
November 16, 2022

Ms. Caprice Shaw
Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup, Western Region
436 Dwight Street
Springfield, MA 01103

**Re: Environmental Sampling Results of
Per- and Polyfluoroalkyl Substances (PFAS)
42 Leverett Road, Shutesbury, Massachusetts
CMG ID 2021-177**

Dear Ms. Shaw:

CMG Environmental, Inc. (CMG) prepared this letter to document our collection and analysis of environmental samples from the Fire Department property in Shutesbury, Massachusetts (the Site) in July & August 2022. CMG's sampling program (as designed by DEP) included collection of soil samples from soil borings/monitoring well installation, groundwater samples from the newly-installed monitoring wells, and quality control samples at the direction of the Massachusetts Department of Environmental Protection (DEP). Ms. Caprice Shaw of DEP and personnel from New England Disposal Technologies, Inc. (NEDT) of Sutton, Massachusetts accompanied CMG for field activities.

SOIL BORINGS & SAMPLING

On July 15, 2022, personnel from DEP, NEDT, Technical Drilling Services, Inc. (TDS), and CMG met at the Site to begin soil borings and monitoring well installation. TDS advanced soil boring SB-1 between two drinking water wells at the northeast portion of the property, east of the fire station and approximately 22' north of the southerly well. CMG and NEDT decontaminated a shovel and collected a sample of the rinsate. We used the shovel to remove the upper 6" of grass and soil, then collected a sample by hand. NEDT vactored to about 32" deep and CMG collected another soil sample. TDS and NEDT decontaminated the Geoprobe macro core and we collected an equipment blank from the resulting rinsate. CMG collected a soil sample from 3-4' below grade. The Boring Logs (attached) include descriptions of soil and other observations.

Soil borings SB-2 through SB-7 are located around the fire tower in the central portion of the property and southerly to the tree line. CMG directed TDS and NEDT to advance the borings using the same protocol as for SB-1; NEDT vactored soil as needed and TDS used a Geoprobe to advance to refusal. TDS installed MW-100, MW-101, and MW-102 at boring locations SB-4, SB-6, and SB-7, respectively. The Boring Logs include details of monitoring well construction.

CMG submitted soil samples from the soil borings and completed monitoring wells to Alpha Analytical (Alpha) of Westborough, Massachusetts for analysis of PFAS. Laboratory analysis identified perfluoroheptanoic acid (PFHpA), perfluorooctanoic acid (PFOA), perfluorononanoic

acid (PFNA), and perfluorodecanoic acid (PFDA) in soil samples from SB-2 through SB-6 above DEP reportable concentrations for S-1/GW-1 soil. The laboratories identified concentrations of other PFAS parameters above laboratory reporting limits but below the reportable concentrations. Table 1 summarizes soil quality data; CMG has attached laboratory certificates of analysis and chain-of-custody documentation to this letter.

GROUNDWATER SAMPLING

CMG met Caprice Shaw of DEP’s Western Regional Office and Chris Hanson of NEDT at the Site on July 20, 2022 to develop the newly-installed monitoring wells. CMG gauged depth to water at the three new wells and four previously-installed monitoring wells and performed a survey of monitoring well elevations. We also surveyed each well and boring location using GPS to obtain latitude and longitude coordinates. The following table summarizes survey data.

GROUNDWATER ELEVATIONS (FEET)

WELL ID#	WELLHEAD ELEVATION	DEPTH TO GROUNDWATER	GROUNDWATER ELEVATION
MW-100	96.43	4.53	91.90
MW-101	97.49	5.79	91.70
MW-102	93.29	2.52	90.77
MW-8	98.48	6.14	92.34
MW-9	97.38	4.92	92.46
MW-12	97.85	5.59	92.26
MW-14	97.93	5.74	92.19

MEASUREMENTS RELATIVE TO AN ARBITRARY DATUM OF 100.00 AT [BENCHMARK].

CMG developed each well by purging them multiple times each (allowing for recovery each time). We noted a moderate gasoline odor in MW-9 and a minor gasoline odor in MW-12. The wells were silty at the start of purging; at the end the purge water was clear. NEDT drummed all purge water for proper disposal.

CMG, NEDT, and DEP personnel collected groundwater samples from the 7 monitoring wells (along with a field blank) using low-flow sampling methods on August 3, 2022. We also collected a sample using low-flow sampling methods from the fire department “shallow well” located off the southeast corner of the station building (along with a field blank).

CMG submitted the groundwater samples to Alpha for analysis of PFAS and compared the results to DEP’s recently-promulgated standards for GW-1 groundwater. Well MW-101 did not have sufficient water volume for sampling and thus was not sampled. Alpha identified several PFAS parameters in each sample except the field blanks. The sum of the six regulated concentrations (PFAS6) exceeds the standard of 20 ng/l in the samples from MW-12, MW-14, MW-100, MW-102, and the shallow well. Table 3 summarizes groundwater quality data; CMG has attached laboratory certificates of analysis and chain-of-custody documentation to this letter.

GROUNDWATER QUALITY CONTROL

CMG submitted samples of rinsate from decontamination of the shovel and macro core that we used for sampling on July 15, 2022 to Alpha for laboratory analysis of PFAS. Alpha did not identify any PFAS parameters in these samples. Table 2 summarizes these quality control data; CMG has attached laboratory certificates of analysis and chain-of-custody documentation to this letter.

CONCLUSIONS

CMG identified PFAS impacts to soil and groundwater, including concentrations that exceed applicable standards, at the tested locations in Shutesbury. Please call me at 774-241-0901 if you have questions or if CMG can be of any further assistance to you.

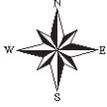
Sincerely,

CMG ENVIRONMENTAL, INC.

A handwritten signature in blue ink, appearing to read "Gary Magnuson", with a long horizontal flourish extending to the right.

