NAVAL AIR STATION JOINT RESERVE BASE (NAS JRB) WILLOW GROVE
Restoration Advisory Board (RAB) Meeting Minutes

Meeting Date: December 12, 2018
Meeting Time: 2:00 p.m.
Meeting Place: Horsham Township Library

	Name	Organization
Attendance:	Willington Lin (R)	Navy BRAC PMO
	Brian Helland (R)	Navy BRAC PMO
	Jason Speicher	Navy, NAVFAC Atlantic
	Jennifer Good	Navy BRAC PMO
	Martin Schy	NAS JRB Navy Caretaker's Office, BRAC
	Jim Rugh	NAS JRB Navy Caretaker's Office, BRAC
	Sarah Kloss (R)	EPA
	Larry Brown	EPA
	Roger Reinhart	EPA
	Colin Wade (R)	PADEP
	Jessica Kasmari (R)	PADEP
	Andrew Frebowitz	Tetra Tech
	Lt. Col. Jacqueline Siciliano	PA Air National Guard
	Chris Botzum	PA Air National Guard
	Keith Freihofer	Air National Guard
	Lt. Christine Lloyd	ATSDR
	Lora Werner	ATSDR
	Kyle Shmeck	Montgomery County Health Department
	Toby Kessler	Gilmore Associates/Horsham Water and Sewer
	Tina O'Rourke	Horsham Water and Sewer
	Dan Goode	United States Geological Survey
	Lisa Senior	United States Geological Survey
	Tom Ames	HLRA
	Larry Burns	HLRA
	William Rothers	HLRA
	Mike McGee	HLRA
	Bill Walker	Horsham Township
	Emily Shaw	Horsham Township
	Mike Shinton	Horsham Township
	Greg Nesbitt	Horsham Township Council
	Lara Flynn	U.S. Senator Casey's Office
	Shea Bauersmith	Rep. Stephen's Office
	Adam Blum	PA Senator Collett's Office
	Joshua Arsenault	PA Senator Collett's Office
	Bailey Landis	PA Senator Collett's Office

Tom Holroyd	PA Senator Collett's Office
Rachel Fingles	PA Senator Collett's Office
Brendon Weis	Montgomery County Heath Department
Larry Menkes	Veteran's Green Jobs Initiative
Matt Machusick	Leidos
Amanda Lapham	PennEnvironment
Jord Yniguez	Purolite
Kyle Bagenstose	Bucks County Courier Times
Joseph McGrath (R)	RAB, former employee and veteran
Ted Roth (R)	RAB
Robert Grigg	Envirogen
Charles Reinhardt	Resident
Virginia Brooke	Resident
Carl Meixsell	Resident
Suzanne Johnson	Resident
Ray Heath	Resident
Joseph Loftus	Resident
Eilene Rinsky	Resident
Nancy Jaeschke	Resident
Hope Grosse	Resident
Other Unidentified Residents	

(R) Designates RAB Member

Willie Lin, the Navy's Base Realignment and Closure (BRAC) Environmental Coordinator and RAB Co-Chair, opened the meeting by greeting the attendees. Mr. Lin noted that the meeting will include presentations from the Navy and Air National Guard (ANG). Mr. Lin explained that following the environmental restoration presentations, a separate discussion on health would occur. Mr. Lin asked RAB members and government representatives to introduce themselves.

Mr. Lin commenced with the Navy presentation. Mr. Lin discussed the purpose of the RAB and gave an overview of the means in which regulatory agencies exchange information with the community. The RAB is established to address environmental restoration activities and not as a forum to discuss health issues. Representatives from the Agency for Toxic Substances and Disease Registry (ATSRD) are present and will be available after the RAB meeting to discuss health concerns.

