoroheptanoic Acid

10. PFDA - Perfluorodecanoic Acid

11. NA - Concentration data not available

12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.

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

14. NE- Not Established

15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.

16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ¹	PFW-5																					
SCREEN DEPTH (FEET)		10-20																					
WELL DIAMETER (INCHES)		2																					
WELL STATUS		Viable																					
SAMPLING DATE		3/31/2015	4/11/2017	1/9/2019	4/23/2019	7/22/2019	10/28/2019	2/18/2020	5/11/2020	7/28/2020	10/20/2020	1/26/2021	5/19/2020	7/28/2021	11/2/2021	1/25/2022	4/21/2022	7/27/2022	11/9/2022	1/31/2023	4/4/2023	7/25/2023	11/3/2023
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 537.1m or PACE SOP 454)																							
PFOS	20	2,700	2,100	1,100	1,900	1,600	2,400	1,000	1,200	980	1,500	1,200	1,200	3,100	370	370	1,000	1,100	2,700	1,100	660	2,200	940
PFOA	20	250	170	64	150	120	26	88	120	100	120	84	120	180	89	150	73	14	24	110	110	99	64
PFNA	20	--	--	BRL (<8.7)	25	16	BRL (<4.9)	11	22	15	29	32	27	15	12	8.6	40.0	5.5	5.5	24.0	55.0	24.0	52.0
PFHxS	20	--	--	240	680	630	260	360	720	610	420	310	790	1,100	560	1,300	340	67	500	580	670	860	370
PFHpA	20	--	--	30	82	54	22	56	66	44	60	80	110	160	76	240	45	9.2	20	48	100	34	67
PFDA	20	--	--	--	12	11	BRL (<4.1)	10	13	11	16	5	7	7	BRL (<3.9)	5.4	11.0	13.0	7.8	BRL (<20)	5.1	7.7	5.5
TOTAL 16 PFAS	20	2,950	2,270	1,434	2,849	2,431	2,708	1,525	2,141	1,760	2,145	1,711	2,254	4,562	1,107	2,074	1,509	1,209	3,257	1,862	1,600	3,225	1,499

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.

2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and invidual concentrations of the six PFAS compounds presented above.

3. BRL - Below Laboratory Detection Limits

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

7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard

5. PFOS - Perfluorooctanesulfonate

6. PFOA - Perfluorooctanoic Acid

7. PFNA - Perfluorononanoic Acid

8. PFHxS - Perfluorohexanesulfonic Acid

9. PFHpA - Perfluoroheptanoic Acid

10. PFDA - Perfluorodecanoic Acid

11. NA - Concentration data not available

12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.

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

14. NE- Not Established

15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.

16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ¹	OW-8A																								FS-15A	
SCREEN DEPTH (FEET)		15-25																								10-20	
WELL DIAMETER (INCHES)		2																								2	
WELL STATUS		Viable																								Viable	
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	2/18/2020	5/11/2020	7/28/2020	10/20/2020	1/26/2021	5/19/2021	7/28/2021	11/3/2021	1/25/2022	4/21/2022	7/27/2022	11/9/2022	1/31/2023	4/4/2023	7/25/2023	6/16/2016	5/19/2021
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	ng/L
PFAS (Method 537.1m or PACE SOP 454)																											
PFOS	20	2,700	8,600	1,700	770	2,800	990	880	780	220	650	150	170	40	230	120	11	520	120	1,200	130	76	480	680	130	1,700	12
PFOA	20	430	1,000	2,000	120	65	420	66	55	130	62	18	12	BRL (<5.0)	290	120	7	720	11	260	16	13	410	210	11	550	BRL (5.0)
PFNA	20	--	--	--	--	310	150	120	78	10	110	12	11	BRL (<5.1)	120	250	BRL (<5.1)	70	BRL (<5.1)	100	20	BRL (<1.9)	48	25	3	--	BRL (<5.1)
PFHxS	20	--	--	--	--	250	890	140	100	750	190	77	30	11	760	330	23	3,100	39	620	45	70	2,000	660	42	--	BRL (<4.4)
PFHpA	20	--	--	--	--	43	210	40	26	190	35	8.9	7.4	BRL (<6.7)	150	66	BRL (<6.7)	360	12	130	12	10	180	140	10	--	BRL (<6.7)
PFDA	20	--	--	--	--	--	--	15	18	14	17	3.6	10	BRL (<3.9)	BRL (<2.0)	3.9	BRL (<3.9)	BRL (<3.9)	BRL (<3.9)	15.0	BRL (<3.9)	BRL (<1.9)	BRL (<10)	4.6	2.1	--	BRL (<3.9)
TOTAL 16 PFAS	20	3,130	9,600	3,700	890	3,468	2,660	1,261	1,057	1,314	1,064	270	240	51	1,550	890	41	4,770	182	2,325	223	169	3,118	1,720	198	2,250	12

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.
2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and individual concentrations of the six PFAS compounds presented above.
3. BRL - Below Laboratory Detection Limits
4. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard
5. PFOS - Perfluorooctanesulfonate
6. PFOA - Perfluorooctanoic Acid
7. PFNA - Perfluorononanoic Acid
8. PFHxS - Perfluorohexanesulfonic Acid
9. PFHpA - Perfluoroheptanoic Acid
10. PFDA - Perfluorodecanoic Acid
11. NA - Concentration data not available
12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.
13. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.
14. NE- Not Established
15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.
16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ⁴	MW-35								MW-125																												
SCREEN DEPTH (FEET)		13.6-23.6								Unknown ¹⁶																												
WELL DIAMETER (INCHES)		2								2																												
WELL STATUS		Viable								Viable																												
SAMPLING DATE		6/3/2014	8/18/2016	11/3/2021	4/21/2022	7/27/2022	11/9/2022 ¹⁸	1/31/2023	11/2/2023	8/20/2014	4/1/2015	6/26/2018	1/11/2019	4/23/2019	7/23/2019	10/29/2019	2/19/2020	5/12/2020	7/29/2020	10/21/2020	1/27/2021	5/20/2021	11/2/2021	1/25/2022	4/20/2022	7/28/2022	2/1/2023	4/5/2023	7/25/2023	11/1/2023								
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	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L						
PFAS (Method 537.1m or PACE SOP 454)																																						
PFOs	20	4,900	1,900	1,400	1,300	1,600	4,200	830	2,800	2,500	4,800	3,000	2,700	2,800	2,800	2,300	3,100	3,500	2,900	3,900	2,300	360	1,400	950	1,700	1,500	1,100	630	1,100	660								
PFOA	20	530	690	360	330	470	890	220	280	400	470	280	650	920	250	380	580	280	220	280	230	46	150	100	170	350	190	150	190	150								
PFNA	20	--	--	36	64	68	110	24	97	--	--	56	64	92	87	80	78	86	51	51	28	6	27	27	18	17	21	14	27	24								
PFHxS	20	--	--	1,800	1,100	1,200	1,600	910	890	--	--	1,200	1,500	1,700	880	1,300	1,200	1,100	900	93	630	170	670	390	830	900	580	400	800	470								
PFHpA	20	--	--	210	160	190	530	81	210	--	--	130	490	440	170	310	390	140	120	110	74	14	73	63	75	100	66	71	120	140								
PFDA	20	--	--	BRL (<3.9)	7	10	8.3	BRL (<10)	8	--	--	--	--	16	11	10	7.5	23	18	13	21	BRL (<3.9)	BRL (<3.9)	4.7	BRL (<6.4)	7.5	BRL (<10)	BRL (<4.1)	5.8	BRL (<4.2)								
TOTAL 16 PFAS	20	5,430	2,590	3,806	2,961	3,538	7,338	2,065	4,285	2,900	5,270	4,666	5,404	5,968	4,198	4,380	5,356	5,129	4,209	4,447	3,283	596	2,320	1,535	2,793	2,875	1,957	1,265	2,243	1,444								

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.

2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and invidual concentrations of the six PFAS compounds presented above.

3. BRL - Below Laboratory Detection Limits

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

7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard

5. PFOS - Perfluorooctanesulfonate

6. PFOA - Perfluorooctanoic Acid

7. PFNA - Perfluorononanoic Acid

8. PFHxS - Perfluorohexanesulfonic Acid

9. PFHpA - Perfluoroheptanoic Acid

10. PFDA - Perfluorodecanoic Acid

11. NA - Concentration data not available

12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.

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

14. NE- Not Established

15. Due to labeling error MW-35 was labeled as MW-3 on the laboratory report and COC in the November 2022.

16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ⁴	MW-13		MW-15D		MW-22																						MW-23		MW-201						
SCREEN DEPTH (FEET)		27-37				14.5-24.5																						14-24		10-20						
WELL DIAMETER (INCHES)		2				2																						2		2						
WELL STATUS		Viable		Viable		Viable																						Viable		Viable						
SAMPLING DATE		7/29/2021	11/10/2022	4/2/2015	11/2/2023	6/3/2014	4/1/2015	6/26/2018	1/11/2019	4/23/2019	7/23/2019	10/29/2019	2/19/2020	5/12/2020	7/29/2020	10/21/20020	1/27/2021	5/20/2021	11/2/2021	1/25/2022	4/20/2022	7/28/2022	2/1/2023	4/5/2023	7/25/2023	11/1/2023	7/29/2021	11/10/2022	5/19/2021	11/9/2022						
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	ng/L	ng/L	ng/L	ng/L						
PFAS (Method 537.1m or PACE SOP 454)																																				
PFOS	20	BRL(<0.020)	200	60	37	4,900	600	320	350	320	410	510	460	380	790	680	470	2,300	340	430	35	480	42	86	130	160	1,100	89	230	18						
PFOA	20	BRL(<0.020)	17	60	10	530	90	30	140	160	190	150	230	120	92	160	250	150	83	94	3.3	77.0	BRL (<10)	7.1	15	14	76	120	14	BRL (<1.9)						
PFNA	20	BRL(<0.020)	4.5	--	BRL (<1.9)	--	--	9	BRL (<8.7)	81	7.6	8.3	5	10	14	14	7	24	BRL (<5.1)	5.7	3.3	8.7	BRL (<10)	BRL (<1.8)	1.8	1.9	BRL (<20)	4.9	19	BRL (<1.9)						
PFHxS	20	BRL(<0.020)	95	--	11	--	--	130	680	600	520	690	540	330	360	740	800	570	220	280	18	370	25.0	23	67	71	260	180	84	15						
PFHpA	20	BRL(<0.020)	30	--	4.7	--	--	13	69	49	33	61	38	32	27	100	88	65	13	21	1	20	BRL (<10)	2	2	3	98	49	24	BRL (<1.9)						
PFDA	20	BRL(<0.020)	BRL (<1.9)	--	1.9	--	--	--	--	BRL (<4.1)	BRL (<4.1)	BRL (<4.1)	BRL (<4.1)	1	5	5	1	15	BRL (<3.9)	<3.9	<0.64	<3.9	BRL (<10)	BRL (<1.8)	BRL (<1.8)	BRL (<1.8)	BRL (<20)	BRL (<1.9)	BRL (<3.9)	BRL (<1.9)						
TOTAL 16 PFAS	20	0	346.5	120	64.2	5,430	690	502	1,239	1,210	1,161	1,419	1,273	873	1,288	1,699	1,616	3,124	656	831	60	956	67	118	216	250	1,534	443	371	33						

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.
2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and invidual concentrations of the six PFAS compounds presented above.
3. BRL - Below Laboratory Detection Limits
4. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard
5. PFOS - Perfluorooctanesulfonate
6. PFOA - Perfluorooctanoic Acid
7. PFNA - Perfluorononanoic Acid
8. PFHxS - Perfluorohexanesulfonic Acid
9. PFHpA - Perfluoroheptanoic Acid
10. PFDA - Perfluorodecanoic Acid
11. NA - Concentration data not available
12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.
13. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.
14. NE- Not Established
15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.
16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ⁴	MW-35i								PC-1																											
SCREEN DEPTH (FEET)		Unknown ¹⁶								29-40																											
WELL DIAMETER (INCHES)		2								2																											
WELL STATUS		Viable								Viable																											
SAMPLING DATE		8/20/2014	5/3/2017	1/10/2019	10/30/2019	10/22/2020	11/2/2021	11/11/2022	11/1/2023	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	2/19/2020	5/12/2020	7/28/2020	10/22/2020	1/27/2021	5/20/2021	11/1/2021	1/26/2022	4/20/2022	7/28/2022	11/10/2022	2/1/2023	4/5/2023	7/25/2023				
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	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L				
PFAS (Method 537.1m or PACE SOP 454)																																					
PFOs	20	60	42	BRL (<6)	BRL (<5.2)	BRL (<5.9)	BRL (<5.7)	23	21	48,000	2,000	56,000	5,700	9,000	10,000	1,700	8,000	4,300	1,600	1,700	1,700	1,900	1,200	1,500	1,500	440	630	660	940	850	78	510	440				
PFOA	20	BRL	14	BRL (<3.3)	BRL (<7.4)	BRL (<5.0)	BRL (<5.0)	2.8	BRL(<2.0)	1,100	BRL (<800)	1,200	--	370	190	140	300	150	72	180	110	63	110	59	49	48	66	76	53	230	35	250	81				
PFNA	20	--	--	BRL (<8.7)	BRL (<4.9)	BRL (<5.1)	BRL (<5.1)	BRL (<1.9)	BRL(<2.0)	--	--	--	--	--	140	62	150	140	75	70	110	58	100	52	72	33	31	30	44	61	BRL (<10)	27	30				
PFHxS	20	--	--	BRL (<5.6)	6	6	10.0	17	13	--	--	--	--	--	850	380	650	430	380	450	400	240	350	190	230	170	180	270	240	960	110	540	140				
PFHpA	20	--	--	BRL (<7.4)	BRL (<7.1)	BRL (<6.7)	BRL (<6.7)	4.1	BRL(<2.0)	--	--	--	--	--	200	200	180	230	150	240	150	98	190	76	83	100	95	110	78	550	41	160	130				
PFDA	20	--	--	--	BRL (<4.1)	BRL (<3.9)	BRL (<3.9)	BRL (<1.9)	BRL(<2.0)	--	--	--	--	--	--	--	78	67	19	20	28	36	27	26	15	BRL (<3.9)	7.5	6.7	9.4	23.0	BRL (<10)	BRL (<4.2)	7.5				
TOTAL 16 PFAS	20	60	56	BRL	6	6	10	47	34	49,100	2,000	57,200	5,700	9,370	11,380	2,482	9,358	5,317	2,296	2,660	2,498	2,395	1,977	1,903	1,949	791	1,010	1,153	1,364	2,674	264	1,487	829				

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.

2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and invidual concentrations of the six PFAS compounds presented above.

3. BRL - Below Laboratory Detection Limits

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

7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard

5. PFOS - Perfluorooctanesulfonate

6. PFOA - Perfluorooctanoic Acid

7. PFNA - Perfluorononanoic Acid

8. PFHxS - Perfluorohexanesulfonic Acid

9. PFHpA - Perfluoroheptanoic Acid

10. PFDA - Perfluorodecanoic Acid

11. NA - Concentration data not available

12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.

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

14. NE- Not Established

15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.

16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ¹	PC-6A																						
SCREEN DEPTH (FEET)		35-45																						
WELL DIAMETER (INCHES)		2																						
WELL STATUS		Viable																						
SAMPLING DATE		3/9/2016	4/27/2017	6/26/2018	1/10/2019	4/24/2019	7/23/2019	10/29/2019	2/19/2020	5/12/2020	7/29/2020	10/21/2020	1/27/2021	5/20/2021	7/28/2021	11/1/2021	1/26/2022	4/20/2022	7/28/2022	11/10/2022	2/1/2023	4/5/2023	7/25/2023	11/3/2023
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 537.1m or PACE SOP 454)																								
PFOS	20	1,300	3,200	1,300	1,800	1,900	940	1,100	1,600	86	1,300	920	1,100	920	500	550	760	1,100	730	470	640	390	440	360
PFOA	20	110	150	60	30	68	33	62	67	4.1	37	28	35	31	14	22	29	34	26	30	29	27	19	11
PFNA	20	--	--	55	25	60	36	48	65	3.8	44	44	58	45	23	32	41	72	42	47	58	45	29	24
PFHxS	20	--	--	300	190	310	150	290	180	23	99	71	83	72	49	59	62	83	62	72	72	65	53	61
PFHpA	20	--	--	75	37	83	45	86	71	9	43	37	43	42	24	32	39	40	33	47	37	36	26	11
PFDA	20					10	BRL (<4.1)	7.4	5.9	0.7	11	12	12	11	3.9	10	10	16	11	12	13	9	8	8.7
TOTAL 16 PFAS	20	1,410	3,350	1,790	2,082	2,431	1,204	1,593	1,989	127	1,534	1,112	1,331	1,121	614	705	941	1,345	904	678	849	572	575	476

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.

2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and individual concentrations of the six PFAS compounds presented above.

3. BRL - Below Laboratory Detection Limits

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

7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard

5. PFOS - Perfluorooctanesulfonate

6. PFOA - Perfluorooctanoic Acid

7. PFNA - Perfluorononanoic Acid

8. PFHxS - Perfluorohexanesulfonic Acid

9. PFHpA - Perfluoroheptanoic Acid

10. PFDA - Perfluorodecanoic Acid

11. NA - Concentration data not available

12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.

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

14. NE- Not Established

15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.

16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ⁴	PC-11																				PC-14						
SCREEN DEPTH (FEET)		35-45																				28-38						
WELL DIAMETER (INCHES)		2																				2						
WELL STATUS		Viable																				Viable						
SAMPLING DATE		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	2/19/2020	5/12/2020	7/29/2020	10/21/2020	1/27/2021	5/19/2021	7/28/2021	11/1/2021	1/26/2022	4/20/2022	11/10/2022	11/1/2023	8/20/2014	3/30/2016	4/28/2017	11/2/2021	11/11/2022	11/1/2023
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	ng/L	ng/L
PFAS (Method 537.1m or PACE SOP 454)																												
PFOS	20	4,400	32,000	3,600	4,000	9,600	14,000	200,000	68,000	22,000	18,000	12,000	9,500	7,200	2,700	2,100	2,400	2,900	1,900	1,600	2,300	830	550	2,100	1,600	700	700	380
PFOA	20	550	430	250	180	250	410	640	BRL (<240)	150	290	140	130	150	78	59	74	58	40	70	120	80	40	250	160	26	76	18
PFNA	20	--	--	--	--	230	190	1,700	540	320	140	130	110	100	74	69	61	78	63	88	82	74	--	--	--	37	69	34
PFHxS	20	--	--	--	--	1,500	1,500	2,400	1,200	800	1,300	720	610	640	250	170	320	270	160	240	620	200	--	--	--	92	160	77
PFHpA	20	--	--	--	--	200	310	210	BRL (<210)	160	210	140	130	160	92	65	75	88	60	87	210	99	--	--	--	43	62	34
PFDA	20	--	--	--	--	--	--	450	BRL (<260)	73	69	56	55	52	69	32	31	21	18	20	22	9.2	--	--	--	BRL (<3.9)	7.3	6.4
TOTAL 16 PFAS	20	4950	32430	3850	4180	11,780	16,410	205,400	69,740	23,503	20,009	13,186	10,535	8,302	3,263	2,495	2,961	3,415	2,241	2,105	3,354	1,292	590	2,350	1,760	898	1,074	549

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.

2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and invidual concentrations of the six PFAS compounds presented above.

3. BRL - Below Laboratory Detection Limits

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

7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard

5. PFOS - Perfluorooctanesulfonate

6. PFOA - Perfluorooctanoic Acid

7. PFNA - Perfluorononanoic Acid

8. PFHxS - Perfluorohexanesulfonic Acid

9. PFHpA - Perfluoroheptanoic Acid

10. PFDA - Perfluorodecanoic Acid

11. NA - Concentration data not available

12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.

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

14. NE- Not Established

15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.

16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ⁴	PC-16d																								PC-18								
SCREEN DEPTH (FEET)		Unknown ¹⁶																								40-50								
WELL DIAMETER (INCHES)		2																								2								
WELL STATUS		Viable																								Viable								
SAMPLING DATE		4/2/2015	10/7/2015	2/6/2018	6/26/2018	1/10/2019	4/24/2019	7/23/2019	10/29/2019	2/19/2020	5/12/2020	7/28/2020	10/21/2020	1/27/2021	5/20/2021	7/28/2021	11/1/2021	1/26/2022	4/20/2022	7/28/2022	11/10/2022	2/1/2023	4/5/2023	7/26/2023	11/2/2023	6/17/2015	10/7/2015	4/27/2017	2/6/2018	1/10/2019	10/29/2019	10/21/2020	11/1/2021	11/10/2022
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	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	
PFAS (Method 537.1m or PACE SOP 454)																																		
PFOS	20	700	560	980	1,900	1,600	2,000	1,400	1,300	1,600	1,200	930	1,900	690	1,200	460	250	300	580	1,300	1,700	290	1,300	410	200	1,200	900	580	890	1,500	1,500	330	290	140
PFOA	20	70	84	64	150	9.3	140	33	75	130	57	99	99	46	70	18	8.9	18	38	130	89	16	120	20	11	110	590	--	70	110	75	18	6.3	8.2
PFNA	20	--	--	--	100	BRL (<8.7)	110	36	79	110	63	49	62	48	83	23	8.9	26	45	70	59	18	72	25	BRL (<11)	--	--	--	--	130	79	20	10	12
PFHxS	20	--	--	--	670	60	520	270	220	360	170	260	280	110	16	72	49	55	160	680	360	75	490	88	54	--	--	--	--	540	220	57	59	32
PFHpA	20	--	--	--	170	13	140	74	80	92	61	68	63	54	47	15	9	25	42	88	71	19	110	28	22	--	--	--	--	140	80	21	20	18
PFDA	20	--	--	--	--	--	8.7	BRL (<4.1)	7.2	7.2	8.5	11	11	5	9	6	BRL (<3.9)	BRL (<3.9)	4.2	10.0	11.0	BRL (<10)	8.2	BRL (<10)	BRL (<11)	--	--	--	--	--	7.2	6.8	BRL (<3.9)	2.2
TOTAL 16 PFAS	20	770	644	1044	2,990	1,682	2,919	1,813	1,761	2,299	1,560	1,417	2,415	953	1,425	594	326	424	869	2,278	2,290	418	2,100	571	287	1310	1490	580	960	2420	1,961	453	385	212

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.

2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and invidual concentrations of the six PFAS compounds presented above.

3. BRL - Below Laboratory Detection Limits

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

7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard

5. PFOS - Perfluorooctanesulfonate

6. PFOA - Perfluorooctanoic Acid

7. PFNA - Perfluorononanoic Acid

8. PFHxS - Perfluorohexanesulfonic Acid

9. PFHpA - Perfluoroheptanoic Acid

10. PFDA - Perfluorodecanoic Acid

11. NA - Concentration data not available

12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.

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

14. NE- Not Established

15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.

16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ⁴	PC-28																					
SCREEN DEPTH (FEET)		30-39																					
WELL DIAMETER (INCHES)		2																					
WELL STATUS		Viable																					
SAMPLING DATE		3/9/2016	4/28/2017	1/10/2019	4/24/2019	7/23/2019	10/28/2019	2/19/2020	5/12/2020	7/29/2020	10/21/2020	1/27/2021	5/20/2021	7/28/2021	11/3/2021	1/26/2022	4/20/2022	7/28/2022	11/10/2022	2/1/2023	4/4/2023	7/26/2023	
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 537.1m or PACE SOP 454)																							
PFOS	20	400	770	38	18	82	270	270	430	200	1,100	1,200	820	100	730	670	1,200	550	960	1,200	600	190	
PFOA	20	27	61	BRL (<3.3)	BRL (<7.4)	190	12	BRL (<7.4)	18	12	65	48	22	38	16	26	34	30	56	48	29	11	
PFNA	20	--	--	BRL(<8.7)	BRL (<4.9)	BRL (<4.9)	9	BRL (<4.9)	15	10	49	61	33	45	23	28	59	45	82	95	46	17	
PFHxS	20	--	--	17	15	30	94	72	120	71	230	170	110	120	85	83	95	75	130	120	76	55	
PFHpA	20	--	--	20	24	25	33	23	41	30	89	66	45	53	43	51	47	40	75	66	44	26	
PFDA	20	--	--	--	BRL (<4.1)	BRL (<4.1)	BRL (<4.1)	BRL (<4.1)	2.2	BRL (<4.1)	8	10	6	9	BRL (<3.9)	7.5	14.0	9.0	15.0	18.0	10.0	4.8	
TOTAL 16 PFAS	20	427	831	75	57	327	418	365	626	323	1,541	1,555	1,036	365	897	865.5	1,449.0	749.0	1,318.0	1,547.0	805.0	303.8	

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.

2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and invidiual concentrations of the six PFAS compounds presented above.

3. BRL - Below Laboratory Detection Limits

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

7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard

5. PFOS - Perfluorooctanesulfonate

6. PFOA - Perfluorooctanoic Acid

7. PFNA - Perfluorononanoic Acid

8. PFHxS - Perfluorohexanesulfonic Acid

9. PFHpA - Perfluoroheptanoic Acid

10. PFDA - Perfluorodecanoic Acid

11. NA - Concentration data not available

12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.

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

14. NE- Not Established

15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.

16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ⁴	PC-30																								PC-345							
SCREEN DEPTH (FEET)		39-49																								5-15							
WELL DIAMETER (INCHES)		2																								2							
WELL STATUS		Viable																								Viable							
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	2/19/2020	5/12/2020	7/29/2020	10/21/2020	1/27/2021	5/20/2021	7/28/2021	11/1/2021	1/26/2022	4/20/2022	7/28/2022	11/10/2022	2/1/2023	4/5/2023	7/25/2023	11/2/2023	4/14/2016	11/2/2021	4/21/2022	7/27/2022	11/9/2022	1/31/2023	11/2/2023	
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	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	
PFAS (Method 537.1m or PACE SOP 454)																																	
PFOS	20	980	2,500	1,900	1,600	2,200	1,200	4,300	960	1,200	880	1,100	850	580	540	450	720	480	340	180	340	1,100	580	390	870	1,300	1,300	580	710	1,300	1,500	800	
PFOA	20	88	--	98	99	85	85	79	55	130	45	38	32	48	26	21	30	25	23	16	21	45	35	26	37	72	74	65	69	80	94	73	
PFNA	20	--	--	--	80	88	100	100	61	74	45	57	40	24	40	BRL (<5.1)	51	34	23	19	43	110	65	45	69	--	150	100	130	140	230	120	
PFHxS	20	--	--	--	510	390	340	300	220	210	180	120	100	76	64	68	96	72	63	43	59	110	96	80	98	--	160	140	140	130	210	130	
PFHpA	20	--	--	--	130	110	110	96	71	87	80	48	47	47	40	34	43	35	33	25	29	54	45	41	45	--	87	77	74	98	110	97	
PFDA	20	--	--	--	--	--	12	BRL (<4.1)	6	5.9	8.2	7.7	6.2	5.3	5.2	4.9	BRL (<3.9)	6.4	4.7	4.8	5.3	16.0	10.0	6.9	BRL (<10)	--	7.8	7.2	8.6	16	17	13	
TOTAL 16 PFAS	20	1068	2500	1998	2,419	2,873	1,847	4,875	1,373	1,707	1,238	1,371	1,075	780	715	578	940	652	487	288	497	1,435	831	589	1,119	1372	1,779	969	1,132	1,764	2,161	1,233	

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.

2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and invidual concentrations of the six PFAS compounds presented above.

3. BRL - Below Laboratory Detection Limits

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

7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard

5. PFOS - Perfluorooctanesulfonate

6. PFOA - Perfluorooctanoic Acid

7. PFNA - Perfluorononanoic Acid

8. PFHxS - Perfluorohexanesulfonic Acid

9. PFHpA - Perfluoroheptanoic Acid

10. PFDA - Perfluorodecanoic Acid

11. NA - Concentration data not available

12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.

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

14. NE- Not Established

15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.

16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ⁴	PC-36S							PC-36D			PC-37		PC-38												PC-39							PC-39D	
SCREEN DEPTH (FEET)		14-24												Unknown ¹⁶												Unknown ¹⁶							46-51	
WELL DIAMETER (INCHES)		2												2												2								
WELL STATUS		Viable							Viable			Viable		Viable												Viable								
SAMPLING DATE		4/14/2016	1/11/2019	10/29/2019	10/22/2020	11/3/2021	11/10/2022	11/2/2023	4/14/2016	4/24/2017	11/2/2023	4/10/2017	11/3/2023	4/24/2017	10/29/2019	5/12/2020	7/28/2020	10/21/2020	1/27/2021	5/20/2021	7/28/2021	11/1/2021	1/26/2022	11/10/2022	11/3/2023	4/24/2017	2/19/2020	11/2/2021	7/28/2022	11/10/2022	2/1/2023	4/4/2023	7/26/2023	7/26/2023
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	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.1m or PACE SOP 454)																																		
PFOS	20	35	64	1,200	700	640	760	130	3,100	2,500	620	45	45	BRL (<2.6)	BRL (<5.2)	4.5	BRL (<5.2)	BRL (<5.7)	3	BRL (<5.7)	BRL (<5.7)	BRL (<5.7)	BRL (<5.7)	5.5	3.5	1,200	820	140	180	160	180	96	54	29
PFOA	20	BRL (<5.3)	BRL (<3.3)	54	36	32	37	12	150	120	17	BRL (<20)	6.7	BRL (<4.6)	BRL (<7.4)	BRL (<0.23)	BRL (<7.4)	BRL (<5.0)	BRL (<2.0)	BRL (<5.0)	BRL (<5.0)	BRL (<5.0)	BRL (<5.0)	BRL (<2.0)	BRL (<1.9)	46	28	BRL (<5.0)	BRL (<5.0)	2.2	BRL (<10)	BRL (<4.1)	BRL (<1.9)	BRL (<1.9)
PFNA	20	--	BRL (<8.7)	80	57	71	120	10	--	--	32	--	2.4	--	BRL (<4.9)	BRL (<0.48)	BRL (<4.9)	BRL (<5.1)	BRL (<2.0)	BRL (<5.1)	BRL (<5.1)	BRL (<5.1)	BRL (<5.1)	BRL (<2.0)	BRL (<1.9)	--	61	6.9	6.0	5.2	BRL (<10)	BRL (<4.1)	2.4	2.8
PFHxS	20	--	38	120	79	73	90	140	--	--	45	--	83	--	6	2.2	BRL (<5.2)	BRL (<4.4)	2	BRL (<4.4)	BRL (<4.4)	BRL (<4.4)	BRL (<4.4)	BRL (<2.0)	BRL (<1.9)	--	100	4.9	12.0	12	13	9.2	5.7	6.5
PFHpA	20	--	BRL (<7.4)	62	42	38	49	18	--	--	23	--	11	--	BRL (<7.1)	BRL (<0.37)	BRL (<7.1)	BRL (<6.7)	BRL (<2.0)	BRL (<6.7)	BRL (<6.7)	BRL (<6.7)	BRL (<6.7)	BRL (<2.0)	BRL (<1.9)	--	28	BRL (<6.7)	BRL (<6.7)	4	BRL (<10)	BRL (<4.1)	2.4	2.1
PFDA	20	--	--	11	11	11	13	BRL (<1.9)	--	--	6	--	BRL (<1.8)	--	BRL (<4.1)	BRL (<0.18)	BRL (<4.1)	BRL (<3.9)	BRL (<2.0)	BRL (<3.9)	BRL (<3.9)	BRL (<3.9)	BRL (<3.9)	BRL (<2.0)	BRL (<1.9)	--	BRL (<4.1)	BRL (<3.9)	BRL (<3.9)	BRL (<1.8)	BRL (<10)	BRL (<4.1)	BRL (<1.9)	BRL (<1.9)
TOTAL 16 PFAS	20	35	102	1,527	925	865	1,069	310	3250	2620	743	45	148.1	BRL	6.1	6.7	BRL	BRL	4.3	BRL	BRL	BRL	BRL	5.5	3.5	1,246	1037	151.8	198	183.4	193	105.2	64.5	40.4

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.

2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and individual concentrations of the six PFAS compounds presented above.

3. BRL - Below Laboratory Detection Limits

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

7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard

5. PFOS - Perfluorooctanesulfonate

6. PFOA - Perfluorooctanoic Acid

7. PFNA - Perfluorononanoic Acid

8. PFHxS - Perfluorohexanesulfonic Acid

9. PFHpA - Perfluoroheptanoic Acid

10. PFDA - Perfluorodecanoic Acid

11. NA - Concentration data not available

12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.

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

14. NE- Not Established

15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.

16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Table 4 - Summary of Long Term Groundwater Monitoring Data
Former Barnstable County Fire and Rescue Training Academy
155 S. Flint Rock Road, Barnstable, MA
RTN 4-26179

SAMPLE ID	Method 1 GW-1 Standards ⁴	PC-29		HW-15	HW-1D ¹³						
SCREEN DEPTH (FEET)		25-35		Unknown ¹⁹	Unknown ¹⁹						
WELL DIAMETER (INCHES)		2			2						
WELL STATUS		Viable			Viable						
SAMPLING DATE		11/10/2022	11/1/2023	11/1/2023	5/3/2017	1/10/2019	10/28/2019	10/21/2020	11/3/2021	11/11/2022	11/1/2023
UNITS	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PFAS (Method 537.1m or PACE SOP 454)											
PFOS	20	2.4	BRL (<1.8)	BRL (<1.8)	25	BRL (<6)	BRL (<5.2)	BRL (<5.7)	BRL (<5.7)	17	16
PFOA	20	BRL (<1.8)	BRL (<1.8)	BRL (<1.8)	8	BRL (<3.3)	BRL (<7.4)	BRL (<5.0)	BRL (<5.0)	BRL (<1.9)	BRL (<1.8)
PFNA	20	BRL (<1.8)	BRL (<1.8)	BRL (<1.8)	--	BRL (<8.7)	BRL (<4.9)	BRL (<5.1)	BRL (<5.1)	BRL (<1.9)	BRL (<1.8)
PFHxS	20	3.6	2.1	BRL (<1.8)	--	BRL (<5.6)	BRL (<5.2)	BRL (<4.4)	BRL (<4.4)	37	13
PFHpA	20	BRL (<1.8)	BRL (<1.8)	BRL (<1.8)	--	BRL (<7.4)	BRL (<7.1)	BRL (<6.7)	BRL (<6.7)	BRL (<1.9)	BRL (<1.8)
PFDA	20	BRL (<1.8)	BRL (<1.8)	BRL (<1.8)	--	--	BRL (<4.1)	BRL (<3.9)	BRL (<3.9)	BRL (<1.9)	BRL (<1.8)
TOTAL 16 PFAS	20	6	2.1	BRL	33	BRL	BRL	BRL	BRL	54	29

Notes:

1. 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 in the IRA Status Reports. Data presented herein is summarized and data was selected based on quarterly sampling events.
2. On December 27, 2019 MassDEP MCP GW-1 Risk Standards for groundwater became final. The MCP GW-1 Risk Standard of 20 ng/L apply to the sum of and individual concentrations of the six PFAS compounds presented above.
3. BRL - Below Laboratory Detection Limits
4. Concentrations presented in ng/L - nanograms per Liter - parts per trillion
7. Concentrations in **bold** exceed applicable Health Advisory Limit or Method 1 GW-1 Standard
5. PFOS - Perfluorooctanesulfonate
6. PFOA - Perfluorooctanoic Acid
7. PFNA - Perfluorononanoic Acid
8. PFHxS - Perfluorohexanesulfonic Acid
9. PFHpA - Perfluoroheptanoic Acid
10. PFDA - Perfluorodecanoic Acid
11. NA - Concentration data not available
12. Monitoring well HS-1, HS-2, HS-2S, and HS-6 were destroyed or removed during soil removal activities in January 2017 as part of an Immediate Response Action Plan. The wells were replaced with HSW-1/HS-1(a), HWS-2/HS2(a) as post-exacavation activities.
13. Monitoring well HW-1D is a downgradient well located on the north side of Mary Dunn Pond.
14. NE- Not Established
15. Due to labeling error MW-3S was labeled as MW-3 on the laboratory report and COC in the November 2022.
16. Well construction logs could not be located for this monitoring well. Therefore well screen depth is unknown at this time.

Figures

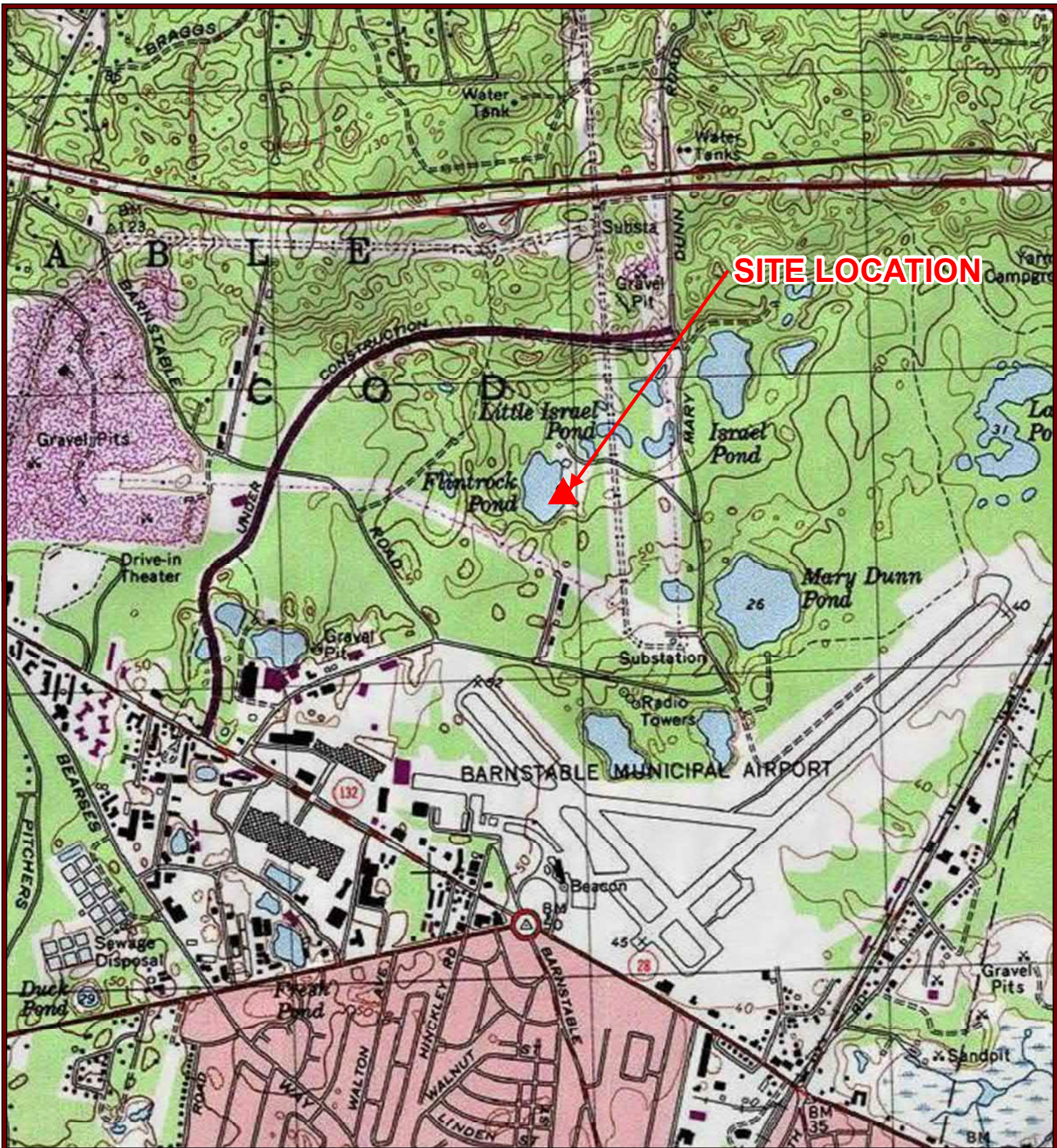


FIGURE 1 - SITE LOCATION

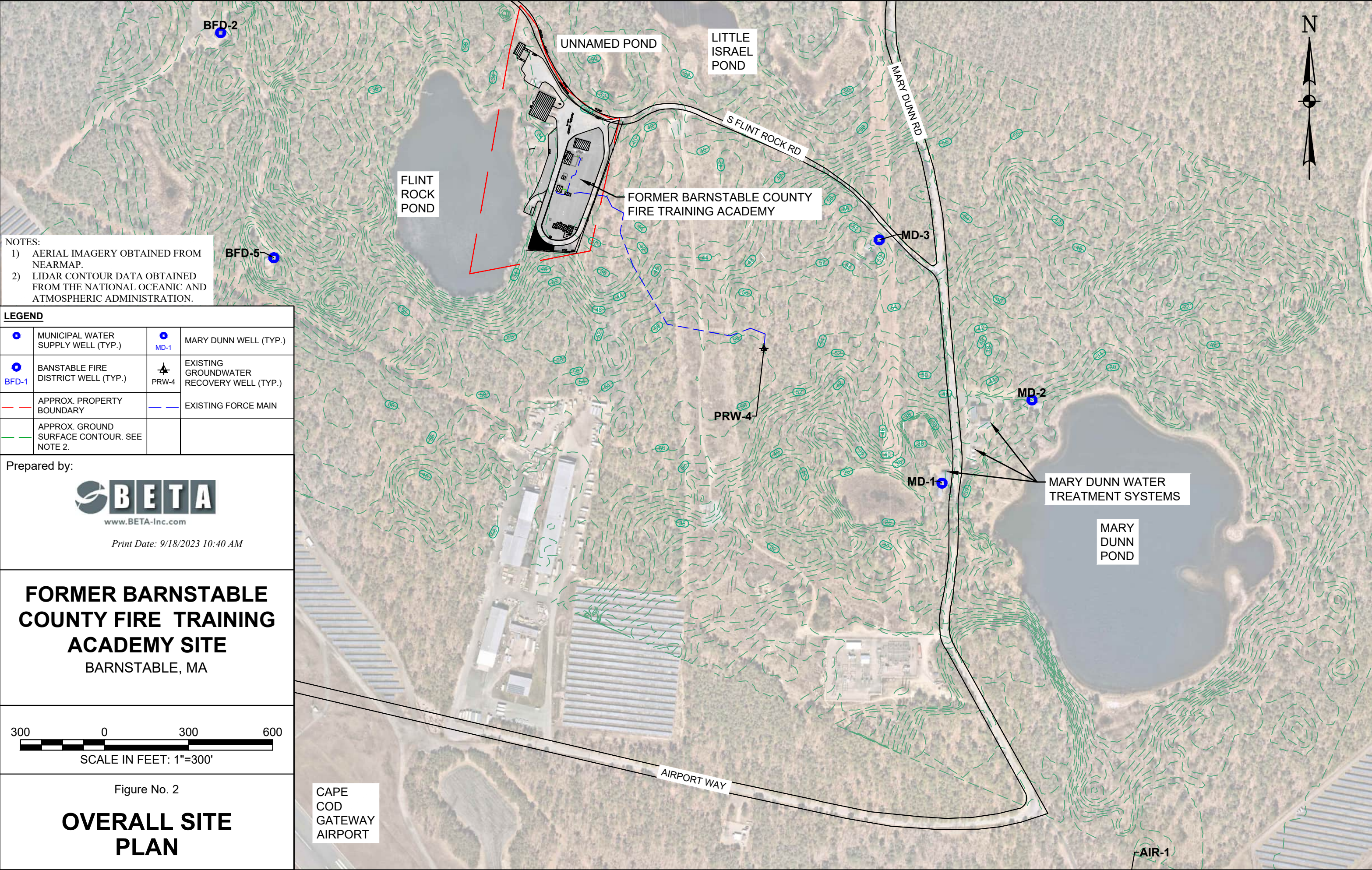
BARNSTABLE COUNTY
FIRE & RESCUE TRAINING ACADEMY SITE
155 S. FLINT ROCK ROAD
BARNSTABLE, MA 02630
RTN 4-26179

LATITUDE: 41°40'41.53"N
LONGITUDE: 70°17'7.82"W

0 500 1,000 2,000
Feet



Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Copyright: © 2013 National Geographic Society, i-cubed



NOTES:
1) AERIAL IMAGERY OBTAINED FROM NEARMAP.
2) LIDAR CONTOUR DATA OBTAINED FROM THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION.

LEGEND			
	MUNICIPAL WATER SUPPLY WELL (TYP.)		MARY DUNN WELL (TYP.)
	BANSTABLE FIRE DISTRICT WELL (TYP.)		EXISTING GROUNDWATER RECOVERY WELL (TYP.)
	APPROX. PROPERTY BOUNDARY		EXISTING FORCE MAIN
	APPROX. GROUND SURFACE CONTOUR. SEE NOTE 2.		

Prepared by:



www.BETA-inc.com

Print Date: 9/18/2023 10:40 AM

**FORMER BARNSTABLE
COUNTY FIRE TRAINING
ACADEMY SITE**
BARNSTABLE, MA

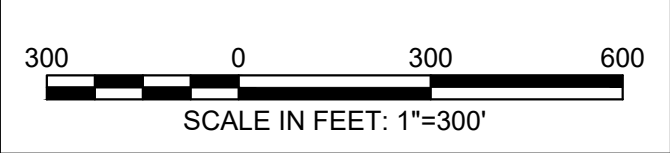
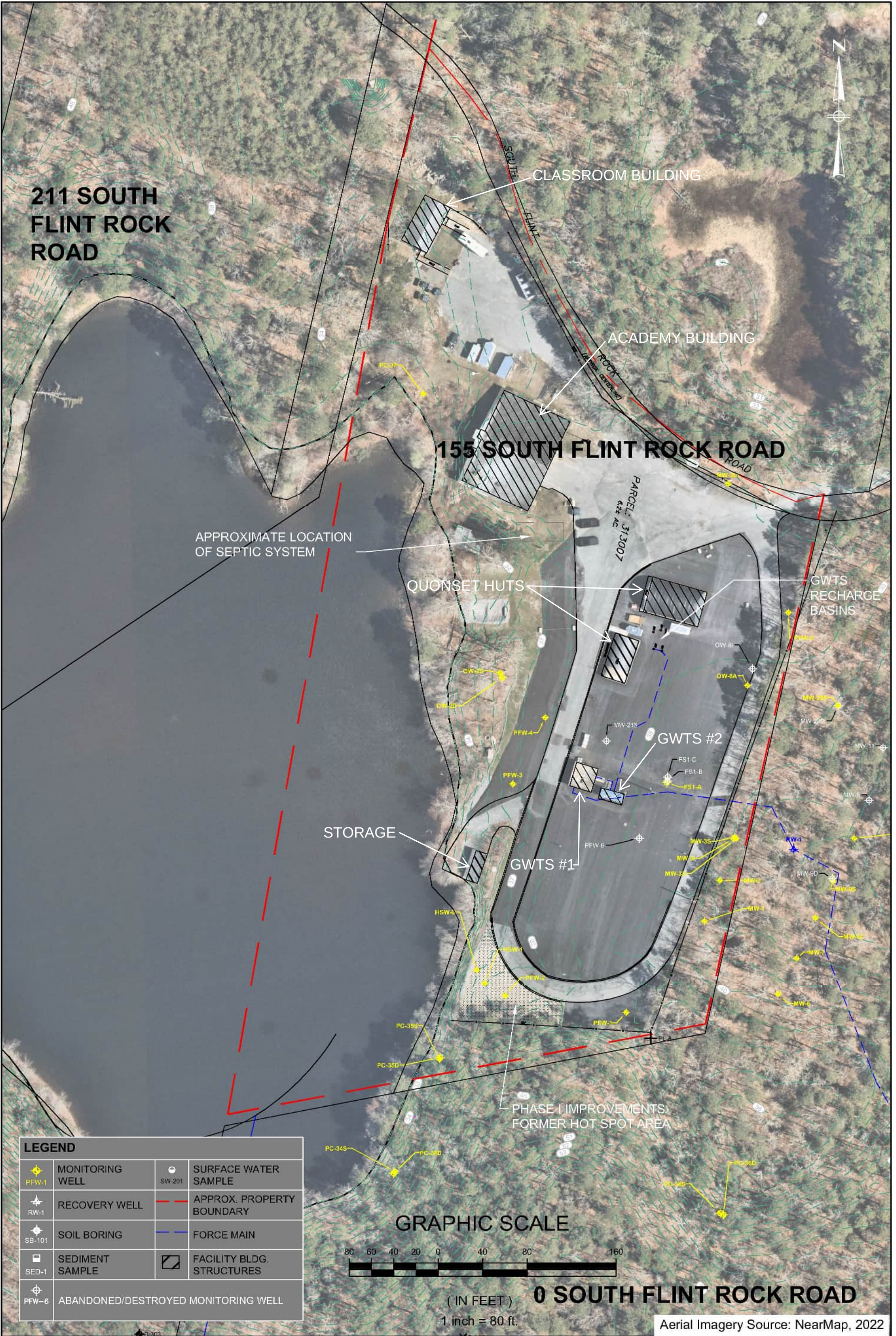
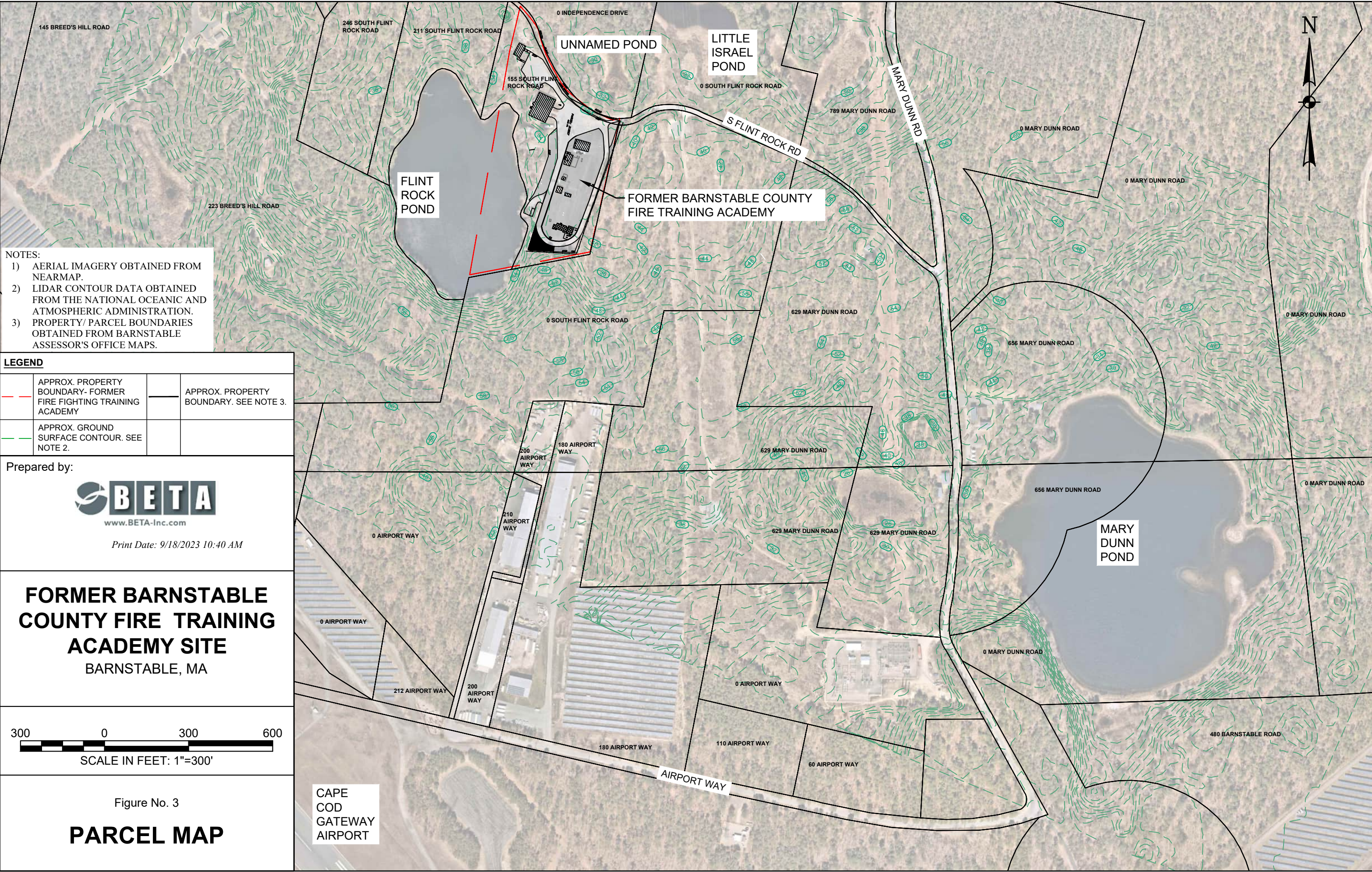


