City of Portsmouth

Department of Public Works

Portsmouth Water System
PFC Sampling Update
Issued: February 6, 2017
Updated: September 25, 2017

Per- and polyfluoroalkyl substances (PFAS) are a diverse group of compounds resistant to heat, water, and oil. For decades, they have been used in hundreds of industrial applications and consumer products such as carpeting, apparels, upholstery, food paper wrappings, fire-fighting foams and metal plating. In May, 2014, the City of Portsmouth was contacted by the New Hampshire Department of Environmental Services the samples from the Haven Well, part of the Pease Tradeport drinking water system, had a PFAS compound – PFOS – that exceeded the drinking water health advisory at that time. The well was immediately shut down.

The Air Force's engineering consultant has been performing frequent routine sampling of the water supply wells in the system near the Haven Well for PFAS compounds (also referred to as PFCs). Prior to the installation of activated carbon filters for the Smith and Harrison Wells (Pease Wells), the Smith Well was sampled weekly and the Harrison Well was sampled every two weeks while the Portsmouth and Collins wells were sampled monthly. In addition to the water supply wells, the Air Force's consultant samples other monitoring wells in the surrounding area to track any potential migration of PFAS to the aquifer that may be moving toward the supply wells. To date, PFAS levels have remained consistent and all detected levels of PFOS and PFOA in the currently operating supply wells remain below the EPA's current health advisory standard of 70 parts per trillion. The newly-installed activated carbon treatment system for the Harrison and Smith wells is also sampled, utilizing the same laboratory as the Air Force's consultant uses to provide consistency. Data provided by the Air Force is updated on the City's website once it has been validated by the laboratory and provided to the City by the Air Force's consultant. The data from the carbon treatment system will be updated periodically.

All of the Portsmouth water sources were sampled for PFAS in May 2014 by the New Hampshire Department of Environmental Services (NHDES). Samples were also taken in two locations of the City's water distribution system (one at the DPW on Peverly Hill Road and another at the meter pit in New Castle). All of the Portsmouth water sources were also sampled as part of the USEPA's third Unregulated Contaminant Monitoring Rule (UCMR 3). Four rounds of UCMR3 sampling were performed between July 2014 and April 2015. Those sample results were below the laboratory's reporting limit for all PFAS.

In June 2016 the NHDES sent out a request to all community and other non-transient water systems to voluntarily collect a water sample for PFOA and PFOS and share the results with NHDES. They also recommended that a lab certified or accredited to complete EPA Method 537 with detection limits of at least 5 nanograms per liter (parts-per-trillion or ppt) be utilized. Following this request Portsmouth water operations staff sampled for PFAS. A second round of sampling was performed in November. The lower reporting limit revealed that the Greenland well results had an average level of 9 ppt of PFOS. It should be noted that the levels were also flagged by the laboratory as "J" values, which means that they were an estimate.

The following table summarizes the results for the 2016 PFAS sampling for the two contaminants with Health Advisories – PFOA and PFOS:

City of Portsmouth Sampling	Samples Analyzed	Laboratory	PFOA (ppt)	PFOS (ppt)	Combined PFOA - PFOS
Bellamy Reservoir	2	Maxxam	<5	<3	**NA**
Madbury Well 2	1	Maxxam	<5	<3	**NA**
Madbury Well 3	2	Maxxam	<5	<3	**NA**
Madbury Well 4	1	Maxxam	<5	<3	**NA**
Madbury Treatment Plant Finished Water	2	Maxxam	<5	<3	**NA**
Greenland Well	3	Maxxam	<5	9 (J)	**9 (J)**
Air Force Sampling - City Wells					
Portsmouth Well	11	Maxxam	5 (J)	5 (J)	**10 (J)**
Collins Well	12	Maxxam	1 (J)	5 (J)	**6 (J)**
Air Force Sampling - Pease Wells					
Harrison Well	24	Maxxam	7 (J)	24	**31**
Smith Well	42	Maxxam	2 (J)	11 (J)	**13 (J)**

notes:
ppt - Parts per Trillion
< - less than
ND - Non Detect
NA - Not Applicable
(J) - The result is an estimated value.

