



Welcome

Open House Meeting

Actions to Address Impacts to Drinking Water from:

Former Naval Air Station Joint Reserve Base Willow Grove

Former Naval Air Warfare Center Warminster

Horsham Air Guard Station

May 24, 2016 5:00 pm – 7:00 pm

May 25, 2016 11:00 am – 1:00 pm

http://www.bracpmo.navy.mil/brac_bases/northeast/reserve_base_willow_grove.html

http://bracpmo.navy.mil/brac_bases/northeast/former_warfare_center_warminster.html

<http://www.111attackwing.ang.af.mil/>

Warrington Township Water and Sewer Department (WTWSD)

Sampling for Unregulated Contaminants

- WTWSD voluntarily accelerated participation in the third Unregulated Contaminant Monitoring Rule (UCMR3).
- On 29 October 2014, Perfluorooctane sulfonate (PFOS) was detected in multiple wells
- WTWSD Wells 1, 2, and 6, contained PFOS above the EPA's Provisional Health Advisory (PHA) levels and were taken off-line that same day
- On 3 November 2014, WTWSD customers were notified of the PFOS findings
- On 24 & 25 February 2015, WTWSD personnel participated in two Open House Meetings along with all of the involved organizations
- On 5 February 2016, WTWSD customers were provided an update via public notice on the status of the work being done to resolve the issue
- On 19 May 2016, WTWSD Wells 3 and 9 were removed from service due to the new Health Advisory (HA) level for PFOA/PFOS and a notice was posted to our website.

Drinking water provided by the WTWSD continues to meet all regulatory standards.

Warrington Township Water and Sewer Department (WTWSD)

Actions to Protect the WTWSD Water Supply

Current Actions

- Wells 1, 2, and 6 continue to be kept out of service
- Supplemental water is being purchased from North Wales Water Authority, with no detectable PFCs.
- Entered into a Cooperative Agreement with the Air National Guard (ANG) in the amount of approx. \$5.9 million to address the contamination
- Township Engineers for this project are working on designs for the filtration system and driveway upgrade
- Township Engineers for this project are working on designs for the water main installations and service connections to properties with private wells testing at or above the PHA level for PFOS
- Acquiring necessary Easements to finish designs and proceed with various aspects of project
- Awaiting ANG response concerning a requested amendment to the Cooperative Agreement to provide funding for filtration at Wells 3 and 9 as well as additional extensions and connections as a result of the new HA level.

Future Actions

- Upgrade existing driveway to Water Tank on Costner Drive
- Install Granular Activated Carbon (GAC) filtration system on wells 1, 2, and 6 that we anticipate will be approved by DEP
- Extend existing water mains along Valley Road to serve public water to residents with private wells that test at or above the PHA level for PFOS
- Install water service connections to serve public water to residents with private wells that test at or above the PHA level for PFOS

Warminster Township Municipal Authority (WTMA)

Sampling for Unregulated Contaminants

- As part of the third Unregulated Contaminant Monitoring Rule (UCMR3), the Environmental Protection Agency (EPA) requires public water suppliers, including WTMA, to sample for 28 contaminants that are not regulated, but may require regulatory levels in the future.
- WTMA Public Water Supply (PWS) Well 26, contained PFOS above the EPA's PHA levels. PWS Wells 10 and 13 also contained PFOS at levels just below the provisional HAL.
- Firefighting agents used at the former NAWC Warminster are a likely source of the PFOS/PFOA in groundwater.
- On May 19, 2016, WTMA Wells 2, 14, and 15 were removed from service due to the new Health Advisory (HA) level for PFOA/PFOS.

Drinking water provided by the WTMA continues to meet all regulatory standards.

Warminster Township Municipal Authority (WTMA)

Actions to Protect the WTMA Water Supply

▪ ***Current Actions***

- Wells 10, 13, and 26 are no longer connected to the drinking water system. Construction of permanent treatment is underway on well 10. Treatment system construction for wells 13 and 26 will be complete in summer 2016.

- The Navy and WTMA completed a \$4.3 million cooperative agreement (grant) to compensate for:
 - replacement water costs
 - treatment system installation and operations on all three wells
 - installation of a water main on a portion of Newtown and Kirk Roads, completed in 2015
 - connection of private residences to the water system. All residences at/above PHA levels are now connected

▪ ***Future Actions***

- Continue with filtration system construction and testing of production wells. If protective limits change, WTMA will adapt and conform to those regulatory standards

Horsham Water and Sewer Authority (HWSA)

Sampling for Unregulated Contaminants

- July 30, 2014 sample results under the third Unregulated Contaminant Monitoring Rule (UCMR3) revealed the presence of Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) in HWSA Public Water Supply (PWS) wells.
 - Wells 26 and 40 contained PFOS above the EPA's Provisional Health Advisory (PHA) level. These wells were immediately taken off-line and notice issued to consumers. These wells remain out of service.
- HWSA has been actively monitoring all public water supply sources
- May 19, 2016 EPA released 0.07 µg/L (or 70 parts per trillion) as the lifetime health advisory for combined levels of PFOS and PFOA in drinking water
 - Wells 10, 17, and 21 were immediately taken out of service. Written notice to consumers is forthcoming.
- Firefighting agents used at the former NASJRB Willow Grove are a likely source of the PFOS/PFOA in groundwater.
- Cooperative Agreements: U.S. Navy – July 2015, PA National Guard Bureau – November 2015
 - Install treatment systems on PWS wells with PFOS/PFOA above lifetime HA level (Navy)
 - Purchase water from other sources (Navy)
 - Connect properties with private wells above the lifetime health advisory levels to the Public Water Supply (Navy, NGB)

Drinking water provided by the HWSA continues to meet all regulatory standards.