Mr. Lin presented a summary of the phases of the environmental restoration process. Mr. Lin introduced Andrew Frebowitz to provide an update on the cleanup sites, including landfill Sites 3 and 12, and Site 5, the former Fire Training Area. Mr. Frebowitz provided background on Sites 3 and 12 stating that they were former landfills used by the Public Works Department. Results from the remedial investigations (RIs) at both sites showed soils with elevated levels of metals and polycyclic aromatic hydrocarbons. In addition, groundwater at Site 3 showed elevated levels of the volatile organic compound (VOC) tetrachloroethene (PCE). Feasibility studies have been submitted for both sites to present various clean-up alternatives. The Navy is in the process of responding to regulatory review comments and preparing the revised reports. The next step is to

prepare the proposed remedial action plan and record of decision selecting the cleanup remedy for the sites.

Mr. Frebowitz discussed the remediation for Site 5 groundwater. The site was a former fire training area where solvents were stored and burned. An active anaerobic bioremediation system is in place to reduce the parent compounds trichloroethene (TCE) and PCE. Quarterly monitoring to assess anaerobic conditions and annual performance monitoring to obtain concentrations of VOCs is being conducted. Monitoring results show good conditions for bioremediation and a reduction in concentrations of VOCs. Additional injections of amendments for the treatment system will be conducted based on monitoring results.

Mr. Lin began the presentation for the next agenda item, perfluorinated compounds (PFCs)/perfluoroakyl substances (PFAS). These chemicals are man-made and found in fire-fighting solutions. In mid-2014, the PFCs perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) were found in public drinking water wells near NASJRB Willow Grove as part of sampling under EPA's Unregulated Contaminant Monitoring Rule 3 (UCMR3). At that time, the health advisory levels were 0.4 micrograms per liter, or 400 parts per trillion (ppt) for PFOA, and 0.2 micrograms per liter, or 200 ppt for PFOS. In 2014, the Navy began sampling private drinking wells in the area and Horsham Water and Sewer municipal drinking wells. In May 2016, the EPA released new lifetime health advisory levels of 70 ppt for combined PFOA and PFOS. The Navy is providing bottled water to those well users with PFOA and PFOS above the health advisory level until they can be connected to public water. Mr. Lin stated that if there are health concerns, they should be addressed with a health professional. Links to health information were included in the presentation.

Mr. Lin provided a summary of the Navy's private well sampling activities. Tetra Tech., a Navy contractor, has assumed sampling responsibilities previously conducted by EPA. Approximately 500 wells have been sampled, of which 99 locations have levels above the health advisory of 70 ppt combined PFOA and PFOS. Mr. Lin showed the locations of the samples and results. The figure is in the handouts and locations in red exceed the health advisory level, locations in orange are between 40 and 70 ppt and are sampled quarterly, and yellow and green are below 40 ppt. The figure is updated periodically and may be found on the Navy website.

Of the wells above the health advisory, about 11 remain to be connected to the public water supply. Connections are being arranged through Horsham Water and Sewer Authority. Bottled water is being provided to locations above the health advisory where connections have not yet been completed. The Navy is also funding filtration systems at Horsham Water and Sewer. Treated public water is now below the lifetime health advisory and the wells are back to drinking water service. The Navy has funded approximately $18 million to date to Horsham Water and Sewer for public water treatment.

Mr. Lin moved on to discuss the RI for PFAS. A draft report was submitted in November 2016 summarizing the data collected and identifying data gaps and strategies to collect additional needed data. Much of the additional data has been collected, but some additional data collection will be required. The overall investigation so far will be documented in a RI report submitted for regulatory review at the end of 2018.

Mr. Frebowitz provided information on an ongoing storm water investigation. The outfalls were sampled; concentrations are lower during storm events. The outfalls to Park Creek on the northern end of the base have been closed and the outlet at the retention basin has been raised to hold more water back from discharging to the creek. An evaluation to determine where groundwater is entering the storm sewer on the facility is also being conducted. Some groundwater has been seen in the storm system during a dry period. Two miles of storm sewer lines on the base have been evaluated and reviewed. A report detailing recommendations and results of that study are in preparation.

A Phase II PFAS investigation is now in preparation. Project scoping sessions are being conducted and work plans are in development. The source areas that were identified in the Phase I RI, particularly the aircraft maintenance facilities and Site 5 will be investigated further. A Draft Pilot Test Work Plan was submitted to the EPA and PADEP in November 2018 to evaluate groundwater treatment options in the area near the aircraft maintenance facilities. The Phase II RI will also include the installation of additional monitoring wells to evaluate the extent of the contamination. Surface water discharge monitoring and additional soil samples will also be conducted.

