



ANALYTICAL REPORT

Lab Number:	L2332762
Client:	Horseley & Witten, Inc. Sextant Hill Office Park 90 Route 6A Sandwich, MA 02563
ATTN:	Brian Massa
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Project Name:	CAPECOD GATEWAY AIRPORT
Project Number:	23070
Report Date:	06/30/23

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Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2332762-01	HW-I (S)	WATER	HYANIS, MA	06/07/23 10:10	06/09/23
L2332762-02	HW-I (M)	WATER	HYANIS, MA	06/07/23 12:15	06/09/23
L2332762-03	HW-I (D)	WATER	HYANIS, MA	06/07/23 11:15	06/09/23
L2332762-04	HW-P (S)	WATER	HYANIS, MA	06/08/23 10:25	06/09/23
L2332762-05	HW-P (M)	WATER	HYANIS, MA	06/08/23 11:48	06/09/23
L2332762-06	HW-S (S)	WATER	HYANIS, MA	06/09/23 10:08	06/09/23
L2332762-07	HW-S (M)	WATER	HYANIS, MA	06/09/23 12:25	06/09/23

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

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: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution

L2332762-01 and -06: The sample has elevated detection limits due to the limited sample volume utilized during extraction, as required by the high concentrations in the screen results.

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:

 Darian Dailey

Title: Technical Director/Representative

Date: 06/30/23

ORGANICS

SEMIVOLATILES

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-01
Client ID: HW-I (S)
Sample Location: HYANIS, MA

Date Collected: 06/07/23 10:10
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 18:05
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	43.0		ng/l	20.0	4.08	1
Perfluoropentanoic Acid (PFPeA)	166		ng/l	20.0	3.96	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	20.0	2.38	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	20.0	4.52	1
Perfluorohexanoic Acid (PFHxA)	87.4		ng/l	20.0	3.28	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	20.0	2.45	1
Perfluoroheptanoic Acid (PFHpA)	106		ng/l	20.0	2.25	1
Perfluorohexanesulfonic Acid (PFHxS)	69.2		ng/l	20.0	3.76	1
Perfluorooctanoic Acid (PFOA)	172		ng/l	20.0	2.36	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	1530		ng/l	20.0	13.3	1
Perfluoroheptanesulfonic Acid (PFHpS)	9.88	J	ng/l	20.0	6.88	1
Perfluorononanoic Acid (PFNA)	235		ng/l	20.0	3.12	1
Perfluorooctanesulfonic Acid (PFOS)	708		ng/l	20.0	5.04	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	20.0	3.04	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	20.0	12.1	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	20.0	11.2	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	20.0	6.48	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	20.0	2.60	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	20.0	9.80	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	20.0	5.80	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	20.0	8.04	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	20.0	3.72	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	20.0	3.27	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	20.0	2.48	1

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-01
Client ID: HW-I (S)
Sample Location: HYANIS, MA

Date Collected: 06/07/23 10:10
Date Received: 06/09/23
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)	100		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	109		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	97		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	98		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	97		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	99		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	100		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	119		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	99		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	111		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	112		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	100		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	17		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	113		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	96		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	93		22-136

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-02
Client ID: HW-I (M)
Sample Location: HYANIS, MA

Date Collected: 06/07/23 12:15
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 18:21
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	0.553	J	ng/l	1.74	0.354	1
Perfluoropentanoic Acid (PFPeA)	0.987	J	ng/l	1.74	0.344	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.74	0.207	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.74	0.393	1
Perfluorohexanoic Acid (PFHxA)	0.963	J	ng/l	1.74	0.285	1
Perfluoropentanesulfonic Acid (PFPeS)	0.219	JF	ng/l	1.74	0.213	1
Perfluoroheptanoic Acid (PFHpA)	1.16	J	ng/l	1.74	0.196	1
Perfluorohexanesulfonic Acid (PFHxS)	5.92		ng/l	1.74	0.327	1
Perfluorooctanoic Acid (PFOA)	0.977	J	ng/l	1.74	0.205	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.74	1.16	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.74	0.598	1
Perfluorononanoic Acid (PFNA)	0.518	J	ng/l	1.74	0.271	1
Perfluorooctanesulfonic Acid (PFOS)	6.76		ng/l	1.74	0.438	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.74	0.264	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.74	1.05	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.74	0.973	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.74	0.563	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.74	0.226	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.74	0.852	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.74	0.504	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.74	0.698	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.74	0.323	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.74	0.284	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.74	0.215	1

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-02
Client ID: HW-I (M)
Sample Location: HYANIS, MA

Date Collected: 06/07/23 12:15
Date Received: 06/09/23
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)	82				58-132	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	90				62-163	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	113				70-131	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	115				12-142	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	79				57-129	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79				60-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	105				71-134	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89				62-129	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	109				14-147	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	90				59-139	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	106				69-131	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	95				62-124	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	108				10-162	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	97				24-116	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	96				55-137	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	13				5-112	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	97				27-126	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	95				48-131	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	76				22-136	

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-03
Client ID: HW-I (D)
Sample Location: HYANIS, MA

Date Collected: 06/07/23 11:15
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 18:38
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	10.2		ng/l	1.74	0.356	1
Perfluoropentanoic Acid (PFPeA)	33.4		ng/l	1.74	0.345	1
Perfluorobutanesulfonic Acid (PFBS)	1.15	J	ng/l	1.74	0.208	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.74	0.394	1
Perfluorohexanoic Acid (PFHxA)	25.8		ng/l	1.74	0.286	1
Perfluoropentanesulfonic Acid (PFPeS)	1.48	J	ng/l	1.74	0.214	1
Perfluoroheptanoic Acid (PFHpA)	10.8		ng/l	1.74	0.196	1
Perfluorohexanesulfonic Acid (PFHxS)	28.0		ng/l	1.74	0.328	1
Perfluorooctanoic Acid (PFOA)	10.1		ng/l	1.74	0.206	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.74	1.16	1
Perfluoroheptanesulfonic Acid (PFHpS)	2.43		ng/l	1.74	0.600	1
Perfluorononanoic Acid (PFNA)	1.17	J	ng/l	1.74	0.272	1
Perfluorooctanesulfonic Acid (PFOS)	71.9		ng/l	1.74	0.440	1
Perfluorodecanoic Acid (PFDA)	0.296	JF	ng/l	1.74	0.265	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.74	1.06	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.74	0.977	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.74	0.565	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.74	0.227	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.74	0.855	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.74	0.506	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.74	0.701	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.74	0.324	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.74	0.285	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.74	0.216	1

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-03
Client ID: HW-I (D)
Sample Location: HYANIS, MA

Date Collected: 06/07/23 11:15
Date Received: 06/09/23
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)	81				58-132	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	91				62-163	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106				70-131	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	112				12-142	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	76				57-129	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79				60-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	104				71-134	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	85				62-129	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	105				14-147	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	79				59-139	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	80				69-131	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	70				62-124	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	77				10-162	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	80				24-116	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	70				55-137	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	5				5-112	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78				27-126	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	63				48-131	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	57				22-136	

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-04
Client ID: HW-P (S)
Sample Location: HYANIS, MA

Date Collected: 06/08/23 10:25
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 18:54
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	12.3		ng/l	1.76	0.359	1
Perfluoropentanoic Acid (PFPeA)	28.6		ng/l	1.76	0.348	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.76	0.209	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.76	0.397	1
Perfluorohexanoic Acid (PFHxA)	15.5		ng/l	1.76	0.288	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.76	0.216	1
Perfluoroheptanoic Acid (PFHpA)	6.98		ng/l	1.76	0.198	1
Perfluorohexanesulfonic Acid (PFHxS)	0.798	JF	ng/l	1.76	0.330	1
Perfluorooctanoic Acid (PFOA)	14.5		ng/l	1.76	0.207	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	4.41		ng/l	1.76	1.17	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.76	0.605	1
Perfluorononanoic Acid (PFNA)	15.1		ng/l	1.76	0.274	1
Perfluorooctanesulfonic Acid (PFOS)	1.38	JF	ng/l	1.76	0.443	1
Perfluorodecanoic Acid (PFDA)	0.464	J	ng/l	1.76	0.267	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.76	1.06	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.76	0.985	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.76	0.570	1
Perfluoroundecanoic Acid (PFUnA)	0.243	JF	ng/l	1.76	0.228	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.76	0.862	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.76	0.510	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.76	0.707	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.76	0.327	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.76	0.288	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.76	0.218	1

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-04
Client ID: HW-P (S)
Sample Location: HYANIS, MA

Date Collected: 06/08/23 10:25
Date Received: 06/09/23
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)	72				58-132	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	79				62-163	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105				70-131	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	116				12-142	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	66				57-129	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	67				60-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101				71-134	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	70				62-129	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	109				14-147	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	67				59-139	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	97				69-131	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	72				62-124	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	104				10-162	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	78				24-116	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	76				55-137	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	6				5-112	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	75				27-126	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	74				48-131	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	73				22-136	

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-05
Client ID: HW-P (M)
Sample Location: HYANIS, MA

Date Collected: 06/08/23 11:48
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 19:11
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	6.07		ng/l	1.74	0.354	1
Perfluoropentanoic Acid (PFPeA)	14.9		ng/l	1.74	0.344	1
Perfluorobutanesulfonic Acid (PFBS)	0.278	J	ng/l	1.74	0.207	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.74	0.392	1
Perfluorohexanoic Acid (PFHxA)	7.88		ng/l	1.74	0.285	1
Perfluoropentanesulfonic Acid (PFPeS)	0.354	J	ng/l	1.74	0.213	1
Perfluoroheptanoic Acid (PFHpA)	4.51		ng/l	1.74	0.196	1
Perfluorohexanesulfonic Acid (PFHxS)	3.40		ng/l	1.74	0.326	1
Perfluorooctanoic Acid (PFOA)	3.78		ng/l	1.74	0.205	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.74	1.16	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.74	0.598	1
Perfluorononanoic Acid (PFNA)	7.46		ng/l	1.74	0.271	1
Perfluorooctanesulfonic Acid (PFOS)	2.75		ng/l	1.74	0.438	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.74	0.264	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.74	1.05	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.74	0.973	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.74	0.563	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.74	0.226	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.74	0.851	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.74	0.504	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.74	0.698	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.74	0.323	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.74	0.284	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.74	0.215	1

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-05
Client ID: HW-P (M)
Sample Location: HYANIS, MA

Date Collected: 06/08/23 11:48
Date Received: 06/09/23
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)	79				58-132	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	88				62-163	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105				70-131	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	94				12-142	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	74				57-129	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	73				60-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	104				71-134	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	79				62-129	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	103				14-147	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	80				59-139	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98				69-131	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	82				62-124	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	96				10-162	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	94				24-116	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	87				55-137	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	17				5-112	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	87				27-126	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83				48-131	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	85				22-136	

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-06
Client ID: HW-S (S)
Sample Location: HYANIS, MA

Date Collected: 06/09/23 10:08
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 19:28
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	32.3		ng/l	10.0	2.04	1
Perfluoropentanoic Acid (PFPeA)	135		ng/l	10.0	1.98	1
Perfluorobutanesulfonic Acid (PFBS)	1.74	J	ng/l	10.0	1.19	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	10.0	2.26	1
Perfluorohexanoic Acid (PFHxA)	77.0		ng/l	10.0	1.64	1
Perfluoropentanesulfonic Acid (PFPeS)	3.26	J	ng/l	10.0	1.23	1
Perfluoroheptanoic Acid (PFHpA)	46.7		ng/l	10.0	1.13	1
Perfluorohexanesulfonic Acid (PFHxS)	30.0		ng/l	10.0	1.88	1
Perfluorooctanoic Acid (PFOA)	52.1		ng/l	10.0	1.18	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	1150		ng/l	10.0	6.66	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	10.0	3.44	1
Perfluorononanoic Acid (PFNA)	44.2		ng/l	10.0	1.56	1
Perfluorooctanesulfonic Acid (PFOS)	185		ng/l	10.0	2.52	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	10.0	1.52	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	10.0	6.06	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	10.0	5.60	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	10.0	3.24	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	10.0	1.30	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	10.0	4.90	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	10.0	2.90	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	10.0	4.02	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	10.0	1.86	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	10.0	1.64	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	10.0	1.24	1

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-06
Client ID: HW-S (S)
Sample Location: HYANIS, MA

Date Collected: 06/09/23 10:08
Date Received: 06/09/23
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)	74				58-132	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	84				62-163	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105				70-131	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	94				12-142	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	73				57-129	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74				60-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101				71-134	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	83				62-129	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	126				14-147	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88				59-139	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101				69-131	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	95				62-124	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	106				10-162	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	107				24-116	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	101				55-137	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	20				5-112	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	99				27-126	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	98				48-131	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	88				22-136	

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-07
Client ID: HW-S (M)
Sample Location: HYANIS, MA

Date Collected: 06/09/23 12:25
Date Received: 06/09/23
Field Prep: Not Specified

Sample Depth:

Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 19:44
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	10.8		ng/l	1.77	0.360	1
Perfluoropentanoic Acid (PFPeA)	38.0		ng/l	1.77	0.350	1
Perfluorobutanesulfonic Acid (PFBS)	0.533	J	ng/l	1.77	0.210	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.77	0.399	1
Perfluorohexanoic Acid (PFHxA)	24.1		ng/l	1.77	0.290	1
Perfluoropentanesulfonic Acid (PFPeS)	0.749	J	ng/l	1.77	0.216	1
Perfluoroheptanoic Acid (PFHpA)	25.7		ng/l	1.77	0.199	1
Perfluorohexanesulfonic Acid (PFHxS)	21.6		ng/l	1.77	0.332	1
Perfluorooctanoic Acid (PFOA)	29.7		ng/l	1.77	0.208	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	198		ng/l	1.77	1.18	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.93		ng/l	1.77	0.608	1
Perfluorononanoic Acid (PFNA)	26.2		ng/l	1.77	0.276	1
Perfluorooctanesulfonic Acid (PFOS)	255		ng/l	1.77	0.445	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.77	0.268	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	3.23		ng/l	1.77	1.07	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.77	0.989	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.77	0.572	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.77	0.230	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.77	0.865	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.77	0.512	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.77	0.710	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.77	0.328	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.77	0.289	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.77	0.219	1

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

SAMPLE RESULTS

Lab ID: L2332762-07
Client ID: HW-S (M)
Sample Location: HYANIS, MA

Date Collected: 06/09/23 12:25
Date Received: 06/09/23
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)	85				58-132	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	95				62-163	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	112				70-131	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	114				12-142	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	84				57-129	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	85				60-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	113				71-134	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91				62-129	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	144				14-147	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92				59-139	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101				69-131	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	96				62-124	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	116				10-162	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	101				24-116	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	100				55-137	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	20				5-112	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	103				27-126	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	95				48-131	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	89				22-136	

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 12:39
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-07 Batch: WG1797335-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 06/29/23 12:39
Analyst: AC

Extraction Method: ALPHA 23528
Extraction Date: 06/28/23 16:55

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-07 Batch: WG1797335-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	101		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	108		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	102		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	102		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	103		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	100		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	105		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	108		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	101		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	96		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	121		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	94		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	104		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	35		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	97		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	96		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	91		22-136

Lab Control Sample Analysis

Batch Quality Control

Project Name: CAPECOD GATEWAY AIRPORT

Project Number: 23070

Lab Number: L2332762

Report Date: 06/30/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 Batch: WG1797335-2								
Perfluorobutanoic Acid (PFBA)	99		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	100		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	94		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	99		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	99		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	101		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	100		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	96		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	98		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	96		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	98		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	102		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	93		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	101		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	105		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	100		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	103		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	102		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	104		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	103		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	92		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	95		-		67-153	-		30

Lab Control Sample Analysis **Batch Quality Control**

Project Name: CAPECOD GATEWAY AIRPORT

Lab Number: L2332762

Project Number: 23070

Report Date: 06/30/23

Parameter	LCS %Recovery	Qual	LCS %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 Batch: WG1797335-2								
Perfluorotridecanoic Acid (PFTTrDA)	113		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	100		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCS %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	104				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	112				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	101				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	107				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	101				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	99				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	103				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	112				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	102				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	121				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	103				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	107				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	31				5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	109				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	109				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	103				22-136

Matrix Spike Analysis

Batch Quality Control

Project Name: CAPECOD GATEWAY AIRPORT

Project Number: 23070

Lab Number: L2332762

Report Date: 06/30/23

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): 01-07 QC Batch ID: WG1797335-3 QC Sample: L2332157-01 Client ID: MS Sample												
Perfluorobutanesulfonic Acid (PFBS)	1.07J	35	33.4	92		-	-		65-157	-		30
Perfluorohexanoic Acid (PFHxA)	3.71	39.4	41.4	96		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	0.335J	37.1	36.0	96		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	2.33	39.4	40.3	96		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	1.81J	36	36.8	97		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	5.04	39.4	42.7	96		-	-		63-159	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	37.6	37.7	100		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	0.390J	39.4	40.8	103		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	3.28F	36.5	38.3	96		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	ND	39.4	39.8	101		-	-		63-171	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	39.4	38.0	96		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	39.4	39.2	100		-	-		60-153	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	39.4	36.3	92		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	39.4	38.5	98		-	-		67-153	-		30
Perfluorotridecanoic Acid (PFTrDA)	ND	39.4	42.7	108		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	39.4	38.4	98		-	-		59-182	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	384	378	98		-	-		57-162	-		30
4,8-Dioxo-3h-Perfluorononanoic Acid (ADONA)	ND	37.2	32.0	86		-	-		69-143	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	36.8	34.4	94		-	-		55-158	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	37.2	35.9	97		-	-		52-156	-		30