Horsham Water and Sewer Authority (HWSA)

Actions to Protect the HWSA Water Supply

▪ Current Actions

- Continue to monitor all public water supply sources.
- Connect properties with private wells above the lifetime Health Advisory levels where public water exists.
- Installation of public water mains in order to connect properties above Lifetime Health Advisory levels where public water does not currently exist.
- Design treatment systems for public supply wells above the Lifetime Health Advisory levels.
- Purchase water from adjacent suppliers to offset loss of production

▪ Future Actions

- Continue to monitor all HWSA sources to ensure compliance with Lifetime Health Advisory levels or any future standard.
- Maintain communication with the community and all involved agencies to ensure that the public water supply continues to meet all health advisories and safe drinking water standards.

Drinking water provided by the HWSA continues to meet all regulatory standards.

Private Well Sampling NAWC Warminster

Navy Requested EPA Assistance

- **Private drinking water wells near the former Naval Air Warfare Center (NAWC) Warminster may contain PFOS/PFOA.**
- **EPA has sampled private wells on behalf of the U.S. Navy.**
 - As of May 1, 2016, EPA has sampled 161 private wells.
 - Results – Over 30 private wells are above the HA levels and have been provided a temporary drinking water source. 12 private wells are connected to public water.
 - The private wells above the May 2016 HA were immediately provided bottled water and will be offered a permanent water connection.

The Navy will continue to fund actions required to protect drinking water at private wells near NAWC Warminster

Private Well Sampling NAS JRB Willow Grove Horsham Air Guard Station

Navy and Air National Guard Requested EPA Assistance

- **Private drinking water wells near the former Naval Air Station Joint Reserve Base (NAS JRB) Willow Grove and Horsham Air Guard Station (HAGS) may contain PFOS/PFOA**
- **EPA is sampling private wells on behalf of the Navy and Air National Guard**
 - As of May 1, 2016, EPA has sampled 332 private wells
 - Results – Over 110 private wells are above HA levels and have been provided a temporary drinking water source. 64 locations have been offered a permanent water connection.
 - The private wells above the May 2016 HA were immediately provided bottled water and will be offered a permanent water connection.

The Navy or Air National Guard will continue to fund actions required to protect drinking water at private wells near NAS JRB and HAGS

Private Well Sampling

Actions to Ensure Water Quality Regarding PFOS/PFOA

Action	PFOA + PFOS Concentration
Provide bottled water and future connection to public water supply	above HA level (0.07 ppb or 70 ppt)
Additional sampling or other actions may occur in the future due to additional understanding of groundwater flow or revised health information	

- ***On May 19, 2016, a Health Advisory (HA) level for PFOA and PFOS was established by the EPA. When both PFOA and PFOS are found in drinking water, the combined concentrations of PFOA and PFOS are compared with the 70 parts per trillion (equivalent to 0.07 parts per billion) health advisory level.***
- ***The Navy and Air National Guard responded immediately to the new Health Advisory and provided alternate drinking water at private drinking water wells who are above the HA.***
- ***A permanent connection to public water supply will be provided (no cost to homeowner) for those above the HA level due to Navy or Air National Guard PFOS/PFOA contamination***

Actions Private Well Owners Can Take to Ensure Water Quality

- ***Agree to have your well tested and/or retested for PFOS/PFOA***
- ***If bottled water is provided, use it for cooking and drinking***

If you have a private drinking water well and are unsure if it should be tested for PFOS/PFOA please contact:

NAVY: Willie Lin, BRAC Environmental Coordinator
willie.lin@navy.mil

AIR GUARD: Keith Freihofer, Restoration Program Manager
keith.e.freihofer.civ@mail.mil

The Navy or Air National Guard will continue to fund actions required to protect drinking water at private wells near NAS JRB and HAGS

PFOS and PFOA

Perfluorinated Compounds

- **PFOS and PFOA are both fluorinated organic chemicals that are part of a group of chemicals known as perfluoralkyl substances (PFASs). They are also known as Perfluorinated Compounds (PFCs)**

- Man-made compounds with multiple carbon-fluorine bonds
- Break down very slowly, which makes them useful for many home and industrial purposes, but also long-lasting in the environment

Used since the 1950s in many products because of their stain and water repellent properties

- Fire-fighting foam
- Stains, paints, and grease
- Fabric for upholstered furniture
- Carpets
- Nonstick cookware
- Floor wax,
- Food packaging (e.g., lining of microwave popcorn bags, fast food wrappers)

- **Now, widely distributed in the environment and have been detected in the blood of humans, wildlife, and fish**