As previously mentioned, the Portsmouth and Collins wells are sampled monthly by the Air Force as part of the Pease PFAS water quality monitoring program. Though there are detections, they are generally less than what we see in the Harrison and Smith wells. To date, the Air Force's consultant's analysis of this data show no increasing trend in PFAS concentrations. If concentrations show an increasing trend, or if the regulations get revised, then treatment of these wells may be considered.

It should be noted that both the Air Force's engineering consultant and the City of Portsmouth are sampling for more PFAS parameters than most other water systems. The Unregulated Contaminant Monitoring that took place across the country in 2014 and 2015 (which the City's water system participated in) only required sampling for six parameters – PFOS, PFOA, PFBS,PFHxS, PFHpA, and PFNA. When the Haven Well contamination was discovered in 2014, DES recommended that the Air Force sample for more compounds than the UCMR required. It was also recommended that a lab capable of sampling at lower levels be utilized. At the time, there were only two labs that could do this type of analysis, Maxxam was one of them and they were selected and have been used for sampling ever since. The DES has been very proactive with this issue and they put out a recommendation and request to all public drinking water systems that they re-sample their water sources utilizing methods that detect PFAS compounds more precise laboratory method than when many drinking water systems in the U.S. sampled for PFAS compounds in 2014-2015. Water systems that had no detections utilizing the UCMR methods at that time now have detections - Dover, Rye, Hampton (Aquarion), Portsmouth and many other water systems in New Hampshire. Detailed information on this sampling can be accessed at the DES website:

https://www4.des.state.nh.us/nh-pfas-investigation/

https://www.des.nh.gov/organization/commissioner/documents/pfoa-public-water-results-20170503.pdf

As for the tap sampling, we have on occasion sampled for PFAS at the tap. Samples were taken last year in June at two of our DES sample sites, one on Sagamore Road and the other at the Portsmouth Library using the same sample method and laboratory (Maxxam) as the Air Force's consultant uses (to be consistent). Results for PFOA and PFOS were non-detect. Five other compounds were detected at low levels in the tap samples collected in 2016: PFBS, PFHpS, PFPeA, PFTeDA, and PFTrDA. The level of these compounds at the taps were equivalent to the sources that served the sample location, with the exception of PFHpS which was not detected at any of the sources, thus likely associated with the facility plumbing or a laboratory analysis issue. The results of these compounds were all estimated by the lab and are near the limits of the lab's ability to detect. We do not intend to continue twice a year sampling at the tap locations based on the confirmation last year in the field. We will continue twice a year sampling of PFAS at all of our source waters. A copy of all the sample results is included at the end of this update.

The NHDES has stated that because of the widespread use of PFAS it is not unusual to find these compounds in groundwater and surface water throughout the nation anywhere samples are analyzed at the part per trillion level. The recent voluntary sampling of public water systems in New Hampshire shows detected PFAS in multiple drinking water systems, including those that previously had no detections utilizing the UCMR3 methods. The NHDES also notes that concentrations of PFAS in groundwater below 10 parts per trillion are normal and can be considered anthropogenic "background" concentration. Additional information on New Hampshire public drinking water sampling for PFAS can be accessed at the NHDES website: http://des.nh.gov/organization/commissioner/pfoa.htm

Health Advisory Levels

In May 2016, the EPA set a Lifetime Health Advisory Level of 70 ppt for PFOS and PFOA. According to EPA information these health advisory levels were calculated to offer a margin of protection for all Americans throughout their life from adverse health effects resulting from exposure to these contaminants in drinking water. In order to assure compliance with the newly adopted health standard, the City of Portsmouth's water division will continue to monitor for PFAS in all water sources twice a year. The Air Force will continue with monthly sampling of the Portsmouth, Collins, Harrison and Smith wells.

