PFAS Update
Supporting Information

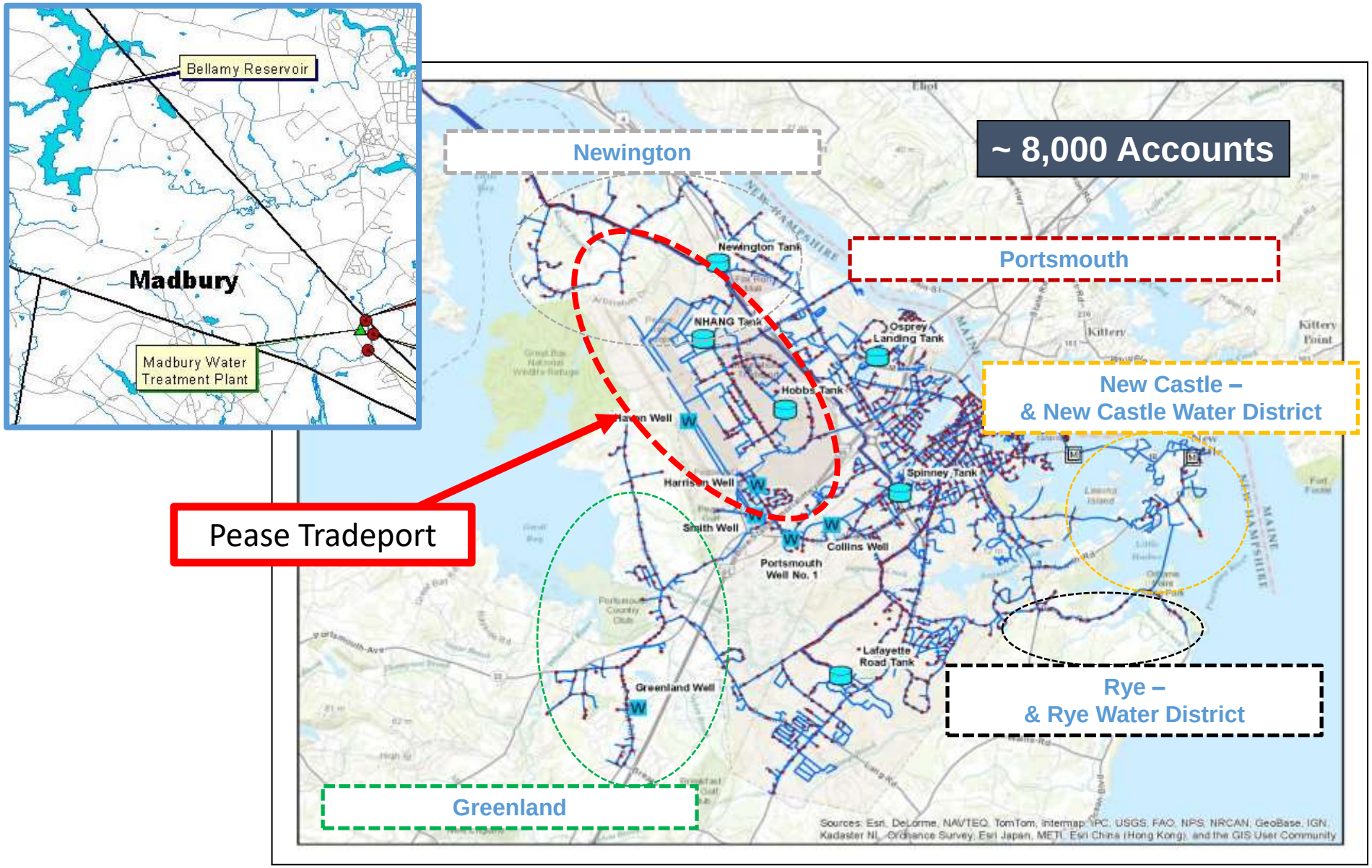
City of Portsmouth

Portsmouth City Council Packet
March 5, 2018

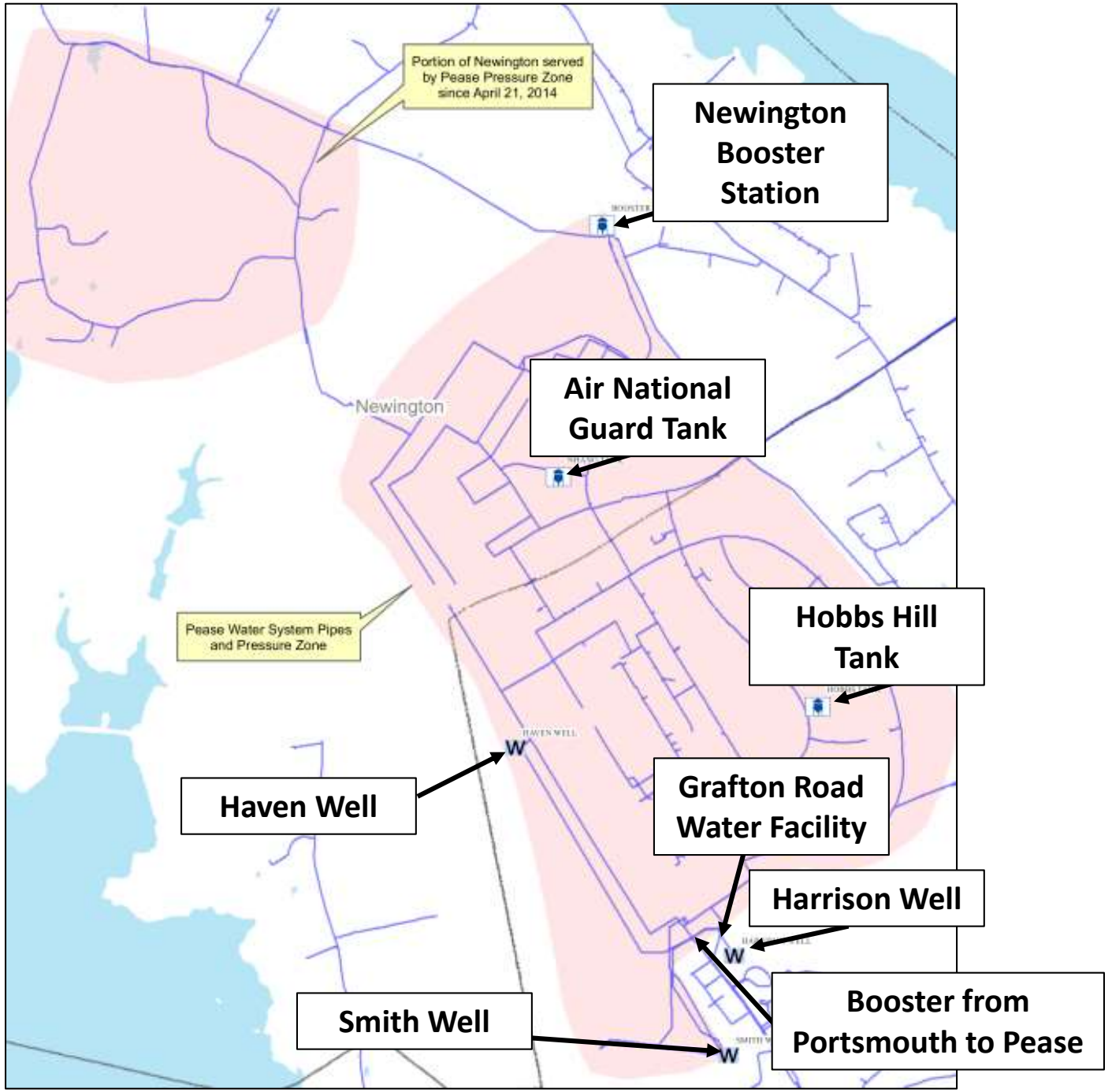
What is 1 Part-per-Trillion (ppt)?

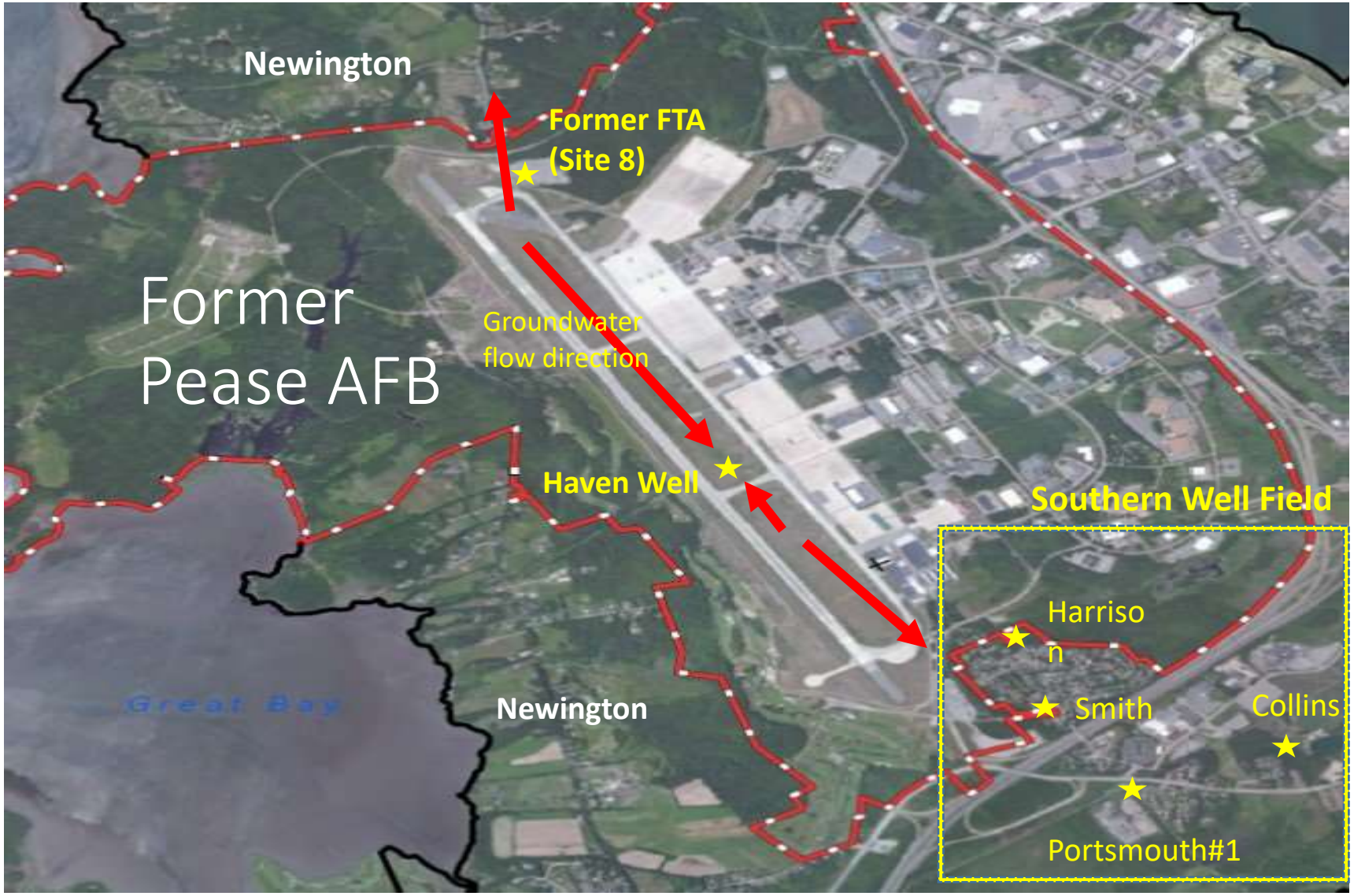
- 1 Second in 32,000 years
- 1 Square inch in 250 square miles
- 1 Grain of Sand in an Olympic-size swimming pool
- Approximately 1 Grain of Sand in the new Pease Hobbs Hill Storage Tank (600,000 gallons)