Matrix Spike Analysis**Batch Quality Control****Project Name:** CAPECOD GATEWAY AIRPORT**Project Number:** 23070**Lab Number:** L2332762**Report Date:** 06/30/23

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): 01-07 QC Batch ID: WG1797335-3 QC Sample: L2332157-01 Client ID: MS Sample												

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	71				10-165
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	95				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	95				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	85				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	78				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	75				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	99				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	87				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	86				22-136
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	80				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	78				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	104				70-131

Lab Duplicate Analysis Batch Quality Control

Project Name: CAPECOD GATEWAY AIRPORT

Project Number: 23070

Lab Number: L2332762

Report Date: 06/30/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1797335-4 QC Sample: L2332728-01 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	14.1	13.7	ng/l	3		30
Perfluoropentanoic Acid (PFPeA)	10.9	10.0	ng/l	9		30
Perfluorobutanesulfonic Acid (PFBS)	1.37J	1.41J	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	9.19	8.84	ng/l	4		30
Perfluoropentanesulfonic Acid (PFPeS)	0.793J	0.630J	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	9.92	9.43	ng/l	5		30
Perfluorohexanesulfonic Acid (PFHxS)	4.92	4.87	ng/l	1		30
Perfluorooctanoic Acid (PFOA)	62.1	59.2	ng/l	5		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	2.13	1.73J	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	2.13	2.08	ng/l	2		30
Perfluorooctanesulfonic Acid (PFOS)	23.0	22.6	ng/l	2		30
Perfluorodecanoic Acid (PFDA)	0.337JF	0.295J	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis Batch Quality Control

Project Name: CAPECOD GATEWAY AIRPORT

Project Number: 23070

Lab Number: L2332762

Report Date: 06/30/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1797335-4 QC Sample: L2332728-01 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	29.4	23.9	ng/l	21		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	89		83		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	89		84		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	89		84		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	158	Q	153	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	73		68		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	80		75		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	91		84		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	85		80		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	169	Q	152	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	80		77		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	76		71		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	75		67		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	155		136		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	108		84		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	75		65		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	26		11		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	121		103		27-126

Lab Duplicate Analysis

Batch Quality Control

Project Name: CAPECOD GATEWAY AIRPORT

Project Number: 23070

Lab Number: L2332762

Report Date: 06/30/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1797335-4 QC Sample: L2332728-01 Client ID: DUP Sample						

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	71		61		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	64		60		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	75		71		10-165

Project Name: CAPECOD GATEWAY AIRPORT**Lab Number:** L2332762**Project Number:** 23070**Report Date:** 06/30/23**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(*)
L2332762-01A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-01B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-02A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-02B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-03A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-03B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-04A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-04B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-05A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-05B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-06A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-06B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-07A	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)
L2332762-07B	Plastic 250ml unpreserved	A	NA		2.9	Y	Absent		A2-537-ISOTOPE(28)

Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Serial_No:06302314:46
Lab Number: L2332762
Report Date: 06/30/23

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: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Serial_No:06302314:46
Lab Number: L2332762
Report Date: 06/30/23

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: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

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: DU Report with 'J' Qualifiers



Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

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. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers



Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

Data Qualifiers

Identified Compounds (TICs).

- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.
- 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.)

Report Format: DU Report with 'J' Qualifiers



Project Name: CAPECOD GATEWAY AIRPORT
Project Number: 23070

Lab Number: L2332762
Report Date: 06/30/23

REFERENCES

- 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.



Alpha Analytical, Inc.Facility: **Company-wide**Department: **Quality Assurance**Title: **Certificate/Approval Program Summary**ID No.: **17873**

Revision 20

Published Date: 6/16/2023 4:52:28 PM

Page 1 of 1

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, SM4500CI-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.



8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 6/9/23

ALPHA Job #: L2332762

Project Information

Project Name: CAPE COD GATEWAY AIRPORT

Project Location: HYANNIS, MA

Project #: 23070

Project Manager: BRYAN MASSA

ALPHA Quote #:

Report Information - Data Deliverables

☐ ADEx ☒ EMAIL

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☒ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☒ No CT RCP Analytical Methods
☐ Yes ☒ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☒ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☒ No NPDES RGP
☐ Other State /Fed Program Criteria

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

ANALYSIS	VOC: ☐ 8260 ☐ 624 ☐ 524.2	SVOC: ☐ ABN ☐ PAH	METALS: ☐ MCP 13 ☐ MCP 14 ☐ MCP 15	EPH: ☐ RCRA5 ☐ RCRA8 ☐ PP13	VPH: ☐ Ranges & Targets ☐ Ranges Only	PCB ☐ PEST	TPH: ☐ Quant Only ☐ Fingerprint	PFAS	SAMPLE INFO
									Filtration ☐ Field ☐ Lab to do Preservation ☐ Lab to do

Client Information

Client: HORSLEY WITTEN GROUP

Address: 90 ROUTE 6A
SANDWICH, MA 02563

Phone: 508-833-6600

Email: jgustave.sen@horklywitten.com

Additional Project Information:

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler Initials	VOC:	SVOC:	METAL	METAL	EPH: ☐	VPH: ☐	☐ PCB	TPH: ☐	PFA				Sample Comments	SUM
		Date	Time																
32762-01	HW-I(S)	6/7/23	1010	GW	JG														2
-02	HW-I(M)	6/7/23	1215																
-03	HW-I(D)	6/7/23	1115																
-04	HW-P(S)	6/8/23	1025																
-05	HW-P(M)	6/8/23	1148																
-06	HW-S(S)	6/9/23	1008																
-07	HW-S(M)	6/9/23	1225																

Container Type

P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative

A= None
B= HCl
C= HNO₃
D= H₂SO₄
E= NaOH
F= MeOH
G= NaHSO₄
H= Na₂S₂O₃
I= Ascorbic Acid
J= NH₄Cl
K= Zn Acetate
O= Other

Container Type

Preservative

P

A

Relinquished By:

Date/Time

Received By:

Date/Time

HW FRIDGE

6/9/23 1331

HW FRIDGE

6/9/23 1331

HW FRIDGE

6/9/23 16:00

HW FRIDGE

6/9/23 16:00

HW FRIDGE

6/9/23 17:45

HW FRIDGE

6/9/23 17:45

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

June 12, 2023

Bryan Massa
Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563

Project Location: Barnstable, MA
Client Job Number:
Project Number: [none]
Laboratory Work Order Number: 23F0282

Enclosed are results of analyses for samples as received by the laboratory on June 2, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Kaitlyn A. Feliciano
Project Manager

Table of Contents

Sample Summary	3
Case Narrative	4
Sample Results	5
23F0282-01	5
23F0282-02	6
Sample Preparation Information	7
QC Data	8
Semivolatile Organic Compounds by - LC/MS-MS	8
B342148	8
Flag/Qualifier Summary	10
Internal standard Area & RT Summary	11
Certifications	15
Chain of Custody/Sample Receipt	16

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

Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563
ATTN: Bryan Massa

REPORT DATE: 6/12/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: [none]

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23F0282

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
HW-R	23F0282-01	Ground Water		SOP-454 PFAS	
HW-H	23F0282-02	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.

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:**M2-6:2FTS**23F0282-01[HW-R]

S-29

Extracted Internal Standard is outside of control limits.

Analyte & Samples(s) Qualified:**M2-8:2FTS**S088826-CCV1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:**Perfluoro-1-hexanesulfonamide (FHxSA)**23F0282-01[HW-R], 23F0282-02[HW-H], S088826-CCV2, S088826-CCV3

V-20

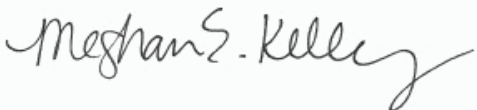
Continuing calibration verification (CCV) did not meet method specifications and was biased on the high side. Data validation is not affected since sample result was "not detected" for this compound.

Analyte & Samples(s) Qualified:**Perfluorononanesulfonic acid (PFNS)**

S088826-CCV1

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: 23F0282

Date Received: 6/2/2023

Field Sample #: HW-R

Sampled: 6/1/2023 10:25

Sample ID: 23F0282-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	11	1.8	0.65	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorobutanesulfonic acid (PFBS)	1.2	1.8	0.65	ng/L	1	J	SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoropentanoic acid (PFPeA)	40	1.8	0.70	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorohexanoic acid (PFHxA)	24	1.8	0.72	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.65	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.91	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.52	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.84	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorodecanoic acid (PFDA)	ND	1.8	0.73	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.81	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND	1.8	0.64	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	0.72	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.84	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.73	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.91	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.89	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.90	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.92	ng/L	1	V-05	SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorohexanesulfonic acid (PFHxS)	1.2	1.8	0.63	ng/L	1	J	SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.63	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.57	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	1.1	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoropentanesulfonic acid (PFPeS)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluoroheptanoic acid (PFHpA)	9.9	1.8	0.74	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorooctanoic acid (PFOA)	ND	1.8	1.2	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorooctanesulfonic acid (PFOS)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW
Perfluorononanoic acid (PFNA)	ND	1.8	0.81	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:32	QNW

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

Project Location: Barnstable, MA

Sample Description:

Work Order: 23F0282

Date Received: 6/2/2023

Field Sample #: HW-H

Sampled: 6/1/2023 11:15

Sample ID: 23F0282-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	3.4	1.8	0.67	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoropentanoic acid (PFPeA)	8.7	1.8	0.72	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorohexanoic acid (PFHxA)	7.8	1.8	0.74	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorodecanoic acid (PFDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.83	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.72	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.95	ng/L	1	V-05	SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoro-1-butanefulfonamide (FBFA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorohexanesulfonic acid (PFHxS)	0.99	1.8	0.64	ng/L	1	J	SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.64	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.59	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	1.1	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoropentanesulfonic acid (PFPeS)	ND	1.8	0.69	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluoroheptanoic acid (PFHpA)	ND	1.8	0.76	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorooctanoic acid (PFOA)	ND	1.8	1.2	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorooctanesulfonic acid (PFOS)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	QNW
Perfluorononanoic acid (PFNA)	ND	1.8	0.83	ng/L	1		SOP-454 PFAS	6/6/23	6/8/23 16:39	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
23F0282-01 [HW-R]	B342148	285	1.00	06/06/23
23F0282-02 [HW-H]	B342148	277	1.00	06/06/23

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 B342148 - SOP 454-PFAAS
Blank (B342148-BLK1)

Prepared: 06/06/23 Analyzed: 06/08/23

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 (B342148-BS1)

Prepared: 06/06/23 Analyzed: 06/08/23

Perfluorobutanoic acid (PFBA)	8.65	1.9	ng/L	9.69	89.2	73-129
Perfluorobutanesulfonic acid (PFBS)	7.63	1.9	ng/L	8.58	89.0	72-130
Perfluoropentanoic acid (PFPeA)	8.25	1.9	ng/L	9.69	85.2	72-129
Perfluorohexanoic acid (PFHxA)	8.47	1.9	ng/L	9.69	87.4	72-129
11Cl-PF3OUdS (F53B Major)	7.82	1.9	ng/L	9.13	85.6	55.1-141
9Cl-PF3ONS (F53B Minor)	7.64	1.9	ng/L	9.03	84.6	59.6-146
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	7.70	1.9	ng/L	9.13	84.3	60.3-131
Hexafluoropropylene oxide dimer acid (HFPO-DA)	6.38	1.9	ng/L	9.69	65.9	37.6-167
8:2 Fluorotelomersulfonic acid (8:2FTS A)	9.08	1.9	ng/L	9.30	97.6	67-138
Perfluorodecanoic acid (PFDA)	8.65	1.9	ng/L	9.69	89.2	71-129
Perfluorododecanoic acid (PFDoA)	8.69	1.9	ng/L	9.69	89.7	72-134
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	7.44	1.9	ng/L	8.62	86.2	49.4-154

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 B342148 - SOP 454-PFAAS
LCS (B342148-BS1)

Prepared: 06/06/23 Analyzed: 06/08/23

Perfluoroheptanesulfonic acid (PFHpS)	8.52	1.9	ng/L	9.25		92.1	69-134			
N-EtFOSAA (NEtFOSAA)	8.19	1.9	ng/L	9.69		84.5	61-135			
N-MeFOSAA (NMeFOSAA)	9.28	1.9	ng/L	9.69		95.8	65-136			
Perfluorotetradecanoic acid (PFTA)	7.93	1.9	ng/L	9.69		81.8	71-132			
Perfluorotridecanoic acid (PFTDA)	9.53	1.9	ng/L	9.69		98.3	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	8.02	1.9	ng/L	9.06		88.5	63-143			
Perfluorodecanesulfonic acid (PFDS)	7.74	1.9	ng/L	9.35		82.8	53-142			
Perfluorooctanesulfonamide (FOSA)	8.90	1.9	ng/L	9.69		91.8	67-137			
Perfluorononanesulfonic acid (PFNS)	8.23	1.9	ng/L	9.30		88.5	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	6.33	1.9	ng/L	9.69		65.3	61.7-156			
Perfluoro-1-butanefulfonamide (FBSA)	7.08	1.9	ng/L	9.69		73.1	61.3-145			
Perfluorohexanesulfonic acid (PFHxS)	7.43	1.9	ng/L	8.87		83.8	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	8.24	1.9	ng/L	9.69		85.0	59.8-147			
Perfluoro-5-oxahexanoic acid (PFMBA)	8.39	1.9	ng/L	9.69		86.5	59.5-146			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	6.87	1.9	ng/L	9.21		74.6	64-140			
Perfluoropentanesulfonic acid (PFPeS)	7.65	1.9	ng/L	9.11		83.9	71-127			
Perfluoroundecanoic acid (PFUnA)	8.84	1.9	ng/L	9.69		91.2	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	7.93	1.9	ng/L	9.69		81.9	58.5-143			
Perfluoroheptanoic acid (PFHpA)	8.81	1.9	ng/L	9.69		90.9	72-130			
Perfluorooctanoic acid (PFOA)	8.75	1.9	ng/L	9.69		90.3	71-133			
Perfluorooctanesulfonic acid (PFOS)	8.58	1.9	ng/L	8.96		95.7	65-140			
Perfluorononanoic acid (PFNA)	6.96	1.9	ng/L	9.69		71.8	69-130			

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

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.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
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.
S-29	Extracted Internal Standard is outside of control limits.
V-05	Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.
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.

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

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-R (23F0282-01) Lab File ID: 23F0282-01.d Analyzed: 06/08/23 16:32									
M8FOSA	211001.6	3.9486	268,784.00	3.9486	79	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	51181.51	2.4228	35,452.00	2.431017	144	50 - 150	-0.0082	+/-0.50	
M2PFTA	323478.5	4.248767	469,922.00	4.248767	69	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	85345.59	3.731083	77,186.00	3.731083	111	50 - 150	0.0000	+/-0.50	
MPFBA	144999.8	1.033533	277,346.00	1.033533	52	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	120862.5	2.76565	130,159.00	2.773833	93	50 - 150	-0.0082	+/-0.50	
M6PFDA	446925.3	3.739567	574,846.00	3.739567	78	50 - 150	0.0000	+/-0.50	
M3PFBS	118083.4	1.83695	127,381.00	1.83695	93	50 - 150	0.0000	+/-0.50	
M7PFUnA	404686.3	3.873917	481,877.00	3.8819	84	50 - 150	-0.0080	+/-0.50	
M2-6:2FTS	49683.5	3.3883	28,494.00	3.3883	174	50 - 150	0.0000	+/-0.50	*
M5PFPeA	228695.3	1.6652	278,521.00	1.6652	82	50 - 150	0.0000	+/-0.50	
M5PFHxA	418491.7	2.506633	467,599.00	2.51485	89	50 - 150	-0.0082	+/-0.50	
M3PFHxS	77013.32	3.153433	82,162.00	3.153433	94	50 - 150	0.0000	+/-0.50	
M4PFHpA	434091.8	3.113417	483,204.00	3.122333	90	50 - 150	-0.0089	+/-0.50	
M8PFOA	477298.3	3.397017	521,324.00	3.397017	92	50 - 150	0.0000	+/-0.50	
M8PFOS	74349.38	3.588267	77,713.00	3.588267	96	50 - 150	0.0000	+/-0.50	
M9PFNA	455007.4	3.589317	532,218.00	3.589317	85	50 - 150	0.0000	+/-0.50	
MPFDoA	322093.3	4.0087	390,006.00	4.0167	83	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	83401.87	3.881417	132,373.00	3.8894	63	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	93401.98	3.809467	140,897.00	3.809467	66	50 - 150	0.0000	+/-0.50	