Sample Location	Sample ID	Collection Date	Sampled By	6:2 Fluorotelomer sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonate (8:2 FTS)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl Perfluorooctane Sulfonamide (MEFOSA)	N-Methyl Perfluorooctane Sulfonamidoethanol (MEFOSE)	Perfluorobutanesulfonic acid (PFBS)	Perfluorobutanoic acid (PFBA)	Perfluorodecane sulfonate (PFDS)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoA)	Perfluoroheptane sulfonate (PFHpS)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanesulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid (PFNA)	Perfluorooctane sulfonamide (PFOSA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	Perfluoropentanoic acid (PFPeA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnA)	PFOS+PFOA
	USEPA Health Advisory (HA):			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.070	0.070	-	-	-	-	0.070
Collins Well	Collins	16-May-14	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	Collins-06182014	18-Jun-14	AMEC	NA	NA	NA	NA	NA	NA	ND	0.0028 J	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	DW-DUP-06182014 (D)	18-Jun-14	AMEC	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS-06252014	25-Jun-14	AMEC	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS-07022014	02-Jul-14	AMEC	NA	NA	NA	NA	NA	NA	ND	0.0056 J	ND	ND	ND	NA	ND	ND	ND	ND	ND	0.0072 J	ND	0.0032 J	ND	ND	ND	0.007
	COLLINS-07092014	09-Jul-14	AMEC	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS-07162014	16-Jul-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0045 J	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS_07242014	24-Jul-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS_08062014	06-Aug-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS_08212014	21-Aug-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS_09042014	04-Sep-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS_09172014	17-Sep-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS_10162014	16-Oct-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0038 J	ND	ND	ND	0.0048 J	ND	0.0044 J	ND	ND	0.005
	COLLINS_11122014	12-Nov-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS_12122014	12-Dec-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS_01052015	05-Jan-15	AMEC	ND	ND	ND	ND	0.0032 J	ND	ND	0.0035 B	0.0043 J	ND	ND	ND	0.0062 J	ND	ND	ND	ND	ND	ND	0.0047 J	ND	0.0035 J	ND	ND	0.005
	COLLINS_02042015	04-Feb-15	AMEC	ND	ND	0.0091 J	ND	ND	ND	ND	0.0031 J	ND	ND	ND	ND	ND	ND	0.0038 J	ND	ND	ND	ND	ND	ND	ND	ND	0.0054 J	
	COLLINS_03172015	17-Mar-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0044 J	ND	ND	ND	ND	ND	0.0054 J	ND	ND	ND	ND	ND	0.005
	COLLINS_03262015	26-Mar-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0047 B	ND	ND	ND	ND	ND	0.005
	COLLINS_04232015	23-Apr-15	AMEC	ND	ND	ND	0.0048 B	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0017 B	0.0041 J	ND	ND	ND	ND	ND	0.004
	COLLINS_05212015	21-May-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS_06162015	16-Jun-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0043 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0052 J	ND	ND	
	COLLINS_07162015	16-Jul-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0040 J	ND	ND	ND	ND	ND	0.004