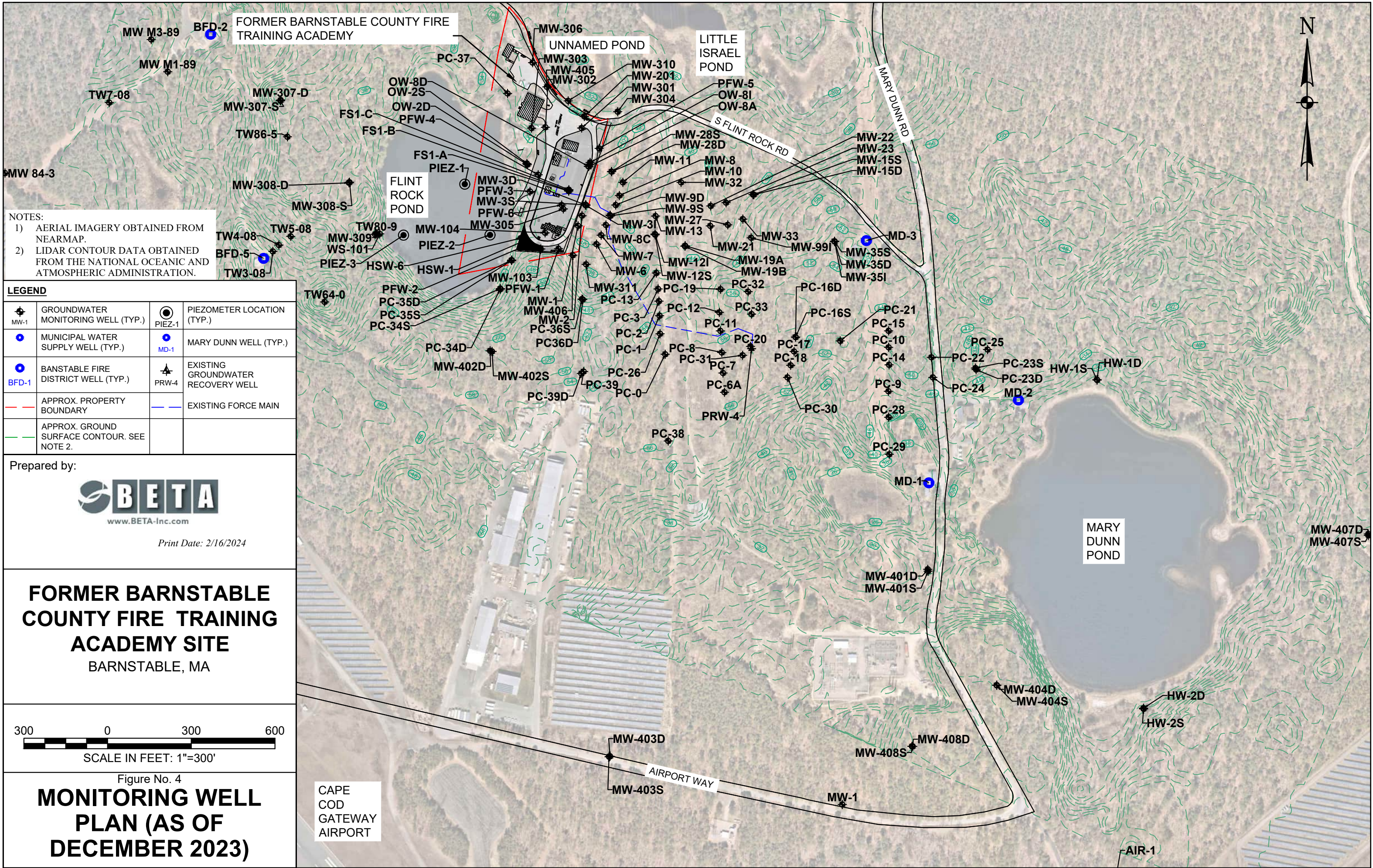
Figure No. 2

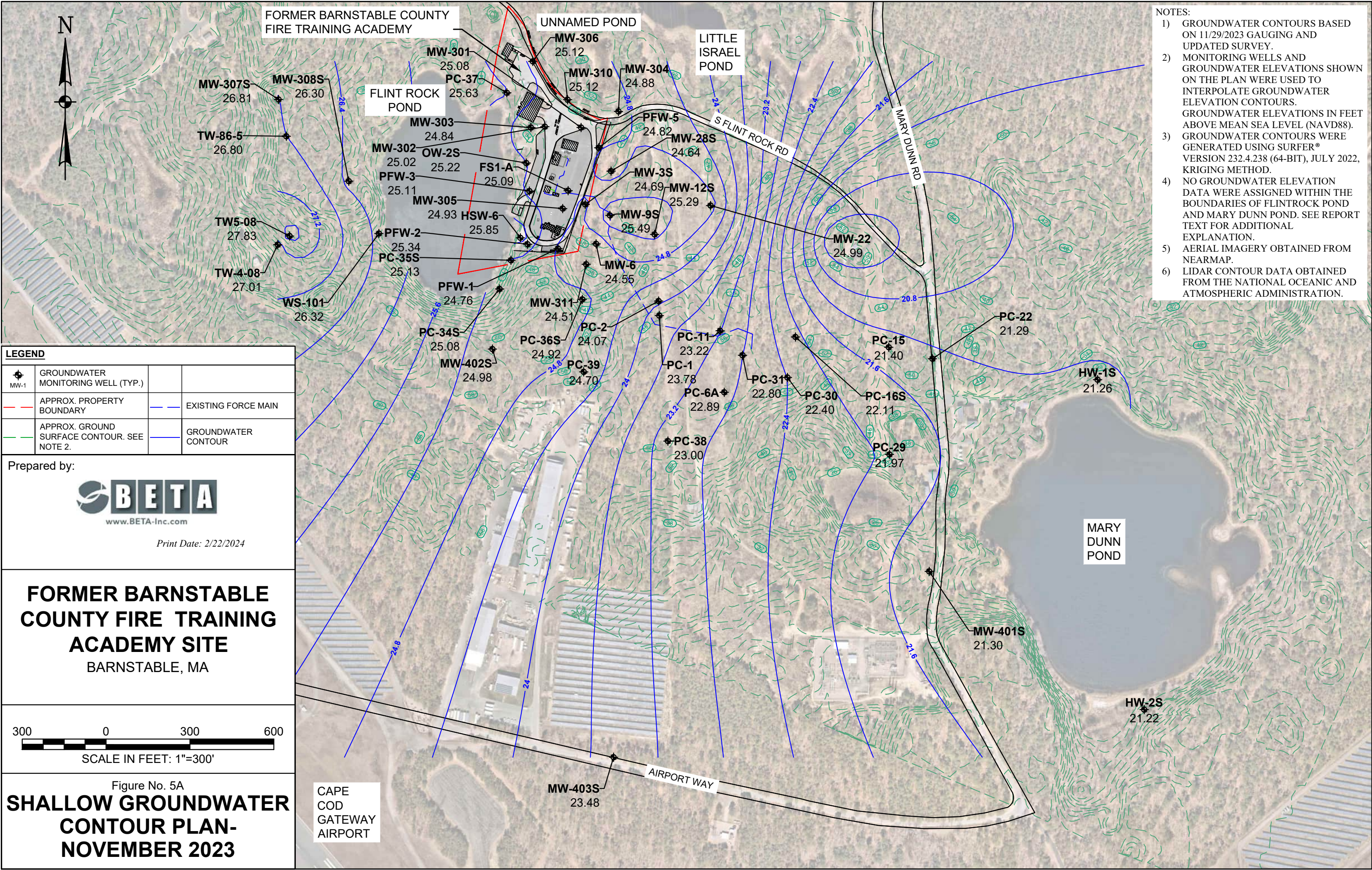
**OVERALL SITE
PLAN**

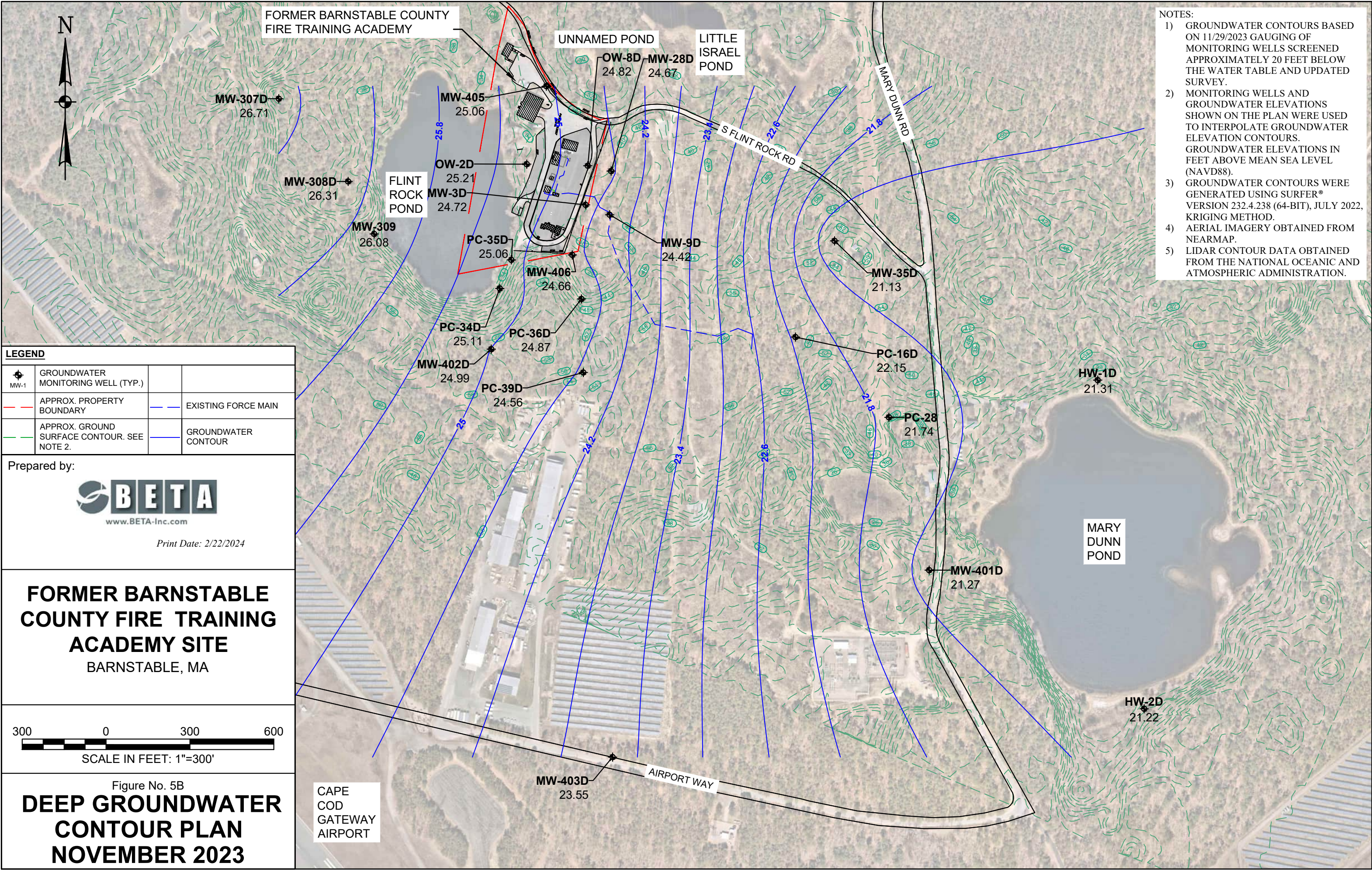
CAPE
COD
GATEWAY
AIRPORT











- NOTES:
- 1) REVISED GROUNDWATER CONTOURS BASED ON 4/18/2023 GAUGING AND UPDATED SURVEY.
 - 2) MONITORING WELLS AND GROUNDWATER ELEVATIONS SHOWN ON THE PLAN WERE USED TO INTERPOLATE GROUNDWATER ELEVATION CONTOURS. GROUNDWATER ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL (NAVD88).
 - 3) GROUNDWATER CONTOURS WERE GENERATED USING SURFER® VERSION 232.4.238 (64-BIT), JULY 2022, KRIGING METHOD.
 - 4) THE MEASURED ELEVATION OF 28.13 FEET (NAVD88) ON 04/18/2023 WAS ASSIGNED TO THE SURFACE OF FLINTROCK POND AS A BREAKLINE IN THE SURFER MAPPING PROGRAM. AERIAL IMAGERY OBTAINED FROM NEARMAP.
 - 5) LIDAR CONTOUR DATA OBTAINED FROM THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION.

LEGEND			
	GROUNDWATER MONITORING WELL (TYP.)		
	APPROX. PROPERTY BOUNDARY		EXISTING FORCE MAIN
	APPROX. GROUND SURFACE CONTOUR. SEE NOTE 2.		GROUNDWATER CONTOUR

Prepared by:

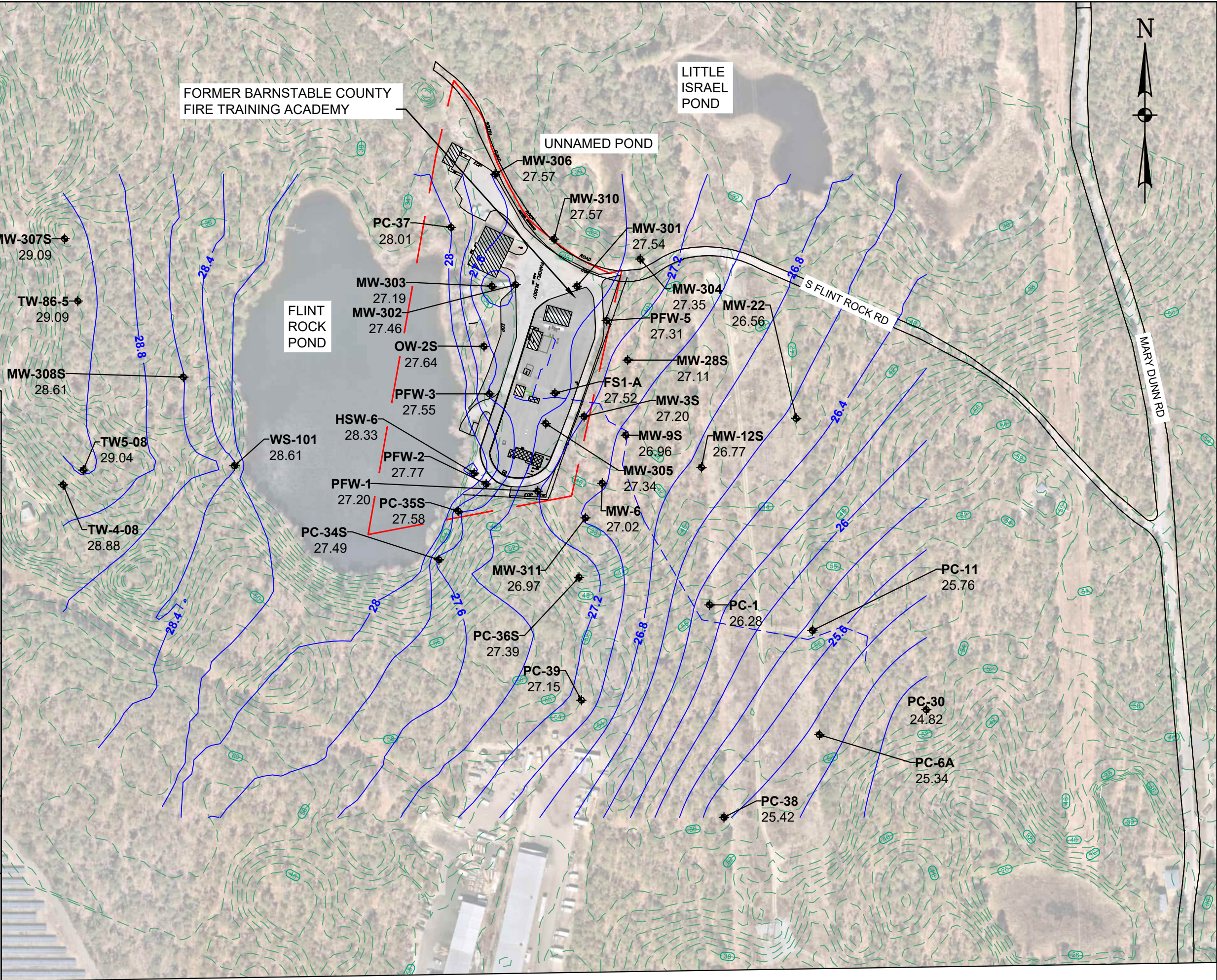


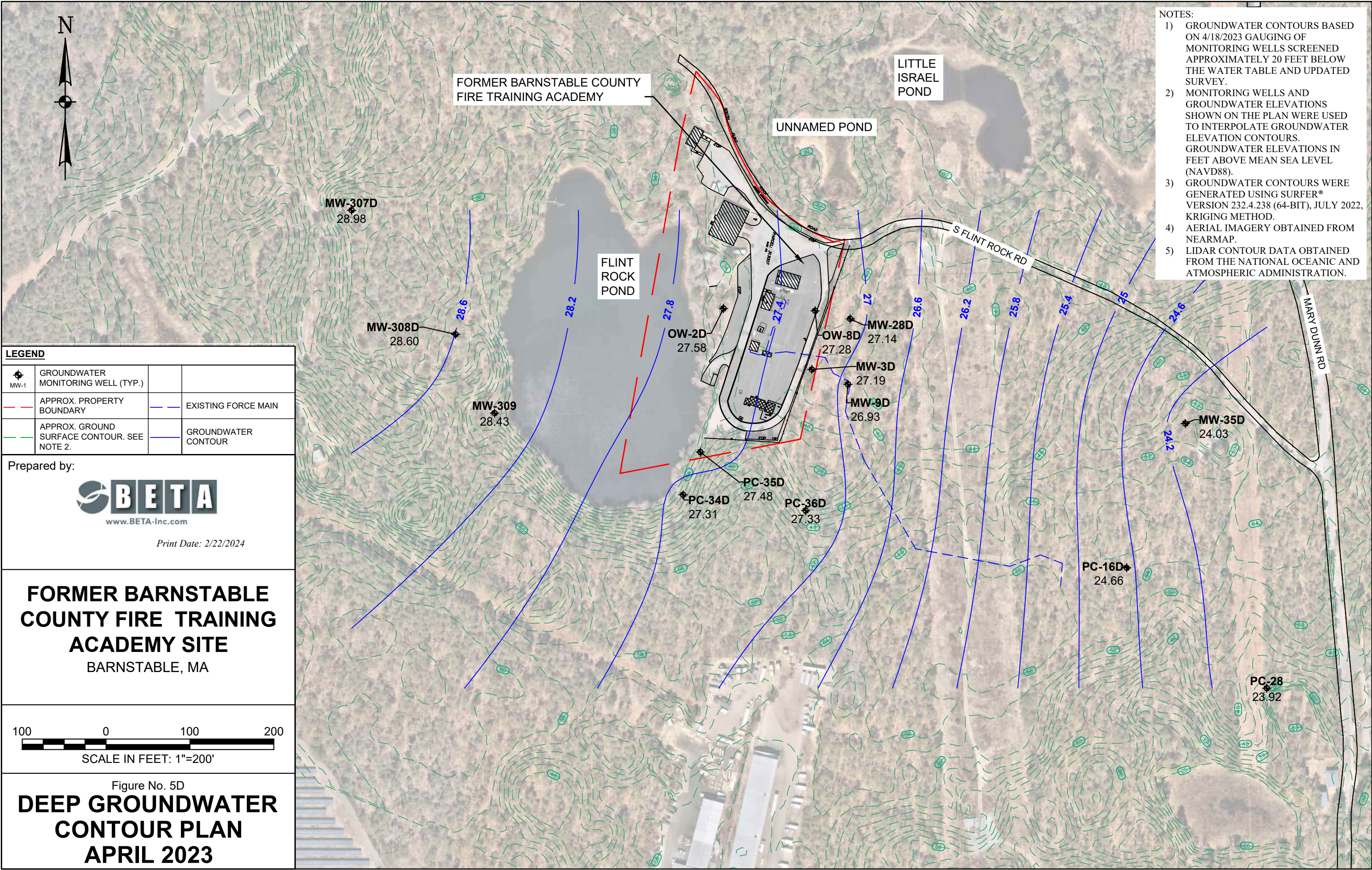
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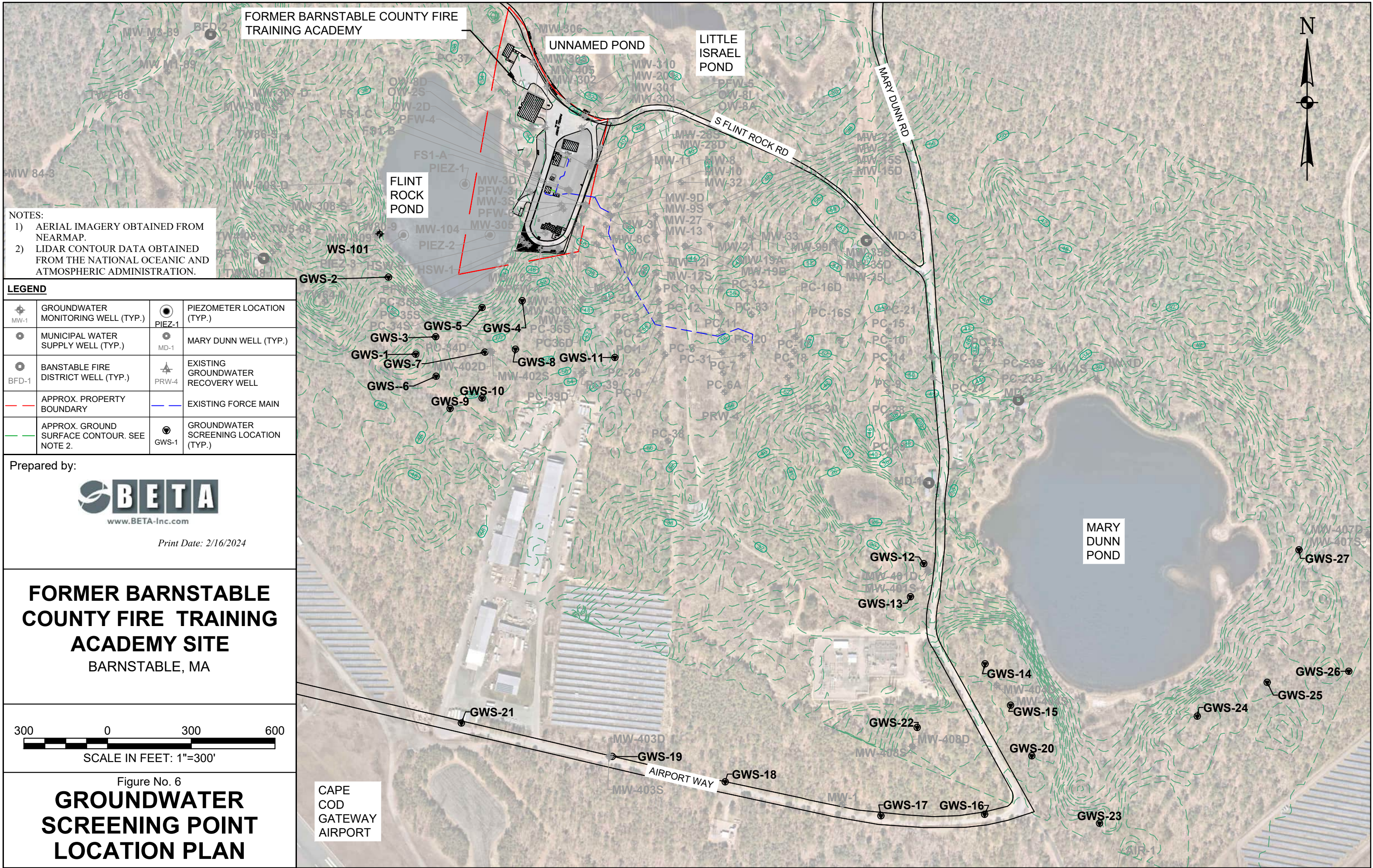
**FORMER BARNSTABLE
COUNTY FIRE TRAINING
ACADEMY SITE**
BARNSTABLE, MA



Figure No. 5C
**REVISED SHALLOW
GROUNDWATER CONTOUR
PLAN- APRIL 2023**







Appendix A - BWSC Transmittal Form



**COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT**

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number

4

26179

A. SITE LOCATION:

1. Site Name: 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 the disposal site that is the source of the release is Tier Classified. Check the current Tier Classification Category:

☒ a. Tier I ☐ b. Tier ID ☐ c. Tier II

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

- ☐ 1. Submit a **Phase I Completion Statement**, pursuant to 310 CMR 40.0484.
- ☐ 2. Submit a **Revised Phase I Completion Statement**, pursuant to 310 CMR 40.0484.
- ☐ 3. Submit a **Phase II Scope of Work**, pursuant to 310 CMR 40.0834.
- ☒ 4. Submit an **interim Phase II Report**. This report does not satisfy the response action deadline requirements in 310 CMR 40.0510.
- ☐ 5. Submit a **final Phase II Report and Completion Statement**, pursuant to 310 CMR 40.0836.
- ☐ 6. Submit a **Revised Phase II Report and Completion Statement**, pursuant to 310 CMR 40.0836.
- ☐ 7. Submit a **Phase III Remedial Action Plan and Completion Statement**, pursuant to 310 CMR 40.0862.
- ☐ 8. Submit a **Revised Phase III Remedial Action Plan and Completion Statement**, pursuant to 310 CMR 40.0862.
- ☐ 9. Submit a **Phase IV Remedy Implementation Plan**, pursuant to 310 CMR 40.0874.
- ☐ 10. Submit a **Modified Phase IV Remedy Implementation Plan**, pursuant to 310 CMR 40.0874.
- ☐ 11. Submit an **As-Built Construction Report**, pursuant to 310 CMR 40.0875.
- ☐ 12. Submit a **Phase IV Status Report**, pursuant to 310 CMR 40.0877.
- ☐ 13. Submit a **Phase IV Completion Statement**, pursuant to 310 CMR 40.0878 and 40.0879.

Specify the outcome of Phase IV activities: (check one)

- ☐ a. Phase V Operation, Maintenance or Monitoring of the Comprehensive Remedial Action is necessary to achieve a Permanent or Temporary Solution.
- ☐ b. The requirements of a Permanent Solution have been met. A completed Permanent Solution Statement and Report (BWSC104) will be submitted to DEP.
- ☐ c. The requirements of a Temporary Solution have been met. A completed Temporary Solution Statement and Report (BWSC104) will be submitted to DEP.



**COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT**

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number

4 - 26179

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

- ☐ 14. Submit a **Revised Phase IV Completion Statement**, pursuant to 310 CMR 40.0878 and 40.0879.
- ☐ 15. Submit a **Phase V Status Report**, pursuant to 310 CMR 40.0892.
- ☐ 16. 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 a Status Report.
- ☐ iv. A Remedial Monitoring Report(s) submitted annually, concurrent with a Status Report.
- c. Status of Site: (check one) ☐ i. Phase IV ☐ ii. Phase V ☐ iii. Remedy Operation Status ☐ iv. Temporary Solution
- d. Number of Remedial Systems and/or Monitoring Programs: _____
- A separate BWSC108A, CRA Remedial Monitoring Report, must be filled out for each Remedial System and/or Monitoring Program addressed by this transmittal form.
- ☐ 17. Submit a **Remedy Operation Status**, pursuant to 310 CMR 40.0893.
- ☐ 18. Submit a **Status Report to maintain a Remedy Operation Status**, pursuant to 310 CMR 40.0893(2).
- ☐ 19. Submit a **Transfer and/or a Modification of Persons Maintaining a Remedy Operation Status (ROS)**, pursuant to 310 CMR 40.0893(5) (check one, or both, if applicable).
- ☐ a. Submit a **Transfer of Persons Maintaining an ROS** (the transferee should be the person listed in Section D, "Person Undertaking Response Actions").
- ☐ b. Submit a **Modification of Persons Maintaining an ROS** (the primary representative should be the person listed in Section D, "Person Undertaking Response Actions").
- c. Number of Persons Maintaining an ROS not including the primary representative: _____
- ☐ 20. Submit a **Termination of a Remedy Operation Status**, pursuant to 310 CMR 40.0893(6). (check one)
- ☐ a. Submit a notice indicating ROS performance standards have not been met. A plan and timetable pursuant to 310 CMR 40.0893(6)(b) for resuming the ROS are attached.
- ☐ b. Submit a notice of Termination of ROS.
- ☐ 21. Submit a **Phase V Completion Statement**, pursuant to 310 CMR 40.0894.
- Specify the outcome of Phase V activities: (check one)
- ☐ a. The requirements of a Permanent Solution have been met. A completed Permanent Solution Statement and Report (BWSC104) will be submitted to DEP.
- ☐ b. The requirements for a Temporary Solution have been met. A completed Temporary Solution Statement and Report (BWSC104) will be submitted to DEP.
- ☐ 22. Submit a **Revised Phase V Completion Statement**, pursuant to 310 CMR 40.0894.
- ☐ 23. Submit a **Temporary Solution Status Report**, pursuant to 310 CMR 40.0898.
- ☐ 24. Submit a **Plan for the Application of Remedial Additives** near a sensitive receptor, pursuant to 310 CMR 40.0046(3).
- a. Status of Site: (check one)
- ☐ i. Phase IV ☐ ii. Phase V ☐ iii. Remedy Operation Status ☐ iv. Temporary Solution



**COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT**

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number

4 - 26179

C. 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,

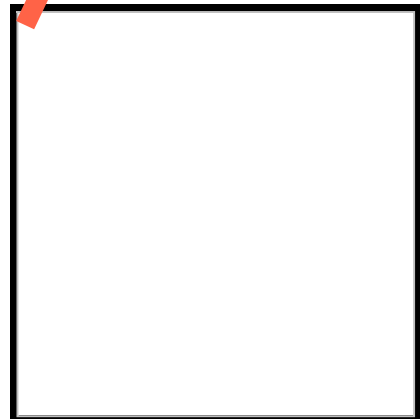
> if Section B indicates that a **Phase I, Phase II, Phase III, Phase IV or Phase V Completion Statement** and/or a **Termination of a Remedy Operation Status** is being submitted, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed and implemented in accordance 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;

> if Section B indicates that a **Phase II Scope of Work** or a **Phase IV Remedy Implementation 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) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> if Section B indicates that an **As-Built Construction Report**, a **Remedy Operation Status**, a **Phase IV, Phase V or Temporary Solution Status Report**, a **Status Report to Maintain a Remedy Operation Status**, a **Transfer or Modification of Persons Maintaining a Remedy Operation Status** and/or a **Remedial Monitoring Report** is 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.

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: 5083312700 5. Ext.:
6. Fax:
7. Signature:
8. Date: (mm/dd/yyyy)
9. LSP Stamp:





Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC 108

**COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT**

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number

4 - 26179

D. PERSON UNDERTAKING RESPONSE ACTIONS:

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: PAUL 4. Last Name: RUSZALA
5. Street: 3195 MAIN ST 6. Title: _____
7. City/Town: BARNSTABLE 8. State: MA 9. ZIP Code: 026301105
10. Telephone: 5083756643 11. Ext: _____ 12. Email: paul.ruszala@capecod.gov

E. RELATIONSHIP TO SITE OF PERSON UNDERTAKING RESPONSE ACTIONS: ☐ Check here to change relationship

- ☒ 1. RP or PRP ☐ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter
- ☒ e. Other RP or PRP Specify: NON-SPECIFIED PRP
- ☐ 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: _____

F. REQUIRED ATTACHMENT AND SUBMITTALS:

- ☒ 1. 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 DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.
- ☒ 2. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the submittal of any Phase Reports to DEP.
- ☐ 3. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the availability of a Phase III Remedial Action Plan.
- ☐ 4. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of the availability of a Phase IV Remedy Implementation Plan.
- ☐ 5. Check here to certify that the Chief Municipal Officer and the Local Board of Health have been notified of any field work involving the implementation of a Phase IV Remedial Action.
- ☐ 6. If submitting a Transfer of a Remedy Operation Status (as per 310 CMR 40.0893(5)), check here to certify that a statement detailing the compliance history for the person making this submittal (transferee) is attached.
- ☐ 7. If submitting a Modification of a Remedy Operation Status (as per 310 CMR 40.0893(5)), check here to certify that a statement detailing the compliance history for each new person making this submittal is attached.
- ☐ 8. 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.
- ☒ 9. Check here to certify that the LSP Opinion containing the material facts, data, and other information is attached.



**COMPREHENSIVE RESPONSE ACTION TRANSMITTAL
FORM & PHASE I COMPLETION STATEMENT**

Pursuant to 310 CMR 40.0484 (Subpart D) and 40.0800 (Subpart H)

Release Tracking Number

4 - 26179

G. CERTIFICATION OF PERSON UNDERTAKING RESPONSE ACTIONS:

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 those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

>if Section B indicates that this is a **Modification of a Remedy Operation Status (ROS)**, I attest under the pains and penalties of perjury that I am fully authorized to act on behalf of all persons performing response actions under the ROS as stated in 310 CMR 40.0893(5)(d) to receive oral and written correspondence from MassDEP with respect to performance of response actions under the ROS, and to receive a statement of fee amount as per 4.03(3).

I understand that any material received by the Primary Representative from MassDEP shall be deemed received by all the persons performing response actions under the ROS, and I am 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: _____
Signature

4. For: BARNSTABLE COUNTY COMMISSIONERS 5. Date: _____
(Name of person or entity recorded in Section D) (mm/dd/yyyy)

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

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:)





BARNSTABLE COUNTY
SUPERIOR COURTHOUSE
3195 MAIN STREET
P.O. BOX 427
BARNSTABLE, MASSACHUSETTS 02630

Paul Ruzala, P.E.
Assets and Infrastructure Manager
(508) 419-2860
paul.ruzala@capecod.gov

June 6, 2023

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup
Southeast Regional Office
20 Riverside Drive
Lakeville, MA 02587

ATTN: Navpreet Brolowski, P.E., LSP, Project Manager

Re: Delegation of Authority
Massachusetts Contingency Plan Filings
Former Barnstable County Fire Training Academy Site
155 South Flint Rock Road, Barnstable, MA
DEP Release Tracking No. RTN 4-26179

Dear Ms. Brolowski:

The purpose of this letter is to delegate signature authority for the filing of Massachusetts Contingency Plan submittals related to the Former Barnstable County Fire Training Academy Site to the Licensed Site Professional (LSP) on record, Roger Thibault, P.E., LSP. Effective upon the issuance of this letter, I authorize Roger Thibault, P.E., LSP, to submit and sign the above referenced documents on behalf of myself and Barnstable County.

If you have any questions upon review of this notification, please contact me, or Roger Thibault, P.E., LSP for the Site at BETA Group, Inc. at your convenience.

Thank you,

A handwritten signature in blue ink that reads "Paul Ruzala". The signature is written in a cursive, flowing style.

Paul Ruzala, P.E.
Assets and Infrastructure Manager

**Statement of Provisions
Attachment To:**

BWSC 108 – Comprehensive Response Action Transmittal Form, Section F, Item 1

**For
Former Barnstable County Fire & Rescue Training Academy
(FTA)
155 South Flint Rock Road
Hyannis, MA 02630
RTN 4-26179**

The FTA facility was donated to the Town of Barnstable by the Cobb Trust in 1955, when it began to be used as a fire training area. The current owner-of-record is the County of Barnstable, which acquired the Site from the Town in 1983. The FTA was used for public safety training from the 1950's through 2019. Fires (for training purposes) were ignited and then extinguished with water CO₂, and/or aqueous film-forming foam (AFFF). The FTA was used for public safety training by fire departments and fire districts from throughout Barnstable County, fire departments outside of Barnstable County, and other public and private institutions.

Under the USEPA's Third Unregulated Contaminant Monitoring Rule (UCMR3) for "emerging contaminants" in public water supplies, samples collected from three of the Town of Barnstable Mary Dunn public water supply wells were analyzed for PFAS (PFOS and PFOA) in November 2013. Analytical results revealed evidence of PFOS contamination in all three wells sampled. Subsequently, Barnstable County collected soils and groundwater samples from the FTA, which is located west and likely upgradient of the Mary Dunn wells. Groundwater analytical results revealed that FTA groundwater was impacted by PFOS and MassDEP was notified. In 2015, Barnstable County funded an initial hydrogeological assessment, implementation of a groundwater pump and treat system to capture PFOS upgradient of the Mary Dunn wells, and additional assessment and immediate response actions.

Massachusetts Department of Environmental Protection (MassDEP) issued a Notice of Responsibility (NOR) to Barnstable County on August 4, 2016. MassDEP determined that the releases of PFAS from the use of AFFF at the FTA is a source of PFAS affecting the water supply of the Mary Dunn wells. MassDEP requested Immediate Response Action (IRA) response actions to include:

- Evaluation of potential Imminent Hazards.
- Assessment and monitoring of nearby public and private water supply wells.
- Prevention, elimination, and/or abate of any hazards associated with the
- consumption of drinking water impacted by PFAS above the USEPA Health Advisory (HA) level of 0.07 µg/L¹.
- Excavation and off-site removal of impacted soils located in a "hot spot" area; and/or expansion of the existing groundwater recovery and treatment system.

MassDEP issued a *Notice of Audit Findings – Immediate Response Action Field Inspection and Request For IRA Modification/Interim Deadline* on June 1, 2018 (NOAF/Request For IRA Modification). In the NOAF/Request For IRA Modification MassDEP indicated that the IRAs currently being conducted at the Site comply with the

¹ Since MassDEP finalization of the MCP Method 1 groundwater standards for PFAS and Maximum Contaminant Limit (MCL) for PFAS in drinking water in December 2019 and October 2020 respectively, current and future IRA response actions implemented at the Site will address the groundwater and drinking water impacted by PFAS above the Method 1 groundwater standards and drinking water MCL. The Method 1 groundwater standards and MCL supersede the USEPA HA.

relevant regulations and the IRA Plan previously submitted. However, the NOAF/Request For IRA Modification indicated that MassDEP had determined that additional IRA response actions were necessary at the Site to minimize continued mobilization of contaminants. MassDEP required the submittal of an IRA Plan Modification that included the installation of drainage controls and/or construction of berms, dikes, or impoundments at the Site to prevent stormwater and/or water from fire training activities from entering the Hot Spot area. The IRA Plan Modification was to be submitted to MassDEP on or before June 29, 2018. This IRA Plan Modification was submitted on June 29, 2018 and subsequently executed in December 2018 through March 2019 following local permitting by the Town of Barnstable Conservation Commission.

MassDEP issued a *Notice of Audit Findings/Compliance and Technical Assistance /Interim Deadline* dated November 21, 2018 (NOAF/Interim Deadline). The evaluations and additional information required by the NOAF/Interim Deadline document were presented in Immediate Response Action (IRA) Status and Remedial Monitoring Report (RMR) No. 27, submitted on February 28, 2019. In the February Status report, planned actions to address breakthrough of PFAS from the activated carbon were described, as was a long-term groundwater monitoring plan.

The November 21, 2018 NOAF/Interim Deadline also required the evaluation of the feasibility of an expansion of groundwater pumping and treatment, and, if an expansion is feasible, a definitive IRA Plan Modification for such expansion to be presented in the next full IRA Status Report (August 2019.) Expanding the existing groundwater recovery and treatment system, both in terms of pumping rate and locations, was evaluated and judged to be feasible. Based on limited funds available, a short-term expansion of groundwater pumping and treatment was judged to likely be financially feasible to implement within the required time frame dictated by the November 21, 2018 NOAF/Interim Deadline.

The NOAF/Interim Deadline also required the evaluation of the feasibility of placing a more robust cap over the former Hot Spot area and the Fire Training Area. If such capping measures were feasible, a definitive IRA Plan Modification for such capping was required in the next full IRA Status Report (August 2019.) The implementation of a more robust cap system in the Hot Spot area was considered not feasible, in the opinion of Barnstable County or BETA Group Inc. (BETA) and its LSP, based on the very recent implementation of a cap system in the Hot Spot area. The implementation of a more robust cap system over portions of or most of the FTA training area was considered not feasible within the time frame specified in the NOAF/Interim Deadline, in the opinion of Barnstable County or BETA, based on multiple factors.

MassDEP issued a *Request For Expedited IRA Plan Modification/Interim Deadline Enforcement Document No. 00006694* on May 1, 2019 that requested that the County submit an expedited IRA Plan Modification by June 28, 2019 including detailed plans for expansion of the groundwater recovery and treatment system and for capping to prevent infiltration of precipitation through PFAS-contaminated soil at the Site. On June 3, 2019, the County submitted a formal request to restore the original IRA Plan Modification Deadline to August 28, 2019, indicating that it was not technically feasible to meet the expedited deadline and that the Public Involvement Plan for the Site required that the document be a public comment draft only. The County received email response from MassDEP indicating that the County's request was accepted and the deadline for the IRA Plan Modification was restored to August 28, 2019.

Following the receipt of public comment, the IRA Plan Modification was finalized and submitted to DEP on December 20, 2019 and DEP contingently approved the capping design. The December 2019 IRA Plan Modification was the second IRA Plan modification proposed and approved for the Disposal Site and will therefore be described as IRA Plan Modification No. 2.

BETA, on behalf of Barnstable County, proceeded with the design of the major capping and stormwater improvements project. BETA submitted the original Notice of Intent for the capping project to the Town of Barnstable Conservation Commission (the Commission) in February 2020.

Based on the public and Commission comments and the decision by the County to permanently end live-fire training at the FTA, the County opted to include the demolition of the two former, live-fire training buildings and all training props at the FTA in the capping project. Following multiple hearings and re-design of the project, the Commission approved the capping design and the public hearing was closed On November 10, 2020. On December 30, 2020, The Barnstable Conservation Commission issued the *Order of Conditions: Special Conditions of Approval (SE3-5772)*.

Based on the decision to include building and training prop demolition in the project, MassDEP requested the filing of an IRA Plan Modification to formalize those inclusions. Following the receipt of public comment on the Draft IRA Plan Modification, IRA Plan Modification No. 3 was finalized and submitted to DEP on June 22, 2021 as an amendment to both the original (September 2016) IRA Plan and the December 2019 IRA Plan Modification. IRA Plan Modification No. 3 presented the selected building demolition design revisions and several minor other additions to the capping project, added during the local approval process. MassDEP issued the *Conditional Approval – Final Immediate Response Action Plan Modification No. 3* on July 8, 2021. The Condition Approval included:

- 1) notifying MassDEP at least 72 hours before start of response actions.
- 2) Complying with MCP requirements for any new reportable conditions.
- 3) Continuing PIP activities
- 4) Complying with MassDEP and federal regulations for solid waste and hazardous waste and materials.
- 5) Complying with municipal permitting requirements.

Construction for the capping and select demolition project started in late August 2021 and was substantially completed in November 2021. Project closeout extended through 2022.

Barnstable County issued a *Notice of Delay of Filing the Phase II Comprehensive Site Assessment Report* dated April 1, 2021. The Notice indicated that due to multiple factors including those related to temporary cessation of all but basic IRA work at the Site due to emergency obligations to respond to the COVID-19 pandemic and the requirements of local permitting and re-design of the capping project, the Phase II CSA Report filing would be delayed.

MassDEP issued the *Notice of Noncompliance Enforcement Document No. 00010606* on May 25, 2021. The Notice stated that the Phase II Comprehensive Site Assessment (CSA) Report had not been submitted by its due date of May 7, 2021. The Notice noted that the County had submitted a Notification of Delay for the Phase II Report but had not included a specific date for submittal of the report. The Notice stated that a Phase II Comprehensive Site Assessment Report must be submitted by May 9, 2022.

Barnstable County issued a response to the MassDEP *Notice of Noncompliance Enforcement Document No. 00010606* on June 7, 2021. The response again noted the reasons for the delay in executing the Phase II CSA and noted that the work related to the Phase II CSA, including preparation of the mandated Phase II CSA Scope of Work (Public Comment Draft and Final) and execution of the Phase II CSA tasks would be proceeding.

MassDEP issued the *Administrative Consent Order – Enforcement Document No. 0031761* on February 27, 2023, which presented a Draft Administrative Consent Order for all comprehensive MCP response actions to be conducted at the Site. Following deliberations between Barnstable County and MassDEP, the County executed the Administrative Consent Order and Notice of Noncompliance (ACO & NON) in May 2023 and provided it to MassDEP. The ACO & NON has not yet been formally executed by MassDEP.

Appendix B - Soil Boring Logs



BORING / MONITORING WELL LOG

BORING ID: MW-404D

Page 1 of 2

PROJECT:	FMR FTA Site	BETA JOB NUMBER:	6206.02
		FIELD REP:	Chris Oien
LOCATION:	520 Airport Way- Between Mary Dunn Rd. & Mary Dunn Pond	CLIENT:	Barnstable County
Consultant:	BETA	DRILLER:	Desmond Well Drilling Sean, Tommy Desmond

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Split spoon	NA	NA	DATE 10/12/2023	Overburden (feet): 52	
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet): --	
HAMMER WEIGHT	140 lb	NA	---	DEPTH 31.50	# of samples: 5.00	
HAMMER FALL	30"	NA	---	SURFACE ELEV:	Well set (feet): 50'	

SAMPLING INTERVALS					Groundwater	DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" `-/-/-/-`	PID (ppmv)			
1						Augered to 28 feet no split spoon soil samples collected as directed by PM	
	0-28'	N/A	N/A				
27							
28							
29	28-30'	8/24"	11/16/18/16			Dry, loose, light brown fine to medium SAND, little gravel, trace medium gravel	
30							
31							
32							
33							
34							
35							
36							
37							
38							
39	38-40'	18/24"	4/4/5/8			Wet, light brown fine to medium SAND, some coarse SAND, little fine gravel and trace silt	
40							
41							
42							

DRILLING RIG TYPE:	CME45-Hollow Stem Auger	MONITORING WELL INSTALLED:	2-inch Diameter, Sch 40 PVC
SURFACE ELEVATION:		RISER FROM: 0' TO 45'	Screen From: 45-50
START DATE:	10/12/2023	Filter Sand: Holliston	Sand Pack Intervals 45-50
END DATE:	10/13/2023	4" Steel Well Protector: +2.5' TO 2.5'	Bentonite Seal Interval 36-38
			Native Backfill 0-36, 38-45

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)	
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8	Fine Sand .02-.003
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9	Silt <.003
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75	Clay <.003
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19	
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08	
		30+ Hard	Medium Sand .08-.02	



BORING/ MONITORING WELL LOG

BORING ID: MW-404D

Page 2 of 2

PROJECT:	FMR FTA Site	BETA JOB NUMBER:	6206.02
		FIELD REP:	Chris Oien, Peter Newton
LOCATION:	520 Airport Way- Between Mary Dunn Rd. & Mary Dunn Pond	CLIENT:	Barnstable County
Consultant:	BETA/ Bristol Engineering	DRILLER:	Desmond Well Drilling Sean, Tommy Desmond

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Split spoon	NA	NA	DATE 10/12/2023	Overburden (feet): 52	
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet): --	
HAMMER WEIGHT	140 lb	NA	---	DEPTH 31.50	# of samples: 5.00	
HAMMER FALL	30"	NA	---	SURFACE ELEV:	Well set (feet): 50	

SAMPLING INTERVALS					Groundwater	DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" ^--/-/--/-	PID (ppmv)			
43							
44	43-45'	15/24"	9/9/7/7			Wet, light brown fine to medium SAND, some coarse SAND, little fine gravel and trace silt	
45							
46							
47							
48							
49	48-50'	12/24"	10/14/12/11			Wet, light brown fine to medium SAND, some coarse SAND, little fine gravel and trace silt	
50							
51	50-52'	10/24"	8/23/26/34			Dense, light brown to gray clay	
52							
						END OF BORING AT 52' *Blockage encountered during well installation at 38 feet, bentonite seal was unable to be installed at planned depth.	