Gary E. Magnuson
Principal

Attachments: Figures
 Tables 1-3
 Boring Logs
 Laboratory Analytical Reports



Shutesbury, MA

1 inch = 100 Feet



August 29, 2022



www.cai-tech.com



FIGURE 2: SITE OVERVIEW
42 LEVERETT ROAD, SHUTESBURY MA
CMG ID 2021-177

ENVIRONMENTAL SERVICES  ENGINEERING SERVICES

67 HALL ROAD, STURBRIDGE MA 01566

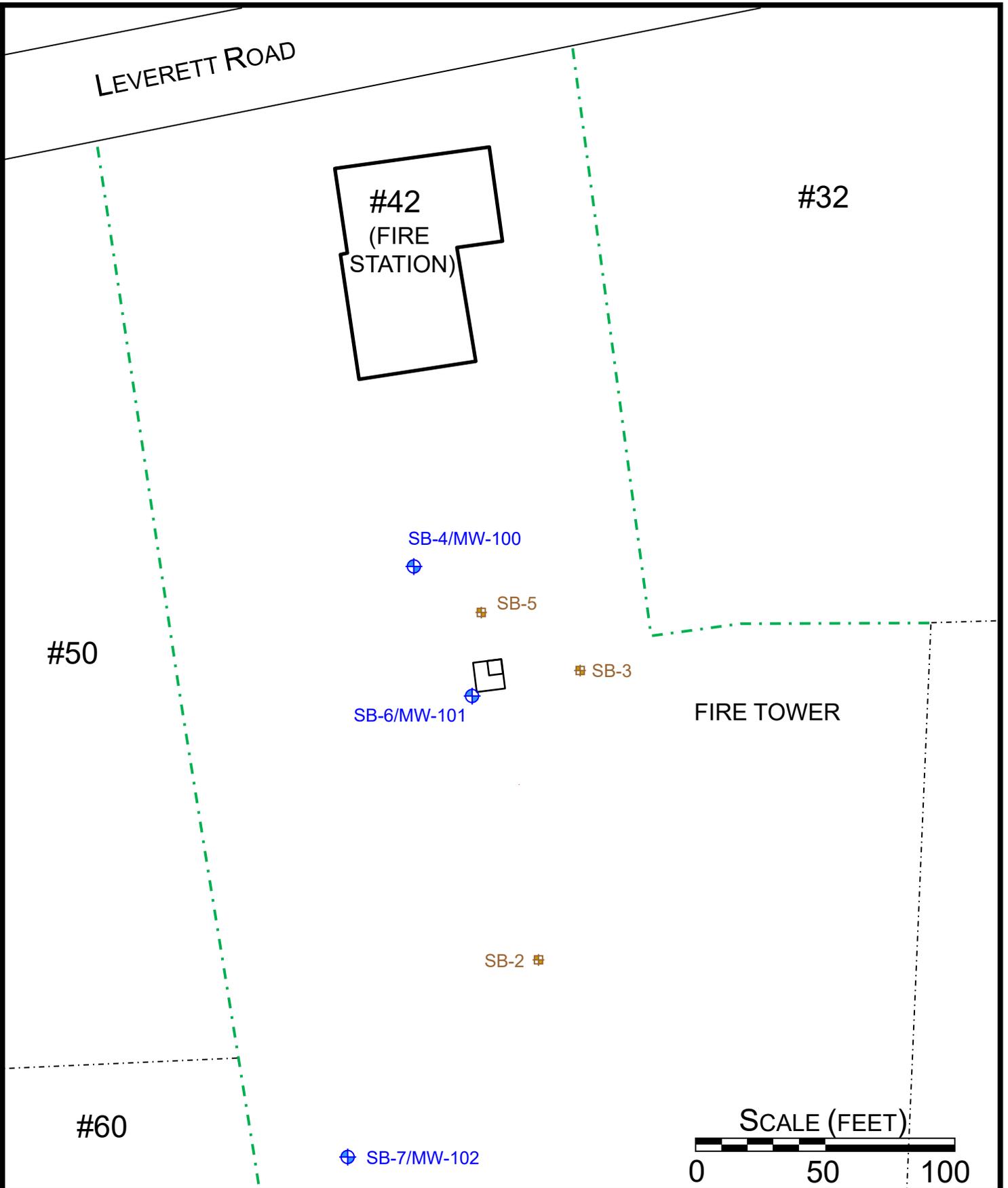


FIGURE 3: SITE PLAN
 42 LEVERETT ROAD, SHUTESBURY MA
 CMG ID 2021-177

TABLE 1

PFAS IN SOIL (NG/G)