	COLLINS_08112015	11-Aug-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0054 J	ND	ND	ND	ND	ND	ND	0.0063 J	ND	0.0077 J	ND	ND	ND	0.006
	COLLINS_09092015	09-Sep-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0044 J	ND	ND	ND	ND	ND	0.004
	COLLINS_10072015	07-Oct-15	AMEC	ND	ND	ND	ND	ND	ND	ND	0.0063 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0074 J	ND	ND	ND	ND	ND	0.007
	COLLINS_11042015	04-Nov-15	AMEC	ND	ND	ND	0.0080 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0060 J	ND	ND	ND	0.0073 J	ND	ND	0.0094 J	ND	0.0052 J	0.007
	COLLINS_12012015	01-Dec-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0066 J	ND	ND	ND	0.0076 J	ND	ND	ND	ND	ND	0.008
	COLLINS_01062016	06-Jan-16	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0057 B	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS_02022016	02-Feb-16	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0041 B	0.0070 B	ND	ND	0.0067 J	ND	ND	ND	ND	ND	0.007
	COLLINS_03012016	01-Mar-16	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0084 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS_03292016	29-Mar-16	AMEC	ND	ND	ND	ND	ND	ND	0.0050 J	0.0077 J	ND	ND	ND	ND	ND	ND	0.0051 B	ND	ND	ND	0.0034 J	ND	ND	ND	ND	ND	0.003
	COLLINS-04122016	12-Apr-16	AMEC	ND	ND	NA	NA	NA	NA	ND	ND	NA	NA	NA	ND	ND	ND	0.0055 B	0.0073 B	ND	ND	0.0058 B	ND	ND	NA	NA	NA	0.006
	COLLINS-GW_20160623	23-Jun-16	AMEC	ND	ND	NA	NA	NA	NA	0.0035 J	ND	NA	NA	NA	ND	ND	ND	0.0042 J	0.0050 J	ND	ND	0.0054 J	0.0055 J	0.0069 J	NA	NA	NA	0.011
	COLLINS-GW_20160719	19-Jul-16	AMEC	ND	ND	NA	NA	NA	NA	0.0034 J	ND	NA	NA	NA	ND	ND	ND	0.0058 J	ND	ND	ND	0.0061 J	ND	0.0055 J	NA	NA	NA	0.006
	COLLINS-GW_20160802	02-Aug-16	AMEC	ND	ND	NA	NA	NA	NA	0.0075 J	ND	NA	NA	NA	ND	ND	ND	0.0054 J	0.0057 J	ND	ND	0.0052 J	0.0071 J	0.0085 J	NA	NA	NA	0.012
	COLLINS-GW_20160913	13-Sep-16	AMEC	ND	ND	NA	NA	NA	NA	0.0079 B	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	0.0047 B	ND	ND	NA	NA	NA	0.005
	COLLINS-GW_20161019	19-Oct-16	AMEC	ND	ND	NA	NA	NA	NA	0.0100 J	ND	NA	NA	NA	ND	ND	ND	0.0054 J	ND	ND	ND	0.0051 J	ND	ND	NA	NA	NA	0.005
	COLLINS-GW_20161117	17-Nov-16	AMEC	ND	ND	NA	NA	NA	NA	0.0160 J	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	0.0061 J	ND	ND	NA	NA	NA	0.006
	COLLINS_GW_20161214	14-Dec-16	AMEC	ND	ND	NA	NA	NA	NA	0.0150 J	ND	NA	NA	NA	ND	ND	ND	0.0060 J	ND	ND	ND	0.0067 J	ND	0.0047 J	NA	NA	NA	0.007
	COLLINS-GW_20170111	11-Jan-17	AMEC	ND	ND	NA	NA	NA	NA	0.0200 J	ND	NA	NA	NA	ND	ND	ND	0.0082 J	0.0093 J	ND	ND	0.0071 J	ND	ND	NA	NA	NA	0.007
	COLLINS-GW_20170217	17-Feb-17	AMEC	ND	ND	NA	NA	NA	NA	0.0130 J	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	0.0068 J	ND	ND	NA	NA	NA	0.007
	COLLINS-GW_20170323	23-Mar-17	AMEC	ND	ND	NA	NA	NA	NA	0.0089 J	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA	
	COLLINS-GW_20170419	19-Apr-17	AMEC	ND	ND	NA	NA	NA	NA	0.0079 J	ND	NA	NA	NA	ND	ND	ND	0.0042 J	ND	ND	ND	0.0056 J	ND	ND	NA	NA	NA	0.006
	COLLINS-GW_20170612	12-Jun-17	AMEC	ND	ND	ND	ND	ND	ND	0.0100 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	COLLINS-GW_20170711	11-Jul-17	AMEC	ND	ND	ND	ND	ND	ND	0.0094 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0069 J	ND	ND	ND	