Portsmouth Regional Water System



Pease Tradeport Water System





Map prepared by:
Scott Hilton, P.G. New Hampshire Department of Environmental Services (DES)

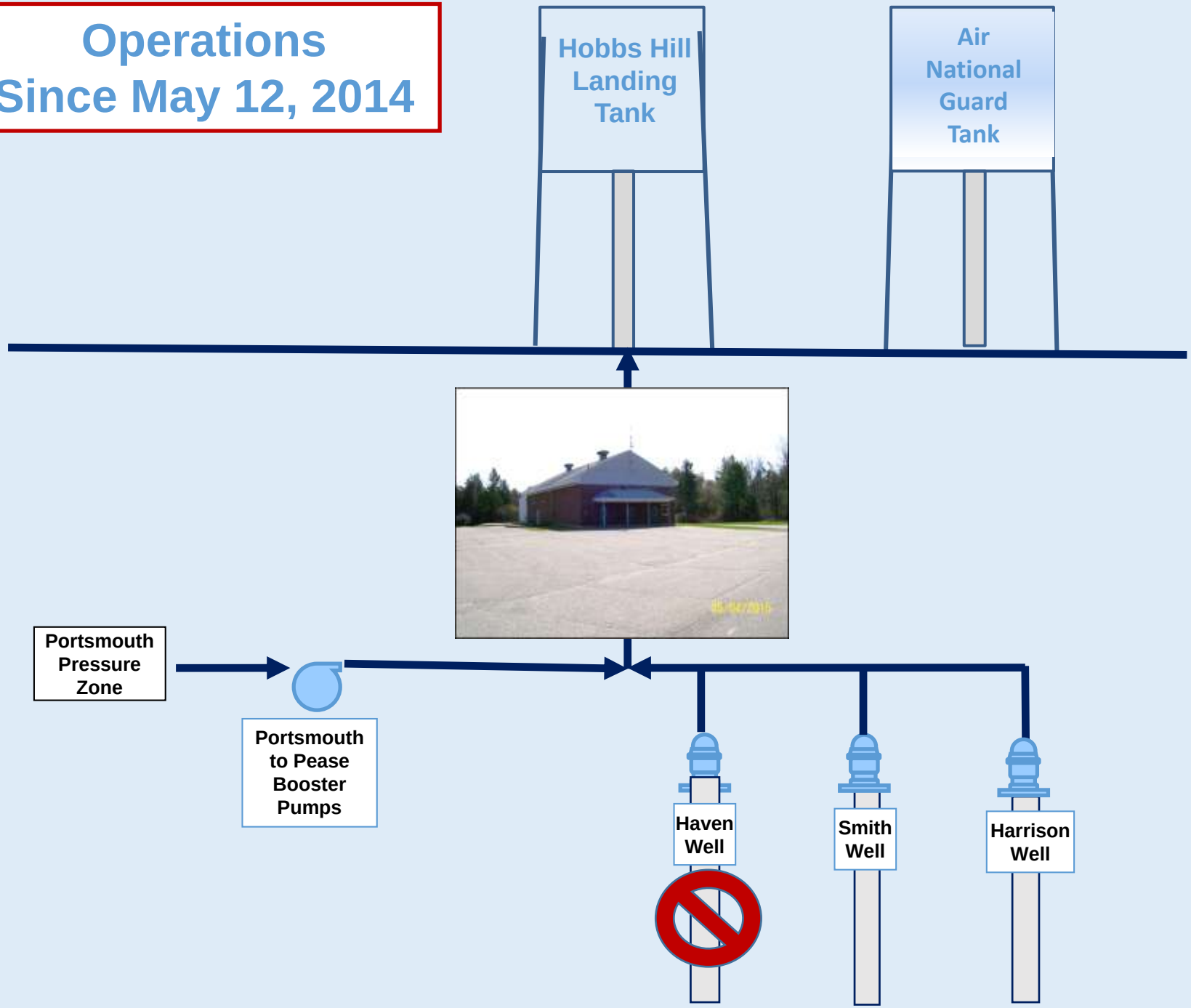
Haven Well

- Installed in 1875 (Haven Springs)
- City of Portsmouth Supply until mid ‘50’s
- Pease Air Base: 1956 to 1992
- Pease Tradeport: 1992 to 2014 (shut down due to PFAS contamination)

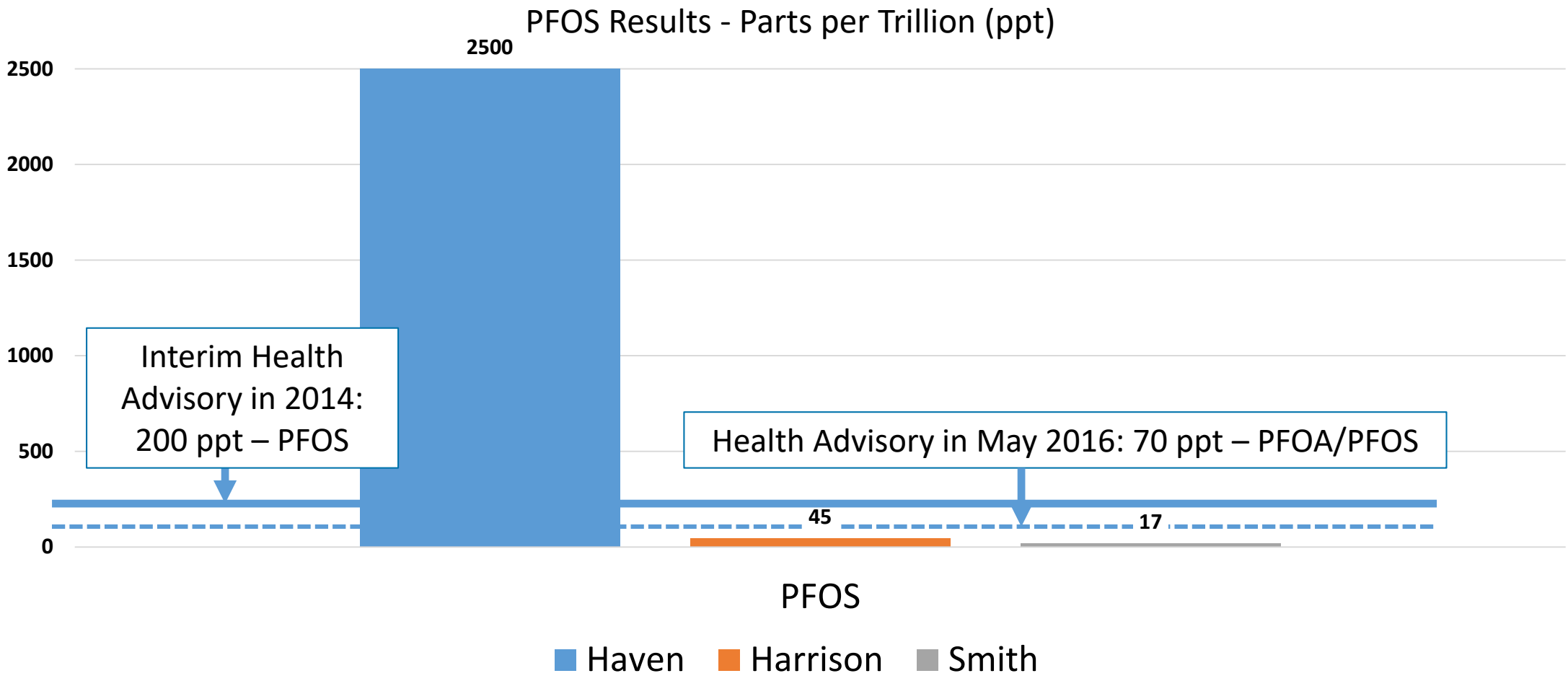
Haven Well Shutdown: Chronology of Events

- April 2014 – City Contacted by EPA regarding their request that Air Force sample the Pease Wells for PFCs
- Air Force Consultant sampled all three Pease wells in mid-April 2014 for PFCs
- May 12, 2014 – City staff are notified that PFC levels in Haven Well exceeded the EPA's Health Advisory Standard for PFOS
  - 2.5 ug/L (Preliminary Health Advisory = 0.2 ug/L)
- May 12, 2014 - Haven Well is shut down
- Since May 12, 2014 - Pease water system is supplemented with water from Portsmouth's water system
- Ongoing Monitoring of PFCs by the Air Force's consultant
- Ongoing technical work both by Air Force and City staff/consultants
- July 2015 – EPA Order to Air Force to treat aquifer and wells