Test	Parameter	S-1/GW-1 Reportable Concentration	SB-1		SB-2			SB-3			SB-4			
			0-6" 7/15/22	3-4' 7/15/22	0-6" 7/15/22	2-3' 7/15/22	3-4' 7/15/22	0-6" 7/15/22	2-3' 7/15/22	4-4.5' 7/15/22	0-6" 7/15/22	2-3' 7/15/22	4-5' 7/15/22	6-7' 7/15/22
1	Perfluorohexanoic acid (PFHxA)	NE	0.064 J	BRL<0.646	2.62	1.29	BRL<0.476	0.426 J	0.816	BRL<0.527	0.750	0.060 J	BRL<0.503	BRL<0.534
	Perfluoroheptanoic acid (PFHpA)	0.5	0.116 J	BRL<0.323	1.71	0.865	BRL<0.238	0.924	1.58	BRL<0.264	1.17	0.084 J	BRL<0.252	BRL<0.267
	Perfluorooctanoic acid (PFOA)	0.72	0.254	BRL<0.323	1.12	0.305	BRL<0.238	2.02	2.49	0.098 J	1.46	0.114 J	0.101 J	BRL<0.267
	Perfluorononanoic acid (PFNA)	0.32	0.264	BRL<0.323	0.612	BRL<0.290	BRL<0.238	4.39	1.09	BRL<0.264	1.72	0.209 J	0.408	BRL<0.267
	Perfluorodecanoic acid (PFDA)	0.3	0.112 J	BRL<0.323	BRL<0.310	BRL<0.290	BRL<0.238	0.613	BRL<0.319	BRL<0.264	1.19	0.138 J	BRL<0.252	BRL<0.267
	Perfluoroundecanoic acid (PFUnA)	NE	0.226 J	BRL<0.646	0.124 J	BRL<0.579	BRL<0.476	1.00	BRL<0.638	BRL<0.527	2.26	0.210 J	BRL<0.503	BRL<0.534
	Perfluorododecanoic acid (PFDoA)	NE	BRL<0.495	BRL<0.646	BRL<0.620	BRL<0.579	BRL<0.476	BRL<0.566	BRL<0.638	BRL<0.527	0.182 J	BRL<0.509	BRL<0.503	BRL<0.534
	Perfluorotridecanoic acid (PFTrDA)	NE	BRL<0.495	NT	BRL<0.620	BRL<0.579	BRL<0.476	BRL<0.566	NT	BRL<0.527	BRL<0.548	BRL<0.509	BRL<0.503	BRL<0.534
	Perfluorotetradecanoic acid (PFTA)	NE	BRL<0.495	NT	BRL<0.620	BRL<0.579	BRL<0.476	BRL<0.566	NT	BRL<0.527	BRL<0.548	BRL<0.509	BRL<0.503	BRL<0.534
	Perfluorobutanesulfonic acid (PFBS)	NE	BRL<0.247	BRL<0.323	BRL<0.310	BRL<0.290	BRL<0.238	BRL<0.283	BRL<0.319	BRL<0.264	0.070 J	BRL<0.254	BRL<0.252	BRL<0.267
Perfluorohexanesulfonic acid (PFHxS)	0.3	BRL<0.247	BRL<0.323	BRL<0.310	BRL<0.290	BRL<0.238	BRL<0.283	BRL<0.319	BRL<0.264	0.070 J	BRL<0.254	BRL<0.252	BRL<0.267	
Perfluorooctanesulfonic acid (PFOS)	2	0.834	BRL<0.323	0.870	BRL<0.290	BRL<0.238	0.591	0.210 J	BRL<0.264	0.838	1.05	BRL<0.252	BRL<0.267	
3	N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	NE	NT	NT	NT	NT	NT							
	Perfluorooctanesulfonamide (FOSA)	NE	NT	NT	NT	NT	NT							
	N-Methyl perfluorooctane sulfonamide (NMeFOSA)	NE	NT	NT	NT	NT	NT							
	N-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	NE	BRL<0.495	NT	BRL<0.620	NT	NT	BRL<0.566	NT	NT	BRL<0.548	BRL<0.509	BRL<0.503	BRL<0.534
	N-Methyl perfluorooctanesulfonamido Ethanol (NMeFOSE)	NE	NT	NT	NT	NT	NT							
	N-Ethyl perfluorooctanesulfonamido Ethanol (NEtFOSE)	NE	NT	NT	NT	NT	NT							
	N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	NE	BRL<0.495	NT	BRL<0.620	NT	NT	BRL<0.566	NT	BRL<0.527	BRL<0.548	BRL<0.509	BRL<0.503	BRL<0.534
Other	Perfluorobutanoic acid (PFBA)	NE	NT	NT	NT	NT	NT							
	Perfluoropentanoic acid (PFPeA)	NE	NT	NT	NT	NT	NT							
	Perfluoropentanesulfonic acid (PFPeS)	NE	NT	NT	NT	NT	NT							
	Perfluoroheptanesulfonic acid (PFHpS)	NE	NT	NT	NT	NT	NT							
	Perfluorodecanesulfonic acid (PFDS)	NE	NT	NT	NT	NT	NT							
	Perfluorononanesulfonic acid (PFNS)	NE	NT	NT	NT	NT	NT							
	2,3,3,3-Tetrafluoro-2[1,1,2,2,3,3,3-heptafluoropropoxy]-propanoic acid (HFPO-DA)	NE	BRL<9.90	BRL<12.9	BRL<12.4	BRL<11.6	BRL<9.52	BRL<11.3	BRL<12.8	BRL<10.5	BRL<11.0	BRL<10.2	BRL<10.1	BRL<10.7
	4,8-Dioxo-3h-perfluorononanoic acid (ADONA)	NE	BRL<0.990	BRL<1.29	BRL<1.24	BRL<1.16	BRL<0.952	BRL<1.13	BRL<1.28	BRL<1.05	BRL<1.10	BRL<1.02	BRL<1.01	BRL<1.07
	Perfluorohexadecanoic acid (PFHxDA)	NE	NT	NT	NT	NT	NT							
	Perfluorooctadecanoic acid (PFODA)	NE	NT	NT	NT	NT	NT							
	Perfluorododecane sulfonic acid (PFDoDS)	NE	NT	NT	NT	NT	NT							
	1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2FTS)	NE	NT	NT	NT	NT	NT							
	1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2FTS)	NE	NT	NT	NT	NT	NT							
	1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2FTS)	NE	NT	NT	NT	NT	NT							
	1H,1H,2H,2H-Perfluorododecanesulfonic acid (10:2FTS)	NE	NT	NT	NT	NT	NT							
	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NE	BRL<0.990	BRL<1.29	BRL<1.24	BRL<1.16	BRL<0.952	BRL<1.13	BRL<1.28	BRL<1.05	BRL<1.10	BRL<1.02	BRL<1.01	BRL<1.07
	11-Chloroicosadecafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUds)	NE	BRL<0.990	BRL<1.29	BRL<1.24	BRL<1.16	BRL<0.952	BRL<1.13	BRL<1.28	BRL<1.05	BRL<1.10	BRL<1.02	BRL<1.01	BRL<1.07
	Perfluoropropane sulfonic acid (PFPrS)	NE	NT	NT	NT	NT	NT							
	Perfluoro-3-Methoxypropanoic acid (PFMPA)	NE	NT	NT	NT	NT	NT							
	Perfluoro-4-Methoxybutanoic acid (PFMBA)	NE	NT	NT	NT	NT	NT							
	Perfluoro(2-Ethoxyethane)sulfonic acid (PFEESA)	NE	NT	NT	NT	NT	NT							
	Nonafluoro-3,6-Dioxaheptanoic acid (NFDHA)	NE	NT	NT	NT	NT	NT							
	Other	Percent Solids	-	90.8%	71.0%	72.2%	82.2%	92.5%	82.7%	75.7%	90.3%	88.4%	88.5%	95.8%