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

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-H (23F0282-02) Lab File ID: 23F0282-02.d Analyzed: 06/08/23 16:39									
M8FOSA	191588.9	3.9486	268,784.00	3.9486	71	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	41657.39	2.4228	35,452.00	2.431017	118	50 - 150	-0.0082	+/-0.50	
M2PFTA	359161.1	4.248767	469,922.00	4.248767	76	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	52997.11	3.731083	77,186.00	3.731083	69	50 - 150	0.0000	+/-0.50	
MPFBA	162831.8	1.033533	277,346.00	1.033533	59	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	113603.7	2.76565	130,159.00	2.773833	87	50 - 150	-0.0082	+/-0.50	
M6PFDA	395469.9	3.7316	574,846.00	3.739567	69	50 - 150	-0.0080	+/-0.50	
M3PFBS	110653.7	1.828667	127,381.00	1.83695	87	50 - 150	-0.0083	+/-0.50	
M7PFUnA	386337.7	3.873917	481,877.00	3.8819	80	50 - 150	-0.0080	+/-0.50	
M2-6:2FTS	37707.73	3.380233	28,494.00	3.3883	132	50 - 150	-0.0081	+/-0.50	
M5PFPeA	213186.3	1.6652	278,521.00	1.6652	77	50 - 150	0.0000	+/-0.50	
M5PFHxA	380034.9	2.506633	467,599.00	2.51485	81	50 - 150	-0.0082	+/-0.50	
M3PFHxS	69730.17	3.153433	82,162.00	3.153433	85	50 - 150	0.0000	+/-0.50	
M4PFHpA	396611.2	3.113417	483,204.00	3.122333	82	50 - 150	-0.0089	+/-0.50	
M8PFOA	449884.9	3.397017	521,324.00	3.397017	86	50 - 150	0.0000	+/-0.50	
M8PFOS	65539.32	3.588267	77,713.00	3.588267	84	50 - 150	0.0000	+/-0.50	
M9PFNA	439632.2	3.581317	532,218.00	3.589317	83	50 - 150	-0.0080	+/-0.50	
MPFDoA	307125.2	4.0087	390,006.00	4.0167	79	50 - 150	-0.0080	+/-0.50	
D5-NEtFOSAA	91506.02	3.881417	132,373.00	3.8894	69	50 - 150	-0.0080	+/-0.50	
D3-NMeFOSAA	95647.33	3.809467	140,897.00	3.809467	68	50 - 150	0.0000	+/-0.50	

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

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 (B342148-BLK1) Lab File ID: B342148-BLK1.d Analyzed: 06/08/23 14:21									
M8FOSA	256694.9	3.9486	268,784.00	3.9486	96	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	41506.67	2.439333	35,452.00	2.431017	117	50 - 150	0.0083	+/-0.50	
M2PFTA	423753.3	4.256834	469,922.00	4.256834	90	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	87081.41	3.73905	77,186.00	3.73905	113	50 - 150	0.0000	+/-0.50	
MPFBA	287826	1.04185	277,346.00	1.033533	104	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	129662.1	2.782017	130,159.00	2.782017	100	50 - 150	0.0000	+/-0.50	
M6PFDA	523699.6	3.739567	574,846.00	3.739567	91	50 - 150	0.0000	+/-0.50	
M3PFBS	136324.6	1.845233	127,381.00	1.845233	107	50 - 150	0.0000	+/-0.50	
M7PFUnA	443994.6	3.8819	481,877.00	3.8819	92	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	34461.97	3.3883	28,494.00	3.3883	121	50 - 150	0.0000	+/-0.50	
M5PFPeA	299746.4	1.681733	278,521.00	1.673467	108	50 - 150	0.0083	+/-0.50	
M5PFHxA	503753.3	2.523067	467,599.00	2.523067	108	50 - 150	0.0000	+/-0.50	
M3PFHxS	83166.31	3.1615	82,162.00	3.153433	101	50 - 150	0.0081	+/-0.50	
M4PFHpA	514162.8	3.122317	483,204.00	3.122317	106	50 - 150	0.0000	+/-0.50	
M8PFOA	581790.5	3.405067	521,324.00	3.405067	112	50 - 150	0.0000	+/-0.50	
M8PFOS	71865.37	3.588267	77,713.00	3.588267	92	50 - 150	0.0000	+/-0.50	
M9PFNA	565916	3.5893	532,218.00	3.589317	106	50 - 150	0.0000	+/-0.50	
MPFDoA	361185.8	4.0167	390,006.00	4.0167	93	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	118862.9	3.8894	132,373.00	3.8894	90	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	130121.6	3.817433	140,897.00	3.809467	92	50 - 150	0.0080	+/-0.50	

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

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 (B342148-BS1)		Lab File ID: B342148-BS1.d				Analyzed: 06/08/23 14:13			
M8FOSA	255406.9	3.9486	268,784.00	3.9486	95	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	40160.35	2.439333	35,452.00	2.431017	113	50 - 150	0.0083	+/-0.50	
M2PFTA	458516.6	4.256834	469,922.00	4.256834	98	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	78121.29	3.73905	77,186.00	3.73905	101	50 - 150	0.0000	+/-0.50	
MPFBA	279092.3	1.04185	277,346.00	1.033533	101	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	135231.3	2.782017	130,159.00	2.782017	104	50 - 150	0.0000	+/-0.50	
M6PFDA	569540.6	3.739567	574,846.00	3.739567	99	50 - 150	0.0000	+/-0.50	
M3PFBS	132695.9	1.845233	127,381.00	1.845233	104	50 - 150	0.0000	+/-0.50	
M7PFUnA	460832.9	3.8819	481,877.00	3.8819	96	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	35179.05	3.3883	28,494.00	3.3883	123	50 - 150	0.0000	+/-0.50	
M5PFPeA	286399.5	1.681733	278,521.00	1.673467	103	50 - 150	0.0083	+/-0.50	
M5PFHxA	486166.7	2.523067	467,599.00	2.523067	104	50 - 150	0.0000	+/-0.50	
M3PFHxS	83622.95	3.1615	82,162.00	3.153433	102	50 - 150	0.0081	+/-0.50	
M4PFHpA	503771.8	3.122317	483,204.00	3.122317	104	50 - 150	0.0000	+/-0.50	
M8PFOA	555438.6	3.405067	521,324.00	3.405067	107	50 - 150	0.0000	+/-0.50	
M8PFOS	75263.58	3.588267	77,713.00	3.588267	97	50 - 150	0.0000	+/-0.50	
M9PFNA	560333.3	3.589317	532,218.00	3.589317	105	50 - 150	0.0000	+/-0.50	
MPFDoA	391526.1	4.0167	390,006.00	4.0167	100	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	124139.9	3.8894	132,373.00	3.8894	94	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	135218.1	3.817433	140,897.00	3.809467	96	50 - 150	0.0080	+/-0.50	

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

CERTIFICATIONS
Certified Analyses included in this Report

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

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

Code	Description	Number	Expires
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2023

Log In Back-Sheet

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



Client Horsley, W. H.
Project HYA PHS Monitoring
MCP/RCP Required MA - MCP
Deliverable Package Req. GW-1
Location Hyannis, MA
PWSID# (When Applicable) nb

Arrival Method:

Courier ☒ Fed Ex ☐ Walk In ☐ Other ☐

Received By / Date / Time Mem 1/2/23 1806

Back-Sheet By / Date / Time Mem 1/2/23 1821

Temperature Method Gun # 5

Temp ☒ < 6° C Actual Temperature 23

Rush Samples: Yes / No Notify No

Short Hold: Yes / No Notify No

Notes regarding Samples/COC outside of SOP:

	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 ☒ Sampler Name ☒
Project ☒ IDs ☒ Collection Date/Time ☒

All Samples Proper pH: N/A ☐ ☐

Container (Circle when applicable)	UnP	HCl	HNO3	H2SO4	NaOH	Trizma	Na2S2O3	Other Preservative
1L Amber Plastic								
500 mL Amber Plastic								
250 mL Amber Plastic	u							
Other Amber Clear Plastic								
16oz Amber Clear								
8oz Amber Clear								
4oz Amber Clear								
2oz Amber Clear								
Col/Bacteria								
Flashpoint								
Plastic Bag								
SOC Kit								
Perchlorate								
Encore								
Frozen								
Proper Headspace	UnP	HCl	MeOH	Bisulfate	DI	Thiosulfate	Sulfuric	Other
Vials								

June 20, 2023

Bryan Massa
Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563

Project Location: Hyannis, MA
Client Job Number:
Project Number: 22071
Laboratory Work Order Number: 23E3794

Enclosed are results of analyses for samples as received by the laboratory on May 30, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Kaitlyn A. Feliciano
Project Manager

Table of Contents

Sample Summary	3
Case Narrative	4
Sample Results	5
23E3794-01	5
23E3794-02	6
23E3794-03	7
Sample Preparation Information	8
QC Data	9
Semivolatile Organic Compounds by - LC/MS-MS	9
B342713	9
Flag/Qualifier Summary	12
Internal standard Area & RT Summary	13
Certifications	19
Chain of Custody/Sample Receipt	20

Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563
ATTN: Bryan Massa

REPORT DATE: 6/20/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 22071

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23E3794

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

PROJECT LOCATION: Hyannis, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
ME-1	23E3794-01	Ground Water		SOP-454 PFAS	
ME-2	23E3794-02	Ground Water		SOP-454 PFAS	
ME-3	23E3794-03	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:****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:**Perfluoroheptanesulfonic acid (PFHpS)**

23E3794-01RE1[ME-1], 23E3794-02RE1[ME-2], 23E3794-03RE1[ME-3], B342713-BSD1

S-29

Extracted Internal Standard is outside of control limits.

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

23E3794-01RE1[ME-1]

M2-8:2FTS

S088753-CCV1

M8FOSA

23E3794-02RE1[ME-2]

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

Project Location: Hyannis, MA

Sample Description:

Work Order: 23E3794

Date Received: 5/30/2023

Field Sample #: ME-1

Sampled: 5/26/2023 08:45

Sample ID: 23E3794-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	19	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorobutanesulfonic acid (PFBS)	2.5	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoropentanoic acid (PFPeA)	60	1.8	0.72	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorohexanoic acid (PFHxA)	38	1.8	0.74	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.87	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorodecanoic acid (PFDA)	0.83	1.8	0.75	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.84	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.0	1.8	0.74	ng/L	1	L-07	SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorotridecanoic acid (PFTTrDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.95	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-1-butanesulfonamide (FBSA)	1.3	1.8	0.71	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorohexanesulfonic acid (PFHxS)	29	1.8	0.65	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.65	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.59	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	43	1.8	1.1	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.4	1.8	0.69	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoroheptanoic acid (PFHpA)	18	1.8	0.76	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorooctanoic acid (PFOA)	18	1.8	1.2	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorooctanesulfonic acid (PFOS)	69	1.8	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorononanoic acid (PFNA)	11	1.8	0.84	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW

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

Project Location: Hyannis, MA

Sample Description:

Work Order: 23E3794

Date Received: 5/30/2023

Sampled: 5/26/2023 08:55

Field Sample #: ME-2

Sample ID: 23E3794-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	16	1.9	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorobutanesulfonic acid (PFBS)	4.2	1.9	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoropentanoic acid (PFPeA)	54	1.9	0.75	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorohexanoic acid (PFHxA)	40	1.9	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.9	0.71	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.9	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.98	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.56	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	5.7	1.9	0.90	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorodecanoic acid (PFDA)	ND	1.9	0.79	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.87	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.69	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.4	1.9	0.77	ng/L	1	L-07	SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.9	0.76	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.9	0.99	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.90	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorotridecanoic acid (PFTTrDA)	ND	1.9	0.78	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.98	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.96	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.97	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	1.0	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-1-butanefulfonamide (FBFA)	1.7	1.9	0.74	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorohexanesulfonic acid (PFHxS)	44	1.9	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.61	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	45	1.9	1.1	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoropentanesulfonic acid (PFPeS)	3.6	1.9	0.72	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.81	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoroheptanoic acid (PFHpA)	17	1.9	0.80	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorooctanoic acid (PFOA)	17	1.9	1.3	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorooctanesulfonic acid (PFOS)	65	1.9	0.80	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorononanoic acid (PFNA)	6.7	1.9	0.87	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW

Project Location: Hyannis, MA

Sample Description:

Work Order: 23E3794

Date Received: 5/30/2023

Field Sample #: ME-3

Sampled: 5/26/2023 08:50

Sample ID: 23E3794-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	8.2	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorobutanesulfonic acid (PFBS)	1.7	1.8	0.66	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoropentanoic acid (PFPeA)	23	1.8	0.71	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorohexanoic acid (PFHxA)	18	1.8	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorodecanoic acid (PFDA)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.83	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.2	1.8	0.73	ng/L	1	L-07	SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.72	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.85	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.69	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorooctanesulfonamide (FOSA)	11	1.8	0.91	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	1.9	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-1-butanefulfonamide (FBFA)	0.91	1.8	0.70	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorohexanesulfonic acid (PFHxS)	34	1.8	0.64	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.64	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.58	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	2.7	1.8	1.1	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.1	1.8	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoroheptanoic acid (PFHpA)	8.6	1.8	0.75	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorooctanoic acid (PFOA)	14	1.8	1.2	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorooctanesulfonic acid (PFOS)	83	1.8	0.76	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorononanoic acid (PFNA)	6.1	1.8	0.83	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW

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

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23E3794-01RE1 [ME-1]	B342713	276	1.00	06/13/23
23E3794-02RE1 [ME-2]	B342713	264	1.00	06/13/23
23E3794-03RE1 [ME-3]	B342713	279	1.00	06/13/23

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 B342713 - SOP 454-PFAAS
Blank (B342713-BLK1)

Prepared: 06/13/23 Analyzed: 06/15/23

Perfluorobutanoic acid (PFBA)	ND	2.1	ng/L
Perfluorobutanesulfonic acid (PFBS)	ND	2.1	ng/L
Perfluoropentanoic acid (PFPeA)	ND	2.1	ng/L
Perfluorohexanoic acid (PFHxA)	ND	2.1	ng/L
11Cl-PF3OUdS (F53B Major)	ND	2.1	ng/L
9Cl-PF3ONS (F53B Minor)	ND	2.1	ng/L
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.1	ng/L
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.1	ng/L
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.1	ng/L
Perfluorodecanoic acid (PFDA)	ND	2.1	ng/L
Perfluorododecanoic acid (PFDoA)	ND	2.1	ng/L
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	2.1	ng/L
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.1	ng/L
N-EtFOSAA (NEtFOSAA)	ND	2.1	ng/L
N-MeFOSAA (NMeFOSAA)	ND	2.1	ng/L
Perfluorotetradecanoic acid (PFTA)	ND	2.1	ng/L
Perfluorotridecanoic acid (PFTrDA)	ND	2.1	ng/L
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.1	ng/L
Perfluorodecanesulfonic acid (PFDS)	ND	2.1	ng/L
Perfluorooctanesulfonamide (FOSA)	ND	2.1	ng/L
Perfluorononanesulfonic acid (PFNS)	ND	2.1	ng/L
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.1	ng/L
Perfluoro-1-butanesulfonamide (FBSA)	ND	2.1	ng/L
Perfluorohexanesulfonic acid (PFHxS)	ND	2.1	ng/L
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.1	ng/L
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.1	ng/L
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.1	ng/L
Perfluoropentanesulfonic acid (PFPeS)	ND	2.1	ng/L
Perfluoroundecanoic acid (PFUnA)	ND	2.1	ng/L
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.1	ng/L
Perfluoroheptanoic acid (PFHpA)	ND	2.1	ng/L
Perfluorooctanoic acid (PFOA)	ND	2.1	ng/L
Perfluorooctanesulfonic acid (PFOS)	ND	2.1	ng/L
Perfluorononanoic acid (PFNA)	ND	2.1	ng/L

LCS (B342713-BS1)

Prepared: 06/13/23 Analyzed: 06/15/23

Perfluorobutanoic acid (PFBA)	10.3	2.0	ng/L	10.2	102	73-129
Perfluorobutanesulfonic acid (PFBS)	9.03	2.0	ng/L	8.99	100	72-130
Perfluoropentanoic acid (PFPeA)	10.3	2.0	ng/L	10.2	101	72-129
Perfluorohexanoic acid (PFHxA)	10.5	2.0	ng/L	10.2	103	72-129
11Cl-PF3OUdS (F53B Major)	9.20	2.0	ng/L	9.57	96.1	55.1-141
9Cl-PF3ONS (F53B Minor)	8.88	2.0	ng/L	9.47	93.7	59.6-146
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	9.47	2.0	ng/L	9.57	99.0	60.3-131
Hexafluoropropylene oxide dimer acid (HFPO-DA)	9.74	2.0	ng/L	10.2	95.9	37.6-167
8:2 Fluorotelomersulfonic acid (8:2FTS A)	9.64	2.0	ng/L	9.75	98.8	67-138
Perfluorodecanoic acid (PFDA)	10.6	2.0	ng/L	10.2	104	71-129
Perfluorododecanoic acid (PFDoA)	11.9	2.0	ng/L	10.2	117	72-134
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	8.89	2.0	ng/L	9.04	98.4	49.4-154

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 B342713 - SOP 454-PFAAS
LCS (B342713-BS1)

Prepared: 06/13/23 Analyzed: 06/15/23

Perfluoroheptanesulfonic acid (PFHpS)	10.5	2.0	ng/L	9.70		108	69-134			
N-EtFOSAA (NEtFOSAA)	11.4	2.0	ng/L	10.2		112	61-135			
N-MeFOSAA (NMeFOSAA)	11.9	2.0	ng/L	10.2		117	65-136			
Perfluorotetradecanoic acid (PFTA)	10.7	2.0	ng/L	10.2		105	71-132			
Perfluorotridecanoic acid (PFTTrDA)	11.7	2.0	ng/L	10.2		115	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	9.63	2.0	ng/L	9.50		101	63-143			
Perfluorodecanesulfonic acid (PFDS)	7.82	2.0	ng/L	9.80		79.7	53-142			
Perfluorooctanesulfonamide (FOSA)	10.8	2.0	ng/L	10.2		107	67-137			
Perfluorononanesulfonic acid (PFNS)	8.87	2.0	ng/L	9.75		90.9	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	9.25	2.0	ng/L	10.2		91.1	61.7-156			
Perfluoro-1-butanefulfonamide (FBSA)	9.18	2.0	ng/L	10.2		90.4	61.3-145			
Perfluorohexanesulfonic acid (PFHxS)	8.78	2.0	ng/L	9.30		94.4	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	10.4	2.0	ng/L	10.2		103	59.8-147			
Perfluoro-5-oxahexanoic acid (PFMBA)	10.0	2.0	ng/L	10.2		98.8	59.5-146			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	10.6	2.0	ng/L	9.65		110	64-140			
Perfluoropentanesulfonic acid (PFPeS)	9.72	2.0	ng/L	9.55		102	71-127			
Perfluoroundecanoic acid (PFUnA)	10.2	2.0	ng/L	10.2		100	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	11.3	2.0	ng/L	10.2		111	58.5-143			
Perfluoroheptanoic acid (PFHpA)	10.4	2.0	ng/L	10.2		103	72-130			
Perfluorooctanoic acid (PFOA)	10.7	2.0	ng/L	10.2		105	71-133			
Perfluorooctanesulfonic acid (PFOS)	9.66	2.0	ng/L	9.40		103	65-140			
Perfluorononanoic acid (PFNA)	10.1	2.0	ng/L	10.2		99.7	69-130			