DRILLING RIG TYPE:	CME45-Hollow Stem Auger	MONITORING WELL INSTALLED:	2-inch Diameter, Sch 40 PVC
SURFACE ELEVATION:		RISER FROM: 0' TO 45'	Screen From: 45-50
START DATE:	10/12/2023	Filter Sand: Holliston	Sand Pack Intervals 41-57
END DATE:	10/13/2023	4" Steel Well Protector: +2.5' TO 2.5'	Bentonite Seal Interval 36-38
			Native Backfill 0-36, 38-45
PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08
		30+ Hard	Medium Sand .08-.02

**BETA****BORING/ MONITORING WELL LOG**

BORING ID: MW-404S

Page 1 of 1

PROJECT: FMR FTA Site

BETA JOB NUMBER: 6206.02
FIELD REP: Chris OienLOCATION: 520 Airport Way- Between Mary Dunn Rd. &
Mary Dunn Pond

CLIENT: Barnstable County

Consultant: BETA

DRILLER: Desmond Well Drilling
Sean, Tommy Desmond

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Split spoon	NA	NA	DATE 11/2/2023	Overburden (feet): 37	
SIZE (ID)	2"	NA	NA	TIME 2:00 PM	Rock Cored (feet): --	
HAMMER WEIGHT	140 lb	NA	---	DEPTH 32.93	# of samples:	
HAMMER FALL	30"	NA	---	SURFACE ELEV:	Well set (feet): 37	

SAMPLING INTERVALS					Ground-water	DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" '-/-/'--	PID (ppmv)			
1		N/A	N/A				
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							

No samples collected; Augered to 37' and set well

DRILLING RIG TYPE: CME45-Hollow Stem Auger

MONITORING WELL INSTALLED:
RISER FROM: 0' TO 29.5'
Filter Sand: Holliston
4" Steel Well Protector: +2.5' TO 2.5'2-inch Diameter, Sch 40 PVC
Screen From: 29.5-39.5
Sand Pack Intervals 39.5-29.5
Bentonite Seal Interval 23-25
Native Backfill 0-23

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08
		30+ Hard	Medium Sand .08-.02



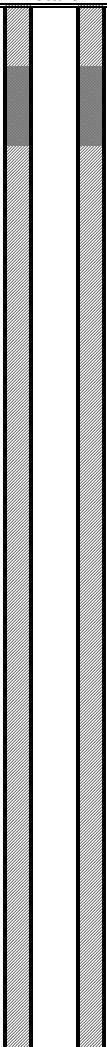
BORING/ MONITORING WELL LOG

BORING ID: MW-405

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PROJECT:	FMR FTA Site	BETA JOB NUMBER:	6206.02
LOCATION:	155 South Flintrock Road, Barnstable, MA Fmr. Fire Training Academy	FIELD REP:	
CLIENT:	Barnstable County		
Consultant:	BETA	DRILLER:	Bronson Drilling

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Dual tube & macrocore	NA	NA	DATE	Overburden (feet):	50
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet):	--
HAMMER WEIGHT	NA	NA	---	DEPTH	# of samples:	10.00
HAMMER FALL	NA	NA	---	SURFACE ELEV:	Well set (feet):	50

SAMPLING INTERVALS						DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details		
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" `-/-/--/--`	PID (ppmv)	Groundwater				
1	0-4	22/48"	NA	NA		(0-2") asphalt (2-23") Dry, fine to medium SAND , trace fine gravel			
2									
3									
4									
5	4-8	31/48"	NA	NA		Dry, light brown medium to coarse SAND, trace fine to medium gravel and trace cobbles			
6									
7									
8									
9	8-12	30/48"	NA	NA		Dry, light brown medium to coarse SAND			
10									
11									
12									
13	12-16	10/48"	NA	NA		Wet, light brown medium to coarse SAND w. some fine to medium gravel			
14									
15									
16									
17	16-20	21/48"	NA	NA		Wet, light brown medium to coarse SAND *Driller switching to macrocore sampler (5 ft intervals)			
18									
19									
20									

DRILLING RIG TYPE:	AMS Powerprobe	MONITORING WELL INSTALLED:	1-inch Diameter, Sch 40 PVC
SURFACE ELEVATION:		RISER FROM: 0' To 45'	Screen From: 45-50'
START DATE:	11/9/2023	Filter Sand: N/A	Sand Pack Intervals
END DATE:	11/9/2023	2" Steel Well Protector: +2.5' TO 2.5'	Bentonite Seal Interval
			Native Backfill 0-50'

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)	
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8	Fine Sand .02-.003
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9	Silt <.003
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75	Clay <.003
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19	
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08	
		30+ Hard	Medium Sand .08-.02	



BORING/ MONITORING WELL LOG

BORING ID: MW-405

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PROJECT: FMR FTA Site

BETA JOB NUMBER: 6206.02
FIELD REP:LOCATION: 155 South Flintrock Road, Barnstable, MA
Fmr. Fire Training Academy

CLIENT: Barnstable County

Consultant: BETA

DRILLER: Bronson Drilling

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Dual tube & macrocore	NA	NA	DATE	Overburden (feet): 50	
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet): --	
HAMMER WEIGHT	NA	NA	---	DEPTH	# of samples: 10.00	
HAMMER FALL	NA	NA	---	SURFACE ELEV:	Well set (feet): 50	

SAMPLING INTERVALS						DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details			
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" `-/-/--/--`	PID (ppmv)	Groundwater					
21	20-25	50/60"	NA	NA		Wet, light brown medium to coarse SAND, trace fine to medium gravel				
22										
23										
24										
25										
26	25-30	44/60"	NA	NA		Wet, light brown fine to coarse SAND, trace fine gravel				
27										
28										
29										
30										
31	30-35	24/60"	NA	NA		Wet, light brown fine to medium SAND, some coarse sand, little fine gravel				
32										
33										
34										
35										
36	35-40	50/60"	NA	NA		Wet, light brown fine to medium SAND, trace medium gravel				
37										
38										
39										
40										

DRILLING RIG TYPE: AMS Powerprobe

MONITORING WELL INSTALLED:
RISER FROM: 0' To 45'
Filter Sand: N/A
2" Steel Well Protector: +2.5' TO 2.5'1-inch Diameter, Sch 40 PVC
Screen From: 45-50'
Sand Pack Intervals
Bentonite Seal Interval 1-2'
Native Backfill 0-50'

SURFACE ELEVATION:

START DATE: 11/9/2023
END DATE: 11/9/2023

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)	
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8	Fine Sand .02-.003
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9	Silt <.003
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75	Clay <.003
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19	
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08	
		30+ Hard	Medium Sand .08-.02	

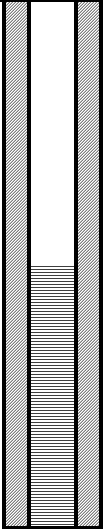


BORING/ MONITORING WELL LOG

BORING ID: MW-405
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PROJECT:	FMR FTA Site	BETA JOB NUMBER:	6206.02
		FIELD REP:	
LOCATION:	155 South Flintrock Road, Barnstable, MA Fmr. Fire Training Academy	CLIENT:	Barnstable County
Consultant:	BETA	DRILLER:	Bronson Drilling

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Dual tube & macrocore	NA	NA	DATE	Overburden (feet):	50
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet):	--
HAMMER WEIGHT	NA	NA	---	DEPTH	# of samples:	10.00
HAMMER FALL	NA	NA	---	SURFACE ELEV:	Well set (feet):	50

SAMPLING INTERVALS					Groundwater	DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" --/--/--	PID (ppmv)			
41	40-45	0/60"	NA			No Recovery	
42							
43							
44							
45							
46	45-50	50/60"	NA			Wet, light brown fine to coarse SAND, little fine to medium gravel	
47							
48							
49							
50							
51						END OF BORING AT 50'	
52							
53							
54							
55							
56							
57							
58							
59							
60							

DRILLING RIG TYPE:	AMS Powerprobe	MONITORING WELL INSTALLED:	2-inch Diameter, Sch 40 PVC
SURFACE ELEVATION:		RISER FROM: 0' To 45'	Screen From: 45-50'
START DATE:	11/9/2023	Filter Sand: N/A	Sand Pack Intervals
END DATE:	11/9/2023	4" Steel Well Protector: +2.5' TO 2.5'	Bentonite Seal Interval
			Native Backfill

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)	
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8	Fine Sand .02-.003
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9	Silt <.003
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75	Clay <.003
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19	
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08	
		30+ Hard	Medium Sand .08-.02	



BORING/ MONITORING WELL LOG

BORING ID: MW-406

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PROJECT:	FMR FTA Site	BETA JOB NUMBER:	6206.02
		FIELD REP:	
LOCATION:	0 South Flint Rock Rd. Parcel No. 313008B00	CLIENT:	Barnstable County
Consultant:	BETA	DRILLER:	Bronson Drilling

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Macrocore	NA	NA	DATE	Overburden (feet):	45
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet):	
HAMMER WEIGHT	NA	NA	---	DEPTH	# of samples:	3.00
HAMMER FALL	NA	NA	---	SURFACE ELEV:	Well set (feet):	45

SAMPLING INTERVALS						DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details			
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" `-/-/-/-`	PID (ppmv)	Groundwater					
21	NA	NA	NA	NA		No sample collected per PM.				
22										
23										
24										
25										
26	NA	NA	NA	NA		No sample collected per PM.				
27										
28										
29										
30										
31	NA	NA	NA	NA		No sample collected per PM.				
32										
33										
34										
35										
36	NA	NA	NA	NA		No sample collected per PM.				
37										
38										
39										
40										

DRILLING RIG TYPE:	AMS Powerprobe	MONITORING WELL INSTALLED:	1-inch Diameter, Sch 40 PVC
SURFACE ELEVATION:		RISER FROM: 0' TO 40'	Screen From: 40-45'
START DATE:	11/9/2023	Filter Sand: N/A	Sand Pack Intervals
END DATE:	11/9/2023	2" Steel Well Protector: +2.5' TO 2.5'	Bentonite Seal Interval 1-2'
			Native Backfill 0-45'

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)	
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8	Fine Sand .02-.003
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9	Silt <.003
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75	Clay <.003
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19	
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08	
		30+ Hard	Medium Sand .08-.02	



BORING / MONITORING WELL LOG

BORING ID: MW-407-S
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PROJECT: FMR FTA Site	BETA JOB NUMBER: 6206.02 FIELD REP: A. Ray
LOCATION: HPWMA Parcel ID - 347002001	CLIENT: Barnstable County
Consultant: BETA	DRILLER: Desmond Well Drilling Tommy Desmond

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Split Spoon	NA	NA	DATE 2/6/2024	Overburden (feet): 28	
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet): --	
HAMMER WEIGHT	NA	NA	---	DEPTH 19.46'	# of samples: --	
HAMMER FALL	NA	NA	---	SURFACE ELEV:	Well set (feet): 26	

SAMPLING INTERVALS					Groundwater	DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" --/-/--/-	PID (ppmv)			
1					▽	No samples collected; Augered 28 feet and set well. Brown fine to coarse SAND, some gravel observed on augers	
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

DRILLING RIG TYPE: CME45-Hollow Stem Auger	MONITORING WELL INSTALLED: RISER FROM: 0' TO 16' Filter Sand: N/A 4" Steel Well Protector:	2-inch Diameter, Sch 40 PVC Screen From: 16-26' Sand Pack Intervals: 12-26' Bentonite Seal Interval: 10-12' Native Backfill: 0-10'
SURFACE ELEVATION: START DATE: 2/6/2024 END DATE: 2/6/2024		

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08
		30+ Hard	Medium Sand .08-.02

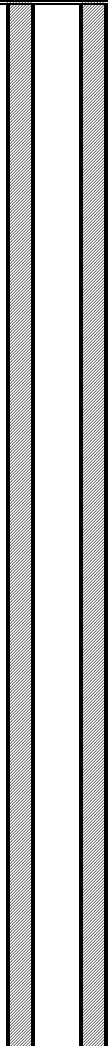


BORING/ MONITORING WELL LOG

BORING ID: MW-407-D
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PROJECT:	FMR FTA Site	BETA JOB NUMBER:	6206.02
		FIELD REP:	R. Thibault
LOCATION:	HPWMA Parcel ID - 347002001	CLIENT:	Barnstable County
Consultant:	BETA	DRILLER:	Desmond Well Drilling Tommy Desmond

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Split Spoon	NA	NA	DATE 2/6/2024	Overburden (feet): 47	
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet): --	
HAMMER WEIGHT	NA	NA	---	DEPTH 19.64'	# of samples: --	
HAMMER FALL	NA	NA	---	SURFACE ELEV:	Well set (feet): 43	

SAMPLING INTERVALS					Groundwater	DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" '--/--/--'	PID (ppmv)			
1						Augered to 33 feet; no samples collected as directed by PM. Tan medium SAND observed on augers.	
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

DRILLING RIG TYPE:	CME45-Hollow Stem Auger	MONITORING WELL INSTALLED:	2-inch Diameter, Sch 40 PVC
SURFACE ELEVATION:		RISER FROM: 0' TO 38'	Screen From: 38-43
START DATE:	2/5/2024	Filter Sand: N/A	Sand Pack Intervals 32-43
END DATE:	2/5/2024	4" Steel Well Protector:	Bentonite Seal Interval 27-32'
			Native Backfill 0-27'

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)	
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8	Fine Sand .02-.003
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9	Silt <.003
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75	Clay <.003
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19	
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08	
		30+ Hard	Medium Sand .08-.02	



BORING/ MONITORING WELL LOG

BORING ID: MW-407-D

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PROJECT:	FMR FTA Site	BETA JOB NUMBER:	6206.02
		FIELD REP:	R. Thibault
LOCATION:	HPWMA Parcel ID - 347002001	CLIENT:	Barnstable County
Consultant:	BETA	DRILLER:	Desmond Well Drilling Tommy Desmond

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Split Spoon	NA	NA	DATE 2/6/2024	Overburden (feet): 47	
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet): --	
MER WEIGHT	NA	NA	---	DEPTH 19.64'	# of samples: --	
MMER FALL	NA	NA	---	SURFACE ELEV:	Well set (feet): 43	

SAMPLING INTERVALS					Groundwater	DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" '--/--/--	PID (ppmv)			
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34	33-35'	17/24	1/3/7/7			11" Wet tan medium to fine SAND	
35						6" Wet medium to coarse SAND, little fine sand	
36							
37							
38							
39	38-40'	0/24	5/5/7/7			No Recovery; basket retainer broken	
40							

DRILLING RIG TYPE:	CME45-Hollow Stem Auger	MONITORING WELL INSTALLED:	2-inch Diameter, Sch 40 PVC
SURFACE ELEVATION:		RISER FROM: 0' TO 38'	Screen From: 38-43
START DATE:	2/5/2024	Filter Sand: N/A	Sand Pack Intervals 32-43
END DATE:	2/5/2024	4" Steel Well Protector:	Bentonite Seal Interval 27-32'
			Native Backfill 0-27'

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)	
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8	Fine Sand .02-.003
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9	Silt <.003
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75	Clay <.003
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19	
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08	
		30+ Hard	Medium Sand .08-.02	



BORING/ MONITORING WELL LOG

BORING ID: MW-408-D
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PROJECT: FMR FTA Site	BETA JOB NUMBER: 6206.02
	FIELD REP: C. Oien
LOCATION:	CLIENT: Barnstable County
Consultant: BETA	DRILLER: Bronson Drilling - Dan

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Single tube core sampler	NA	NA	DATE 2/10/2024	Overburden (feet): 50	
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet): --	
HAMMER WEIGHT	NA	NA	---	DEPTH 28.5'	# of samples: --	
HAMMER FALL	NA	NA	---	SURFACE ELEV:	Well set (feet): 50	

SAMPLING INTERVALS					Groundwater	DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" '--/--/--'	PID (ppmv)			
1					No samples collected as directed by PM.		
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

DRILLING RIG TYPE: Geoprobe 7822 DT	MONITORING WELL INSTALLED: RISER FROM: 0' TO 45' Filter Sand: N/A 4" Steel Well Protector:	2-inch Diameter, Sch 40 PVC Screen From: 45-50' Sand Pack Intervals: 45-50' Bentonite Seal Interval: -- Native Backfill: 0-45'
SURFACE ELEVATION:	START DATE: 2/10/2024	END DATE: 2/10/2024

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08
		30+ Hard	Medium Sand .08-.02
			Fine Sand .02-.003
			Silt <.003
			Clay <.003



BORING/ MONITORING WELL LOG

BORING ID: MW-408-D
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PROJECT: FMR FTA Site	BETA JOB NUMBER: 6206.02 FIELD REP: C. Oien
LOCATION:	CLIENT: Barnstable County
Consultant: BETA	DRILLER: Bronson Drilling - Dan

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Single tube core sampler	NA	NA	DATE 2/10/2024	Overburden (feet):	
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet): --	
HAMMER WEIGHT	NA	NA	---	DEPTH 28.5'	# of samples: --	
HAMMER FALL	NA	NA	---	SURFACE ELEV:	Well set (feet): 43	

SAMPLING INTERVALS					Groundwater	DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" '--/--/--	PID (ppmv)			
21					▽	No samples collected as directed by PM.	
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							

DRILLING RIG TYPE: Geoprobe 7822 DT	MONITORING WELL INSTALLED: RISER FROM: 0' TO 45' Filter Sand: N/A 4" Steel Well Protector:	2-inch Diameter, Sch 40 PVC Screen From: 45-50' Sand Pack Intervals 45-50' Bentonite Seal Interval -- Native Backfill 0-45
SURFACE ELEVATION:	START DATE: 2/10/2024	END DATE: 2/10/2024

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)	
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8	Fine Sand .02-.003
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9	Silt <.003
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75	Clay <.003
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19	
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08	
		30+ Hard	Medium Sand .08-.02	

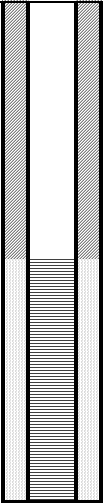


BORING/ MONITORING WELL LOG

BORING ID: MW-408-D
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PROJECT: FMR FTA Site	BETA JOB NUMBER: 6206.02
	FIELD REP: C. Oien
LOCATION:	CLIENT: Barnstable County
Consultant: BETA	DRILLER: Bronson Drilling - Dan

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Single tube core sampler	NA	NA	DATE 2/10/2024	Overburden (feet):	
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet):	--
HAMMER WEIGHT	NA	NA	---	DEPTH 28.5'	# of samples:	--
HAMMER FALL	NA	NA	---	SURFACE ELEV:	Well set (feet):	43

SAMPLING INTERVALS					Groundwater	DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" '--/--/--	PID (ppmv)			
41						Wet, tan fine to medium SAND, trace fine gravel	
42							
43							
44							
45							
46	45-50'	58/60	N/A				
47							
48							
49							
50							
						END OF BORING AT 50' WELL SET AT 50'	

DRILLING RIG TYPE: Geoprobe 7822 DT	MONITORING WELL INSTALLED: 2-inch Diameter, Sch 40 PVC
SURFACE ELEVATION:	RISER FROM: 0' TO 45'
START DATE: 2/10/2024	Filter Sand: N/A
END DATE: 2/10/2024	4" Steel Well Protector:
	Screen From: 45-50'
	Sand Pack Intervals: 45-50'
	Bentonite Seal Interval: --
	Native Backfill: 0-45'

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)	
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8	Fine Sand .02-.003
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9	Silt <.003
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75	Clay <.003
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19	
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08	
		30+ Hard	Medium Sand .08-.02	



BORING/ MONITORING WELL LOG

BORING ID: MW-408-S
Page 1 of 2

PROJECT: FMR FTA Site	BETA JOB NUMBER: 6206.02 FIELD REP: C. Oien
LOCATION:	CLIENT: Barnstable County
Consultant: BETA	DRILLER: Bronson Drilling - Dan

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Single tube core sampler	NA	NA	DATE	Overburden (feet): 34	
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet): --	
HAMMER WEIGHT	NA	NA	---	DEPTH	# of samples: --	
HAMMER FALL	NA	NA	---	SURFACE ELEV:	Well set (feet): 34	

SAMPLING INTERVALS					Groundwater	DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" '--/--/--'	PID (ppmv)			
1					No samples collected as directed by PM.		
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

DRILLING RIG TYPE: Geoprobe 7822 DT	MONITORING WELL INSTALLED: RISER FROM: 0' TO 24' Filter Sand: N/A 4" Steel Well Protector:	2-inch Diameter, Sch 40 PVC Screen From: 24-34' Sand Pack Intervals: 24-34' Bentonite Seal Interval: -- Native Backfill: 0-24'
SURFACE ELEVATION:		
START DATE: 2/10/2024		
END DATE: 2/10/2024		

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)	
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8	Fine Sand .02-.003
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9	Silt <.003
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75	Clay <.003
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19	
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08	
		30+ Hard	Medium Sand .08-.02	



BORING/ MONITORING WELL LOG

BORING ID: MW-408-S
Page 2 of 2

PROJECT: FMR FTA Site	BETA JOB NUMBER: 6206.02
	FIELD REP: C. Oien
LOCATION:	CLIENT: Barnstable County
Consultant: BETA	DRILLER: Bronson Drilling - Dan

	SAMPLER	CASING	CORE BARREL	DEPTH TO GROUNDWATER	SUMMARY	
TYPE	Single tube core sampler	NA	NA	DATE	Overburden (feet):	34
SIZE (ID)	2"	NA	NA	TIME	Rock Cored (feet):	--
HAMMER WEIGHT	NA	NA	---	DEPTH	# of samples:	--
HAMMER FALL	NA	NA	---	SURFACE ELEV:	Well set (feet):	34

SAMPLING INTERVALS					Groundwater	DESCRIPTION OF MATERIALS (Burmister Soil Classification System)	Monitoring Well Construction Details
DEPTH (feet)	Sample ID #	REC/PEN Inches	Blows / 6" \--/--/--	PID (ppmv)			
21					▽	No samples collected as directed by PM.	
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35						END OF BORING AT 34'	
36						WELL SET AT 34'	
37							
38							
39							
40							

DRILLING RIG TYPE: Geoprobe 7822 DT	MONITORING WELL INSTALLED: RISER FROM: 0' TO 24'	2-inch Diameter, Sch 40 PVC
SURFACE ELEVATION:	Filter Sand: N/A	Screen From: 24-34'
START DATE: 2/10/2024	4" Steel Well Protector:	Sand Pack Intervals 24-34'
END DATE: 2/10/2024		Bentonite Seal Interval --
		Native Backfill 0-24'

PROPORTIONS USED	RELATIVE DENSITY	CONSISTENCY	SOIL CLASSIFICATION (inches)	
trace 0-10%	0-4 Very Loose	0-2 Very Soft	Boulders >11.8	Fine Sand .02-.003
little 10-20%	4-10 Loose	2-4 Soft	Cobbles 11.8-2.9	Silt <.003
some 20-35%	10-30 Medium Dense	4-8 Medium Stiff	Coarse Gravel 2.9-.75	Clay <.003
and 35-50%	30-50 Dense	8-15 Stiff	Fine Gravel .75-.19	
	50+ Very Dense	15-30 Very Stiff	Coarse Sand .19-.08	
		30+ Hard	Medium Sand .08-.02	

Appendix C - Laboratory Reports



ANALYTICAL REPORT

Lab Number:	L2367150
Client:	Beta Group, Inc. 315 Norwood Park South Norwood, MA 02062
ATTN:	Roger Thibault
Phone:	(781) 255-7982
Project Name:	BCFTA
Project Number:	6206.02
Report Date:	12/12/23

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0825), DoD (L2474), FL (E87814), IL (200081), IN (C-MA-04), KY (KY98046), LA (85084), ME (MA00030), MD (350), MI (99110), NJ (MA015), NY (11627), NC (685), OH (CL106), OR (MA-0262), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #525-23-107-88708), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com



Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2367150-01	MW-405 5'	SOIL	BARNSTABLE, MA	11/09/23 08:00	11/10/23
L2367150-02	MW-405 12'	SOIL	BARNSTABLE, MA	11/09/23 08:30	11/10/23
L2367150-03	MW-406 5'	SOIL	BARNSTABLE, MA	11/09/23 13:00	11/10/23
L2367150-04	MW-406 13'	SOIL	BARNSTABLE, MA	11/09/23 13:30	11/10/23

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Case Narrative (continued)

Sample Receipt

L2367150-01, -02, -03, and -04: The sample was received in an inappropriate container for the PFAAs via LCMSMS-Isotope Dilution.

L2367150-02: The collection date and time on the chain of custody was 09-NOV-23 08:30; however, the collection date/time on the container label was 09-NOV-23 08:15. At the client's request, the collection date/time is reported as 09-NOV-23 08:30.

L2367150-04: The collection date and time on the chain of custody was 09-NOV-23 00:00; however, the collection date/time on the container label was 09-NOV-23 13:30. At the client's request, the collection date/time is reported as 09-NOV-23 00:00.

L2367150-04: The sample identified as "MW-406" on the chain of custody was identified as "MW-406 13" on the container label. At the client's request, the sample is reported as "MW-406".

Perfluorinated Alkyl Acids by Isotope Dilution

L2367150-01: The Extracted Internal Standard recoveries are less than 5% for n-deuteriomethylperfluoro-1-octanesulfonamidoacetic acid (d3-nmefosaa) (3%); however, the results are confirmed by the batch QC performed on this sample; therefore, re-extraction was not required.

L2367150-01, -02, -03, -04, WG1852775-1, WG1852775-3, and WG1852775-4: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

WG1852775-3: The Extracted Internal Standard recovery for the WG1852775-3 MS, performed on L2367150-01, is below the acceptance criteria (less than 5%) for n-deuterioethylperfluoro-1-octanesulfonamidoacetic acid (d5-netfosaa) (3%); however, all associated target analytes are within MS criteria; therefore, no further action was taken.

The WG1852775-3 MS recoveries, performed on L2367150-01, are outside the acceptance criteria for n-methyl perfluorooctanesulfonamidoacetic acid (nmefosaa) (56%), perfluoroundecanoic acid (pfuna) (57%) and perfluorotetradecanoic acid (pfta) (153%).

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Alycia Mogayzel

Title: Technical Director/Representative

Date: 12/12/23

ORGANICS

SEMIVOLATILES

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

SAMPLE RESULTS

Lab ID: L2367150-01
Client ID: MW-405 5'
Sample Location: BARNSTABLE, MA

Date Collected: 11/09/23 08:00
Date Received: 11/10/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 134,LCMSMS-ID
Analytical Date: 12/01/23 21:47
Analyst: SG
Percent Solids: 95%

Extraction Method: ALPHA 23528
Extraction Date: 11/15/23 17:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/g	0.462	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	0.462	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.231	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/g	0.924	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.462	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/g	0.924	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.231	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.231	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.231	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/g	0.462	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/g	0.462	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.231	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/g	0.231	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/g	0.231	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/g	0.462	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/g	0.924	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.462	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/g	0.462	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/g	0.462	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/g	0.462	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.462	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.462	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.462	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.462	--	1

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

SAMPLE RESULTS

Lab ID: L2367150-01
Client ID: MW-405 5'
Sample Location: BARNSTABLE, MA

Date Collected: 11/09/23 08:00
Date Received: 11/10/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Surrogate (Extracted Internal Standard)	% Recovery		Qualifier	Acceptance Criteria		
Perfluoro[13C4]Butanoic Acid (MPFBA)	42		Q	61-135		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	45		Q	58-150		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	57		Q	74-139		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	43			14-167		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	45		Q	66-128		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	46		Q	71-129		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	62		Q	78-139		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	46		Q	75-130		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	44			20-154		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	46		Q	72-140		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	54		Q	79-136		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	44		Q	75-130		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	55			19-175		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	3		Q	31-134		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	59		Q	61-155		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	48			5-117		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	7		Q	34-137		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	65			54-150		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	28			24-159		

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

SAMPLE RESULTS

Lab ID: L2367150-02
Client ID: MW-405 12'
Sample Location: BARNSTABLE, MA

Date Collected: 11/09/23 08:30
Date Received: 11/10/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 134,LCMSMS-ID
Analytical Date: 12/03/23 16:49
Analyst: SG
Percent Solids: 97%

Extraction Method: ALPHA 23528
Extraction Date: 11/15/23 17:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/g	0.455	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	0.455	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.227	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/g	0.909	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.455	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/g	0.909	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.227	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.227	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.227	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/g	0.455	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/g	0.455	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.227	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/g	0.227	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/g	0.227	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/g	0.455	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/g	0.909	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.455	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/g	0.455	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/g	0.455	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/g	0.455	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.455	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.455	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.455	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.455	--	1

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

SAMPLE RESULTS

Lab ID: L2367150-02
Client ID: MW-405 12'
Sample Location: BARNSTABLE, MA

Date Collected: 11/09/23 08:30
Date Received: 11/10/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Surrogate (Extracted Internal Standard)	% Recovery			Qualifier	Acceptance Criteria	
Perfluoro[13C4]Butanoic Acid (MPFBA)	66				61-135	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	70				58-150	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	79				74-139	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	80				14-167	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	71				66-128	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	68			Q	71-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	81				78-139	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	71			Q	75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	79				20-154	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	74				72-140	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	67			Q	79-136	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	72			Q	75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	86				19-175	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	15			Q	31-134	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	84				61-155	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	15				5-117	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	19			Q	34-137	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	90				54-150	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	37				24-159	

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

SAMPLE RESULTS

Lab ID: L2367150-03
Client ID: MW-406 5'
Sample Location: BARNSTABLE, MA

Date Collected: 11/09/23 13:00
Date Received: 11/10/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 134,LCMSMS-ID
Analytical Date: 12/03/23 17:22
Analyst: SG
Percent Solids: 94%

Extraction Method: ALPHA 23528
Extraction Date: 11/15/23 17:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/g	0.503	--	1
Perfluoropentanoic Acid (PFPeA)	0.514		ng/g	0.503	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.252	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/g	1.01	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.503	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/g	1.01	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.252	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.252	--	1
Perfluorooctanoic Acid (PFOA)	0.371		ng/g	0.252	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/g	0.503	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/g	0.503	--	1
Perfluorononanoic Acid (PFNA)	0.364		ng/g	0.252	--	1
Perfluorooctanesulfonic Acid (PFOS)	22.3		ng/g	0.252	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/g	0.252	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/g	0.503	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/g	1.01	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.503	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/g	0.503	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/g	0.503	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/g	0.503	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.503	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.503	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.503	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.503	--	1

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

SAMPLE RESULTS

Lab ID: L2367150-03
Client ID: MW-406 5'
Sample Location: BARNSTABLE, MA

Date Collected: 11/09/23 13:00
Date Received: 11/10/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Surrogate (Extracted Internal Standard)	% Recovery		Qualifier	Acceptance Criteria		
Perfluoro[13C4]Butanoic Acid (MPFBA)	68			61-135		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	69			58-150		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	92			74-139		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	88			14-167		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	73			66-128		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	68		Q	71-129		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	93			78-139		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	71		Q	75-130		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	90			20-154		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	74			72-140		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	71		Q	79-136		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	73		Q	75-130		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	94			19-175		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	9		Q	31-134		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	90			61-155		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	17			5-117		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	8		Q	34-137		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	88			54-150		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	38			24-159		

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

SAMPLE RESULTS

Lab ID: L2367150-04
Client ID: MW-406 13'
Sample Location: BARNSTABLE, MA

Date Collected: 11/09/23 13:30
Date Received: 11/10/23
Field Prep: Not Specified

Sample Depth:

Matrix: Soil
Analytical Method: 134,LCMSMS-ID
Analytical Date: 12/03/23 17:39
Analyst: SG
Percent Solids: 93%

Extraction Method: ALPHA 23528
Extraction Date: 11/15/23 17:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/g	0.469	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	0.469	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.234	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/g	0.938	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.469	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/g	0.938	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.234	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.234	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.234	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/g	0.469	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/g	0.469	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.234	--	1
Perfluorooctanesulfonic Acid (PFOS)	4.27		ng/g	0.234	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/g	0.234	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/g	0.469	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/g	0.938	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.469	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/g	0.469	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/g	0.469	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/g	0.469	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.469	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.469	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.469	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.469	--	1

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

SAMPLE RESULTS

Lab ID: L2367150-04
Client ID: MW-406 13'
Sample Location: BARNSTABLE, MA

Date Collected: 11/09/23 13:30
Date Received: 11/10/23
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Surrogate (Extracted Internal Standard)	% Recovery		Qualifier	Acceptance Criteria		
Perfluoro[13C4]Butanoic Acid (MPFBA)	70			61-135		
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	72			58-150		
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	86			74-139		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	77			14-167		
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	75			66-128		
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	72			71-129		
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	87			78-139		
Perfluoro[13C8]Octanoic Acid (M8PFOA)	73		Q	75-130		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	82			20-154		
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	77			72-140		
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	74		Q	79-136		
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	75			75-130		
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	88			19-175		
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	17		Q	31-134		
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	89			61-155		
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	15			5-117		
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	19		Q	34-137		
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	86			54-150		
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	40			24-159		

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 12/01/23 21:14
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 11/15/23 17:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-04 Batch: WG1852775-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/g	0.500	--
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	0.500	--
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.250	--
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/g	1.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.500	--
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/g	1.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.250	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.250	--
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.250	--
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/g	0.500	--
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/g	0.500	--
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.250	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/g	0.250	--
Perfluorodecanoic Acid (PFDA)	ND		ng/g	0.250	--
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/g	0.500	--
Perfluorononanesulfonic Acid (PFNS)	ND		ng/g	1.00	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/g	0.500	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/g	0.500	--
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/g	0.500	--
Perfluorooctanesulfonamide (FOSA)	ND		ng/g	0.500	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.500	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.500	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.500	--
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.500	--

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
 Analytical Date: 12/01/23 21:14
 Analyst: SG

Extraction Method: ALPHA 23528
 Extraction Date: 11/15/23 17:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-04 Batch: WG1852775-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	86		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	94		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	89		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	101		14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90		66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	90		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	87		75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	90		20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	86		72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	77	Q	79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	80		75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	96		19-175
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	94		31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	105		61-155
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	19		5-117
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	99		34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	109		54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	50		24-159

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 12/07/23 12:33
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 11/15/23 17:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-04 Batch: WG1852775-1					
Perfluorooctanesulfonamide (FOSA)	ND		ng/g	0.500	--

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	45		5-117

Lab Control Sample Analysis Batch Quality Control

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 Batch: WG1852775-2								
Perfluorobutanoic Acid (PFBA)	95		-		71-135	-		30
Perfluoropentanoic Acid (PFPeA)	95		-		69-132	-		30
Perfluorobutanesulfonic Acid (PFBS)	93		-		72-128	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	93		-		62-145	-		30
Perfluorohexanoic Acid (PFHxA)	96		-		70-132	-		30
Perfluoropentanesulfonic Acid (PFPeS)	88		-		73-123	-		30
Perfluoroheptanoic Acid (PFHpA)	97		-		71-131	-		30
Perfluorohexanesulfonic Acid (PFHxS)	90		-		67-130	-		30
Perfluorooctanoic Acid (PFOA)	94		-		69-133	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	95		-		64-140	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	97		-		70-132	-		30
Perfluorononanoic Acid (PFNA)	98		-		72-129	-		30
Perfluorooctanesulfonic Acid (PFOS)	90		-		68-136	-		30
Perfluorodecanoic Acid (PFDA)	90		-		69-133	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	86		-		65-137	-		30
Perfluorononanesulfonic Acid (PFNS)	89		-		69-125	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	102		-		63-144	-		30
Perfluoroundecanoic Acid (PFUnA)	98		-		64-136	-		30
Perfluorodecanesulfonic Acid (PFDS)	93		-		59-134	-		30
Perfluorooctanesulfonamide (FOSA)	89		-		67-137	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	91		-		61-139	-		30
Perfluorododecanoic Acid (PFDoA)	94		-		69-135	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 Batch: WG1852775-2								
Perfluorotridecanoic Acid (PFTTrDA)	110		-		66-139	-		30
Perfluorotetradecanoic Acid (PFTA)	99		-		69-133	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	89				61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	87				58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	82				74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	91				14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	84				66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82				71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	86				78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	86				75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	93				20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	82				72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	87				79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84				75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	100				19-175
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	95				31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	88				61-155
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	23				5-117
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	107				34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	85				54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	88				24-159

Lab Control Sample Analysis Batch Quality Control

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 Batch: WG1852775-2								
Perfluorooctanesulfonamide (FOSA)	98		-		67-137	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	46				5-117

Matrix Spike Analysis

Batch Quality Control

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1852775-3 QC Sample: L2367150-01 Client ID:												
Perfluorobutanoic Acid (PFBA)	ND	4.84	3.99	82		-	-		71-135	-		30
Perfluoropentanoic Acid (PFPeA)	ND	4.84	4.01	83		-	-		69-132	-		30
Perfluorobutanesulfonic Acid (PFBS)	ND	4.3	3.64	85		-	-		72-128	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	4.54	3.85	85		-	-		62-145	-		30
Perfluorohexanoic Acid (PFHxA)	ND	4.84	4.03	83		-	-		70-132	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	4.56	3.61	79		-	-		73-123	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	4.84	3.87	80		-	-		71-131	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	4.43	3.80	86		-	-		67-130	-		30
Perfluorooctanoic Acid (PFOA)	ND	4.84	4.06	84		-	-		69-133	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	4.61	4.51	98		-	-		64-140	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	4.62	4.60	100		-	-		70-132	-		30
Perfluorononanoic Acid (PFNA)	ND	4.84	4.54	94		-	-		72-129	-		30
Perfluorooctanesulfonic Acid (PFOS)	ND	4.49	4.29	96		-	-		68-136	-		30
Perfluorodecanoic Acid (PFDA)	ND	4.84	4.60	95		-	-		69-133	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	4.65	3.63	78		-	-		65-137	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	4.66	5.18	111		-	-		69-125	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	4.84	2.70	56	Q	-	-		63-144	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	4.84	2.76	57	Q	-	-		64-136	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	4.68	4.96	106		-	-		59-134	-		30
Perfluorooctanesulfonamide (FOSA)	ND	4.84	4.23F	87		-	-		67-137	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	4.84	5.98	123		-	-		61-139	-		30
Perfluorododecanoic Acid (PFDoA)	ND	4.84	3.96	82		-	-		69-135	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1852775-3 QC Sample: L2367150-01 Client ID: MW-405 5'												
Perfluorotridecanoic Acid (PFTrDA)	ND	4.84	6.29	130		-	-		66-139	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	4.84	7.40	153	Q	-	-		69-133	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	Qualifier	MSD % Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	62				19-175
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	59				14-167
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	55				20-154
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	3	Q			34-137
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	4	Q			31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	63				61-155
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	47	Q			75-130
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	45	Q			66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	49	Q			71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	67	Q			78-139
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	71				54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	32				24-159
Perfluoro[13C4]Butanoic Acid (MPFBA)	42	Q			61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	47	Q			58-150
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	32				5-117
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	58	Q			79-136
Perfluoro[13C8]Octanoic Acid (M8PFOA)	49	Q			75-130
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	49	Q			72-140
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	60	Q			74-139

Lab Duplicate Analysis Batch Quality Control

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1852775-4 QC Sample: L2367150-02 Client ID: MW-405 12'						
Perfluorobutanoic Acid (PFBA)	ND	ND	ng/g	NC		30
Perfluoropentanoic Acid (PFPeA)	ND	ND	ng/g	NC		30
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/g	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/g	NC		30
Perfluorohexanoic Acid (PFHxA)	ND	ND	ng/g	NC		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/g	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/g	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/g	NC		30
Perfluorooctanoic Acid (PFOA)	ND	ND	ng/g	NC		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	ng/g	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/g	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/g	NC		30
Perfluorooctanesulfonic Acid (PFOS)	ND	ND	ng/g	NC		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/g	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/g	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/g	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/g	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/g	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/g	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/g	NC		30

Lab Duplicate Analysis Batch Quality Control

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1852775-4 QC Sample: L2367150-02 Client ID: MW-405 12'						

N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/g	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/g	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/g	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/g	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	66		64		61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	70		66		58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	79		81		74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	80		82		14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	71		72		66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	68	Q	65	Q	71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	81		84		78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	71	Q	68	Q	75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	79		77		20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	74		70	Q	72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	67	Q	68	Q	79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	72	Q	69	Q	75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	86		86		19-175
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	15	Q	18	Q	31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	84		83		61-155
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	15		17		5-117
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	19	Q	20	Q	34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	90		86		54-150

Lab Duplicate Analysis Batch Quality Control

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1852775-4 QC Sample: L2367150-02 Client ID: MW-405 12'						

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	37		37		24-159

INORGANICS & MISCELLANEOUS

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

SAMPLE RESULTS

Lab ID: L2367150-01
Client ID: MW-405 5'
Sample Location: BARNSTABLE, MA

Date Collected: 11/09/23 08:00
Date Received: 11/10/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	94.5		%	0.100	--	1	-	11/13/23 14:40	121,2540G	BLR



Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

SAMPLE RESULTS

Lab ID: L2367150-02
Client ID: MW-405 12'
Sample Location: BARNSTABLE, MA

Date Collected: 11/09/23 08:30
Date Received: 11/10/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	97.1		%	0.100	--	1	-	11/13/23 14:40	121,2540G	BLR



Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

SAMPLE RESULTS

Lab ID: L2367150-03
Client ID: MW-406 5'
Sample Location: BARNSTABLE, MA

Date Collected: 11/09/23 13:00
Date Received: 11/10/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	94.4		%	0.100	--	1	-	11/13/23 14:40	121,2540G	BLR



Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

SAMPLE RESULTS

Lab ID: L2367150-04
Client ID: MW-406 13'
Sample Location: BARNSTABLE, MA

Date Collected: 11/09/23 13:30
Date Received: 11/10/23
Field Prep: Not Specified

Sample Depth:
Matrix: Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	92.9		%	0.100	--	1	-	11/13/23 14:40	121,2540G	BLR



Lab Duplicate Analysis
Batch Quality Control

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1851694-1 QC Sample: L2367150-01 Client ID: MW-405 5'						
Solids, Total	94.5	94.5	%	0		10

Project Name: BCFTA
Project Number: 6206.02

Serial_No:12122317:15
Lab Number: L2367150
Report Date: 12/12/23

Sample Receipt and Container Information

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2367150-01A	Plastic 120ml unpreserved	A	NA		3.7	Y	Absent		A2-TS(7),A2-537-ISOTOPE(90)
L2367150-01B	Plastic 120ml unpreserved	A	NA		3.7	Y	Absent		A2-TS(7),A2-537-ISOTOPE(90)
L2367150-01C	Plastic 120ml unpreserved	A	NA		3.7	Y	Absent		A2-TS(7),A2-537-ISOTOPE(90)
L2367150-02A	Plastic 120ml unpreserved	A	NA		3.7	Y	Absent		A2-TS(7),A2-537-ISOTOPE(90)
L2367150-02B	Plastic 120ml unpreserved	A	NA		3.7	Y	Absent		A2-TS(7),A2-537-ISOTOPE(90)
L2367150-02C	Plastic 120ml unpreserved	A	NA		3.7	Y	Absent		A2-TS(7),A2-537-ISOTOPE(90)
L2367150-03A	Plastic 120ml unpreserved	A	NA		3.7	Y	Absent		A2-TS(7),A2-537-ISOTOPE(90)
L2367150-03B	Plastic 120ml unpreserved	A	NA		3.7	Y	Absent		A2-TS(7),A2-537-ISOTOPE(90)
L2367150-03C	Plastic 120ml unpreserved	A	NA		3.7	Y	Absent		A2-TS(7),A2-537-ISOTOPE(90)
L2367150-04A	Plastic 120ml unpreserved	A	NA		3.7	Y	Absent		A2-TS(7),A2-537-ISOTOPE(90)
L2367150-04B	Plastic 120ml unpreserved	A	NA		3.7	Y	Absent		A2-TS(7),A2-537-ISOTOPE(90)
L2367150-04C	Plastic 120ml unpreserved	A	NA		3.7	Y	Absent		A2-TS(7),A2-537-ISOTOPE(90)

Project Name: BCFTA
Project Number: 6206.02

Serial_No:12122317:15
Lab Number: L2367150
Report Date: 12/12/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA/PFTeDA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS/PFDoS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
Perfluoropropanesulfonic Acid	PFPrS	423-41-6
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA/PFOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: BCFTA
Project Number: 6206.02

Serial_No:12122317:15
Lab Number: L2367150
Report Date: 12/12/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
FLUOROTELOMER CARBOXYLIC ACIDS (FTCAs)		
3-Perfluoroheptyl Propanoic Acid	7:3FTCA	812-70-4
2H,2H,3H,3H-Perfluorooctanoic Acid	5:3FTCA	914637-49-3
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report



Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

Report Format: Data Usability Report



Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

Data Qualifiers

- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.
- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name: BCFTA
Project Number: 6206.02

Lab Number: L2367150
Report Date: 12/12/23

REFERENCES

- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.
- 134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility

EPA 624.1: m/p-xylene, o-xylene, Naphthalene

EPA 625.1: alpha-Terpineol

EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270E: NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO₂, NO₃.

Mansfield Facility

SM 2540D: TSS.

EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water

EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**

EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.

Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

Non-Potable Water

SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1:** Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.

EPA 624.1: Volatile Halocarbons & Aromatics,

EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

EPA 625.1: SVOC (Acid/Base/Neutral Extractables).

Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water

EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.

EPA 522, EPA 537.1.

Non-Potable Water

EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

EPA 245.1 Hg.

SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



CHAIN OF CUSTODY

PAGE OF

Project Information

Westborough, MA Mansfield, MA
TEL: 508-898-9220 TEL: 508-822-9300
FAX: 508-898-9193 FAX: 508-822-3288

Client Information

Client: BETA Group, Inc.

Address: 701 George Washington Highway

Lincoln, RI 02865

Phone: 401.333.2382

Fax:

Email: RThibault@BETA-Inc.com

☐ These samples have been Previously analyzed by Alpha

Project Name: BCFTA

Project Location: Barnstable, MA

Project #: 6206.02

Project Manager: RThibault@BETA-Inc.com

ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:

soil samples collected using Pace Analytical bottles. Each sample has 3 bottles for sufficient volume and total solids analysis. Please call w. any questions

ALPHA Lab ID
(Lab Use Only)

Sample ID

Collection

Date Time

Sample Matrix

Sampler's Initials

67150-01	MW-405 5'	11-9-23	8:00	Soil	CO
-02	MW-405 12'	11-9-23	8:30	Soil	CO
-03	MW-406 5'	11-9-23	13:00	Soil	CO
-04	MW-406 13'	11-9-23	13:30	Soil	CO

*edited by M.C. 12/12/23

PLEASE ANSWER QUESTIONS ABOVE!

IS YOUR PROJECT MA MCP or CT RCP?

FORM 102-01-01(1)
(rev. 5-2004-12)

Container Type

Preservative

Relinquished By:

Date/Time

Received By:

Date/Time

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

Date Rec'd in Lab: 11/10/23

ALPHA Job #: L2367150

Report Information Data Deliverables

☐ FAX

☐ EMAIL

☐ ADEx

☐ Add'l Deliverables

Billing Information

☒ Same as Client info

PO #:

Regulatory Requirements/Report Limits

State/Fed Program

Criteria

MCP

S-1/GW-1

MCP PRESUMPTIVE CERTAINTY-CT REASONABLE CONFIDENCE PROTOCOLS

☒ Yes

☐ No

Are MCP Analytical Methods Required?

☐ Yes

☐ No

Are CT RCP (Reasonable Confidence Protocols) Required?

ANALYSIS

PFAS (134 isotope dilution)

SAMPLE HANDLING

☐ Done

☐ Not Needed

☐ Lab to do

☐ Lab to do

☐ Lab to do
(Please specify below)

Sample Specific Comments

TOTAL # BOTTLES

11/10/23 2130

December 19, 2023

Roger Thibault
Beta Group, Inc. - RI
701 George Washington Highway
Lincoln, RI 02865

Project Location: Barnstable, MA
Client Job Number:
Project Number: 6206.02
Laboratory Work Order Number: 23K2978

Enclosed are results of analyses for samples as received by the laboratory on November 22, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Kaitlyn A. Feliciano
Project Manager

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332Beta Group, Inc. - RI
701 George Washington Highway
Lincoln, RI 02865
ATTN: Roger Thibault

REPORT DATE: 12/19/2023

PURCHASE ORDER NUMBER: 23000936

PROJECT NUMBER: 6206.02

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23K2978

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Barnstable, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
PC-1	23K2978-01	Ground Water		SOP-454 PFAS	
HW-25	23K2978-02	Ground Water		SOP-454 PFAS	
HW-2D	23K2978-03	Ground Water		SOP-454 PFAS	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

SOP-454 PFAS**Qualifications:****L-01**

Laboratory fortified blank/laboratory control sample recovery outside of control limits. Data validation is not affected since all results are "not detected" for all samples in this batch for this compound and bias is on the high side.

Analyte & Samples(s) Qualified:**N-EtFOSAA (NEtFOSAA)**

23K2978-01[PC-1], 23K2978-02[HW-25], 23K2978-03[HW-2D]

Perfluorodecanoic acid (PFDA)

23K2978-02[HW-25], 23K2978-03[HW-2D]

Perfluorotetradecanoic acid (PFTA)

23K2978-01[PC-1], 23K2978-02[HW-25], 23K2978-03[HW-2D]

L-02

Laboratory fortified blank/laboratory control sample recovery and duplicate recoveries outside of control limits. Data validation is not affected since all results are "not detected" for associated samples in this batch and bias is on the high side.

Analyte & Samples(s) Qualified:**6:2 Fluorotelomersulfonic acid (6:2FTS A)**

23K2978-02[HW-25], 23K2978-03[HW-2D]

N-EtFOSAA (NEtFOSAA)

B360698-BS1, B360698-BSD1

N-MeFOSAA (NMeFOSAA)

23K2978-01[PC-1], 23K2978-02[HW-25], 23K2978-03[HW-2D], B359274-BS1, B359274-BSD1

L-06

Laboratory fortified blank/laboratory control sample recovery and/or duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the high side.

Analyte & Samples(s) Qualified:**6:2 Fluorotelomersulfonic acid (6:2FTS A)**

23K2978-01[PC-1], B359274-BS1, B359274-BSD1

Perfluorohexanesulfonic acid (PFHxS)

23K2978-01RE3[PC-1]

L-07

Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.

Analyte & Samples(s) Qualified:**N-EtFOSAA (NEtFOSAA)**

B359274-BS1

Perfluorodecanoic acid (PFDA)

23K2978-01[PC-1], B359274-BS1

Perfluorododecanoic acid (PFDoA)

B360698-BSD1

Perfluorononanoic acid (PFNA)

23K2978-01[PC-1], 23K2978-02[HW-25], 23K2978-03[HW-2D], B359274-BS1

Perfluorotetradecanoic acid (PFTA)

B359274-BS1

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

PF-18

Re-analysis confirmed Extracted Internal Standard failure due to matrix effects.

Analyte & Samples(s) Qualified:**D3-NMeFOSAA**

23K2978-03[HW-2D]

D5-NEtFOSAA

23K2978-01[PC-1], 23K2978-03[HW-2D]

M2-4:2FTS

23K2978-01[PC-1], 23K2978-03[HW-2D]

M2PFTA

23K2978-01[PC-1], 23K2978-03[HW-2D]

M7PFUnA

23K2978-03[HW-2D]

M8FOSA

23K2978-03[HW-2D]

MPFBA

23K2978-01[PC-1]

MPFDoA

23K2978-01[PC-1], 23K2978-03[HW-2D]

PF-19

Sample re-analyzed at a dilution that was re-fortified with internal standard.

Analyte & Samples(s) Qualified:**Perfluorohexanesulfonic acid (PFHxS)**

23K2978-01RE1[PC-1], 23K2978-01RE3[PC-1]

Perfluorooctanesulfonic acid (PFOS)

23K2978-01RE1[PC-1], 23K2978-01RE3[PC-1], 23K2978-02RE1[HW-25], 23K2978-03RE1[HW-2D]

S-29

Extracted Internal Standard is outside of control limits.

Analyte & Samples(s) Qualified:**M2-8:2FTS**

S097696-CCV4

M2PFTA

23K2978-02[HW-25]

M8FOSA

23K2978-02[HW-25]

MPFBA

23K2978-02[HW-25]

V-20

Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:**9Cl-PF3ONS (F53B Minor)**

S097984-CCV3

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.