Operations Since May 12, 2014

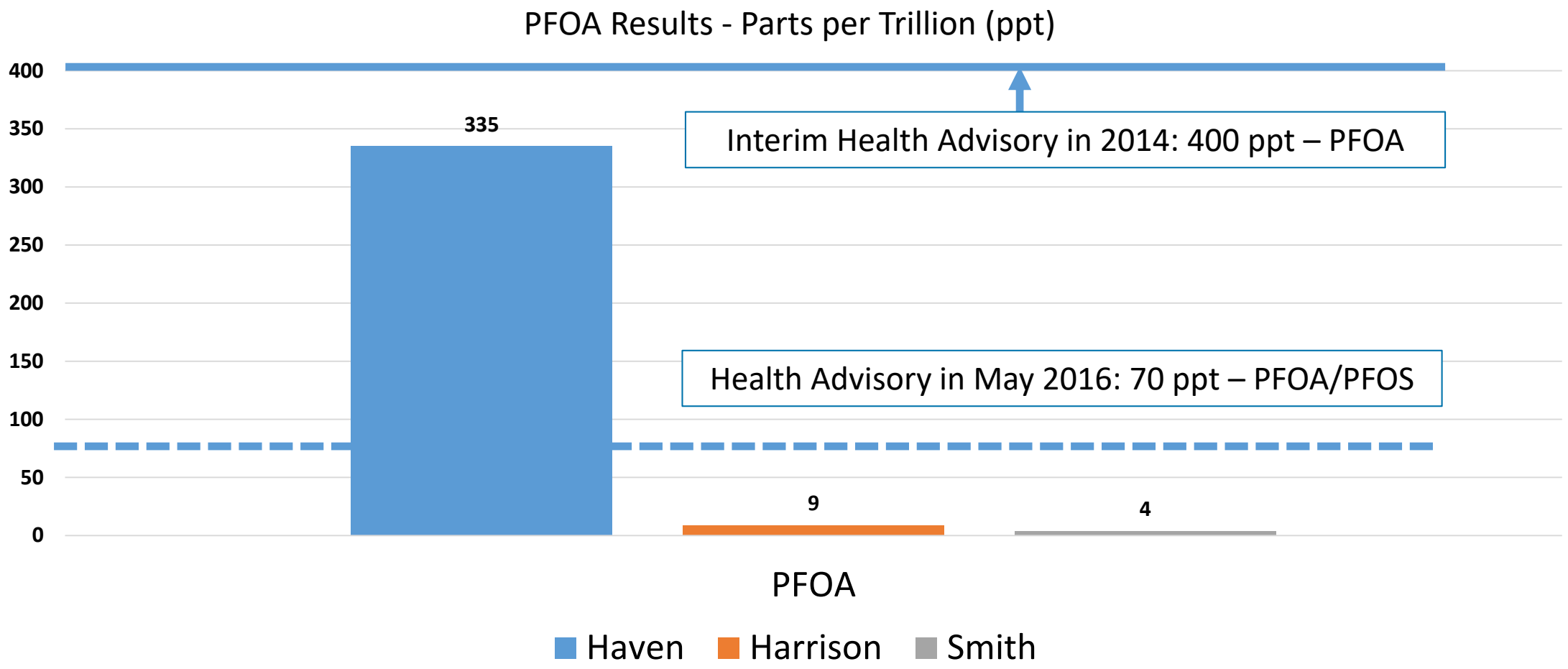


Pease Wells – 2014 PFOS Sampling



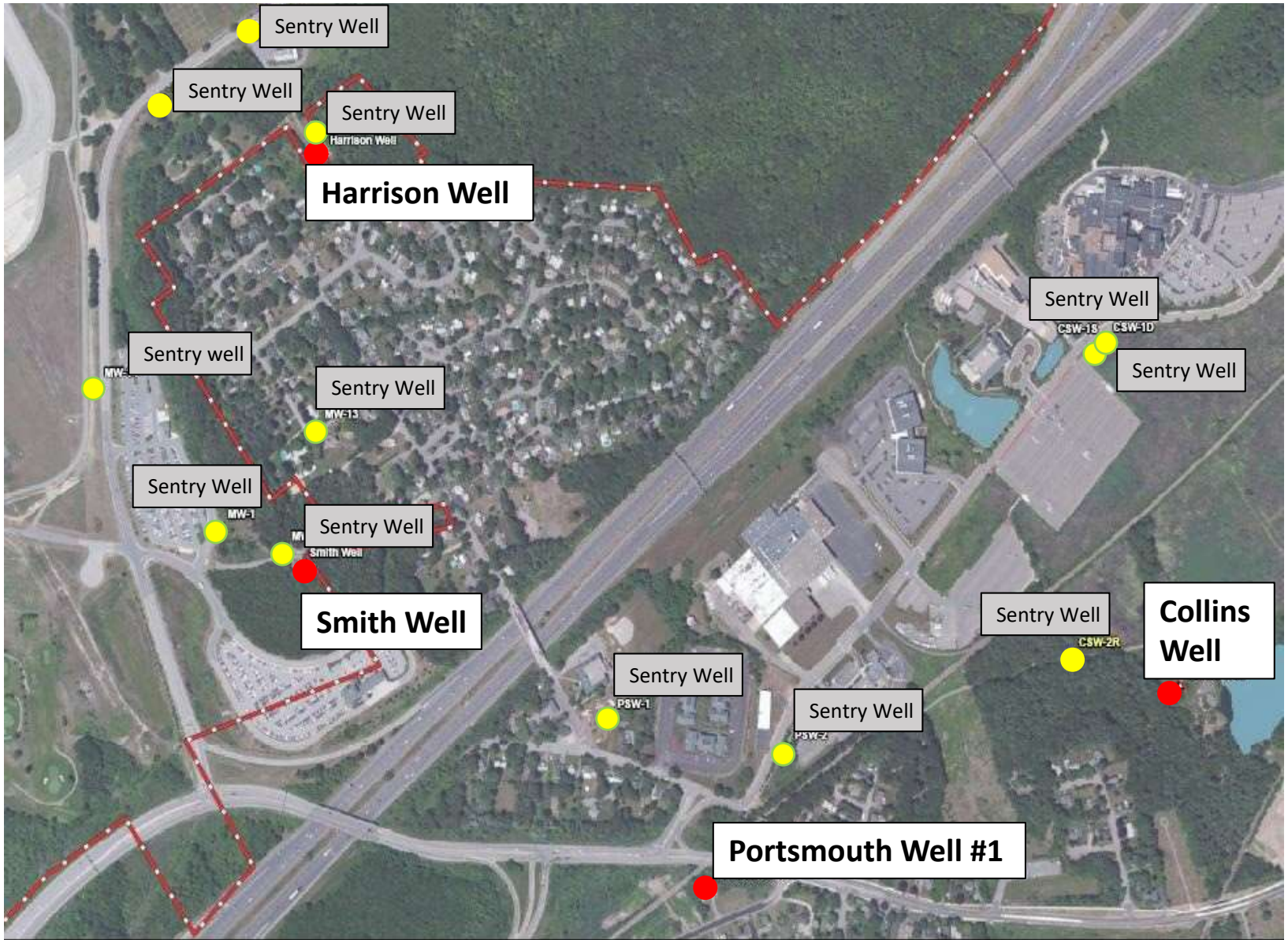
Note: Recent testing results of Haven Well = 1360 ppt (Haven Pilot Data)

Pease Well – 2014 PFOA Sampling



Note: Recent testing results of Haven Well = 242 ppt (Haven Pilot Data)

Southern Water Supply Well Field Municipal and Monitoring Wells
Monthly PFAS Sampling Since May 2014



Water Quality Monitoring Data Uploaded to City of Portsmouth Website

City of PORTSMOUTH NH | DEPARTMENT OF PUBLIC WORKS | WATER

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PEASE WELL MONITORING AND SAMPLING RESULTS

The Air Force's consultants under the direction of the EPA and DES and in cooperation with the City of Portsmouth have been sampling PFCs in and around the effected Portsmouth drinking water wells. Once validated, this data is posted below:

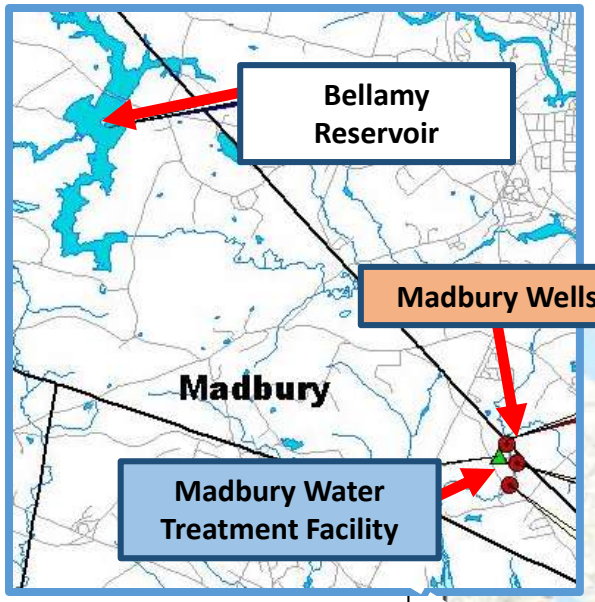
- Pease PFC Sampling Locations
- Pease Comprehensive PFC Sampling Data August 2017
- Pease Comprehensive PFC Sampling Data May 2017
- Pease PFC Sampling Data May 2017
- Pease Well PFC Results through April 2017
- Pease Well PFC Results through 12.14.2016
- Pease Well PFC Results Most Recent 11 17 2016
- Pease Well PFC Results Most Recent 10 19 2016
- Pease Well PFC Results thru 10 19 2016
- Pease Well PFC Results Most Recent 08 30 2016
- Pease Well PFC Results thru 08 30 2016
- Pease Well PFC Results Most Recent 06_23_2016
- Pease Well PFC Results thru 06_23_2016
- Pease Well PFC Most Recent Summary May 2016
- Pease Well PFC Results thru 5/31/16
- Pease Well PFC Results thru 4/20/16
- Pease Well PFC Results thru 2/23/16
- Pease Well PFC Results thru 01/26/16

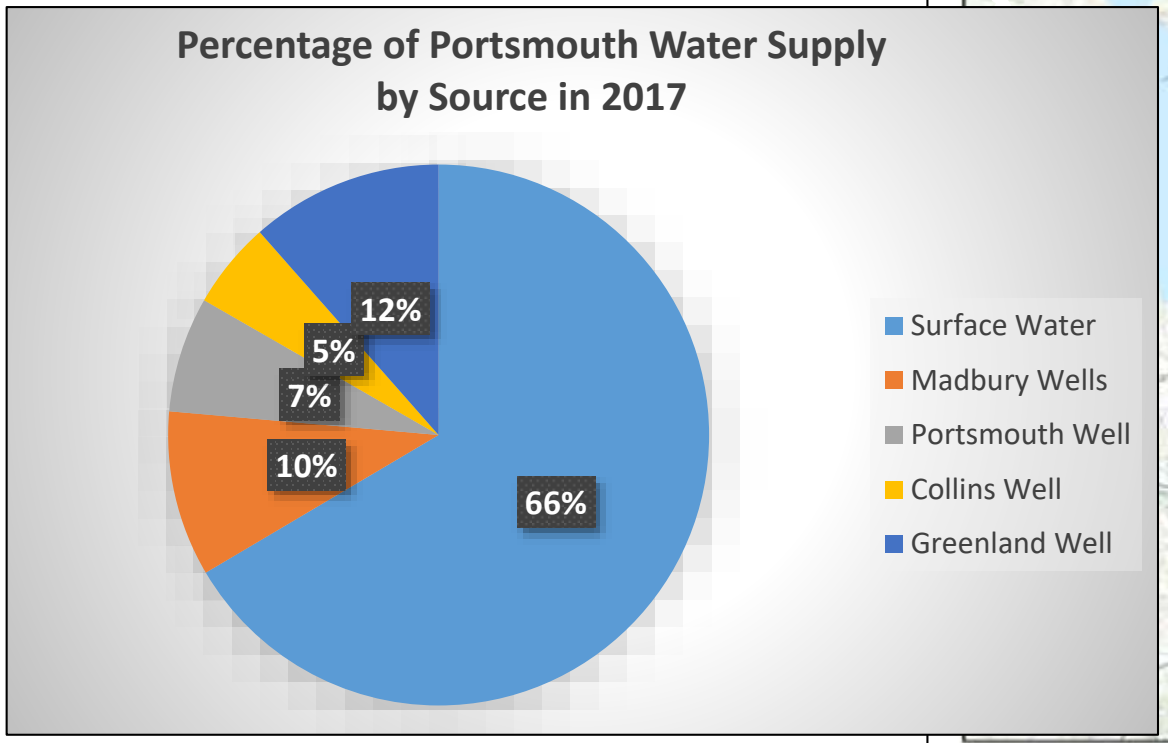
PFAS Trends in Air Force Sampling – Monthly Sampling Since June 2014