LCS Dup (B342713-BSD1)

Prepared: 06/13/23 Analyzed: 06/15/23

Perfluorobutanoic acid (PFBA)	11.4	2.1	ng/L	10.5		109	73-129	9.93	30	
Perfluorobutanesulfonic acid (PFBS)	10.2	2.1	ng/L	9.26		110	72-130	12.3	30	
Perfluoropentanoic acid (PFPeA)	11.5	2.1	ng/L	10.5		109	72-129	10.8	30	
Perfluorohexanoic acid (PFHxA)	11.5	2.1	ng/L	10.5		110	72-129	9.29	30	
11Cl-PF3OUdS (F53B Major)	9.22	2.1	ng/L	9.86		93.5	55.1-141	0.252	30	
9Cl-PF3ONS (F53B Minor)	10.2	2.1	ng/L	9.76		105	59.6-146	13.9	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	10.5	2.1	ng/L	9.86		107	60.3-131	10.5	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	9.16	2.1	ng/L	10.5		87.6	37.6-167	6.15	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	12.6	2.1	ng/L	10.0		125	67-138	26.6	30	
Perfluorodecanoic acid (PFDA)	11.3	2.1	ng/L	10.5		108	71-129	6.41	30	
Perfluorododecanoic acid (PFDoA)	11.4	2.1	ng/L	10.5		109	72-134	3.79	30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	10.1	2.1	ng/L	9.32		108	49.4-154	12.3	30	
Perfluoroheptanesulfonic acid (PFHpS)	13.6	2.1	ng/L	10.0		137	* 69-134	26.4	30	L-07
N-EtFOSAA (NEtFOSAA)	12.3	2.1	ng/L	10.5		118	61-135	7.96	30	
N-MeFOSAA (NMeFOSAA)	12.9	2.1	ng/L	10.5		123	65-136	7.82	30	
Perfluorotetradecanoic acid (PFTA)	11.6	2.1	ng/L	10.5		111	71-132	8.45	30	
Perfluorotridecanoic acid (PFTTrDA)	11.5	2.1	ng/L	10.5		110	65-144	1.59	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	10.3	2.1	ng/L	9.79		106	63-143	7.08	30	
Perfluorodecanesulfonic acid (PFDS)	8.99	2.1	ng/L	10.1		89.0	53-142	14.0	30	
Perfluorooctanesulfonamide (FOSA)	11.6	2.1	ng/L	10.5		111	67-137	6.57	30	
Perfluorononanesulfonic acid (PFNS)	11.5	2.1	ng/L	10.0		115	69-127	25.9	30	
Perfluoro-1-hexanesulfonamide (FHxSA)	10.6	2.1	ng/L	10.5		101	61.7-156	13.3	30	
Perfluoro-1-butanefulfonamide (FBSA)	10.7	2.1	ng/L	10.5		102	61.3-145	15.0	30	
Perfluorohexanesulfonic acid (PFHxS)	10.5	2.1	ng/L	9.58		109	68-131	17.6	30	
Perfluoro-4-oxapentanoic acid (PFMPA)	11.7	2.1	ng/L	10.5		111	59.8-147	11.2	30	
Perfluoro-5-oxahexanoic acid (PFMBA)	11.3	2.1	ng/L	10.5		108	59.5-146	12.3	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 B342713 - SOP 454-PFAAS
LCS Dup (B342713-BSD1)

Prepared: 06/13/23 Analyzed: 06/15/23

6:2 Fluorotelomersulfonic acid (6:2FTS A)	9.81	2.1	ng/L	9.94		98.6	64-140	8.13	30	
Perfluoropentanesulfonic acid (PFPeS)	11.0	2.1	ng/L	9.84		112	71-127	12.7	30	
Perfluoroundecanoic acid (PFUnA)	11.4	2.1	ng/L	10.5		109	69-133	11.4	30	
Nonafluoro-3,6-dioxahexanoic acid (NFDHA)	12.4	2.1	ng/L	10.5		119	58.5-143	9.68	30	
Perfluoroheptanoic acid (PFHpA)	11.1	2.1	ng/L	10.5		106	72-130	5.87	30	
Perfluorooctanoic acid (PFOA)	11.2	2.1	ng/L	10.5		107	71-133	4.69	30	
Perfluorooctanesulfonic acid (PFOS)	11.1	2.1	ng/L	9.68		114	65-140	13.7	30	
Perfluorononanoic acid (PFNA)	11.3	2.1	ng/L	10.5		108	69-130	11.0	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.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
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.
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
ME-1 (23E3794-01RE1) Lab File ID: 23E3794-01RE1.d Analyzed: 06/15/23 16:52									
M8FOSA	213334.6	3.980567	227,522.00	3.980567	94	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	28486.3	2.562517	27,028.00	2.562517	105	50 - 150	0.0000	+/-0.50	
M2PFTA	355459	4.329667	479,880.00	4.329667	74	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	37332.14	3.794817	33,212.00	3.802783	112	50 - 150	-0.0080	+/-0.50	
MPFBA	231042	1.066783	256,957.00	1.058467	90	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	102523.9	2.880217	114,902.00	2.880217	89	50 - 150	0.0000	+/-0.50	
M6PFDA	449810.7	3.795333	445,919.00	3.795333	101	50 - 150	0.0000	+/-0.50	
M3PFBS	110999.1	1.944683	104,197.00	1.9364	107	50 - 150	0.0083	+/-0.50	
M7PFUnA	450689.3	3.946033	453,308.00	3.946017	99	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	43785.91	3.445283	27,565.00	3.445283	159	50 - 150	0.0000	+/-0.50	*
M5PFPeA	271434.3	1.757717	276,869.00	1.757717	98	50 - 150	0.0000	+/-0.50	
M5PFHxA	467718.8	2.655	458,596.00	2.646767	102	50 - 150	0.0082	+/-0.50	
M3PFHxS	77050.47	3.218333	68,806.00	3.218333	112	50 - 150	0.0000	+/-0.50	
M4PFHpA	500292.4	3.186933	461,168.00	3.186933	108	50 - 150	0.0000	+/-0.50	
M8PFOA	548914.8	3.453817	508,809.00	3.453817	108	50 - 150	0.0000	+/-0.50	
M8PFOS	76850.11	3.636183	76,995.00	3.636183	100	50 - 150	0.0000	+/-0.50	
M9PFNA	512879.3	3.637217	526,406.00	3.637217	97	50 - 150	0.0000	+/-0.50	
MPFDoA	361032.2	4.088634	386,713.00	4.088634	93	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	91828.38	3.9535	101,789.00	3.9535	90	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	107819.7	3.873767	116,586.00	3.873767	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
ME-2 (23E3794-02RE1) Lab File ID: 23E3794-02RE1.d Analyzed: 06/15/23 16:59									
M8FOSA	63430.73	3.980567	227,522.00	3.980567	28	50 - 150	0.0000	+/-0.50	*
M2-4:2FTS	24893.35	2.562517	27,028.00	2.562517	92	50 - 150	0.0000	+/-0.50	
M2PFTA	364628.1	4.329667	479,880.00	4.329667	76	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	31018.9	3.794817	33,212.00	3.802783	93	50 - 150	-0.0080	+/-0.50	
MPFBA	216959.8	1.058467	256,957.00	1.058467	84	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	98515.74	2.880217	114,902.00	2.880217	86	50 - 150	0.0000	+/-0.50	
M6PFDA	380677.3	3.795333	445,919.00	3.795333	85	50 - 150	0.0000	+/-0.50	
M3PFBS	99833.68	1.9364	104,197.00	1.9364	96	50 - 150	0.0000	+/-0.50	
M7PFUnA	358386.6	3.946033	453,308.00	3.946017	79	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	37812.95	3.437283	27,565.00	3.445283	137	50 - 150	-0.0080	+/-0.50	
M5PFPeA	250487.6	1.757717	276,869.00	1.757717	90	50 - 150	0.0000	+/-0.50	
M5PFHxA	423755.1	2.655	458,596.00	2.646767	92	50 - 150	0.0082	+/-0.50	
M3PFHxS	69592.15	3.218333	68,806.00	3.218333	101	50 - 150	0.0000	+/-0.50	
M4PFHpA	456410.2	3.186933	461,168.00	3.186933	99	50 - 150	0.0000	+/-0.50	
M8PFOA	478276.5	3.453817	508,809.00	3.453817	94	50 - 150	0.0000	+/-0.50	
M8PFOS	68816.74	3.636183	76,995.00	3.636183	89	50 - 150	0.0000	+/-0.50	
M9PFNA	474013.9	3.637217	526,406.00	3.637217	90	50 - 150	0.0000	+/-0.50	
MPFDoA	295467.7	4.088634	386,713.00	4.088634	76	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	71346.97	3.9535	101,789.00	3.9535	70	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	82685.68	3.873767	116,586.00	3.873767	71	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
ME-3 (23E3794-03RE1)			Lab File ID: 23E3794-03RE1.d			Analyzed: 06/15/23 17:06			
M8FOSA	166835.3	3.980567	227,522.00	3.980567	73	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	24394.43	2.562517	27,028.00	2.562517	90	50 - 150	0.0000	+/-0.50	
M2PFTA	343507.3	4.329667	479,880.00	4.329667	72	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	29683.95	3.794817	33,212.00	3.802783	89	50 - 150	-0.0080	+/-0.50	
MPFBA	199579.7	1.066783	256,957.00	1.058467	78	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	95104.96	2.880217	114,902.00	2.880217	83	50 - 150	0.0000	+/-0.50	
M6PFDA	375022.2	3.795333	445,919.00	3.795333	84	50 - 150	0.0000	+/-0.50	
M3PFBS	92953.21	1.9364	104,197.00	1.9364	89	50 - 150	0.0000	+/-0.50	
M7PFUnA	351270.3	3.946033	453,308.00	3.946017	77	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	31350.92	3.437283	27,565.00	3.445283	114	50 - 150	-0.0080	+/-0.50	
M5PFPeA	231561.3	1.757717	276,869.00	1.757717	84	50 - 150	0.0000	+/-0.50	
M5PFHxA	392931.2	2.646767	458,596.00	2.646767	86	50 - 150	0.0000	+/-0.50	
M3PFHxS	64172.11	3.218333	68,806.00	3.218333	93	50 - 150	0.0000	+/-0.50	
M4PFHpA	411807.9	3.186933	461,168.00	3.186933	89	50 - 150	0.0000	+/-0.50	
M8PFOA	450823.7	3.453817	508,809.00	3.453817	89	50 - 150	0.0000	+/-0.50	
M8PFOS	64565.88	3.636183	76,995.00	3.636183	84	50 - 150	0.0000	+/-0.50	
M9PFNA	438212.4	3.637217	526,406.00	3.637217	83	50 - 150	0.0000	+/-0.50	
MPFDoA	287448.7	4.088634	386,713.00	4.088634	74	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	80767.51	3.9535	101,789.00	3.9535	79	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	82407.26	3.873767	116,586.00	3.873767	71	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
Blank (B342713-BLK1)			Lab File ID: B342713-BLK1.d			Analyzed: 06/15/23 16:01			
M8FOSA	196862.9	3.980567	227,522.00	3.980567	87	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	26152.61	2.562517	27,028.00	2.562517	97	50 - 150	0.0000	+/-0.50	
M2PFTA	427562.6	4.337783	479,880.00	4.329667	89	50 - 150	0.0081	+/-0.50	
M2-8:2FTS	29892	3.794817	33,212.00	3.802783	90	50 - 150	-0.0080	+/-0.50	
MPFBA	249440.2	1.058467	256,957.00	1.058467	97	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	94002.9	2.880217	114,902.00	2.880217	82	50 - 150	0.0000	+/-0.50	
M6PFDA	409812.8	3.795333	445,919.00	3.795333	92	50 - 150	0.0000	+/-0.50	
M3PFBS	105955.5	1.944683	104,197.00	1.9364	102	50 - 150	0.0083	+/-0.50	
M7PFUnA	426348.8	3.946017	453,308.00	3.946017	94	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	26142.75	3.437283	27,565.00	3.445283	95	50 - 150	-0.0080	+/-0.50	
M5PFPeA	274971.8	1.757717	276,869.00	1.757717	99	50 - 150	0.0000	+/-0.50	
M5PFHxA	449201.1	2.655	458,596.00	2.646767	98	50 - 150	0.0082	+/-0.50	
M3PFHxS	65679.15	3.218333	68,806.00	3.218333	95	50 - 150	0.0000	+/-0.50	
M4PFHpA	468079.8	3.186933	461,168.00	3.186933	101	50 - 150	0.0000	+/-0.50	
M8PFOA	511877	3.453817	508,809.00	3.453817	101	50 - 150	0.0000	+/-0.50	
M8PFOS	68250.95	3.636183	76,995.00	3.636183	89	50 - 150	0.0000	+/-0.50	
M9PFNA	486195.3	3.637217	526,406.00	3.637217	92	50 - 150	0.0000	+/-0.50	
MPFDoA	361203.5	4.088634	386,713.00	4.088634	93	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	91567.28	3.9535	101,789.00	3.9535	90	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	109350.9	3.873767	116,586.00	3.873767	94	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 (B342713-BS1)			Lab File ID: B342713-BS1.d			Analyzed: 06/15/23 15:47			
M8FOSA	177957.5	3.980567	227,522.00	3.980567	78	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	29196.96	2.562517	27,028.00	2.562517	108	50 - 150	0.0000	+/-0.50	
M2PFTA	408424.1	4.329667	479,880.00	4.329667	85	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	28086.29	3.794817	33,212.00	3.802783	85	50 - 150	-0.0080	+/-0.50	
MPFBA	252572.1	1.058467	256,957.00	1.058467	98	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	97688.41	2.880217	114,902.00	2.880217	85	50 - 150	0.0000	+/-0.50	
M6PFDA	395000.1	3.795333	445,919.00	3.795333	89	50 - 150	0.0000	+/-0.50	
M3PFBS	107557.4	1.944683	104,197.00	1.9364	103	50 - 150	0.0083	+/-0.50	
M7PFUnA	394744.1	3.946033	453,308.00	3.946017	87	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	28605.05	3.437283	27,565.00	3.445283	104	50 - 150	-0.0080	+/-0.50	
M5PFPeA	274098.7	1.757717	276,869.00	1.757717	99	50 - 150	0.0000	+/-0.50	
M5PFHxA	460367.3	2.655	458,596.00	2.646767	100	50 - 150	0.0082	+/-0.50	
M3PFHxS	71050.67	3.218333	68,806.00	3.218333	103	50 - 150	0.0000	+/-0.50	
M4PFHpA	467747.6	3.186933	461,168.00	3.186933	101	50 - 150	0.0000	+/-0.50	
M8PFOA	513461.1	3.453817	508,809.00	3.453817	101	50 - 150	0.0000	+/-0.50	
M8PFOS	69476.79	3.636183	76,995.00	3.636183	90	50 - 150	0.0000	+/-0.50	
M9PFNA	496207.2	3.637217	526,406.00	3.637217	94	50 - 150	0.0000	+/-0.50	
MPFDoA	315758.9	4.088634	386,713.00	4.088634	82	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	89045.16	3.9535	101,789.00	3.9535	87	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	94363.59	3.873767	116,586.00	3.873767	81	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 (B342713-BSD1) Lab File ID: B342713-BSD1.d Analyzed: 06/15/23 15:54									
M8FOSA	220138.8	3.980567	227,522.00	3.980567	97	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	32367.33	2.562517	27,028.00	2.562517	120	50 - 150	0.0000	+/-0.50	
M2PFTA	441651.6	4.329667	479,880.00	4.329667	92	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	31301.99	3.794817	33,212.00	3.802783	94	50 - 150	-0.0080	+/-0.50	
MPFBA	272321.5	1.058467	256,957.00	1.058467	106	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	118835	2.880217	114,902.00	2.880217	103	50 - 150	0.0000	+/-0.50	
M6PFDA	437059.7	3.795333	445,919.00	3.795333	98	50 - 150	0.0000	+/-0.50	
M3PFBS	114906.1	1.944683	104,197.00	1.9364	110	50 - 150	0.0083	+/-0.50	
M7PFUnA	421543.8	3.946033	453,308.00	3.946017	93	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	32375.59	3.437283	27,565.00	3.445283	117	50 - 150	-0.0080	+/-0.50	
M5PFPeA	296427	1.757717	276,869.00	1.757717	107	50 - 150	0.0000	+/-0.50	
M5PFHxA	497145.6	2.655	458,596.00	2.646767	108	50 - 150	0.0082	+/-0.50	
M3PFHxS	73935.12	3.218333	68,806.00	3.218333	107	50 - 150	0.0000	+/-0.50	
M4PFHpA	510817.8	3.186933	461,168.00	3.186933	111	50 - 150	0.0000	+/-0.50	
M8PFOA	559667.8	3.453817	508,809.00	3.453817	110	50 - 150	0.0000	+/-0.50	
M8PFOS	74508.68	3.636183	76,995.00	3.636183	97	50 - 150	0.0000	+/-0.50	
M9PFNA	545909.5	3.637217	526,406.00	3.637217	104	50 - 150	0.0000	+/-0.50	
MPFDoA	347648.5	4.088634	386,713.00	4.088634	90	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	93566.37	3.9535	101,789.00	3.9535	92	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	109406.2	3.873767	116,586.00	3.873767	94	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
Perfluorobutanesulfonic acid (PFBS)	NH-P,PA
Perfluoropentanoic acid (PFPeA)	NH-P,PA
Perfluorohexanoic acid (PFHxA)	NH-P,PA
11Cl-PF3OUdS (F53B Major)	NH-P,PA
9Cl-PF3ONS (F53B Minor)	NH-P,PA
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	NH-P,PA
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P,PA
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P,PA
Perfluorodecanoic acid (PFDA)	NH-P,PA
Perfluorododecanoic acid (PFDoA)	NH-P,PA
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	NH-P,PA
Perfluoroheptanesulfonic acid (PFHpS)	NH-P,PA
N-EtFOSAA (NEtFOSAA)	NH-P,PA
N-MeFOSAA (NMeFOSAA)	NH-P,PA
Perfluorotetradecanoic acid (PFTA)	NH-P,PA
Perfluorotridecanoic acid (PFTrDA)	NH-P,PA
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P,PA
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-butanedisulfonamide (FBSA)	NH-P,PA
Perfluorohexanesulfonic acid (PFHxS)	NH-P,PA
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P,PA
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P,PA
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P,PA
Perfluoropentanesulfonic acid (PFPeS)	NH-P,PA
Perfluoroundecanoic acid (PFUnA)	NH-P,PA
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P,PA
Perfluoroheptanoic acid (PFHpA)	NH-P,PA
Perfluorooctanoic acid (PFOA)	NH-P,PA
Perfluorooctanesulfonic acid (PFOS)	NH-P,PA
Perfluorononanoic acid (PFNA)	NH-P,PA