Sample Location	Sample ID	Collection Date	Sampled By	6:2 Fluorotelomer sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonate (8:2 FTS)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl Perfluorooctane Sulfonamide (MEFOSA)	N-Methyl Perfluorooctane Sulfonamidoethanol (MEFOSE)	Perfluorobutanesulfonic acid (PFBS)	Perfluorobutanoic acid (PFBA)	Perfluorodecane sulfonate (PFDS)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoA)	Perfluoroheptane sulfonate (PFHpS)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanesulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid (PFNA)	Perfluorooctane sulfonamide (PFOSA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	Perfluoropentanoic acid (PFPeA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnA)	PFOS+PFOA
USEPA Health Advisory (HA):				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.070	0.070	-	-	-	-	0.070
Portsmouth Well	Portsmouth	20-May-14	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	Portsmouth-06182014	18-Jun-14	AMEC	NA	NA	NA	NA	NA	NA	ND	0.0029 J	ND	ND	ND	NA	ND	0.0058 J	ND	ND	ND	ND	ND	0.0068 J	ND	ND	ND	
	DW-DUP-06252014 (D)	25-Jun-14	AMEC	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	ND	0.0044 J	ND	ND	ND	ND	ND	0.0031 J	ND	ND	ND	
	PORTSMOUTH-06252014	25-Jun-14	AMEC	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	NA	ND	0.0051 J	ND	ND	ND	ND	ND	0.0035 J	ND	ND	ND	
	PORTSMOUTH-07022014	02-Jul-14	AMEC	NA	NA	NA	NA	NA	NA	ND	0.0058 J	ND	ND	ND	NA	ND	0.0055 J	0.0056 J	ND	0.0025 J	0.0100 J	ND	0.0060 J	ND	ND	ND	0.010
	PORTSMOUTH-07092014	09-Jul-14	AMEC	NA	NA	NA	NA	NA	NA	ND	0.0024 J	ND	ND	ND	NA	ND	ND	0.0029 J	ND	ND	ND	ND	ND	ND	ND	ND	
	PORTSMOUTH-07162014	16-Jul-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0070 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	DUP2_07242014	24-Jul-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0038 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	PORTSMOUTH_07242014	24-Jul-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0036 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	PORTSMOUTH_08062014	06-Aug-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0052 J	ND	ND	ND	ND	ND	0.0032 J	ND	ND	ND	
	PORTSMOUTH_08212014	21-Aug-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0046 J	ND	ND	ND	ND	ND	0.0045 J	ND	ND	ND	
	PORTSMOUTH_09042014	04-Sep-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0073 J	0.0035 J	ND	ND	ND	ND	ND	ND	ND	ND	