Mr. Lin stated soil removal action near the hangar area began in November 2018. It is expected to be completed by the end of January 2019. The removal targets soils with the highest concentrations of PFAS. The soil will be disposed of at a RCRA Subtitle D lined landfill in central New Jersey. There are no standards for soils, but the Navy conducted a statistical analysis to determine hot spots and a removal action goal of approximately 1 milligram per kilogram (mg/kg) (1,000 microgram per kilogram) of PFOS. Soil results near the aircraft maintenance hangar were detected at levels up to 98 mg/kg. The impacted soils will be removed with the intention to remove a source of PFAS which could migrate to groundwater. Almost 3,000 cubic yards of soil have been excavated and removed. Clean backfill will be placed in the excavations in early 2019.

Mr. Lin introduced Jason Speicher to discuss environmental research programs funded by the Department of Defense (DoD) with relation to PFAS. Mr. Speicher explained the DoD is putting almost 50 million dollars into research related to PFAS, including, toxicology, chemistry, assessment, and remediation. Samples from the soil removal will be provided to academic institutions and consultants for research into treatment technologies. Mr. Speicher referred the attendants to a website where the projects can be reviewed and mentioned that most of them focus on remedial technologies. The majority of the projects are smaller scale and will be about one year in duration. If the research is deemed promising, funding to evaluate if the technology will work on a larger scale will be awarded.

Mr. Lin referred attendees to the handouts for links to additional information and resources, then asked for questions from the RAB members.

An unidentified attendee requested to know if the removal of the soil means that the base will be clean. Mr. Lin explained that the soil removal was from a specific area with the highest levels of PFAS and soils above 1,000 mg/kg were removed and there are still areas where PFAS is in the soil below these levels. There are no regulatory levels for PFAS in soil at this time.

Mike McGee inquired about how often the private wells between 40 and 70 ppt were being sampled, and if the results are consistent over time. Mr. Lin explained that it is done on a quarterly basis. The majority of the wells show fairly consistent results from sample to sample, and a wide variation has not been noted.

Mr. McGee followed up by asking how long it will take for Site 5 to be clean. Brian Helland indicated that the Navy is estimating 4 to 5 years. Mr. Frebowitz explained that levels in the area have come down. There are only four to five wells above the remediation goal at this point.

Greg Nesbitt requested that future meeting be held later in the day to allow more residents to attend as well as having changes made to the presentation in PowerPoint that better highlights changes and progress from previous meetings. Mr. Nesbitt also inquired about the completion of the five-year review mentioned in the previous meeting. Mr. Lin explained that it had been completed, and that the report is available on the administrative website. Mr. Lin also acknowledged the comments provided by Mr. Nesbitt regarding meeting times and presentation materials, but expressed that the December meetings are scheduled for the afternoon as a precaution for bad weather. An unidentified attendee asked if the evening meetings could start later than 6:00 pm. Mr. Lin stated that starting the meetings later would not allow for enough time to complete the meetings prior to the library closing time.

Mr. Nesbitt requested to know when the report for the recommendations for the storm water lines would be issued. Mr. Helland replied that it is expected to come out in December. It was delayed due to rain events because the sewer lines must be dry to achieve the inspection. Mr. Nesbitt also asked about the schedule for the Phase I RI report. Mr. Lin replied the draft report will be issued in December 2018.

Tom Ames commented that the reports be published quicker. Mr. Ames requested that a more aggressive approach be taken to publish the Site 3 and Site 12 feasibility studies in a more expedient manner. Mr. Lin responded that the Navy is working with the regulators to finalize the reports and a meeting had just been completed with the EPA regarding these reports.

An unidentified attendee inquired about what action is taken for private wells above 70 ppt and what is the significance of the 40 to 70 ppt range when sampling private wells. Mr. Lin explained 40 ppt is a level that was discussed by the EPA in terms of a level that should be used to monitor. The 70 ppt is the Health Advisory Level that the Navy is taking permanent action on which includes providing bottled water until a permanent connection to the public supply is made.