- **EPA continues to investigate and work to eliminate sources**

- 3M completed a voluntary phase-out of PFOS production in 2002.
- DuPont and others are phasing out PFOA by 2015



Example of fire fighting foam being used for fire training



Example of hangar fire suppression system being tested

PFOS and PFOA

Unregulated Contaminants

- EPA included PFOA and PFOS among the contaminants for which water systems serving more than 10,000 people are required to monitor under the 3rd Unregulated Contaminant Monitoring Rule starting in 2013.
- In 2009, EPA provided provisional Health Advisories (HA) for PFOA and PFOS based on the evidence available at that time. The science has since evolved, and on May 19, 2016, EPA replaced those provisional advisories with new, lifetime health advisories.
- When both PFOA and PFOS are found in drinking water, the combined concentrations should be compared with the 70 parts per trillion health advisory level. This level offers a margin of protection for all Americans throughout their lives from adverse health effects resulting from exposure to PFOA and PFOS in drinking water.
- EPA has established a HA for PFOA and PFOS to provide information to water system operators, states and others so they can take appropriate actions to protect residents.

The health advisory for PFOS + PFOA is: 70 parts per trillion.
(in parts per billion the new advisory level is 0.07 parts per billion)

PFOS and PFOA

Health Effects

What We Know Now

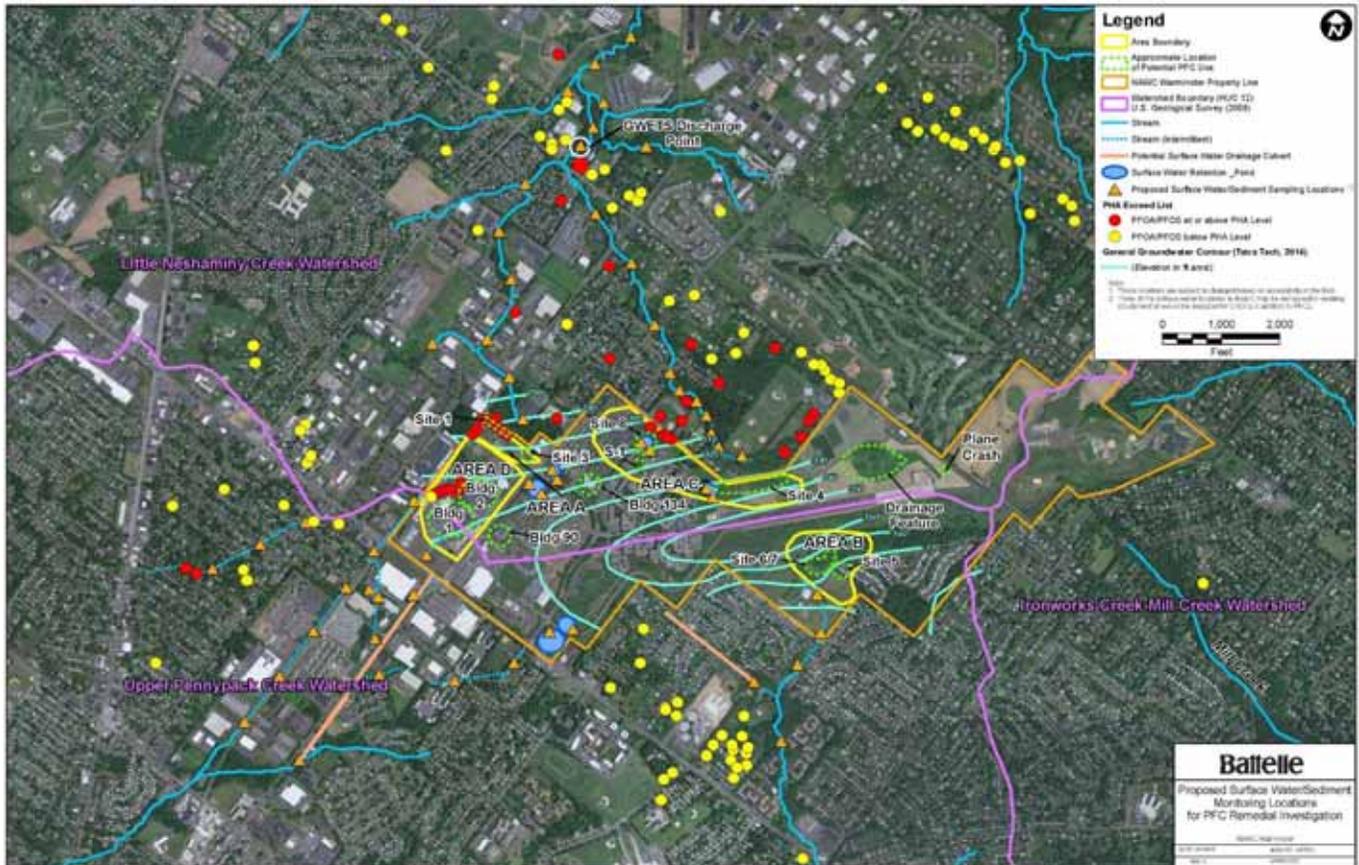
- Exposure to PFOS and PFOA appears to be widespread
 - Studies have found PFOS and PFOA in the blood samples of the general human population and wildlife nationwide (ATSDR 2009; EPA 2006a)
 - 98% or more of the general US population has PFCs in their blood
 - Exposure through ingestion is the primary concern
- Studies on exposed human populations indicate PFOS and/or PFOA may cause elevated cholesterol levels and possibly low infant birth weight
- When animals are given large doses, they exhibit developmental, reproductive and liver effects. Other studies suggest a link with certain cancers