	PORTSMOUTH_09172014	17-Sep-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0084 J	ND	ND	ND	0.0049 J	ND	0.0035 J	ND	ND	ND	0.005
	PORTSMOUTH_10162014	16-Oct-14	AMEC	ND	ND	ND	ND	ND	ND	0.0038 J	0.0047 J	ND	ND	ND	ND	0.0041 J	0.0091 J	0.0072 J	ND	ND	0.0073 J	0.0062 J	0.0090 J	ND	ND	ND	0.014
	PORTSMOUTH_11122014	12-Nov-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0031 J	ND	ND	ND	0.0039 J	ND	0.0033 J	ND	ND	ND	0.004
	PORTSMOUTH_12122014	12-Dec-14	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0052 J	ND	ND	ND	0.0039 J	ND	0.0057 J	ND	ND	ND	0.004
	PORTSMOUTH_01052015	05-Jan-15	AMEC	ND	ND	ND	ND	ND	ND	ND	0.0048 B	ND	ND	ND	0.0060 J	ND	0.0079 J	0.0062 J	ND	ND	0.0074 J	0.0053 J	0.0083 J	ND	ND	ND	0.013
	PORTSMOUTH_02042015	04-Feb-15	AMEC	ND	ND	ND	ND	ND	ND	ND	0.0028 J	ND	ND	ND	ND	ND	0.0076 J	0.0056 J	ND	0.0033 J	0.0075 J	0.0069 J	0.0085 J	ND	ND	ND	0.014
	PORTSMOUTH_03172015	17-Mar-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0044 J	ND	ND	0.0070 J	ND	0.0063 J	ND	ND	ND	0.007
	PORTSMOUTH_03262015	26-Mar-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0052 J	ND	ND	0.0068 B	ND	0.0077 B	ND	ND	ND	0.007
	PORTSMOUTH_04232015	23-Apr-15	AMEC	ND	ND	ND	0.0045 B	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0019 B	0.0059 J	ND	ND	ND	ND	ND	0.006
	PORTSMOUTH_05212015	21-May-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0032 J	ND	ND	0.0076 J	ND	0.0038 J	ND	ND	ND	0.008
	PORTSMOUTH_06162015	16-Jun-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0064 J	ND	ND	ND	0.0045 J	ND	0.0053 J	0.0049 J	ND	ND	0.005
	PORTSMOUTH_07162015	16-Jul-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0050 J	ND	ND	ND	ND	ND	0.005
	PORTSMOUTH_08112015	11-Aug-15	AMEC	ND	ND	ND	ND	ND	ND	0.0049 J	ND	ND	ND	ND	ND	ND	0.0075 J	0.0049 J	ND	ND	0.0070 J	0.0051 J	0.0089 J	ND	ND	ND	0.012
	PORTSMOUTH_09092015	09-Sep-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0075 J	ND	ND	ND	0.0048 J	0.0048 J	0.0064 J	ND	ND	ND	0.010
	PORTSMOUTH_10072015	07-Oct-15	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0071 J	0.0076 J	0.0066 J	ND	ND	0.0074 J	0.0076 J	0.0069 J	ND	ND	ND	0.015
	PORTSMOUTH_11042015	04-Nov-15	AMEC	ND	ND	ND	ND	ND	ND	0.0074 J	0.0069 J	ND	ND	ND	ND	ND	0.0085 J	0.0071 J	ND	ND	0.0064 J	0.0070 J	0.0110 J	ND	ND	ND	0.013
	PORTSMOUTH_12012015	01-Dec-15	AMEC	ND	ND	ND	ND	ND	ND	0.0068 J	0.0100 J	ND	ND	ND	ND	0.0053 J	0.0110 J	0.0082 J	ND	ND	0.0077 J	0.0069 J	0.0058 J	ND	ND	ND	0.015