An unidentified attendee inquired about the private well samples that fall below the 40 ppt level. Mr. Lin explained that two samples are collected from each location. If neither sample is equal to or above 40 ppt, no action or additional sampling is taken at that private well.

There were no additional questions for the Navy. Mr. Lin introduced Mr. Freihofer to commence with the ANG presentation.

Mr. Freihofer provided an update on Site ST01, a former fuel yard where a jet fuel spill occurred in the 1970s. A biosparge system for groundwater remediation was operating but was replaced by persulfate injections in 2016. The petroleum tanks were removed in 2016 to allow access to

impacted soils. Approximately 175 tons of petroleum impacted soil was removed and disposed of at a licensed facility.

Mr. Freihofer continued the presentation with an update on the Privet Road Site. This was a former solid waste management area that has TCE and PCE in groundwater, but below EPA's Maximum Contaminant Levels (MCLs). Leidos has been contracted to conduct long-term, biannual monitoring. A five-year review was completed in September 2018.

Mr. Freihofer began the discussion on PFAS at the facility. A preliminary assessment conducted in 2015 identified 10 potential PFAS source areas. These include areas where PFAS may have been used or stored, such as hangars, or where firefighting foam may have flowed to, such as the storm basin and waste water treatment plant. Mr. Freihofer introduced Matt Machusick of Leidos to provide more details on the PFAS investigation.

Mr. Machusick discussed the PFOS/PFOA investigation Leidos has been conducting. Another round of groundwater sampling was completed in March 2018. The results of this event are in a report on the administrative record. A joint Navy and ANG well elevation measurement event was also conducted to produce a regional groundwater flow map. Baseflow and storm water sampling events were also conducted and a technical memorandum was prepared. The report is now in regulatory review. Once the comments have been addressed, that report will be available on the administrative record.

Mr. Machusick continued with the groundwater investigation and stated a water elevation study was conducted concurrently with the Navy to develop a better understanding of groundwater flow. Sampling was also conducted in March 2018 with results in 78 or the 85 locations exceeding the health advisory level of 70 ppt. The highest concentrations were detected in the southern portion of the ANG facility as well as near buildings in the central portion of the facility. The maximum concentration detected was approximately 300,000 ppt combined PFOA and PFOS with five additional wells above 10,000 ppt. No additional sampling is scheduled at this time.

Mr. Freihofer spoke on PFOS and PFOA in the surface water on the Horsham Air Guard Station. PFOS and PFOA have been detected in the storm water leaving the storm water basin. The water flows through an unnamed tributary that eventually discharges to Neshaminy Creek. An updated carbon filtration system was implemented at the outfall in August 2018 to replace the prior system. The most recent sample collected from November after treatment was 7 ppt for PFOS/PFOA combined. Additional funding was received in September 2018 to increase the capacity of the system and a conceptual design for the upgrade is in preparation.

Mr. Freihofer discussed PFOS and PFOA in drinking water. There is an agreement with Warrington Township to install carbon filtration on five of their supply wells and extend water mains for connections. Private well locations with detections above 70 ppt are being connected to the public supply. Mr. Freihofer presented a slide showing the number of private wells sampled with the number above the 70 ppt health advisory level and number of connections completed.

An unidentified attendee asked what the target concentration for treated surface water through the carbon filters was. Mr. Freihofer answered that the drinking water standard of 70 ppt is being used. The last sample collected was 7 ppt after treatment.

Mr. McGee requested an update on the status of wells 1 and 2, the base drinking wells. Mr. Freihofer answered the wells have a carbon filtration and have been nondetect when sampled and are not being used for drinking water. Major Stefanik added that the treatment is a temporary system. A permanent treatment system will be installed and then a permit for drinking water will be obtained.

Hope Grosse inquired what distance off the base and Park Creek samples were collected. Mr. Machusick answered that samples as far as twelve miles downstream were collected. The farthest samples taken were all below 70 ppt.