Notes BRL = Below laboratory Reporting Limit
 1 = Perfluoroalkylcarboxylic acids; 2 = Perfluoroalkylsulfonates; 3 = Perfluorooctanesulfonamidoacetic acids
 Yellow highlight = Exceeds S-1/GW-1 Method 1 Risk Characterization standard
 ng/g = nanograms per gram
 NE = Not Established; NT = Not Tested
 J = Estimated value. The target analyte concentration is below the quantitation limit, but above the Method Detection Limit or Estimated Detection Limit for Solid Phase Microextraction-related analyses. This

TABLE 1

PFAS IN SOIL (NG/G)

Test	Parameter	S-1/GW-1 Reportable Concentration	SB-5			SB-6				SB-7		
			0-6" 7/15/22	2-3' 7/15/22	4-5' 7/15/22	0-6" 7/15/22	1-2' 7/15/22	4-5' 7/15/22	6-7' 7/15/22	0-6" 7/15/22	2.5-3' 7/15/22	4-5' 7/15/22
1	Perfluorohexanoic acid (PFHxA)	NE	0.497 J	BRL<1.90	BRL<0.541	0.535 J	0.377 J	BRL<0.530	BRL<0.531	BRL<0.562	BRL<1.26	BRL<1.39
	Perfluoroheptanoic acid (PFHpA)	0.5	0.859	BRL<0.953	0.073 J	1.43	0.976	0.249 J	0.080 J	0.063 J	BRL<0.628	BRL<0.693
	Perfluorooctanoic acid (PFOA)	0.72	1.89	0.614 J	0.289	1.86	1.10	1.96	0.384	0.118 J	BRL<0.628	BRL<0.693
	Perfluorononanoic acid (PFNA)	0.32	5.56	1.37	0.416	3.30	1.88	0.713	3.69	0.290	BRL<0.628	BRL<0.693
	Perfluorodecanoic acid (PFDA)	0.3	1.82	BRL<0.953	BRL<0.270	4.16	1.51	0.407	BRL<0.265	0.181 J	BRL<0.628	BRL<0.693
	Perfluoroundecanoic acid (PFUnA)	NE	4.24	BRL<1.90	BRL<0.541	8.01	3.74	BRL<0.530	BRL<0.531	0.360 J	BRL<1.26	BRL<1.39
	Perfluorododecanoic acid (PFDoA)	NE	0.191 J	BRL<1.90	BRL<0.541	0.800	0.214 J	BRL<0.530	BRL<0.531	BRL<0.562	BRL<1.26	BRL<1.39
	Perfluorotridecanoic acid (PFTrDA)	NE	0.501 J	BRL<1.90	BRL<1.56	1.90	1.16	BRL<1.72	BRL<0.531	BRL<0.562	BRL<1.26	BRL<1.39
	Perfluorotetradecanoic acid (PFTA)	NE	BRL<0.513	BRL<1.90	BRL<1.56	0.182 J	0.063 J	BRL<1.72	BRL<0.531	BRL<0.562	BRL<1.26	BRL<1.39
2	Perfluorobutanesulfonic acid (PFBS)	NE	BRL<0.256	BRL<0.953	BRL<0.270	BRL<0.278	BRL<0.269	BRL<0.265	BRL<0.265	BRL<0.281	BRL<0.628	BRL<0.693
	Perfluorohexanesulfonic acid (PFHxS)	0.3	BRL<0.256	BRL<0.953	BRL<0.270	BRL<0.278	BRL<0.269	BRL<0.265	BRL<0.265	BRL<0.281	BRL<0.628	BRL<0.693
	Perfluorooctanesulfonic acid (PFOS)	2	0.786	BRL<0.953	BRL<0.270	0.286	0.164 J	BRL<0.265	BRL<0.265	0.549	BRL<0.628	BRL<0.693
3	N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	NE	NT	NT	NT	NT	BRL<1.08	NT	NT	NT	NT	NT
	Perfluorooctanesulfonamide (FOSA)	NE	NT	NT	NT	NT	BRL<0.538	NT	NT	NT	NT	NT
	N-Methyl perfluorooctane sulfonamide (NMeFOSA)	NE	NT	NT	NT	NT	BRL<1.08	NT	NT	NT	NT	NT
	N-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	NE	BRL<0.513	BRL<1.90	BRL<1.56	BRL<0.556	BRL<0.538	BRL<1.72	BRL<0.531	BRL<0.562	BRL<1.26	BRL<1.39
	N-Methyl perfluorooctanesulfonamido Ethanol (NMeFOSE)	NE	NT	NT	NT	NT	BRL<2.15	NT	NT	NT	NT	NT
	N-Ethyl perfluorooctanesulfonamido Ethanol (NEtFOSE)	NE	NT	NT	NT	NT	BRL<2.15	NT	NT	NT	NT	NT
	N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	NE	BRL<0.513	BRL<1.90	BRL<1.56	BRL<0.556	BRL<0.538	BRL<1.72	BRL<0.531	BRL<0.562	0.519 J	BRL<1.39
Other	Perfluorobutanoic acid (PFBA)	NE	NT	NT	NT	NT	0.400 J	NT	NT	NT	NT	NT
	Perfluoropentanoic acid (PFPeA)	NE	NT	NT	NT	NT	0.754	NT	NT	NT	NT	NT
	Perfluoropentanesulfonic acid (PFPeS)	NE	NT	NT	NT	NT	BRL<1.08	NT	NT	NT	NT	NT
	Perfluoroheptanesulfonic acid (PFHpS)	NE	NT	NT	NT	NT	BRL<0.538	NT	NT	NT	NT	NT
	Perfluorodecanesulfonic acid (PFDS)	NE	NT	NT	NT	NT	BRL<0.538	NT	NT	NT	NT	NT
	Perfluorononanesulfonic acid (PFNS)	NE	NT	NT	NT	NT	BRL<1.08	NT	NT	NT	NT	NT
	2,3,3,3-Tetrafluoro-2[1,1,2,2,3,3,3-heptafluoropropoxy]-propanoic acid (HFPO-DA)	NE	BRL<10.2	BRL<38.1	BRL<10.8	BRL<11.1	BRL<10.8	BRL<10.6	BRL<10.6	BRL<11.2	BRL<25.1	BRL<27.7
	4,8-Dioxo-3h-perfluorononanoic acid (ADONA)	NE	BRL<1.02	BRL<3.81	BRL<1.08	BRL<1.11	BRL<1.08	BRL<1.06	BRL<1.06	BRL<1.12	BRL<2.51	BRL<2.77
	Perfluorohexadecanoic acid (PFHxDA)	NE	NT	NT	NT	NT	BRL<2.69	NT	NT	NT	NT	NT
	Perfluorooctadecanoic acid (PFODA)	NE	NT	NT	NT	NT	BRL<2.69	NT	NT	NT	NT	NT
	Perfluorododecane sulfonic acid (PFDoDS)	NE	NT	NT	NT	NT	BRL<1.08	NT	NT	NT	NT	NT
	1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2FTS)	NE	NT	NT	NT	NT	BRL<1.08	NT	NT	NT	NT	NT
	1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2FTS)	NE	NT	NT	NT	NT	BRL<0.538	NT	NT	NT	NT	NT
	1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2FTS)	NE	NT	NT	NT	NT	0.612	NT	NT	NT	NT	NT
	1H,1H,2H,2H-Perfluorododecanesulfonic acid (10:2FTS)	NE	NT	NT	NT	NT	0.869 J	NT	NT	NT	NT	NT
	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NE	BRL<1.02	BRL<3.81	BRL<1.08	BRL<1.11	BRL<1.08	BRL<1.06	BRL<1.06	BRL<1.12	BRL<2.51	BRL<2.77
	11-Chloroicosadecafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	NE	BRL<1.02	BRL<3.81	BRL<1.08	BRL<1.11	BRL<1.08	BRL<1.06	BRL<1.06	BRL<1.12	BRL<2.51	BRL<2.77
	Perfluoropropane sulfonic acid (PFPrS)	NE	NT	NT	NT	NT	BRL<1.08	NT	NT	NT	NT	NT
	Perfluoro-3-Methoxypropanoic acid (PFMPA)	NE	NT	NT	NT	NT	BRL<1.08	NT	NT	NT	NT	NT
	Perfluoro-4-Methoxybutanoic acid (PFMBA)	NE	NT	NT	NT	NT	BRL<1.08	NT	NT	NT	NT	NT
Perfluoro(2-Ethoxyethane)sulfonic acid (PFEESA)	NE	NT	NT	NT	NT	BRL<1.08	NT	NT	NT	NT	NT	
Nonafluoro-3,6-Dioxaheptanoic acid (NFDHA)	NE	NT	NT	NT	NT	BRL<1.08	NT	NT	NT	NT	NT	
Other	Percent Solids	-	90.5%	93.7%	87.2%	84.8%	82.4%	89.2%	86.0%	82.6%	37.2%	33.4%