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

Code	Description	Number	Expires
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2023
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2024



Phone: 413-525-2332
Fax: 413-525-6405

Access COCs and Support Requests

Company Name: Horsley Withen Group
Address: 90 Route 108, Sandwich, MA
Phone: 508-833-6600
Project Name: HYA
Project Location: Hyannis, MA

Project Number:
Project Manager: Bryan Masso
Pace Quote Name/Number:

Invoice Recipient: bmasso@horsleywithen.com
Sampled By: Caroline Armstrong

Client Sample ID Description

Beginning Date/Time

Ending Date/Time

COMP/GRAB

Matrix Code

Conc Code

VIALS

GLASS

PLASTIC

BACTERIA

ENCORE

PCB ONLY

SOXHLET

NON SOXHLET

Format: PDF EXCEL

Other: ☐

CLP Like Data Pkg Required: ☐

Email To:

Fax To #:

Requested Turnaround Time

7-Day ☐ 10-Day ☐

PFAS 10-Day (std) ☒ Due Date:

Rush Approval Required

1-Day ☐ 3-Day ☐

2-Day ☐ 4-Day ☐

Data Delivery

Field Filtered

Lab to Filter

Orthophosphate Samples

Field Filtered

Lab to Filter

ANALYSIS REQUESTED

Preservation Code

Courier Use Only

Total Number Of:

23E3794 KAF

Doc # 381 Rev 5_07/13/2021

39 Spruce Street
East Longmeadow, MA 01028

CHAIN OF CUSTODY RECORD

http://www.pacelabs.com

Page 1 of 1

ANALYSIS REQUESTED

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

*Pace Analytical 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)

Please use the following codes to indicate possible sample concentration within the Conc Code column above:

H - High; M - Medium; L - Low; C - Clean; U - Unknown

MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

Government

Federal

City

MA

GW

MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

Government

Federal

City

MA

GW

MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

Government

Federal

City

MA

GW

MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

Government

Federal

City

MA

GW

MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

MA

GW

MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

Government

Federal

City

MA

GW

MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

Government

Federal

City

MA

GW

MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

Government

Federal

City

MA

GW

MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

MA

GW

MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

Government

Federal

City

MA

GW

MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

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Federal

City

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MA MCP Required

MCP Certification Form Required

CT RCP Required

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CT RCP Required

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MA State DW Required

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MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

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MCP Certification Form Required

CT RCP Required

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MA State DW Required

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MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

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MA MCP Required

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RCP Certification Form Required

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MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

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Federal

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MA MCP Required

MCP Certification Form Required

CT RCP Required

RCP Certification Form Required

MA State DW Required

PWSID #

Project Entity

Government

39 Spruce St.
East Longmeadow, MA. 01028
P: 413-525-2332
F: 413-525-6405
www.pacelabs.com

ENV-FRM-ELON-0001 V05__ Sample Receiving Checklist

Log In Back-Sheet

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



Client Horsley Witten Group

Project HYA

MCP/RCP Required MA MCP

Deliverable Package Requirement CN-1

Location Hyannis, MA

PWSID# (When Applicable) NA

Arrival Method:

Courier ☒ Fed Ex ☐ Walk In ☐ Other ☐

Received By / Date / Time GR 5/30/23 1606

Back-Sheet By / Date / Time GR 5/30/23 1857

Temperature Method gun # 2

Temp ☒ < 6° C Actual Temperature 2.4

Rush Samples: Yes / ☒ No / Notify

Short Hold: Yes / ☒ No / Notify

Notes regarding Samples/COC outside of SOP:

	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 ☒	Sampler Name ☒
Project ☒	IDs ☒	Collection Date/Time ☒

All Samples Proper pH: N/A ☐ ☐

Additional Container Notes

June 20, 2023

Bryan Massa
Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563

Project Location: Hyannis, MA
Client Job Number:
Project Number: 22071
Laboratory Work Order Number: 23E3794

Enclosed are results of analyses for samples as received by the laboratory on May 30, 2023. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Kaitlyn A. Feliciano
Project Manager

Table of Contents

Sample Summary	3
Case Narrative	4
Sample Results	5
23E3794-01	5
23E3794-02	6
23E3794-03	7
Sample Preparation Information	8
QC Data	9
Semivolatile Organic Compounds by - LC/MS-MS	9
B342713	9
Flag/Qualifier Summary	12
Internal standard Area & RT Summary	13
Certifications	19
Chain of Custody/Sample Receipt	20

Horsley Witten Group
90 Route 6A Unit #1
Sandwich, MA 02563
ATTN: Bryan Massa

REPORT DATE: 6/20/2023

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 22071

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 23E3794

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

PROJECT LOCATION: Hyannis, MA

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
ME-1	23E3794-01	Ground Water		SOP-454 PFAS	
ME-2	23E3794-02	Ground Water		SOP-454 PFAS	
ME-3	23E3794-03	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:****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:**Perfluoroheptanesulfonic acid (PFHpS)**

23E3794-01RE1[ME-1], 23E3794-02RE1[ME-2], 23E3794-03RE1[ME-3], B342713-BSD1

S-29

Extracted Internal Standard is outside of control limits.

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

23E3794-01RE1[ME-1]

M2-8:2FTS

S088753-CCV1

M8FOSA

23E3794-02RE1[ME-2]

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: Hyannis, MA

Sample Description:

Work Order: 23E3794

Date Received: 5/30/2023

Sampled: 5/26/2023 08:45

Field Sample #: ME-1

Sample ID: 23E3794-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	19	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorobutanesulfonic acid (PFBS)	2.5	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoropentanoic acid (PFPeA)	60	1.8	0.72	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorohexanoic acid (PFHxA)	38	1.8	0.74	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.87	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorodecanoic acid (PFDA)	0.83	1.8	0.75	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.84	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.0	1.8	0.74	ng/L	1	L-07	SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorotridecanoic acid (PFTTrDA)	ND	1.8	0.75	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.95	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-1-butanefulfonamide (FBFA)	1.3	1.8	0.71	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorohexanesulfonic acid (PFHxS)	29	1.8	0.65	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.65	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.59	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	43	1.8	1.1	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.4	1.8	0.69	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluoroheptanoic acid (PFHpA)	18	1.8	0.76	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorooctanoic acid (PFOA)	18	1.8	1.2	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorooctanesulfonic acid (PFOS)	69	1.8	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW
Perfluorononanoic acid (PFNA)	11	1.8	0.84	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:52	QNW

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

Project Location: Hyannis, MA

Sample Description:

Work Order: 23E3794

Date Received: 5/30/2023

Field Sample #: ME-2

Sampled: 5/26/2023 08:55

Sample ID: 23E3794-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	16	1.9	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorobutanesulfonic acid (PFBS)	4.2	1.9	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoropentanoic acid (PFPeA)	54	1.9	0.75	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorohexanoic acid (PFHxA)	40	1.9	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.9	0.71	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.9	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.98	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.56	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	5.7	1.9	0.90	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorodecanoic acid (PFDA)	ND	1.9	0.79	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.87	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.69	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.4	1.9	0.77	ng/L	1	L-07	SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.9	0.76	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.9	0.99	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.90	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorotridecanoic acid (PFTTrDA)	ND	1.9	0.78	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.98	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.96	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.97	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	1.0	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-1-butanefulfonamide (FBFA)	1.7	1.9	0.74	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorohexanesulfonic acid (PFHxS)	44	1.9	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.61	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	45	1.9	1.1	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoropentanesulfonic acid (PFPeS)	3.6	1.9	0.72	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.81	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluoroheptanoic acid (PFHpA)	17	1.9	0.80	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorooctanoic acid (PFOA)	17	1.9	1.3	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorooctanesulfonic acid (PFOS)	65	1.9	0.80	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW
Perfluorononanoic acid (PFNA)	6.7	1.9	0.87	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 16:59	QNW

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

Project Location: Hyannis, MA

Sample Description:

Work Order: 23E3794

Date Received: 5/30/2023

Field Sample #: ME-3

Sampled: 5/26/2023 08:50

Sample ID: 23E3794-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	8.2	1.8	0.67	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorobutanesulfonic acid (PFBS)	1.7	1.8	0.66	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoropentanoic acid (PFPeA)	23	1.8	0.71	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorohexanoic acid (PFHxA)	18	1.8	0.73	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
11Cl-PF3OUdS (F53B Major)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
9Cl-PF3ONS (F53B Minor)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.53	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorodecanoic acid (PFDA)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.83	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.66	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoroheptanesulfonic acid (PFHpS)	2.2	1.8	0.73	ng/L	1	L-07	SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
N-EtFOSAA (NEtFOSAA)	ND	1.8	0.72	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
N-MeFOSAA (NMeFOSAA)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.85	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorotridecanoic acid (PFTTrDA)	ND	1.8	0.74	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.69	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.93	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorooctanesulfonamide (FOSA)	11	1.8	0.91	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.92	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-1-hexanesulfonamide (FHxSA)	1.9	1.8	0.94	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-1-butanesulfonamide (FBSA)	0.91	1.8	0.70	ng/L	1	J	SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorohexanesulfonic acid (PFHxS)	34	1.8	0.64	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.64	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.58	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
6:2 Fluorotelomersulfonic acid (6:2FTS A)	2.7	1.8	1.1	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoropentanesulfonic acid (PFPeS)	2.1	1.8	0.68	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.77	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.70	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluoroheptanoic acid (PFHpA)	8.6	1.8	0.75	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorooctanoic acid (PFOA)	14	1.8	1.2	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorooctanesulfonic acid (PFOS)	83	1.8	0.76	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW
Perfluorononanoic acid (PFNA)	6.1	1.8	0.83	ng/L	1		SOP-454 PFAS	6/13/23	6/15/23 17:06	QNW

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

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
23E3794-01RE1 [ME-1]	B342713	276	1.00	06/13/23
23E3794-02RE1 [ME-2]	B342713	264	1.00	06/13/23
23E3794-03RE1 [ME-3]	B342713	279	1.00	06/13/23

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 B342713 - SOP 454-PFAAS
Blank (B342713-BLK1)

Prepared: 06/13/23 Analyzed: 06/15/23

Perfluorobutanoic acid (PFBA)	ND	2.1	ng/L
Perfluorobutanesulfonic acid (PFBS)	ND	2.1	ng/L
Perfluoropentanoic acid (PFPeA)	ND	2.1	ng/L
Perfluorohexanoic acid (PFHxA)	ND	2.1	ng/L
11Cl-PF3OUdS (F53B Major)	ND	2.1	ng/L
9Cl-PF3ONS (F53B Minor)	ND	2.1	ng/L
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.1	ng/L
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.1	ng/L
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.1	ng/L
Perfluorodecanoic acid (PFDA)	ND	2.1	ng/L
Perfluorododecanoic acid (PFDoA)	ND	2.1	ng/L
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	2.1	ng/L
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.1	ng/L
N-EtFOSAA (NEtFOSAA)	ND	2.1	ng/L
N-MeFOSAA (NMeFOSAA)	ND	2.1	ng/L
Perfluorotetradecanoic acid (PFTA)	ND	2.1	ng/L
Perfluorotridecanoic acid (PFTrDA)	ND	2.1	ng/L
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.1	ng/L
Perfluorodecanesulfonic acid (PFDS)	ND	2.1	ng/L
Perfluorooctanesulfonamide (FOSA)	ND	2.1	ng/L
Perfluorononanesulfonic acid (PFNS)	ND	2.1	ng/L
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.1	ng/L
Perfluoro-1-butanesulfonamide (FBSA)	ND	2.1	ng/L
Perfluorohexanesulfonic acid (PFHxS)	ND	2.1	ng/L
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.1	ng/L
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.1	ng/L
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.1	ng/L
Perfluoropentanesulfonic acid (PFPeS)	ND	2.1	ng/L
Perfluoroundecanoic acid (PFUnA)	ND	2.1	ng/L
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.1	ng/L
Perfluoroheptanoic acid (PFHpA)	ND	2.1	ng/L
Perfluorooctanoic acid (PFOA)	ND	2.1	ng/L
Perfluorooctanesulfonic acid (PFOS)	ND	2.1	ng/L
Perfluorononanoic acid (PFNA)	ND	2.1	ng/L

LCS (B342713-BS1)

Prepared: 06/13/23 Analyzed: 06/15/23

Perfluorobutanoic acid (PFBA)	10.3	2.0	ng/L	10.2	102	73-129
Perfluorobutanesulfonic acid (PFBS)	9.03	2.0	ng/L	8.99	100	72-130
Perfluoropentanoic acid (PFPeA)	10.3	2.0	ng/L	10.2	101	72-129
Perfluorohexanoic acid (PFHxA)	10.5	2.0	ng/L	10.2	103	72-129
11Cl-PF3OUdS (F53B Major)	9.20	2.0	ng/L	9.57	96.1	55.1-141
9Cl-PF3ONS (F53B Minor)	8.88	2.0	ng/L	9.47	93.7	59.6-146
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	9.47	2.0	ng/L	9.57	99.0	60.3-131
Hexafluoropropylene oxide dimer acid (HFPO-DA)	9.74	2.0	ng/L	10.2	95.9	37.6-167
8:2 Fluorotelomersulfonic acid (8:2FTS A)	9.64	2.0	ng/L	9.75	98.8	67-138
Perfluorodecanoic acid (PFDA)	10.6	2.0	ng/L	10.2	104	71-129
Perfluorododecanoic acid (PFDoA)	11.9	2.0	ng/L	10.2	117	72-134
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	8.89	2.0	ng/L	9.04	98.4	49.4-154

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 B342713 - SOP 454-PFAAS
LCS (B342713-BS1)

Prepared: 06/13/23 Analyzed: 06/15/23

Perfluoroheptanesulfonic acid (PFHpS)	10.5	2.0	ng/L	9.70		108	69-134			
N-EtFOSAA (NEtFOSAA)	11.4	2.0	ng/L	10.2		112	61-135			
N-MeFOSAA (NMeFOSAA)	11.9	2.0	ng/L	10.2		117	65-136			
Perfluorotetradecanoic acid (PFTA)	10.7	2.0	ng/L	10.2		105	71-132			
Perfluorotridecanoic acid (PFTTrDA)	11.7	2.0	ng/L	10.2		115	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	9.63	2.0	ng/L	9.50		101	63-143			
Perfluorodecanesulfonic acid (PFDS)	7.82	2.0	ng/L	9.80		79.7	53-142			
Perfluorooctanesulfonamide (FOSA)	10.8	2.0	ng/L	10.2		107	67-137			
Perfluorononanesulfonic acid (PFNS)	8.87	2.0	ng/L	9.75		90.9	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	9.25	2.0	ng/L	10.2		91.1	61.7-156			
Perfluoro-1-butanefulfonamide (FBSA)	9.18	2.0	ng/L	10.2		90.4	61.3-145			
Perfluorohexanesulfonic acid (PFHxS)	8.78	2.0	ng/L	9.30		94.4	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	10.4	2.0	ng/L	10.2		103	59.8-147			
Perfluoro-5-oxahexanoic acid (PFMBA)	10.0	2.0	ng/L	10.2		98.8	59.5-146			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	10.6	2.0	ng/L	9.65		110	64-140			
Perfluoropentanesulfonic acid (PFPeS)	9.72	2.0	ng/L	9.55		102	71-127			
Perfluoroundecanoic acid (PFUnA)	10.2	2.0	ng/L	10.2		100	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	11.3	2.0	ng/L	10.2		111	58.5-143			
Perfluoroheptanoic acid (PFHpA)	10.4	2.0	ng/L	10.2		103	72-130			
Perfluorooctanoic acid (PFOA)	10.7	2.0	ng/L	10.2		105	71-133			
Perfluorooctanesulfonic acid (PFOS)	9.66	2.0	ng/L	9.40		103	65-140			
Perfluorononanoic acid (PFNA)	10.1	2.0	ng/L	10.2		99.7	69-130			