What We Don't Know

- Health effects from exposure to low levels of PFOS and PFOA are not well known and studies are continuing
- It is not possible to link exposures to PFOS and PFOA in water to a person's individual health issues.
- Blood tests are available, but not routinely done. The results can only be used to compare against the national average and cannot be used to predict health effects or determination of source.
- Although a lifetime HA has been established, long term exposure effects will continue to be investigated.

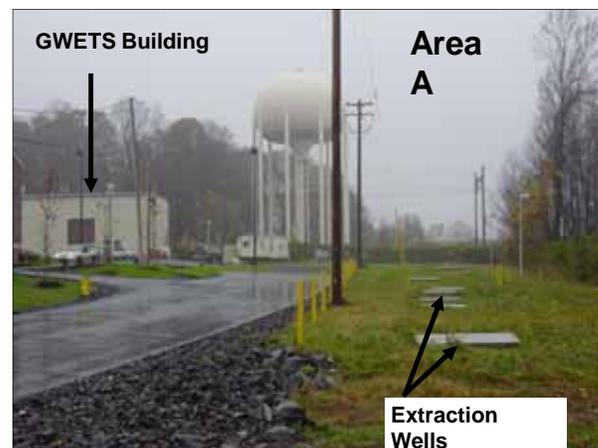
Former Naval Air Warfare Center (NAWC)

PFOA/PFOS Investigation



Groundwater Cleanup

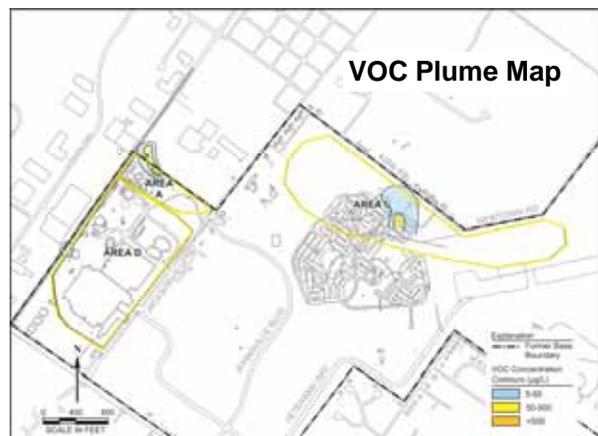
- Three Areas identified for remediation (Area A, Area C, and Area D)
- Groundwater extraction and treatment system (GWETS) provides hydraulic control and removes volatile organic compounds (VOCs) from groundwater. Carbon filters were upgraded to remove PFCs



Monitoring Program

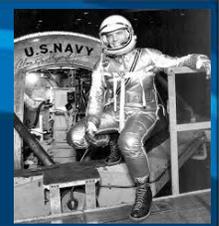
- 74 wells sampled annually (44 semiannually) for VOCs
- PFCs have been added to the monitoring program

http://bracpmo.navy.mil/brac_bases/northeast/former_warfare_center_warminster.html





Naval Air Warfare Center (NAWC) Warminster, PA



PFC - Timeline

Other Stakeholders Actions

EPA issues Provisional Health Advisory (PHA) Levels for PFOS and PFOA in drinking water.



WMA initiates UCMR3 sampling.

WMA removes three wells (10, 13 and 26) from service, and provides public notice to all customers.

EPA and Navy initiate interagency agreement for private well sampling.

EPA issues Safe Drinking Water Act Order to Navy.

EPA, on behalf of Navy, begins door to door public outreach providing PFC fact sheets and responding to 120 resident calls. Sampling of private wells begins.

EPA requests Agency for Toxic Substances and Disease Registry (ATSDR) to conduct public health letter consultation for PFCs.



WMA initiates construction of water main to connect residents

EPA revises fact sheet with health information and contact information for ATSDR health professionals.

WMA completes connection all 12 private residences at or above PHA levels.

ATSDR completes the Letter Health Consultation. The Navy is following all recommendations addressed to the Navy.

WMA awards contracts for the construction of filtration systems on three public supply wells. Scheduled for completion July 2016.

WMA starts construction of treatment system at well 10.

Navy Actions

Navy samples on base (Area A) groundwater for PFOA/PFOS. Results = not detected.
Note: Detection limits = 50 ug/L

Navy completes Third Five Year Review of implemented remedies. PFOA detected on base (Area C) groundwater, the former fire training area. In consultation with EPA/PADEP regulators, no follow-up action for PFOA was requested.

Navy participates in Oregon State Univ. research on PFC analytical methods. Samples from Nov 2012 show PFOS/PFOA above the PHA Levels in several on-base monitoring wells. Results led to further investigation and sampling.

Navy performs additional sampling including public supply well WTMA-13. PFOS/PFOA are detected in WTMA-13. Navy notifies EPA, PADEP and WTMA.