Notes BRL = Below laboratory Reporting Limit
 1 = Perfluoroalkylcarboxylic acids; 2 = Perfluoroalkylsulfonates; 3 = Perfluorooctanesulfonate
 Yellow highlight = Exceeds S-1/GW-1 Method 1 Risk Characterization standard
 ng/g = nanograms per gram
 NE = Not Established; NT = Not Tested
 J = Estimated value. The target analyte concentration is below the quantitation limit, but above the Method Detection Limit or Estimated Detection Limit for Solid Phase Microextraction-related analyses. This

TABLE 2

PFAS IN EQUIPMENT BLANKS (ng/l)

Test	Parameter	MCP RCGW-1 Standard	EB-Shovel		FB-1	EB-Macro
			8:35 7/15/22	12:48 7/15/22	9:10 7/15/22	9:15 7/15/22
1	Perfluorohexanoic acid (PFHxA)	NE	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
	Perfluoroheptanoic acid (PFHpA)	(See PFAS Sum)	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
	Perfluorooctanoic acid (PFOA)	(See PFAS Sum)	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
	Perfluorononanoic acid (PFNA)	(See PFAS Sum)	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
	Perfluorodecanoic acid (PFDA)	(See PFAS Sum)	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
	Perfluoroundecanoic acid (PFUnA)	NE	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
	Perfluorododecanoic acid (PFDoA)	NE	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
	Perfluorotridecanoic acid (PFTrDA)	NE	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
	Perfluorotetradecanoic acid (PFTA)	NE	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
2	Perfluorohexanesulfonic acid (PFHxS)	(See PFAS Sum)	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
	Perfluorooctanesulfonic acid (PFOS)	(See PFAS Sum)	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
Sum of 6 Regulated PFAS compounds		20	All BRL	All BRL	All BRL	All BRL
3	N-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	NE	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
	N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	NE	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
	2,3,3,3-Tetrafluoro-2[1,1,2,2,3,3,3-heptafluoropropoxy]-propanoic acid (HFPO-DA)	NE	BRL<52.6	BRL<52.9	BRL<47.0	BRL<45.2
	4,8-Dioxa-3h-perfluorononanoic acid (ADONA)	NE	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NE	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	NE	BRL<2.10	BRL<2.11	BRL<1.88	BRL<1.81	

Notes BRL = Below laboratory Reporting Limit

1 = Perfluoroalkylcarboxylic acids; 2 = Perfluoroalkylsulfonates;

3 = Perfluorooctanesulfonamidoacetic acids

ng/L = nanograms per liter

NE = Not Established; EB = Equipment Blank; FB = Field Blank

TABLE 3

PFAS IN GROUNDWATER (ng/l)