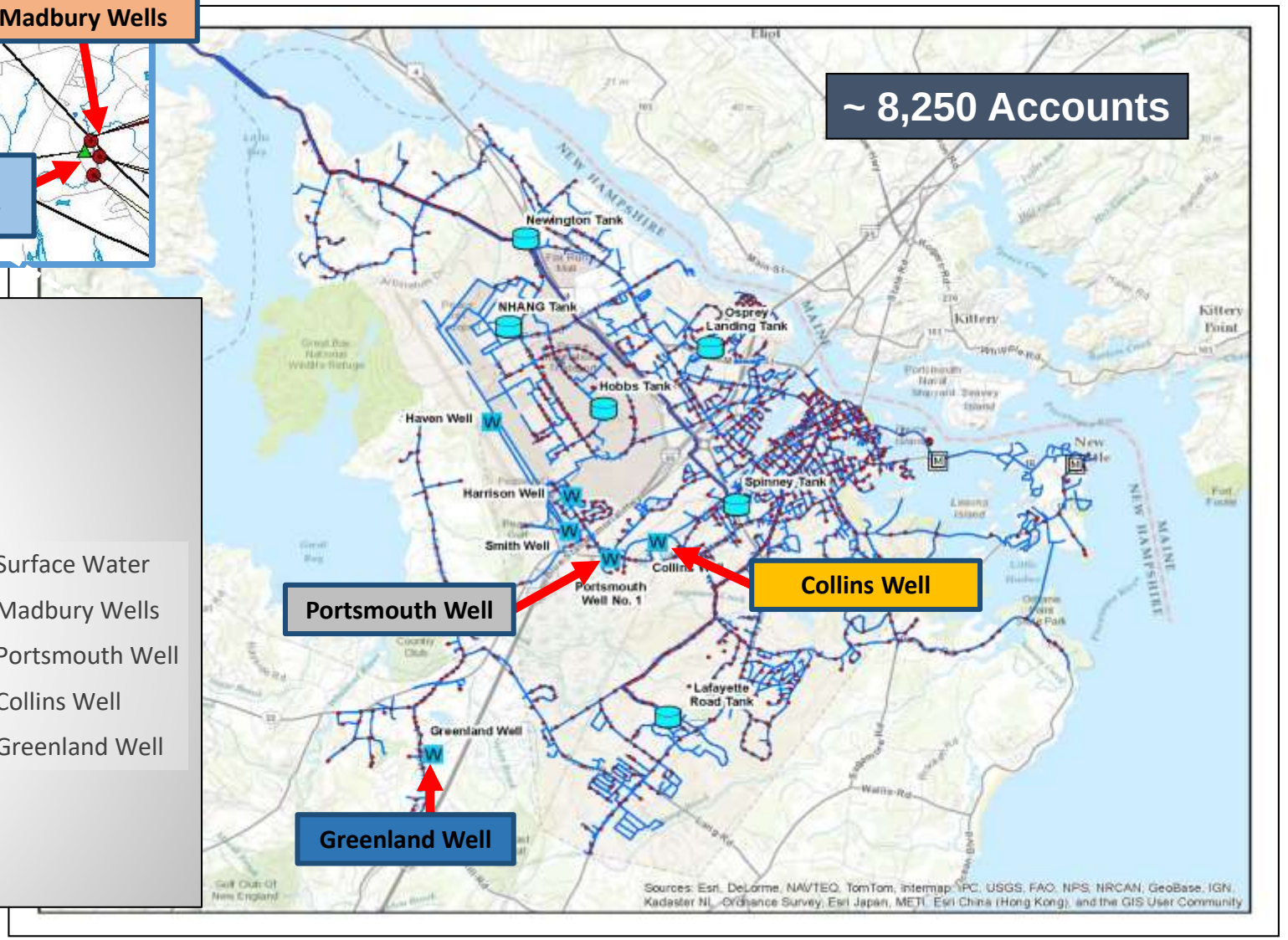
- PFAS concentrations in the municipal wells are consistently below the health advisory (HA) values published by the USEPA in May 2016.
- PFAS concentrations in the sentry monitoring wells are fairly stable, with exceedances of the HA generally limited to monitoring wells located in the center portion of the air field.
- The Air Force's engineering consultant is in the process of performing trend analysis on sentry well sampling data collected to date. A summary of this analysis will be provided in their upcoming 2017 Sentry Well Monitoring Report.

(reference: Wood, plc communication, February 21, 2018)

Portsmouth Water System Sources of Supply







Portsmouth Water Source PFAS Sampling

- All water sources sampled in May 2014 and in 2015 as part of the EPA's Unregulated Contaminant Monitoring Program (UCMR3)
  - Surface Water - "non detect"
  - Madbury Wells - "non detect"
  - Portsmouth Well - "non detect"
  - Collins Well - "non detect"
  - Greenland Well - "non detect"
- When resampled using lower detection limits (same as Pease sampling), some sources show low levels of detections

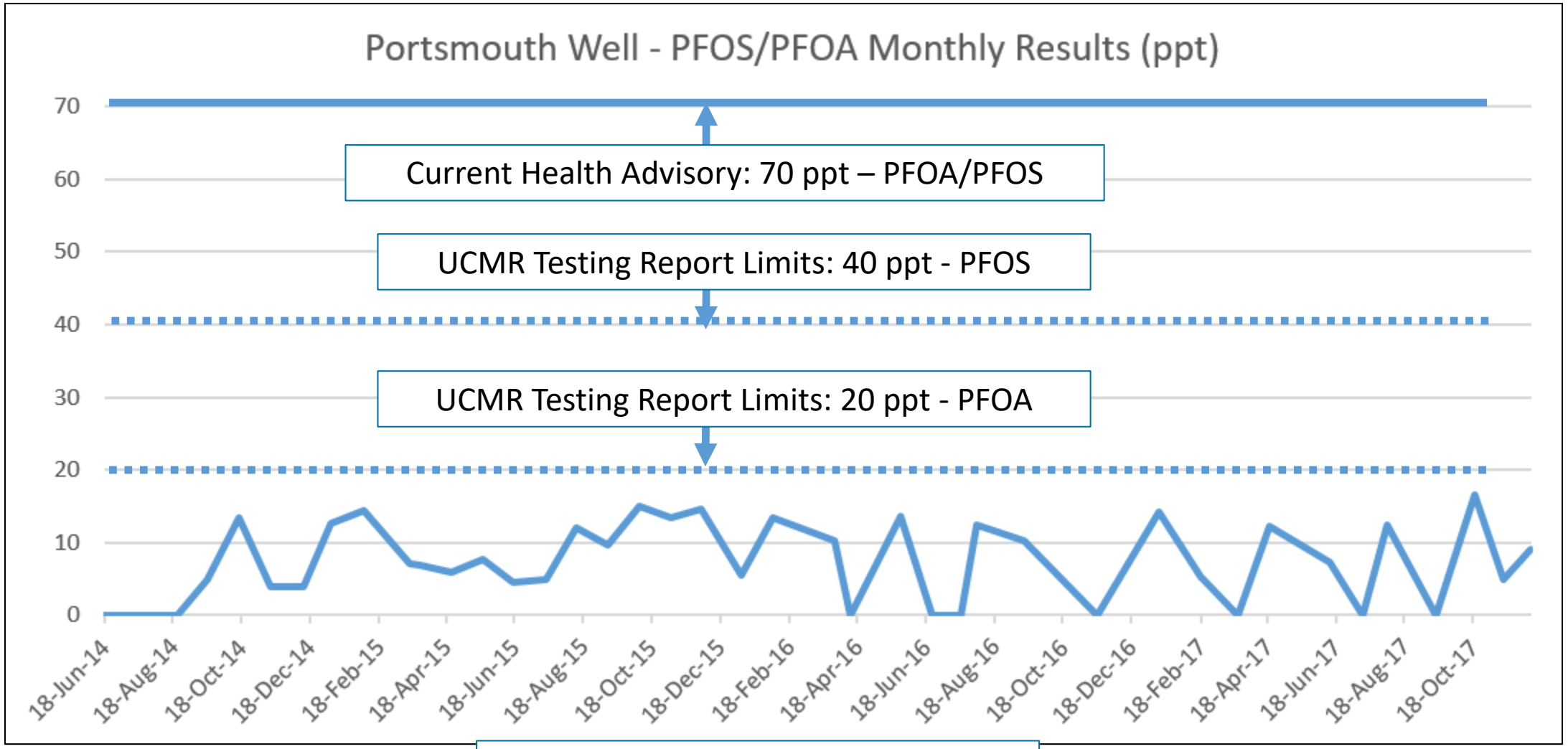
Lower Sampling Limits -

Portsmouth/Pease Sampling versus UCMR3

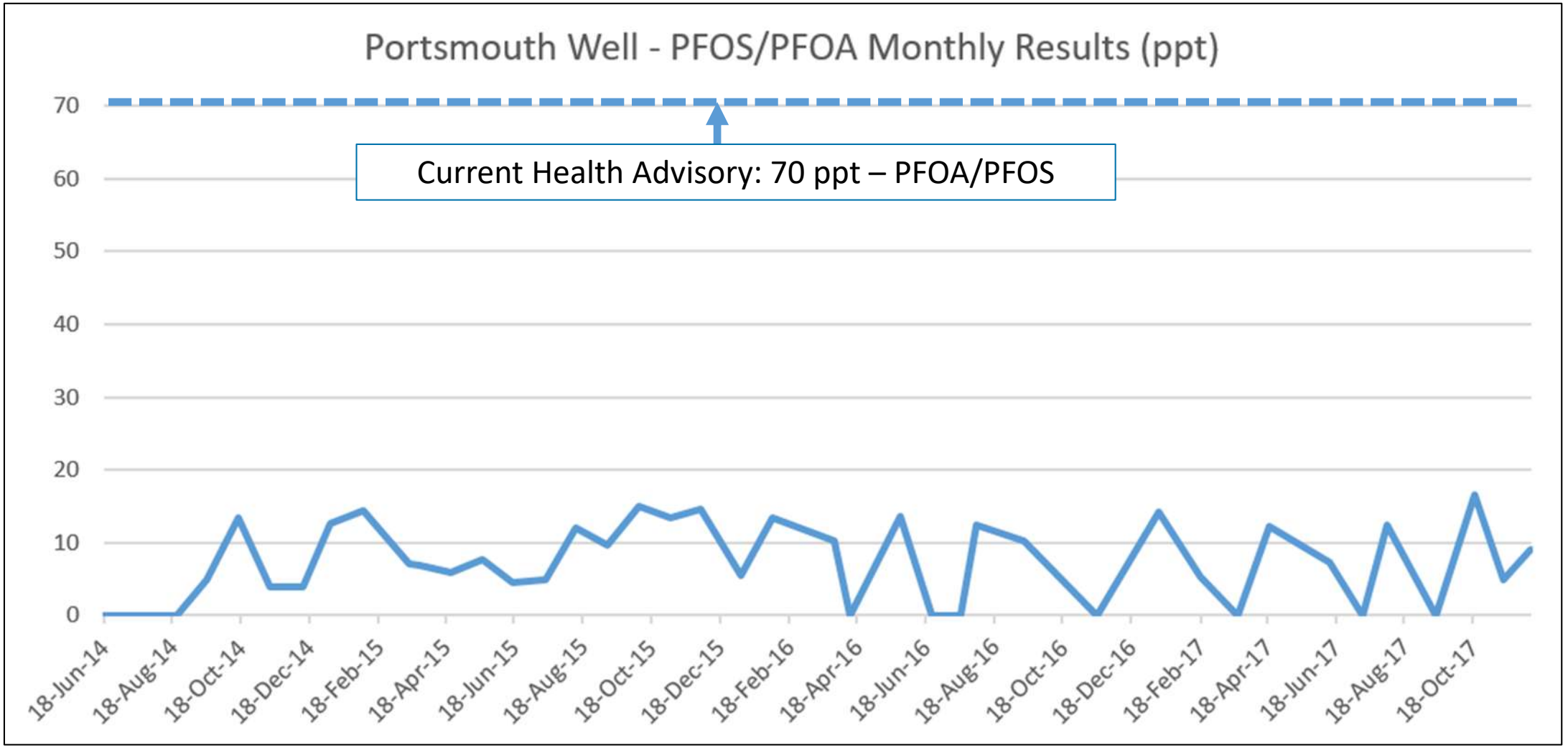
		Maxxam Lab/In-House Reporting Levels		UCMR REPORTING LIMIT	Order of Magnitude: Maxxam MDL vs. UCMR
	Units	RDL	Typical MDL - reported on lab reports		
Perfluorobutane Sulfonate (PFBS)	ug/L	0.020	0.0019	0.090	47 x
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.020	0.0047	0.010	2 x
Perfluorohexane Sulfonate (PFHxS)	ug/L	0.020	0.0040	0.030	8 x
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	0.020	0.0053	0.020	4 x
Perfluorononanoic Acid (PFNA)	ug/L	0.020	0.0046	0.020	4 x
Perfluorooctane Sulfonate (PFOS)	ug/L	0.020	0.0033	0.040	12 x

RDL – Reportable Detection Limit
MDL – Minimum Detection Limit
UCMR3 – EPA's Unregulated Contaminant Monitoring Rule