Navy samples additional on/off base wells and activates additional extraction wells at Area C, near former fire training area.

Navy receives initial sampling results from private wells. Bottled water is distributed to residents at or above PHA levels.

Navy holds public meeting (8/27) at William Tennant High School, followed by additional public outreach with updated information. (Horsham area meeting held Oct.)

Navy completes evaluation of potential sources of PFC report for NAWC Warminster

Navy executes \$4.3M Cooperative Agreement with WMA for filtration systems at public water supply wells and to provide connections to private well owners

Navy holds third public meeting for residents near both bases at the Horsham Community Center

Navy completes evaluation of soil and groundwater conditions at Shenandoah Woods (Area B) to support property transfer



Fourth public meeting/Open House for residents near both bases is scheduled to be held at the Horsham Community Center.



Former Naval Air Station Joint Reserve Base (NASJRB) Willow Grove

Current PFOS/PFOA Evaluation

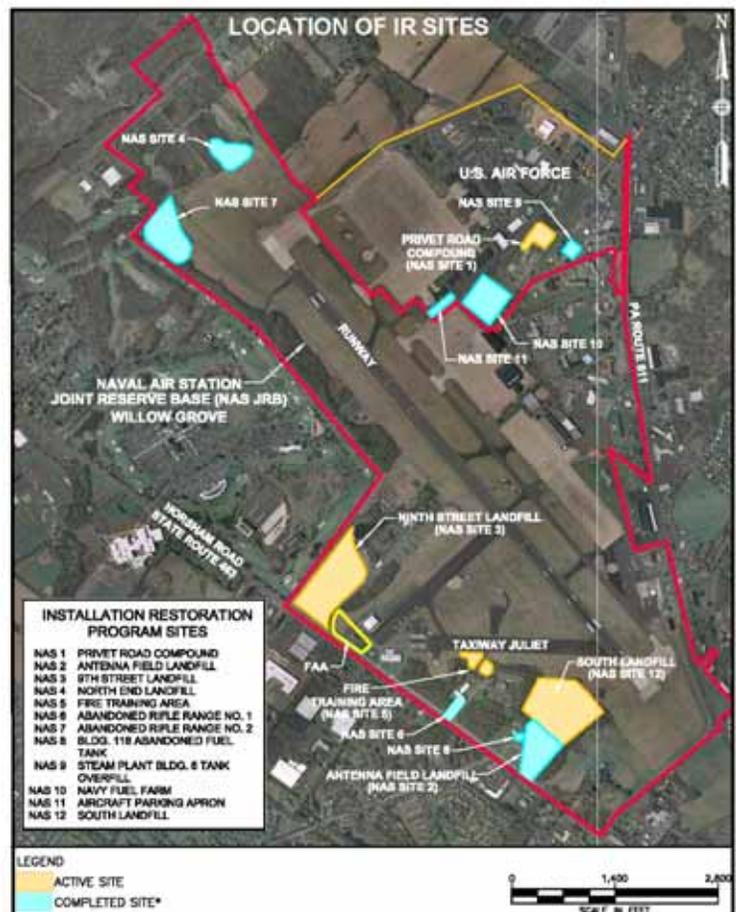
PFOS/PFOA in groundwater are suspected to be from the use of fire fighting foam.

- Site 5 is the likely source of PFOS/PFOA detected in down gradient HWSA Well 26
- Fire-fighting training activities at Site 5 used fire fighting foam
- Use of fire fighting foam on runways, plane crash sites and hangar areas may also be a potential source of PFOS/PFOA

The Navy will continue to investigate and cleanup PFOS/PFOA contamination related to Navy activities at NASJRB Willow Grove.

Environmental Cleanup

- **Navy has completed environmental cleanup at several sites**
 - Landfills (Sites 2 and 4)
 - Rifle Ranges (Sites 6 and 7)
 - Other Sites (Sites 8, 9, 10, 11)
- **Navy is addressing three sites**
 - Site 3 Ninth Street Landfill
 - Site 5 Fire Training Area
 - Site 12 South Landfill
- **Restoration Advisory Board (RAB) meetings occur on quarterly basis**





Naval Air Station Joint Reserve Base (NASJRB) Willow Grove, PA



PFC - Timeline

Other Stakeholders Actions

EPA issues Provisional Health Advisory (PHA) levels for PFOS and PFOA in drinking water

HWSA posts UCMR3 results and takes HWSA Wells 26 and 40 offline

HWSA provides notice to customers.



EPA begins door to door public outreach, mails 1200 fact sheets and access agreements to local citizens and responds to 300 resident calls.

Warrington Township notifies local authorities, PADEP, and EPA of exceedances in wells 1, 2 and 6 due to UCMR3 sampling. Wells are taken offline.

Warrington Twsp. Water and Sewer Authority provides Public Notice to its customers.

EPA issues Safe Drinking Water Act Order to **Air Force** and **Air National Guard Bureau**.

EPA provides current fact sheet containing health information and contact information for **ATSDR** health professionals.

U.S. Geological Survey (USGS) initiates a **Navy** funded area-wide groundwater model development to support long term understanding of the complex groundwater aquifer.