Test	Parameter	MCP RCGW-1 Standard	MW-8 7.14 8.71 8/3/22	MW-9 6.22 12.61 8/3/22	MW-12 6.89 8.65 8/3/22	MW-14 7.04 8.03 8/3/22	MW-100 5.82 6.18 8/3/22	MW-102 3.99 4.11 8/3/22	FB-GW 9:16 8/3/22	Shallow Well 9.64 14.20 8/3/22	FB-Shallow (field blank) 8/3/22
1	Perfluorohexanoic acid (PFHxA)	NE	2.56	2.53	51.3	371	89.2	38.0	BRL<1.78	8.61	BRL<1.79
	Perfluoroheptanoic acid (PFHpA)	(See PFAS Sum)	BRL<2.14	BRL<2.13	41.4	256	136	50.4	BRL<1.78	9.91	BRL<1.79
	Perfluorooctanoic acid (PFOA)	(See PFAS Sum)	4.61	4.10	23.4	80.3	213	38.6	BRL<1.78	11.9	BRL<1.79
	Perfluorononanoic acid (PFNA)	(See PFAS Sum)	BRL<2.14	BRL<2.13	5.76	7.15	170	14.6	BRL<1.78	2.03	BRL<1.79
	Perfluorodecanoic acid (PFDA)	(See PFAS Sum)	BRL<2.14	BRL<2.13	BRL<1.99	BRL<1.91	4.11	BRL<2.08	BRL<1.78	BRL<1.90	BRL<1.79
	Perfluoroundecanoic acid (PFUnA)	NE	BRL<2.14	BRL<2.13	BRL<1.99	BRL<1.91	BRL<2.14	BRL<2.08	BRL<1.78	BRL<1.90	BRL<1.79
	Perfluorododecanoic acid (PFDoA)	NE	BRL<2.14	BRL<2.13	BRL<1.99	BRL<1.91	BRL<2.14	BRL<2.08	BRL<1.78	BRL<1.90	BRL<1.79
	Perfluorotridecanoic acid (PFTTrDA)	NE	BRL<2.14	BRL<2.13	BRL<1.99	BRL<1.91	BRL<2.14	BRL<2.08	BRL<1.78	BRL<1.90	BRL<1.79
Perfluorotetradecanoic acid (PFTA)	NE	BRL<2.14	BRL<2.13	BRL<1.99	BRL<1.91	BRL<2.14	BRL<2.08	BRL<1.78	BRL<1.90	BRL<1.79	
2	Perfluorobutanesulfonic acid (PFBS)	NE	BRL<2.14	BRL<2.13	3.13	25.1	10.5	8.14	BRL<1.78	0.830 J	BRL<1.79
	Perfluorohexanesulfonic acid (PFHxS)	(See PFAS Sum)	3.72	BRL<2.13	5.00	143	164	3.05	BRL<1.78	5.07	BRL<1.79
	Perfluorooctanesulfonic acid (PFOS)	(See PFAS Sum)	6.34	7.66	10.2	9.41	45.6	BRL<2.08	BRL<1.78	9.05	BRL<1.79
Sum of 6 Regulated PFAS compounds		20	14.7	11.8	85.8	496	733	107	All BRL	38.0	All BRL
3	N-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	NE	BRL<2.14	BRL<2.13	BRL<1.99	BRL<1.91	BRL<2.14	BRL<2.08	BRL<1.78	BRL<1.90	BRL<1.79
	N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	NE	BRL<2.14	BRL<2.13	BRL<1.99	BRL<1.91	BRL<2.14	BRL<2.08	BRL<1.78	BRL<1.90	0.737 J
	2,3,3,3-Tetrafluoro-2[1,1,2,2,3,3,3-heptafluoropropoxy]-propanoic acid (HFPO-DA)	NE	BRL<53.4	BRL<53.2	BRL<49.7	BRL<47.7	BRL<53.5	BRL<52.1	BRL<44.4	BRL<47.6	BRL<44.7
	4,8-Dioxa-3h-perfluorononanoic acid (ADONA)	NE	BRL<2.14	BRL<2.13	BRL<1.99	BRL<1.91	BRL<2.14	BRL<2.08	BRL<1.78	BRL<1.90	BRL<1.79
	9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NE	BRL<2.14	BRL<2.13	BRL<1.99	BRL<1.91	BRL<2.14	BRL<2.08	BRL<1.78	BRL<1.90	BRL<1.79
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	NE	BRL<2.14	BRL<2.13	BRL<1.99	BRL<1.91	BRL<2.14	BRL<2.08	BRL<1.78	BRL<1.90	BRL<1.79	

Notes BRL = Below laboratory Reporting Limit

1 = Perfluoroalkylcarboxylic acids; 2 = Perfluoroalkylsulfonates;

3 = Perfluorooctanesulfonamidoacetic acids

Yellow highlight = Exceeds reportable concentration (RC) GW-1 standard

ng/L = nanograms per liter

NE = Not Established; FB = Field Blank

7.74 | 47.40 (Notation under well ID) = Depth to Water | Depth to Bottom of Well (ft)

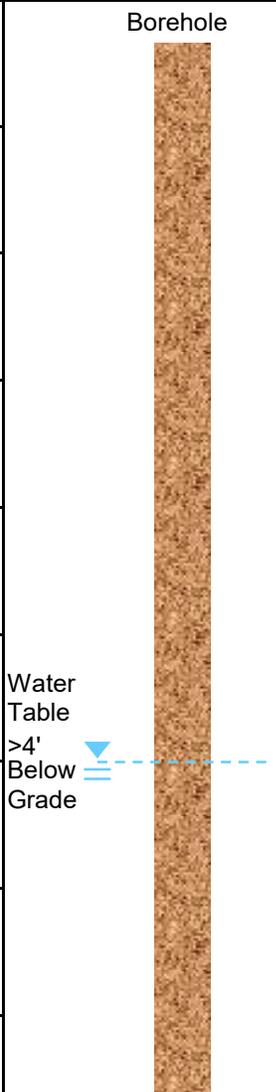
J = Estimated value. The target analyte concentration is below the quantitation limit, but

above the Method Detection Limit or Estimated Detection Limit for Solid Phase

Microextraction-related analyses. This represents an estimated concentration for

Tentatively Identified Compounds.