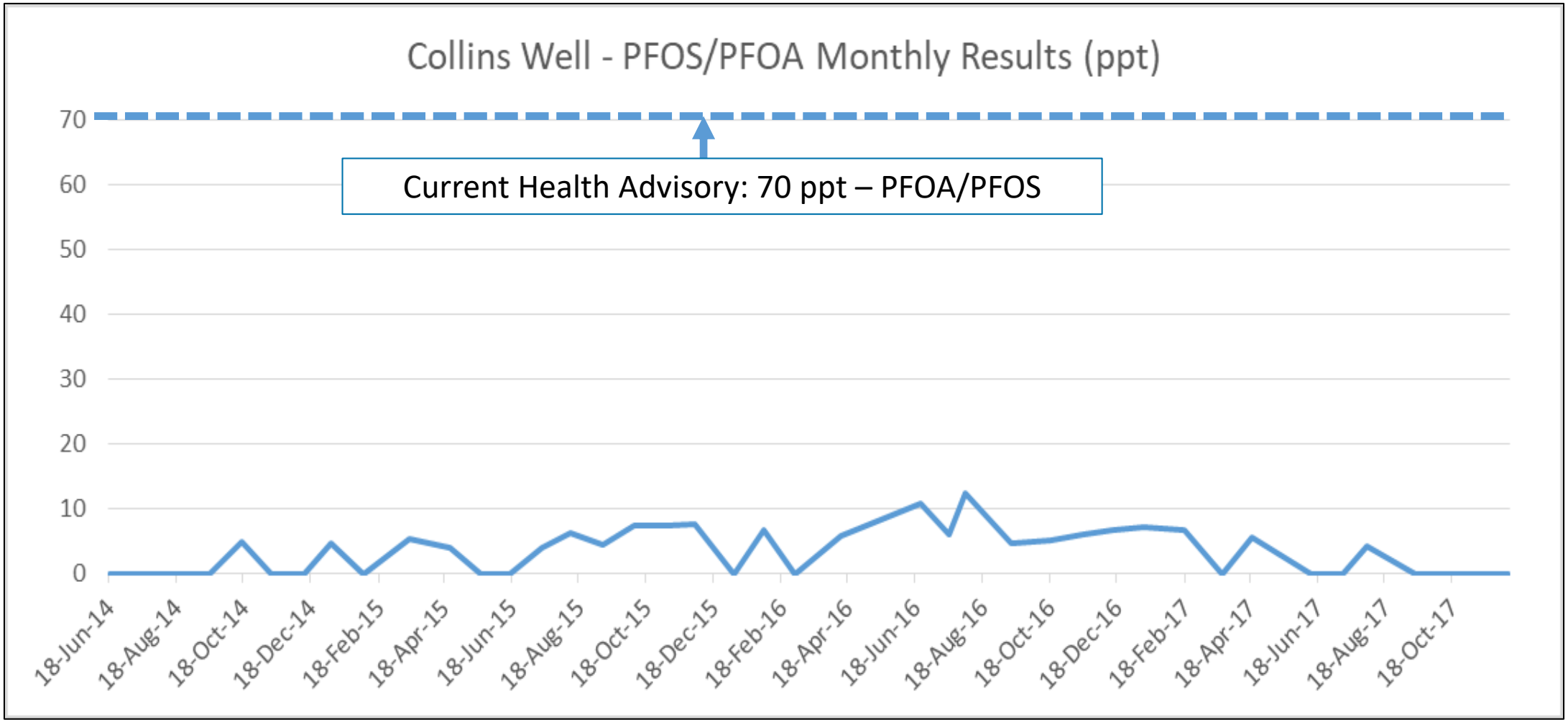
Portsmouth Well Sampling – Detections using lower sample detection limits than UCMR testing



Portsmouth Well Trend



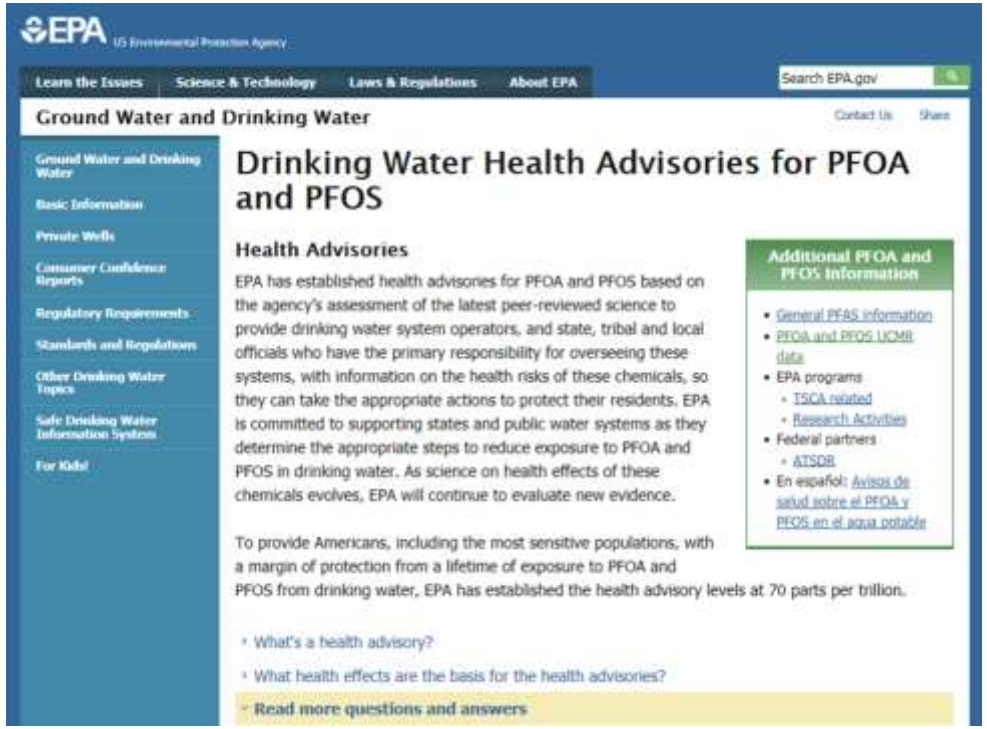
Collins Well Trend



Greenland Well – 6 Sample Events

Date	PFOA/PFOS (ppt)	Notes
21-Jul-14	Non detect	using UCMR method
10-Feb-15	Non detect	using UCMR method
01-Aug-16	7	
17-Nov-16	14	
17-Nov-16	7	Lab Duplicate Sample
27-Apr-17	4	
31-Oct-17	5	
EPA Health Advisory	**70**	**As of May 2016**

PFOA/PFOS Health Advisory Update – May 2016



- "To provide Americans, including the most sensitive populations, with a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water, EPA has established the health advisory levels at 70 parts per trillion."
- "EPA's health advisory level for PFOA and PFOS offers a margin of protection for all Americans throughout their life from adverse health efforts resulting from exposure to PFOA and PFOS in drinking water."
- "These health advisories are specifically for PFOA and PFOS and do not apply to other perfluoroalkyl substances (PFASs). The Agency is continuing to gather information about other PFAS."

Portsmouth System PFAS Testing Summary - 2017

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)									
PER- AND POLYFLUOROALKYL SUBSTANCE (concentrations* reported in **ng/L** or **ppt**)		PORTSMOUTH #1 WELL	COLLINS WELL	GREENLAND WELL	MADBURY WELL 2	MADBURY WELL 3	MADBURY WELL 4	BELLAMY RESERVOIR	WATER TREATMENT PLANT
# of samples in 2017:		11	11	2	1	2	2	2	2
% of water supplied in 2017:		6.9%	5.2%	11.5%	1.8%	3.7%	4.4%	66.5%	
Perfluorobutane-sulfonic acid (PFBS)	Average	BD	**13**	BD	ND	ND	ND	ND	ND
	Range	ND to 8	8 to 20	ND to 6	ND	ND	ND	ND	ND
Perfluorobutanoic acid (PFBA)	Average	ND	ND	ND	ND	ND	ND	ND	**10**
	Range	ND	ND	ND	ND	ND	ND	ND	ND to 18
Perfluorohexane-sulfonic acid (PFHxS)	Average	**7**	BD	**4**	ND	ND	ND	ND	ND
	Range	ND to 11	ND to 8	ND to 6	ND	ND	ND	ND	ND
Perfluorohexanoic acid (PFHxA)	Average	BD	BD	BD	ND	ND	ND	ND	ND
	Range	ND to 12	ND to 9	ND to 3	ND	ND	ND	ND	ND
**Perfluorooctane-sulfonic acid (PFOS)	Average	**3**	**3**	**4**	ND	ND	ND	ND	ND
	Range	ND to 8	ND to 7	4 to 5	ND	ND	ND	ND	ND
**Perfluorooctanoic acid (PFOA)	Average	**6**	ND	ND	ND	ND	ND	ND	ND
	Range	ND to 10	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	Average	**4**	BD	ND	ND	ND	ND	ND	ND
	Range	ND to 8	ND to 7	ND	ND	ND	ND	ND	ND
** PFOS + PFOA	Average	**9**	**3**	**4**	ND	ND	ND	ND	ND
	Range	ND to 14	ND to 7	4 to 5	ND	ND	ND	ND	ND

* Due to laboratory analytical method limitations, low concentrations reported for these chemicals are considered estimates unless the amount measured is above 20 ng/L (ppt)

** EPA Health Advisory Level and NHDES AGQS for PFOS and PFOA concentration separately or combined is **70 ng/L** (ppt)

Averages are calculated using half of the method detection limit for samples that were less than detection, per USEPA risk assessment protocols.

ND = Not Detected above laboratory method detection limit

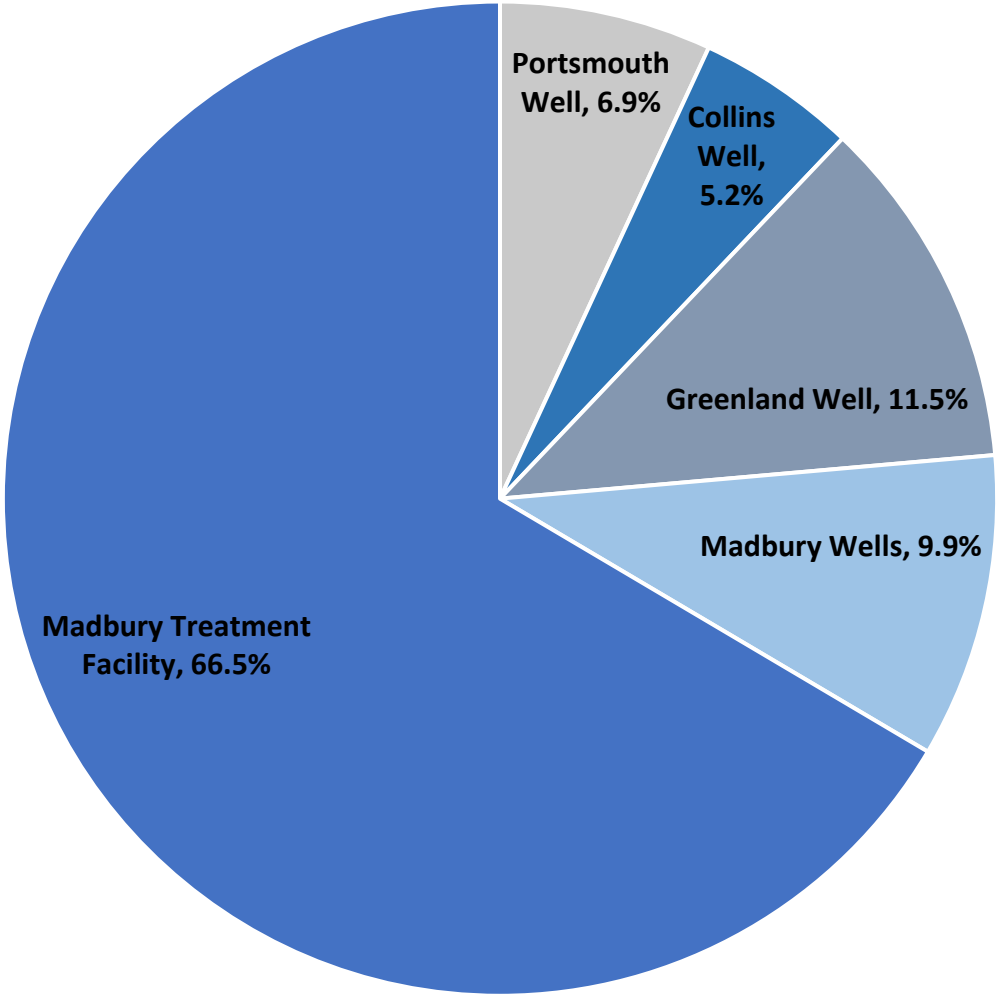
BD = Average calculated using half of detection limits for non-detect values resulted in average below the detection limit.