	PORTSMOUTH_01062016	06-Jan-16	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0057 J	0.0098 B	0.0068 J	ND	ND	ND	0.0056 J	0.0082 J	ND	ND	ND	0.006
	PORTSMOUTH_02022016	02-Feb-16	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0071 B	0.0099 B	ND	ND	0.0069 J	0.0066 J	ND	ND	ND	ND	0.014
	PORTSMOUTH _03012016	01-Mar-16	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0082 J	0.0120 J	ND	ND	ND	ND	0.0130 J	ND	ND	ND	ND	0.013
	PORTSMOUTH_03292016	29-Mar-16	AMEC	ND	ND	ND	ND	ND	ND	0.0054 J	0.0088 J	ND	ND	ND	ND	ND	0.0087 B	ND	ND	ND	0.0044 J	0.0059 J	0.0090 J	ND	ND	ND	0.010
	PORTSMOUTH-04122016	12-Apr-16	AMEC	ND	ND	NA	NA	NA	NA	ND	ND	NA	NA	NA	ND	0.0052 J	0.0100 B	0.0089 B	ND	ND	0.0072 B	ND	ND	NA	NA	NA	
	PORTSMOUTH-GW_20160526	26-May-16	AMEC	ND	ND	NA	NA	NA	NA	0.0058 J	0.0078 J	NA	NA	NA	ND	ND	0.0069 J	ND	ND	ND	0.0068 J	0.0069 J	0.0049 J	NA	NA	NA	0.014
	PORTSMOUTH-GW_20160623	23-Jun-16	AMEC	ND	ND	NA	NA	NA	NA	0.0040 J	ND	NA	NA	NA	ND	ND	0.0073 J	0.0059 J	ND	ND	0.0060 J	ND	0.0066 J	NA	NA	NA	
	PORTSMOUTH-GW_20160719	19-Jul-16	AMEC	ND	ND	NA	NA	NA	NA	ND	ND	NA	NA	NA	ND	ND	0.0087 J	0.0061 J	ND	ND	0.0062 J	ND	0.0088 J	NA	NA	NA	
	PORTSMOUTH-GW_20160802	02-Aug-16	AMEC	ND	ND	NA	NA	NA	NA	0.0049 J	ND	NA	NA	NA	ND	ND	0.0095 J	0.0063 J	ND	ND	0.0054 J	0.0070 J	0.0095 J	NA	NA	NA	0.012
	PORTSMOUTH-GW_20160913	13-Sep-16	AMEC	ND	ND	NA	NA	NA	NA	0.0032 B	ND	NA	NA	NA	ND	ND	0.0063 B	ND	ND	ND	0.0045 B	0.0057 J	0.0059 B	NA	NA	NA	0.010
	PORTSMOUTH-GW_20161117	17-Nov-16	AMEC	ND	ND	NA	NA	NA	NA	0.0025 J	ND	NA	NA	NA	ND	ND	0.0090 J	ND	ND	ND	0.0082 J	ND	0.0092 J	NA	NA	NA	
	PORTSMOUTH-GW_20170111	11-Jan-17	AMEC	ND	ND	NA	NA	NA	NA	0.0084 J	ND	NA	NA	NA	ND	ND	0.0110 J	0.0120 J	ND	ND	0.0084 J	0.0059 J	0.0076 J	NA	NA	NA	0.014
	PORTSMOUTH-GW_20170217	17-Feb-17	AMEC	ND	ND	NA	NA	NA	NA	0.0024 J	ND	NA	NA	NA	ND	ND	0.0053 J	ND	ND	ND	ND	0.0053 J	0.0072 J	NA	NA	NA	0.005
	DUP-GW_20170323	23-Mar-17	AMEC	ND	ND	NA	NA	NA	NA	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	0.0032 J	NA	NA	NA	
	PORTSMOUTH-GW_20170323	23-Mar-17	AMEC	ND	ND	NA	NA	NA	NA	ND	ND	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	0.0032 J	NA	NA	NA	
	PORTSMOUTH-GW_20170419	19-Apr-17	AMEC	ND	ND	NA	NA	NA	NA	ND	ND	NA	NA	NA	ND	ND	0.0095 J	ND	ND	ND	0.0060 J	0.0062 J	0.0044 J	NA	NA	NA	0.012
	PORTSMOUTH-GW_20170612	12-Jun-17	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0038 J	ND	ND	ND	ND	0.0072 J	ND	ND	ND	ND	0.007
	PORTSMOUTH-GW_20170711	11-Jul-17	AMEC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0110 J	ND	ND	ND	ND	ND	0.0071 J	ND	ND	ND	