I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Lisa A. Worthington
Technical Representative

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K2978

Date Received: 11/22/2023

Field Sample #: PC-1

Sampled: 11/21/2023 13:00

Sample ID: 23K2978-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	48	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluorobutanesulfonic acid (PFBS)	17	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluoropentanoic acid (PFPeA)	140	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluorohexanoic acid (PFHxA)	110	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	74	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluorodecanoic acid (PFDA)	7.1	1.9	ng/L	1	L-07	SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluoroheptanesulfonic acid (PFHpS)	9.3	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L	1	L-01	SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L	1	L-02	SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L	1	L-01	SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluorotridecanoic acid (PFTTrDA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluorooctanesulfonamide (FOSA)	4.0	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluorononanesulfonic acid (PFNS)	2.3	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	40	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluoro-1-butanefulfonamide (FBFA)	14	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluorohexanesulfonic acid (PFHxS)	210	19	ng/L	10	L-06, PF-19	SOP-454 PFAS	12/15/23	12/18/23 18:52	QNW
Perfluorohexanesulfonic acid (PFHxS)	220	19	ng/L	10	PF-19	SOP-454 PFAS	12/12/23	12/13/23 12:12	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	51	1.9	ng/L	1	L-06	SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluoropentanesulfonic acid (PFPeS)	25	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluoroundecanoic acid (PFUnA)	40	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluoroheptanoic acid (PFHpA)	100	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluorooctanoic acid (PFOA)	57	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW
Perfluorooctanesulfonic acid (PFOS)	220	19	ng/L	10	PF-19	SOP-454 PFAS	12/15/23	12/18/23 18:52	QNW
Perfluorooctanesulfonic acid (PFOS)	230	19	ng/L	10	PF-19	SOP-454 PFAS	12/12/23	12/13/23 12:12	QNW
Perfluorononanoic acid (PFNA)	25	1.9	ng/L	1	L-07	SOP-454 PFAS	12/12/23	12/12/23 17:26	QNW

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K2978

Date Received: 11/22/2023

Field Sample #: HW-25

Sampled: 11/21/2023 13:30

Sample ID: 23K2978-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	2.6	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluoropentanoic acid (PFPeA)	3.6	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluorohexanoic acid (PFHxA)	4.2	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluorodecanoic acid (PFDA)	ND	1.9	ng/L	1	L-01	SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L	1	L-01	SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L	1	L-02	SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L	1	L-01	SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluorotridecanoic acid (PFTTrDA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluorohexanesulfonic acid (PFHxS)	14	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	ng/L	1	L-02	SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluoropentanesulfonic acid (PFPeS)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluoroheptanoic acid (PFHpA)	3.6	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluorooctanoic acid (PFOA)	3.0	1.9	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW
Perfluorooctanesulfonic acid (PFOS)	150	19	ng/L	10	PF-19	SOP-454 PFAS	12/12/23	12/13/23 12:19	QNW
Perfluorononanoic acid (PFNA)	22	1.9	ng/L	1	L-07	SOP-454 PFAS	12/12/23	12/12/23 17:33	QNW

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K2978

Date Received: 11/22/2023

Field Sample #: HW-2D

Sampled: 11/21/2023 12:00

Sample ID: 23K2978-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	8.8	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluorobutanesulfonic acid (PFBS)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluoropentanoic acid (PFPeA)	26	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluorohexanoic acid (PFHxA)	23	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
11Cl-PF3OUdS (F53B Major)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
9Cl-PF3ONS (F53B Minor)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluorodecanoic acid (PFDA)	ND	2.1	ng/L	1	L-01	SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluorododecanoic acid (PFDoA)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.9	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
N-EtFOSAA (NEtFOSAA)	ND	2.1	ng/L	1	L-01	SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
N-MeFOSAA (NMeFOSAA)	ND	2.1	ng/L	1	L-02	SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluorotetradecanoic acid (PFTA)	ND	2.1	ng/L	1	L-01	SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluorotridecanoic acid (PFTTrDA)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluorooctanesulfonamide (FOSA)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluorononanesulfonic acid (PFNS)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluoro-1-butanefulfonamide (FBFA)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluorohexanesulfonic acid (PFHxS)	61	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.1	ng/L	1	L-02	SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.5	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluoroundecanoic acid (PFUnA)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluoroheptanoic acid (PFHpA)	11	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluorooctanoic acid (PFOA)	23	2.1	ng/L	1		SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW
Perfluorooctanesulfonic acid (PFOS)	170	21	ng/L	10	PF-19	SOP-454 PFAS	12/12/23	12/13/23 12:26	QNW
Perfluorononanoic acid (PFNA)	3.2	2.1	ng/L	1	L-07	SOP-454 PFAS	12/12/23	12/12/23 17:40	QNW

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332**Sample Extraction Data****Prep Method:**SOP 454-PFAAS **Analytical Method:**SOP-454 PFAS

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23K2978-01 [PC-1]	B359274	267	1.00	12/12/23
23K2978-01RE1 [PC-1]	B359274	267	1.00	12/12/23
23K2978-02 [HW-25]	B359274	261	1.00	12/12/23
23K2978-02RE1 [HW-25]	B359274	261	1.00	12/12/23
23K2978-03 [HW-2D]	B359274	237	1.00	12/12/23
23K2978-03RE1 [HW-2D]	B359274	237	1.00	12/12/23

Prep Method:SOP 454-PFAAS **Analytical Method:**SOP-454 PFAS

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23K2978-01RE3 [PC-1]	B360698	269	1.00	12/15/23

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B359274 - SOP 454-PFAAS
Blank (B359274-BLK1)

Prepared & Analyzed: 12/12/23

Perfluorobutanoic acid (PFBA)	ND	1.8	ng/L
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	ng/L
Perfluoropentanoic acid (PFPeA)	ND	1.8	ng/L
Perfluorohexanoic acid (PFHxA)	ND	1.8	ng/L
11Cl-PF3OUdS (F53B Major)	ND	1.8	ng/L
9Cl-PF3ONS (F53B Minor)	ND	1.8	ng/L
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	ng/L
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	ng/L
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	ng/L
Perfluorodecanoic acid (PFDA)	ND	1.8	ng/L
Perfluorododecanoic acid (PFDoA)	ND	1.8	ng/L
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.8	ng/L
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	ng/L
N-EtFOSAA (NEtFOSAA)	ND	1.8	ng/L
N-MeFOSAA (NMeFOSAA)	ND	1.8	ng/L
Perfluorotetradecanoic acid (PFTA)	ND	1.8	ng/L
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	ng/L
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	ng/L
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	ng/L
Perfluorooctanesulfonamide (FOSA)	ND	1.8	ng/L
Perfluorononanesulfonic acid (PFNS)	ND	1.8	ng/L
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	ng/L
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.8	ng/L
Perfluorohexanesulfonic acid (PFHxS)	ND	1.8	ng/L
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	ng/L
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	ng/L
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	ng/L
Perfluoropentanesulfonic acid (PFPeS)	ND	1.8	ng/L
Perfluoroundecanoic acid (PFUnA)	ND	1.8	ng/L
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	ng/L
Perfluoroheptanoic acid (PFHpA)	ND	1.8	ng/L
Perfluorooctanoic acid (PFOA)	ND	1.8	ng/L
Perfluorooctanesulfonic acid (PFOS)	ND	1.8	ng/L
Perfluorononanoic acid (PFNA)	ND	1.8	ng/L

LCS (B359274-BS1)

Prepared & Analyzed: 12/12/23

Perfluorobutanoic acid (PFBA)	11.6	1.9	ng/L	9.36	124	73-129
Perfluorobutanesulfonic acid (PFBS)	10.0	1.9	ng/L	8.29	121	72-130
Perfluoropentanoic acid (PFPeA)	11.4	1.9	ng/L	9.36	122	72-129
Perfluorohexanoic acid (PFHxA)	11.8	1.9	ng/L	9.36	126	72-129
11Cl-PF3OUdS (F53B Major)	8.22	1.9	ng/L	8.82	93.2	43.3-138
9Cl-PF3ONS (F53B Minor)	8.72	1.9	ng/L	8.73	99.9	52-140
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	9.25	1.9	ng/L	8.82	105	53.7-152
Hexafluoropropylene oxide dimer acid (HFPO-DA)	11.3	1.9	ng/L	9.36	121	42.1-145
8:2 Fluorotelomersulfonic acid (8:2FTS A)	12.1	1.9	ng/L	8.99	135	67-138
Perfluorodecanoic acid (PFDA)	12.2	1.9	ng/L	9.36	130 *	71-129
Perfluorododecanoic acid (PFDoA)	12.1	1.9	ng/L	9.36	129	72-134
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	10.1	1.9	ng/L	8.33	121	52.7-147

L-07

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B359274 - SOP 454-PFAAS										
LCS (B359274-BS1)										
Prepared & Analyzed: 12/12/23										
Perfluoroheptanesulfonic acid (PFHpS)	11.6	1.9	ng/L	8.94		130	69-134			
N-EtFOSAA (NEtFOSAA)	13.9	1.9	ng/L	9.36		149 *	61-135			L-07
N-MeFOSAA (NMeFOSAA)	14.1	1.9	ng/L	9.36		151 *	65-136			L-02
Perfluorotetradecanoic acid (PFTA)	13.3	1.9	ng/L	9.36		142 *	71-132			L-07
Perfluorotridecanoic acid (PFTTrDA)	12.8	1.9	ng/L	9.36		136	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	10.7	1.9	ng/L	8.75		122	63-143			
Perfluorodecanesulfonic acid (PFDS)	10.4	1.9	ng/L	9.03		115	53-142			
Perfluorooctanesulfonamide (FOSA)	11.7	1.9	ng/L	9.36		125	67-137			
Perfluorononanesulfonic acid (PFNS)	10.0	1.9	ng/L	8.99		111	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	8.31	1.9	ng/L	9.36		88.8	50-150			
Perfluoro-1-butanefulfonamide (FBSA)	9.00	1.9	ng/L	9.36		96.2	50-150			
Perfluorohexanesulfonic acid (PFHxS)	10.1	1.9	ng/L	8.57		118	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	11.5	1.9	ng/L	9.36		123	53.8-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	11.1	1.9	ng/L	9.36		118	54.5-152			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	12.5	1.9	ng/L	8.89		141 *	64-140			L-06
Perfluoropentanesulfonic acid (PFPeS)	10.3	1.9	ng/L	8.80		118	71-127			
Perfluoroundecanoic acid (PFUnA)	11.6	1.9	ng/L	9.36		124	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	12.5	1.9	ng/L	9.36		134	50.5-159			
Perfluoroheptanoic acid (PFHpA)	11.5	1.9	ng/L	9.36		123	72-130			
Perfluorooctanoic acid (PFOA)	11.6	1.9	ng/L	9.36		123	71-133			
Perfluorooctanesulfonic acid (PFOS)	10.6	1.9	ng/L	8.66		123	65-140			
Perfluorononanoic acid (PFNA)	12.5	1.9	ng/L	9.36		133 *	69-130			L-07
LCS Dup (B359274-BSD1)										
Prepared & Analyzed: 12/12/23										
Perfluorobutanoic acid (PFBA)	10.1	1.8	ng/L	8.76		115	73-129	14.6	30	
Perfluorobutanesulfonic acid (PFBS)	8.54	1.8	ng/L	7.76		110	72-130	16.1	30	
Perfluoropentanoic acid (PFPeA)	9.79	1.8	ng/L	8.76		112	72-129	15.1	30	
Perfluorohexanoic acid (PFHxA)	10.2	1.8	ng/L	8.76		116	72-129	14.8	30	
11Cl-PF3OUdS (F53B Major)	7.45	1.8	ng/L	8.26		90.2	43.3-138	9.82	30	
9Cl-PF3ONS (F53B Minor)	7.83	1.8	ng/L	8.17		95.9	52-140	10.7	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	7.60	1.8	ng/L	8.26		92.0	53.7-152	19.6	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	9.05	1.8	ng/L	8.76		103	42.1-145	22.1	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	10.5	1.8	ng/L	8.41		125	67-138	14.4	30	
Perfluorodecanoic acid (PFDA)	10.7	1.8	ng/L	8.76		123	71-129	12.7	30	
Perfluorododecanoic acid (PFDoA)	11.0	1.8	ng/L	8.76		125	72-134	9.45	30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	8.59	1.8	ng/L	7.80		110	52.7-147	15.7	30	
Perfluoroheptanesulfonic acid (PFHpS)	10.3	1.8	ng/L	8.37		124	69-134	11.4	30	
N-EtFOSAA (NEtFOSAA)	10.8	1.8	ng/L	8.76		123	61-135	25.4	30	
N-MeFOSAA (NMeFOSAA)	13.1	1.8	ng/L	8.76		149 *	65-136	7.73	30	L-02
Perfluorotetradecanoic acid (PFTA)	10.6	1.8	ng/L	8.76		121	71-132	22.6	30	
Perfluorotridecanoic acid (PFTTrDA)	10.2	1.8	ng/L	8.76		117	65-144	22.2	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	9.45	1.8	ng/L	8.19		115	63-143	12.6	30	
Perfluorodecanesulfonic acid (PFDS)	8.62	1.8	ng/L	8.46		102	53-142	18.6	30	
Perfluorooctanesulfonamide (FOSA)	9.81	1.8	ng/L	8.76		112	67-137	17.6	30	
Perfluorononanesulfonic acid (PFNS)	8.53	1.8	ng/L	8.41		101	69-127	16.0	30	
Perfluoro-1-hexanesulfonamide (FHxSA)	7.01	1.8	ng/L	8.76		79.9	50-150	17.0	30	
Perfluoro-1-butanefulfonamide (FBSA)	7.96	1.8	ng/L	8.76		90.9	50-150	12.2	30	
Perfluorohexanesulfonic acid (PFHxS)	8.72	1.8	ng/L	8.02		109	68-131	14.4	30	
Perfluoro-4-oxapentanoic acid (PFMPA)	10.1	1.8	ng/L	8.76		115	53.8-150	13.4	30	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B359274 - SOP 454-PFAAS
LCS Dup (B359274-BSD1)

Prepared & Analyzed: 12/12/23

Perfluoro-5-oxahexanoic acid (PFMBA)	9.47	1.8	ng/L	8.76		108	54.5-152	15.6	30	
6:2 Fluorotelomersulfonic acid (6:2FTS A)	12.4	1.8	ng/L	8.33		149	* 64-140	1.09	30	L-06
Perfluoropentanesulfonic acid (PFPeS)	8.73	1.8	ng/L	8.24		106	71-127	16.9	30	
Perfluoroundecanoic acid (PFUnA)	9.32	1.8	ng/L	8.76		106	69-133	21.6	30	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	10.4	1.8	ng/L	8.76		119	50.5-159	18.7	30	
Perfluoroheptanoic acid (PFHpA)	9.88	1.8	ng/L	8.76		113	72-130	15.2	30	
Perfluorooctanoic acid (PFOA)	9.51	1.8	ng/L	8.76		109	71-133	19.4	30	
Perfluorooctanesulfonic acid (PFOS)	9.68	1.8	ng/L	8.11		119	65-140	9.41	30	
Perfluorononanoic acid (PFNA)	10.4	1.8	ng/L	8.76		118	69-130	18.5	30	

Batch B360698 - SOP 454-PFAAS
Blank (B360698-BLK1)

Prepared: 12/15/23 Analyzed: 12/18/23

Perfluorobutanoic acid (PFBA)	ND	1.8	ng/L
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	ng/L
Perfluoropentanoic acid (PFPeA)	ND	1.8	ng/L
Perfluorohexanoic acid (PFHxA)	ND	1.8	ng/L
11Cl-PF3OUdS (F53B Major)	ND	1.8	ng/L
9Cl-PF3ONS (F53B Minor)	ND	1.8	ng/L
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	ng/L
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	ng/L
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	ng/L
Perfluorodecanoic acid (PFDA)	ND	1.8	ng/L
Perfluorododecanoic acid (PFDoA)	ND	1.8	ng/L
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.8	ng/L
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	ng/L
N-EtFOSAA (NEtFOSAA)	ND	1.8	ng/L
N-MeFOSAA (NMeFOSAA)	ND	1.8	ng/L
Perfluorotetradecanoic acid (PFTA)	ND	1.8	ng/L
Perfluorotridecanoic acid (PFTTrDA)	ND	1.8	ng/L
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	ng/L
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	ng/L
Perfluorooctanesulfonamide (FOSA)	ND	1.8	ng/L
Perfluorononanesulfonic acid (PFNS)	ND	1.8	ng/L
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	ng/L
Perfluoro-1-butanefulfonamide (FBSA)	ND	1.8	ng/L
Perfluorohexanesulfonic acid (PFHxS)	ND	1.8	ng/L
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	ng/L
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	ng/L
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	ng/L
Perfluoropentanesulfonic acid (PFPeS)	ND	1.8	ng/L
Perfluoroundecanoic acid (PFUnA)	ND	1.8	ng/L
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	ng/L
Perfluoroheptanoic acid (PFHpA)	ND	1.8	ng/L
Perfluorooctanoic acid (PFOA)	ND	1.8	ng/L
Perfluorooctanesulfonic acid (PFOS)	ND	1.8	ng/L
Perfluorononanoic acid (PFNA)	ND	1.8	ng/L

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QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B360698 - SOP 454-PFAAS
LCS (B360698-BS1)

Prepared: 12/15/23 Analyzed: 12/19/23

Perfluorobutanoic acid (PFBA)	10.5	1.8	ng/L	8.78		119	73-129			
Perfluorobutanesulfonic acid (PFBS)	9.37	1.8	ng/L	7.77		121	72-130			
Perfluoropentanoic acid (PFPeA)	10.2	1.8	ng/L	8.78		116	72-129			
Perfluorohexanoic acid (PFHxA)	10.3	1.8	ng/L	8.78		117	72-129			
11Cl-PF3OUdS (F53B Major)	8.84	1.8	ng/L	8.27		107	43.3-138			
9Cl-PF3ONS (F53B Minor)	9.29	1.8	ng/L	8.19		113	52-140			
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	8.32	1.8	ng/L	8.27		101	53.7-152			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	8.46	1.8	ng/L	8.78		96.3	42.1-145			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	10.5	1.8	ng/L	8.43		124	67-138			
Perfluorodecanoic acid (PFDA)	10.9	1.8	ng/L	8.78		124	71-129			
Perfluorododecanoic acid (PFDoA)	11.4	1.8	ng/L	8.78		129	72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	10.4	1.8	ng/L	7.82		133	52.7-147			
Perfluoroheptanesulfonic acid (PFHpS)	9.48	1.8	ng/L	8.39		113	69-134			
N-EtFOSAA (NEtFOSAA)	12.2	1.8	ng/L	8.78		139	* 61-135			L-02
N-MeFOSAA (NMeFOSAA)	11.9	1.8	ng/L	8.78		135	65-136			
Perfluorotetradecanoic acid (PFTA)	11.5	1.8	ng/L	8.78		131	71-132			
Perfluorotridecanoic acid (PFTrDA)	11.8	1.8	ng/L	8.78		135	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	10.2	1.8	ng/L	8.21		125	63-143			
Perfluorodecanesulfonic acid (PFDS)	9.24	1.8	ng/L	8.48		109	53-142			
Perfluorooctanesulfonamide (FOSA)	10.3	1.8	ng/L	8.78		117	67-137			
Perfluorononanesulfonic acid (PFNS)	8.51	1.8	ng/L	8.43		101	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	6.80	1.8	ng/L	8.78		77.4	50-150			
Perfluoro-1-butanesulfonamide (FBSA)	6.98	1.8	ng/L	8.78		79.5	50-150			
Perfluorohexanesulfonic acid (PFHxS)	10.1	1.8	ng/L	8.04		126	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	9.91	1.8	ng/L	8.78		113	53.8-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	9.10	1.8	ng/L	8.78		104	54.5-152			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	11.0	1.8	ng/L	8.34		131	64-140			
Perfluoropentanesulfonic acid (PFPeS)	9.41	1.8	ng/L	8.26		114	71-127			
Perfluoroundecanoic acid (PFUnA)	11.7	1.8	ng/L	8.78		133	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	9.27	1.8	ng/L	8.78		106	50.5-159			
Perfluoroheptanoic acid (PFHpA)	10.6	1.8	ng/L	8.78		120	72-130			
Perfluorooctanoic acid (PFOA)	10.6	1.8	ng/L	8.78		120	71-133			
Perfluorooctanesulfonic acid (PFOS)	9.70	1.8	ng/L	8.13		119	65-140			
Perfluorononanoic acid (PFNA)	10.7	1.8	ng/L	8.78		122	69-130			

LCS Dup (B360698-BS1)

Prepared: 12/15/23 Analyzed: 12/19/23

Perfluorobutanoic acid (PFBA)	10.8	1.8	ng/L	9.07		119	73-129	3.08	30	
Perfluorobutanesulfonic acid (PFBS)	9.42	1.8	ng/L	8.03		117	72-130	0.502	30	
Perfluoropentanoic acid (PFPeA)	10.5	1.8	ng/L	9.07		116	72-129	3.12	30	
Perfluorohexanoic acid (PFHxA)	10.5	1.8	ng/L	9.07		116	72-129	2.20	30	
11Cl-PF3OUdS (F53B Major)	8.66	1.8	ng/L	8.54		101	43.3-138	2.07	30	
9Cl-PF3ONS (F53B Minor)	9.05	1.8	ng/L	8.45		107	52-140	2.60	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	8.60	1.8	ng/L	8.54		101	53.7-152	3.34	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	10.5	1.8	ng/L	9.07		116	42.1-145	21.9	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	10.9	1.8	ng/L	8.71		125	67-138	3.58	30	
Perfluorodecanoic acid (PFDA)	11.7	1.8	ng/L	9.07		129	71-129	6.96	30	
Perfluorododecanoic acid (PFDoA)	12.3	1.8	ng/L	9.07		136	* 72-134	8.04	30	L-07
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	10.6	1.8	ng/L	8.07		132	52.7-147	2.10	30	

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QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B360698 - SOP 454-PFAAS										
LCS Dup (B360698-BSD1)										
Prepared: 12/15/23 Analyzed: 12/19/23										
Perfluoroheptanesulfonic acid (PFHpS)	9.89	1.8	ng/L	8.66		114	69-134	4.27	30	
N-EtFOSAA (NEtFOSAA)	13.0	1.8	ng/L	9.07		143	* 61-135	5.81	30	L-02
N-MeFOSAA (NMeFOSAA)	11.9	1.8	ng/L	9.07		131	65-136	0.307	30	
Perfluorotetradecanoic acid (PFTA)	11.5	1.8	ng/L	9.07		127	71-132	0.299	30	
Perfluorotridecanoic acid (PFTrDA)	12.3	1.8	ng/L	9.07		136	65-144	4.39	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	10.1	1.8	ng/L	8.48		120	63-143	1.07	30	
Perfluorodecanesulfonic acid (PFDS)	9.33	1.8	ng/L	8.75		107	53-142	1.03	30	
Perfluorooctanesulfonamide (FOSA)	11.2	1.8	ng/L	9.07		124	67-137	8.35	30	
Perfluorononanesulfonic acid (PFNS)	9.72	1.8	ng/L	8.71		112	69-127	13.3	30	
Perfluoro-1-hexanesulfonamide (FHxSA)	7.12	1.8	ng/L	9.07		78.5	50-150	4.49	30	
Perfluoro-1-butanefulfonamide (FBSA)	7.33	1.8	ng/L	9.07		80.8	50-150	4.84	30	
Perfluorohexanesulfonic acid (PFHxS)	9.53	1.8	ng/L	8.30		115	68-131	6.25	30	
Perfluoro-4-oxapentanoic acid (PFMPA)	10.1	1.8	ng/L	9.07		111	53.8-150	1.85	30	
Perfluoro-5-oxahexanoic acid (PFMBA)	9.27	1.8	ng/L	9.07		102	54.5-152	1.85	30	
6:2 Fluorotelomersulfonic acid (6:2FTS A)	11.2	1.8	ng/L	8.62		130	64-140	2.13	30	
Perfluoropentanesulfonic acid (PFPeS)	9.83	1.8	ng/L	8.52		115	71-127	4.35	30	
Perfluoroundecanoic acid (PFUnA)	11.6	1.8	ng/L	9.07		128	69-133	0.759	30	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	9.53	1.8	ng/L	9.07		105	50.5-159	2.77	30	
Perfluoroheptanoic acid (PFHpA)	10.5	1.8	ng/L	9.07		116	72-130	0.293	30	
Perfluorooctanoic acid (PFOA)	10.7	1.8	ng/L	9.07		118	71-133	1.63	30	
Perfluorooctanesulfonic acid (PFOS)	9.13	1.8	ng/L	8.39		109	65-140	6.02	30	
Perfluorononanoic acid (PFNA)	11.4	1.8	ng/L	9.07		126	69-130	6.59	30	

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
L-01	Laboratory fortified blank/laboratory control sample recovery outside of control limits. Data validation is not affected since all results are "not detected" for all samples in this batch for this compound and bias is on the high side.
L-02	Laboratory fortified blank/laboratory control sample recovery and duplicate recoveries outside of control limits. Data validation is not affected since all results are "not detected" for associated samples in this batch and bias is on the high side.
L-06	Laboratory fortified blank/laboratory control sample recovery and/or duplicate recovery are outside of control limits. Reported value for this compound is likely to be biased on the high side.
L-07	Either laboratory fortified blank/laboratory control sample or duplicate recovery is outside of control limits, but the other is within limits. RPD between the two LFB/LCS results is within method specified criteria.
PF-18	Re-analysis confirmed Extracted Internal Standard failure due to matrix effects.
PF-19	Sample re-analyzed at a dilution that was re-fortified with internal standard.
S-29	Extracted Internal Standard is outside of control limits.
V-20	Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

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INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PC-1 (23K2978-01) Lab File ID: 23K2978-01.d Analyzed: 12/12/23 17:26									
M8FOSA	360455.3	3.9486	707,119.00	3.948617	51	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	55894.59	2.463967	117,614.00	2.472183	48	50 - 150	-0.0082	+/-0.50	*
M2PFTA	515093.6	4.30535	1,087,831.00	4.31345	47	50 - 150	-0.0081	+/-0.50	*
M2-8:2FTS	166996.9	3.770917	165,683.00	3.7789	101	50 - 150	-0.0080	+/-0.50	
MPFBA	345179.3	1.058467	801,955.00	1.050167	43	50 - 150	0.0083	+/-0.50	*
M3HFPO-DA	141551.8	2.798383	230,692.00	2.806583	61	50 - 150	-0.0082	+/-0.50	
M6PFDA	896754.6	3.77145	1,409,304.00	3.77145	64	50 - 150	0.0000	+/-0.50	
M3PFBS	206270.6	1.861817	305,252.00	1.861817	68	50 - 150	0.0000	+/-0.50	
M7PFUnA	649132.6	3.92205	1,281,109.00	3.922067	51	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	72689.84	3.41245	73,080.00	3.412467	99	50 - 150	0.0000	+/-0.50	
M5PFPeA	476067.3	1.698283	726,231.00	1.698283	66	50 - 150	0.0000	+/-0.50	
M5PFHxA	756876.4	2.5477	1,130,870.00	2.547717	67	50 - 150	0.0000	+/-0.50	
M3PFHxS	134596.9	3.177667	215,682.00	3.177667	62	50 - 150	0.0000	+/-0.50	
M4PFHpA	729828.3	3.138483	1,101,580.00	3.146567	66	50 - 150	-0.0081	+/-0.50	
M8PFOA	871270.5	3.421183	1,201,948.00	3.421183	72	50 - 150	0.0000	+/-0.50	
M8PFOS	135130.2	3.620217	233,924.00	3.620233	58	50 - 150	0.0000	+/-0.50	
M9PFNA	699439.8	3.62125	1,205,846.00	3.621267	58	50 - 150	0.0000	+/-0.50	
MPFDoA	532128.9	4.064667	1,115,887.00	4.064683	48	50 - 150	0.0000	+/-0.50	*
D5-NEtFOSAA	76334.55	3.929517	162,242.00	3.929533	47	50 - 150	0.0000	+/-0.50	*
D3-NMeFOSAA	80378.21	3.8497	158,055.00	3.849717	51	50 - 150	0.0000	+/-0.50	
PC-1 (23K2978-01RE1) Lab File ID: 23K2978-01RE1.d Analyzed: 12/13/23 12:12									
M3PFHxS	214264.3	3.185733	212,179.00	3.193817	101	50 - 150	-0.0081	+/-0.50	
M8PFOS	243947.5	3.6282	245,160.00	3.628217	100	50 - 150	0.0000	+/-0.50	
PC-1 (23K2978-01RE3) Lab File ID: 23K2978-01RE3.d Analyzed: 12/18/23 18:52									
M3PFHxS	165622.6	3.193817	192,255.00	3.193817	86	50 - 150	0.0000	+/-0.50	
M8PFOS	191428.5	3.6282	210,426.00	3.6282	91	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-25 (23K2978-02) Lab File ID: 23K2978-02.d Analyzed: 12/12/23 17:33									
M8FOSA	318529.7	3.9486	707,119.00	3.948617	45	50 - 150	0.0000	+/-0.50	*
M2-4:2FTS	63605.5	2.45575	117,614.00	2.472183	54	50 - 150	-0.0164	+/-0.50	
M2PFTA	391668.5	4.30535	1,087,831.00	4.31345	36	50 - 150	-0.0081	+/-0.50	*
M2-8:2FTS	152383.5	3.770933	165,683.00	3.7789	92	50 - 150	-0.0080	+/-0.50	
MPFBA	399438.3	1.058467	801,955.00	1.050167	50	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	147420.2	2.798383	230,692.00	2.806583	64	50 - 150	-0.0082	+/-0.50	
M6PFDA	1005612	3.77145	1,409,304.00	3.77145	71	50 - 150	0.0000	+/-0.50	
M3PFBS	220210.9	1.861817	305,252.00	1.861817	72	50 - 150	0.0000	+/-0.50	
M7PFUnA	801127.2	3.922067	1,281,109.00	3.922067	63	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	71002.74	3.41245	73,080.00	3.412467	97	50 - 150	0.0000	+/-0.50	
M5PFPeA	528073.6	1.698283	726,231.00	1.698283	73	50 - 150	0.0000	+/-0.50	
M5PFHxA	833022.9	2.539483	1,130,870.00	2.547717	74	50 - 150	-0.0082	+/-0.50	
M3PFHxS	152769.6	3.177667	215,682.00	3.177667	71	50 - 150	0.0000	+/-0.50	
M4PFHpA	826261.6	3.138483	1,101,580.00	3.146567	75	50 - 150	-0.0081	+/-0.50	
M8PFOA	951274.6	3.421167	1,201,948.00	3.421183	79	50 - 150	0.0000	+/-0.50	
M8PFOS	152496.1	3.620217	233,924.00	3.620233	65	50 - 150	0.0000	+/-0.50	
M9PFNA	798486.4	3.613267	1,205,846.00	3.621267	66	50 - 150	-0.0080	+/-0.50	
MPFDoA	625743.9	4.064667	1,115,887.00	4.064683	56	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	96888.86	3.929533	162,242.00	3.929533	60	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	101139.3	3.8497	158,055.00	3.849717	64	50 - 150	0.0000	+/-0.50	
HW-25 (23K2978-02RE1) Lab File ID: 23K2978-02RE1.d Analyzed: 12/13/23 12:19									
M8PFOS	239106.4	3.620233	245,160.00	3.628217	98	50 - 150	-0.0080	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-2D (23K2978-03) Lab File ID: 23K2978-03.d Analyzed: 12/12/23 17:40									
M8FOSA	126912.5	3.948617	707,119.00	3.948617	18	50 - 150	0.0000	+/-0.50	*
M2-4:2FTS	37169.82	2.463967	117,614.00	2.472183	32	50 - 150	-0.0082	+/-0.50	*
M2PFTA	98457.45	4.30535	1,087,831.00	4.31345	09	50 - 150	-0.0081	+/-0.50	*
M2-8:2FTS	108550.4	3.770933	165,683.00	3.7789	66	50 - 150	-0.0080	+/-0.50	
MPFBA	510963.2	1.058467	801,955.00	1.050167	64	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	141150.5	2.798383	230,692.00	2.806583	61	50 - 150	-0.0082	+/-0.50	
M6PFDA	828444.1	3.77145	1,409,304.00	3.77145	59	50 - 150	0.0000	+/-0.50	
M3PFBS	201974.5	1.861817	305,252.00	1.861817	66	50 - 150	0.0000	+/-0.50	
M7PFUnA	536128.9	3.922067	1,281,109.00	3.922067	42	50 - 150	0.0000	+/-0.50	*
M2-6:2FTS	45818.18	3.41245	73,080.00	3.412467	63	50 - 150	0.0000	+/-0.50	
M5PFPeA	507197.6	1.698283	726,231.00	1.698283	70	50 - 150	0.0000	+/-0.50	
M5PFHxA	774956.8	2.5477	1,130,870.00	2.547717	69	50 - 150	0.0000	+/-0.50	
M3PFHxS	142957.4	3.177667	215,682.00	3.177667	66	50 - 150	0.0000	+/-0.50	
M4PFHpA	745383.7	3.14655	1,101,580.00	3.146567	68	50 - 150	0.0000	+/-0.50	
M8PFOA	885678.8	3.421183	1,201,948.00	3.421183	74	50 - 150	0.0000	+/-0.50	
M8PFOS	141427.5	3.620217	233,924.00	3.620233	60	50 - 150	0.0000	+/-0.50	
M9PFNA	710710.8	3.621267	1,205,846.00	3.621267	59	50 - 150	0.0000	+/-0.50	
MPFDoA	370702.8	4.064683	1,115,887.00	4.064683	33	50 - 150	0.0000	+/-0.50	*
D5-NEtFOSAA	62190	3.929533	162,242.00	3.929533	38	50 - 150	0.0000	+/-0.50	*
D3-NMeFOSAA	78474.98	3.849717	158,055.00	3.849717	50	50 - 150	0.0000	+/-0.50	
HW-2D (23K2978-03RE1) Lab File ID: 23K2978-03RE1.d Analyzed: 12/13/23 12:26									
M8PFOS	250372.1	3.620217	245,160.00	3.628217	102	50 - 150	-0.0080	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B359274-BLK1)			Lab File ID: B359274-BLK1.d			Analyzed: 12/12/23 15:09			
M8FOSA	533133.8	3.9486	707,119.00	3.956617	75	50 - 150	-0.0080	+/-0.50	
M2-4:2FTS	97740.15	2.4886	117,614.00	2.488617	83	50 - 150	0.0000	+/-0.50	
M2PFTA	782428	4.31345	1,087,831.00	4.313433	72	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	132006.4	3.7789	165,683.00	3.7789	80	50 - 150	0.0000	+/-0.50	
MPFBA	645401.6	1.058467	801,955.00	1.058467	80	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	151390.3	2.822933	230,692.00	2.81475	66	50 - 150	0.0082	+/-0.50	
M6PFDA	1102131	3.779417	1,409,304.00	3.779433	78	50 - 150	0.0000	+/-0.50	
M3PFBS	254040.4	1.886667	305,252.00	1.878383	83	50 - 150	0.0083	+/-0.50	
M7PFUnA	976215.1	3.93005	1,281,109.00	3.930067	76	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	76637.4	3.4205	73,080.00	3.420517	105	50 - 150	0.0000	+/-0.50	
M5PFPeA	616155.8	1.714833	726,231.00	1.714833	85	50 - 150	0.0000	+/-0.50	
M5PFHxA	957204.6	2.572333	1,130,870.00	2.57235	85	50 - 150	0.0000	+/-0.50	
M3PFHxS	172614	3.185733	215,682.00	3.18575	80	50 - 150	0.0000	+/-0.50	
M4PFHpA	955898.1	3.154633	1,101,580.00	3.15465	87	50 - 150	0.0000	+/-0.50	
M8PFOA	1087647	3.42985	1,201,948.00	3.429867	90	50 - 150	0.0000	+/-0.50	
M8PFOS	191119.9	3.620217	233,924.00	3.620233	82	50 - 150	0.0000	+/-0.50	
M9PFNA	1031575	3.621267	1,205,846.00	3.621267	86	50 - 150	0.0000	+/-0.50	
MPFDoA	788992.7	4.072667	1,115,887.00	4.072683	71	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	124915.1	3.937517	162,242.00	3.937533	77	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	120957.7	3.857667	158,055.00	3.857683	77	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B359274-BS1)		Lab File ID: B359274-BS1.d				Analyzed: 12/12/23 14:54			
M8FOSA	470092.3	3.948617	707,119.00	3.956617	66	50 - 150	-0.0080	+/-0.50	
M2-4:2FTS	90437.59	2.496817	117,614.00	2.488617	77	50 - 150	0.0082	+/-0.50	
M2PFTA	732676.2	4.313433	1,087,831.00	4.313433	67	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	116620.7	3.786867	165,683.00	3.7789	70	50 - 150	0.0080	+/-0.50	
MPFBA	596422.4	1.066783	801,955.00	1.058467	74	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	133353	2.831117	230,692.00	2.81475	58	50 - 150	0.0164	+/-0.50	
M6PFDA	986463.6	3.779433	1,409,304.00	3.779433	70	50 - 150	0.0000	+/-0.50	
M3PFBS	226033.3	1.894967	305,252.00	1.878383	74	50 - 150	0.0166	+/-0.50	
M7PFUnA	861109.9	3.930067	1,281,109.00	3.930067	67	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	82379.9	3.4205	73,080.00	3.420517	113	50 - 150	0.0000	+/-0.50	
M5PFPeA	558811.5	1.7231	726,231.00	1.714833	77	50 - 150	0.0083	+/-0.50	
M5PFHxA	879492.9	2.58055	1,130,870.00	2.57235	78	50 - 150	0.0082	+/-0.50	
M3PFHxS	154641.3	3.185733	215,682.00	3.18575	72	50 - 150	0.0000	+/-0.50	
M4PFHpA	830689.3	3.154633	1,101,580.00	3.15465	75	50 - 150	0.0000	+/-0.50	
M8PFOA	1000500	3.42985	1,201,948.00	3.429867	83	50 - 150	0.0000	+/-0.50	
M8PFOS	178385.6	3.620217	233,924.00	3.620233	76	50 - 150	0.0000	+/-0.50	
M9PFNA	924280.1	3.62125	1,205,846.00	3.621267	77	50 - 150	0.0000	+/-0.50	
MPFDoA	745462.4	4.072683	1,115,887.00	4.072683	67	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	101226.9	3.937533	162,242.00	3.937533	62	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	114061.2	3.857667	158,055.00	3.857683	72	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS Dup (B359274-BSD1) Lab File ID: B359274-BSD1.d Analyzed: 12/12/23 15:02									
M8FOSA	513966.4	3.948617	707,119.00	3.956617	73	50 - 150	-0.0080	+/-0.50	
M2-4:2FTS	94907.81	2.488617	117,614.00	2.488617	81	50 - 150	0.0000	+/-0.50	
M2PFTA	752696.1	4.313433	1,087,831.00	4.313433	69	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	119074.9	3.7789	165,683.00	3.7789	72	50 - 150	0.0000	+/-0.50	
MPFBA	627670.9	1.058467	801,955.00	1.058467	78	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	162260.6	2.82295	230,692.00	2.81475	70	50 - 150	0.0082	+/-0.50	
M6PFDA	1054641	3.779417	1,409,304.00	3.779433	75	50 - 150	0.0000	+/-0.50	
M3PFBS	240375.4	1.886683	305,252.00	1.878383	79	50 - 150	0.0083	+/-0.50	
M7PFUnA	899127.6	3.930067	1,281,109.00	3.930067	70	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	73516.53	3.420517	73,080.00	3.420517	101	50 - 150	0.0000	+/-0.50	
M5PFPeA	591541.8	1.714833	726,231.00	1.714833	81	50 - 150	0.0000	+/-0.50	
M5PFHxA	923094.2	2.57235	1,130,870.00	2.57235	82	50 - 150	0.0000	+/-0.50	
M3PFHxS	169604.1	3.18575	215,682.00	3.18575	79	50 - 150	0.0000	+/-0.50	
M4PFHpA	895369.4	3.15465	1,101,580.00	3.15465	81	50 - 150	0.0000	+/-0.50	
M8PFOA	1058221	3.429867	1,201,948.00	3.429867	88	50 - 150	0.0000	+/-0.50	
M8PFOS	177264.5	3.620233	233,924.00	3.620233	76	50 - 150	0.0000	+/-0.50	
M9PFNA	990372.1	3.621267	1,205,846.00	3.621267	82	50 - 150	0.0000	+/-0.50	
MPFDoA	727170.3	4.072683	1,115,887.00	4.072683	65	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	120943.9	3.937533	162,242.00	3.937533	75	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	115210.8	3.857667	158,055.00	3.857683	73	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B360698-BLK1)			Lab File ID: B360698-BLK1.d			Analyzed: 12/18/23 17:04			
M8FOSA	553063.7	3.9646	785,370.00	3.972583	70	50 - 150	-0.0080	+/-0.50	
M2-4:2FTS	166287.2	2.537883	253,797.00	2.5543	66	50 - 150	-0.0164	+/-0.50	
M2PFTA	1182525	4.3297	2,191,245.00	4.337817	54	50 - 150	-0.0081	+/-0.50	
M2-8:2FTS	212657.9	3.8028	290,438.00	3.8028	73	50 - 150	0.0000	+/-0.50	
MPFBA	614589.9	1.0834	851,124.00	1.0834	72	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	215058.2	2.86385	228,269.00	2.872033	94	50 - 150	-0.0082	+/-0.50	
M6PFDA	1191323	3.79535	1,765,419.00	3.803317	67	50 - 150	-0.0080	+/-0.50	
M3PFBS	235123	1.928117	314,234.00	1.944683	75	50 - 150	-0.0166	+/-0.50	
M7PFUnA	1045248	3.94605	1,675,624.00	3.954033	62	50 - 150	-0.0080	+/-0.50	
M2-6:2FTS	148329.1	3.4373	183,944.00	3.445283	81	50 - 150	-0.0080	+/-0.50	
M5PFPeA	592654.3	1.757717	784,382.00	1.766017	76	50 - 150	-0.0083	+/-0.50	
M5PFHxA	1005876	2.629833	1,328,451.00	2.646767	76	50 - 150	-0.0169	+/-0.50	
M3PFHxS	144130.8	3.21025	192,255.00	3.218333	75	50 - 150	-0.0081	+/-0.50	
M4PFHpA	975806.4	3.178867	1,301,472.00	3.186933	75	50 - 150	-0.0081	+/-0.50	
M8PFOA	1156591	3.453817	1,492,035.00	3.46195	78	50 - 150	-0.0081	+/-0.50	
M8PFOS	158197	3.644183	210,426.00	3.644167	75	50 - 150	0.0000	+/-0.50	
M9PFNA	1087174	3.645217	1,446,382.00	3.645217	75	50 - 150	0.0000	+/-0.50	
MPFDoA	853963.4	4.088666	1,449,550.00	4.09665	59	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	220644.5	3.953517	304,370.00	3.9615	72	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	242926.7	3.873783	396,602.00	3.881767	61	50 - 150	-0.0080	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B360698-BS1) Lab File ID: B360698-BS1.d Analyzed: 12/19/23 11:13									
M8FOSA	577920.9	3.9566	770,047.00	3.9566	75	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	175475.7	2.52145	221,149.00	2.52145	79	50 - 150	0.0000	+/-0.50	
M2PFTA	1347624	4.329683	2,053,088.00	4.329683	66	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	387931.3	3.794833	456,451.00	3.794833	85	50 - 150	0.0000	+/-0.50	
MPFBA	659758.1	1.0834	839,274.00	1.075083	79	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	204706.1	2.847483	204,484.00	2.847483	100	50 - 150	0.0000	+/-0.50	
M6PFDA	1411861	3.79535	1,710,765.00	3.79535	83	50 - 150	0.0000	+/-0.50	
M3PFBS	248521.4	1.911533	304,809.00	1.90325	82	50 - 150	0.0083	+/-0.50	
M7PFUnA	1181177	3.946033	1,671,274.00	3.946033	71	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	144940.6	3.4373	167,667.00	3.4373	86	50 - 150	0.0000	+/-0.50	
M5PFPeA	630882.9	1.741117	760,379.00	1.741117	83	50 - 150	0.0000	+/-0.50	
M5PFHxA	1060639	2.605183	1,276,662.00	2.605183	83	50 - 150	0.0000	+/-0.50	
M3PFHxS	149274.2	3.201883	182,978.00	3.201883	82	50 - 150	0.0000	+/-0.50	
M4PFHpA	1053276	3.170783	1,247,426.00	3.170783	84	50 - 150	0.0000	+/-0.50	
M8PFOA	1194369	3.445833	1,428,397.00	3.445833	84	50 - 150	0.0000	+/-0.50	
M8PFOS	174387.1	3.644167	214,587.00	3.636183	81	50 - 150	0.0080	+/-0.50	
M9PFNA	1152054	3.6452	1,399,645.00	3.6452	82	50 - 150	0.0000	+/-0.50	
MPFDoA	967001.6	4.08865	1,387,742.00	4.08865	70	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	226872.1	3.9535	331,684.00	3.9535	68	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	312701.1	3.873767	431,045.00	3.873767	73	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS Dup (B360698-BSD1)			Lab File ID: B360698-BSD1.d			Analyzed: 12/19/23 11:20			
M8FOSA	553248.8	3.9566	770,047.00	3.9566	72	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	169126.7	2.51325	221,149.00	2.52145	76	50 - 150	-0.0082	+/-0.50	
M2PFTA	1239702	4.329683	2,053,088.00	4.329683	60	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	370743.3	3.794833	456,451.00	3.794833	81	50 - 150	0.0000	+/-0.50	
MPFBA	642613.1	1.0834	839,274.00	1.075083	77	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	173415.6	2.8393	204,484.00	2.847483	85	50 - 150	-0.0082	+/-0.50	
M6PFDA	1317725	3.79535	1,710,765.00	3.79535	77	50 - 150	0.0000	+/-0.50	
M3PFBS	240894.7	1.90325	304,809.00	1.90325	79	50 - 150	0.0000	+/-0.50	
M7PFUnA	1115192	3.946033	1,671,274.00	3.946033	67	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	150327.6	3.4373	167,667.00	3.4373	90	50 - 150	0.0000	+/-0.50	
M5PFPeA	611886.2	1.741117	760,379.00	1.741117	80	50 - 150	0.0000	+/-0.50	
M5PFHxA	1029337	2.596983	1,276,662.00	2.605183	81	50 - 150	-0.0082	+/-0.50	
M3PFHxS	145857.2	3.201883	182,978.00	3.201883	80	50 - 150	0.0000	+/-0.50	
M4PFHpA	1003883	3.170783	1,247,426.00	3.170783	80	50 - 150	0.0000	+/-0.50	
M8PFOA	1170772	3.445833	1,428,397.00	3.445833	82	50 - 150	0.0000	+/-0.50	
M8PFOS	168350.6	3.636183	214,587.00	3.636183	78	50 - 150	0.0000	+/-0.50	
M9PFNA	1114675	3.637217	1,399,645.00	3.6452	80	50 - 150	-0.0080	+/-0.50	
MPFDoA	912851.6	4.08865	1,387,742.00	4.08865	66	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	208605.9	3.9535	331,684.00	3.9535	63	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	288492.4	3.873767	431,045.00	3.873767	67	50 - 150	0.0000	+/-0.50	

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CERTIFICATIONS
Certified Analyses included in this Report

Analyte	Certifications
<i>SOP-454 PFAS in Water</i>	
Perfluorobutanoic acid (PFBA)	NH-P,PA,NY
Perfluorobutanesulfonic acid (PFBS)	NH-P,PA,NY
Perfluoropentanoic acid (PFPeA)	NH-P,PA,NY
Perfluorohexanoic acid (PFHxA)	NH-P,PA,NY
11Cl-PF3OUdS (F53B Major)	NH-P,PA,NY
9Cl-PF3ONS (F53B Minor)	NH-P,PA
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	NH-P,PA,NY
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P,PA,NY
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P,PA
Perfluorodecanoic acid (PFDA)	NH-P,PA,NY
Perfluorododecanoic acid (PFDoA)	NH-P,PA,NY
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	NH-P,PA,NY
Perfluoroheptanesulfonic acid (PFHpS)	NH-P,PA,NY
N-EtFOSAA (NEtFOSAA)	NH-P,PA,NY
N-MeFOSAA (NMeFOSAA)	NH-P,PA,NY
Perfluorotetradecanoic acid (PFTA)	NH-P,PA,NY
Perfluorotridecanoic acid (PFTrDA)	NH-P,PA,NY
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P,PA,NY
Perfluorodecanesulfonic acid (PFDS)	NH-P,PA
Perfluorooctanesulfonamide (FOSA)	NH-P,PA
Perfluorononanesulfonic acid (PFNS)	NH-P,PA
Perfluoro-1-hexanesulfonamide (FHxSA)	NH-P,PA
Perfluoro-1-butanefulfonamide (FBSA)	NH-P,PA
Perfluorohexanesulfonic acid (PFHxS)	NH-P,PA,NY
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P,PA,NY
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P,PA,NY
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P,PA,NY
Perfluoropentanesulfonic acid (PFPeS)	NH-P,PA,NY
Perfluoroundecanoic acid (PFUnA)	NH-P,PA,NY
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P,PA
Perfluoroheptanoic acid (PFHpA)	NH-P,PA,NY
Perfluorooctanoic acid (PFOA)	NH-P,PA,NY
Perfluorooctanesulfonic acid (PFOS)	NH-P,PA,NY
Perfluorononanoic acid (PFNA)	NH-P,PA,NY

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
NY	New York State Department of Health	10899 NELAP	04/1/2024
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2024
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2024

DC#_Title: ENV-FRM-ELON-0001 v07_Sample Receiving Checklist

Effective Date: 07/13/2023



Log In Back-Sheet

Client BETA Group

Project Barnstable Fire Training Academy

MCP/RCP Required MA-MCP

Deliverable Package Requirement GW-1

Location Barnstable, MA

PW/SID# (When Applicable) n/a

Arrival Method:

Courier ☒ Fed Ex ☐ Walk In ☐ Other ☐

Received By / Date / Time Men 11/22/23 1715

Back-Sheet By / Date / Time Men 11/24/23 0850

Temperature Method Gun # 5

Temp < 6° C Actual Temperature 49

Rush Samples: Yes / No Notify No

Short Hold: Yes / No Notify No

Notes regarding Samples/COC outside of SOP:

Log In Sample Receipt Checklist – (Rejection Criteria Listing
– Using Acceptance Policy) Any False statement will be
brought to the attention of the Client – True or False

	True	False
Received on Ice	☒	☐
Received in Cooler	☒	☐
Custody Seal: DATE TIME	☐	☒
COC Relinquished	☒	☐
COC/Samples Labels Agree	☒	☐
All Samples in Good Condition	☒	☐
Samples Received within Holding Time	☒	☐
Is there enough Volume	☒	☐
Proper Media/Container Used	☒	☐
Splitting Samples Required	☐	☒
MS/MSD	☐	☒
Trip Blanks	☐	☒
Lab to Filters	☐	☒
COC Legible	☒	☐
COC Included: (Check all included)		
Client ☒ Analysis ☒		☒
Project ☒ IDs ☒	Sampler Name	☒
	Collection Date/Time	☐
All Samples Proper pH:	☐	☐

Additional Container Notes

Note: West Virginia requires all samples to have their
temperature taken. Note any outliers.

[illegible]

December 4, 2023

Roger Thibault
Beta Group, Inc. - RI
701 George Washington Highway
Lincoln, RI 02865

Project Location: Barnstable, MA
Client Job Number:
Project Number: 6206.02
Laboratory Work Order Number: 23K1075

Enclosed are results of analyses for samples as received by the laboratory on November 8, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Kaitlyn A. Feliciano
Project Manager

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Beta Group, Inc. - RI
701 George Washington Highway
Lincoln, RI 02865
ATTN: Roger Thibault

REPORT DATE: 12/4/2023

PURCHASE ORDER NUMBER: 23000936

PROJECT NUMBER: 6206.02

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23K1075

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Barnstable, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
PC-36D	23K1075-01	Ground Water		SOP-454 PFAS	
MW-15D	23K1075-02	Ground Water		SOP-454 PFAS	
HW-1S	23K1075-03	Ground Water		SOP-454 PFAS	
PC-36S	23K1075-04	Ground Water		SOP-454 PFAS	
MW-304	23K1075-05	Ground Water		SOP-454 PFAS	
PC-37	23K1075-06	Ground Water		SOP-454 PFAS	
MW-404S	23K1075-07	Ground Water		SOP-454 PFAS	
MW-404D	23K1075-08	Ground Water		SOP-454 PFAS	
HW-1D	23K1075-09	Ground Water		SOP-454 PFAS	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SOP-454 PFAS**Qualifications:****PF-17**

Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.

Analyte & Samples(s) Qualified:**M2-4:2FTS**

23K1075-01[PC-36D]

PF-19

Sample re-analyzed at a dilution that was re-fortified with internal standard.

Analyte & Samples(s) Qualified:**Perfluorooctanesulfonic acid (PFOS)**

23K1075-01RE1[PC-36D], 23K1075-08RE1[MW-404D]

S-29

Extracted Internal Standard is outside of control limits.

Analyte & Samples(s) Qualified:**M2-6:2FTS**

23K1075-01[PC-36D]

M2PFTA

23K1075-03[HW-1S], 23K1075-05[MW-304]

M3PFBS

23K1075-01[PC-36D]

M3PFHxS

23K1075-01[PC-36D]

M4PFHpA

23K1075-01[PC-36D]

M5PFHxA

23K1075-01[PC-36D]

M5PFPeA

23K1075-01[PC-36D]

M8FOSA

23K1075-05[MW-304]

M8PFOA

23K1075-01[PC-36D]

MPFBA

23K1075-06[PC-37]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.

I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Lisa A. Worthington
Technical Representative

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1075

Date Received: 11/8/2023

Field Sample #: PC-36D

Sampled: 11/2/2023 12:15

Sample ID: 23K1075-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	9.9	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluorobutanesulfonic acid (PFBS)	5.2	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluoropentanoic acid (PFPeA)	27	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluorohexanoic acid (PFHxA)	36	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	4.4	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluorodecanoic acid (PFDA)	6.0	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluoroheptanesulfonic acid (PFHpS)	4.1	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluorononanesulfonic acid (PFNS)	2.5	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	14	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluoro-1-butanefulfonamide (FBFA)	3.1	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluorohexanesulfonic acid (PFHxS)	45	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	11	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluoropentanesulfonic acid (PFPeS)	5.9	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluoroundecanoic acid (PFUnA)	12	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluoroheptanoic acid (PFHpA)	23	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluorooctanoic acid (PFOA)	17	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB
Perfluorooctanesulfonic acid (PFOS)	620	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 0:47	RRB
Perfluorononanoic acid (PFNA)	32	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:39	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1075

Date Received: 11/8/2023

Field Sample #: MW-15D

Sampled: 11/2/2023 13:00

Sample ID: 23K1075-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	3.4	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluoropentanoic acid (PFPeA)	11	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorohexanoic acid (PFHxA)	8.3	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorodecanoic acid (PFDA)	1.9	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorononanesulfonic acid (PFNS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorohexanesulfonic acid (PFHxS)	11	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluoropentanesulfonic acid (PFPeS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluoroundecanoic acid (PFUnA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluoroheptanoic acid (PFHpA)	4.7	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorooctanoic acid (PFOA)	9.6	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorooctanesulfonic acid (PFOS)	37	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB
Perfluorononanoic acid (PFNA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:46	RRB

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1075

Date Received: 11/8/2023

Sampled: 11/1/2023 09:30

Field Sample #: HW-1S

Sample ID: 23K1075-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluoropentanoic acid (PFPeA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorohexanoic acid (PFHxA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorodecanoic acid (PFDA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorododecanoic acid (PFDoA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
N-MeFOSAA (NMeFOSAA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorooctanesulfonamide (FOSA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorononanesulfonic acid (PFNS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorohexanesulfonic acid (PFHxS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluoropentanesulfonic acid (PFPeS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluoroundecanoic acid (PFUnA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluoroheptanoic acid (PFHpA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorooctanoic acid (PFOA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorooctanesulfonic acid (PFOS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB
Perfluorononanoic acid (PFNA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 20:53	RRB

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1075

Date Received: 11/8/2023

Sampled: 11/2/2023 12:15

Field Sample #: PC-36S

Sample ID: 23K1075-04

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	8.0	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorobutanesulfonic acid (PFBS)	12	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluoropentanoic acid (PFPeA)	16	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorohexanoic acid (PFHxA)	17	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorodecanoic acid (PFDA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluoroheptanesulfonic acid (PFHpS)	3.5	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorononanesulfonic acid (PFNS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorohexanesulfonic acid (PFHxS)	140	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluoropentanesulfonic acid (PFPeS)	16	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluoroundecanoic acid (PFUnA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluoroheptanoic acid (PFHpA)	18	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorooctanoic acid (PFOA)	12	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorooctanesulfonic acid (PFOS)	130	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB
Perfluorononanoic acid (PFNA)	10	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:00	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1075

Date Received: 11/8/2023

Sampled: 11/3/2023 11:15

Field Sample #: MW-304

Sample ID: 23K1075-05

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	34	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorobutanesulfonic acid (PFBS)	5.9	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluoropentanoic acid (PFPeA)	72	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorohexanoic acid (PFHxA)	56	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	50	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorodecanoic acid (PFDA)	2.4	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluoroheptanesulfonic acid (PFHpS)	3.1	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorononanesulfonic acid (PFNS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorohexanesulfonic acid (PFHxS)	160	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	53	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluoropentanesulfonic acid (PFPeS)	9.0	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluoroundecanoic acid (PFUnA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluoroheptanoic acid (PFHpA)	78	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorooctanoic acid (PFOA)	52	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorooctanesulfonic acid (PFOS)	88	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB
Perfluorononanoic acid (PFNA)	10	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:07	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1075

Date Received: 11/8/2023

Sampled: 11/3/2023 09:15

Field Sample #: PC-37

Sample ID: 23K1075-06

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	9.6	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorobutanesulfonic acid (PFBS)	5.4	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluoropentanoic acid (PFPeA)	22	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorohexanoic acid (PFHxA)	21	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorodecanoic acid (PFDA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorododecanoic acid (PFDoA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluoroheptanesulfonic acid (PFHpS)	3.1	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
N-MeFOSAA (NMeFOSAA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorooctanesulfonamide (FOSA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorononanesulfonic acid (PFNS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorohexanesulfonic acid (PFHxS)	83	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluoropentanesulfonic acid (PFPeS)	8.1	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluoroundecanoic acid (PFUnA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluoroheptanoic acid (PFHpA)	11	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorooctanoic acid (PFOA)	6.7	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorooctanesulfonic acid (PFOS)	45	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB
Perfluorononanoic acid (PFNA)	2.4	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:15	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1075

Date Received: 11/8/2023

Field Sample #: MW-404S

Sampled: 11/2/2023 08:00

Sample ID: 23K1075-07

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluoropentanoic acid (PFPeA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorohexanoic acid (PFHxA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
11Cl-PF3OUdS (F53B Major)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
9Cl-PF3ONS (F53B Minor)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorodecanoic acid (PFDA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorododecanoic acid (PFDoA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
N-EtFOSAA (NEtFOSAA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
N-MeFOSAA (NMeFOSAA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorotetradecanoic acid (PFTA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorooctanesulfonamide (FOSA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorononanesulfonic acid (PFNS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluoro-1-butanefulfonamide (FBFA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorohexanesulfonic acid (PFHxS)	21	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluoropentanesulfonic acid (PFPeS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluoroundecanoic acid (PFUnA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluoroheptanoic acid (PFHpA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorooctanoic acid (PFOA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorooctanesulfonic acid (PFOS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB
Perfluorononanoic acid (PFNA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:22	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1075

Date Received: 11/8/2023

Field Sample #: MW-404D

Sampled: 11/2/2023 09:00

Sample ID: 23K1075-08

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	11	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluoropentanoic acid (PFPeA)	30	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluorohexanoic acid (PFHxA)	23	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
11Cl-PF3OUdS (F53B Major)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
9Cl-PF3ONS (F53B Minor)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluorodecanoic acid (PFDA)	2.5	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluorododecanoic acid (PFDoA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluoroheptanesulfonic acid (PFHpS)	3.2	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
N-EtFOSAA (NEtFOSAA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
N-MeFOSAA (NMeFOSAA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluorotetradecanoic acid (PFTA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluorooctanesulfonamide (FOSA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluorononanesulfonic acid (PFNS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	2.3	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluoro-1-butanefulfonamide (FBFA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluorohexanesulfonic acid (PFHxS)	89	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluoropentanesulfonic acid (PFPeS)	3.7	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluoroundecanoic acid (PFUnA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluoroheptanoic acid (PFHpA)	11	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluorooctanoic acid (PFOA)	16	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB
Perfluorooctanesulfonic acid (PFOS)	220	20	ng/L	10	PF-19	SOP-454 PFAS	11/28/23	12/1/23 0:55	RRB
Perfluorononanoic acid (PFNA)	3.8	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:29	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1075

Date Received: 11/8/2023

Field Sample #: HW-1D

Sampled: 11/2/2023 09:25

Sample ID: 23K1075-09

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluoropentanoic acid (PFPeA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorohexanoic acid (PFHxA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorodecanoic acid (PFDA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorododecanoic acid (PFDoA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
N-MeFOSAA (NMeFOSAA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorooctanesulfonamide (FOSA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorononanesulfonic acid (PFNS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorohexanesulfonic acid (PFHxS)	13	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluoropentanesulfonic acid (PFPeS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluoroundecanoic acid (PFUnA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluoroheptanoic acid (PFHpA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorooctanoic acid (PFOA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorooctanesulfonic acid (PFOS)	16	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB
Perfluorononanoic acid (PFNA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:36	RRB

Sample Extraction Data**Prep Method:**SOP 454-PFAAS **Analytical Method:**SOP-454 PFAS

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23K1075-01 [PC-36D]	B357679	265	1.00	11/28/23
23K1075-01RE1 [PC-36D]	B357679	265	1.00	11/28/23
23K1075-02 [MW-15D]	B357679	269	1.00	11/28/23
23K1075-03 [HW-1S]	B357679	270	1.00	11/28/23
23K1075-04 [PC-36S]	B357679	261	1.00	11/28/23
23K1075-05 [MW-304]	B357679	269	1.00	11/28/23
23K1075-06 [PC-37]	B357679	277	1.00	11/28/23
23K1075-07 [MW-404S]	B357679	254	1.00	11/28/23
23K1075-08 [MW-404D]	B357679	254	1.00	11/28/23
23K1075-08RE1 [MW-404D]	B357679	254	1.00	11/28/23
23K1075-09 [HW-1D]	B357679	272	1.00	11/28/23

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B357679 - SOP 454-PFAAS
Blank (B357679-BLK1)

Prepared: 11/28/23 Analyzed: 11/29/23

Perfluorobutanoic acid (PFBA)	ND	1.9	ng/L
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	ng/L
Perfluoropentanoic acid (PFPeA)	ND	1.9	ng/L
Perfluorohexanoic acid (PFHxA)	ND	1.9	ng/L
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	ng/L
Perfluorodecanoic acid (PFDA)	ND	1.9	ng/L
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.9	ng/L
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	ng/L
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L
Perfluorononanesulfonic acid (PFNS)	ND	1.9	ng/L
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	ng/L
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.9	ng/L
Perfluorohexanesulfonic acid (PFHxS)	ND	1.9	ng/L
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	ng/L
Perfluoropentanesulfonic acid (PFPeS)	ND	1.9	ng/L
Perfluoroundecanoic acid (PFUnA)	ND	1.9	ng/L
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L
Perfluoroheptanoic acid (PFHpA)	ND	1.9	ng/L
Perfluorooctanoic acid (PFOA)	ND	1.9	ng/L
Perfluorooctanesulfonic acid (PFOS)	ND	1.9	ng/L
Perfluorononanoic acid (PFNA)	ND	1.9	ng/L

LCS (B357679-BS1)

Prepared: 11/28/23 Analyzed: 11/29/23

Perfluorobutanoic acid (PFBA)	10.1	1.9	ng/L	9.44	107	73-129
Perfluorobutanesulfonic acid (PFBS)	8.83	1.9	ng/L	8.35	106	72-130
Perfluoropentanoic acid (PFPeA)	9.98	1.9	ng/L	9.44	106	72-129
Perfluorohexanoic acid (PFHxA)	10.4	1.9	ng/L	9.44	110	72-129
11Cl-PF3OUdS (F53B Major)	6.97	1.9	ng/L	8.89	78.4	43.3-138
9Cl-PF3ONS (F53B Minor)	7.53	1.9	ng/L	8.80	85.6	52-140
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	7.22	1.9	ng/L	8.89	81.2	53.7-152
Hexafluoropropylene oxide dimer acid (HFPO-DA)	7.27	1.9	ng/L	9.44	77.1	42.1-145
8:2 Fluorotelomersulfonic acid (8:2FTS A)	9.23	1.9	ng/L	9.06	102	67-138
Perfluorodecanoic acid (PFDA)	10.3	1.9	ng/L	9.44	109	71-129
Perfluorododecanoic acid (PFDoA)	11.7	1.9	ng/L	9.44	124	72-134
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	7.12	1.9	ng/L	8.40	84.7	52.7-147

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B357679 - SOP 454-PFAAS
LCS (B357679-BS1)

Prepared: 11/28/23 Analyzed: 11/29/23

Perfluoroheptanesulfonic acid (PFHpS)	10.7	1.9	ng/L	9.01		118	69-134			
N-EtFOSAA (NEtFOSAA)	12.2	1.9	ng/L	9.44		130	61-135			
N-MeFOSAA (NMeFOSAA)	11.4	1.9	ng/L	9.44		121	65-136			
Perfluorotetradecanoic acid (PFTA)	10.2	1.9	ng/L	9.44		108	71-132			
Perfluorotridecanoic acid (PFTTrDA)	9.62	1.9	ng/L	9.44		102	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	9.82	1.9	ng/L	8.83		111	63-143			
Perfluorodecanesulfonic acid (PFDS)	8.57	1.9	ng/L	9.11		94.1	53-142			
Perfluorooctanesulfonamide (FOSA)	10.9	1.9	ng/L	9.44		116	67-137			
Perfluorononanesulfonic acid (PFNS)	9.50	1.9	ng/L	9.06		105	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	6.59	1.9	ng/L	9.44		69.8	50-150			
Perfluoro-1-butanefulfonamide (FBSA)	7.01	1.9	ng/L	9.44		74.3	50-150			
Perfluorohexanesulfonic acid (PFHxS)	10.0	1.9	ng/L	8.64		116	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	8.73	1.9	ng/L	9.44		92.5	53.8-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	8.59	1.9	ng/L	9.44		91.0	54.5-152			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	9.93	1.9	ng/L	8.97		111	64-140			
Perfluoropentanesulfonic acid (PFPeS)	10.4	1.9	ng/L	8.87		117	71-127			
Perfluoroundecanoic acid (PFUnA)	9.96	1.9	ng/L	9.44		106	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	8.61	1.9	ng/L	9.44		91.2	50.5-159			
Perfluoroheptanoic acid (PFHpA)	9.84	1.9	ng/L	9.44		104	72-130			
Perfluorooctanoic acid (PFOA)	11.3	1.9	ng/L	9.44		120	71-133			
Perfluorooctanesulfonic acid (PFOS)	9.52	1.9	ng/L	8.73		109	65-140			
Perfluorononanoic acid (PFNA)	9.32	1.9	ng/L	9.44		98.7	69-130			

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
PF-17	Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.
PF-19	Sample re-analyzed at a dilution that was re-fortified with internal standard.
S-29	Extracted Internal Standard is outside of control limits.