PFAS analyzed but not detected in the samples:

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), Perfluorodecane sulfonate (PFDS), Perfluorodecanoic acid (PFDA), Perfluorododecanoic acid (PFDoA),Perfluoroheptane sulfonate (PFHpS), Perfluoroheptanoic acid (PFHpA), Perfluorononanoic acid (PFNA), Perfluorooctane sulfonamide (PFOSA), Perfluorotetradecanoic acid (PFTeDA), Perfluorotridecanoic acid (PFTrDA), and Perfluoroundecanoic acid (PFUnA)

70 ppt – EPA Health Advisory
All water sources are below this limit, most water is “non detect”

Percentage of Portsmouth Water Sources - 2017

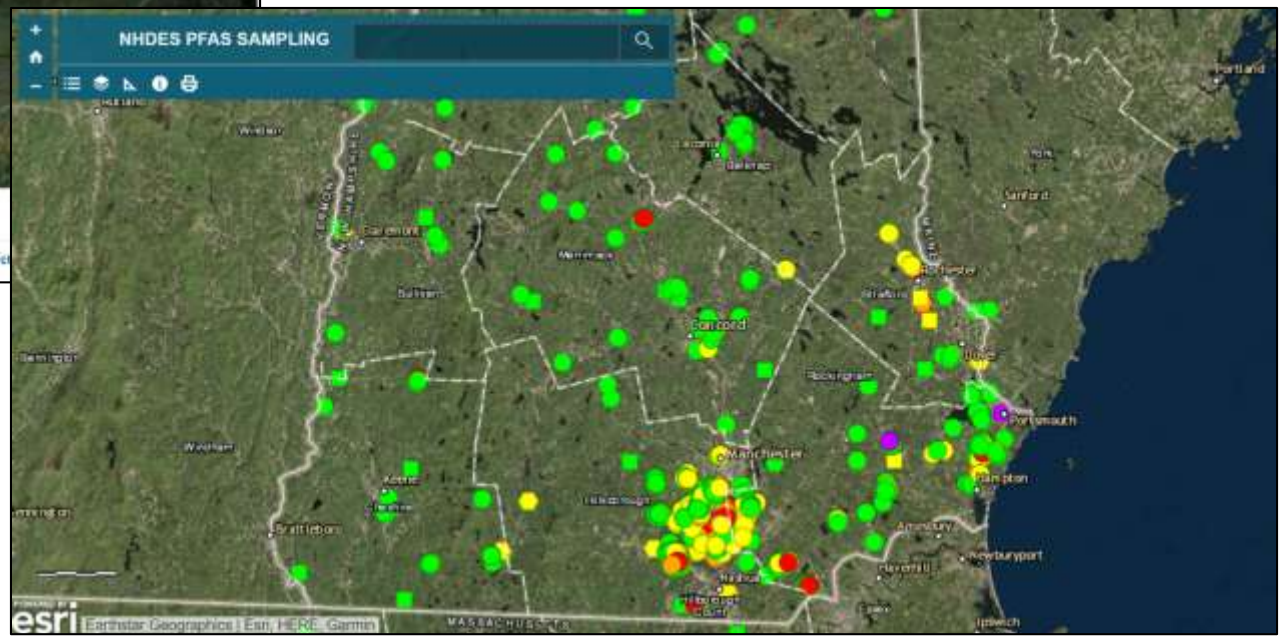


Other Water Systems with PFAS issues:

With lower sample detection limits many more systems are having detections – many that had “non-detect” during UCMR sampling

- Hoosick Falls, NY (PFAS Manufacturing)
- Bennington, VT (PFAS Manufacturing)
- Hyannis, MA (Fire Training Area)
- Westfield, MA (Airport)
- Horsham, PA (Airport)
- Fountain, CO (Airport)
- Airway Heights, WA (Airport)
- Grand Rapids, Michigan (Manufacturing)
- Aqua America, Pennsylvania
- Kennebunkport, ME (biosolids)

New Hampshire PFAS Investigations



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

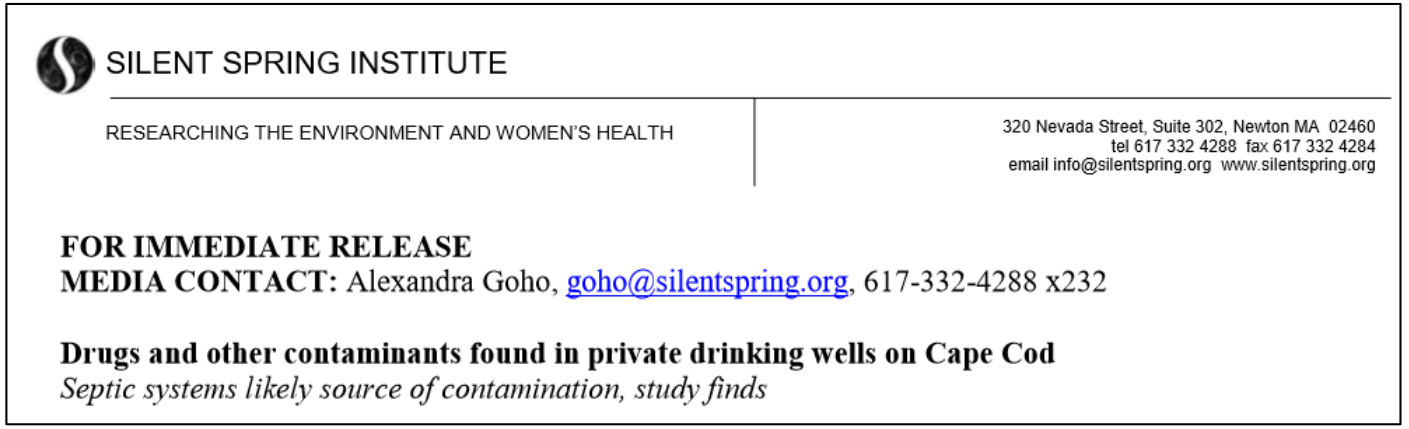
New Hampshire Public Water Systems with Detections

(Using lower laboratory detection limits as recommended by New Hampshire DES in 2016)

- Merrimack Village Water District
- Aquarion Water (Hampton, North Hampton)
- Pennichuck Water (Nashua)
- Hudson
- Dover
- Rochester
- Bedford
- Rye
- Bow

Data source: NHDES communication – February 27, 2018

Cape Cod Private Drinking Water Well Study



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RESEARCHING THE ENVIRONMENT AND WOMEN'S HEALTH

320 Nevada Street, Suite 302, Newton MA 02460
tel 617 332 4288 fax 617 332 4284
email info@silentspring.org www.silentspring.org

FOR IMMEDIATE RELEASE
MEDIA CONTACT: Alexandra Goho, goho@silentspring.org, 617-332-4288 x232

Drugs and other contaminants found in private drinking wells on Cape Cod
Septic systems likely source of contamination, study finds

- **A new study finds that pollutants from household wastewater—pharmaceuticals** and consumer product **chemicals—can make their way into people's private wells, and that backyard septic systems are likely to blame.**
- In tests of water samples from private wells on Cape Cod, researchers at Silent Spring Institute sampled water from 20 private wells throughout Cape Cod and tested the samples for 117 different contaminants. **About 70 percent of the wells contained PFASs (perfluoroalkyl substances.**

Link to paper: http://www.sciencedirect.com/science/article/pii/S0048969715312353

Treatment Options?

- Activated Carbon Filtration is most widely accepted for drinking water applications
- Membrane Filtration
- Anion Exchange
- Advanced Oxidation

Oakdale, Minnesota

Activated Carbon

Newcastle, Delaware

Activated Carbon

Analysis of other water systems with PFAS contamination

- Research on municipal drinking water systems with the same general groundwater quality indicates Granular Activated Carbon (GAC) as the preferred treatment alternative
  - GAC only – 9/13 utilities
  - GAC and resin – 1/13 utilities
  - Point of use (carbon) – 1/13 utilities
  - No treatment – 1/13 utilities
  - No information – 1/13 utilities
- No readily available data on the long term effectiveness of alternative media
- Preliminary performance data on some resin media

Harrison/Smith Well Filter Demonstration Project Activated Carbon Filtering Since September 2016

Pease Tradeport Water System Activated Carbon Treatment Demonstration Project Sampling: <u>January 10, 2018 Results</u>

Source Water: Harrison and Smith Wells

Well	PFOS	PFOA
Combined Influent *	0.0076	ND

*Note: Harrison Well was offline for cleaning during this period of sampling

Filter #1

Filter #1 Effluent

PFOS	PFOA
ND	ND

Filter #2

Water To Distribution System

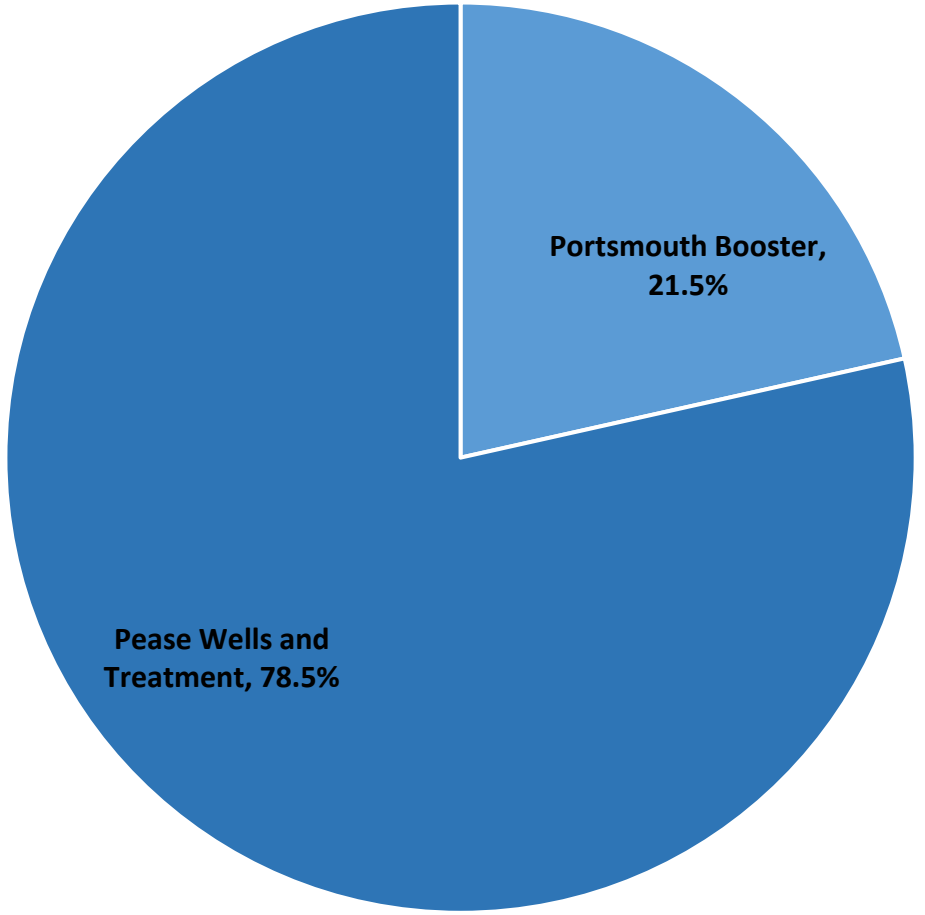
PFOS	PFOA
ND	ND

Sample Rounds – 37
Gallons Treated – 199 million gallons
Filter Bed Volumes – 38,386

Notes: All samples in parts-per-billion (ppb)
ND = Non Detect
All samples collected by Weston & Sampson and analyzed by Maxxam Laboratory

Percentage of Pease Tradeport Water - 2017

Pease Water is predominantly supplied by water from the Smith and Harrison wells through the carbon treatment system, with some boosted Portsmouth water depending on demand. 2017 data totaled 78.5% of water from Pease sources and 21.5% supplemented from Portsmouth system.