Air National Guard and **Navy** hold fourth public meeting/Open House for residents near both bases at the Horsham Community Center.

HWSA anticipates completion of construction projects and private residents will be connected to public water.

Navy Actions

Navy Site 5 (former Fire Training Area) sampling detects PFOS and PFOA in groundwater

Navy, in consultation with EPA/PADEP, completes Site 5 (former Fire Training Area) Groundwater Record of Decision (ROD). ROD implements land use controls (LUC) to control exposure of PFOA/PFOS. Determination made that changes in toxicity will be evaluated during future reviews. LUC restricting groundwater established May 2013.

Navy samples base monitoring wells and Horsham Water and Sewer Authority (HWSA) Well 26

Navy recommends that the Horsham Air Guard Station sample drinking water wells for PFOA/PFOS

Navy completes Interagency Agreement with EPA for private residential well sampling

Navy holds public meeting on Oct. 7 for Horsham Township residents at Horsham Community Center. (Warminster Township meeting held 8/27)

Navy initiates sampling of private wells via EPA. Bottled water provided immediately to residents at or above PHA levels.

Public meeting (Feb. 24/25) for residents near both bases at the Horsham Community Ctr.

Navy completes \$8.8M Agreement with **HWSA** for filtration systems at public supply wells and to connect private well owners to public water.

Navy initiates offers to connect private wells to HWSA public water



Navy performs on-base sampling and site characterization. (Continues through June)

Navy provides 26 additional connection offers.