LCS Dup (B342713-BSD1)

Prepared: 06/13/23 Analyzed: 06/15/23

Perfluorobutanoic acid (PFBA)	11.4	2.1	ng/L	10.5		109	73-129	9.93	30	
Perfluorobutanesulfonic acid (PFBS)	10.2	2.1	ng/L	9.26		110	72-130	12.3	30	
Perfluoropentanoic acid (PFPeA)	11.5	2.1	ng/L	10.5		109	72-129	10.8	30	
Perfluorohexanoic acid (PFHxA)	11.5	2.1	ng/L	10.5		110	72-129	9.29	30	
11Cl-PF3OUdS (F53B Major)	9.22	2.1	ng/L	9.86		93.5	55.1-141	0.252	30	
9Cl-PF3ONS (F53B Minor)	10.2	2.1	ng/L	9.76		105	59.6-146	13.9	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	10.5	2.1	ng/L	9.86		107	60.3-131	10.5	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	9.16	2.1	ng/L	10.5		87.6	37.6-167	6.15	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	12.6	2.1	ng/L	10.0		125	67-138	26.6	30	
Perfluorodecanoic acid (PFDA)	11.3	2.1	ng/L	10.5		108	71-129	6.41	30	
Perfluorododecanoic acid (PFDoA)	11.4	2.1	ng/L	10.5		109	72-134	3.79	30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	10.1	2.1	ng/L	9.32		108	49.4-154	12.3	30	
Perfluoroheptanesulfonic acid (PFHpS)	13.6	2.1	ng/L	10.0		137	* 69-134	26.4	30	L-07
N-EtFOSAA (NEtFOSAA)	12.3	2.1	ng/L	10.5		118	61-135	7.96	30	
N-MeFOSAA (NMeFOSAA)	12.9	2.1	ng/L	10.5		123	65-136	7.82	30	
Perfluorotetradecanoic acid (PFTA)	11.6	2.1	ng/L	10.5		111	71-132	8.45	30	
Perfluorotridecanoic acid (PFTTrDA)	11.5	2.1	ng/L	10.5		110	65-144	1.59	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	10.3	2.1	ng/L	9.79		106	63-143	7.08	30	
Perfluorodecanesulfonic acid (PFDS)	8.99	2.1	ng/L	10.1		89.0	53-142	14.0	30	
Perfluorooctanesulfonamide (FOSA)	11.6	2.1	ng/L	10.5		111	67-137	6.57	30	
Perfluorononanesulfonic acid (PFNS)	11.5	2.1	ng/L	10.0		115	69-127	25.9	30	
Perfluoro-1-hexanesulfonamide (FHxSA)	10.6	2.1	ng/L	10.5		101	61.7-156	13.3	30	
Perfluoro-1-butanefulfonamide (FBSA)	10.7	2.1	ng/L	10.5		102	61.3-145	15.0	30	
Perfluorohexanesulfonic acid (PFHxS)	10.5	2.1	ng/L	9.58		109	68-131	17.6	30	
Perfluoro-4-oxapentanoic acid (PFMPA)	11.7	2.1	ng/L	10.5		111	59.8-147	11.2	30	
Perfluoro-5-oxahexanoic acid (PFMBA)	11.3	2.1	ng/L	10.5		108	59.5-146	12.3	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 B342713 - SOP 454-PFAAS
LCS Dup (B342713-BSD1)

Prepared: 06/13/23 Analyzed: 06/15/23

6:2 Fluorotelomersulfonic acid (6:2FTS A)	9.81	2.1	ng/L	9.94		98.6	64-140	8.13	30	
Perfluoropentanesulfonic acid (PFPeS)	11.0	2.1	ng/L	9.84		112	71-127	12.7	30	
Perfluoroundecanoic acid (PFUnA)	11.4	2.1	ng/L	10.5		109	69-133	11.4	30	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	12.4	2.1	ng/L	10.5		119	58.5-143	9.68	30	
Perfluoroheptanoic acid (PFHpA)	11.1	2.1	ng/L	10.5		106	72-130	5.87	30	
Perfluorooctanoic acid (PFOA)	11.2	2.1	ng/L	10.5		107	71-133	4.69	30	
Perfluorooctanesulfonic acid (PFOS)	11.1	2.1	ng/L	9.68		114	65-140	13.7	30	
Perfluorononanoic acid (PFNA)	11.3	2.1	ng/L	10.5		108	69-130	11.0	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.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
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.
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
ME-1 (23E3794-01RE1) Lab File ID: 23E3794-01RE1.d Analyzed: 06/15/23 16:52									
M8FOSA	213334.6	3.980567	227,522.00	3.980567	94	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	28486.3	2.562517	27,028.00	2.562517	105	50 - 150	0.0000	+/-0.50	
M2PFTA	355459	4.329667	479,880.00	4.329667	74	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	37332.14	3.794817	33,212.00	3.802783	112	50 - 150	-0.0080	+/-0.50	
MPFBA	231042	1.066783	256,957.00	1.058467	90	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	102523.9	2.880217	114,902.00	2.880217	89	50 - 150	0.0000	+/-0.50	
M6PFDA	449810.7	3.795333	445,919.00	3.795333	101	50 - 150	0.0000	+/-0.50	
M3PFBS	110999.1	1.944683	104,197.00	1.9364	107	50 - 150	0.0083	+/-0.50	
M7PFUnA	450689.3	3.946033	453,308.00	3.946017	99	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	43785.91	3.445283	27,565.00	3.445283	159	50 - 150	0.0000	+/-0.50	*
M5PFPeA	271434.3	1.757717	276,869.00	1.757717	98	50 - 150	0.0000	+/-0.50	
M5PFHxA	467718.8	2.655	458,596.00	2.646767	102	50 - 150	0.0082	+/-0.50	
M3PFHxS	77050.47	3.218333	68,806.00	3.218333	112	50 - 150	0.0000	+/-0.50	
M4PFHpA	500292.4	3.186933	461,168.00	3.186933	108	50 - 150	0.0000	+/-0.50	
M8PFOA	548914.8	3.453817	508,809.00	3.453817	108	50 - 150	0.0000	+/-0.50	
M8PFOS	76850.11	3.636183	76,995.00	3.636183	100	50 - 150	0.0000	+/-0.50	
M9PFNA	512879.3	3.637217	526,406.00	3.637217	97	50 - 150	0.0000	+/-0.50	
MPFDoA	361032.2	4.088634	386,713.00	4.088634	93	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	91828.38	3.9535	101,789.00	3.9535	90	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	107819.7	3.873767	116,586.00	3.873767	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
ME-2 (23E3794-02RE1) Lab File ID: 23E3794-02RE1.d Analyzed: 06/15/23 16:59									
M8FOSA	63430.73	3.980567	227,522.00	3.980567	28	50 - 150	0.0000	+/-0.50	*
M2-4:2FTS	24893.35	2.562517	27,028.00	2.562517	92	50 - 150	0.0000	+/-0.50	
M2PFTA	364628.1	4.329667	479,880.00	4.329667	76	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	31018.9	3.794817	33,212.00	3.802783	93	50 - 150	-0.0080	+/-0.50	
MPFBA	216959.8	1.058467	256,957.00	1.058467	84	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	98515.74	2.880217	114,902.00	2.880217	86	50 - 150	0.0000	+/-0.50	
M6PFDA	380677.3	3.795333	445,919.00	3.795333	85	50 - 150	0.0000	+/-0.50	
M3PFBS	99833.68	1.9364	104,197.00	1.9364	96	50 - 150	0.0000	+/-0.50	
M7PFUnA	358386.6	3.946033	453,308.00	3.946017	79	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	37812.95	3.437283	27,565.00	3.445283	137	50 - 150	-0.0080	+/-0.50	
M5PFPeA	250487.6	1.757717	276,869.00	1.757717	90	50 - 150	0.0000	+/-0.50	
M5PFHxA	423755.1	2.655	458,596.00	2.646767	92	50 - 150	0.0082	+/-0.50	
M3PFHxS	69592.15	3.218333	68,806.00	3.218333	101	50 - 150	0.0000	+/-0.50	
M4PFHpA	456410.2	3.186933	461,168.00	3.186933	99	50 - 150	0.0000	+/-0.50	
M8PFOA	478276.5	3.453817	508,809.00	3.453817	94	50 - 150	0.0000	+/-0.50	
M8PFOS	68816.74	3.636183	76,995.00	3.636183	89	50 - 150	0.0000	+/-0.50	
M9PFNA	474013.9	3.637217	526,406.00	3.637217	90	50 - 150	0.0000	+/-0.50	
MPFDoA	295467.7	4.088634	386,713.00	4.088634	76	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	71346.97	3.9535	101,789.00	3.9535	70	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	82685.68	3.873767	116,586.00	3.873767	71	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
ME-3 (23E3794-03RE1)			Lab File ID: 23E3794-03RE1.d			Analyzed: 06/15/23 17:06			
M8FOSA	166835.3	3.980567	227,522.00	3.980567	73	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	24394.43	2.562517	27,028.00	2.562517	90	50 - 150	0.0000	+/-0.50	
M2PFTA	343507.3	4.329667	479,880.00	4.329667	72	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	29683.95	3.794817	33,212.00	3.802783	89	50 - 150	-0.0080	+/-0.50	
MPFBA	199579.7	1.066783	256,957.00	1.058467	78	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	95104.96	2.880217	114,902.00	2.880217	83	50 - 150	0.0000	+/-0.50	
M6PFDA	375022.2	3.795333	445,919.00	3.795333	84	50 - 150	0.0000	+/-0.50	
M3PFBS	92953.21	1.9364	104,197.00	1.9364	89	50 - 150	0.0000	+/-0.50	
M7PFUnA	351270.3	3.946033	453,308.00	3.946017	77	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	31350.92	3.437283	27,565.00	3.445283	114	50 - 150	-0.0080	+/-0.50	
M5PFPeA	231561.3	1.757717	276,869.00	1.757717	84	50 - 150	0.0000	+/-0.50	
M5PFHxA	392931.2	2.646767	458,596.00	2.646767	86	50 - 150	0.0000	+/-0.50	
M3PFHxS	64172.11	3.218333	68,806.00	3.218333	93	50 - 150	0.0000	+/-0.50	
M4PFHpA	411807.9	3.186933	461,168.00	3.186933	89	50 - 150	0.0000	+/-0.50	
M8PFOA	450823.7	3.453817	508,809.00	3.453817	89	50 - 150	0.0000	+/-0.50	
M8PFOS	64565.88	3.636183	76,995.00	3.636183	84	50 - 150	0.0000	+/-0.50	
M9PFNA	438212.4	3.637217	526,406.00	3.637217	83	50 - 150	0.0000	+/-0.50	
MPFDoA	287448.7	4.088634	386,713.00	4.088634	74	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	80767.51	3.9535	101,789.00	3.9535	79	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	82407.26	3.873767	116,586.00	3.873767	71	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
Blank (B342713-BLK1) Lab File ID: B342713-BLK1.d Analyzed: 06/15/23 16:01									
M8FOSA	196862.9	3.980567	227,522.00	3.980567	87	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	26152.61	2.562517	27,028.00	2.562517	97	50 - 150	0.0000	+/-0.50	
M2PFTA	427562.6	4.337783	479,880.00	4.329667	89	50 - 150	0.0081	+/-0.50	
M2-8:2FTS	29892	3.794817	33,212.00	3.802783	90	50 - 150	-0.0080	+/-0.50	
MPFBA	249440.2	1.058467	256,957.00	1.058467	97	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	94002.9	2.880217	114,902.00	2.880217	82	50 - 150	0.0000	+/-0.50	
M6PFDA	409812.8	3.795333	445,919.00	3.795333	92	50 - 150	0.0000	+/-0.50	
M3PFBS	105955.5	1.944683	104,197.00	1.9364	102	50 - 150	0.0083	+/-0.50	
M7PFUnA	426348.8	3.946017	453,308.00	3.946017	94	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	26142.75	3.437283	27,565.00	3.445283	95	50 - 150	-0.0080	+/-0.50	
M5PFPeA	274971.8	1.757717	276,869.00	1.757717	99	50 - 150	0.0000	+/-0.50	
M5PFHxA	449201.1	2.655	458,596.00	2.646767	98	50 - 150	0.0082	+/-0.50	
M3PFHxS	65679.15	3.218333	68,806.00	3.218333	95	50 - 150	0.0000	+/-0.50	
M4PFHpA	468079.8	3.186933	461,168.00	3.186933	101	50 - 150	0.0000	+/-0.50	
M8PFOA	511877	3.453817	508,809.00	3.453817	101	50 - 150	0.0000	+/-0.50	
M8PFOS	68250.95	3.636183	76,995.00	3.636183	89	50 - 150	0.0000	+/-0.50	
M9PFNA	486195.3	3.637217	526,406.00	3.637217	92	50 - 150	0.0000	+/-0.50	
MPFDoA	361203.5	4.088634	386,713.00	4.088634	93	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	91567.28	3.9535	101,789.00	3.9535	90	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	109350.9	3.873767	116,586.00	3.873767	94	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 (B342713-BS1)			Lab File ID: B342713-BS1.d			Analyzed: 06/15/23 15:47			
M8FOSA	177957.5	3.980567	227,522.00	3.980567	78	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	29196.96	2.562517	27,028.00	2.562517	108	50 - 150	0.0000	+/-0.50	
M2PFTA	408424.1	4.329667	479,880.00	4.329667	85	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	28086.29	3.794817	33,212.00	3.802783	85	50 - 150	-0.0080	+/-0.50	
MPFBA	252572.1	1.058467	256,957.00	1.058467	98	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	97688.41	2.880217	114,902.00	2.880217	85	50 - 150	0.0000	+/-0.50	
M6PFDA	395000.1	3.795333	445,919.00	3.795333	89	50 - 150	0.0000	+/-0.50	
M3PFBS	107557.4	1.944683	104,197.00	1.9364	103	50 - 150	0.0083	+/-0.50	
M7PFUnA	394744.1	3.946033	453,308.00	3.946017	87	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	28605.05	3.437283	27,565.00	3.445283	104	50 - 150	-0.0080	+/-0.50	
M5PFPeA	274098.7	1.757717	276,869.00	1.757717	99	50 - 150	0.0000	+/-0.50	
M5PFHxA	460367.3	2.655	458,596.00	2.646767	100	50 - 150	0.0082	+/-0.50	
M3PFHxS	71050.67	3.218333	68,806.00	3.218333	103	50 - 150	0.0000	+/-0.50	
M4PFHpA	467747.6	3.186933	461,168.00	3.186933	101	50 - 150	0.0000	+/-0.50	
M8PFOA	513461.1	3.453817	508,809.00	3.453817	101	50 - 150	0.0000	+/-0.50	
M8PFOS	69476.79	3.636183	76,995.00	3.636183	90	50 - 150	0.0000	+/-0.50	
M9PFNA	496207.2	3.637217	526,406.00	3.637217	94	50 - 150	0.0000	+/-0.50	
MPFDoA	315758.9	4.088634	386,713.00	4.088634	82	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	89045.16	3.9535	101,789.00	3.9535	87	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	94363.59	3.873767	116,586.00	3.873767	81	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 (B342713-BSD1) Lab File ID: B342713-BSD1.d Analyzed: 06/15/23 15:54									
M8FOSA	220138.8	3.980567	227,522.00	3.980567	97	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	32367.33	2.562517	27,028.00	2.562517	120	50 - 150	0.0000	+/-0.50	
M2PFTA	441651.6	4.329667	479,880.00	4.329667	92	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	31301.99	3.794817	33,212.00	3.802783	94	50 - 150	-0.0080	+/-0.50	
MPFBA	272321.5	1.058467	256,957.00	1.058467	106	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	118835	2.880217	114,902.00	2.880217	103	50 - 150	0.0000	+/-0.50	
M6PFDA	437059.7	3.795333	445,919.00	3.795333	98	50 - 150	0.0000	+/-0.50	
M3PFBS	114906.1	1.944683	104,197.00	1.9364	110	50 - 150	0.0083	+/-0.50	
M7PFUnA	421543.8	3.946033	453,308.00	3.946017	93	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	32375.59	3.437283	27,565.00	3.445283	117	50 - 150	-0.0080	+/-0.50	
M5PFPeA	296427	1.757717	276,869.00	1.757717	107	50 - 150	0.0000	+/-0.50	
M5PFHxA	497145.6	2.655	458,596.00	2.646767	108	50 - 150	0.0082	+/-0.50	
M3PFHxS	73935.12	3.218333	68,806.00	3.218333	107	50 - 150	0.0000	+/-0.50	
M4PFHpA	510817.8	3.186933	461,168.00	3.186933	111	50 - 150	0.0000	+/-0.50	
M8PFOA	559667.8	3.453817	508,809.00	3.453817	110	50 - 150	0.0000	+/-0.50	
M8PFOS	74508.68	3.636183	76,995.00	3.636183	97	50 - 150	0.0000	+/-0.50	
M9PFNA	545909.5	3.637217	526,406.00	3.637217	104	50 - 150	0.0000	+/-0.50	
MPFDoA	347648.5	4.088634	386,713.00	4.088634	90	50 - 150	0.0000	+/-0.50	
D5-NEtFOSAA	93566.37	3.9535	101,789.00	3.9535	92	50 - 150	0.0000	+/-0.50	
D3-NMeFOSAA	109406.2	3.873767	116,586.00	3.873767	94	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
Perfluorobutanesulfonic acid (PFBS)	NH-P,PA
Perfluoropentanoic acid (PFPeA)	NH-P,PA
Perfluorohexanoic acid (PFHxA)	NH-P,PA
11Cl-PF3OUdS (F53B Major)	NH-P,PA
9Cl-PF3ONS (F53B Minor)	NH-P,PA
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	NH-P,PA
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P,PA
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P,PA
Perfluorodecanoic acid (PFDA)	NH-P,PA
Perfluorododecanoic acid (PFDoA)	NH-P,PA
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	NH-P,PA
Perfluoroheptanesulfonic acid (PFHpS)	NH-P,PA
N-EtFOSAA (NEtFOSAA)	NH-P,PA
N-MeFOSAA (NMeFOSAA)	NH-P,PA
Perfluorotetradecanoic acid (PFTA)	NH-P,PA
Perfluorotridecanoic acid (PFTrDA)	NH-P,PA
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P,PA
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-butanedisulfonamide (FBSA)	NH-P,PA
Perfluorohexanesulfonic acid (PFHxS)	NH-P,PA
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P,PA
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P,PA
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P,PA
Perfluoropentanesulfonic acid (PFPeS)	NH-P,PA
Perfluoroundecanoic acid (PFUnA)	NH-P,PA
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P,PA
Perfluoroheptanoic acid (PFHpA)	NH-P,PA
Perfluorooctanoic acid (PFOA)	NH-P,PA
Perfluorooctanesulfonic acid (PFOS)	NH-P,PA
Perfluorononanoic acid (PFNA)	NH-P,PA