Ongoing Haven Well Water Treatment Piloting - Activated Carbon and Resins

Ongoing Haven Well Treatment Pilot

- Activated Carbon, same as utilized in the Harrison/Smith Well Demonstration Treatment system
- Resins
- Running well water at 1.5 gallons per minute through filter columns
- Periodic water quality sampling to assess performance of filters
- Resins have proven to be a viable option
- **Current design, agreed upon by Air Force, is to treat wells through resin filters followed by activated carbon**

Air Force Agreements to Address the Loss of the Haven Well

- September 2014
  - Hydrogeologic study for replacement well - $154,000
  - Technical support assistance reimbursement - $25,000
- November 2015
  - Preliminary Treatment Assessment - $60,000
- April 2016
  - Treatment Pilot and Demonstration Project - $947,700
- February 2017
  - Additional Treatment Design Evaluation - $46,623
- August 2017
  - Final Design of Treatment for Pease Tradeport wells - $1,329,080
- Pending
  - Facility Construction Cost
  - Long-term operations and maintenance

Pease Well Treatment System Conceptual Design:

Haven Well Reactivation – Hydrogeologic and Water Quality Monitoring Program

- Met in September with Project Technical Team to discuss past and future monitoring of Haven well and Aquifer
- Intend to develop comprehensive monitoring plan of PFAS and other key water quality parameters
- Sampling to occur prior to reactivation of Haven Well and will continue thereafter
- Meeting again in early 2018 to review

Public Outreach……

City of PORTSMOUTH NH | DEPARTMENT OF PUBLIC WORKS

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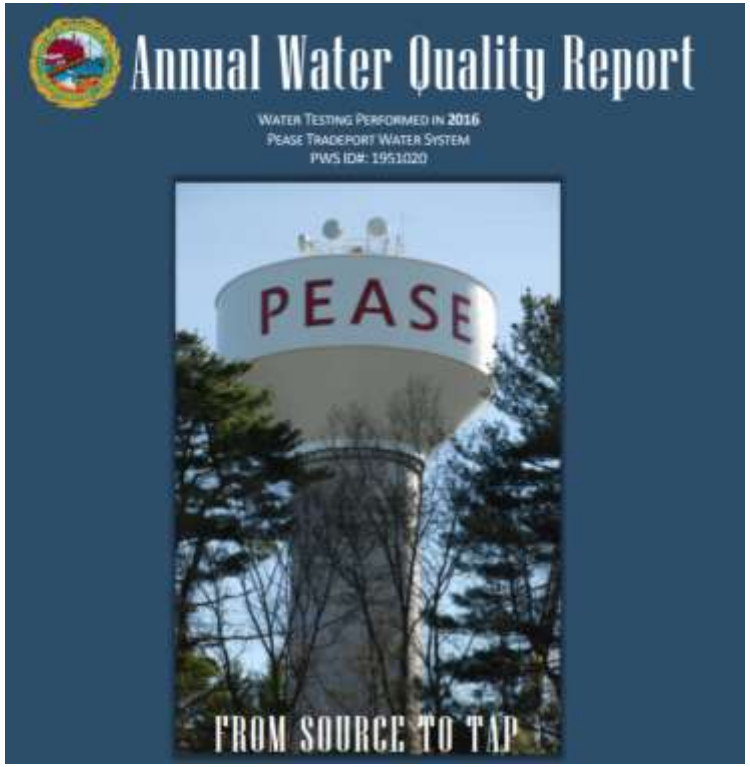
PEASE TRADEPORT WATER SYSTEM

Pease International Tradeport Water System Update

The City of Portsmouth's Water Division has been actively working with the United States Air Force (Air Force), the United States Environmental Protection Agency (EPA), and the New Hampshire Department of Environmental Services (DES) in response to the detection of elevated levels of the unregulated contaminant perfluorooctane sulfonic acid (PFOS) from the Haven Well, one of three wells that serves the Pease International Tradeport and the New Hampshire Air National Guard base at Pease. PFOS is one of a class of chemicals known as PFCs or perfluorochemicals. Because the level of PFOS exceeded the "provisional health advisory" set by the EPA, the well was shut down by the City of Portsmouth on May 12, 2014 and since that time it has been physically disconnected from the system. A number of actions have been taken by the project team. The following documents provide additional information:

- Pease Water Supply and PFC Demonstration Project 10.03.17
- Pease RAB Meeting 7.26.17 Drinking Water System Update
- Pease Water Supply and PFC Demonstration Project Update 05.16.17
- Pease RAB Meeting 3-22-17 Drinking Water System Update
- Pease Water Supply and PFC Demonstration Project Update 03.21.17
- Pease Water Supply and PFC Demonstration Project Update 02.06.17
- Pease Well Update to Pease CAP January 9 2017
- Pease Tradeport Water System Well Treatment Pilot Report Final
- Pease Water Supply and PFC Demonstration Project Update 12.06.16
- Drinking Water Health Advisories
- Portsmouth announces upgraded water filtration at Pease Tradeport
- Pease Water Supply Update 09_08_16
- Pease Water Treatment System and Piloting Overview RAB Tour 07.14.16
- Pease Water Supply Update 06_30_16
- Portsmouth Signs Agreement with Air Force to Proceed with Pease Tradeport Well Treatment System Project
- Haven Well Update to City Council March 12 2016



PER– AND POLYFLUOROALKYL SUBSTANCES (PFAS)

Per- and polyfluoroalkyl substances (PFAS) are currently unregulated by the Safe Drinking Water Act (SDWA); however, the USEPA Health Advisory concentration is 70 parts per trillion (ppt) for perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). Studies indicate that exposure to PFOA and PFOS over certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants (e.g., low birth weight, accelerated puberty, skeletal variations), cancer (e.g., testicular, kidney), liver effects (e.g., tissue damage), immune effects (e.g., antibody production and immunity), thyroid effects and other effects (e.g., cholesterol changes).

In response to the discovery of PFOS in the Haven Well in May 2014 at levels exceeding the EPA Provisional Health Advisory level (200 ppt at that time), the Haven Well was removed from service. This well has remained disconnected from the system since this finding. The source of the PFAS at the Tradeport was aqueous film-forming foam that had been used to extinguish fires and in training exercises at the former Air Force Base.

Over the past three years, the Harrison Well and the Smith Well on the Pease Tradeport Water System and Portsmouth #1 Well and Collins Well in the Portsmouth Water System, have been routinely monitored for PFAS by the Air Force. The City of Portsmouth samples all of the other Portsmouth water supply sources routinely. Sample results from 2016 are summarized in the PFAS Table in this report. All of the monitoring data is available on the City of Portsmouth website: www.cityofportsmouth.com in the Drinking Water Quality link.

In September 2016, the City of installed a granular activated carbon (GAC) filtration system to treat the water from the Harrison Well and Smith Well. Testing of this system has demonstrated effective removal of PFAS. The City is currently negotiating with the Air Force for the design and upgrades to the Pease Water Treatment Facility on Grafton Road that will allow for the treatment of all three Pease Wells with a GAC system.

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

		Water From Portsmouth System Supplied As Needed (0% to 50% of Total Pease Supply)								Pease Sources**		Treated Well Water***
PER- AND POLYFLUOROALKYL SUBSTANCE (concentrations* reported in ng/L or ppt)		PORTSMOUTH #1 WELL	COLLINS WELL	GREENLAND WELL	MADBURY WELL 2	MADBURY WELL 3	MADBURY WELL 4	BELLAMY RESERVOIR	WATER TREATMENT PLANT	SMITH WELL	HARRISON WELL	POST GAC TREATMENT
# of samples in 2016:		11	12	2	1	2	1	2	1	42	24	7
6:2 Fluorotelomer sulfonate (6:2 FTS)	Average	ND	ND	7	ND	ND	ND	ND	ND	ND	ND	ND
	Range	ND	ND	ND to 7	ND	ND	ND	ND	ND	ND	ND	ND
Perfluorobutane-sulfonic acid (PFBS)	Average	4	9	3	4	4	4	4	ND	6	5	ND
	Range	ND to 6	ND to 16	ND to 4	4	ND to 4	4	ND to 4	ND	ND to 10	ND to 10	ND
Perfluorobutanoic acid (PFBA)	Average	8	9	ND	ND	ND	ND	ND	ND	8	9	ND
	Range	ND to 9	ND to 13	ND	ND	ND	ND	ND	ND	ND to 10	ND to 13	ND
Perfluoroheptane sulfonate (PFHpS)	Average	ND	ND	ND	ND	ND	ND	ND	ND	5	7	ND
	Range	ND	ND	ND	ND	ND	ND	ND	ND	ND to 8	ND to 10	ND
Perfluoroheptanoic acid (PFHpA)	Average	6	ND	ND	ND	ND	ND	ND	ND	6	9	ND
	Range	ND to 8	ND	ND	ND	ND	ND	ND	ND	ND to 8	5 to 14	ND
Perfluorohexane-sulfonic acid (PFHxS)	Average	9	6	6	4	ND	ND	ND	ND	14	28	ND
	Range	6 to 12	ND to 8	ND to 6	4	ND	ND	ND	ND	10 to 17	21 to 35	ND
Perfluorohexanoic acid (PFHxA)	Average	7	9	ND	ND	ND	ND	ND	ND	6	9	ND
	Range	ND to 10	ND to 7	ND	ND	ND	ND	ND	ND	ND to 9	5 to 14	ND
****Perfluorooctane-sulfonic acid (PFOS)	Average	6	6	9	ND	ND	ND	ND	ND	11	24	ND
	Range	ND to 8	ND to 7	7 to 14	ND	ND	ND	ND	ND	8 to 18	17 to 29	ND
****Perfluorooctanoic acid (PFOA)	Average	7	6	ND	ND	ND	ND	ND	ND	7	8	ND
	Range	ND to 13	ND to 7	ND	ND	ND	ND	ND	ND	ND to 11	ND to 14	ND
Perfluoropentanoic acid (PFPeA)	Average	8	6	6	ND	ND	ND	ND	ND	7	11	ND
	Range	ND to 10	ND to 9	ND to 7	ND	ND	ND	ND	ND	ND to 10	5 to 19	ND
**** PFOS + PFOA	Average	10	7	9	ND	ND	ND	ND	ND	14	31	ND
	Range	6 to 14	ND to 12	7 to 14	ND	ND	ND	ND	ND	8 to 27	22 to 43	ND

* Due to laboratory analytical method limitations, low concentrations reported for these chemicals are considered estimates unless the amount measured is above 20 ng/L (ppt)

** Pease well sources. Concentrations are from wells supplied to the Pease system until September 22, 2016. Water from these wells was mixed by 50% with Portsmouth system water prior to treatment installation.