2009

2011

2012

2013

MAY

2014

JULY

AUGUST

OCTOBER

NOVEMBER

2015

FEBRUARY

MAY

JULY

OCTOBER

DECEMBER

2016

JANUARY

FEBRUARY

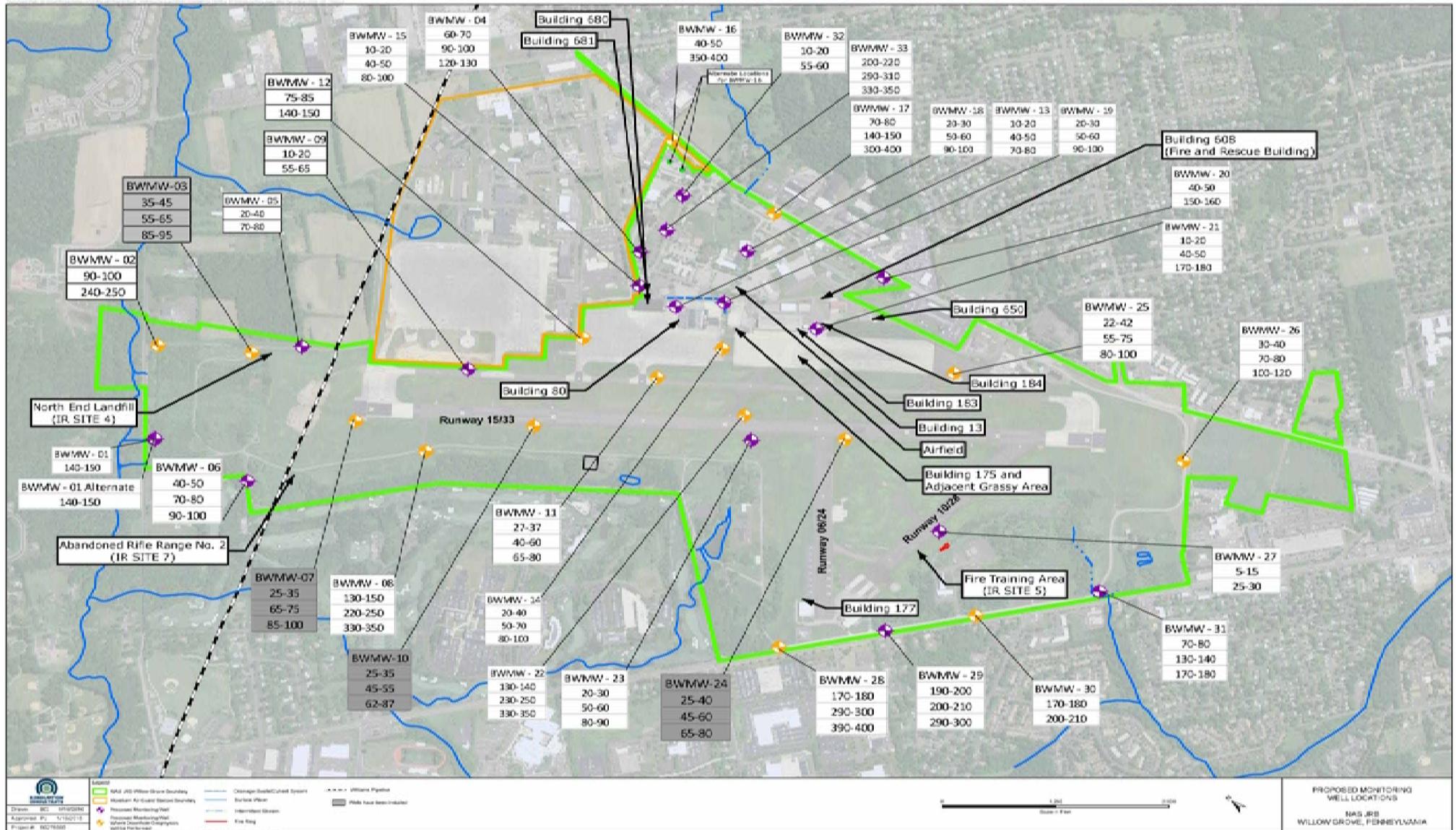
MAY

DECEMBER



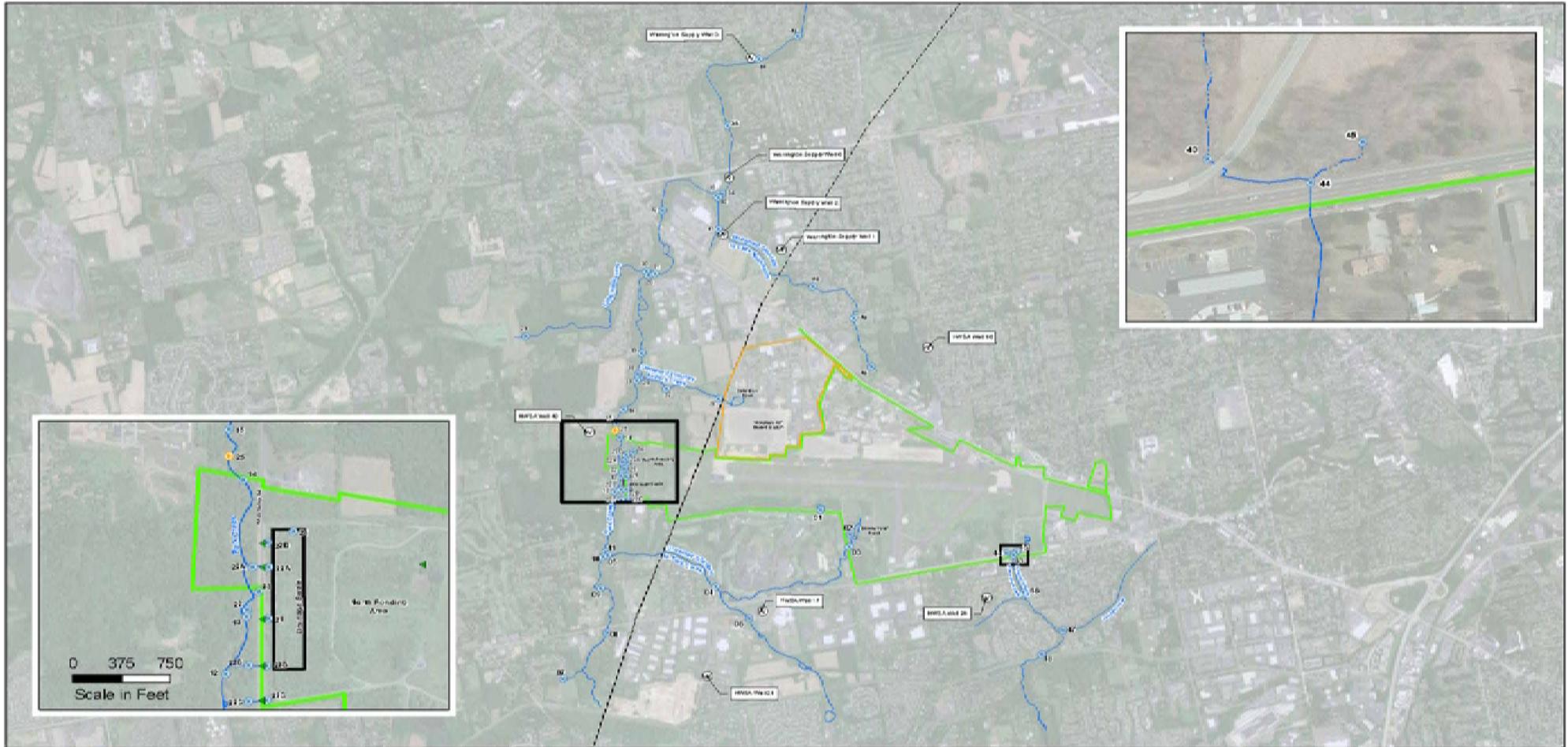
Former Naval Air Station Joint Reserve Base (NASJRB) Willow Grove

Navy PFOS/PFOA Monitoring Well Locations



Former Naval Air Station Joint Reserve Base (NASJRB) Willow Grove

Navy PFOS/PFOA Stream and Sediment Sampling



RESOLUTION CONSULTANTS

Drawn: BC 6/29/2015

Approved: MS 6/29/2015

Project #: 60276603

Legend

- Wastewater Treatment Plant Outfall
- Proposed Surface Water/Sediment Sample Location
- Outfall
- Water
- Williams Pipe Line
- NASJRB Willow Grove Boundary
- Hornham Air Guard Station Boundary
- Public Supply Well