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

Code	Description	Number	Expires
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2023
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2024



Phone: 413-525-2332
Fax: 413-525-6405

Access COCs and Support Requests

Company Name: Horsley Withen Group
Address: 90 Route 10A, Sandwich, MA
Phone: 508-833-6600
Project Name: HWA
Project Location: Hyannis, MA

Project Number:
Project Manager: Bryan Masso
Pace Quote Name/Number:

Invoice Recipient: bmasso@horsleywithen.com
Sampled By: Caroline Armstrong

Client Sample ID Description

Beginning Date/Time

Ending Date/Time

COMP/GRAB

Matrix Code

Conc Code

VIALS

GLASS

PLASTIC

BACTERIA

ENCORE

PCB ONLY

SOXHLET

NON SOXHLET

Format: PDF EXCEL

Other: ☐

CLP Like Data Pkg Required: ☐

Email To:

Fax To #:

Requested Turnaround Time

7-Day ☐ 10-Day ☐

PFAS 10-Day (std) ☒ Due Date:

1-Day ☐ 3-Day ☐

2-Day ☐ 4-Day ☐

Rush Approval Required

Orthophosphate Samples

Field Filtered

Lab to Filter

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Data Delivery

PCB ONLY

SOXHLET

NON SOXHLET

Format: PDF EXCEL

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Requested Turnaround Time

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PFAS 10-Day (std) ☒ Due Date:

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Data Delivery

PCB ONLY

SOXHLET

39 Spruce St.
East Longmeadow, MA. 01028
P: 413-525-2332
F: 413-525-6405
www.pacelabs.com

ENV-FRM-ELON-0001 V05__ Sample Receiving Checklist

Log In Back-Sheet

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



Client Horsley Witten Group

Project HYA

MCP/RCP Required MA MCP

Deliverable Package Requirement CN-1

Location Hyannis, MA

PWSID# (When Applicable) NA

Arrival Method:

Courier ☒ Fed Ex ☐ Walk In ☐ Other ☐

Received By / Date / Time GR 5/30/23 1606

Back-Sheet By / Date / Time GR 5/30/23 1857

Temperature Method gun # 2

Temp ☒ < 6° C Actual Temperature 2.4

Rush Samples: Yes / ☒ No / Notify

Short Hold: Yes / ☒ No / Notify

Notes regarding Samples/COC outside of SOP:

	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	☒	☐

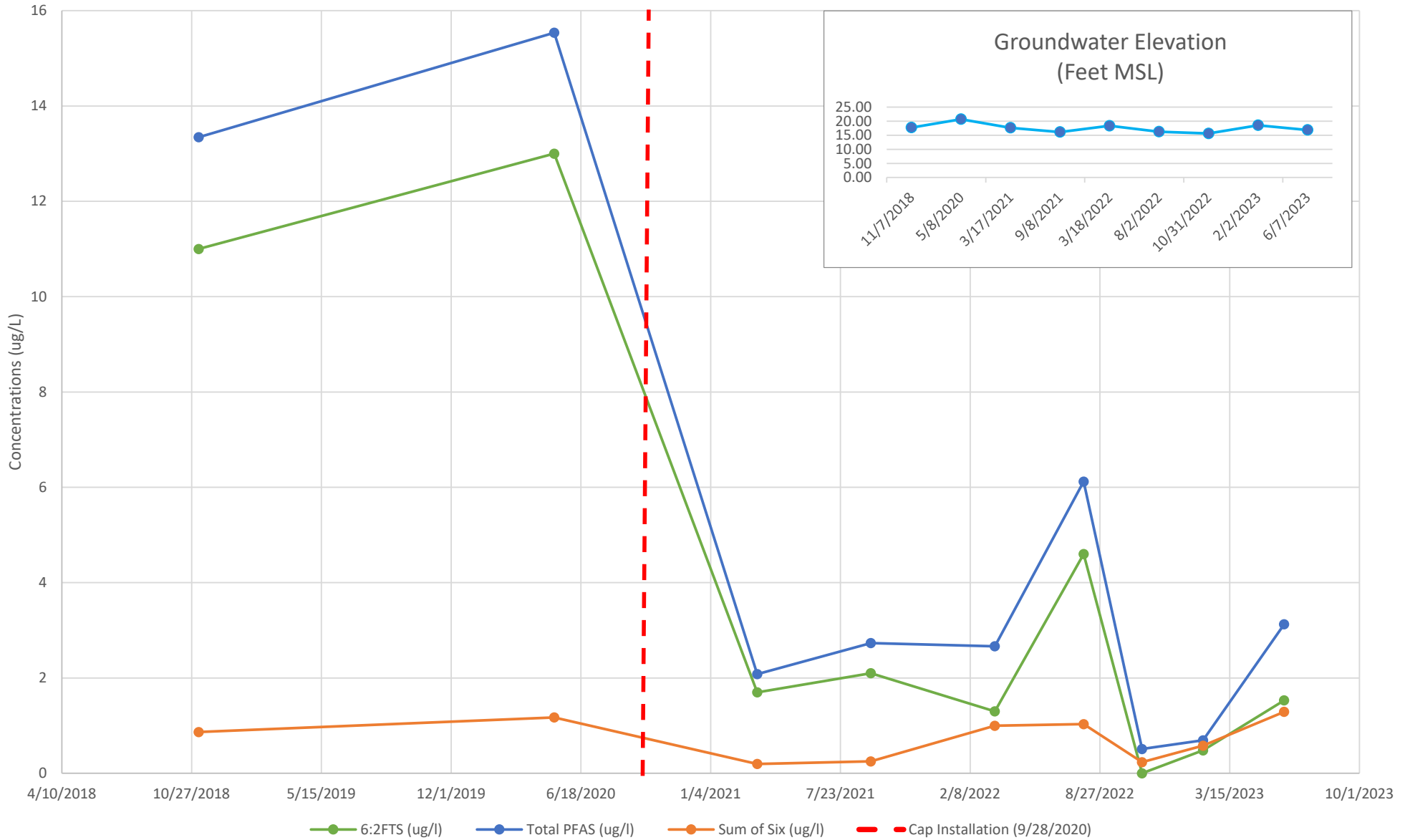
COC Included: (Check all included)

Client ☒ Analysis ☒ Sampler Name ☒
Project ☒ IDs ☒ Collection Date/Time ☒

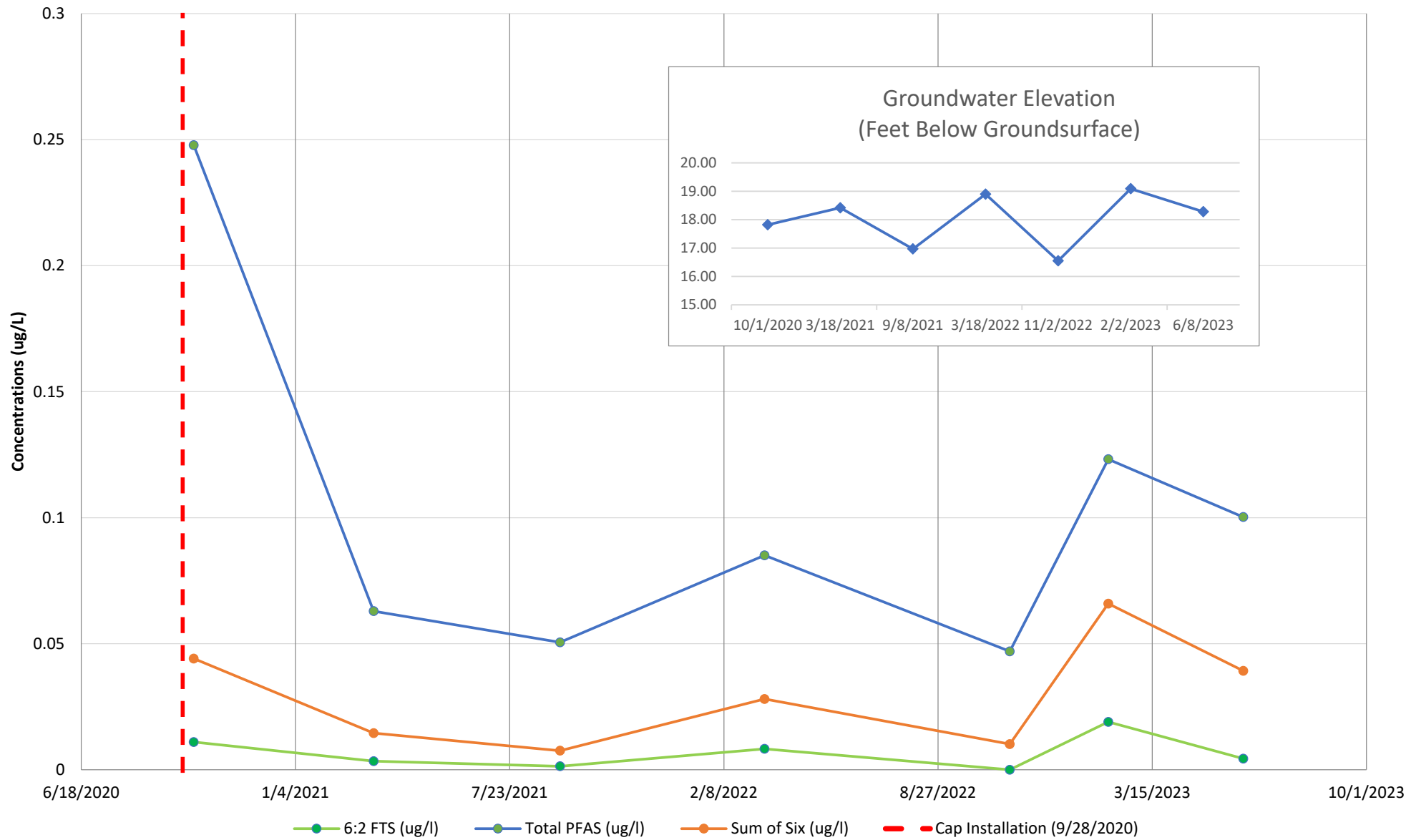
All Samples Proper pH: N/A ☐ ☐

Additional Container Notes

HW-I(s)



HW-P(s)



COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DRINKING WATER PROGRAM
100 CAMBRIDGE STREET, SUITE 900, BOSTON, MA 02114 • (617) 292-5770



2023
Certificate of Registration

The Department of Environmental Protection
Drinking Water Program
Hereby Recognizes the

**HYANNIS WATER SYSTEM, TOWN OF
BARNSTABLE
PWS ID # 4020004**

as a Registered Public Water System in Massachusetts.
Public Water Systems must comply with
the Massachusetts Drinking Water Regulations,
310 CMR 22.00.

A handwritten signature in black ink, reading "Yvette dePeiza".

Yvette dePeiza, Program Director
Drinking Water Program

Certificate expires December 31, 2023

Please contact the Drinking Water Program if there are any changes in this system.

MassDEP: <https://www.mass.gov/orgs/massachusetts-department-of-environmental-protection>

Information for Persons with Compromised Immune Systems

Some people are more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons, such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC (Center for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the **Safe Drinking Water Hotline (800) 426-4791 or www.epa.gov/safewater/hotline**.

Source Water Assessment and Protection

The Massachusetts DEP has prepared a Source Water Assessment Program (SWAP) Report for the Hyannis Water System. The report assesses the susceptibility of public water supplies to contamination and makes recommendations. This report is available from the Hyannis Water System located at 47 Old Yarmouth Road in Hyannis, the local Board of Health and also at the DEP website: **<http://www.mass.gov/dep/water/drinking/sourcewa.htm#reports>**.

A susceptibility ranking of HIGH was assigned to all wells in our system by the DEP due to the absence of hydrogeologic barriers, i.e., clay, in the Cape Cod Aquifer. There are activities and land uses within the Zone I, a 400 ft. radius around each well head, and the Zone II, the aquifer recharge area, that can contribute to drinking water contamination. Examples include local roads and power line easements in the Zone I, transportation corridors, residential septic systems, heating oil storage, household hazardous materials usage and storage, and stormwater from roads and lawns within the Zone II.

The Hyannis Water System was commended by the Massachusetts DEP for posting water protection signs, acquiring and protecting land within Zone I areas, and working with the Town of Yarmouth to protect Zone II areas.

In conjunction with its certified operator, Veolia, the Hyannis Water System is addressing the concerns stated in the SWAP Report and welcomes your input to our planning. If you have questions, please contact Kevin Sampson at (508) 775-0063

2022 Hyannis Water System improvements

In 2022 the Hyannis Water System’s capital improvements dealt with the 12 inch water main replacement on Phinney’s Lane in conjunction with the sewer expansion and Vineyard Wind conduit installation project. The water mains at the intersection of Route 28 and Yarmouth Road were replaced as part of the Mass DOT intersection improvements.



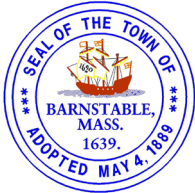
Fire Service Installation

How Many Times a Day Do You Turn on the Faucet?

The average American home uses about 100 to 130 gallons of water a day. Did you know that only 1% of our in-home water use is for drinking? The majority of our daily water consumption, about 75%, is used in the bathroom. Did you know that 14% of in-home water use is wasted by leaking taps and toilets? Conserving water is as simple as repairing leaky faucets and toilets, taking shorter showers, not leaving water running while brushing teeth, washing hands, washing fruits and vegetables. Learn more about using water wisely at www.USEPA/WaterSense.

Using water wisely benefits you and the environment.

Hyannis Water System
Operated by Veolia
47 Old Yarmouth Road
Hyannis, MA 02601-0326
(508) 775-0063



ANNUAL

WATER QUALITY REPORT

Water testing performed in calendar year 2022

Hyannis Water System
PWS ID: #4020004



The night-time installation of a 3-way valve cluster during a snow event in Hyannis

Hyannis Water Board

- Samuel Wilson, Chair
- Amy Wrightson, Vice-chair
- Jonathan Jaxtimer, Member
- Louise O’Neil, Member
- Timothy Stump, Member

Este relatório contém informações importantes sobre a água potável. Ter alguém que traduzi-lo para você, ou falar com alguém que entende-lo.

Hyannis Water System
The Hyannis Water System is operated and maintained by a private company, Veolia, with oversight provided by the Town of Barnstable Department of Public Works, Water Supply Division.

Questions about this report
Please contact:
Hans Keijser, Supervisor, Water Supply Division
508-775-0063

This report was prepared by Veolia for the Hyannis Water System. Additional copies of this report are available upon request; please contact (508) 775-0063 for additional copies.

established by the American Water Works Association. Chemicals also must meet the performance standards by the American National Standards Institute (ANSI). International) or Underwriters Laboratory, both accredited organizations: National Sanitation Foundation (NSF) for water treatment by one or more of the following All chemicals used for the corrosion control are approved for water treatment by one or more of the following have contributed to the detection of Volatile Organic Compounds (VOCs) in the Maher well field. These chemicals are removed from the water using an aeration process and then adding a disinfectant to the water before it enters the distribution system.

Activated carbon filtration systems are installed on all of the Hyannis Water System wells to remove PFAS contamination.

All chemicals used for the corrosion control are approved for water treatment by one or more of the following organizations: National Sanitation Foundation (NSF International) or Underwriters Laboratory, both accredited by the American National Standards Institute (ANSI). Chemicals also must meet the performance standards established by the American Water Works Association.

Water Treatment

In our effort to supply safe, clean and healthy water to the Hyannis communities, chemicals are added in safe quantities to ensure that your water quality is consistently maintained.

United Water Environmental Services began operating the Hyannis Water System on July 1, 2009. As of November 16, 2015 United Water was consolidated under Suez and now Veolia. The operations contract includes operations and maintenance of the water treatment plants and the system’s pumping stations, cross connection control services, inspection and maintenance of the distribution system, fire hydrants and gate valves, the complete rehabilitation of two system wells per year, hydrant painting, meter installation and maintenance, customer service, billing and all other duties required for the day to day operations of the public water supply treatment and distribution system. Oversight of the contract is provided by the Barnstable Department of Public Works Water Supply Division.