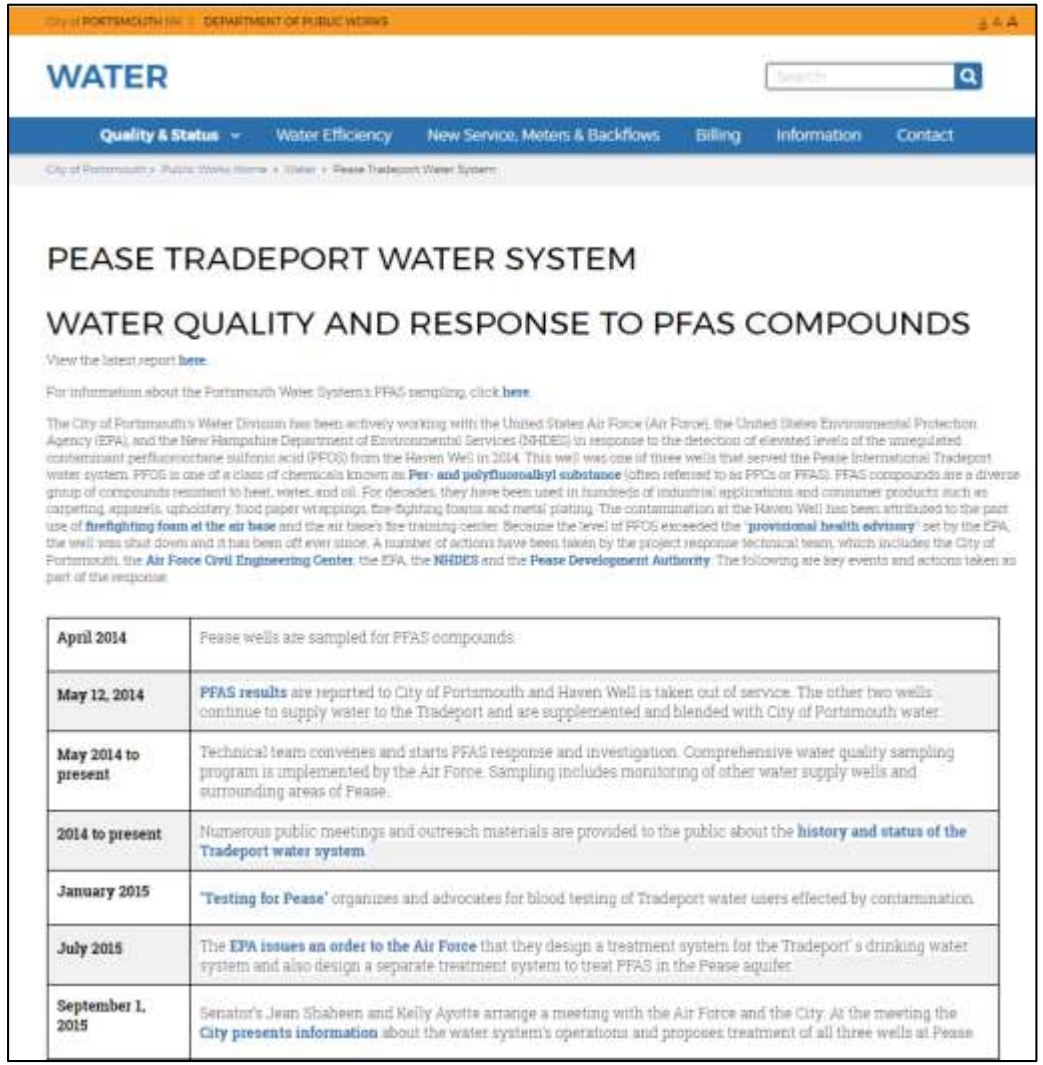
*** Concentrations from post-granular activated carbon (GAC) treatment.

**** EPA Health Advisory Level and NHDES AGQS for PFOS and PFOA concentration separately or combined is 70 ng/L (ppt)

ND = Not Detected above laboratory method detection limit

PFAS analyzed but not detected in the samples:
6:2 Fluorotelomer sulfonate (6:2 FTS), N-Ethyl perfluorooctane sulfonamide (EtFOSA), N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE), N-Methyl Perfluorooctane Sulfonamide (MeFOSA), N-Methyl Perfluorooctane Sulfonamidoethanol (MeFOSE), Perfluorodecane sulfonate (PFDS), Perfluorodecanoic acid (PFDA), Perfluorododecanoic acid (PFDoA), Perfluorononanoic acid (PFNA), Perfluoroctane sulfonamide (PFOSA), Perfluorotetradecanoic acid (PFTeDA), Perfluorotridecanoic acid (PFTrDA), and Perfluoroundecanoic acid (PFUnA)

City Website and Water System Updates



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PEASE TRADEPORT WATER SYSTEM

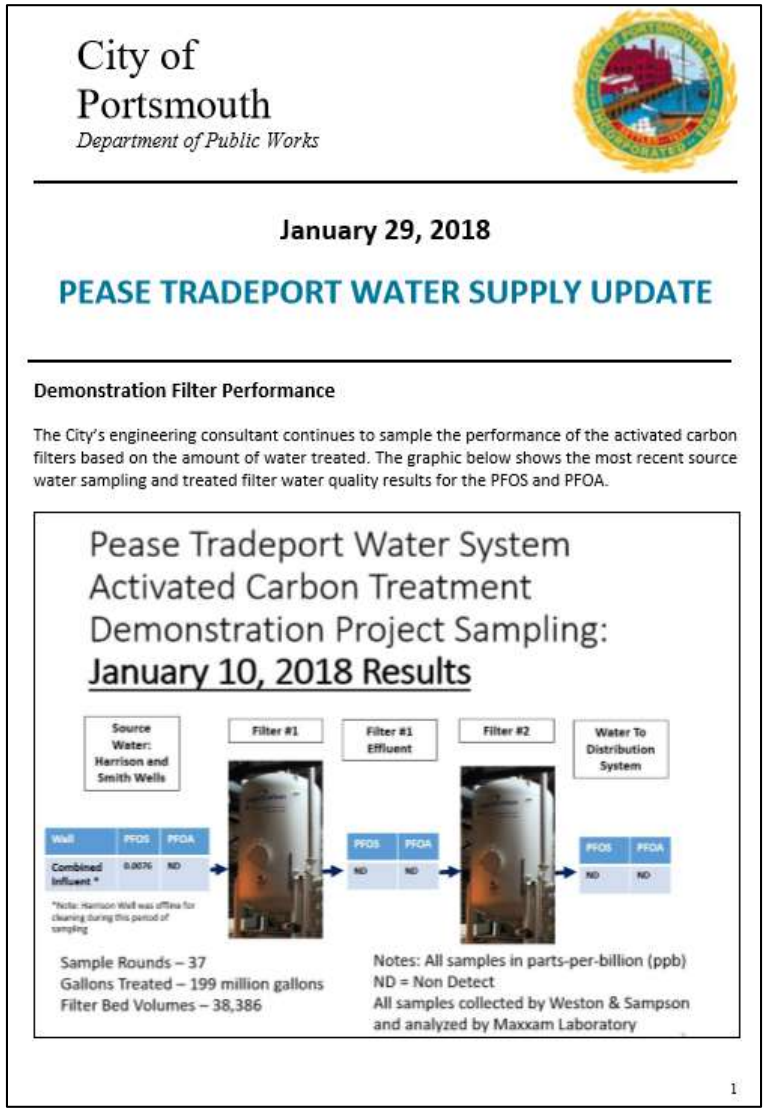
WATER QUALITY AND RESPONSE TO PFAS COMPOUNDS

View the latest report here.

For information about the Portsmouth Water System's PFAS sampling, click here.

The City of Portsmouth's Water Division has been actively working with the United States Air Force (Air Force), the United States Environmental Protection Agency (EPA), and the New Hampshire Department of Environmental Services (NHDES) in response to the detection of elevated levels of the unregulated contaminant perfluorooctane sulfonic acid (PFOS) from the Haven Well in 2014. This well was one of three wells that served the Pease International Tradeport water system. PFOS is one of a class of chemicals known as **Per- and polyfluoroalkyl substance** (often referred to as PFCs or PFAS). PFAS compounds 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. The contamination at the Haven Well has been attributed to the past use of **firefighting foam at the air base** and the air base's fire training center. Because the level of PFOS exceeded the "**provisional health advisory**" set by the EPA, the well was shut down and it has been off ever since. A number of actions have been taken by the project response technical team, which includes the City of Portsmouth, the **Air Force Civil Engineering Center**, the EPA, the **NHDES** and the **Pease Development Authority**. The following are key events and actions taken as part of the response:

April 2014	Pease wells are sampled for PFAS compounds.
May 12, 2014	**PFAS results** are reported to City of Portsmouth and Haven Well is taken out of service. The other two wells continue to supply water to the Tradeport and are supplemented and blended with City of Portsmouth water.
May 2014 to present	Technical team convenes and starts PFAS response and investigation. Comprehensive water quality sampling program is implemented by the Air Force. Sampling includes monitoring of other water supply wells and surrounding areas of Pease.
2014 to present	Numerous public meetings and outreach materials are provided to the public about the **history and status of the Tradeport water system**.
January 2015	"**Testing for Pease**" organizes and advocates for blood testing of Tradeport water users effected by contamination.
July 2015	The **EPA issues an order to the Air Force** that they design a treatment system for the Tradeport's drinking water system and also design a separate treatment system to treat PFAS in the Pease aquifer.
September 1, 2015	Senator's Jean Shaheen and Kelly Ayotte arrange a meeting with the Air Force and the City. At the meeting the **City presents information** about the water system's operations and proposes treatment of all three wells at Pease.



City of
Portsmouth
Department of Public Works

January 29, 2018

PEASE TRADEPORT WATER SUPPLY UPDATE

Demonstration Filter Performance

The City's engineering consultant continues to sample the performance of the activated carbon filters based on the amount of water treated. The graphic below shows the most recent source water sampling and treated filter water quality results for the PFOS and PFOA.

Pease Tradeport Water System
Activated Carbon Treatment
Demonstration Project Sampling:
January 10, 2018 Results

Sample Rounds – 37
Gallons Treated – 199 million gallons
Filter Bed Volumes – 38,386

Notes: All samples in parts-per-billion (ppb)
ND = Non Detect
All samples collected by Weston & Sampson and analyzed by Maxxam Laboratory

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August 26, 2015 - CAB meeting with U.S. Air Force to discuss Pease PFC contamination

Public Involvement:

- Presentations to Portsmouth City Council and Other Groups
- *Testing for Pease* Group
- Haven Well Community Advisory Board
  - 14 public meetings in 2014
- Blood Testing
  - March 31st, 2015 – Public Meeting where NHHS Announces Protocol for Pease Blood Testing
  - Three public meetings announcing blood test results
- ATSDR Community Assistance Panel (CAP)
  - Formed in 2016 to address long-term health concerns
- Pease Restoration Advisory Board (RAB)
  - Reestablished in 2016 – Meets every quarter

Additional Information:

- https://www.cityofportsmouth.com/publicworks/water/pease-tradeport-water-system
- https://www.dhhs.nh.gov/dphs/investigation-pease.htm
- https://www.atsdr.cdc.gov/sites/pease/index.html
- http://www.afcec.af.mil/Home/BRAC/Pease/
- www.testingforpease.com

Looking Ahead:

- The City of Portsmouth's water operations staff will continue to address the PFAS contamination issue by continuing to:
  - Work with the Air Force and regulators to monitor PFAS compounds in the water sources in and around the Haven Well.
  - Design and construct drinking water treatment system to treat and remove PFAS compounds in the Pease Tradeport Drinking water system wells.
  - Develop a long-term water quality monitoring plan (to include not only PFAS compounds but other water quality parameters) for the reactivation of the Haven Well.
  - Continue twice-a-year monitoring of all other Portsmouth water supply sources for PFAS compounds and respond appropriately should contaminant levels appear to be approaching HA levels.
  - Work with regulators and waterworks professionals to track and respond to the evolving water quality information, regulations and treatment technologies.
  - Provide public information on this and all other water quality parameters in our water systems.

www.cityofportsmouth.com/publicworks/water/pease-tradeport-water-system