DIRECT PUSH BORING LOG

Location: 42 Leverett Road, Shutesbury MA			Boring Designation: SB-1	
Drilling Company: New England Disposal Technologies, Inc.			Date: July 15, 2022	
Field supervisor: Gary Magnuson			Project ID: 2021-177	
Direct-Push Sampling Interval (feet)	Sample Recovery (inches)	PID Reading (ppmv)	Soil Characterization	Well Diagram
0-2½	30	0.0	Used decontaminated shovel to excavate upper 6" (grass, topsoil), collected sample of undisturbed soil; tan-brown very fine-grained sand & silt w/organics, dry; vactored to 32" (rocks/roots/tan-brown fine- to medium-grained sand, dry)	 <p>Borehole</p> <p>Water Table >4' Below Grade</p> <p>Borehole</p>
3-4	12	0.0	Tan to brown, very fine-grained sand and silt, some organics, moist; soft fractured rock at 4'; refusal at ~4-5'	

<p>Soil Classification</p> <p>Particles <0.075 mm = silt (rounded) or clay (laminar)</p> <p>0.075 to 0.25 mm = fine-grained sand</p> <p>0.25 to 0.60 mm = medium-grained sand</p> <p>0.60 to 2.0 mm = coarse-grained sand</p> <p>2.0 to 76 mm = gravel</p> <p>Particles >76 mm = cobbles</p> <p>"and" = 30 to 50% by volume in sample</p> <p>"some" = 20 to 35% by volume in sample</p> <p>"little" = 10 to 20% by volume in sample</p> <p>"trace" = 0 to 10% by volume in sample</p>	<p align="center">Boring Observations</p> <p>Estimated depth to water: >4 feet below grade</p> <p>Bottom of boring: 4 feet below grade</p>
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DIRECT PUSH BORING LOG

Location: 42 Leverett Road, Shutesbury MA			Boring Designation: SB-2	
Drilling Company: New England Disposal Technologies, Inc./Technical Drilling Services, Inc.			Date: July 15, 2022	
Field supervisor: Gary Magnuson			Project ID: 2021-177	
Direct-Push Sampling Interval (feet)	Sample Recovery (inches)	PID Reading (ppmv)	Soil Characterization	Well Diagram
0-2	18	0.0	Used decontaminated shovel to excavate upper 6" (grass, topsoil), collected sample of undisturbed soil; brown to tan very fine-grained sand, organic; vactored from 6-24" and collected sample from 2'	 <p>Borehole</p> <p>Water Table >4' Below Grade</p> <p>Borehole</p>
2-3	12	0.0	Tan to brown, very fine- to fine-grained sand, trace silt, native, dry; some fractured rock at 3'	
3-4	6	0.0	Used Geoprobe to advance through fractured rock from 3-3½' deep; fine- to medium-grained sand, dry; rock at 4' (refusal)	

<p>Soil Classification</p> <p>Particles <0.075 mm = silt (rounded) or clay (laminar)</p> <p>0.075 to 0.25 mm = fine-grained sand</p> <p>0.25 to 0.60 mm = medium-grained sand</p> <p>0.60 to 2.0 mm = coarse-grained sand</p> <p>2.0 to 76 mm = gravel</p> <p>Particles >76 mm = cobbles</p> <p>"and" = 30 to 50% by volume in sample</p> <p>"some" = 20 to 35% by volume in sample</p> <p>"little" = 10 to 20% by volume in sample</p> <p>"trace" = 0 to 10% by volume in sample</p>	<p>Boring Observations</p> <p>Estimated depth to water: >4 feet below grade</p> <p>Bottom of boring: 4 feet below grade</p>
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DIRECT PUSH BORING LOG

Location: 42 Leverett Road, Shutesbury MA			Boring Designation: SB-3	
Drilling Company: New England Disposal Technologies, Inc./Technical Drilling Services, Inc.			July 15, 2022	
Field supervisor: Gary Magnuson			Project ID: 2021-177	
Direct-Push Sampling Interval (feet)	Sample Recovery (inches)	PID Reading (ppmv)	Soil Characterization	Well Diagram
0-½	6	0.0	Used decontaminated shovel to excavate upper 6" (grass, topsoil), collected sample of undisturbed soil; grass, tan/brown/orange, very fine-grained sand, trace silt, some organics, dry	 <p>Borehole</p> <p>Water Table >4.5' Below Grade</p> <p>Borehole</p>
½-3	30	0.0	Tan-brown, very fine-grained sand and silt, trace organics, dry	
4-5	6	0.0	Gray to tan, fine- to medium-grained sand, trace silt, moist; refusal at 4.5'; used Geoprobe to sample	

<p>Soil Classification</p> <p>Particles <0.075 mm = silt (rounded) or clay (laminar) 0.075 to 0.25 mm = fine-grained sand 0.25 to 0.60 mm = medium-grained sand 0.60 to 2.0 mm = coarse-grained sand 2.0 to 76 mm = gravel Particles >76 mm = cobbles "and" = 30 to 50% by volume in sample "some" = 20 to 35% by volume in sample "little" = 10 to 20% by volume in sample "trace" = 0 to 10% by volume in sample</p>	<p>Boring Observations</p> <p>Estimated depth to water: >4.5 feet below grade Bottom of boring: 4.5 feet below grade</p>
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DIRECT PUSH BORING LOG/WELL CONSTRUCTION DIAGRAM

Location: 42 Leverett Road, Shutesbury MA			Boring Designation: SB-4/MW-100	
Drilling Company: New England Disposal Technologies, Inc./Technical Drilling Services, Inc.			Date: July 15, 2022	
Field supervisor: Gary Magnuson			Project ID: 2021-177	
Direct-Push Sampling Interval (feet)	Sample Recovery (inches)	PID Reading (ppmv)	Soil Characterization	Well Diagram
0-2	6	0.0	Used decontaminated shovel to excavate upper 6" (grass, topsoil), collected sample of undisturbed soil; tan-brown silt with some very fine-grained sand, organics; vactored to 36"	
2-3	12	0.0	Brown to tan, medium- to coarse-grained sand, some gravel, some uniform medium-grained sand at 3', dry	
3-5	22	0.0	Used Geoprobe to advance and sample; tan, medium-grained sand, some silt, rock in tip, dry	
5-7	NR	0.0	Used Geoprobe to advance and sample; gray/tan/brown, fine-grained sand, some silt, trace gravel, wet; rock/refusal at 7'	