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PC-36D (23K1075-01) Lab File ID: 23K1075-01.d Analyzed: 11/29/23 20:39									
M8FOSA	817319.8	3.996567	668,109.00	3.9966	122	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	405138.7	2.636633	230,805.00	2.644867	176	50 - 150	-0.0082	+/-0.50	*
M2PFTA	1070528	4.370317	1,372,008.00	4.370333	78	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	290564.3	3.835033	224,508.00	3.835033	129	50 - 150	0.0000	+/-0.50	
MPFBA	760347.7	1.0917	747,715.00	1.100017	102	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	201956.3	2.929717	217,420.00	2.93785	93	50 - 150	-0.0081	+/-0.50	
M6PFDA	1978742	3.835517	1,363,136.00	3.835533	145	50 - 150	0.0000	+/-0.50	
M3PFBS	513292.1	2.002783	285,464.00	2.011067	180	50 - 150	-0.0083	+/-0.50	*
M7PFUnA	1896325	3.986017	1,369,349.00	3.986033	138	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	382795.1	3.477383	192,908.00	3.4774	198	50 - 150	0.0000	+/-0.50	*
M5PFPeA	1135102	1.816233	708,804.00	1.824517	160	50 - 150	-0.0083	+/-0.50	*
M5PFHxA	1940909	2.722683	1,169,882.00	2.730867	166	50 - 150	-0.0082	+/-0.50	*
M3PFHxS	363070	3.250667	209,914.00	3.250683	173	50 - 150	0.0000	+/-0.50	*
M4PFHpA	1939558	3.227633	1,182,052.00	3.227633	164	50 - 150	0.0000	+/-0.50	*
M8PFOA	2423193	3.4859	1,412,221.00	3.4859	172	50 - 150	0.0000	+/-0.50	*
M8PFOS	323394.9	3.668133	234,102.00	3.66815	138	50 - 150	0.0000	+/-0.50	
M9PFNA	1957841	3.669167	1,581,628.00	3.669183	124	50 - 150	0.0000	+/-0.50	
MPFDoA	1503940	4.1208	1,242,329.00	4.128833	121	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	355294.9	3.993483	297,341.00	3.9935	119	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	422292.2	3.913917	295,321.00	3.913933	143	50 - 150	0.0000	+/-0.50	
PC-36D (23K1075-01RE1) Lab File ID: 23K1075-01RE1.d Analyzed: 12/01/23 00:47									
M8PFOS	289139	3.660167	232,302.00	3.660167	124	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-15D (23K1075-02)		Lab File ID: 23K1075-02.d				Analyzed: 11/29/23 20:46			
M8FOSA	451898.3	3.996567	668,109.00	3.9966	68	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	142586.5	2.636633	230,805.00	2.644867	62	50 - 150	-0.0082	+/-0.50	
M2PFTA	1048684	4.3703	1,372,008.00	4.370333	76	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	130104	3.835017	224,508.00	3.835033	58	50 - 150	0.0000	+/-0.50	
MPFBA	527854.3	1.0917	747,715.00	1.100017	71	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	177796.6	2.929717	217,420.00	2.93785	82	50 - 150	-0.0081	+/-0.50	
M6PFDA	1075613	3.835517	1,363,136.00	3.835533	79	50 - 150	0.0000	+/-0.50	
M3PFBS	264048.8	2.002783	285,464.00	2.011067	92	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1093290	3.986	1,369,349.00	3.986033	80	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	130725	3.477383	192,908.00	3.4774	68	50 - 150	0.0000	+/-0.50	
M5PFPeA	565088.4	1.816233	708,804.00	1.824517	80	50 - 150	-0.0083	+/-0.50	
M5PFHxA	975082.9	2.722683	1,169,882.00	2.730867	83	50 - 150	-0.0082	+/-0.50	
M3PFHxS	186548.1	3.250667	209,914.00	3.250683	89	50 - 150	0.0000	+/-0.50	
M4PFHpA	997122.8	3.227617	1,182,052.00	3.227633	84	50 - 150	0.0000	+/-0.50	
M8PFOA	1213109	3.485883	1,412,221.00	3.4859	86	50 - 150	0.0000	+/-0.50	
M8PFOS	202092.1	3.668133	234,102.00	3.66815	86	50 - 150	0.0000	+/-0.50	
M9PFNA	1394291	3.669167	1,581,628.00	3.669183	88	50 - 150	0.0000	+/-0.50	
MPFDoA	979209.9	4.120767	1,242,329.00	4.128833	79	50 - 150	-0.0081	+/-0.50	
D5-NEtFOSAA	213953.1	3.985483	297,341.00	3.9935	72	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	219502.5	3.9139	295,321.00	3.913933	74	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-1S (23K1075-03)		Lab File ID: 23K1075-03.d				Analyzed: 11/29/23 20:53			
M8FOSA	379919.7	3.996583	668,109.00	3.9966	57	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	151286.2	2.636633	230,805.00	2.644867	66	50 - 150	-0.0082	+/-0.50	
M2PFTA	445898.3	4.370317	1,372,008.00	4.370333	32	50 - 150	0.0000	+/-0.50	*
M2-8:2FTS	124123.4	3.835033	224,508.00	3.835033	55	50 - 150	0.0000	+/-0.50	
MPFBA	434458.2	1.0917	747,715.00	1.100017	58	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	186175.5	2.929733	217,420.00	2.93785	86	50 - 150	-0.0081	+/-0.50	
M6PFDA	934581.6	3.827567	1,363,136.00	3.835533	69	50 - 150	-0.0080	+/-0.50	
M3PFBS	263839.8	2.002783	285,464.00	2.011067	92	50 - 150	-0.0083	+/-0.50	
M7PFUnA	850718.4	3.986033	1,369,349.00	3.986033	62	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	161340.4	3.477383	192,908.00	3.4774	84	50 - 150	0.0000	+/-0.50	
M5PFPeA	574682.7	1.816233	708,804.00	1.824517	81	50 - 150	-0.0083	+/-0.50	
M5PFHxA	970124.6	2.722683	1,169,882.00	2.730867	83	50 - 150	-0.0082	+/-0.50	
M3PFHxS	179814.6	3.250683	209,914.00	3.250683	86	50 - 150	0.0000	+/-0.50	
M4PFHpA	995784.9	3.227633	1,182,052.00	3.227633	84	50 - 150	0.0000	+/-0.50	
M8PFOA	1167499	3.4859	1,412,221.00	3.4859	83	50 - 150	0.0000	+/-0.50	
M8PFOS	178160.4	3.668133	234,102.00	3.66815	76	50 - 150	0.0000	+/-0.50	
M9PFNA	1236575	3.669167	1,581,628.00	3.669183	78	50 - 150	0.0000	+/-0.50	
MPFDoA	677821	4.1208	1,242,329.00	4.128833	55	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	176948.5	3.9855	297,341.00	3.9935	60	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	182174.2	3.905933	295,321.00	3.913933	62	50 - 150	-0.0080	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PC-36S (23K1075-04)		Lab File ID: 23K1075-04.d				Analyzed: 11/29/23 21:00			
M8FOSA	447971.3	3.996567	668,109.00	3.9966	67	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	133634	2.636633	230,805.00	2.644867	58	50 - 150	-0.0082	+/-0.50	
M2PFTA	1017709	4.3703	1,372,008.00	4.370333	74	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	123765.6	3.835017	224,508.00	3.835033	55	50 - 150	0.0000	+/-0.50	
MPFBA	457753	1.0917	747,715.00	1.100017	61	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	187463	2.929733	217,420.00	2.93785	86	50 - 150	-0.0081	+/-0.50	
M6PFDA	1032195	3.82755	1,363,136.00	3.835533	76	50 - 150	-0.0080	+/-0.50	
M3PFBS	261018.5	2.0028	285,464.00	2.011067	91	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1021462	3.986017	1,369,349.00	3.986033	75	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	143216.6	3.4694	192,908.00	3.4774	74	50 - 150	-0.0080	+/-0.50	
M5PFPeA	571171	1.816233	708,804.00	1.824517	81	50 - 150	-0.0083	+/-0.50	
M5PFHxA	968448.9	2.722683	1,169,882.00	2.730867	83	50 - 150	-0.0082	+/-0.50	
M3PFHxS	188164	3.250667	209,914.00	3.250683	90	50 - 150	0.0000	+/-0.50	
M4PFHpA	981351.5	3.227617	1,182,052.00	3.227633	83	50 - 150	0.0000	+/-0.50	
M8PFOA	1261243	3.4859	1,412,221.00	3.4859	89	50 - 150	0.0000	+/-0.50	
M8PFOS	188444	3.668133	234,102.00	3.66815	80	50 - 150	0.0000	+/-0.50	
M9PFNA	1353879	3.669167	1,581,628.00	3.669183	86	50 - 150	0.0000	+/-0.50	
MPFDoA	901449.4	4.120783	1,242,329.00	4.128833	73	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	185673	3.993483	297,341.00	3.9935	62	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	193470.1	3.9139	295,321.00	3.913933	66	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-304 (23K1075-05)		Lab File ID: 23K1075-05.d				Analyzed: 11/29/23 21:07			
M8FOSA	123414.8	3.996583	668,109.00	3.9966	18	50 - 150	0.0000	+/-0.50	*
M2-4:2FTS	155053.4	2.636633	230,805.00	2.644867	67	50 - 150	-0.0082	+/-0.50	
M2PFTA	290456.3	4.370317	1,372,008.00	4.370333	21	50 - 150	0.0000	+/-0.50	*
M2-8:2FTS	151485.8	3.835033	224,508.00	3.835033	67	50 - 150	0.0000	+/-0.50	
MPFBA	406970.8	1.0917	747,715.00	1.100017	54	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	184517.6	2.929733	217,420.00	2.93785	85	50 - 150	-0.0081	+/-0.50	
M6PFDA	1016259	3.827567	1,363,136.00	3.835533	75	50 - 150	-0.0080	+/-0.50	
M3PFBS	238919.9	2.002783	285,464.00	2.011067	84	50 - 150	-0.0083	+/-0.50	
M7PFUnA	946391.3	3.986033	1,369,349.00	3.986033	69	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	168487.4	3.4694	192,908.00	3.4774	87	50 - 150	-0.0080	+/-0.50	
M5PFPeA	531381.9	1.816233	708,804.00	1.824517	75	50 - 150	-0.0083	+/-0.50	
M5PFHxA	901669.3	2.722683	1,169,882.00	2.730867	77	50 - 150	-0.0082	+/-0.50	
M3PFHxS	165084.1	3.250683	209,914.00	3.250683	79	50 - 150	0.0000	+/-0.50	
M4PFHpA	911151.3	3.227633	1,182,052.00	3.227633	77	50 - 150	0.0000	+/-0.50	
M8PFOA	1144472	3.4859	1,412,221.00	3.4859	81	50 - 150	0.0000	+/-0.50	
M8PFOS	184140.9	3.66815	234,102.00	3.66815	79	50 - 150	0.0000	+/-0.50	
M9PFNA	1276761	3.669183	1,581,628.00	3.669183	81	50 - 150	0.0000	+/-0.50	
MPFDoA	716160.5	4.1208	1,242,329.00	4.128833	58	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	166494.2	3.9935	297,341.00	3.9935	56	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	178373.3	3.913917	295,321.00	3.913933	60	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PC-37 (23K1075-06) Lab File ID: 23K1075-06.d Analyzed: 11/29/23 21:15									
M8FOSA	431494.8	3.996567	668,109.00	3.9966	65	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	175430.8	2.636633	230,805.00	2.644867	76	50 - 150	-0.0082	+/-0.50	
M2PFTA	899133.4	4.370317	1,372,008.00	4.370333	66	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	141515.6	3.835033	224,508.00	3.835033	63	50 - 150	0.0000	+/-0.50	
MPFBA	320437.2	1.0917	747,715.00	1.100017	43	50 - 150	-0.0083	+/-0.50	*
M3HFPO-DA	154030.8	2.929717	217,420.00	2.93785	71	50 - 150	-0.0081	+/-0.50	
M6PFDA	1052619	3.827567	1,363,136.00	3.835533	77	50 - 150	-0.0080	+/-0.50	
M3PFBS	257461.5	1.9945	285,464.00	2.011067	90	50 - 150	-0.0166	+/-0.50	
M7PFUnA	1071773	3.986017	1,369,349.00	3.986033	78	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	162659.1	3.4694	192,908.00	3.4774	84	50 - 150	-0.0080	+/-0.50	
M5PFPeA	535649.3	1.80795	708,804.00	1.824517	76	50 - 150	-0.0166	+/-0.50	
M5PFHxA	945945.2	2.722683	1,169,882.00	2.730867	81	50 - 150	-0.0082	+/-0.50	
M3PFHxS	188624	3.250667	209,914.00	3.250683	90	50 - 150	0.0000	+/-0.50	
M4PFHpA	964289.3	3.227617	1,182,052.00	3.227633	82	50 - 150	0.0000	+/-0.50	
M8PFOA	1209197	3.4859	1,412,221.00	3.4859	86	50 - 150	0.0000	+/-0.50	
M8PFOS	199388.6	3.668133	234,102.00	3.66815	85	50 - 150	0.0000	+/-0.50	
M9PFNA	1318581	3.669167	1,581,628.00	3.669183	83	50 - 150	0.0000	+/-0.50	
MPFDoA	905092.6	4.120783	1,242,329.00	4.128833	73	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	188199.1	3.985483	297,341.00	3.9935	63	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	183782	3.905917	295,321.00	3.913933	62	50 - 150	-0.0080	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-404S (23K1075-07) Lab File ID: 23K1075-07.d Analyzed: 11/29/23 21:22									
M8FOSA	444345.2	3.996567	668,109.00	3.9966	67	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	138545.6	2.636633	230,805.00	2.644867	60	50 - 150	-0.0082	+/-0.50	
M2PFTA	963688	4.370317	1,372,008.00	4.370333	70	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	131854.5	3.835017	224,508.00	3.835033	59	50 - 150	0.0000	+/-0.50	
MPFBA	495492.9	1.0917	747,715.00	1.100017	66	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	194086.5	2.929717	217,420.00	2.93785	89	50 - 150	-0.0081	+/-0.50	
M6PFDA	1021760	3.827567	1,363,136.00	3.835533	75	50 - 150	-0.0080	+/-0.50	
M3PFBS	260962	2.002783	285,464.00	2.011067	91	50 - 150	-0.0083	+/-0.50	
M7PFUnA	976433.8	3.978017	1,369,349.00	3.986033	71	50 - 150	-0.0080	+/-0.50	
M2-6:2FTS	155384.5	3.4694	192,908.00	3.4774	81	50 - 150	-0.0080	+/-0.50	
M5PFPeA	580075.8	1.816233	708,804.00	1.824517	82	50 - 150	-0.0083	+/-0.50	
M5PFHxA	953731.3	2.722683	1,169,882.00	2.730867	82	50 - 150	-0.0082	+/-0.50	
M3PFHxS	183889.3	3.250667	209,914.00	3.250683	88	50 - 150	0.0000	+/-0.50	
M4PFHpA	997181.4	3.227617	1,182,052.00	3.227633	84	50 - 150	0.0000	+/-0.50	
M8PFOA	1194870	3.485883	1,412,221.00	3.4859	85	50 - 150	0.0000	+/-0.50	
M8PFOS	195742.6	3.668133	234,102.00	3.66815	84	50 - 150	0.0000	+/-0.50	
M9PFNA	1338880	3.669167	1,581,628.00	3.669183	85	50 - 150	0.0000	+/-0.50	
MPFDoA	857995.4	4.120783	1,242,329.00	4.128833	69	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	179228.3	3.985483	297,341.00	3.9935	60	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	200841.3	3.905917	295,321.00	3.913933	68	50 - 150	-0.0080	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-404D (23K1075-08) Lab File ID: 23K1075-08.d Analyzed: 11/29/23 21:29									
M8FOSA	502563.5	3.996583	668,109.00	3.9966	75	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	117843.2	2.636633	230,805.00	2.644867	51	50 - 150	-0.0082	+/-0.50	
M2PFTA	1135925	4.370317	1,372,008.00	4.370333	83	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	123013	3.835033	224,508.00	3.835033	55	50 - 150	0.0000	+/-0.50	
MPFBA	624160.1	1.0917	747,715.00	1.100017	83	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	208938.7	2.929733	217,420.00	2.93785	96	50 - 150	-0.0081	+/-0.50	
M6PFDA	1200658	3.827567	1,363,136.00	3.835533	88	50 - 150	-0.0080	+/-0.50	
M3PFBS	301368.6	2.002783	285,464.00	2.011067	106	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1162991	3.978033	1,369,349.00	3.986033	85	50 - 150	-0.0080	+/-0.50	
M2-6:2FTS	161563.3	3.469417	192,908.00	3.4774	84	50 - 150	-0.0080	+/-0.50	
M5PFPeA	648567.8	1.816233	708,804.00	1.824517	92	50 - 150	-0.0083	+/-0.50	
M5PFHxA	1084324	2.722683	1,169,882.00	2.730867	93	50 - 150	-0.0082	+/-0.50	
M3PFHxS	209968	3.250683	209,914.00	3.250683	100	50 - 150	0.0000	+/-0.50	
M4PFHpA	1113845	3.227633	1,182,052.00	3.227633	94	50 - 150	0.0000	+/-0.50	
M8PFOA	1389105	3.4859	1,412,221.00	3.4859	98	50 - 150	0.0000	+/-0.50	
M8PFOS	221420.2	3.66815	234,102.00	3.66815	95	50 - 150	0.0000	+/-0.50	
M9PFNA	1545063	3.669183	1,581,628.00	3.669183	98	50 - 150	0.0000	+/-0.50	
MPFDoA	1030352	4.1208	1,242,329.00	4.128833	83	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	215937.9	3.9855	297,341.00	3.9935	73	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	225511.1	3.905917	295,321.00	3.913933	76	50 - 150	-0.0080	+/-0.50	
MW-404D (23K1075-08RE1) Lab File ID: 23K1075-08RE1.d Analyzed: 12/01/23 00:55									
M8PFOS	256834.3	3.66015	232,302.00	3.660167	111	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HW-1D (23K1075-09)		Lab File ID: 23K1075-09.d				Analyzed: 11/29/23 21:36			
M8FOSA	514283	3.996583	668,109.00	3.9966	77	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	147771.1	2.636633	230,805.00	2.644867	64	50 - 150	-0.0082	+/-0.50	
M2PFTA	1109114	4.3622	1,372,008.00	4.370333	81	50 - 150	-0.0081	+/-0.50	
M2-8:2FTS	140056	3.835033	224,508.00	3.835033	62	50 - 150	0.0000	+/-0.50	
MPFBA	543304.9	1.0917	747,715.00	1.100017	73	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	238573	2.929733	217,420.00	2.93785	110	50 - 150	-0.0081	+/-0.50	
M6PFDA	1165888	3.827567	1,363,136.00	3.835533	86	50 - 150	-0.0080	+/-0.50	
M3PFBS	286686	2.002783	285,464.00	2.011067	100	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1134468	3.986033	1,369,349.00	3.986033	83	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	160127.3	3.4694	192,908.00	3.4774	83	50 - 150	-0.0080	+/-0.50	
M5PFPeA	641691.9	1.816233	708,804.00	1.824517	91	50 - 150	-0.0083	+/-0.50	
M5PFHxA	1078378	2.722683	1,169,882.00	2.730867	92	50 - 150	-0.0082	+/-0.50	
M3PFHxS	210086.8	3.250667	209,914.00	3.250683	100	50 - 150	0.0000	+/-0.50	
M4PFHpA	1098858	3.227617	1,182,052.00	3.227633	93	50 - 150	0.0000	+/-0.50	
M8PFOA	1351760	3.4859	1,412,221.00	3.4859	96	50 - 150	0.0000	+/-0.50	
M8PFOS	224096.2	3.668133	234,102.00	3.66815	96	50 - 150	0.0000	+/-0.50	
M9PFNA	1526318	3.669183	1,581,628.00	3.669183	97	50 - 150	0.0000	+/-0.50	
MPFDoA	1038101	4.1208	1,242,329.00	4.128833	84	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	235312.1	3.9855	297,341.00	3.9935	79	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	229936.2	3.905917	295,321.00	3.913933	78	50 - 150	-0.0080	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B357679-BLK1)			Lab File ID: B357679-BLK1.d			Analyzed: 11/29/23 20:17			
M8FOSA	613048.6	3.996567	668,109.00	3.9966	92	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	214203.5	2.636633	230,805.00	2.644867	93	50 - 150	-0.0082	+/-0.50	
M2PFTA	1364218	4.3703	1,372,008.00	4.370333	99	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	226639.9	3.835017	224,508.00	3.835033	101	50 - 150	0.0000	+/-0.50	
MPFBA	764754.8	1.0917	747,715.00	1.100017	102	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	238262.9	2.93785	217,420.00	2.93785	110	50 - 150	0.0000	+/-0.50	
M6PFDA	1416191	3.82755	1,363,136.00	3.835533	104	50 - 150	-0.0080	+/-0.50	
M3PFBS	326400.3	2.002783	285,464.00	2.011067	114	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1388198	3.986	1,369,349.00	3.986033	101	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	230872.1	3.477383	192,908.00	3.4774	120	50 - 150	0.0000	+/-0.50	
M5PFPeA	751130.6	1.816233	708,804.00	1.824517	106	50 - 150	-0.0083	+/-0.50	
M5PFHxA	1259548	2.722683	1,169,882.00	2.730867	108	50 - 150	-0.0082	+/-0.50	
M3PFHxS	238349.7	3.250667	209,914.00	3.250683	114	50 - 150	0.0000	+/-0.50	
M4PFHpA	1320902	3.227617	1,182,052.00	3.227633	112	50 - 150	0.0000	+/-0.50	
M8PFOA	1632481	3.485883	1,412,221.00	3.4859	116	50 - 150	0.0000	+/-0.50	
M8PFOS	254433.2	3.668133	234,102.00	3.66815	109	50 - 150	0.0000	+/-0.50	
M9PFNA	1858389	3.669167	1,581,628.00	3.669183	117	50 - 150	0.0000	+/-0.50	
MPFDoA	1206904	4.120767	1,242,329.00	4.128833	97	50 - 150	-0.0081	+/-0.50	
D5-NEtFOSAA	307228.2	3.993467	297,341.00	3.9935	103	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	296382.1	3.9139	295,321.00	3.913933	100	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B357679-BS1)			Lab File ID: B357679-BS1.d			Analyzed: 11/29/23 20:09			
M8FOSA	565658.1	3.996583	668,109.00	3.9966	85	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	211569.6	2.636633	230,805.00	2.644867	92	50 - 150	-0.0082	+/-0.50	
M2PFTA	1303011	4.370317	1,372,008.00	4.370333	95	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	232320.8	3.835033	224,508.00	3.835033	103	50 - 150	0.0000	+/-0.50	
MPFBA	708556.1	1.0917	747,715.00	1.100017	95	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	225180	2.929717	217,420.00	2.93785	104	50 - 150	-0.0081	+/-0.50	
M6PFDA	1300310	3.835517	1,363,136.00	3.835533	95	50 - 150	0.0000	+/-0.50	
M3PFBS	310779.8	2.002783	285,464.00	2.011067	109	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1350868	3.986017	1,369,349.00	3.986033	99	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	209148.4	3.477383	192,908.00	3.4774	108	50 - 150	0.0000	+/-0.50	
M5PFPeA	696736.4	1.816233	708,804.00	1.824517	98	50 - 150	-0.0083	+/-0.50	
M5PFHxA	1162807	2.722683	1,169,882.00	2.730867	99	50 - 150	-0.0082	+/-0.50	
M3PFHxS	218138.1	3.250683	209,914.00	3.250683	104	50 - 150	0.0000	+/-0.50	
M4PFHpA	1250912	3.227633	1,182,052.00	3.227633	106	50 - 150	0.0000	+/-0.50	
M8PFOA	1521252	3.4859	1,412,221.00	3.4859	108	50 - 150	0.0000	+/-0.50	
M8PFOS	242556.3	3.668133	234,102.00	3.66815	104	50 - 150	0.0000	+/-0.50	
M9PFNA	1798645	3.669167	1,581,628.00	3.669183	114	50 - 150	0.0000	+/-0.50	
MPFDoA	1144580	4.120783	1,242,329.00	4.128833	92	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	278130.9	3.993483	297,341.00	3.9935	94	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	284712.6	3.913917	295,321.00	3.913933	96	50 - 150	0.0000	+/-0.50	

CERTIFICATIONS
Certified Analyses included in this Report

Analyte	Certifications
SOP-454 PFAS in Water	
Perfluorobutanoic acid (PFBA)	NH-P,PA,NY
Perfluorobutanesulfonic acid (PFBS)	NH-P,PA,NY
Perfluoropentanoic acid (PFPeA)	NH-P,PA,NY
Perfluorohexanoic acid (PFHxA)	NH-P,PA,NY
11Cl-PF3OUdS (F53B Major)	NH-P,PA,NY
9Cl-PF3ONS (F53B Minor)	NH-P,PA
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	NH-P,PA,NY
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P,PA,NY
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P,PA
Perfluorodecanoic acid (PFDA)	NH-P,PA,NY
Perfluorododecanoic acid (PFDoA)	NH-P,PA,NY
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	NH-P,PA,NY
Perfluoroheptanesulfonic acid (PFHpS)	NH-P,PA,NY
N-EtFOSAA (NEtFOSAA)	NH-P,PA,NY
N-MeFOSAA (NMeFOSAA)	NH-P,PA,NY
Perfluorotetradecanoic acid (PFTA)	NH-P,PA,NY
Perfluorotridecanoic acid (PFTrDA)	NH-P,PA,NY
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P,PA,NY
Perfluorodecanesulfonic acid (PFDS)	NH-P,PA
Perfluorooctanesulfonamide (FOSA)	NH-P,PA
Perfluorononanesulfonic acid (PFNS)	NH-P,PA
Perfluoro-1-hexanesulfonamide (FHxSA)	NH-P,PA
Perfluoro-1-butanefulfonamide (FBSA)	NH-P,PA
Perfluorohexanesulfonic acid (PFHxS)	NH-P,PA,NY
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P,PA,NY
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P,PA,NY
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P,PA,NY
Perfluoropentanesulfonic acid (PFPeS)	NH-P,PA,NY
Perfluoroundecanoic acid (PFUnA)	NH-P,PA,NY
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P,PA
Perfluoroheptanoic acid (PFHpA)	NH-P,PA,NY
Perfluorooctanoic acid (PFOA)	NH-P,PA,NY
Perfluorooctanesulfonic acid (PFOS)	NH-P,PA,NY
Perfluorononanoic acid (PFNA)	NH-P,PA,NY

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
NY	New York State Department of Health	10899 NELAP	04/1/2024
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2024
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2024

December 4, 2023

Roger Thibault
Beta Group, Inc. - RI
701 George Washington Highway
Lincoln, RI 02865

Project Location: Barnstable, MA
Client Job Number:
Project Number: 6206.04
Laboratory Work Order Number: 23K1079

Enclosed are results of analyses for samples as received by the laboratory on November 8, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Kaitlyn A. Feliciano
Project Manager

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Beta Group, Inc. - RI
701 George Washington Highway
Lincoln, RI 02865
ATTN: Roger Thibault

REPORT DATE: 12/4/2023

PURCHASE ORDER NUMBER: 23000936

PROJECT NUMBER: 6206.04

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23K1079

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Barnstable, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
HSW-6	23K1079-01	Ground Water		SOP-454 PFAS	
PFW-1	23K1079-02	Ground Water		SOP-454 PFAS	
PFW-5	23K1079-03	Ground Water		SOP-454 PFAS	
MW-311	23K1079-04	Ground Water		SOP-454 PFAS	
MW-35	23K1079-05	Ground Water		SOP-454 PFAS	
PC-6A	23K1079-07	Ground Water		SOP-454 PFAS	
PC-11	23K1079-08	Ground Water		SOP-454 PFAS	
PC-345	23K1079-09	Ground Water		SOP-454 PFAS	
DUP-1	23K1079-10	Water		SOP-454 PFAS	
PC-16D	23K1079-11	Ground Water		SOP-454 PFAS	
PC-29	23K1079-12	Ground Water		SOP-454 PFAS	
EB-11.1.23	23K1079-13	Equipment Blank Water		SOP-454 PFAS	
PC-30	23K1079-14	Ground Water		SOP-454 PFAS	
PC-14	23K1079-15	Ground Water		SOP-454 PFAS	
MW-125	23K1079-16	Ground Water		SOP-454 PFAS	
MW-22	23K1079-17	Ground Water		SOP-454 PFAS	
MW-35I	23K1079-18	Ground Water		SOP-454 PFAS	
EB.11.2.23	23K1079-19	Equipment Blank Water		SOP-454 PFAS	
PC-38	23K1079-20	Ground Water		SOP-454 PFAS	
Equip-Blank-11.3.23	23K1079-21	Equipment Blank Water		SOP-454 PFAS	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

Qualifications:**D-01**

Sample extracted/prepared at a dilution due to sample matrix.

Analyte & Samples(s) Qualified:

23K1079-02[PFW-1], 23K1079-03[PFW-5], 23K1079-07[PC-6A], 23K1079-11[PC-16D], 23K1079-14[PC-30], 23K1079-16[MW-125]

E

Reported result is estimated. Value reported over verified calibration range.

Analyte & Samples(s) Qualified:**6:2 Fluorotelomersulfonic acid (6:2FTS A)**

B357679-MS1, B357679-MSD1

MS-07A

Matrix spike and spike duplicate recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery.

Possibility of matrix effects that lead to low bias or non-homogeneous sample aliquot cannot be eliminated.

Analyte & Samples(s) Qualified:**Perfluorodecanesulfonic acid (PFDS)**

23K1079-08[PC-11], B357679-MS1, B357679-MSD1

Perfluoroheptanesulfonic acid (PFHpS)

23K1079-08[PC-11], B357679-MSD1

Perfluorononanesulfonic acid (PFNS)

23K1079-08[PC-11], B357679-MS1, B357679-MSD1

MS-09

Matrix spike recovery and/or matrix spike duplicate recovery outside of control limits. Possibility of sample matrix effects that lead to a low bias for reported result or non-homogeneous sample aliquots cannot be eliminated.

Analyte & Samples(s) Qualified:**Perfluorooctanesulfonamide (FOSA)**

23K1079-08[PC-11], B357679-MS1, B357679-MSD1

MS-12

Matrix spike recovery and matrix spike duplicate recovery outside of control limits. Possibility of sample matrix effects that lead to a high bias for reported result or non-homogeneous sample aliquots cannot be eliminated.

Analyte & Samples(s) Qualified:**Perfluoroheptanesulfonic acid (PFHpS)**

23K1079-08[PC-11], B357679-MS1

MS-19

Sample to spike ratio is greater than or equal to 4:1. Spiked amount is not representative of the native amount in the sample. Appropriate or meaningful recoveries cannot be calculated.

Analyte & Samples(s) Qualified:**6:2 Fluorotelomersulfonic acid (6:2FTS A)**

23K1079-08RE1[PC-11], B357679-MS1, B357679-MSD1

8:2 Fluorotelomersulfonic acid (8:2FTS A)

23K1079-08RE1[PC-11], B357679-MS1, B357679-MSD1

Perfluoro-1-hexanesulfonamide (FHxSA)

23K1079-08RE1[PC-11], B357679-MS1, B357679-MSD1

Perfluorohexanesulfonic acid (PFHxS)

23K1079-08RE1[PC-11], B357679-MS1, B357679-MSD1

Perfluorohexanoic acid (PFHxA)

23K1079-08RE1[PC-11], B357679-MSD1

Perfluorooctanesulfonic acid (PFOS)

23K1079-08RE1[PC-11], B357679-MS1, B357679-MSD1

Perfluorooctanoic acid (PFOA)

23K1079-08[PC-11], B357679-MSD1

Perfluoropentanoic acid (PFPeA)

23K1079-08RE1[PC-11], B357679-MS1, B357679-MSD1

Perfluoroundecanoic acid (PFUnA)

23K1079-08RE1[PC-11], B357679-MS1, B357679-MSD1

MS-22

Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.

Analyte & Samples(s) Qualified:**N-EtFOSAA (NEtFOSAA)**

B357679-MS1

N-MeFOSAA (NMeFOSAA)

B357679-MSD1

Perfluorobutanesulfonic acid (PFBS)

23K1079-08[PC-11], B357679-MSD1

Perfluorobutanoic acid (PFBA)

23K1079-08[PC-11], B357679-MSD1

Perfluoroheptanoic acid (PFHpA)

23K1079-08[PC-11], B357679-MS1

Perfluoropentanesulfonic acid (PFPeS)23K1079-08[PC-11], B357679-MSD1

MS-23

Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is outside of the method specified criteria. Reduced precision anticipated for any reported result for this compound.

Analyte & Samples(s) Qualified:**Perfluoro-1-butanesulfonamide (FBSA)**

23K1079-08[PC-11], B357679-MSD1

Perfluorononanoic acid (PFNA)23K1079-08[PC-11], B357679-MSD1

PF-17

Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.

Analyte & Samples(s) Qualified:**M2-4:2FTS**23K1079-05[MW-35]

PF-18

Re-analysis confirmed Extracted Internal Standard failure due to matrix effects.

Analyte & Samples(s) Qualified:**M2-6:2FTS**

23K1079-08[PC-11], B357679-MS1, B357679-MSD1

M2-8:2FTS

23K1079-08[PC-11], B357679-MS1, B357679-MSD1

M2PF7A

23K1079-08[PC-11], B357679-MSD1

PF-19

Sample re-analyzed at a dilution that was re-fortified with internal standard.

Analyte & Samples(s) Qualified:**6:2 Fluorotelomersulfonic acid (6:2FTS A)**

23K1079-01RE1[HSW-6], 23K1079-02RE1[PFW-1], 23K1079-04RE1[MW-311], 23K1079-05RE1[MW-35], 23K1079-08RE1[PC-11]

8:2 Fluorotelomersulfonic acid (8:2FTS A)

23K1079-01RE1[HSW-6], 23K1079-02RE1[PFW-1], 23K1079-04RE1[MW-311], 23K1079-08RE1[PC-11]

Perfluoro-1-butanesulfonamide (FBSA)

23K1079-04RE1[MW-311]

Perfluoro-1-hexanesulfonamide (FHxSA)

23K1079-01RE1[HSW-6], 23K1079-02RE1[PFW-1], 23K1079-04RE1[MW-311], 23K1079-05RE1[MW-35], 23K1079-08RE1[PC-11]

Perfluorobutanoic acid (PFBA)

23K1079-04RE1[MW-311]

Perfluoroheptanesulfonic acid (PFHpS)

23K1079-04RE1[MW-311]

Perfluoroheptanoic acid (PFHpA)

23K1079-01RE1[HSW-6], 23K1079-04RE1[MW-311], 23K1079-05RE1[MW-35]

Perfluorohexanesulfonic acid (PFHxS)

23K1079-01RE1[HSW-6], 23K1079-02RE1[PFW-1], 23K1079-04RE1[MW-311], 23K1079-05RE1[MW-35], 23K1079-08RE1[PC-11], 23K1079-16RE1[MW-125]

Perfluorohexanoic acid (PFHxA)

23K1079-01RE1[HSW-6], 23K1079-04RE1[MW-311], 23K1079-05RE1[MW-35], 23K1079-08RE1[PC-11]

Perfluorononanesulfonic acid (PFNS)

23K1079-04RE4[MW-311]

Perfluorooctanesulfonic acid (PFOS)

23K1079-01RE2[HSW-6], 23K1079-02RE2[PFW-1], 23K1079-03RE1[PFW-5], 23K1079-04RE2[MW-311], 23K1079-05RE2[MW-35], 23K1079-07RE1[PC-6A], 23K1079-08RE1[PC-11], 23K1079-09RE1[PC-345], 23K1079-15RE1[PC-14], 23K1079-16RE1[MW-125], 23K1079-17RE1[MW-22]

Perfluorooctanoic acid (PFOA)

23K1079-01RE1[HSW-6], 23K1079-04RE1[MW-311], 23K1079-05RE1[MW-35]

Perfluoropentanesulfonic acid (PFPeS)

23K1079-04RE1[MW-311]

Perfluoropentanoic acid (PFPeA)

23K1079-01RE1[HSW-6], 23K1079-04RE1[MW-311], 23K1079-05RE1[MW-35], 23K1079-08RE1[PC-11]

Perfluoroundecanoic acid (PFUnA)

23K1079-08RE1[PC-11]

PF-23

Qualifier ion ratio <50% of associated calibration. Detection is suspect.

Analyte & Samples(s) Qualified:**N-McFOSAA (NMcFOSAA)**

23K1079-05[MW-35]

Perfluorodecanesulfonic acid (PFDS)

23K1079-01[HSW-6], 23K1079-02[PFW-1], 23K1079-04[MW-311], 23K1079-05[MW-35], 23K1079-08[PC-11]

Perfluorononanesulfonic acid (PFNS)

23K1079-05[MW-35]

R-05

Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.

Analyte & Samples(s) Qualified:**Perfluorodecanesulfonic acid (PFDS)**

23K1079-08[PC-11], B357679-MSD1

Perfluoroheptanesulfonic acid (PFHpS)

23K1079-08[PC-11], B357679-MSD1

Perfluorononanesulfonic acid (PFNS)

23K1079-08[PC-11], B357679-MSD1

S-29

Extracted Internal Standard is outside of control limits.

Analyte & Samples(s) Qualified:**M2-4:2FTS**

S097248-CCV2

M2-6:2FTS

23K1079-05RE1[MW-35], 23K1079-08RE1[PC-11], 23K1079-09[PC-345]

M2-8:2FTS

23K1079-05[MW-35], 23K1079-08RE1[PC-11], 23K1079-09[PC-345], 23K1079-10[DUP-1], 23K1079-12[PC-29]

M2PFTA

23K1079-09[PC-345], 23K1079-15[PC-14]

M8FOSA

23K1079-09[PC-345], 23K1079-15[PC-14], B357679-MS1

M8PFOS

23K1079-01[HSW-6], 23K1079-02[PFW-1], 23K1079-04[MW-311], 23K1079-05[MW-35], 23K1079-05RE2[MW-35]

M9PFNA

23K1079-01[HSW-6], 23K1079-02[PFW-1], 23K1079-04[MW-311], 23K1079-05[MW-35]

MPFBA

23K1079-01[HSW-6], 23K1079-05[MW-35], 23K1079-09[PC-345]

MPFDoA

23K1079-15[PC-14]

Z-01

Extracted internal standard outside of control limits due. No remaining volume for re-extraction.

Analyte & Samples(s) Qualified:**D3-NMeFOSAA**

23K1079-21[Equip-Blank-11.3.23]

D5-NEtFOSAA

23K1079-21[Equip-Blank-11.3.23]

M2-4:2FTS

23K1079-21[Equip-Blank-11.3.23]

M2-6:2FTS

23K1079-21[Equip-Blank-11.3.23]

M2-8:2FTS

23K1079-21[Equip-Blank-11.3.23]

M2PFTA

23K1079-21[Equip-Blank-11.3.23]

M3HFPO-DA

23K1079-21[Equip-Blank-11.3.23]

M3PFBS

23K1079-21[Equip-Blank-11.3.23]

M3PFHxS

23K1079-21[Equip-Blank-11.3.23]

M4PFHpA

23K1079-21[Equip-Blank-11.3.23]

M5PFHxA

23K1079-21[Equip-Blank-11.3.23]

M5PFPeA

23K1079-21[Equip-Blank-11.3.23]

M6PFDA

23K1079-21[Equip-Blank-11.3.23]

M7PFUnA

23K1079-21[Equip-Blank-11.3.23]

M8FOSA

23K1079-21[Equip-Blank-11.3.23]

M8PFOA

23K1079-21[Equip-Blank-11.3.23]

M8PFOS

23K1079-21[Equip-Blank-11.3.23]

M9PFNA

23K1079-21[Equip-Blank-11.3.23]

MPFBA

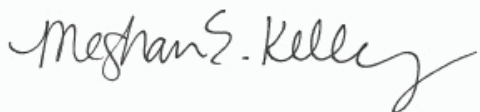
23K1079-21[Equip-Blank-11.3.23]

MPFDoA

23K1079-21[Equip-Blank-11.3.23]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.