Office Hours
Monday through Friday 8 AM to 5 PM
Saturday 8 AM to 12 PM

In the event of any emergency call:
(508) 775-0063
Staff is available 24/7

Maintaining Water Quality

The Hyannis Water System continuously strives to produce the highest quality water that meets or surpasses water quality standards for safe drinking water. We monitor all our water sources and distribution system very closely. The standards that we operate under were enacted by the U. S. Congress as the Safe Drinking Water Act in 1974 and amended in 1986 and 1996.

To ensure tap water is safe to drink, the Massachusetts Department of Environmental Protection (DEP) and U.S. Environmental Protection Agency (EPA) prescribe regulations that limit the amount of certain contaminants in water provided by all public drinking water systems. The Food and Drug Administration (FDA) and the Massachusetts Department of Public Health regulations establish the limits for contaminants in bottled water to provide the same protection for public health.

The Hyannis Water System meets all primary Water Quality Standards set forth by the United States Environmental Protection Agency and Massachusetts Department of Environmental Protection.

The Hyannis Water Board is proud to present its annual water quality report. The statistics in this report are based on testing done throughout 2022 as well as prior years. We hope you will find it helpful to know the sources of your water and the process by which safe drinking water is delivered to your home or business. We have maintained our high standards in an effort to continue delivering the best quality drinking water possible. We remain vigilant in meeting the challenges of source water protection.

Where Does My Water Come From?

The Hyannis Water System supplies the most densely populated residential and commercial areas of Hyannis, Hyannisport, and West Hyannisport comprising approximately 9 square miles. The water is obtained from 11 groundwater wells that are located in the Town of Barnstable and draw water from the Sagamore Lens, part of the Cape Cod Aquifer. The wells are: Airport # 1 (4020004-10g), Hyannisport Well (4020004-03g), Maher Well # 1 (4020004-07g), Maher Well # 2 (4020004-02g), Maher Well # 3 (4020004-11g), Mary Dunn Well # 1 (4020004-04g), Mary Dunn Well # 2 (4020004-05g), Mary Dunn Well # 3 (4020004-08g), Mary Dunn Well # 4 (4020004-09g), Straightway Well (4020004-12g), and the Simmons Pond Well (4020004-06g).

There are also four water storage tanks. Two located on Mary Dunn Road: Mary Dunn Tank # 1 - 370,000 gallons, Mary Dunn Tank # 2 - 1 million gallons, Maher - 800,000 gallons and Straightway - 400,000 gallons.

Water system interconnections are established with the Town of Yarmouth water system and the COMM. water system to have the ability to draw water as a backup water supply.

Opportunities for Public Participation

We encourage you to share your thoughts with us on the information contained in this report. Our meetings are open public meetings. A schedule of these meetings is posted on the Town of Barnstable website: <http://www.town.barnstable.ma.us/Hyannis-WaterBoard/?brcd=Hyannis+Water+Board>. Should you ever have questions, we are available to assist you. Call Hans Keijser, Supervisor, Water Supply Division at 508 775-0063

DISTRIBUTION SYSTEM WATER QUALITY								
This report summarizes only those items detected during sampling - not all contaminants that are monitored								
Microbial Results	Highest % Positive in a Month	Range Detected	MCL	MCLG	Violation	Possible Source of Contamination		
Total Coliform Bacteria **	0.0%	0%	>5% Monthly Samples Positive	0	No	Naturally present in the environment		
E.coli (in ground water source) **	1 Positive sample	ND-1	TT	N/A	No	Human and animal fecal waste		
*Compliance with the Fecal Coliform / E.coli MCL is determined upon additional repeat testing.								
**Total Coliform: We were notified on 10/04/2022 of an E.coli positive sample in the raw water sample from Maher well 2 (O2-G). You may remember receiving public notice of this violation on 10/04/2022. Because of this we took Maher Well 2 (O2-G) off-line on 10/04/2022 for one day till the results of the 5 samples were known. ** On 10/04/2022 We took 5 repeat samples at Maher Well 2 (O2-G) for E.coli on 10/04/2022. We were notified by the lab on 10/05/2022 that all 5 samples were absent for E.coli. We were in contact with MASS DEP and they permitted us to put Maher Well 2 (O2-G) back on-line.								
Health Effects: Fecal coliform and E. coli are bacteria whose presence indicates that the water maybe contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a health risk for infants, young children, some elderly, and people with severely compromised immune systems.								
Lead & Copper	Dates Collected	90th Percentile	Action Level	MCLG	# of Sites samples	# of Sites Above Action Level	Violation	Possible Source of Contamination
Lead (ppm)	4/07/2022-4/21/2022	0	0.015	0	30	0	No	Corrosion of household plumbing systems; Erosion of natural deposits
Copper (ppm)	4/07/2022-4/21/2022	0.63	1.3	1.3	30	0	No	Corrosion of household plumbing systems; Erosion of natural deposits
TESTING FOR LEAD - If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Hyannis Water System is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead .								
SUMMARY OF FINISHED WATER CHARACTERISTICS								
Regulated Contaminants	Date(s) Collected	Highest Detect Value	Range Detected	MCL	MCLG	Violation	Possible Source of Contamination	
Inorganic Contaminants:								
Barium (ppm)	4/13/22	0.03	N/A	2	2	No	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	
Cadmium (ppm)	4/13/22	ND	N/A	0.004	0.005	No	Corrosion of galvanized pipes;erosion of natural deposits;discharge from metal refineries;runoff from waste batteries and paints	
Sodium** (ppm)	4/13/22	76	N/A		20		Road salting; erosion of natural deposits	
Arsenic (ppm)	4/13/22	ND	ND - 0.001	0.01	0.1	No	Run off from orchards; and from glass& electronics production wastes. Erosion of natural deposits.	
Fluoride (ppm)	4/13/22	0.054	N/A	4	4	No	Discharge from fertilizer and aluminum factories; erosion of natural deposits.	
Selenium (ppm)	4/13/22	ND	ND - 0.002	0.05	0.05	No	Discharge from petroleum and metal refineries;erosion of natural deposits; Discharge from mines	
Nitrate* (ppm)	10/19/22	4.4	ND-4.4	10	10	No	Runoff from fertilizer use; leaching from septic tanks; sewage; erosion of natural deposits	
Perchlorate*** (ppb)	8/3/22	0.25	0.091-0.25	2	-	No	*rocket propellants, fireworks, munitions, nares, blasting agents (see note below)*	
*Nitrate	Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant, you should ask for advice from your health care provider.							
**Sodium	Sodium is a naturally-occurring common element found in soil and water. It is necessary for the normal functioning of regulating fluids in human systems. Some people, however, have difficulty regulating fluid volume as a result of several diseases, including congestive heart failure and hypertension. The guideline of 20mg/L for sodium represents a level in water that physicians and sodium sensitive individuals should be aware of in cases where sodium exposures are being carefully controlled. For additional information, contact your health care provider, your local board of health or the Massachusetts Department of Public Health, Bureau of Environmental Health Assessment at 617-624-5757.							
***Perchlorate (Various Chemical Abstract Service Registry Numbers (CASRN) for different chemical species)	Perchlorate interferes with the normal function of the thyroid gland and thus has the potential to affect growth and development, causing brain damage and other adverse effects, particularly in fetuses and infants. Pregnant women, the fetus, infants, children up to the age of 12, and people with a hypothyroid condition are particularly susceptible to perchlorate toxicity. *J' values are required when the results are above the MDL(0.012) and below the MRL(0.05)							
Organic Contaminants:								
Tetrachloroethylene (PCE) (ppb)	02/23/2022-7/19/2022	0.51	ND - 0.51	5	-	No	Discharge from factories and dry cleaners	
Bromodichloromethane (ppb)	7/19/22	ND	ND	NA	NA	No	By-product of drinking water chlorination	
Chlorodibromomethane (ppb)	7/19/22	ND	ND	NA	NA	No	By-product of drinking water chlorination	
Dibromochloromethane (ppb)	7/19/22	ND	ND	NA	NA	No	By-product of drinking water chlorination	
Bromoform (ppb)	7/19/22	ND	ND	NA	NA	No	By-product of drinking water chlorination	
Chloroform (ppb)	7/19/22	ND	ND	ORSG 70	NA	No	By-product of drinking water chlorination	
Stage 2 Disinfectants and Disinfection Byproducts								
Chlorine (ppm)	4th Quarter	0.91	0.76-0.91	4	4	No	Water additive used to control microbes	
THMs (Stage 2)								
[Total Trihalomethanes] (ppb)	Quarterly	8.2	ND-8.2	80	-	No	By-product of drinking water chlorination	
HAA5s (Stage 2) (ppb)	Haloacetic Acids (HAA5)	1.8	ND - 1.8	60	-	No	By-product of drinking water chlorination (TT)	
** Note highest detected value is highest Running Annual Average (RAA). ***Local Running Annual Average								
* Note: THM, HAA and Chlorine minimum and maximum levels in the ranges of results are site specific.								
Secondary Contaminants	Date(s) Collected	Highest Detect Value	Range Detected	SMCL	ORSG	Possible Source of Contamination		
Magnesium (ppm)	9/27/22	4.1	1.8-4.1	-	-	Natural Mineral and Organic Matter		
Chloride (ppm)	9/27/22	82	ND-82	250	NA	Natural Mineral, Road Salt		
Calcium (ppm)	9/27/22	13	2.1-13	-	-	Natural Mineral and Organic Matter		
Copper (ppm)	9/27/22	0	ND	1	-	Naturally occurring element;corrosion of household plumbing		
Iron (ppm)	9/27/22	0	ND	0.3	NA	Erosion of Natural Deposits, and oxidation of iron components		
Manganese (ppm)*	9/27/22	0.04	0.01-0.04	0.05	0.3	Erosion of Natural Deposits		
Potassium (ppm)	9/27/22	3.2	1.6-3.2	-	-	Natural Mineral and Organic Matter		
Sulfate (ppm)	9/27/22	19	ND - 19	250	250	Natural Sources		
Alkalinity (ppm)	9/27/22	16	ND-16	-	-	Natural Sources		
Odor (ton)	9/27/22	0	0	3		Naturally occurring organic materials that form ions when in water; seawater influence		
Hardness (ppm)	9/27/22	49	12.6-49	-	-	Natural Sources		
Total Dissolved solids (ppm)	9/27/22	320	220-320	500		Runoff and leaching from natural deposits; seawater influence		
PH	9/27/22	7.3	7.2-7.3	6.5-8.5		Runoff and leaching from natural deposits; seawater influence		
Turbidity (NTU)	9/27/22	ND	ND	-		Soil runoff		
Zinc (ppm)	9/27/22	0.11	0.09-0.11	5	NA	Erosion of Natural Deposits, and Industrial Discharge		
*EPA has established a lifetime health advisory (HA) for manganese at 0.3ppm and an acute at 1ppm								
UCMR3 EPA unregulated contaminants	Date(s) Collected	Highest Detect Value	Range Detected	Average Detected	ORSG	Possible Source of Contamination		
1,4-Dioxane (ppb)	Quarterly(2022)	0.23	ND - 0.23	0.060	0.3 ppb	Solvent or stabilizer used in processing of paper, cosmetics, shampoos, coolant		
Third Unregulated Contaminant Monitoring Rule (UCMR3) IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER - Availability of Monitoring Data for Unregulated Contaminants for Hyannis Water System As required by US Environmental Protection Agency (EPA), our water system has sampled for a series of unregulated contaminants. Unregulated contaminants are those that don't yet have a drinking water standard set by EPA. The purpose of monitoring for these contaminants is to help EPA decide whether the contaminants should have a public health protection standard. As our customers, you have a right to know that these data are available. If you are interested in examining the results, please contact Hans Keijser at (508) 775-0063 or 47 Old Yarmouth Road Hyannis, MA 02601. This notice is being sent to you by the Hyannis Water System. State Water System ID#: 4020004. For more information visit the AWWA FAQ UCMR 3 link: http://www.drinktap.org/home/water-information/water-quality/ucmr3.aspx								

CCR Regulated Chart for PFAS detects in 2022

Regulated Contaminant	Date(s) Collected	Range Detected ppt	Average Detected ppt	MCL ppt	Possible Source of Contamination	Health Effects
PFOS, PFOA, PFNA, PFHxS, PFHpA,PFDA	Quarterly	ND	0.23 *	20	Man-made chemicals. Used as surfactants to make products stain or water resistant, in fire-fighting foam, for industrial purposes, and as a pesticide. Used in fluoropolymers (such as teflon) cosmetics, greases and lubricants, paints, adhesives and photographic films. PFOS U.S. manufacturing phased out in 2002; PFOS may still be generated incidentally or in imported products.	Long-term exposure to PFOS and PFOA in drinking water may affect the liver, cholesterol and thyroid hormone levels. Some studies indicate that exposure to elevated levels of PFOS and PFOA could cause immunological effects, developmental effects and some types of cancer in laboratory animals. Scientists are working to better understand the degree of risk to people. Based on studies of laboratory animals and chemical similarity to PFOS and PFOA depending on the level and length of exposure, PFNA, PFHxS, PFHpA and PFDA in drinking water may affect the liver, cholesterol levels, thyroid and immune system and may cause developmental effects.
PerfluoroHexanoic (PFHxA)	Quarterly	ND-4.38	0.96	**	Man-made chemical; used in products to make them stain, grease, heat and water resistant.	Based on studies of laboratory animals, people exposed to elevated levels of PFHxA for several years could experience effects on the liver. It is less toxic and is cleared from the body much faster than PFOS, PFOA and other longer-chain PFAS.

On October 2, 2020, the Massachusetts Department of Environmental Protection (MassDEP) published final regulations establishing a drinking water standard, or a Maximum Contaminant Level (MCL), for the sum of six per- and polyfluoroalkyl substances (PFAS). The MCL is 20 parts per trillion (ppt) for what the regulations call PFAS6, or the sum of six PFAS compounds: perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorohexane sulfonic acid (PFHxS), perfluorononanoic acid (PFNA), perfluoroheptanoic acid (PFHpA), and perfluorodecanoic acid (PFDA). PFAS are a family of chemicals widely used since the 1950s to manufacture common consumer products. They have been linked to a variety of health risks, particularly in women who are pregnant or nursing, and in infants. In using the sum of six PFAS compounds, the new standard protects public health for sensitive subgroups including pregnant women, nursing mothers and infants. Please consult your health practitioner if you have any health related questions. For a consumer factsheet on PFAS see: <https://www.mass.gov/doc/massdep-fact-sheet-pfas-in-drinking-water-questions-and-answers-for-consumers/download>

* Running Annual Average** There is no ORS Guidline or UCMR3 reference concentration health benchmark for this compound. However, the Minnesota Department of Health established a drinking water guidance value of 2,000 ppt for PFBS. See <http://www.health.state.mn.us/divs/eh/risk/guidance/gw/pfbsinfo.pdf>. EPA also has draft toxicity assesments for PFBS at <https://www.epa.gov/pfas/genx-and-draft-toxicity-assesments>

SAFE DRINKING WATER ACT – WATER QUALITY STANDARD DEFINITIONS

Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

HA: Health Advisory.

Massachusetts Maximum Contaminant Levels (MMCL): The Massachusetts maximum contaminants listed in the drinking water regulations consist of promulgated US EPA MCLs which have become effective, plus a few MCLs set specifically by Massachusetts.

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Minimum Detection Limit (MDL): Is the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte is greater than zero.

Secondary Maximum Contaminant Level (SMCL): These standards are developed to protect the aesthetic qualities of drinking water and are not health based.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of disinfectant is necessary for control of microbial contaminants

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectant to control microbial contamination.

Primary Standards: Federal drinking water regulations for substances that are health-related. Water suppliers must meet all primary drinking water standards.

Secondary Standards: Federal drinking water measurements for substances that do not have an impact on health. These reflect aesthetic qualities such as taste, odor and appearance. Secondary standards are recommendations, not mandates.

Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.

Massachusetts Office of Research and Standard Guideline (ORSG): This is the concentration of a chemical in drinking water, at or, below which, adverse, non-cancer health effects are unlikely to occur after chronic (lifetime): exposure. If exceeded, it serves as an indicator or the potential for further action.

Third Unregulated Contaminant Monitoring Rule (UCMR3): As required by US Environmental Protection Agency (EPA), our water system has sampled for a series of unregulated contaminants. Unregulated contaminants are those that don't yet have a drinking water standard set by EPA. The purpose of monitoring for these contaminants is to help EPA decide whether the contaminants should have a public health protection standard.

- KEY**
- CU:** Color unit.
 - NA:** Not applicable.
 - ND:** Not detected.
 - Ug/L:** Micrograms per liter=ppb
 - ppb:** Parts per billion. The equivalent of one second in 32 years.
 - ppm:** Parts per million. The equivalent of one second in 12 days.
 - ppt:** Parts per trillion.
 - pCi/L:** Picocuries per liter. The Equivalent of one second in 32 million years.
 - NTU:** Nephelometric Turbidity Unit.
 - TON:** Threshold Odor Number.
 - Ti:** Treatment Technique.

Water Source Characteristics

The sources of drinking water (for both tap and bottled water) include rivers, lakes, streams, ponds, springs, reservoirs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals, and, in some cases, radioactive materials, and can pick up substances resulting from the presence of animals or human activity.

Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewer treatment plants, septic systems, agricultural livestock operations and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban storm water runoff and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production. These contaminants can also come from gasoline storage, urban storm water runoff, and septic systems.
- Radioactive contaminants, which can be naturally occurring or be the result of oil or gas production and mining activities.

For Your Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at (800) 426-4791.

Where to go for more information: The Massachusetts DEP at (617) 292-5885 or www.state.ma.us/dep or the Massachusetts Drinking Water Education Partnership at www.madwep.org.