<p>Soil Classification</p> <ul style="list-style-type: none"> Particles <0.075 mm = silt (rounded) or clay (laminae) 0.075 to 0.25 mm = fine-grained sand 0.25 to 0.60 mm = medium-grained sand 0.60 to 2.0 mm = coarse-grained sand 2.0 to 76 mm = gravel Particles >76 mm = cobbles "and" = 30 to 50% by volume in sample "some" = 20 to 35% by volume in sample "little" = 10 to 20% by volume in sample "trace" = 0 to 10% by volume in sample 	<p>Well Construction Details</p> <ul style="list-style-type: none"> Estimated depth to water: >5 feet below grade Bottom of boring: 7 feet below grade Screened interval: 2 to 7 feet below grade Well materials: 2-inch schedule 40 PVC
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DIRECT PUSH BORING LOG

Location: 42 Leverett Road, Shutesbury MA			Boring Designation: SB-5	
Drilling Company: New England Disposal Technologies, Inc./Technical Drilling Services, Inc.			Date: July 15, 2022	
Field supervisor: Gary Magnuson			Project ID: 2021-177	
Direct-Push Sampling Interval (feet)	Sample Recovery (inches)	PID Reading (ppmv)	Soil Characterization	Well Diagram
0-½	6	0.0	Used decontaminated shovel to excavate upper 6" (grass, topsoil), collected sample of undisturbed soil; grass and very fine-grained sand and silt, trace organics; vactored to 36"	 <p>Borehole</p> <p>Water Table >4.5' Below Grade</p> <p>Borehole</p>
2-3	12	0.0	Very fine-grained sand and silt, trace organics	
4-5	12	0.0	Used Geoprobe to refusal at 5' (rock); tan-brown, fine- to medium-grained sand, moist	

<p>Soil Classification</p> <p>Particles <0.075 mm = silt (rounded) or clay (laminar) 0.075 to 0.25 mm = fine-grained sand 0.25 to 0.60 mm = medium-grained sand 0.60 to 2.0 mm = coarse-grained sand 2.0 to 76 mm = gravel Particles >76 mm = cobbles "and" = 30 to 50% by volume in sample "some" = 20 to 35% by volume in sample "little" = 10 to 20% by volume in sample "trace" = 0 to 10% by volume in sample</p>	<p>Boring Observations</p> <p>Estimated depth to water: >4.5 feet below grade Bottom of boring: 4.5 feet below grade</p>
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DIRECT PUSH BORING LOG/WELL CONSTRUCTION DIAGRAM

Location: 42 Leverett Road, Shutesbury MA			Boring Designation: SB-6/MW-101	
Drilling Company: New England Disposal Technologies, Inc./Technical Drilling Services, Inc.			Date: July 15, 2022	
Field supervisor: Gary Magnuson			Project ID: 2021-177	
Direct-Push Sampling Interval (feet)	Sample Recovery (inches)	PID Reading (ppmv)	Soil Characterization	Well Diagram
0-½	6	0.0	Used decontaminated shovel to excavate upper 6" (grass, topsoil), collected sample of undisturbed soil; grass, silty topsoil, some silt, some organics, brown	
1-2	12	0.0	Hand dug to 2'; tan to brown to orange, very fine-grained sand and silt	
3-5	12	0.0	Used Geoprobe from 3-5'; gray to tan, fine to medium-grained sand, moist to wet at 5'; lab sample at 4-5'.	
5-8	NR	0.0	Geoprobe from 5-8', refusal at 8'; 5-8': gray to tan, fine- to medium-grained sand, some rocks, wet at 5'; lab sample at 6-7' deep	

<p>Soil Classification</p> <ul style="list-style-type: none"> Particles <0.075 mm = silt (rounded) or clay (lamellar) 0.075 to 0.25 mm = fine-grained sand 0.25 to 0.60 mm = medium-grained sand 0.60 to 2.0 mm = coarse-grained sand 2.0 to 76 mm = gravel Particles >76 mm = cobbles "and" = 30 to 50% by volume in sample "some" = 20 to 35% by volume in sample "little" = 10 to 20% by volume in sample "trace" = 0 to 10% by volume in sample 	<p>Well Construction Details</p> <ul style="list-style-type: none"> Estimated depth to water: 5 feet below grade Bottom of boring: 7 feet below grade Screened interval: 2 to 7 feet below grade Well materials: 3-inch schedule 40 PVC
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DIRECT PUSH BORING LOG/WELL CONSTRUCTION DIAGRAM

Location: 42 Leverett Road, Shutesbury MA			Boring Designation: SB-7/MW-102	
Drilling Company: New England Disposal Technologies, Inc./Technical Drilling Services, Inc.			Date: July 15, 2022	
Field supervisor: Gary Magnuson			Project ID: 2021-177	
Direct-Push Sampling Interval (feet)	Sample Recovery (inches)	PID Reading (ppmv)	Soil Characterization	Well Diagram
0-½	6	0.0	Used decontaminated shovel to excavate upper 6" (grass, topsoil), collected sample of undisturbed soil; grass, brown to tan, very fine-grained silt and very fine-grained sand, trace organics	
2-3	6	0.0	Vactored to 3'; brown/tan sand and silt from 6"-2½'; 2½'-3': peat, moist	
3-5	12	0.0	Geoprobe from 3-5', refusal at 5'; 2½'-3½': peat; 3½'-5': tan to gray, fine- to medium-grained sand; lab sample from 4-5'	

<p>Soil Classification</p> <ul style="list-style-type: none"> Particles <0.075 mm = silt (rounded) or clay (laminae) 0.075 to 0.25 mm = fine-grained sand 0.25 to 0.60 mm = medium-grained sand 0.60 to 2.0 mm = coarse-grained sand 2.0 to 76 mm = gravel Particles >76 mm = cobbles "and" = 30 to 50% by volume in sample "some" = 20 to 35% by volume in sample "little" = 10 to 20% by volume in sample "trace" = 0 to 10% by volume in sample 	<p>Well Construction Details</p> <ul style="list-style-type: none"> Estimated depth to water: >3 feet below grade Bottom of boring: 5 feet below grade Screened interval: 3 to 5 feet below grade Well materials: 2-inch schedule 40 PVC
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