I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Meghan E. Kelley
Reporting Specialist

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: HSW-6

Sampled: 11/2/2023 09:15

Sample ID: 23K1079-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	120	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluorobutanesulfonic acid (PFBS)	45	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluoropentanoic acid (PFPeA)	500	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:02	RRB
Perfluorohexanoic acid (PFHxA)	480	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:02	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	390	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:02	RRB
Perfluorodecanoic acid (PFDA)	34	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluorododecanoic acid (PFDoA)	3.0	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluoroheptanesulfonic acid (PFHpS)	56	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluorotridecanoic acid (PFTrDA)	6.8	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	7.1	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluorodecanesulfonic acid (PFDS)	18	1.9	ng/L	1	PF-23	SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluorooctanesulfonamide (FOSA)	4.8	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluorononanesulfonic acid (PFNS)	78	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	260	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:02	RRB
Perfluoro-1-butanefulfonamide (FBFA)	93	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluorohexanesulfonic acid (PFHxS)	430	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:02	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	750	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:02	RRB
Perfluoropentanesulfonic acid (PFPeS)	80	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluoroundecanoic acid (PFUnA)	120	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Nonafluoro-3,6-dioxahexanoic acid (NFDHA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB
Perfluoroheptanoic acid (PFHpA)	190	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:02	RRB
Perfluorooctanoic acid (PFOA)	160	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:02	RRB
Perfluorooctanesulfonic acid (PFOS)	3200	380	ng/L	200	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:09	RRB
Perfluorononanoic acid (PFNA)	170	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 21:43	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: PFW-1

Sampled: 11/2/2023 10:00

Sample ID: 23K1079-02

Sample Matrix: Ground Water

Sample Flags: D-01

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	140	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluorobutanesulfonic acid (PFBS)	63	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluoropentanoic acid (PFPeA)	470	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluorohexanoic acid (PFHxA)	470	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
11Cl-PF3OUdS (F53B Major)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
9Cl-PF3ONS (F53B Minor)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	2400	210	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:16	RRB
Perfluorodecanoic acid (PFDA)	95	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluorododecanoic acid (PFDoA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluoroheptanesulfonic acid (PFHpS)	290	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
N-EtFOSAA (NEtFOSAA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
N-MeFOSAA (NMeFOSAA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluorotetradecanoic acid (PFTA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluorodecanesulfonic acid (PFDS)	17	11	ng/L	1	PF-23	SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluorooctanesulfonamide (FOSA)	11	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluorononanesulfonic acid (PFNS)	260	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	1700	210	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:16	RRB
Perfluoro-1-butanefulfonamide (FBFA)	190	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluorohexanesulfonic acid (PFHxS)	1000	210	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:16	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	1200	210	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:16	RRB
Perfluoropentanesulfonic acid (PFPeS)	130	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluoroundecanoic acid (PFUnA)	140	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Nonafluoro-3,6-dioxahexanoic acid (NFDHA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluoroheptanoic acid (PFHpA)	230	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluorooctanoic acid (PFOA)	370	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB
Perfluorooctanesulfonic acid (PFOS)	20000	2100	ng/L	200	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:23	RRB
Perfluorononanoic acid (PFNA)	260	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:05	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: PFW-5

Sampled: 11/3/2023 10:05

Sample ID: 23K1079-03

Sample Matrix: Ground Water

Sample Flags: D-01

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	29	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluorobutanesulfonic acid (PFBS)	26	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluoropentanoic acid (PFPeA)	75	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluorohexanoic acid (PFHxA)	89	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
11Cl-PF3OUdS (F53B Major)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
9Cl-PF3ONS (F53B Minor)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	250	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluorodecanoic acid (PFDA)	5.5	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluorododecanoic acid (PFDoA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluoroheptanesulfonic acid (PFHpS)	21	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
N-EtFOSAA (NEtFOSAA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
N-MeFOSAA (NMeFOSAA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluorotetradecanoic acid (PFTA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluorooctanesulfonamide (FOSA)	27	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluorononanesulfonic acid (PFNS)	7.6	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	120	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluoro-1-butanefulfonamide (FBSA)	16	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluorohexanesulfonic acid (PFHxS)	370	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	9.7	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluoropentanesulfonic acid (PFPeS)	38	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluoroundecanoic acid (PFUnA)	22	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluoroheptanoic acid (PFHpA)	67	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluorooctanoic acid (PFOA)	64	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB
Perfluorooctanesulfonic acid (PFOS)	940	84	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:31	RRB
Perfluorononanoic acid (PFNA)	52	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:12	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: MW-311

Sampled: 11/2/2023 13:15

Sample ID: 23K1079-04

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	150	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:53	RRB
Perfluorobutanesulfonic acid (PFBS)	100	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Perfluoropentanoic acid (PFPeA)	560	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:53	RRB
Perfluorohexanoic acid (PFHxA)	500	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:53	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	1100	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:53	RRB
Perfluorodecanoic acid (PFDA)	67	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Perfluoroheptanesulfonic acid (PFHpS)	350	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:53	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	4.3	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Perfluorodecanesulfonic acid (PFDS)	14	1.9	ng/L	1	PF-23	SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Perfluorooctanesulfonamide (FOSA)	18	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Perfluorononanesulfonic acid (PFNS)	80	3.8	ng/L	2	PF-19	SOP-454 PFAS	11/28/23	12/4/23 12:03	JR2
Perfluoro-1-hexanesulfonamide (FHxSA)	890	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:53	RRB
Perfluoro-1-butanesulfonamide (FBSA)	140	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:53	RRB
Perfluorohexanesulfonic acid (PFHxS)	1600	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:53	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	1200	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:53	RRB
Perfluoropentanesulfonic acid (PFPeS)	120	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:53	RRB
Perfluoroundecanoic acid (PFUnA)	100	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB
Perfluoroheptanoic acid (PFHpA)	300	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:53	RRB
Perfluorooctanoic acid (PFOA)	470	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 1:53	RRB
Perfluorooctanesulfonic acid (PFOS)	5900	380	ng/L	200	PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:00	RRB
Perfluorononanoic acid (PFNA)	190	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:19	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: MW-35

Sampled: 11/2/2023 13:50

Sample ID: 23K1079-05

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	110	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluorobutanesulfonic acid (PFBS)	41	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluoropentanoic acid (PFPeA)	430	36	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:07	RRB
Perfluorohexanoic acid (PFHxA)	280	36	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:07	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	11	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluorodecanoic acid (PFDA)	8.0	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluorododecanoic acid (PFDoA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluoroheptanesulfonic acid (PFHpS)	86	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
N-MeFOSAA (NMeFOSAA)	2.2	1.8	ng/L	1	PF-23	SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluorodecanesulfonic acid (PFDS)	2.3	1.8	ng/L	1	PF-23	SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluorooctanesulfonamide (FOSA)	36	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluorononanesulfonic acid (PFNS)	20	1.8	ng/L	1	PF-23	SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	230	36	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:07	RRB
Perfluoro-1-butanefulfonamide (FBFA)	20	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluorohexanesulfonic acid (PFHxS)	890	36	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:07	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	220	36	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:07	RRB
Perfluoropentanesulfonic acid (PFPeS)	70	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluoroundecanoic acid (PFUnA)	19	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB
Perfluoroheptanoic acid (PFHpA)	210	36	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:07	RRB
Perfluorooctanoic acid (PFOA)	280	36	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:07	RRB
Perfluorooctanesulfonic acid (PFOS)	2800	360	ng/L	200	PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:14	RRB
Perfluorononanoic acid (PFNA)	97	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:27	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: PC-6A

Sampled: 11/3/2023 09:30

Sample ID: 23K1079-07

Sample Matrix: Ground Water

Sample Flags: D-01

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	6.3	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluorobutanesulfonic acid (PFBS)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluoropentanoic acid (PFPeA)	9.7	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluorohexanoic acid (PFHxA)	12	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
11Cl-PF3OUdS (F53B Major)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
9Cl-PF3ONS (F53B Minor)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluorodecanoic acid (PFDA)	8.7	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluorododecanoic acid (PFDoA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluoroheptanesulfonic acid (PFHpS)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
N-EtFOSAA (NEtFOSAA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
N-MeFOSAA (NMeFOSAA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluorotetradecanoic acid (PFTA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluorooctanesulfonamide (FOSA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluorononanesulfonic acid (PFNS)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	13	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluoro-1-butanefulfonamide (FBFA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluorohexanesulfonic acid (PFHxS)	61	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluoropentanesulfonic acid (PFPeS)	4.9	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluoroundecanoic acid (PFUnA)	47	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluoroheptanoic acid (PFHpA)	11	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluorooctanoic acid (PFOA)	11	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB
Perfluorooctanesulfonic acid (PFOS)	360	42	ng/L	10	PF-19	SOP-454 PFAS	11/28/23	12/1/23 11:04	RRB
Perfluorononanoic acid (PFNA)	24	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:34	RRB

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: PC-11

Sampled: 11/1/2023 14:00

Sample ID: 23K1079-08

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	67	1.9	ng/L	1	MS-22	SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluorobutanesulfonic acid (PFBS)	20	1.9	ng/L	1	MS-22	SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluoropentanoic acid (PFPeA)	150	38	ng/L	20	MS-19, PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:29	RRB
Perfluorohexanoic acid (PFHxA)	160	38	ng/L	20	MS-19, PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:29	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	120	38	ng/L	20	MS-19, PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:29	RRB
Perfluorodecanoic acid (PFDA)	9.2	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluoroheptanesulfonic acid (PFHpS)	19	1.9	ng/L	1	MS-07A, MS-12, R-05	SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	2.4	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluorodecanesulfonic acid (PFDS)	35	1.9	ng/L	1	MS-07A, PF-23, R-05	SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluorooctanesulfonamide (FOSA)	13	1.9	ng/L	1	MS-09	SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluorononanesulfonic acid (PFNS)	39	1.9	ng/L	1	MS-07A, R-05	SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	180	38	ng/L	20	MS-19, PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:29	RRB
Perfluoro-1-butanefulfonamide (FBSA)	54	1.9	ng/L	1	MS-23	SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluorohexanesulfonic acid (PFHxS)	200	38	ng/L	20	MS-19, PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:29	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	250	38	ng/L	20	MS-19, PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:29	RRB
Perfluoropentanesulfonic acid (PFPeS)	35	1.9	ng/L	1	MS-22	SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluoroundecanoic acid (PFUnA)	150	38	ng/L	20	MS-19, PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:29	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluoroheptanoic acid (PFHpA)	99	1.9	ng/L	1	MS-22	SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluorooctanoic acid (PFOA)	80	1.9	ng/L	1	MS-19	SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB
Perfluorooctanesulfonic acid (PFOS)	830	38	ng/L	20	MS-19, PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:29	RRB
Perfluorononanoic acid (PFNA)	74	1.9	ng/L	1	MS-23	SOP-454 PFAS	11/28/23	11/29/23 22:41	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: PC-345

Sampled: 11/2/2023 10:40

Sample ID: 23K1079-09

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	49	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluorobutanesulfonic acid (PFBS)	22	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluoropentanoic acid (PFPeA)	130	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluorohexanoic acid (PFHxA)	170	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
11Cl-PF3OUdS (F53B Major)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
9Cl-PF3ONS (F53B Minor)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	9.8	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluorodecanoic acid (PFDA)	13	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluorododecanoic acid (PFDoA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluoroheptanesulfonic acid (PFHpS)	22	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
N-EtFOSAA (NEtFOSAA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
N-MeFOSAA (NMeFOSAA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluorotetradecanoic acid (PFTA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluorooctanesulfonamide (FOSA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluorononanesulfonic acid (PFNS)	4.5	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	30	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluoro-1-butanefulfonamide (FBFA)	17	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluorohexanesulfonic acid (PFHxS)	130	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	86	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluoropentanesulfonic acid (PFPeS)	20	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluoroundecanoic acid (PFUnA)	8.3	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluoroheptanoic acid (PFHpA)	97	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluorooctanoic acid (PFOA)	73	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB
Perfluorooctanesulfonic acid (PFOS)	800	40	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 2:43	RRB
Perfluorononanoic acid (PFNA)	120	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:48	RRB

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: DUP-1

Sampled: 11/3/2023 08:40

Sample ID: 23K1079-10

Sample Matrix: Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluoropentanoic acid (PFPeA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorohexanoic acid (PFHxA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorodecanoic acid (PFDA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorononanesulfonic acid (PFNS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorohexanesulfonic acid (PFHxS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluoropentanesulfonic acid (PFPeS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluoroundecanoic acid (PFUnA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluoroheptanoic acid (PFHpA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorooctanoic acid (PFOA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorooctanesulfonic acid (PFOS)	4.1	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB
Perfluorononanoic acid (PFNA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 22:55	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: PC-16D

Sampled: 11/2/2023 12:00

Sample ID: 23K1079-11

Sample Matrix: Ground Water

Sample Flags: D-01

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	20	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorobutanesulfonic acid (PFBS)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluoropentanoic acid (PFPeA)	57	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorohexanoic acid (PFHxA)	52	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
11Cl-PF3OUdS (F53B Major)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
9Cl-PF3ONS (F53B Minor)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorodecanoic acid (PFDA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorododecanoic acid (PFDoA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluoroheptanesulfonic acid (PFHpS)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
N-EtFOSAA (NEtFOSAA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
N-MeFOSAA (NMeFOSAA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorotetradecanoic acid (PFTA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorooctanesulfonamide (FOSA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorononanesulfonic acid (PFNS)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	11	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluoro-1-butanefulfonamide (FBFA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorohexanesulfonic acid (PFHxS)	54	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	11	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluoropentanesulfonic acid (PFPeS)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluoroundecanoic acid (PFUnA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluoroheptanoic acid (PFHpA)	22	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorooctanoic acid (PFOA)	11	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorooctanesulfonic acid (PFOS)	200	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB
Perfluorononanoic acid (PFNA)	ND	11	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:03	RRB

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Sampled: 11/1/2023 11:10

Field Sample #: PC-29

Sample ID: 23K1079-12

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluoropentanoic acid (PFPeA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorohexanoic acid (PFHxA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
11Cl-PF3OUdS (F53B Major)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
9Cl-PF3ONS (F53B Minor)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorodecanoic acid (PFDA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorododecanoic acid (PFDoA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
N-EtFOSAA (NEtFOSAA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
N-MeFOSAA (NMeFOSAA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorotetradecanoic acid (PFTA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorooctanesulfonamide (FOSA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorononanesulfonic acid (PFNS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorohexanesulfonic acid (PFHxS)	2.1	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluoropentanesulfonic acid (PFPeS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluoroundecanoic acid (PFUnA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluoroheptanoic acid (PFHpA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorooctanoic acid (PFOA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorooctanesulfonic acid (PFOS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB
Perfluorononanoic acid (PFNA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:10	RRB

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: EB-11.1.23

Sampled: 11/1/2023 14:30

Sample ID: 23K1079-13

Sample Matrix: Equipment Blank Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluoropentanoic acid (PFPeA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorohexanoic acid (PFHxA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
11Cl-PF3OUdS (F53B Major)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
9Cl-PF3ONS (F53B Minor)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorodecanoic acid (PFDA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorododecanoic acid (PFDoA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
N-EtFOSAA (NEtFOSAA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
N-MeFOSAA (NMeFOSAA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorotetradecanoic acid (PFTA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorotridecanoic acid (PFTrDA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorodecanesulfonic acid (PFDS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorooctanesulfonamide (FOSA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorononanesulfonic acid (PFNS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluoro-1-butanesulfonamide (FBSA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorohexanesulfonic acid (PFHxS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluoropentanesulfonic acid (PFPeS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluoroundecanoic acid (PFUnA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluoroheptanoic acid (PFHpA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorooctanoic acid (PFOA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorooctanesulfonic acid (PFOS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS
Perfluorononanoic acid (PFNA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/29/23 23:53	AMS

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: PC-30

Sampled: 11/2/2023 11:00

Sample ID: 23K1079-14

Sample Matrix: Ground Water

Sample Flags: D-01

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	21	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorobutanesulfonic acid (PFBS)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluoropentanoic acid (PFPeA)	51	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorohexanoic acid (PFHxA)	66	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
11Cl-PF3OUdS (F53B Major)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
9Cl-PF3ONS (F53B Minor)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorodecanoic acid (PFDA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorododecanoic acid (PFDoA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluoroheptanesulfonic acid (PFHpS)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
N-EtFOSAA (NEtFOSAA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
N-MeFOSAA (NMeFOSAA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorotetradecanoic acid (PFTA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorotridecanoic acid (PFTrDA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorodecanesulfonic acid (PFDS)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorooctanesulfonamide (FOSA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorononanesulfonic acid (PFNS)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluoro-1-hexanesulfonamide (FHxSA)	29	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluoro-1-butanefulfonamide (FBFA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorohexanesulfonic acid (PFHxS)	98	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
6:2 Fluorotelomersulfonic acid (6:2FTS A)	26	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluoropentanesulfonic acid (PFPeS)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluoroundecanoic acid (PFUnA)	16	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluoroheptanoic acid (PFHpA)	45	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorooctanoic acid (PFOA)	37	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorooctanesulfonic acid (PFOS)	870	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS
Perfluorononanoic acid (PFNA)	69	10	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:00	AMS

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Sampled: 11/1/2023 12:30

Field Sample #: PC-14

Sample ID: 23K1079-15

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	15	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluorobutanesulfonic acid (PFBS)	6.5	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluoropentanoic acid (PFPeA)	42	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluorohexanoic acid (PFHxA)	42	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
8:2 Fluorotelomersulfonic acid (8:2FTS A)	6.5	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluorodecanoic acid (PFDA)	6.4	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluoroheptanesulfonic acid (PFHpS)	6.2	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluorooctanesulfonamide (FOSA)	18	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluorononanesulfonic acid (PFNS)	2.3	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluoro-1-hexanesulfonamide (FHxSA)	7.8	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluoro-1-butanefulfonamide (FBSA)	7.6	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluorohexanesulfonic acid (PFHxS)	77	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
6:2 Fluorotelomersulfonic acid (6:2FTS A)	21	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluoropentanesulfonic acid (PFPeS)	8.7	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluoroundecanoic acid (PFUnA)	16	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluoroheptanoic acid (PFHpA)	34	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluorooctanoic acid (PFOA)	18	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS
Perfluorooctanesulfonic acid (PFOS)	380	38	ng/L	20	PF-19	SOP-454 PFAS	11/28/23	12/1/23 3:05	RRB
Perfluorononanoic acid (PFNA)	34	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:07	AMS

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: MW-125

Sampled: 11/1/2023 13:30

Sample ID: 23K1079-16

Sample Matrix: Ground Water

Sample Flags: D-01

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	84	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluorobutanesulfonic acid (PFBS)	23	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluoropentanoic acid (PFPeA)	330	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluorohexanoic acid (PFHxA)	250	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
11Cl-PF3OUdS (F53B Major)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
9Cl-PF3ONS (F53B Minor)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluorodecanoic acid (PFDA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluorododecanoic acid (PFDoA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluoroheptanesulfonic acid (PFHpS)	15	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
N-EtFOSAA (NEtFOSAA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
N-MeFOSAA (NMeFOSAA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluorotetradecanoic acid (PFTA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluorotridecanoic acid (PFTrDA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluorodecanesulfonic acid (PFDS)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluorooctanesulfonamide (FOSA)	360	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluorononanesulfonic acid (PFNS)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluoro-1-hexanesulfonamide (FHxSA)	55	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluoro-1-butanefulfonamide (FBFA)	14	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluorohexanesulfonic acid (PFHxS)	470	42	ng/L	10	PF-19	SOP-454 PFAS	11/28/23	12/1/23 3:12	RRB
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
6:2 Fluorotelomersulfonic acid (6:2FTS A)	95	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluoropentanesulfonic acid (PFPeS)	35	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluoroundecanoic acid (PFUnA)	13	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluoroheptanoic acid (PFHpA)	140	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluorooctanoic acid (PFOA)	150	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS
Perfluorooctanesulfonic acid (PFOS)	660	42	ng/L	10	PF-19	SOP-454 PFAS	11/28/23	12/1/23 3:12	RRB
Perfluorononanoic acid (PFNA)	24	4.2	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:15	AMS

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Sampled: 11/1/2023 12:30

Field Sample #: MW-22

Sample ID: 23K1079-17

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluoropentanoic acid (PFPeA)	3.1	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluorohexanoic acid (PFHxA)	4.2	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
11Cl-PF3OUdS (F53B Major)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
9Cl-PF3ONS (F53B Minor)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluorodecanoic acid (PFDA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluorododecanoic acid (PFDoA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluoroheptanesulfonic acid (PFHpS)	2.6	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
N-EtFOSAA (NEtFOSAA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
N-MeFOSAA (NMeFOSAA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluorotetradecanoic acid (PFTA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluorooctanesulfonamide (FOSA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluorononanesulfonic acid (PFNS)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluoro-1-hexanesulfonamide (FHxSA)	2.2	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluorohexanesulfonic acid (PFHxS)	71	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluoropentanesulfonic acid (PFPeS)	3.1	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluoroundecanoic acid (PFUnA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluoroheptanoic acid (PFHpA)	2.8	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluorooctanoic acid (PFOA)	14	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS
Perfluorooctanesulfonic acid (PFOS)	160	18	ng/L	10	PF-19	SOP-454 PFAS	11/28/23	12/1/23 3:19	RRB
Perfluorononanoic acid (PFNA)	1.9	1.8	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:22	AMS

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Sampled: 11/1/2023 11:30

Field Sample #: MW-351

Sample ID: 23K1079-18

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluoropentanoic acid (PFPeA)	2.7	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorohexanoic acid (PFHxA)	3.4	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
11Cl-PF3OUdS (F53B Major)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
9Cl-PF3ONS (F53B Minor)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorodecanoic acid (PFDA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorododecanoic acid (PFDoA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
N-EtFOSAA (NEtFOSAA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
N-MeFOSAA (NMeFOSAA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorotetradecanoic acid (PFTA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorotridecanoic acid (PFTrDA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorodecanesulfonic acid (PFDS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorooctanesulfonamide (FOSA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorononanesulfonic acid (PFNS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluoro-1-butanefulfonamide (FBFA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorohexanesulfonic acid (PFHxS)	13	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluoropentanesulfonic acid (PFPeS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluoroundecanoic acid (PFUnA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluoroheptanoic acid (PFHpA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorooctanoic acid (PFOA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorooctanesulfonic acid (PFOS)	21	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS
Perfluorononanoic acid (PFNA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:29	AMS

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Sampled: 11/2/2023 14:30

Field Sample #: EB.11.2.23

Sample ID: 23K1079-19

Sample Matrix: Equipment Blank Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluoropentanoic acid (PFPeA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorohexanoic acid (PFHxA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorodecanoic acid (PFDA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorononanesulfonic acid (PFNS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorohexanesulfonic acid (PFHxS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluoropentanesulfonic acid (PFPeS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluoroundecanoic acid (PFUnA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluoroheptanoic acid (PFHpA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorooctanoic acid (PFOA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorooctanesulfonic acid (PFOS)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS
Perfluorononanoic acid (PFNA)	ND	1.9	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:36	AMS

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Sampled: 11/3/2023 08:30

Field Sample #: PC-38

Sample ID: 23K1079-20

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluoropentanoic acid (PFPeA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorohexanoic acid (PFHxA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
11Cl-PF3OUdS (F53B Major)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
9Cl-PF3ONS (F53B Minor)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorodecanoic acid (PFDA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorododecanoic acid (PFDoA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
N-EtFOSAA (NEtFOSAA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
N-MeFOSAA (NMeFOSAA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorotetradecanoic acid (PFTA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorotridecanoic acid (PFTrDA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorodecanesulfonic acid (PFDS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorooctanesulfonamide (FOSA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorononanesulfonic acid (PFNS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluoro-1-butanefulfonamide (FBFA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorohexanesulfonic acid (PFHxS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluoropentanesulfonic acid (PFPeS)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluoroundecanoic acid (PFUnA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluoroheptanoic acid (PFHpA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorooctanoic acid (PFOA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorooctanesulfonic acid (PFOS)	3.5	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS
Perfluorononanoic acid (PFNA)	ND	2.0	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:43	AMS

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Barnstable, MA

Sample Description:

Work Order: 23K1079

Date Received: 11/8/2023

Field Sample #: Equip-Blank-11.3.23

Sampled: 11/3/2023 11:20

Sample ID: 23K1079-21

Sample Matrix: Equipment Blank Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorobutanesulfonic acid (PFBS)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluoropentanoic acid (PFPeA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorohexanoic acid (PFHxA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
11Cl-PF3OUdS (F53B Major)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
9Cl-PF3ONS (F53B Minor)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
4,8-Dioxo-3H-perfluorononanoic acid (ADONA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorodecanoic acid (PFDA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorododecanoic acid (PFDoA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
N-EtFOSAA (NEtFOSAA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
N-MeFOSAA (NMeFOSAA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorotetradecanoic acid (PFTA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorotridecanoic acid (PFTrDA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorodecanesulfonic acid (PFDS)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorooctanesulfonamide (FOSA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorononanesulfonic acid (PFNS)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorohexanesulfonic acid (PFHxS)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluoropentanesulfonic acid (PFPeS)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluoroundecanoic acid (PFUnA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluoroheptanoic acid (PFHpA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorooctanoic acid (PFOA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorooctanesulfonic acid (PFOS)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS
Perfluorononanoic acid (PFNA)	ND	1.7	ng/L	1		SOP-454 PFAS	11/28/23	11/30/23 0:51	AMS

Sample Extraction Data

Prep Method:SOP 454-PFAAS Analytical Method:SOP-454 PFAS

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23K1079-01 [HSW-6]	B357679	266	1.00	11/28/23
23K1079-01RE1 [HSW-6]	B357679	266	1.00	11/28/23
23K1079-01RE2 [HSW-6]	B357679	266	1.00	11/28/23
23K1079-02 [PFW-1]	B357679	47.1	1.00	11/28/23
23K1079-02RE1 [PFW-1]	B357679	47.1	1.00	11/28/23
23K1079-02RE2 [PFW-1]	B357679	47.1	1.00	11/28/23
23K1079-03 [PFW-5]	B357679	119	1.00	11/28/23
23K1079-03RE1 [PFW-5]	B357679	119	1.00	11/28/23
23K1079-04 [MW-311]	B357679	261	1.00	11/28/23
23K1079-04RE1 [MW-311]	B357679	261	1.00	11/28/23
23K1079-04RE2 [MW-311]	B357679	261	1.00	11/28/23
23K1079-04RE4 [MW-311]	B357679	261	1.00	11/28/23
23K1079-05 [MW-35]	B357679	274	1.00	11/28/23
23K1079-05RE1 [MW-35]	B357679	274	1.00	11/28/23
23K1079-05RE2 [MW-35]	B357679	274	1.00	11/28/23
23K1079-07 [PC-6A]	B357679	119	1.00	11/28/23
23K1079-07RE1 [PC-6A]	B357679	119	1.00	11/28/23
23K1079-08 [PC-11]	B357679	266	1.00	11/28/23
23K1079-08RE1 [PC-11]	B357679	266	1.00	11/28/23
23K1079-09 [PC-345]	B357679	253	1.00	11/28/23
23K1079-09RE1 [PC-345]	B357679	253	1.00	11/28/23
23K1079-10 [DUP-1]	B357679	260	1.00	11/28/23
23K1079-11 [PC-16D]	B357679	47.6	1.00	11/28/23
23K1079-12 [PC-29]	B357679	284	1.00	11/28/23

Prep Method:SOP 454-PFAAS Analytical Method:SOP-454 PFAS

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23K1079-13 [EB-11.1.23]	B358210	256	1.00	11/28/23
23K1079-14 [PC-30]	B358210	48.1	1.00	11/28/23
23K1079-15 [PC-14]	B358210	263	1.00	11/28/23
23K1079-15RE1 [PC-14]	B358210	263	1.00	11/28/23
23K1079-16 [MW-125]	B358210	119	1.00	11/28/23
23K1079-16RE1 [MW-125]	B358210	119	1.00	11/28/23
23K1079-17 [MW-22]	B358210	273	1.00	11/28/23
23K1079-17RE1 [MW-22]	B358210	273	1.00	11/28/23
23K1079-18 [MW-35I]	B358210	254	1.00	11/28/23
23K1079-19 [EB.11.2.23]	B358210	267	1.00	11/28/23
23K1079-20 [PC-38]	B358210	251	1.00	11/28/23
23K1079-21 [Equip-Blank-11.3.23]	B358210	289	1.00	11/28/23

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B357679 - SOP 454-PFAAS
Blank (B357679-BLK1)

Prepared: 11/28/23 Analyzed: 11/29/23

Perfluorobutanoic acid (PFBA)	ND	1.9	ng/L
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	ng/L
Perfluoropentanoic acid (PFPeA)	ND	1.9	ng/L
Perfluorohexanoic acid (PFHxA)	ND	1.9	ng/L
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	ng/L
Perfluorodecanoic acid (PFDA)	ND	1.9	ng/L
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.9	ng/L
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	ng/L
N-EtFOSAA (NEtFOSAA)	ND	1.9	ng/L
N-MeFOSAA (NMeFOSAA)	ND	1.9	ng/L
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L
Perfluorononanesulfonic acid (PFNS)	ND	1.9	ng/L
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	ng/L
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.9	ng/L
Perfluorohexanesulfonic acid (PFHxS)	ND	1.9	ng/L
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	ng/L
Perfluoropentanesulfonic acid (PFPeS)	ND	1.9	ng/L
Perfluoroundecanoic acid (PFUnA)	ND	1.9	ng/L
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L
Perfluoroheptanoic acid (PFHpA)	ND	1.9	ng/L
Perfluorooctanoic acid (PFOA)	ND	1.9	ng/L
Perfluorooctanesulfonic acid (PFOS)	ND	1.9	ng/L
Perfluorononanoic acid (PFNA)	ND	1.9	ng/L

LCS (B357679-BS1)

Prepared: 11/28/23 Analyzed: 11/29/23

Perfluorobutanoic acid (PFBA)	10.1	1.9	ng/L	9.44	107	73-129
Perfluorobutanesulfonic acid (PFBS)	8.83	1.9	ng/L	8.35	106	72-130
Perfluoropentanoic acid (PFPeA)	9.98	1.9	ng/L	9.44	106	72-129
Perfluorohexanoic acid (PFHxA)	10.4	1.9	ng/L	9.44	110	72-129
11Cl-PF3OUdS (F53B Major)	6.97	1.9	ng/L	8.89	78.4	43.3-138
9Cl-PF3ONS (F53B Minor)	7.53	1.9	ng/L	8.80	85.6	52-140
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	7.22	1.9	ng/L	8.89	81.2	53.7-152
Hexafluoropropylene oxide dimer acid (HFPO-DA)	7.27	1.9	ng/L	9.44	77.1	42.1-145
8:2 Fluorotelomersulfonic acid (8:2FTS A)	9.23	1.9	ng/L	9.06	102	67-138
Perfluorodecanoic acid (PFDA)	10.3	1.9	ng/L	9.44	109	71-129
Perfluorododecanoic acid (PFDoA)	11.7	1.9	ng/L	9.44	124	72-134
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	7.12	1.9	ng/L	8.40	84.7	52.7-147

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B357679 - SOP 454-PFAAS
LCS (B357679-BS1)

Prepared: 11/28/23 Analyzed: 11/29/23

Perfluoroheptanesulfonic acid (PFHpS)	10.7	1.9	ng/L	9.01		118	69-134			
N-EtFOSAA (NEtFOSAA)	12.2	1.9	ng/L	9.44		130	61-135			
N-MeFOSAA (NMeFOSAA)	11.4	1.9	ng/L	9.44		121	65-136			
Perfluorotetradecanoic acid (PFTA)	10.2	1.9	ng/L	9.44		108	71-132			
Perfluorotridecanoic acid (PFTTrDA)	9.62	1.9	ng/L	9.44		102	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	9.82	1.9	ng/L	8.83		111	63-143			
Perfluorodecanesulfonic acid (PFDS)	8.57	1.9	ng/L	9.11		94.1	53-142			
Perfluorooctanesulfonamide (FOSA)	10.9	1.9	ng/L	9.44		116	67-137			
Perfluorononanesulfonic acid (PFNS)	9.50	1.9	ng/L	9.06		105	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	6.59	1.9	ng/L	9.44		69.8	50-150			
Perfluoro-1-butanefulfonamide (FBSA)	7.01	1.9	ng/L	9.44		74.3	50-150			
Perfluorohexanesulfonic acid (PFHxS)	10.0	1.9	ng/L	8.64		116	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	8.73	1.9	ng/L	9.44		92.5	53.8-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	8.59	1.9	ng/L	9.44		91.0	54.5-152			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	9.93	1.9	ng/L	8.97		111	64-140			
Perfluoropentanesulfonic acid (PFPeS)	10.4	1.9	ng/L	8.87		117	71-127			
Perfluoroundecanoic acid (PFUnA)	9.96	1.9	ng/L	9.44		106	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	8.61	1.9	ng/L	9.44		91.2	50.5-159			
Perfluoroheptanoic acid (PFHpA)	9.84	1.9	ng/L	9.44		104	72-130			
Perfluorooctanoic acid (PFOA)	11.3	1.9	ng/L	9.44		120	71-133			
Perfluorooctanesulfonic acid (PFOS)	9.52	1.9	ng/L	8.73		109	65-140			
Perfluorononanoic acid (PFNA)	9.32	1.9	ng/L	9.44		98.7	69-130			

Matrix Spike (B357679-MS1)
Source: 23K1079-08

Prepared: 11/28/23 Analyzed: 11/29/23

Perfluorobutanoic acid (PFBA)	75.6	1.9	ng/L	9.48	66.8	93.3	73-129			
Perfluorobutanesulfonic acid (PFBS)	28.6	1.9	ng/L	8.39	20.3	98.6	72-130			
Perfluoropentanoic acid (PFPeA)	225	1.9	ng/L	9.48	209	171 *	72-129			MS-19
Perfluorohexanoic acid (PFHxA)	224	1.9	ng/L	9.48	215	99.7	72-129			
11Cl-PF3OUdS (F53B Major)	7.50	1.9	ng/L	8.93	ND	84.0	50-150			
9Cl-PF3ONS (F53B Minor)	9.70	1.9	ng/L	8.83	ND	110	50-150			
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	7.60	1.9	ng/L	8.93	ND	85.2	51.4-161			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	8.67	1.9	ng/L	9.48	ND	91.5	40.3-148			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	217	1.9	ng/L	9.10	216	17.2 *	67-138			MS-19
Perfluorodecanoic acid (PFDA)	19.9	1.9	ng/L	9.48	9.19	113	71-129			
Perfluorododecanoic acid (PFDoA)	11.8	1.9	ng/L	9.48	ND	124	72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	7.30	1.9	ng/L	8.44	ND	86.5	57.2-150			
Perfluoroheptanesulfonic acid (PFHpS)	32.6	1.9	ng/L	9.05	19.5	145 *	69-134			MS-12
N-EtFOSAA (NEtFOSAA)	14.1	1.9	ng/L	9.48	1.15	137 *	61-135			MS-22
N-MeFOSAA (NMeFOSAA)	12.9	1.9	ng/L	9.48	ND	136	65-136			
Perfluorotetradecanoic acid (PFTA)	10.4	1.9	ng/L	9.48	ND	110	71-132			
Perfluorotridecanoic acid (PFTTrDA)	9.85	1.9	ng/L	9.48	ND	104	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	13.6	1.9	ng/L	8.86	2.39	126	63-143			
Perfluorodecanesulfonic acid (PFDS)	30.8	1.9	ng/L	9.15	34.7	-43.3 *	53-142			MS-07A
Perfluorooctanesulfonamide (FOSA)	15.9	1.9	ng/L	9.48	13.4	26.2 *	67-137			MS-09
Perfluorononanesulfonic acid (PFNS)	38.0	1.9	ng/L	9.10	38.7	-7.60 *	69-127			MS-07A
Perfluoro-1-hexanesulfonamide (FHxSA)	195	1.9	ng/L	9.48	196	-9.25 *	50-150			MS-19
Perfluoro-1-butanefulfonamide (FBSA)	62.0	1.9	ng/L	9.48	54.3	80.9	49.5-154			
Perfluorohexanesulfonic acid (PFHxS)	269	1.9	ng/L	8.67	273	-46.2 *	68-131			MS-19
Perfluoro-4-oxapentanoic acid (PFMPA)	12.4	1.9	ng/L	9.48	ND	131	50-150			

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B357679 - SOP 454-PFAAS										
Matrix Spike (B357679-MS1)	Source: 23K1079-08			Prepared: 11/28/23 Analyzed: 11/29/23						
Perfluoro-5-oxahexanoic acid (PFMBA)	9.96	1.9	ng/L	9.48	ND	105	58.1-164			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	ng/L	9.00	ND	*	64-140			E, MS-19
Perfluoropentanesulfonic acid (PFPeS)	45.1	1.9	ng/L	8.91	34.6	118	71-127			
Perfluoroundecanoic acid (PFUnA)	231	1.9	ng/L	9.48	232	-4.73	* 69-133			MS-19
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	9.60	1.9	ng/L	9.48	ND	101	54.6-170			
Perfluoroheptanoic acid (PFHpA)	105	1.9	ng/L	9.48	99.0	67.1	* 72-130			MS-22
Perfluorooctanoic acid (PFOA)	90.7	1.9	ng/L	9.48	80.2	110	71-133			
Perfluorooctanesulfonic acid (PFOS)	885	1.9	ng/L	8.77	978	-1060	* 65-140			MS-19
Perfluorononanoic acid (PFNA)	80.8	1.9	ng/L	9.48	73.6	76.0	69-130			
Matrix Spike Dup (B357679-MSD1)	Source: 23K1079-08			Prepared: 11/28/23 Analyzed: 11/29/23						
Perfluorobutanoic acid (PFBA)	55.9	1.8	ng/L	8.93	66.8	-122	* 73-129	30.0	30	MS-22
Perfluorobutanesulfonic acid (PFBS)	22.4	1.8	ng/L	7.90	20.3	26.9	* 72-130	24.1	30	MS-22
Perfluoropentanoic acid (PFPeA)	142	1.8	ng/L	8.93	209	-753	* 72-129	45.4	* 30	MS-19
Perfluorohexanoic acid (PFHxA)	115	1.8	ng/L	8.93	215	-1120	* 72-129	64.6	* 30	MS-19
11Cl-PF3OUdS (F53B Major)	6.97	1.8	ng/L	8.41	ND	82.8	50-150	7.30	30	
9Cl-PF3ONS (F53B Minor)	8.92	1.8	ng/L	8.32	ND	107	50-150	8.33	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	7.59	1.8	ng/L	8.41	ND	90.2	51.4-161	0.195	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	7.66	1.8	ng/L	8.93	ND	85.8	40.3-148	12.4	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	89.9	1.8	ng/L	8.57	216	-1470	* 67-138	82.9	* 30	MS-19
Perfluorodecanoic acid (PFDA)	16.2	1.8	ng/L	8.93	9.19	78.8	71-129	20.4	30	
Perfluorododecanoic acid (PFDoA)	11.5	1.8	ng/L	8.93	ND	129	72-134	2.01	30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	7.17	1.8	ng/L	7.95	ND	90.2	57.2-150	1.76	30	
Perfluoroheptanesulfonic acid (PFHpS)	20.9	1.8	ng/L	8.53	19.5	16.7	* 69-134	43.8	* 30	MS-07A, R-05
N-EtFOSAA (NEtFOSAA)	13.1	1.8	ng/L	8.93	1.15	133	61-135	7.85	30	
N-MeFOSAA (NMeFOSAA)	12.3	1.8	ng/L	8.93	ND	138	* 65-136	4.53	30	MS-22
Perfluorotetradecanoic acid (PFTA)	10.1	1.8	ng/L	8.93	ND	113	71-132	2.97	30	
Perfluorotridecanoic acid (PFTrDA)	11.5	1.8	ng/L	8.93	ND	129	65-144	15.4	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	10.6	1.8	ng/L	8.35	2.39	98.5	63-143	24.4	30	
Perfluorodecanesulfonic acid (PFDS)	10.0	1.8	ng/L	8.62	34.7	-286	* 53-142	102	* 30	MS-07A, R-05
Perfluorooctanesulfonamide (FOSA)	15.9	1.8	ng/L	8.93	13.4	27.5	* 67-137	0.196	30	MS-09
Perfluorononanesulfonic acid (PFNS)	14.7	1.8	ng/L	8.57	38.7	-280	* 69-127	88.5	* 30	MS-07A, R-05
Perfluoro-1-hexanesulfonamide (FHxSA)	40.8	1.8	ng/L	8.93	196	-1740	* 50-150	131	* 30	MS-19
Perfluoro-1-butanesulfonamide (FBSA)	18.8	1.8	ng/L	8.93	54.3	-398	* 49.5-154	107	* 30	MS-23
Perfluorohexanesulfonic acid (PFHxS)	220	1.8	ng/L	8.17	273	-649	* 68-131	20.1	30	MS-19
Perfluoro-4-oxapentanoic acid (PFMPA)	12.1	1.8	ng/L	8.93	ND	135	50-150	2.70	30	
Perfluoro-5-oxahexanoic acid (PFMBA)	9.45	1.8	ng/L	8.93	ND	106	58.1-164	5.23	30	
6:2 Fluorotelomersulfonic acid (6:2FTS A)	176	1.8	ng/L	8.48	ND	2070	* 64-140		30	E, MS-19
Perfluoropentanesulfonic acid (PFPeS)	34.3	1.8	ng/L	8.39	34.6	-2.99	* 71-127	27.1	30	MS-22
Perfluoroundecanoic acid (PFUnA)	55.5	1.8	ng/L	8.93	232	-1970	* 69-133	123	* 30	MS-19
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	9.05	1.8	ng/L	8.93	ND	101	54.6-170	5.91	30	
Perfluoroheptanoic acid (PFHpA)	107	1.8	ng/L	8.93	99.0	91.8	72-130	1.73	30	
Perfluorooctanoic acid (PFOA)	67.5	1.8	ng/L	8.93	80.2	-143	* 71-133	29.3	30	MS-19
Perfluorooctanesulfonic acid (PFOS)	302	1.8	ng/L	8.26	978	-8180	* 65-140	98.3	* 30	MS-19
Perfluorononanoic acid (PFNA)	30.4	1.8	ng/L	8.93	73.6	-484	* 69-130	90.6	* 30	MS-23

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B358210 - SOP 454-PFAAS
Blank (B358210-BLK1)

Prepared: 11/15/23 Analyzed: 11/29/23

Perfluorobutanoic acid (PFBA)	ND	1.8	ng/L
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	ng/L
Perfluoropentanoic acid (PFPeA)	ND	1.8	ng/L
Perfluorohexanoic acid (PFHxA)	ND	1.8	ng/L
11Cl-PF3OUdS (F53B Major)	ND	1.8	ng/L
9Cl-PF3ONS (F53B Minor)	ND	1.8	ng/L
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	ng/L
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	ng/L
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	ng/L
Perfluorodecanoic acid (PFDA)	ND	1.8	ng/L
Perfluorododecanoic acid (PFDoA)	ND	1.8	ng/L
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.8	ng/L
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	ng/L
N-EtFOSAA (NEtFOSAA)	ND	1.8	ng/L
N-MeFOSAA (NMeFOSAA)	ND	1.8	ng/L
Perfluorotetradecanoic acid (PFTA)	ND	1.8	ng/L
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	ng/L
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	ng/L
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	ng/L
Perfluorooctanesulfonamide (FOSA)	ND	1.8	ng/L
Perfluorononanesulfonic acid (PFNS)	ND	1.8	ng/L
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	ng/L
Perfluoro-1-butanefulfonamide (FBSA)	ND	1.8	ng/L
Perfluorohexanesulfonic acid (PFHxS)	ND	1.8	ng/L
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	ng/L
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	ng/L
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	ng/L
Perfluoropentanesulfonic acid (PFPeS)	ND	1.8	ng/L
Perfluoroundecanoic acid (PFUnA)	ND	1.8	ng/L
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	ng/L
Perfluoroheptanoic acid (PFHpA)	ND	1.8	ng/L
Perfluorooctanoic acid (PFOA)	ND	1.8	ng/L
Perfluorooctanesulfonic acid (PFOS)	ND	1.8	ng/L
Perfluorononanoic acid (PFNA)	ND	1.8	ng/L

LCS (B358210-BS1)

Prepared: 11/15/23 Analyzed: 11/29/23

Perfluorobutanoic acid (PFBA)	8.37	1.9	ng/L	9.62	87.0	73-129
Perfluorobutanesulfonic acid (PFBS)	7.49	1.9	ng/L	8.51	87.9	72-130
Perfluoropentanoic acid (PFPeA)	8.32	1.9	ng/L	9.62	86.5	72-129
Perfluorohexanoic acid (PFHxA)	8.05	1.9	ng/L	9.62	83.7	72-129
11Cl-PF3OUdS (F53B Major)	6.10	1.9	ng/L	9.06	67.3	43.3-138
9Cl-PF3ONS (F53B Minor)	6.50	1.9	ng/L	8.97	72.4	52-140
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	6.19	1.9	ng/L	9.06	68.3	53.7-152
Hexafluoropropylene oxide dimer acid (HFPO-DA)	6.07	1.9	ng/L	9.62	63.0	42.1-145
8:2 Fluorotelomersulfonic acid (8:2FTS A)	8.76	1.9	ng/L	9.24	94.8	67-138
Perfluorodecanoic acid (PFDA)	8.34	1.9	ng/L	9.62	86.7	71-129
Perfluorododecanoic acid (PFDoA)	9.96	1.9	ng/L	9.62	104	72-134
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	5.65	1.9	ng/L	8.56	65.9	52.7-147

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B358210 - SOP 454-PFAAS
LCS (B358210-BS1)

Prepared: 11/15/23 Analyzed: 11/29/23

Perfluoroheptanesulfonic acid (PFHpS)	9.15	1.9	ng/L	9.19		99.5	69-134			
N-EtFOSAA (NEtFOSAA)	10.1	1.9	ng/L	9.62		105	61-135			
N-MeFOSAA (NMeFOSAA)	9.40	1.9	ng/L	9.62		97.7	65-136			
Perfluorotetradecanoic acid (PFTA)	8.83	1.9	ng/L	9.62		91.8	71-132			
Perfluorotridecanoic acid (PFTTrDA)	8.36	1.9	ng/L	9.62		86.9	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	8.45	1.9	ng/L	9.00		93.9	63-143			
Perfluorodecanesulfonic acid (PFDS)	6.63	1.9	ng/L	9.28		71.4	53-142			
Perfluorooctanesulfonamide (FOSA)	9.64	1.9	ng/L	9.62		100	67-137			
Perfluorononanesulfonic acid (PFNS)	9.38	1.9	ng/L	9.24		102	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	5.79	1.9	ng/L	9.62		60.1	50-150			
Perfluoro-1-butanefulfonamide (FBSA)	6.58	1.9	ng/L	9.62		68.4	50-150			
Perfluorohexanesulfonic acid (PFHxS)	8.15	1.9	ng/L	8.80		92.5	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	7.28	1.9	ng/L	9.62		75.7	53.8-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	7.30	1.9	ng/L	9.62		75.9	54.5-152			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	8.65	1.9	ng/L	9.14		94.6	64-140			
Perfluoropentanesulfonic acid (PFPeS)	8.15	1.9	ng/L	9.04		90.1	71-127			
Perfluoroundecanoic acid (PFUnA)	8.73	1.9	ng/L	9.62		90.7	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	7.58	1.9	ng/L	9.62		78.8	50.5-159			
Perfluoroheptanoic acid (PFHpA)	8.27	1.9	ng/L	9.62		86.0	72-130			
Perfluorooctanoic acid (PFOA)	9.10	1.9	ng/L	9.62		94.6	71-133			
Perfluorooctanesulfonic acid (PFOS)	8.36	1.9	ng/L	8.90		94.0	65-140			
Perfluorononanoic acid (PFNA)	7.66	1.9	ng/L	9.62		79.6	69-130			

LCS Dup (B358210-BSD1)

Prepared: 11/15/23 Analyzed: 11/29/23

Perfluorobutanoic acid (PFBA)	7.39	1.8	ng/L	8.92		82.8	73-129	12.4	30	
Perfluorobutanesulfonic acid (PFBS)	6.41	1.8	ng/L	7.89		81.2	72-130	15.5	30	
Perfluoropentanoic acid (PFPeA)	7.12	1.8	ng/L	8.92		79.8	72-129	15.6	30	
Perfluorohexanoic acid (PFHxA)	7.17	1.8	ng/L	8.92		80.5	72-129	11.5	30	
11Cl-PF3OUdS (F53B Major)	5.17	1.8	ng/L	8.40		61.6	43.3-138	16.4	30	
9Cl-PF3ONS (F53B Minor)	5.14	1.8	ng/L	8.31		61.9	52-140	23.3	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	5.81	1.8	ng/L	8.40		69.1	53.7-152	6.41	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	4.94	1.8	ng/L	8.92		55.4	42.1-145	20.5	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	8.06	1.8	ng/L	8.56		94.2	67-138	8.25	30	
Perfluorodecanoic acid (PFDA)	7.82	1.8	ng/L	8.92		87.7	71-129	6.47	30	
Perfluorododecanoic acid (PFDoA)	8.42	1.8	ng/L	8.92		94.5	72-134	16.7	30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	4.96	1.8	ng/L	7.94		62.5	52.7-147	13.0	30	
Perfluoroheptanesulfonic acid (PFHpS)	8.02	1.8	ng/L	8.52		94.2	69-134	13.1	30	
N-EtFOSAA (NEtFOSAA)	8.87	1.8	ng/L	8.92		99.5	61-135	13.0	30	
N-MeFOSAA (NMeFOSAA)	8.33	1.8	ng/L	8.92		93.4	65-136	12.1	30	
Perfluorotetradecanoic acid (PFTA)	7.48	1.8	ng/L	8.92		83.9	71-132	16.6	30	
Perfluorotridecanoic acid (PFTTrDA)	6.93	1.8	ng/L	8.92		77.7	65-144	18.7	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	7.14	1.8	ng/L	8.34		85.6	63-143	16.8	30	
Perfluorodecanesulfonic acid (PFDS)	5.67	1.8	ng/L	8.61		65.9	53-142	15.5	30	
Perfluorooctanesulfonamide (FOSA)	8.51	1.8	ng/L	8.92		95.5	67-137	12.4	30	
Perfluorononanesulfonic acid (PFNS)	7.88	1.8	ng/L	8.56		92.1	69-127	17.3	30	
Perfluoro-1-hexanesulfonamide (FHxSA)	4.95	1.8	ng/L	8.92		55.5	50-150	15.6	30	
Perfluoro-1-butanefulfonamide (FBSA)	5.73	1.8	ng/L	8.92		64.2	50-150	13.9	30	
Perfluorohexanesulfonic acid (PFHxS)	7.21	1.8	ng/L	8.16		88.4	68-131	12.2	30	
Perfluoro-4-oxapentanoic acid (PFMPA)	6.29	1.8	ng/L	8.92		70.5	53.8-150	14.7	30	
Perfluoro-5-oxahexanoic acid (PFMBA)	6.31	1.8	ng/L	8.92		70.7	54.5-152	14.6	30	

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B358210 - SOP 454-PFAAS
LCS Dup (B358210-BSD1)

Prepared: 11/15/23 Analyzed: 11/29/23

6:2 Fluorotelomersulfonic acid (6:2FTS A)	7.84	1.8	ng/L	8.47		92.5	64-140	9.83	30	
Perfluoropentanesulfonic acid (PFPeS)	7.42	1.8	ng/L	8.38		88.5	71-127	9.47	30	
Perfluoroundecanoic acid (PFUnA)	7.43	1.8	ng/L	8.92		83.4	69-133	16.0	30	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	6.72	1.8	ng/L	8.92		75.4	50.5-159	12.0	30	
Perfluoroheptanoic acid (PFHpA)	7.35	1.8	ng/L	8.92		82.5	72-130	11.8	30	
Perfluorooctanoic acid (PFOA)	7.41	1.8	ng/L	8.92		83.1	71-133	20.5	30	
Perfluorooctanesulfonic acid (PFOS)	6.91	1.8	ng/L	8.25		83.8	65-140	19.0	30	
Perfluorononanoic acid (PFNA)	6.55	1.8	ng/L	8.92		73.4	69-130	15.7	30	

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
D-01	Sample extracted/prepared at a dilution due to sample matrix.
E	Reported result is estimated. Value reported over verified calibration range.
MS-07A	Matrix spike and spike duplicate recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery. Possibility of matrix effects that lead to low bias or non-homogeneous sample aliquot cannot be eliminated.
MS-09	Matrix spike recovery and/or matrix spike duplicate recovery outside of control limits. Possibility of sample matrix effects that lead to a low bias for reported result or non-homogeneous sample aliquots cannot be eliminated.
MS-12	Matrix spike recovery and matrix spike duplicate recovery outside of control limits. Possibility of sample matrix effects that lead to a high bias for reported result or non-homogeneous sample aliquots cannot be eliminated.
MS-19	Sample to spike ratio is greater than or equal to 4:1. Spiked amount is not representative of the native amount in the sample. Appropriate or meaningful recoveries cannot be calculated.
MS-22	Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.
MS-23	Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is outside of the method specified criteria. Reduced precision anticipated for any reported result for this compound.
PF-17	Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.
PF-18	Re-analysis confirmed Extracted Internal Standard failure due to matrix effects.
PF-19	Sample re-analyzed at a dilution that was re-fortified with internal standard.
PF-23	Qualifier ion ratio <50% of associated calibration. Detection is suspect.
R-05	Laboratory fortified blank duplicate RPD is outside of control limits. Reduced precision is anticipated for any reported value for this compound.
S-29	Extracted Internal Standard is outside of control limits.
Z-01	Extracted internal standard outside of control limits due. No remaining volume for re-extraction.