Notes:
 HWSA - Hornham Water and Sewer Authority

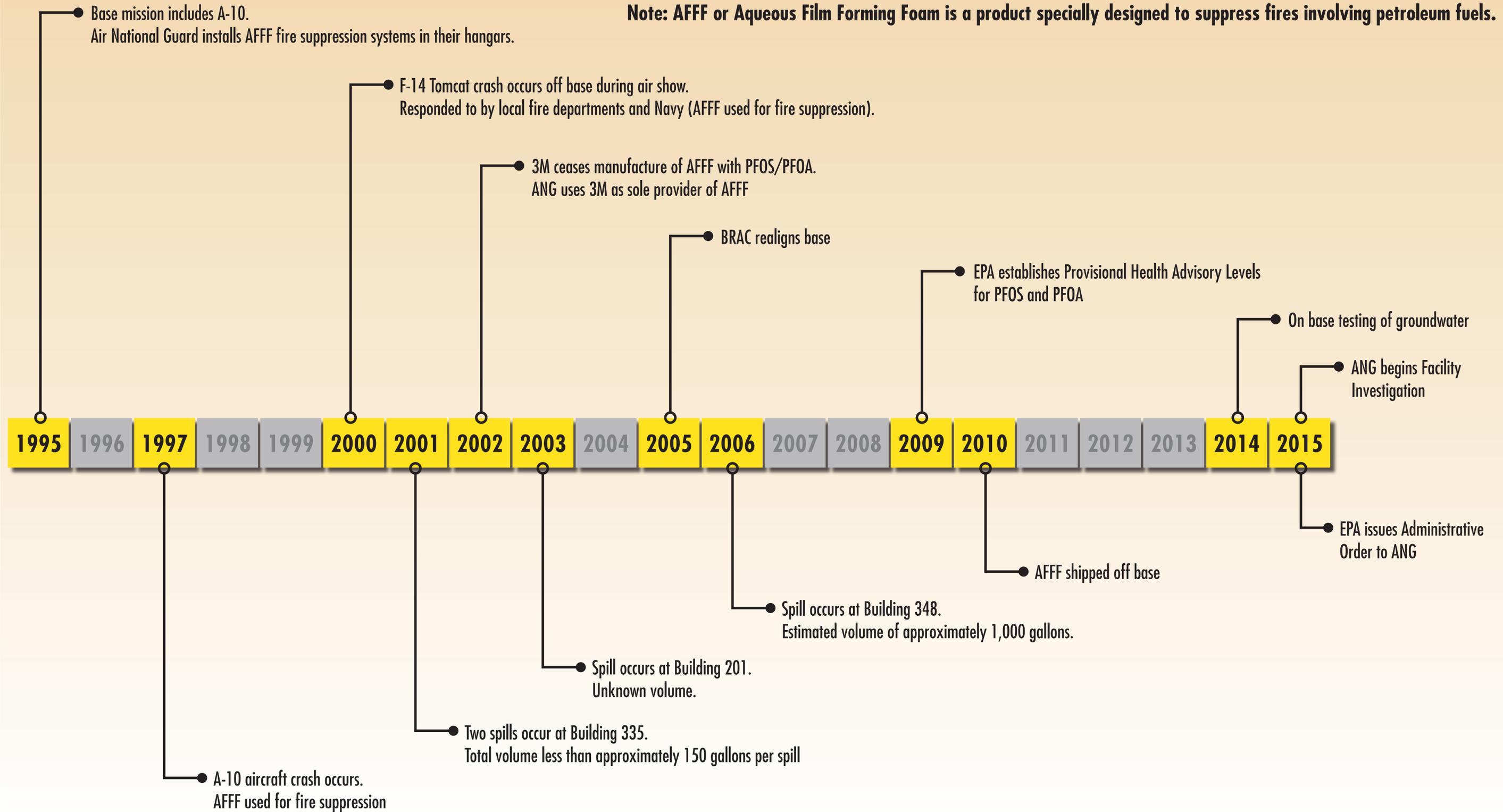
0 1,500 3,000
 Scale in Feet

FIGURE 17-2
PROPOSED SURFACE WATER/SEDIMENT SAMPLES
NAS JRB
WILLOW GROVE, PENNSYLVANIA



TIMELINE FOR USAGE OF FIRE-FIGHTING FOAM (AFFF) CONTAINING PFOS/PFOA AT THE HORSHAM AIR GUARD STATION.

Note: AFFF or Aqueous Film Forming Foam is a product specially designed to suppress fires involving petroleum fuels.





SAMPLING LOCATIONS AT HORSHAM AIR GUARD STATION



LEGEND:

- Existing Groundwater Monitoring Well ¹
- Soil Boring
- Surface Water Sample
- Sediment Sample²
- Sediment and Surface Water Sample
- Approximate AFFF Tank Location
- Stream³
- Building³
- Installation Boundary³

NOTES:

1. Additional monitoring well locations will be added pending results of analytical samples.
2. An additional sediment sample was collected immediately downstream from the wastewater treatment outfall located along Park Creek at the County Line Road bridge.
3. Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 09/14/2015.
4. Background Source: ESRI World Imagery (USDA NAIP, 06/2013).

0 200 400 Feet

HORSHAM AIR GUARD STATION
HORSHAM TOWNSHIP,
PENNSYLVANIA

SAMPLING LOCATIONS
AT HORSHAM AGS

FIGURE: 1 | DATE: 5/9/2016