Sample Location	Sample ID	Collection Date	Sampled By	6:2 Fluorotelomer sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonate (8:2 FTS)	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N-Methyl Perfluorooctane Sulfonamide (MEFOSA)	N-Methyl Perfluorooctane Sulfonamidoethanol (MEFOSE)	Perfluorobutanesulfonic acid (PFBS)	Perfluorobutanoic acid (PFBA)	Perfluorodecane sulfonate (PFDS)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoA)	Perfluoroheptane sulfonate (PFHpS)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexanesulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid (PFNA)	Perfluorooctane sulfonamide (PFOSA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	Perfluoropentanoic acid (PFPeA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnA)	PFOS+PFOA
USEPA Health Advisory (HA):				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.070	0.070	-	-	-	-	0.070
Bellamy Reservoir Source Water	BELLAMY RAW	16-May-14	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	BELLAMY RESERVOIR - 20160609	09-Jun-16	DPW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	BELLAMY RESERVOIR - 20161109	09-Nov-16	DPW	ND	ND	ND	ND	ND	ND	0.0038 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	BELLAMY RESERVOIR - 20170427	27-Apr-17	DPW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Madbury Well 2	MADBURY WELL 2	16-May-14	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	MADBURY WELL 2_20161109	09-Nov-16	DPW	ND	ND	ND	ND	ND	ND	0.0038 J	ND	ND	ND	ND	ND	ND	0.0042 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Madbury Well 3	MADBURY WELL 3	16-May-14	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	MADBURY WELL 3_20160609	09-Jun-16	DPW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	MADBURY WELL 3_20160916	09-Nov-16	DPW	ND	ND	ND	ND	ND	ND	0.0037 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	MADBURY WELL 3_20170427	27-Apr-17	DPW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Madbury Well 4	MADBURY WELL 4	16-May-14	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	MADBURY WELL 4_20161109	09-Nov-16	DPW	ND	ND	ND	ND	ND	ND	0.0038 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	MADBURY WELL 4_20170427	27-Apr-17	DPW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Treatment Plant Finished Water	MADBURY FINISHED_20161109	09-Nov-16	DPW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
	MADBURY FINISHED_20170427	27-Apr-17	DPW	ND	ND	ND	ND	ND	ND	ND	0.018 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Madbury Blend (treatment plant and wells)	TREATMENT PLANT	21-Jul-14	DPW	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	MADBURY BLEND_20141027	27-Oct-14	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	MADBURY BLEND_20150210	10-Feb-15	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	MADBURY BLEND_20150407	07-Apr-15	DPW	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	MADBURY BLEND_20160607	07-Jun-16	DPW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0048 J	ND	ND	ND	ND	ND	ND	ND	0.0058 J	0.0097 J	ND	
Greenland Well	GREENLAND	16-May-14	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	GREENLAND WELL_20140721	21-Jul-14	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	GREENLAND WELL_20150210	10-Feb-15	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
	GREENLAND WELL_20160801	01-Aug-16	DPW	ND	ND	ND	ND	ND	ND	0.0033 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.007 J	ND	0.0071 J	ND	ND	ND	0.007
	GREENLAND WELL_20161117	17-Nov-16	DPW	0.007 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0061 J	ND	ND	ND	0.014 J	ND	0.0046 J	ND	ND	ND	0.014
	GREENLAND WELL_20161117_RERUN	17-Nov-16	DPW	ND	ND	ND	ND	ND	ND	0.0035 J	ND	ND	ND	ND	ND	ND	0.0058 J	ND	ND	ND	0.0065 J	ND	ND	ND	ND	ND	0.007
	GREENLAND WELL_20170427	27-Apr-17	DPW	ND	ND	ND	ND	ND	ND	0.0062 J	ND	ND	ND	ND	ND	ND	0.006 J	0.0033 J	ND	ND	0.0037 J	ND	ND	ND	ND	ND	0.004
DISTRIBUTION - TAP SAMPLING																											
DPW	DPW	16-May-14	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
New Castle	NEW CASTLE	16-May-14	NHDES	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	NA	ND	ND	NA	NA	NA	NA	
Library	LIBRARY	07-Jun-16	DPW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0045 J	ND	ND	ND	ND	ND	ND	ND	0.0065 J	0.0056 J	0.0093 J	ND	
Sagamore Ave. Sample Site	SAGAMORE AVE	07-Jun-16	DPW	ND	ND	ND	ND	ND	ND	0.0052 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0079 J	0.0054 J	0.0092 J	ND	

Notes:

Grey text indicates the parameter was not analyzed (NA) or not detected below the laboratory detection limit (ND).
Grey highlight indicates the compound was not analyzed
All concentrations in µg/L - micrograms per liter
All values in micrograms per liter (µg/L)

D - duplicate sample
J - The result is an estimated value.
B - Compound Detected in Blank.