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
HSW-6 (23K1079-01) Lab File ID: 23K1079-01.d Analyzed: 11/29/23 21:43									
M8FOSA	480432.4	3.996583	668,109.00	3.9966	72	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	284578.6	2.628233	230,805.00	2.644867	123	50 - 150	-0.0166	+/-0.50	
M2PFTA	996109.9	4.3622	1,372,008.00	4.370333	73	50 - 150	-0.0081	+/-0.50	
MPFBA	332522.4	1.0917	747,715.00	1.100017	44	50 - 150	-0.0083	+/-0.50	*
M3HFPO-DA	173338.4	2.929733	217,420.00	2.93785	80	50 - 150	-0.0081	+/-0.50	
M6PFDA	1122992	3.827567	1,363,136.00	3.835533	82	50 - 150	-0.0080	+/-0.50	
M3PFBS	268973.4	1.9945	285,464.00	2.011067	94	50 - 150	-0.0166	+/-0.50	
M7PFUnA	1146763	3.978017	1,369,349.00	3.986033	84	50 - 150	-0.0080	+/-0.50	
M5PFPeA	499214.4	1.80795	708,804.00	1.824517	70	50 - 150	-0.0166	+/-0.50	
M5PFHxA	902800.6	2.7145	1,169,882.00	2.730867	77	50 - 150	-0.0164	+/-0.50	
M3PFHxS	174091.4	3.250667	209,914.00	3.250683	83	50 - 150	0.0000	+/-0.50	
M4PFHpA	947479.3	3.21955	1,182,052.00	3.227633	80	50 - 150	-0.0081	+/-0.50	
M8PFOA	1122442	3.4859	1,412,221.00	3.4859	79	50 - 150	0.0000	+/-0.50	
M8PFOS	91527.92	3.668133	234,102.00	3.66815	39	50 - 150	0.0000	+/-0.50	*
M9PFNA	499576.5	3.677167	1,581,628.00	3.669183	32	50 - 150	0.0080	+/-0.50	*
MPFDoA	942762.4	4.120783	1,242,329.00	4.128833	76	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	219614.5	3.9855	297,341.00	3.9935	74	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	243975.3	3.905917	295,321.00	3.913933	83	50 - 150	-0.0080	+/-0.50	
HSW-6 (23K1079-01RE1) Lab File ID: 23K1079-01RE1.d Analyzed: 12/01/23 01:02									
M2-8:2FTS	227656.6	3.818733	232,714.00	3.818767	98	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	194207	3.461417	208,918.00	3.461433	93	50 - 150	0.0000	+/-0.50	
M5PFPeA	855178.7	1.7826	706,168.00	1.7826	121	50 - 150	0.0000	+/-0.50	
M5PFHxA	1362096	2.68055	1,153,660.00	2.68055	118	50 - 150	0.0000	+/-0.50	
M3PFHxS	264502.1	3.2345	204,620.00	3.234517	129	50 - 150	0.0000	+/-0.50	
M4PFHpA	1376216	3.21145	1,186,878.00	3.211467	116	50 - 150	0.0000	+/-0.50	
M8PFOA	1741525	3.469933	1,468,289.00	3.46995	119	50 - 150	0.0000	+/-0.50	
HSW-6 (23K1079-01RE2) Lab File ID: 23K1079-01RE2.d Analyzed: 12/01/23 01:09									
M8PFOS	307709.4	3.660133	232,302.00	3.660167	132	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PFW-1 (23K1079-02) Lab File ID: 23K1079-02.d Analyzed: 11/29/23 22:05									
M8FOSA	541622.8	3.996567	668,109.00	3.996567	81	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	148018.6	2.628233	230,805.00	2.628217	64	50 - 150	0.0000	+/-0.50	
M2PFTA	1114558	4.3622	1,372,008.00	4.362184	81	50 - 150	0.0000	+/-0.50	
MPFBA	609459.9	1.091717	747,715.00	1.0917	82	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	247736.1	2.929733	217,420.00	2.929733	114	50 - 150	0.0000	+/-0.50	
M6PFDA	1125672	3.827567	1,363,136.00	3.827567	83	50 - 150	0.0000	+/-0.50	
M3PFBS	283732.3	1.9945	285,464.00	2.002783	99	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1156081	3.978017	1,369,349.00	3.978017	84	50 - 150	0.0000	+/-0.50	
M5PFPeA	631866.9	1.816233	708,804.00	1.816233	89	50 - 150	0.0000	+/-0.50	
M5PFHxA	1034073	2.7145	1,169,882.00	2.722683	88	50 - 150	-0.0082	+/-0.50	
M3PFHxS	186728.9	3.250667	209,914.00	3.250667	89	50 - 150	0.0000	+/-0.50	
M4PFHpA	1085295	3.21955	1,182,052.00	3.219533	92	50 - 150	0.0000	+/-0.50	
M8PFOA	1341176	3.4859	1,412,221.00	3.4859	95	50 - 150	0.0000	+/-0.50	
M8PFOS	85221.11	3.668133	234,102.00	3.668133	36	50 - 150	0.0000	+/-0.50	*
M9PFNA	519699.6	3.677167	1,581,628.00	3.669167	33	50 - 150	0.0080	+/-0.50	*
MPFDoA	993343.5	4.120783	1,242,329.00	4.120783	80	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	235244.1	3.9855	297,341.00	3.985483	79	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	241719.9	3.905917	295,321.00	3.905917	82	50 - 150	0.0000	+/-0.50	
PFW-1 (23K1079-02RE1) Lab File ID: 23K1079-02RE1.d Analyzed: 12/01/23 01:16									
M2-8:2FTS	256155.9	3.818733	232,714.00	3.818767	110	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	227988.2	3.461417	208,918.00	3.461433	109	50 - 150	0.0000	+/-0.50	
M3PFHxS	279747	3.2345	204,620.00	3.234517	137	50 - 150	0.0000	+/-0.50	
M8PFOA	1893787	3.469917	1,468,289.00	3.46995	129	50 - 150	0.0000	+/-0.50	
PFW-1 (23K1079-02RE2) Lab File ID: 23K1079-02RE2.d Analyzed: 12/01/23 01:23									
M8PFOS	294997.7	3.66015	232,302.00	3.660167	127	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PFW-5 (23K1079-03) Lab File ID: 23K1079-03.d Analyzed: 11/29/23 22:12									
M8FOSA	485674.3	3.996567	668,109.00	3.996567	73	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	145423.4	2.628217	230,805.00	2.628217	63	50 - 150	0.0000	+/-0.50	
M2PFTA	1090484	4.3622	1,372,008.00	4.362184	79	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	197802.8	3.827067	224,508.00	3.835033	88	50 - 150	-0.0080	+/-0.50	
MPFBA	524944.4	1.0917	747,715.00	1.0917	70	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	211842.1	2.929717	217,420.00	2.929733	97	50 - 150	0.0000	+/-0.50	
M6PFDA	1187867	3.82755	1,363,136.00	3.827567	87	50 - 150	0.0000	+/-0.50	
M3PFBS	265670.3	1.9945	285,464.00	2.002783	93	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1199060	3.978017	1,369,349.00	3.978017	88	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	160643.8	3.4694	192,908.00	3.4694	83	50 - 150	0.0000	+/-0.50	
M5PFPeA	595710.1	1.80795	708,804.00	1.816233	84	50 - 150	-0.0083	+/-0.50	
M5PFHxA	1003770	2.7145	1,169,882.00	2.722683	86	50 - 150	-0.0082	+/-0.50	
M3PFHxS	187702.3	3.250667	209,914.00	3.250667	89	50 - 150	0.0000	+/-0.50	
M4PFHpA	1032608	3.219533	1,182,052.00	3.219533	87	50 - 150	0.0000	+/-0.50	
M8PFOA	1239914	3.4859	1,412,221.00	3.4859	88	50 - 150	0.0000	+/-0.50	
M8PFOS	199431.9	3.668133	234,102.00	3.668133	85	50 - 150	0.0000	+/-0.50	
M9PFNA	1229963	3.669167	1,581,628.00	3.669167	78	50 - 150	0.0000	+/-0.50	
MPFDoA	1066690	4.120783	1,242,329.00	4.120783	86	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	224106.2	3.985483	297,341.00	3.985483	75	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	236420.4	3.905917	295,321.00	3.905917	80	50 - 150	0.0000	+/-0.50	
PFW-5 (23K1079-03RE1) Lab File ID: 23K1079-03RE1.d Analyzed: 12/01/23 01:31									
M8PFOS	288790.3	3.66015	232,302.00	3.660167	124	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-311 (23K1079-04) Lab File ID: 23K1079-04.d Analyzed: 11/29/23 22:19									
M8FOSA	465517.3	3.996567	668,109.00	3.996567	70	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	176258.4	2.628217	230,805.00	2.628217	76	50 - 150	0.0000	+/-0.50	
M2PFTA	1034488	4.3622	1,372,008.00	4.362184	75	50 - 150	0.0000	+/-0.50	
MPFBA	453467.5	1.0917	747,715.00	1.0917	61	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	217980.3	2.929717	217,420.00	2.929733	100	50 - 150	0.0000	+/-0.50	
M6PFDA	941557.2	3.827567	1,363,136.00	3.827567	69	50 - 150	0.0000	+/-0.50	
M3PFBS	257148	1.9945	285,464.00	2.002783	90	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1050878	3.978017	1,369,349.00	3.978017	77	50 - 150	0.0000	+/-0.50	
M5PFPeA	503906	1.80795	708,804.00	1.816233	71	50 - 150	-0.0083	+/-0.50	
M5PFHxA	844827.4	2.7145	1,169,882.00	2.722683	72	50 - 150	-0.0082	+/-0.50	
M3PFHxS	106430.2	3.250667	209,914.00	3.250667	51	50 - 150	0.0000	+/-0.50	
M4PFHpA	792194.7	3.219533	1,182,052.00	3.219533	67	50 - 150	0.0000	+/-0.50	
M8PFOA	835098.9	3.4859	1,412,221.00	3.4859	59	50 - 150	0.0000	+/-0.50	
M8PFOS	62036.07	3.668133	234,102.00	3.668133	26	50 - 150	0.0000	+/-0.50	*
M9PFNA	384334.9	3.67715	1,581,628.00	3.669167	24	50 - 150	0.0080	+/-0.50	*
MPFDoA	925549.4	4.120783	1,242,329.00	4.120783	75	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	193171.5	3.9855	297,341.00	3.985483	65	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	210377.8	3.905917	295,321.00	3.905917	71	50 - 150	0.0000	+/-0.50	
MW-311 (23K1079-04RE1) Lab File ID: 23K1079-04RE1.d Analyzed: 12/01/23 01:53									
M2-8:2FTS	282623.1	3.81875	232,714.00	3.81875	121	50 - 150	0.0000	+/-0.50	
MPFBA	957684.8	1.0834	744,723.00	1.0834	129	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	249016.3	3.461417	208,918.00	3.461417	119	50 - 150	0.0000	+/-0.50	
M5PFPeA	926558.9	1.7826	706,168.00	1.7826	131	50 - 150	0.0000	+/-0.50	
M5PFHxA	1490640	2.680533	1,153,660.00	2.672333	129	50 - 150	0.0082	+/-0.50	
M3PFHxS	276166.6	3.2345	204,620.00	3.2345	135	50 - 150	0.0000	+/-0.50	
M4PFHpA	1547109	3.2031	1,186,878.00	3.2031	130	50 - 150	0.0000	+/-0.50	
M8PFOA	1935324	3.469933	1,468,289.00	3.469933	132	50 - 150	0.0000	+/-0.50	
M8PFOS	279461.2	3.66015	232,302.00	3.660167	120	50 - 150	0.0000	+/-0.50	
MW-311 (23K1079-04RE2) Lab File ID: 23K1079-04RE2.d Analyzed: 12/01/23 02:00									
M8PFOS	337579.7	3.660167	232,302.00	3.660167	145	50 - 150	0.0000	+/-0.50	
MW-311 (23K1079-04RE4) Lab File ID: 23K1079-04RE5.d Analyzed: 12/04/23 12:03									
M8PFOS	130710.4	3.668133	234,224.00	3.668133	56	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-35 (23K1079-05) Lab File ID: 23K1079-05.d Analyzed: 11/29/23 22:27									
M8FOSA	370726.9	3.996583	668,109.00	3.996567	55	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	460975.5	2.562517	230,805.00	2.628217	200	50 - 150	-0.0657	+/-0.50	*
M2PFTA	782688.6	4.362184	1,372,008.00	4.362184	57	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	525453.1	3.827083	224,508.00	3.835033	234	50 - 150	-0.0080	+/-0.50	*
MPFBA	257804.8	1.075083	747,715.00	1.0917	34	50 - 150	-0.0166	+/-0.50	*
M3HFPO-DA	134165.5	2.880217	217,420.00	2.929733	62	50 - 150	-0.0495	+/-0.50	
M6PFDA	1104588	3.827567	1,363,136.00	3.827567	81	50 - 150	0.0000	+/-0.50	
M3PFBS	230582	1.95315	285,464.00	2.002783	81	50 - 150	-0.0496	+/-0.50	
M7PFUnA	1151894	3.978033	1,369,349.00	3.978017	84	50 - 150	0.0000	+/-0.50	
M5PFPeA	461237.6	1.7743	708,804.00	1.816233	65	50 - 150	-0.0419	+/-0.50	
M5PFHxA	879379.1	2.638533	1,169,882.00	2.722683	75	50 - 150	-0.0842	+/-0.50	
M3PFHxS	136215.4	3.21835	209,914.00	3.250667	65	50 - 150	-0.0323	+/-0.50	
M4PFHpA	758493.8	3.18695	1,182,052.00	3.219533	64	50 - 150	-0.0326	+/-0.50	
M8PFOA	828147.6	3.469933	1,412,221.00	3.4859	59	50 - 150	-0.0160	+/-0.50	
M8PFOS	100324.7	3.66015	234,102.00	3.668133	43	50 - 150	-0.0080	+/-0.50	*
M9PFNA	503208.9	3.669183	1,581,628.00	3.669167	32	50 - 150	0.0000	+/-0.50	*
MPFDaA	932865.8	4.120783	1,242,329.00	4.120783	75	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	256044.1	3.9855	297,341.00	3.985483	86	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	264449.9	3.905917	295,321.00	3.905917	90	50 - 150	0.0000	+/-0.50	
MW-35 (23K1079-05RE1) Lab File ID: 23K1079-05RE1.d Analyzed: 12/01/23 02:07									
M2-6:2FTS	510729.8	3.461417	208,918.00	3.461417	244	50 - 150	0.0000	+/-0.50	*
M5PFPeA	924147.4	1.7826	706,168.00	1.7826	131	50 - 150	0.0000	+/-0.50	
M5PFHxA	1527275	2.672333	1,153,660.00	2.672333	132	50 - 150	0.0000	+/-0.50	
M3PFHxS	282957.5	3.2345	204,620.00	3.2345	138	50 - 150	0.0000	+/-0.50	
M4PFHpA	1648350	3.2031	1,186,878.00	3.2031	139	50 - 150	0.0000	+/-0.50	
M8PFOA	2144060	3.469933	1,468,289.00	3.469933	146	50 - 150	0.0000	+/-0.50	
MW-35 (23K1079-05RE2) Lab File ID: 23K1079-05RE2.d Analyzed: 12/01/23 02:14									
M8PFOS	351275.3	3.66015	232,302.00	3.660167	151	50 - 150	0.0000	+/-0.50	*

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PC-6A (23K1079-07) Lab File ID: 23K1079-07.d Analyzed: 11/29/23 22:34									
M8FOSA	476101	3.9966	668,109.00	3.996567	71	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	141444.7	2.620033	230,805.00	2.628217	61	50 - 150	-0.0082	+/-0.50	
M2PFTA	1035968	4.362216	1,372,008.00	4.362184	76	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	134328.8	3.8271	224,508.00	3.835033	60	50 - 150	-0.0079	+/-0.50	
MPFBA	518704	1.091717	747,715.00	1.0917	69	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	225017.7	2.92115	217,420.00	2.929733	103	50 - 150	-0.0086	+/-0.50	
M6PFDA	1079988	3.8276	1,363,136.00	3.827567	79	50 - 150	0.0000	+/-0.50	
M3PFBS	262015.8	1.986217	285,464.00	2.002783	92	50 - 150	-0.0166	+/-0.50	
M7PFUnA	1069249	3.97805	1,369,349.00	3.978017	78	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	155196.5	3.469433	192,908.00	3.4694	80	50 - 150	0.0000	+/-0.50	
M5PFPeA	573684.1	1.80795	708,804.00	1.816233	81	50 - 150	-0.0083	+/-0.50	
M5PFHxA	956068.3	2.706333	1,169,882.00	2.722683	82	50 - 150	-0.0164	+/-0.50	
M3PFHxS	193227.9	3.242617	209,914.00	3.250667	92	50 - 150	-0.0080	+/-0.50	
M4PFHpA	998124.8	3.219567	1,182,052.00	3.219533	84	50 - 150	0.0000	+/-0.50	
M8PFOA	1269244	3.47795	1,412,221.00	3.4859	90	50 - 150	-0.0080	+/-0.50	
M8PFOS	193029.7	3.668167	234,102.00	3.668133	82	50 - 150	0.0000	+/-0.50	
M9PFNA	1295426	3.6692	1,581,628.00	3.669167	82	50 - 150	0.0000	+/-0.50	
MPFDoA	927012.4	4.120817	1,242,329.00	4.120783	75	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	236849	3.985517	297,341.00	3.985483	80	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	223243	3.90595	295,321.00	3.905917	76	50 - 150	0.0000	+/-0.50	
PC-6A (23K1079-07RE1) Lab File ID: 23K1079-07RE1.d Analyzed: 12/01/23 11:04									
M8PFOS	213194.5	3.668133	239,870.00	3.668133	89	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PC-11 (23K1079-08) Lab File ID: 23K1079-08.d Analyzed: 11/29/23 22:41									
M8FOSA	355616.3	3.996567	668,109.00	3.996567	53	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	194852.2	2.620017	230,805.00	2.628217	84	50 - 150	-0.0082	+/-0.50	
M2PFTA	579462.9	4.362184	1,372,008.00	4.362184	42	50 - 150	0.0000	+/-0.50	*
M2-8:2FTS	711926.4	3.827067	224,508.00	3.835033	317	50 - 150	-0.0080	+/-0.50	*
MPFBA	411439.2	1.0917	747,715.00	1.0917	55	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	215004.4	2.921133	217,420.00	2.929733	99	50 - 150	-0.0086	+/-0.50	
M6PFDA	1160321	3.82755	1,363,136.00	3.827567	85	50 - 150	0.0000	+/-0.50	
M3PFBS	255306.6	1.986217	285,464.00	2.002783	89	50 - 150	-0.0166	+/-0.50	
M7PFUnA	1077984	3.978017	1,369,349.00	3.978017	79	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	981330	3.4694	192,908.00	3.4694	509	50 - 150	0.0000	+/-0.50	*
M5PFPeA	555335.1	1.799667	708,804.00	1.816233	78	50 - 150	-0.0166	+/-0.50	
M5PFHxA	930606.8	2.706317	1,169,882.00	2.722683	80	50 - 150	-0.0164	+/-0.50	
M3PFHxS	171248.9	3.242583	209,914.00	3.250667	82	50 - 150	-0.0081	+/-0.50	
M4PFHpA	1034470	3.219533	1,182,052.00	3.219533	88	50 - 150	0.0000	+/-0.50	
M8PFOA	1202037	3.4779	1,412,221.00	3.4859	85	50 - 150	-0.0080	+/-0.50	
M8PFOS	137489.3	3.66015	234,102.00	3.668133	59	50 - 150	-0.0080	+/-0.50	
M9PFNA	927821.8	3.669167	1,581,628.00	3.669167	59	50 - 150	0.0000	+/-0.50	
MPFDoA	909718.9	4.120783	1,242,329.00	4.120783	73	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	244507.4	3.985483	297,341.00	3.985483	82	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	261219.5	3.9059	295,321.00	3.905917	88	50 - 150	0.0000	+/-0.50	
PC-11 (23K1079-08RE1) Lab File ID: 23K1079-08RE1.d Analyzed: 12/01/23 02:29									
M2-8:2FTS	355478.3	3.81875	232,714.00	3.81875	153	50 - 150	0.0000	+/-0.50	*
M7PFUnA	1742827	3.970033	1,393,340.00	3.970033	125	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	495748	3.461417	208,918.00	3.461417	237	50 - 150	0.0000	+/-0.50	*
M5PFPeA	907112.9	1.7826	706,168.00	1.7826	128	50 - 150	0.0000	+/-0.50	
M5PFHxA	1459677	2.672333	1,153,660.00	2.672333	127	50 - 150	0.0000	+/-0.50	
M3PFHxS	278472.9	3.234517	204,620.00	3.2345	136	50 - 150	0.0000	+/-0.50	
M8PFOA	2084667	3.469933	1,468,289.00	3.469933	142	50 - 150	0.0000	+/-0.50	
M8PFOS	305250.3	3.66015	232,302.00	3.660167	131	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PC-345 (23K1079-09) Lab File ID: 23K1079-09.d Analyzed: 11/29/23 22:48									
M8FOSA	267564.5	3.996567	668,109.00	3.996567	40	50 - 150	0.0000	+/-0.50	*
M2-4:2FTS	277942	2.6118	230,805.00	2.628217	120	50 - 150	-0.0164	+/-0.50	
M2PFTA	638083.4	4.362184	1,372,008.00	4.362184	47	50 - 150	0.0000	+/-0.50	*
M2-8:2FTS	503802.4	3.827067	224,508.00	3.835033	224	50 - 150	-0.0080	+/-0.50	*
MPFBA	357561.8	1.0834	747,715.00	1.0917	48	50 - 150	-0.0083	+/-0.50	*
M3HFPO-DA	221985.5	2.91295	217,420.00	2.929733	102	50 - 150	-0.0168	+/-0.50	
M6PFDA	1068598	3.827567	1,363,136.00	3.827567	78	50 - 150	0.0000	+/-0.50	
M3PFBS	265097.9	1.986217	285,464.00	2.002783	93	50 - 150	-0.0166	+/-0.50	
M7PFUnA	973604.2	3.978017	1,369,349.00	3.978017	71	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	627539.2	3.4694	192,908.00	3.4694	325	50 - 150	0.0000	+/-0.50	*
M5PFPeA	578325.6	1.799667	708,804.00	1.816233	82	50 - 150	-0.0166	+/-0.50	
M5PFHxA	989237.8	2.696967	1,169,882.00	2.722683	85	50 - 150	-0.0257	+/-0.50	
M3PFHxS	192707.2	3.242583	209,914.00	3.250667	92	50 - 150	-0.0081	+/-0.50	
M4PFHpA	1052710	3.21145	1,182,052.00	3.219533	89	50 - 150	-0.0081	+/-0.50	
M8PFOA	1269975	3.477917	1,412,221.00	3.4859	90	50 - 150	-0.0080	+/-0.50	
M8PFOS	143682.8	3.66015	234,102.00	3.668133	61	50 - 150	-0.0080	+/-0.50	
M9PFNA	974348.5	3.661183	1,581,628.00	3.669167	62	50 - 150	-0.0080	+/-0.50	
MPFDoA	711111.8	4.120783	1,242,329.00	4.120783	57	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	269060.6	3.9855	297,341.00	3.985483	90	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	252730.9	3.905917	295,321.00	3.905917	86	50 - 150	0.0000	+/-0.50	
PC-345 (23K1079-09RE1) Lab File ID: 23K1079-09RE1.d Analyzed: 12/01/23 02:43									
M8PFOS	306714.8	3.660167	232,302.00	3.660167	132	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
DUP-1 (23K1079-10)		Lab File ID: 23K1079-10.d				Analyzed: 11/29/23 22:55			
M8FOSA	365866.8	4.004583	668,109.00	3.996567	55	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	120578	2.611817	230,805.00	2.628217	52	50 - 150	-0.0164	+/-0.50	
M2PFTA	848334.3	4.3622	1,372,008.00	4.362184	62	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	110465.9	3.827083	224,508.00	3.835033	49	50 - 150	-0.0080	+/-0.50	*
MPFBA	542200.7	1.0834	747,715.00	1.0917	73	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	210362	2.912967	217,420.00	2.929733	97	50 - 150	-0.0168	+/-0.50	
M6PFDA	835476.1	3.827583	1,363,136.00	3.827567	61	50 - 150	0.0000	+/-0.50	
M3PFBS	256543.5	1.986217	285,464.00	2.002783	90	50 - 150	-0.0166	+/-0.50	
M7PFUnA	849555.3	3.978033	1,369,349.00	3.978017	62	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	132842.1	3.469417	192,908.00	3.4694	69	50 - 150	0.0000	+/-0.50	
M5PFPeA	555052.6	1.799667	708,804.00	1.816233	78	50 - 150	-0.0166	+/-0.50	
M5PFHxA	899591.5	2.706333	1,169,882.00	2.722683	77	50 - 150	-0.0164	+/-0.50	
M3PFHxS	183712.2	3.2426	209,914.00	3.250667	88	50 - 150	-0.0081	+/-0.50	
M4PFHpA	939843.8	3.21955	1,182,052.00	3.219533	80	50 - 150	0.0000	+/-0.50	
M8PFOA	1186056	3.477933	1,412,221.00	3.4859	84	50 - 150	-0.0080	+/-0.50	
M8PFOS	171128.6	3.660167	234,102.00	3.668133	73	50 - 150	-0.0080	+/-0.50	
M9PFNA	1165819	3.669183	1,581,628.00	3.669167	74	50 - 150	0.0000	+/-0.50	
MPFDoA	756640.4	4.1208	1,242,329.00	4.120783	61	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	158697.2	3.9855	297,341.00	3.985483	53	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	166243.3	3.905933	295,321.00	3.905917	56	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PC-16D (23K1079-11)		Lab File ID: 23K1079-11.d				Analyzed: 11/29/23 23:03			
M8FOSA	462042.3	4.004583	668,109.00	3.996567	69	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	126450.7	2.6118	230,805.00	2.628217	55	50 - 150	-0.0164	+/-0.50	
M2PFTA	985800.3	4.3622	1,372,008.00	4.362184	72	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	139428.4	3.827083	224,508.00	3.835033	62	50 - 150	-0.0080	+/-0.50	
MPFBA	570709.5	1.0834	747,715.00	1.0917	76	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	208529.4	2.912967	217,420.00	2.929733	96	50 - 150	-0.0168	+/-0.50	
M6PFDA	1079474	3.827583	1,363,136.00	3.827567	79	50 - 150	0.0000	+/-0.50	
M3PFBS	262157	1.986217	285,464.00	2.002783	92	50 - 150	-0.0166	+/-0.50	
M7PFUnA	1087054	3.978033	1,369,349.00	3.978017	79	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	166145.8	3.461433	192,908.00	3.4694	86	50 - 150	-0.0080	+/-0.50	
M5PFPeA	579324.3	1.799667	708,804.00	1.816233	82	50 - 150	-0.0166	+/-0.50	
M5PFHxA	949268.8	2.696967	1,169,882.00	2.722683	81	50 - 150	-0.0257	+/-0.50	
M3PFHxS	191345.6	3.2426	209,914.00	3.250667	91	50 - 150	-0.0081	+/-0.50	
M4PFHpA	993256.3	3.211467	1,182,052.00	3.219533	84	50 - 150	-0.0081	+/-0.50	
M8PFOA	1266746	3.477933	1,412,221.00	3.4859	90	50 - 150	-0.0080	+/-0.50	
M8PFOS	194185	3.660167	234,102.00	3.668133	83	50 - 150	-0.0080	+/-0.50	
M9PFNA	1306586	3.6612	1,581,628.00	3.669167	83	50 - 150	-0.0080	+/-0.50	
MPFDoA	1011078	4.1208	1,242,329.00	4.120783	81	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	217177.3	3.985517	297,341.00	3.985483	73	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	224837.4	3.905933	295,321.00	3.905917	76	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PC-29 (23K1079-12)		Lab File ID: 23K1079-12.d				Analyzed: 11/29/23 23:10			
M8FOSA	462754.9	4.004567	668,109.00	3.996567	69	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	144557.4	2.6118	230,805.00	2.628217	63	50 - 150	-0.0164	+/-0.50	
M2PFTA	958877.3	4.362184	1,372,008.00	4.362184	70	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	111795.8	3.827067	224,508.00	3.835033	50	50 - 150	-0.0080	+/-0.50	
MPFBA	526280.9	1.0834	747,715.00	1.0917	70	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	254077	2.912967	217,420.00	2.929733	117	50 - 150	-0.0168	+/-0.50	
M6PFDA	983417.8	3.827567	1,363,136.00	3.827567	72	50 - 150	0.0000	+/-0.50	
M3PFBS	278029.2	1.986217	285,464.00	2.002783	97	50 - 150	-0.0166	+/-0.50	
M7PFUnA	986233.9	3.978033	1,369,349.00	3.978017	72	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	163241.4	3.4694	192,908.00	3.4694	85	50 - 150	0.0000	+/-0.50	
M5PFPeA	604169.9	1.799667	708,804.00	1.816233	85	50 - 150	-0.0166	+/-0.50	
M5PFHxA	999425.6	2.696967	1,169,882.00	2.722683	85	50 - 150	-0.0257	+/-0.50	
M3PFHxS	192354.3	3.2426	209,914.00	3.250667	92	50 - 150	-0.0081	+/-0.50	
M4PFHpA	1015582	3.211467	1,182,052.00	3.219533	86	50 - 150	-0.0081	+/-0.50	
M8PFOA	1276568	3.477917	1,412,221.00	3.4859	90	50 - 150	-0.0080	+/-0.50	
M8PFOS	186147.5	3.66015	234,102.00	3.668133	80	50 - 150	-0.0080	+/-0.50	
M9PFNA	1274822	3.6612	1,581,628.00	3.669167	81	50 - 150	-0.0080	+/-0.50	
MPFDoA	837758.9	4.120783	1,242,329.00	4.120783	67	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	179846.5	3.9855	297,341.00	3.985483	60	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	200297.1	3.905917	295,321.00	3.905917	68	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
EB-11.1.23 (23K1079-13)		Lab File ID: 23K1079-13.d				Analyzed: 11/29/23 23:53			
M8FOSA	499188.3	4.004567	668,109.00	3.996583	75	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	170095.5	2.6118	230,805.00	2.6118	74	50 - 150	0.0000	+/-0.50	
M2PFTA	1132814	4.362184	1,372,008.00	4.3622	83	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	181612.2	3.827083	224,508.00	3.827083	81	50 - 150	0.0000	+/-0.50	
MPFBA	772255.1	1.0834	747,715.00	1.0834	103	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	277635.1	2.91295	217,420.00	2.91295	128	50 - 150	0.0000	+/-0.50	
M6PFDA	1231500	3.827567	1,363,136.00	3.827567	90	50 - 150	0.0000	+/-0.50	
M3PFBS	294707.1	1.986217	285,464.00	1.978033	103	50 - 150	0.0082	+/-0.50	
M7PFUnA	1259629	3.978033	1,369,349.00	3.978033	92	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	279412.8	3.461417	192,908.00	3.4694	145	50 - 150	-0.0080	+/-0.50	
M5PFPeA	679296.3	1.799667	708,804.00	1.799667	96	50 - 150	0.0000	+/-0.50	
M5PFHxA	1080295	2.706317	1,169,882.00	2.696967	92	50 - 150	0.0093	+/-0.50	
M3PFHxS	213957	3.242583	209,914.00	3.242583	102	50 - 150	0.0000	+/-0.50	
M4PFHpA	1147254	3.219533	1,182,052.00	3.211467	97	50 - 150	0.0081	+/-0.50	
M8PFOA	1516021	3.477917	1,412,221.00	3.477917	107	50 - 150	0.0000	+/-0.50	
M8PFOS	230418.3	3.660167	234,102.00	3.660167	98	50 - 150	0.0000	+/-0.50	
M9PFNA	1585031	3.6612	1,581,628.00	3.6612	100	50 - 150	0.0000	+/-0.50	
MPFDoA	1088308	4.11265	1,242,329.00	4.11265	88	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	251255.8	3.9855	297,341.00	3.9855	85	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	267692	3.905917	295,321.00	3.905917	91	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PC-30 (23K1079-14)		Lab File ID: 23K1079-14.d				Analyzed: 11/30/23 00:00			
M8FOSA	519885.2	4.004567	668,109.00	3.996583	78	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	145746.7	2.6118	230,805.00	2.6118	63	50 - 150	0.0000	+/-0.50	
M2PFTA	1074032	4.362184	1,372,008.00	4.3622	78	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	147939.2	3.827067	224,508.00	3.827083	66	50 - 150	0.0000	+/-0.50	
MPFBA	625467.9	1.0834	747,715.00	1.0834	84	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	297062.5	2.91295	217,420.00	2.91295	137	50 - 150	0.0000	+/-0.50	
M6PFDA	1143188	3.82755	1,363,136.00	3.827567	84	50 - 150	0.0000	+/-0.50	
M3PFBS	290707.4	1.986217	285,464.00	1.978033	102	50 - 150	0.0082	+/-0.50	
M7PFUnA	1108556	3.978017	1,369,349.00	3.978033	81	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	193775.3	3.461417	192,908.00	3.4694	100	50 - 150	-0.0080	+/-0.50	
M5PFPeA	657416.4	1.799667	708,804.00	1.799667	93	50 - 150	0.0000	+/-0.50	
M5PFHxA	1064094	2.696967	1,169,882.00	2.696967	91	50 - 150	0.0000	+/-0.50	
M3PFHxS	210508.9	3.242583	209,914.00	3.242583	100	50 - 150	0.0000	+/-0.50	
M4PFHpA	1076160	3.21145	1,182,052.00	3.211467	91	50 - 150	0.0000	+/-0.50	
M8PFOA	1387255	3.477917	1,412,221.00	3.477917	98	50 - 150	0.0000	+/-0.50	
M8PFOS	205408	3.66015	234,102.00	3.660167	88	50 - 150	0.0000	+/-0.50	
M9PFNA	1430050	3.661183	1,581,628.00	3.6612	90	50 - 150	0.0000	+/-0.50	
MPFDoA	961212.3	4.120783	1,242,329.00	4.11265	77	50 - 150	0.0081	+/-0.50	
D5-NEtFOSAA	229837.8	3.985483	297,341.00	3.9855	77	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	247814	3.905917	295,321.00	3.905917	84	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PC-14 (23K1079-15) Lab File ID: 23K1079-15.d Analyzed: 11/30/23 00:07									
M8FOSA	135703.6	4.004583	668,109.00	3.996583	20	50 - 150	0.0080	+/-0.50	*
M2-4:2FTS	168429.9	2.6118	230,805.00	2.6118	73	50 - 150	0.0000	+/-0.50	
M2PFTA	259044	4.3622	1,372,008.00	4.3622	19	50 - 150	0.0000	+/-0.50	*
M2-8:2FTS	146345.1	3.827067	224,508.00	3.827083	65	50 - 150	0.0000	+/-0.50	
MPFBA	479088.1	1.0917	747,715.00	1.0834	64	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	276970.2	2.91295	217,420.00	2.91295	127	50 - 150	0.0000	+/-0.50	
M6PFDA	974979.9	3.827567	1,363,136.00	3.827567	72	50 - 150	0.0000	+/-0.50	
M3PFBS	272855.3	1.986217	285,464.00	1.978033	96	50 - 150	0.0082	+/-0.50	
M7PFUnA	840058.1	3.978033	1,369,349.00	3.978033	61	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	246506	3.461417	192,908.00	3.4694	128	50 - 150	-0.0080	+/-0.50	
M5PFPeA	604391.4	1.799667	708,804.00	1.799667	85	50 - 150	0.0000	+/-0.50	
M5PFHxA	987043.9	2.696967	1,169,882.00	2.696967	84	50 - 150	0.0000	+/-0.50	
M3PFHxS	190029.9	3.242583	209,914.00	3.242583	91	50 - 150	0.0000	+/-0.50	
M4PFHpA	1015980	3.21145	1,182,052.00	3.211467	86	50 - 150	0.0000	+/-0.50	
M8PFOA	1247337	3.477917	1,412,221.00	3.477917	88	50 - 150	0.0000	+/-0.50	
M8PFOS	176828.6	3.66015	234,102.00	3.660167	76	50 - 150	0.0000	+/-0.50	
M9PFNA	1133784	3.661183	1,581,628.00	3.6612	72	50 - 150	0.0000	+/-0.50	
MPFDoA	584293.6	4.11265	1,242,329.00	4.11265	47	50 - 150	0.0000	+/-0.50	*
D5-NEtFOSAA	178442.7	3.9855	297,341.00	3.9855	60	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	216942.4	3.897733	295,321.00	3.905917	73	50 - 150	-0.0082	+/-0.50	
PC-14 (23K1079-15RE1) Lab File ID: 23K1079-15RE1.d Analyzed: 12/01/23 03:05									
M8PFOS	241788.3	3.66015	232,302.00	3.66015	104	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-125 (23K1079-16) Lab File ID: 23K1079-16.d Analyzed: 11/30/23 00:15									
M8FOSA	495642.4	4.004567	668,109.00	3.996583	74	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	256755.8	2.603583	230,805.00	2.6118	111	50 - 150	-0.0082	+/-0.50	
M2PFTA	1077468	4.362184	1,372,008.00	4.3622	79	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	229619.7	3.827067	224,508.00	3.827083	102	50 - 150	0.0000	+/-0.50	
MPFBA	435650.3	1.0834	747,715.00	1.0834	58	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	240031.9	2.91295	217,420.00	2.91295	110	50 - 150	0.0000	+/-0.50	
M6PFDA	1229803	3.82755	1,363,136.00	3.827567	90	50 - 150	0.0000	+/-0.50	
M3PFBS	293732.9	1.978033	285,464.00	1.978033	103	50 - 150	0.0000	+/-0.50	
M7PFUnA	1180948	3.978017	1,369,349.00	3.978033	86	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	290213	3.461417	192,908.00	3.4694	150	50 - 150	-0.0080	+/-0.50	
M5PFPeA	633064.1	1.791367	708,804.00	1.799667	89	50 - 150	-0.0083	+/-0.50	
M5PFHxA	1087917	2.68875	1,169,882.00	2.696967	93	50 - 150	-0.0082	+/-0.50	
M3PFHxS	198472.6	3.242583	209,914.00	3.242583	95	50 - 150	0.0000	+/-0.50	
M4PFHpA	1124465	3.21145	1,182,052.00	3.211467	95	50 - 150	0.0000	+/-0.50	
M8PFOA	1408953	3.477917	1,412,221.00	3.477917	100	50 - 150	0.0000	+/-0.50	
M8PFOS	212555.1	3.66015	234,102.00	3.660167	91	50 - 150	0.0000	+/-0.50	
M9PFNA	1327774	3.661183	1,581,628.00	3.6612	84	50 - 150	0.0000	+/-0.50	
MPFDoA	1027472	4.112633	1,242,329.00	4.11265	83	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	252559.2	3.9775	297,341.00	3.9855	85	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	273588.5	3.897733	295,321.00	3.905917	93	50 - 150	-0.0082	+/-0.50	
MW-125 (23K1079-16RE1) Lab File ID: 23K1079-16RE1.d Analyzed: 12/01/23 03:12									
M3PFHxS	245976.4	3.2345	204,620.00	3.2345	120	50 - 150	0.0000	+/-0.50	
M8PFOS	243559.7	3.66015	232,302.00	3.66015	105	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-22 (23K1079-17) Lab File ID: 23K1079-17.d Analyzed: 11/30/23 00:22									
M8FOSA	432700.2	4.004583	668,109.00	3.996583	65	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	140396.8	2.6118	230,805.00	2.6118	61	50 - 150	0.0000	+/-0.50	
M2PFTA	961426.8	4.3622	1,372,008.00	4.3622	70	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	125296.6	3.827083	224,508.00	3.827083	56	50 - 150	0.0000	+/-0.50	
MPFBA	525356.5	1.0834	747,715.00	1.0834	70	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	234817.8	2.912967	217,420.00	2.91295	108	50 - 150	0.0000	+/-0.50	
M6PFDA	958096.5	3.827583	1,363,136.00	3.827567	70	50 - 150	0.0000	+/-0.50	
M3PFBS	272385.8	1.986217	285,464.00	1.978033	95	50 - 150	0.0082	+/-0.50	
M7PFUnA	927561.8	3.978033	1,369,349.00	3.978033	68	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	164673.6	3.461433	192,908.00	3.4694	85	50 - 150	-0.0080	+/-0.50	
M5PFPeA	598193	1.799667	708,804.00	1.799667	84	50 - 150	0.0000	+/-0.50	
M5PFHxA	995969.7	2.696967	1,169,882.00	2.696967	85	50 - 150	0.0000	+/-0.50	
M3PFHxS	191624.9	3.2426	209,914.00	3.242583	91	50 - 150	0.0000	+/-0.50	
M4PFHpA	1013984	3.211467	1,182,052.00	3.211467	86	50 - 150	0.0000	+/-0.50	
M8PFOA	1264245	3.477933	1,412,221.00	3.477917	90	50 - 150	0.0000	+/-0.50	
M8PFOS	172726.2	3.660167	234,102.00	3.660167	74	50 - 150	0.0000	+/-0.50	
M9PFNA	1201450	3.6612	1,581,628.00	3.6612	76	50 - 150	0.0000	+/-0.50	
MPFDoA	808465.3	4.1208	1,242,329.00	4.11265	65	50 - 150	0.0081	+/-0.50	
D5-NEtFOSAA	181579.9	3.9855	297,341.00	3.9855	61	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	196268	3.905933	295,321.00	3.905917	66	50 - 150	0.0000	+/-0.50	
MW-22 (23K1079-17RE1) Lab File ID: 23K1079-17RE1.d Analyzed: 12/01/23 03:19									
M8PFOS	256168.7	3.66015	232,302.00	3.66015	110	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-351 (23K1079-18) Lab File ID: 23K1079-18.d Analyzed: 11/30/23 00:29									
M8FOSA	501948	4.004567	668,109.00	3.996583	75	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	134543.8	2.6118	230,805.00	2.6118	58	50 - 150	0.0000	+/-0.50	
M2PFTA	1045459	4.362184	1,372,008.00	4.3622	76	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	142097.8	3.827067	224,508.00	3.827083	63	50 - 150	0.0000	+/-0.50	
MPFBA	667771.6	1.0834	747,715.00	1.0834	89	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	293607.8	2.91295	217,420.00	2.91295	135	50 - 150	0.0000	+/-0.50	
M6PFDA	1145483	3.827567	1,363,136.00	3.827567	84	50 - 150	0.0000	+/-0.50	
M3PFBS	296946.6	1.986217	285,464.00	1.978033	104	50 - 150	0.0082	+/-0.50	
M7PFUnA	1068153	3.978033	1,369,349.00	3.978033	78	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	198581.5	3.4694	192,908.00	3.4694	103	50 - 150	0.0000	+/-0.50	
M5PFPeA	664622.9	1.799667	708,804.00	1.799667	94	50 - 150	0.0000	+/-0.50	
M5PFHxA	1107909	2.706317	1,169,882.00	2.696967	95	50 - 150	0.0093	+/-0.50	
M3PFHxS	211608.2	3.2426	209,914.00	3.242583	101	50 - 150	0.0000	+/-0.50	
M4PFHpA	1143192	3.21955	1,182,052.00	3.211467	97	50 - 150	0.0081	+/-0.50	
M8PFOA	1378254	3.477917	1,412,221.00	3.477917	98	50 - 150	0.0000	+/-0.50	
M8PFOS	216129.4	3.66015	234,102.00	3.660167	92	50 - 150	0.0000	+/-0.50	
M9PFNA	1482683	3.661183	1,581,628.00	3.6612	94	50 - 150	0.0000	+/-0.50	
MPFDoA	978942.2	4.11265	1,242,329.00	4.11265	79	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	219345.6	3.9855	297,341.00	3.9855	74	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	241747.9	3.905917	295,321.00	3.905917	82	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
EB.11.2.23 (23K1079-19)		Lab File ID: 23K1079-19.d				Analyzed: 11/30/23 00:36			
M8FOSA	504183.9	4.004567	668,109.00	3.996583	75	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	143403.8	2.6118	230,805.00	2.6118	62	50 - 150	0.0000	+/-0.50	
M2PFTA	1096289	4.362184	1,372,008.00	4.3622	80	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	163458.8	3.827067	224,508.00	3.827083	73	50 - 150	0.0000	+/-0.50	
MPFBA	712717.4	1.0834	747,715.00	1.0834	95	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	286631.2	2.91295	217,420.00	2.91295	132	50 - 150	0.0000	+/-0.50	
M6PFDA	1167530	3.82755	1,363,136.00	3.827567	86	50 - 150	0.0000	+/-0.50	
M3PFBS	274695.9	1.986217	285,464.00	1.978033	96	50 - 150	0.0082	+/-0.50	
M7PFUnA	1182696	3.978017	1,369,349.00	3.978033	86	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	173882	3.4614	192,908.00	3.4694	90	50 - 150	-0.0080	+/-0.50	
M5PFPeA	619805.6	1.799667	708,804.00	1.799667	87	50 - 150	0.0000	+/-0.50	
M5PFHxA	1010866	2.696967	1,169,882.00	2.696967	86	50 - 150	0.0000	+/-0.50	
M3PFHxS	190537.4	3.242583	209,914.00	3.242583	91	50 - 150	0.0000	+/-0.50	
M4PFHpA	1056404	3.21145	1,182,052.00	3.211467	89	50 - 150	0.0000	+/-0.50	
M8PFOA	1310937	3.4779	1,412,221.00	3.477917	93	50 - 150	0.0000	+/-0.50	
M8PFOS	219257.9	3.660133	234,102.00	3.660167	94	50 - 150	0.0000	+/-0.50	
M9PFNA	1390826	3.661183	1,581,628.00	3.6612	88	50 - 150	0.0000	+/-0.50	
MPFDoA	1019419	4.112633	1,242,329.00	4.11265	82	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	234855.8	3.977483	297,341.00	3.9855	79	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	251930.5	3.897717	295,321.00	3.905917	85	50 - 150	-0.0082	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
PC-38 (23K1079-20) Lab File ID: 23K1079-20.d Analyzed: 11/30/23 00:43									
M8FOSA	535728.9	4.004567	668,109.00	3.996583	80	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	168096.6	2.6118	230,805.00	2.6118	73	50 - 150	0.0000	+/-0.50	
M2PFTA	1194190	4.362184	1,372,008.00	4.3622	87	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	139456.8	3.827067	224,508.00	3.827083	62	50 - 150	0.0000	+/-0.50	
MPFBA	701869.6	1.0834	747,715.00	1.0834	94	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	295482.5	2.91295	217,420.00	2.91295	136	50 - 150	0.0000	+/-0.50	
M6PFDA	1208161	3.827567	1,363,136.00	3.827567	89	50 - 150	0.0000	+/-0.50	
M3PFBS	333836.6	1.986217	285,464.00	1.978033	117	50 - 150	0.0082	+/-0.50	
M7PFUnA	1147896	3.978017	1,369,349.00	3.978033	84	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	208073.5	3.4694	192,908.00	3.4694	108	50 - 150	0.0000	+/-0.50	
M5PFPeA	733073.4	1.799667	708,804.00	1.799667	103	50 - 150	0.0000	+/-0.50	
M5PFHxA	1188505	2.696967	1,169,882.00	2.696967	102	50 - 150	0.0000	+/-0.50	
M3PFHxS	229895.3	3.242583	209,914.00	3.242583	110	50 - 150	0.0000	+/-0.50	
M4PFHpA	1261431	3.21955	1,182,052.00	3.211467	107	50 - 150	0.0081	+/-0.50	
M8PFOA	1509420	3.477917	1,412,221.00	3.477917	107	50 - 150	0.0000	+/-0.50	
M8PFOS	235144.2	3.66015	234,102.00	3.660167	100	50 - 150	0.0000	+/-0.50	
M9PFNA	1560855	3.661183	1,581,628.00	3.6612	99	50 - 150	0.0000	+/-0.50	
MPFDoA	1083266	4.112633	1,242,329.00	4.11265	87	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	211807.3	3.985483	297,341.00	3.9855	71	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	231533.8	3.905917	295,321.00	3.905917	78	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Equip-Blank-11.3.23 (23K1079-21) Lab File ID: 23K1079-21.d Analyzed: 11/30/23 00:51									
M8FOSA	81085.86	4.004567	668,109.00	3.996583	12	50 - 150	0.0080	+/-0.50	*
M2-4:2FTS	8508.219	2.6118	230,805.00	2.6118	04	50 - 150	0.0000	+/-0.50	*
M2PFTA	279830.6	4.362184	1,372,008.00	4.3622	20	50 - 150	0.0000	+/-0.50	*
M2-8:2FTS	11597.34	3.827067	224,508.00	3.827083	05	50 - 150	0.0000	+/-0.50	*
MPFBA	46482.79	1.0834	747,715.00	1.0834	06	50 - 150	0.0000	+/-0.50	*
M3HFPO-DA	14837.13	2.91295	217,420.00	2.91295	07	50 - 150	0.0000	+/-0.50	*
M6PFDA	72777.22	3.819267	1,363,136.00	3.827567	05	50 - 150	-0.0083	+/-0.50	*
M3PFBS	28103.99	1.986217	285,464.00	1.978033	10	50 - 150	0.0082	+/-0.50	*
M7PFUnA	88233.9	3.970017	1,369,349.00	3.978033	06	50 - 150	-0.0080	+/-0.50	*
M2-6:2FTS	9053.924	3.461417	192,908.00	3.4694	05	50 - 150	-0.0080	+/-0.50	*
M5PFPeA	38383.58	1.79965	708,804.00	1.799667	05	50 - 150	0.0000	+/-0.50	*
M5PFHxA	60286.16	2.696967	1,169,882.00	2.696967	05	50 - 150	0.0000	+/-0.50	*
M3PFHxS	17274.21	3.242583	209,914.00	3.242583	08	50 - 150	0.0000	+/-0.50	*
M4PFHpA	60863.71	3.21145	1,182,052.00	3.211467	05	50 - 150	0.0000	+/-0.50	*
M8PFOA	73028.98	3.4779	1,412,221.00	3.477917	05	50 - 150	0.0000	+/-0.50	*
M8PFOS	17366.67	3.660133	234,102.00	3.660167	07	50 - 150	0.0000	+/-0.50	*
M9PFNA	88101.05	3.661183	1,581,628.00	3.6612	06	50 - 150	0.0000	+/-0.50	*
MPFDoA	126059.9	4.112633	1,242,329.00	4.11265	10	50 - 150	0.0000	+/-0.50	*
D5-NEtFOSAA	26139.32	3.9775	297,341.00	3.9855	09	50 - 150	-0.0080	+/-0.50	*
D3-NMeFOSAA	19358.14	3.897733	295,321.00	3.905917	07	50 - 150	-0.0082	+/-0.50	*

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B357679-BLK1)			Lab File ID: B357679-BLK1.d			Analyzed: 11/29/23 20:17			
M8FOSA	613048.6	3.996567	668,109.00	3.9966	92	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	214203.5	2.636633	230,805.00	2.644867	93	50 - 150	-0.0082	+/-0.50	
M2PFTA	1364218	4.3703	1,372,008.00	4.370333	99	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	226639.9	3.835017	224,508.00	3.835033	101	50 - 150	0.0000	+/-0.50	
MPFBA	764754.8	1.0917	747,715.00	1.100017	102	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	238262.9	2.93785	217,420.00	2.93785	110	50 - 150	0.0000	+/-0.50	
M6PFDA	1416191	3.82755	1,363,136.00	3.835533	104	50 - 150	-0.0080	+/-0.50	
M3PFBS	326400.3	2.002783	285,464.00	2.011067	114	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1388198	3.986	1,369,349.00	3.986033	101	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	230872.1	3.477383	192,908.00	3.4774	120	50 - 150	0.0000	+/-0.50	
M5PFPeA	751130.6	1.816233	708,804.00	1.824517	106	50 - 150	-0.0083	+/-0.50	
M5PFHxA	1259548	2.722683	1,169,882.00	2.730867	108	50 - 150	-0.0082	+/-0.50	
M3PFHxS	238349.7	3.250667	209,914.00	3.250683	114	50 - 150	0.0000	+/-0.50	
M4PFHpA	1320902	3.227617	1,182,052.00	3.227633	112	50 - 150	0.0000	+/-0.50	
M8PFOA	1632481	3.485883	1,412,221.00	3.4859	116	50 - 150	0.0000	+/-0.50	
M8PFOS	254433.2	3.668133	234,102.00	3.66815	109	50 - 150	0.0000	+/-0.50	
M9PFNA	1858389	3.669167	1,581,628.00	3.669183	117	50 - 150	0.0000	+/-0.50	
MPFDoA	1206904	4.120767	1,242,329.00	4.128833	97	50 - 150	-0.0081	+/-0.50	
D5-NEtFOSAA	307228.2	3.993467	297,341.00	3.9935	103	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	296382.1	3.9139	295,321.00	3.913933	100	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B357679-BS1)			Lab File ID: B357679-BS1.d			Analyzed: 11/29/23 20:09			
M8FOSA	565658.1	3.996583	668,109.00	3.9966	85	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	211569.6	2.636633	230,805.00	2.644867	92	50 - 150	-0.0082	+/-0.50	
M2PFTA	1303011	4.370317	1,372,008.00	4.370333	95	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	232320.8	3.835033	224,508.00	3.835033	103	50 - 150	0.0000	+/-0.50	
MPFBA	708556.1	1.0917	747,715.00	1.100017	95	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	225180	2.929717	217,420.00	2.93785	104	50 - 150	-0.0081	+/-0.50	
M6PFDA	1300310	3.835517	1,363,136.00	3.835533	95	50 - 150	0.0000	+/-0.50	
M3PFBS	310779.8	2.002783	285,464.00	2.011067	109	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1350868	3.986017	1,369,349.00	3.986033	99	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	209148.4	3.477383	192,908.00	3.4774	108	50 - 150	0.0000	+/-0.50	
M5PFPeA	696736.4	1.816233	708,804.00	1.824517	98	50 - 150	-0.0083	+/-0.50	
M5PFHxA	1162807	2.722683	1,169,882.00	2.730867	99	50 - 150	-0.0082	+/-0.50	
M3PFHxS	218138.1	3.250683	209,914.00	3.250683	104	50 - 150	0.0000	+/-0.50	
M4PFHpA	1250912	3.227633	1,182,052.00	3.227633	106	50 - 150	0.0000	+/-0.50	
M8PFOA	1521252	3.4859	1,412,221.00	3.4859	108	50 - 150	0.0000	+/-0.50	
M8PFOS	242556.3	3.668133	234,102.00	3.66815	104	50 - 150	0.0000	+/-0.50	
M9PFNA	1798645	3.669167	1,581,628.00	3.669183	114	50 - 150	0.0000	+/-0.50	
MPFDoA	1144580	4.120783	1,242,329.00	4.128833	92	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	278130.9	3.993483	297,341.00	3.9935	94	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	284712.6	3.913917	295,321.00	3.913933	96	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Matrix Spike (B357679-MS1) Lab File ID: B357679-MS1.d Analyzed: 11/29/23 20:24									
M8FOSA	304052.3	3.996583	668,109.00	3.9966	46	50 - 150	0.0000	+/-0.50	*
M2-4:2FTS	234521.3	2.636633	230,805.00	2.644867	102	50 - 150	-0.0082	+/-0.50	
M2PFTA	850906.9	4.370317	1,372,008.00	4.370333	62	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	790530.4	3.835033	224,508.00	3.835033	352	50 - 150	0.0000	+/-0.50	*
MPFBA	465787.8	1.100017	747,715.00	1.100017	62	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	205955.3	2.929733	217,420.00	2.93785	95	50 - 150	-0.0081	+/-0.50	
M6PFDA	1146962	3.827567	1,363,136.00	3.835533	84	50 - 150	-0.0080	+/-0.50	
M3PFBS	282948.2	2.002783	285,464.00	2.011067	99	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1024246	3.986017	1,369,349.00	3.986033	75	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	1086210	3.477383	192,908.00	3.4774	563	50 - 150	0.0000	+/-0.50	*
M5PFPeA	641276.1	1.816233	708,804.00	1.824517	90	50 - 150	-0.0083	+/-0.50	
M5PFHxA	1091791	2.722683	1,169,882.00	2.730867	93	50 - 150	-0.0082	+/-0.50	
M3PFHxS	186702.7	3.250667	209,914.00	3.250683	89	50 - 150	0.0000	+/-0.50	
M4PFHpA	1159576	3.227617	1,182,052.00	3.227633	98	50 - 150	0.0000	+/-0.50	
M8PFOA	1354074	3.4859	1,412,221.00	3.4859	96	50 - 150	0.0000	+/-0.50	
M8PFOS	146612.8	3.668133	234,102.00	3.66815	63	50 - 150	0.0000	+/-0.50	
M9PFNA	1040059	3.669167	1,581,628.00	3.669183	66	50 - 150	0.0000	+/-0.50	
MPFDoA	830486.4	4.120783	1,242,329.00	4.128833	67	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	249191.3	3.993483	297,341.00	3.9935	84	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	261552.8	3.905917	295,321.00	3.913933	89	50 - 150	-0.0080	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Matrix Spike Dup (B357679-MSD1)			Lab File ID: B357679-MSD1.d			Analyzed: 11/29/23 20:31			
M8FOSA	357880.1	3.996567	668,109.00	3.9966	54	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	188477.2	2.636633	230,805.00	2.644867	82	50 - 150	-0.0082	+/-0.50	
M2PFTA	574864.5	4.3703	1,372,008.00	4.370333	42	50 - 150	0.0000	+/-0.50	*
M2-8:2FTS	610019.3	3.835017	224,508.00	3.835033	272	50 - 150	0.0000	+/-0.50	*
MPFBA	428565.1	1.0917	747,715.00	1.100017	57	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	185133.8	2.929717	217,420.00	2.93785	85	50 - 150	-0.0081	+/-0.50	
M6PFDA	1218401	3.82755	1,363,136.00	3.835533	89	50 - 150	-0.0080	+/-0.50	
M3PFBS	243524	2.002783	285,464.00	2.011067	85	50 - 150	-0.0083	+/-0.50	
M7PFUnA	1154264	3.986	1,369,349.00	3.986033	84	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	760435.2	3.477383	192,908.00	3.4774	394	50 - 150	0.0000	+/-0.50	*
M5PFPeA	582240.3	1.816233	708,804.00	1.824517	82	50 - 150	-0.0083	+/-0.50	
M5PFHxA	1007974	2.722683	1,169,882.00	2.730867	86	50 - 150	-0.0082	+/-0.50	
M3PFHxS	171520.5	3.250667	209,914.00	3.250683	82	50 - 150	0.0000	+/-0.50	
M4PFHpA	1027866	3.227617	1,182,052.00	3.227633	87	50 - 150	0.0000	+/-0.50	
M8PFOA	1305422	3.485883	1,412,221.00	3.4859	92	50 - 150	0.0000	+/-0.50	
M8PFOS	159912.2	3.668133	234,102.00	3.66815	68	50 - 150	0.0000	+/-0.50	
M9PFNA	1153305	3.669167	1,581,628.00	3.669183	73	50 - 150	0.0000	+/-0.50	
MPFDoA	882150.9	4.120783	1,242,329.00	4.128833	71	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	228133.3	3.993483	297,341.00	3.9935	77	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	261904.8	3.9059	295,321.00	3.913933	89	50 - 150	-0.0080	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B358210-BLK1)			Lab File ID: B358210-BLK1.d			Analyzed: 11/29/23 23:46			
M8FOSA	564498.8	4.004567	668,109.00	3.996583	84	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	182890.4	2.6118	230,805.00	2.6118	79	50 - 150	0.0000	+/-0.50	
M2PFTA	1137918	4.3622	1,372,008.00	4.3622	83	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	176301	3.827067	224,508.00	3.827083	79	50 - 150	0.0000	+/-0.50	
MPFBA	715771.4	1.0834	747,715.00	1.0834	96	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	306313.2	2.91295	217,420.00	2.91295	141	50 - 150	0.0000	+/-0.50	
M6PFDA	1181378	3.827567	1,363,136.00	3.827567	87	50 - 150	0.0000	+/-0.50	
M3PFBS	294466.2	1.986217	285,464.00	1.978033	103	50 - 150	0.0082	+/-0.50	
M7PFUnA	1138964	3.978033	1,369,349.00	3.978033	83	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	211481.6	3.461417	192,908.00	3.4694	110	50 - 150	-0.0080	+/-0.50	
M5PFPeA	681065.7	1.799667	708,804.00	1.799667	96	50 - 150	0.0000	+/-0.50	
M5PFHxA	1109066	2.696967	1,169,882.00	2.696967	95	50 - 150	0.0000	+/-0.50	
M3PFHxS	211604	3.2426	209,914.00	3.242583	101	50 - 150	0.0000	+/-0.50	
M4PFHpA	1164307	3.211467	1,182,052.00	3.211467	98	50 - 150	0.0000	+/-0.50	
M8PFOA	1435701	3.477917	1,412,221.00	3.477917	102	50 - 150	0.0000	+/-0.50	
M8PFOS	221277.4	3.66015	234,102.00	3.660167	95	50 - 150	0.0000	+/-0.50	
M9PFNA	1575203	3.661183	1,581,628.00	3.6612	100	50 - 150	0.0000	+/-0.50	
MPFDoA	997375.7	4.1208	1,242,329.00	4.11265	80	50 - 150	0.0081	+/-0.50	
D5-NEtFOSAA	236946	3.9855	297,341.00	3.9855	80	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	257710.7	3.905917	295,321.00	3.905917	87	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B358210-BS1)			Lab File ID: B358210-BS1.d			Analyzed: 11/29/23 23:31			
M8FOSA	590833.8	3.996583	668,109.00	3.996583	88	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	189606.5	2.6118	230,805.00	2.6118	82	50 - 150	0.0000	+/-0.50	
M2PFTA	1202934	4.3622	1,372,008.00	4.3622	88	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	185548.8	3.827083	224,508.00	3.827083	83	50 - 150	0.0000	+/-0.50	
MPFBA	787032.3	1.0834	747,715.00	1.0834	105	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	305685.7	2.91295	217,420.00	2.91295	141	50 - 150	0.0000	+/-0.50	
M6PFDA	1258978	3.827567	1,363,136.00	3.827567	92	50 - 150	0.0000	+/-0.50	
M3PFBS	325342.3	1.986217	285,464.00	1.978033	114	50 - 150	0.0082	+/-0.50	
M7PFUnA	1199145	3.978033	1,369,349.00	3.978033	88	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	216546.2	3.461433	192,908.00	3.4694	112	50 - 150	-0.0080	+/-0.50	
M5PFPeA	731183.3	1.799667	708,804.00	1.799667	103	50 - 150	0.0000	+/-0.50	
M5PFHxA	1204165	2.706317	1,169,882.00	2.696967	103	50 - 150	0.0093	+/-0.50	
M3PFHxS	229400.9	3.2426	209,914.00	3.242583	109	50 - 150	0.0000	+/-0.50	
M4PFHpA	1274076	3.211467	1,182,052.00	3.211467	108	50 - 150	0.0000	+/-0.50	
M8PFOA	1609419	3.477917	1,412,221.00	3.477917	114	50 - 150	0.0000	+/-0.50	
M8PFOS	225195.8	3.66015	234,102.00	3.660167	96	50 - 150	0.0000	+/-0.50	
M9PFNA	1610726	3.6612	1,581,628.00	3.6612	102	50 - 150	0.0000	+/-0.50	
MPFDoA	1092711	4.120783	1,242,329.00	4.11265	88	50 - 150	0.0081	+/-0.50	
D5-NEtFOSAA	246628.8	3.9855	297,341.00	3.9855	83	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	270336.5	3.905917	295,321.00	3.905917	92	50 - 150	0.0000	+/-0.50	

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

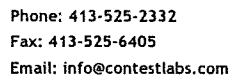
Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS Dup (B358210-BSD1) Lab File ID: B358210-BSD1.d Analyzed: 11/29/23 23:39									
M8FOSA	529267.1	3.996567	668,109.00	3.996583	79	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	172797.5	2.6118	230,805.00	2.6118	75	50 - 150	0.0000	+/-0.50	
M2PFTA	1110697	4.362167	1,372,008.00	4.3622	81	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	152325.9	3.827067	224,508.00	3.827083	68	50 - 150	0.0000	+/-0.50	
MPFBA	673605.8	1.0834	747,715.00	1.0834	90	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	260526.5	2.91295	217,420.00	2.91295	120	50 - 150	0.0000	+/-0.50	
M6PFDA	1074373	3.82755	1,363,136.00	3.827567	79	50 - 150	0.0000	+/-0.50	
M3PFBS	285791.6	1.986217	285,464.00	1.978033	100	50 - 150	0.0082	+/-0.50	
M7PFUnA	1066361	3.978017	1,369,349.00	3.978033	78	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	201116	3.461417	192,908.00	3.4694	104	50 - 150	-0.0080	+/-0.50	
M5PFPeA	639457.9	1.799667	708,804.00	1.799667	90	50 - 150	0.0000	+/-0.50	
M5PFHxA	1035531	2.696967	1,169,882.00	2.696967	89	50 - 150	0.0000	+/-0.50	
M3PFHxS	198744.1	3.242583	209,914.00	3.242583	95	50 - 150	0.0000	+/-0.50	
M4PFHpA	1088915	3.21145	1,182,052.00	3.211467	92	50 - 150	0.0000	+/-0.50	
M8PFOA	1380083	3.4779	1,412,221.00	3.477917	98	50 - 150	0.0000	+/-0.50	
M8PFOS	212307.2	3.660133	234,102.00	3.660167	91	50 - 150	0.0000	+/-0.50	
M9PFNA	1499784	3.661183	1,581,628.00	3.6612	95	50 - 150	0.0000	+/-0.50	
MPFDoA	977065.6	4.120767	1,242,329.00	4.11265	79	50 - 150	0.0081	+/-0.50	
D5-NEtFOSAA	214227.9	3.985483	297,341.00	3.9855	72	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	238517	3.9059	295,321.00	3.905917	81	50 - 150	0.0000	+/-0.50	

CERTIFICATIONS
Certified Analyses included in this Report

Analyte	Certifications
<i>SOP-454 PFAS in Water</i>	
Perfluorobutanoic acid (PFBA)	NH-P,PA,NY
Perfluorobutanesulfonic acid (PFBS)	NH-P,PA,NY
Perfluoropentanoic acid (PFPeA)	NH-P,PA,NY
Perfluorohexanoic acid (PFHxA)	NH-P,PA,NY
11Cl-PF3OUdS (F53B Major)	NH-P,PA,NY
9Cl-PF3ONS (F53B Minor)	NH-P,PA
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	NH-P,PA,NY
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P,PA,NY
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P,PA
Perfluorodecanoic acid (PFDA)	NH-P,PA,NY
Perfluorododecanoic acid (PFDoA)	NH-P,PA,NY
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	NH-P,PA,NY
Perfluoroheptanesulfonic acid (PFHpS)	NH-P,PA,NY
N-EtFOSAA (NEtFOSAA)	NH-P,PA,NY
N-MeFOSAA (NMeFOSAA)	NH-P,PA,NY
Perfluorotetradecanoic acid (PFTA)	NH-P,PA,NY
Perfluorotridecanoic acid (PFTrDA)	NH-P,PA,NY
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P,PA,NY
Perfluorodecanesulfonic acid (PFDS)	NH-P,PA
Perfluorooctanesulfonamide (FOSA)	NH-P,PA
Perfluorononanesulfonic acid (PFNS)	NH-P,PA
Perfluoro-1-hexanesulfonamide (FHxSA)	NH-P,PA
Perfluoro-1-butanefulfonamide (FBSA)	NH-P,PA
Perfluorohexanesulfonic acid (PFHxS)	NH-P,PA,NY
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P,PA,NY
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P,PA,NY
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P,PA,NY
Perfluoropentanesulfonic acid (PFPeS)	NH-P,PA,NY
Perfluoroundecanoic acid (PFUnA)	NH-P,PA,NY
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P,PA
Perfluoroheptanoic acid (PFHpA)	NH-P,PA,NY
Perfluorooctanoic acid (PFOA)	NH-P,PA,NY
Perfluorooctanesulfonic acid (PFOS)	NH-P,PA,NY
Perfluorononanoic acid (PFNA)	NH-P,PA,NY

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
NY	New York State Department of Health	10899 NELAP	04/1/2024
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2024
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2024



CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

Doc # 381 Rev 2 06262019

Page 1 of 3

Company Name:	BETA Group Inc.
Address:	701 George Washington Hwy, Lincoln, RI
Phone:	
Project Name:	BFTA
Project Location:	Barnstable, MA
Project Number:	6206.04
Project Manager:	Roger Thibault
Con-Test Quote Name/Number:	
Invoice Recipient:	**Stacy Wildanger - AP@BETA-Inc.com
Sampled By:	Laura Bouley

Requested Turnaround Time		Discussed Metals Samples	
7-Day ☐	10-Day ☐	☐ Field Filtered	
PFAS 15-Day (std) ☒	Due Date:	☐ Lab to Filter	
Rush-Approval Required		Orthophosphate Samples	
1-Day ☐	3-Day ☐	☐ Field Filtered	
2-Day ☐	4-Day ☐	☐ Lab to Filter	
Data Delivery			
Format: PDF ☒	EXCEL ☒	PCB ONLY	
Other:		SOXHLET	☐
CLP Like Data Pkg Required: ☐		NON SOXHLET	☐
Email To: Rithibatali@BETA-Inc.com , Louxlady@BETA-Inc.com			
Fax To #:			

ANALYSIS REQUESTED										2 Preservation Code	
O	N	H								Courier Use Only	
										<u>Total Number Of:</u> VIALS _____ GLASS _____ PLASTIC _____ BACTERIA _____ ENCORE _____	

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	'Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	PFAS
1	HSW-6	11-2-23	9:15	GRAB	GW	H			1/2	(C)		X
2	PFW-1	11-2-23	10:00	GRAB	GW	H			1/2	(C)		X
3	PFW-5	11-3-23	10:05	GRAB	GW	H			1/2	(C)		X
4	MW-311	11-2-23	13:15	GRAB	GW	H			1/2	(C)		X
5	MW-35	11-2-23	13:50	GRAB	GW	H			1/2	(C)		X
6	PC-1	11-3-23	11:15	GRAB	GW	H			2			X
7	PC-6A	11-3-23	9:30	GRAB	GW	H			2			X
8	PC-11	11-1-23	14:00	GRAB	GW	H			2			X
9	PC-34S	11-2-23	10:40	GRAB	GW	H			1/2	(C)		X
10	DUP-1	11-3-23	8:40	Grab	GW L-M				2			X

2	Preservation Code
Courier Use Only	
<u>Total Number Of:</u>	
VIALS _____	
GLASS _____	
PLASTIC _____	
BACTERIA _____	
ENCORE _____	

Relinquished by: (signature) <i>[Signature]</i>	Date/Time: 11-3-23 15:00	Client Comments: *Lab requested MS/MSD. Sample confirmation and report to Rthibault@BETA-Inc.com & Lbouley@BETA-Inc.com only 1 sample bottle available for H30-6, PFW-1, PFW-5, MW-311, MW-35, PC-345, PC-29, MW-125, MW-22, and Equip-1 Blank-11.3.23.			
Received by: (signature) <i>Lincoln Frige</i>	Date/Time: 11-3-23 15:00				
Relinquished by: (signature) <i>P. B. Moore</i>	Date/Time: 11/8/23 9:58	Detection Limit Requirements		Special Requirements	
Received by: (signature) <i>[Signature]</i>	Date/Time: 11/8/23 16:18	MA	GW-1	☒	MA MCP Required
Relinquished by: (signature) <i>[Signature]</i>	Date/Time:			☐	MCP Certification Form Required
Received by: (signature) <i>[Signature]</i>	Date/Time:			☐	CT RCP Required
Relinquished by: (signature) <i>[Signature]</i>	Date/Time:	CT			RCP Certification Form Required
Received by: (signature) <i>[Signature]</i>	Date/Time: 11/5/23 16:15			☐	MA State DW Required
Relinquished by: (signature) <i>[Signature]</i>	Date/Time:	Other:	PWSID #	NELAC and AIHA-LAP, LLC Accredited	
Received by: (signature)	Date/Time:	Project Entity			
		Government ☐	Municipality ☐	MWRA ☐	WRTA ☐
		Federal ☐	21 J ☐	School ☐	
		City ☐	Brownfield ☐	MBTA ☐	
		Other ☐ Chromatogram ☐ AIHA-LAP, LLC			

Glassware in the fridge? Y / N

Glassware in freezer? Y / N

Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

1 Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

2 Preservation Codes:
I = Iced

H = HCL

M = Methanol

N = Nitric Acid

S = Sulfuric Acid

B = Sodium Bisulfate

X = Sodium Hydroxide

T = Sodium Thiosulfate

O = Other (please define) ___Non-preserved

Lab Comments:

Sample -06 not received 1/17/23 KF

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. The Chain of Custody is a legal document that must be complete and accurate and is used to determine what analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. Con-Test values your partnership on each project and will try to assist with missing information, but will not be held accountable.

Phone: 413-525-2332

Fax: 413-525-6405

Email: info@contestlabs.com

BETA Group Inc.

Address: 701 George Washington Hwy, Lincoln, RI

Phone: BETA

Project Location: Barnstable, MA

Project Number: 6206.04

Project Manager: Roger Thibault

Con-Test Quote Name/Number: **Stacy Wildanger - AP@BETA-Inc.com

Invoice Recipient: Laura Bouley

Sampled By:

39 Spruce Street
East Longmeadow, MA 01028

CHAIN OF CUSTODY RECORD

Requested Turnaround Time

7-Day ☐ 10-Day ☐ Field Filtered ☐

PFAS 15-Day (std) ☒ Due Date: ☐

Orthophosphate Samples

1-Day ☐ 3-Day ☐ Field Filtered ☐

2-Day ☐ 4-Day ☐ Lab to Filter ☐

PCB ONLY

Format: PDF ☒ EXCEL ☒

Other: ☐

CLP Like Data Pkg Required: ☐

Email To: ☐

Fax To #: ☐

ANALYSIS REQUESTED

O N H

2 Preservation Code

Courier Use Only

Total Number Of:

VIALS

GLASS

PLASTIC

BACTERIA

ENCORE

Glassware in the fridge? Y / N

Glassware in freezer? Y / N

Prepackaged Cooler? Y / N

*Contest is not responsible for missing samples from prepacked coolers

1 Matrix Codes:

GW = Ground Water

WW = Waste Water

DW = Drinking Water

A = Air

S = Soil

SL = Sludge

SOL = Solid

O = Other (please define)

2 Preservation Codes:

I = Iced

H = HCL

M = Methanol

N = Nitric Acid

S = Sulfuric Acid

B = Sodium Bisulfate

X = Sodium Hydroxide

T = Sodium Thiosulfate

O = Other (please define) ___ Non-preserved

Client Comments: *Lab requested MS/MSD. Sample confirmation and report to Rthibault@BETA-Inc.com & Lbouley@BETA-Inc.com

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CT RCP Required

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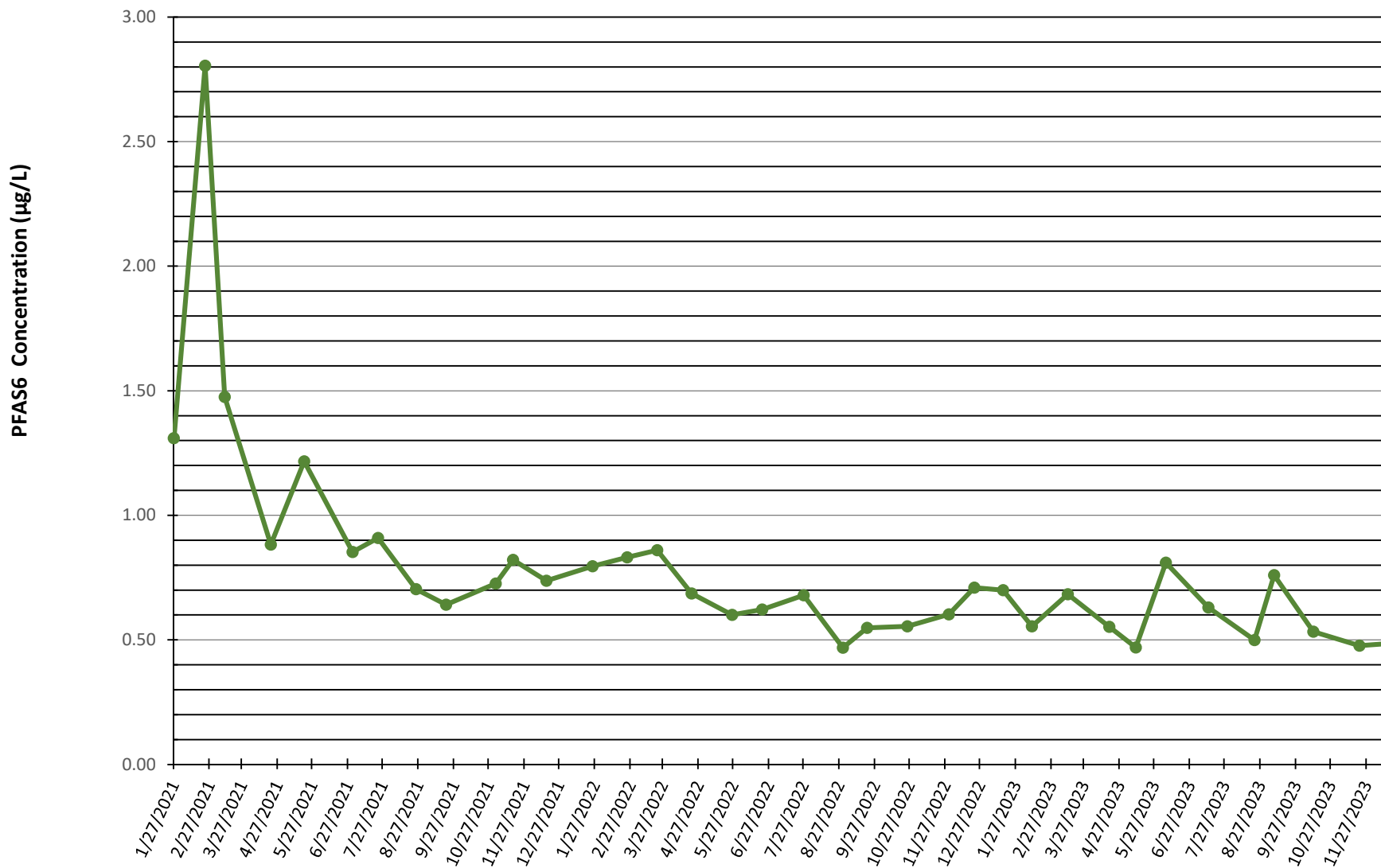
MA State DW Required

MA State DW Required

MA State DW Required

Appendix D - IRA Status Report #66 Figures

Figure 5 - BFTA PRW-4/GWTS INFLUENT PFAS6 Concentrations 2021-2023



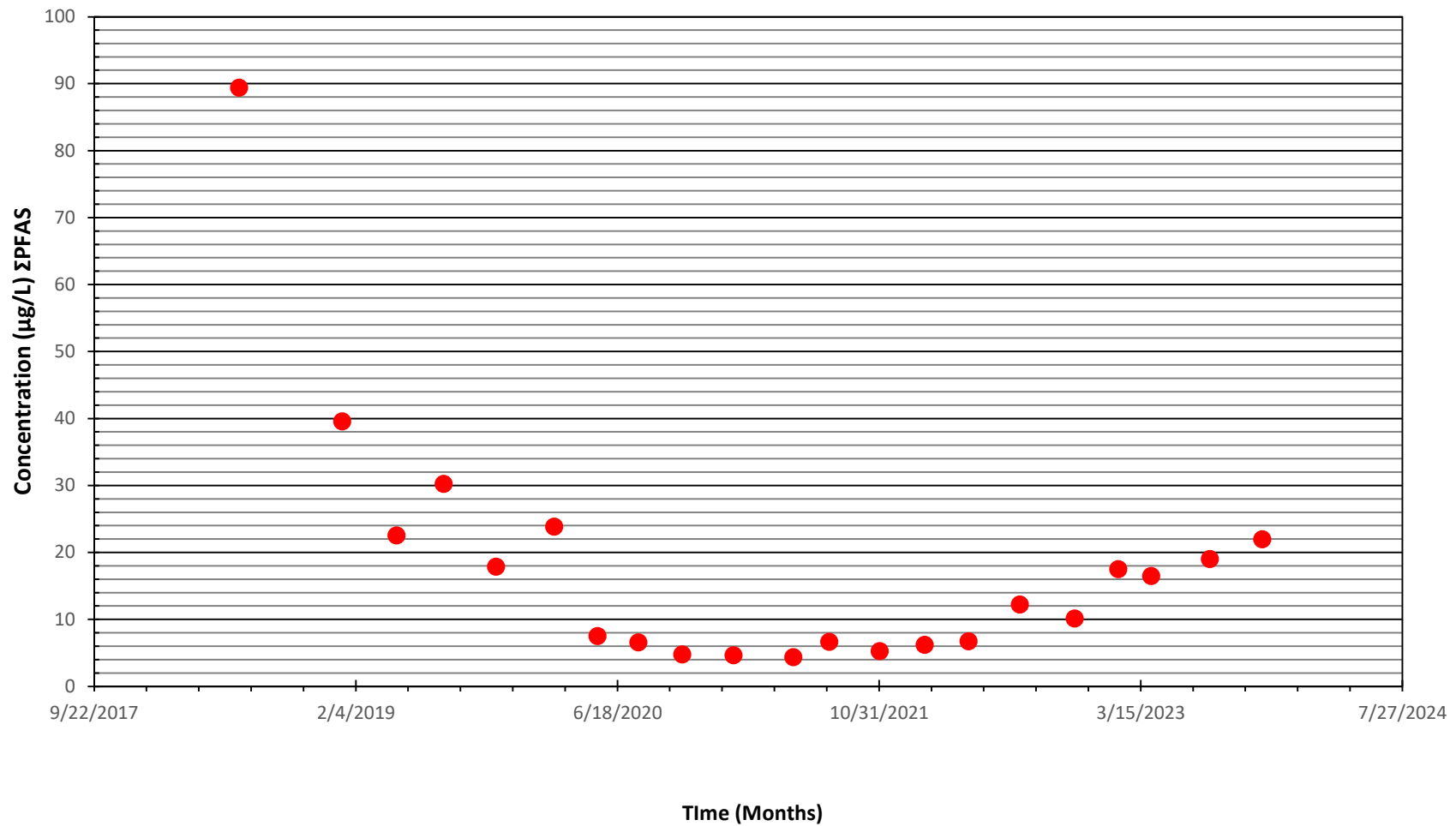
Former Barnstable County Fire Training Academy Site
 155 South Flint Rock Road, Barnstable, MA
 RTN 4-26179
 Time (Date)



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 current graphical date 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 6 - ΣPFAS Concentrations in PFW-1 from June 2018 - November 2023



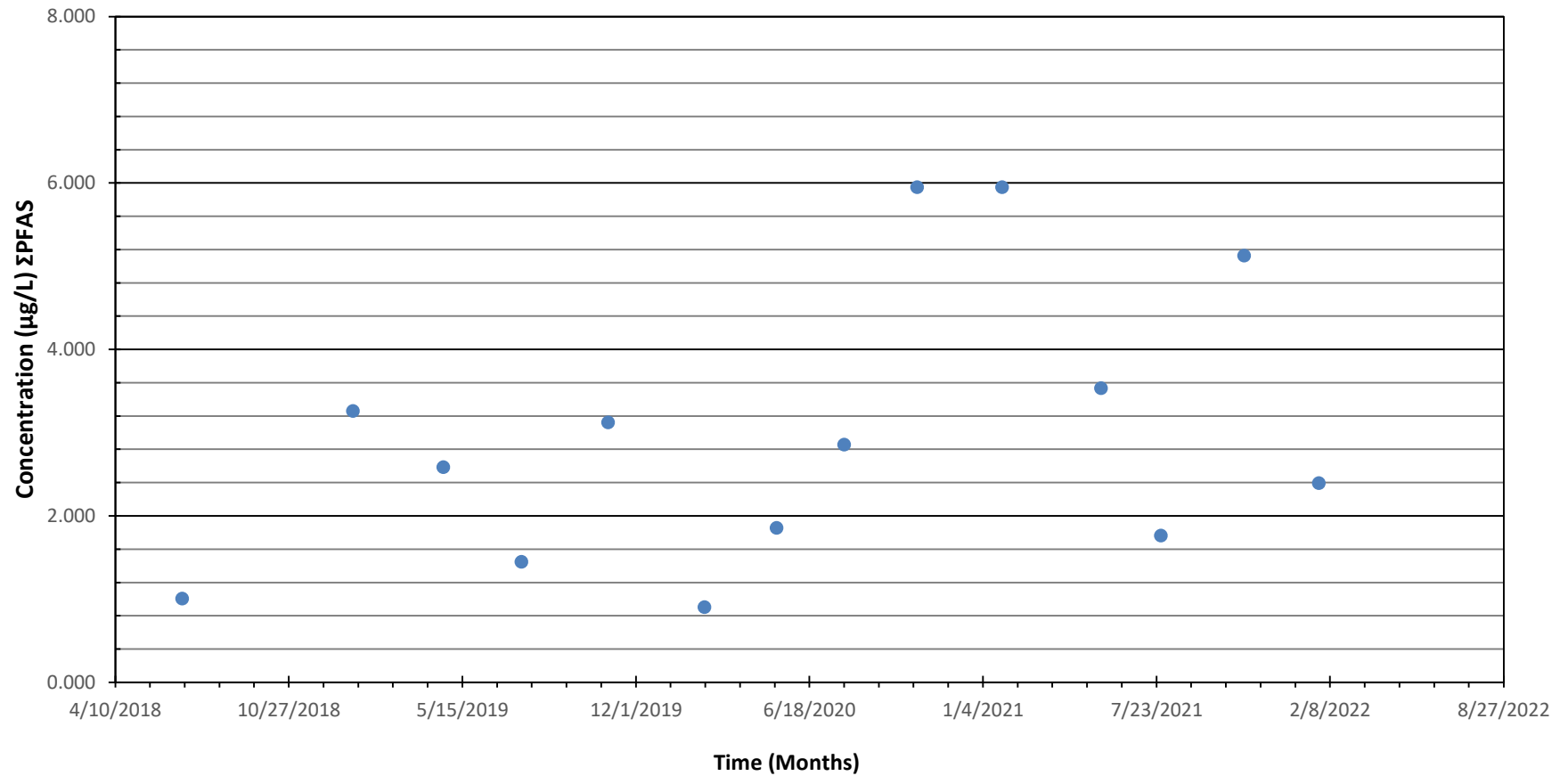
Barnstable County Fire & Rescue Training Academy
155 South Flint Rock Road, Barnstable, MA
RTN 4-26179



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 current graphical date 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 6A - ΣPFAS Concentrations in HSW-1/HSW-6 from June 2018 - January 2022

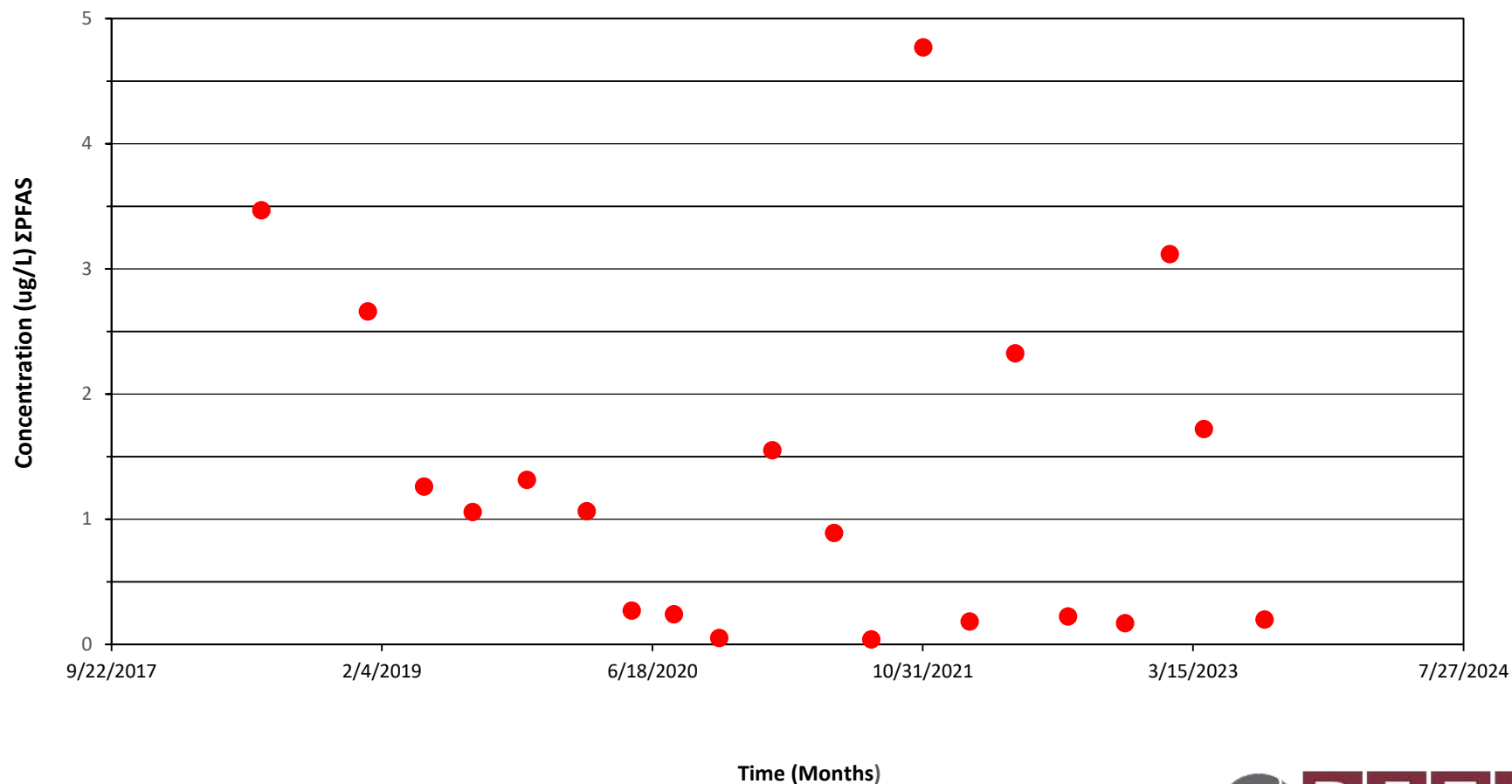


Barnstable County Fire & Rescue Training Academy
155 South Flint Rock Road, Barnstable, MA
RTN 4-26179



- 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 to current graphical date 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. The averages concentrations of HSW-1 and HSW-6 were utilized.

Figure 7 - ΣPFAS Concentrations in OW-8A from January 2019 - November 2023



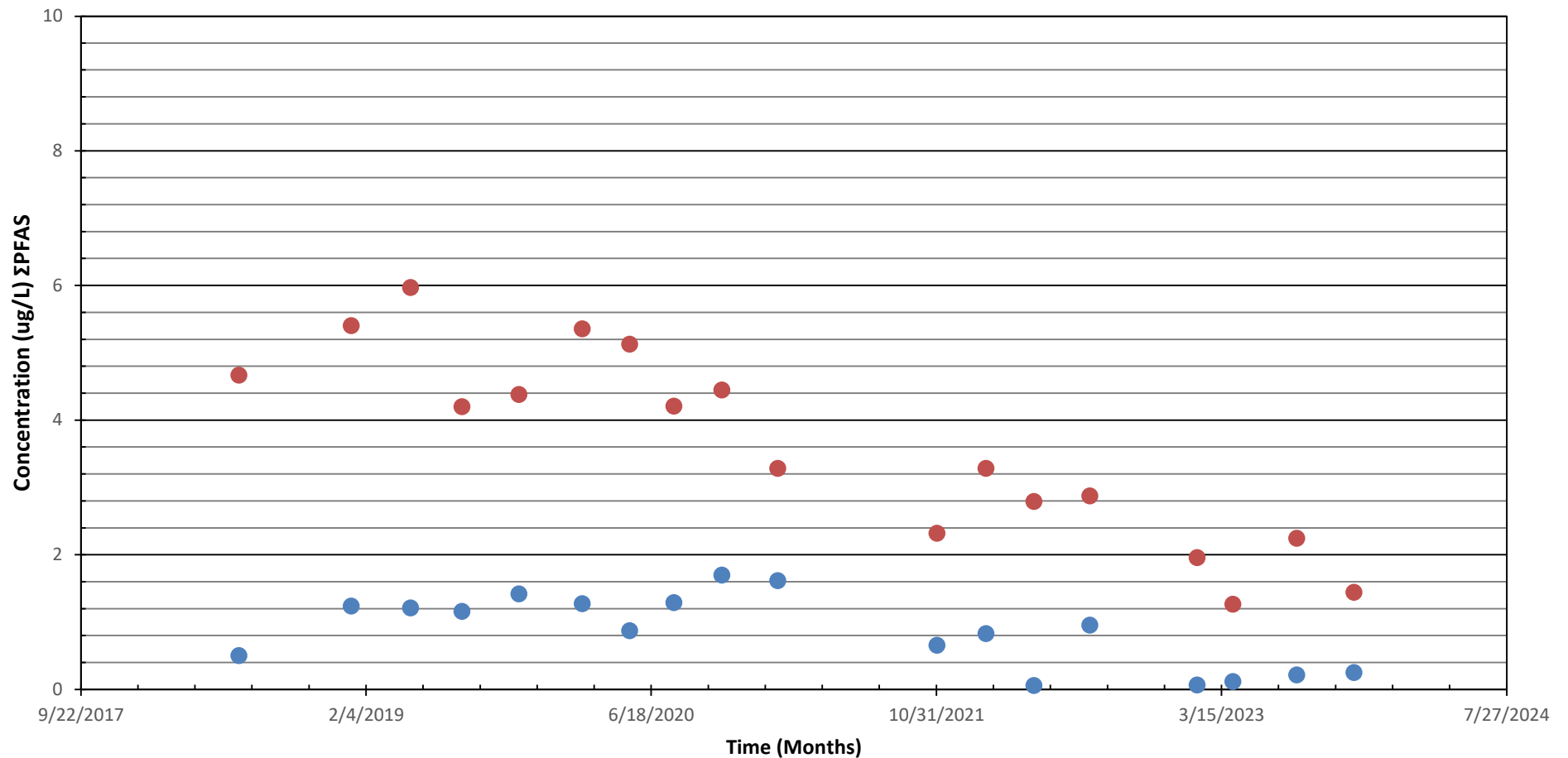
Barnstable County Fire & Rescue Training Academy
155 South Flint Rock Road, Barnstable, MA
RTN 4-26179



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 current graphical date 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 8 - ΣPFAS Concentrations in MW-12 and MW-22 from June 2018 - November 2023



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

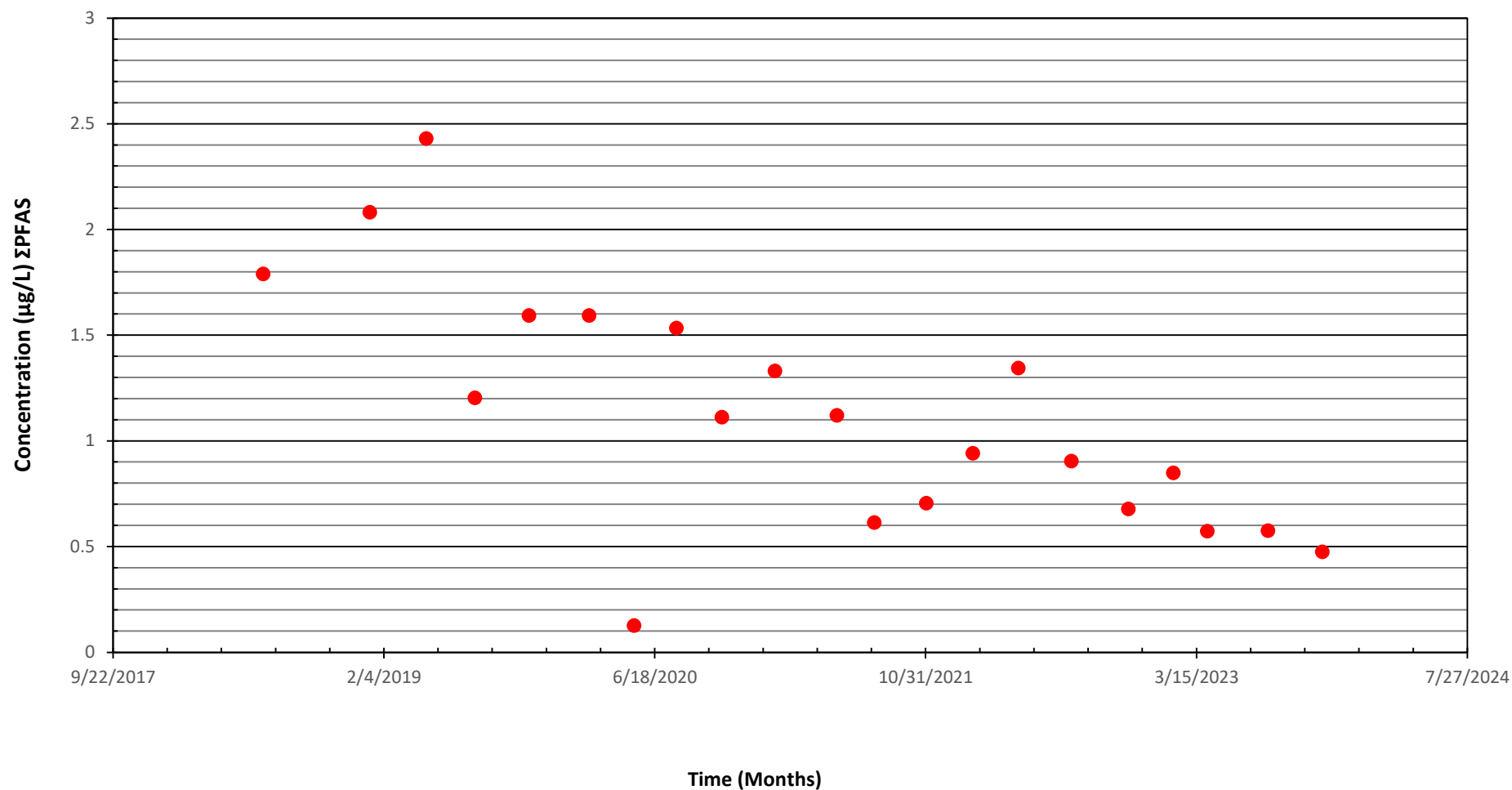
● MW-22 ● MW-12S



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).
3. Concentrations from May 2021 were not included due to sample naming issue and concentrations from July 2021 are not depicted because both wells were dry.

Figure 9A - ΣPFAS Concentrations in PC-6A from June 2018 - November 2023



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

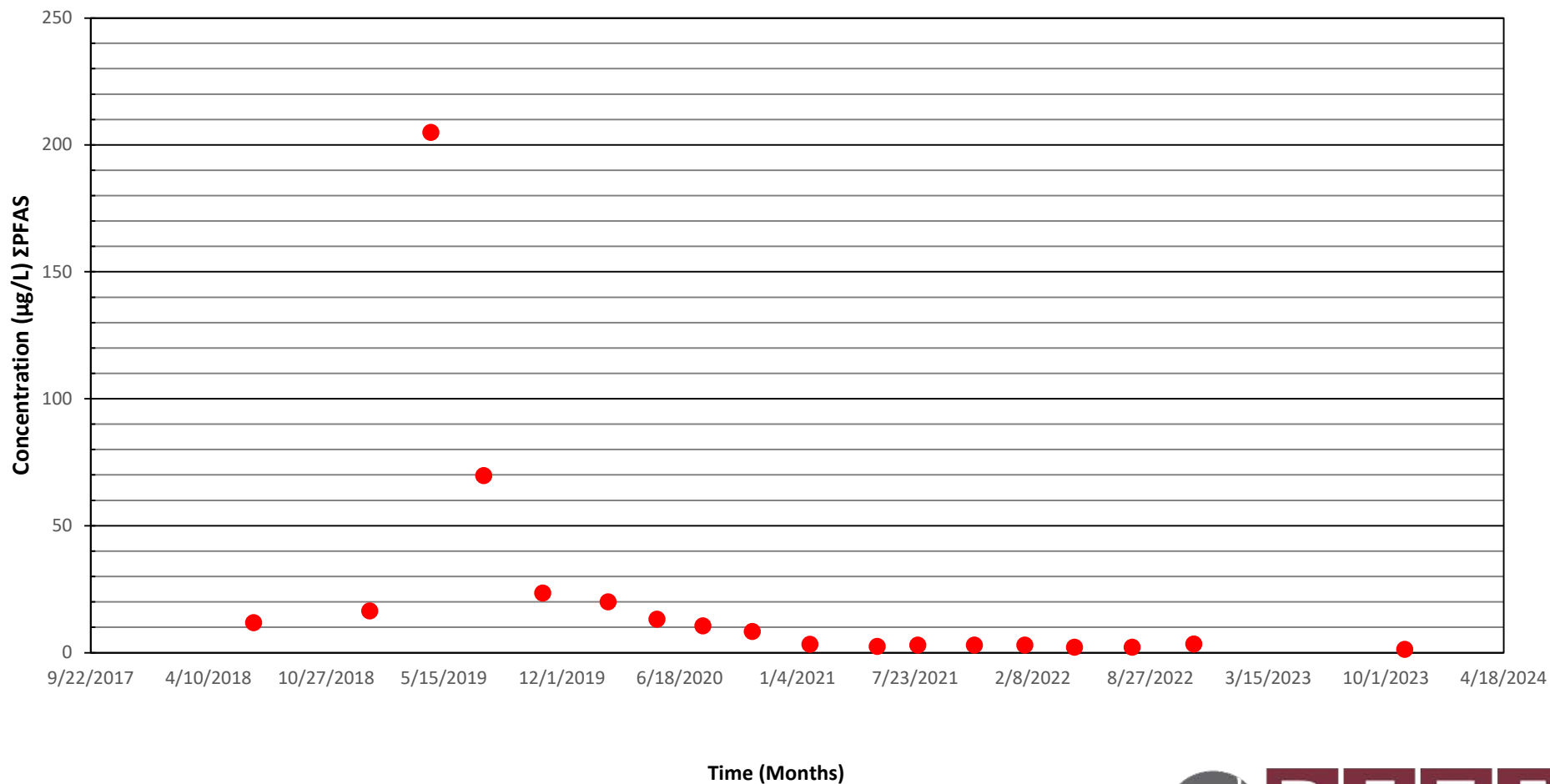
● PC-6A



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 9B - ΣPFAS Concentrations in PC-11 from June 2018 - November 2023



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

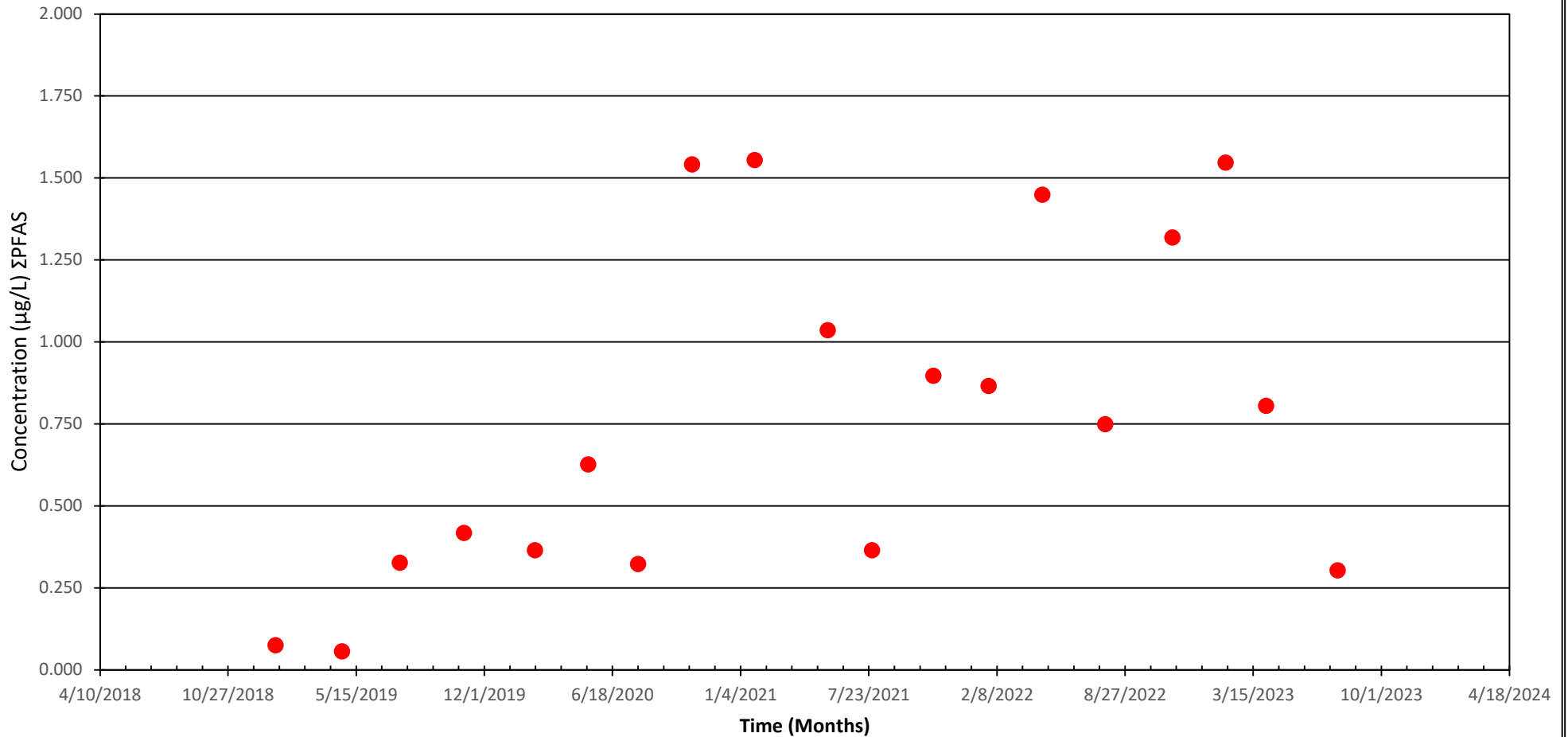
● PC-11



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 9C - ΣPFAS Concentrations in PC-28 from January 2019 - November 2023



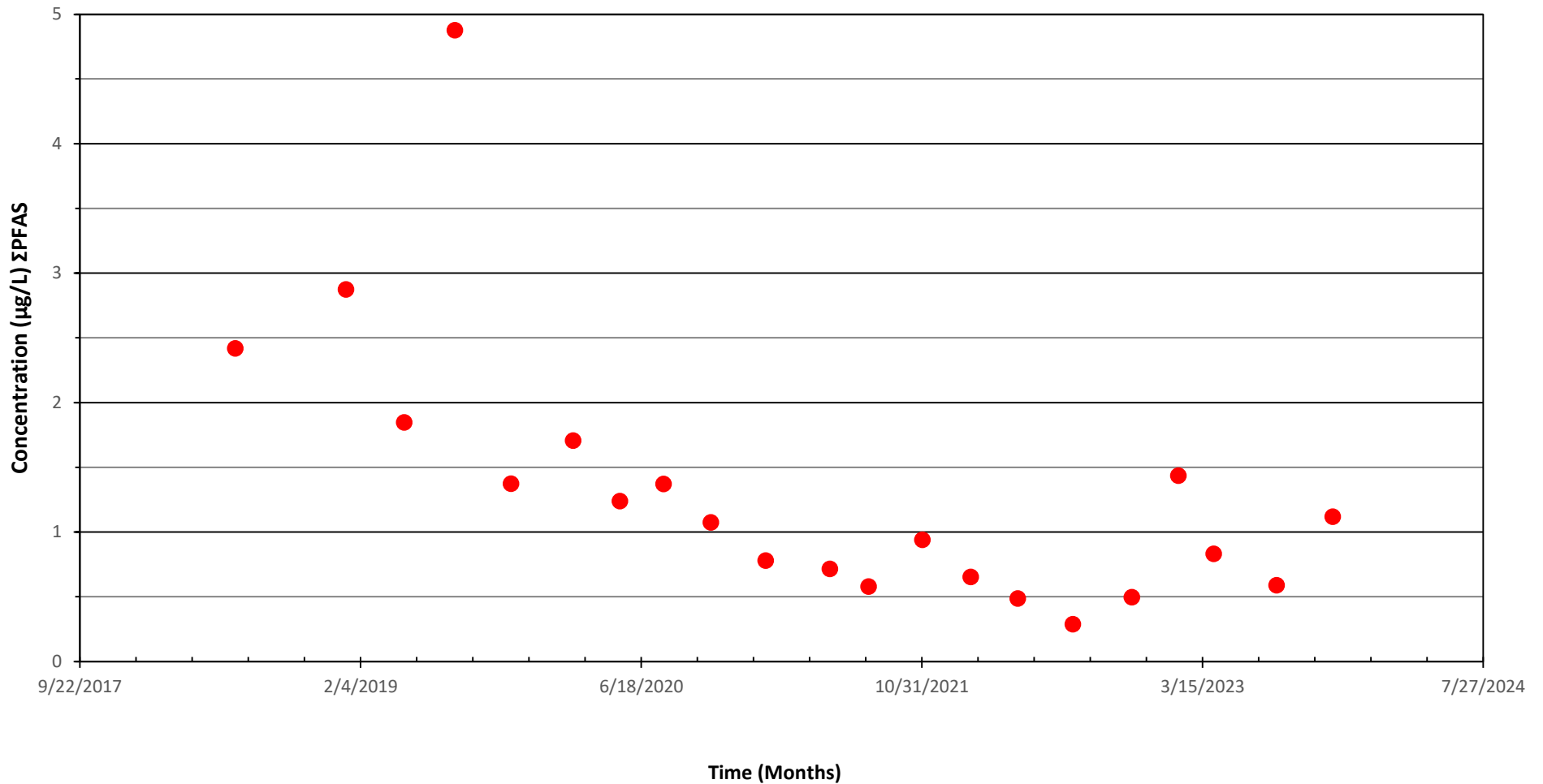
Barnstable County Fire & Rescue Training Academy
155 South Flint Rock Road, Barnstable, MA
RTN 4-26179



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 9D - ΣPFAS Concentrations in PC-30 from June 2018 - November 2023



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

● PC-30



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 the graphically represented date are represented as 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).

Appendix E - Public Notifications



February 2024

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

RE: Notice of Interim Phase II CSA Status Report #3
The Former Barnstable County Fire Training Academy Site
155 South Flint Rock Road
Barnstable, Massachusetts
DEP Release Tracking No. 4-26179
BETA Project File #6206

Dear Mr. Ells,

As required by the Massachusetts Contingency Plan (MCP) 310 CMR 40.1403(3)(e), BETA Group, Inc.(BETA) is notifying you on behalf of our client, Barnstable County, that the Interim Phase II Comprehensive Site Assessment (Phase II CSA) Status Report No. 3 has been submitted to the Massachusetts Department of Environmental Protection - Bureau of Waste Site Cleanup (MassDEP – BWSC). The Interim Phase II CSA Status Report No. 3 has been prepared at the request of MassDEP for the release Site referenced as the former Barnstable County Fire Training Academy (FTA) located at 155 South Flint Rock Road in Barnstable, Massachusetts (the Disposal Site or Site). The release Site and related documentation is being managed under MassDEP Release Tracking Number (RTN) 4-26179.

The release Site is associated with a release of poly- and perfluoroalkyl substances (PFAS) attributable to historic training with aqueous film-forming foams (AFFF). In August 2016, MassDEP Southeast Regional Office issued a Notice of Responsibility (NOR) to Barnstable County, as the owner and operator of the FTA at that time, that the detection of elevated concentrations of 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 FTA and the inferred groundwater flow, MassDEP determined that the releases of PFAS from the use of aqueous film-forming foam (AFFF) at the FTA is a source of PFAS detected in the Mary Dunn public water supply wells.

The Interim Phase II CSA Status Report No. 3 summarizes the on-going Phase II CSA activities completed from July 2023 to February 2024. The Phase II CSA activities are currently being conducted in addition to the on-going Immediate Response Actions at the Site. The primary Phase II CSA activities summarized in this report include:

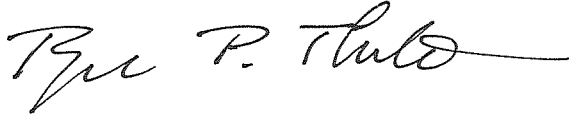
- One wide-area groundwater gauging round at the Former FTA, Barnstable Fire District property west of Flintrock Pond and/or Cape Cod Gateway Airport (RTN 4-26347)
- monitoring well installations
- groundwater sampling
- Updated precision survey of selected monitoring wells

The Interim Phase II CSA Status Report #3 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>

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 Associate

Copies: 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