Ms. Grosse if groundwater will be contained and treated. Mr. Lin answered that a pilot test is planned to do further evaluation of the geology of the area and then extract and treat groundwater. The goal is to use the knowledge gained from the pilot test to construct a large scale extraction and treatment system.

Ms. Grosse inquired how far along in the process the pilot test was. Mr. Lin answered that the pilot study work plan has been drafted. Currently the regulators are being consulted before the groundwater can be extracted and treated. Mr. Nesbitt asked for clarification on the area in which the pilot test would be conducted. Mr. Lin replied that it will occur in the area near the Navy's aircraft hangars.

Todd Stephens stated his displeasure at the rate in which plans were being enacted, and he asked what was being done to stop contaminants from entering the local waterways. Mr. Freihofer answered they have replaced the treatment system at the retention basin to help treat water leaving the base. There are plans to install a system with higher capacity that will allow even more water to leave the base below detection levels. He went on to explain that using these new technologies and plans has challenges that come with them. It is likely that the new system could be expected in the late spring of 2019. In addition, there are sometimes delays in funding that impact the timeline for implementation of work.

An unidentified attendee inquired about the possible response to the other source areas identified on the base. Mr. Freihofer replied that scoping for work in the RI report is being done to address that. Further investigation will be needed at groundwater hotspots on and off the base.

An unidentified attendee suggested that the Air National Guard and the Navy should combine their efforts where possible. The attendee also asked if the Air National Guard could provide email updates when new information is available similar to what the Navy provides. Mr. Lin replied that a meeting was just held to discuss coordinating future efforts. Mr. Freihofer replied that he would look into the possibility of an email service, but currently all Air National Guard documents can be viewed online at their website.

An unidentified attendee inquired about how Aqua is dealing with PFAS in the water and what concentrations are now present. An unidentified representative of Aqua replied that they have installed activated carbon to remove PFOS/PFAS contaminants from the water. Other groundwater treatment systems are also using carbon filters. The concentration of PFOS/PFAS is dependent upon location but have generally been around 10 ppt.

Ms. Gross requested clarification on the areas where the soil was currently being excavated and the monitoring system once the soil is removed. Mr. Lin went over the slides with photographs and figures of the soil excavation areas and the PFAS concentrations that were shown on them. Mr. Lin continued that during the Phase II groundwater will be analyzed from previously sampled wells. This will allow them to compare the data and see what effect the excavation may have had.

An unidentified attendee inquired about the decision to excavate the selected locations. Mr. Speicher replied that there are no official soil criteria developed by any of the regulatory agencies. Over 300 soil samples were collected, and, using this data, the locations with the highest levels were selected for excavation. The cleanup goal was established by statistical methods and the areas with the highest 5% levels of contamination were removed.

Mr. Lin introduced Sarah Kloss of EPA to discuss EPA's role in the Superfund program for the Willow Grove site. Ms. Kloss stated she wanted to clarify EPA's position on the work being conducted and some of the questions that were asked. Ms. Kloss stated the EPA agreed with the decision the Navy made to excavate the soil in the areas with high levels in the hopes of removing possible source material that could affect the groundwater. EPA often implements interim actions while working toward long-term remedial action. EPA feels it was a good decision to remove impacted soils and place them in a secure, permitted, lined landfill while determining the best long-term options for cleanup. The groundwater pilot test is another area where EPA feels an interim action will help control contamination from areas with higher levels until a long-term remedy is determined. EPA is also encouraging communication by holding quarterly meetings with the Navy, Air Guard, and PADEP to exchange data and information.

Roger Reinhart added an explanation of how the EPA selected the current levels that would place private wells into the monitoring program. Based on multiple samples taken, 40 ppt was selected as the level to continue monitoring because if the results were below 40 ppt, another sample collected at the same location would have an extremely low probability of ever exceeding 70 ppt. There is a low variation of concentrations collected between samples collected at the same residences.

Mr. Stephens inquired the length of time it takes to connect a private residence to public water once 70 ppt is exceeded. Mr. Lin answered even when unvalidated results are returned over the 70 ppt level, bottled water is immediately provided. The connection to public water is performed by the water authority and is dependent upon the location. Some areas are challenging when no water main exists nearby.

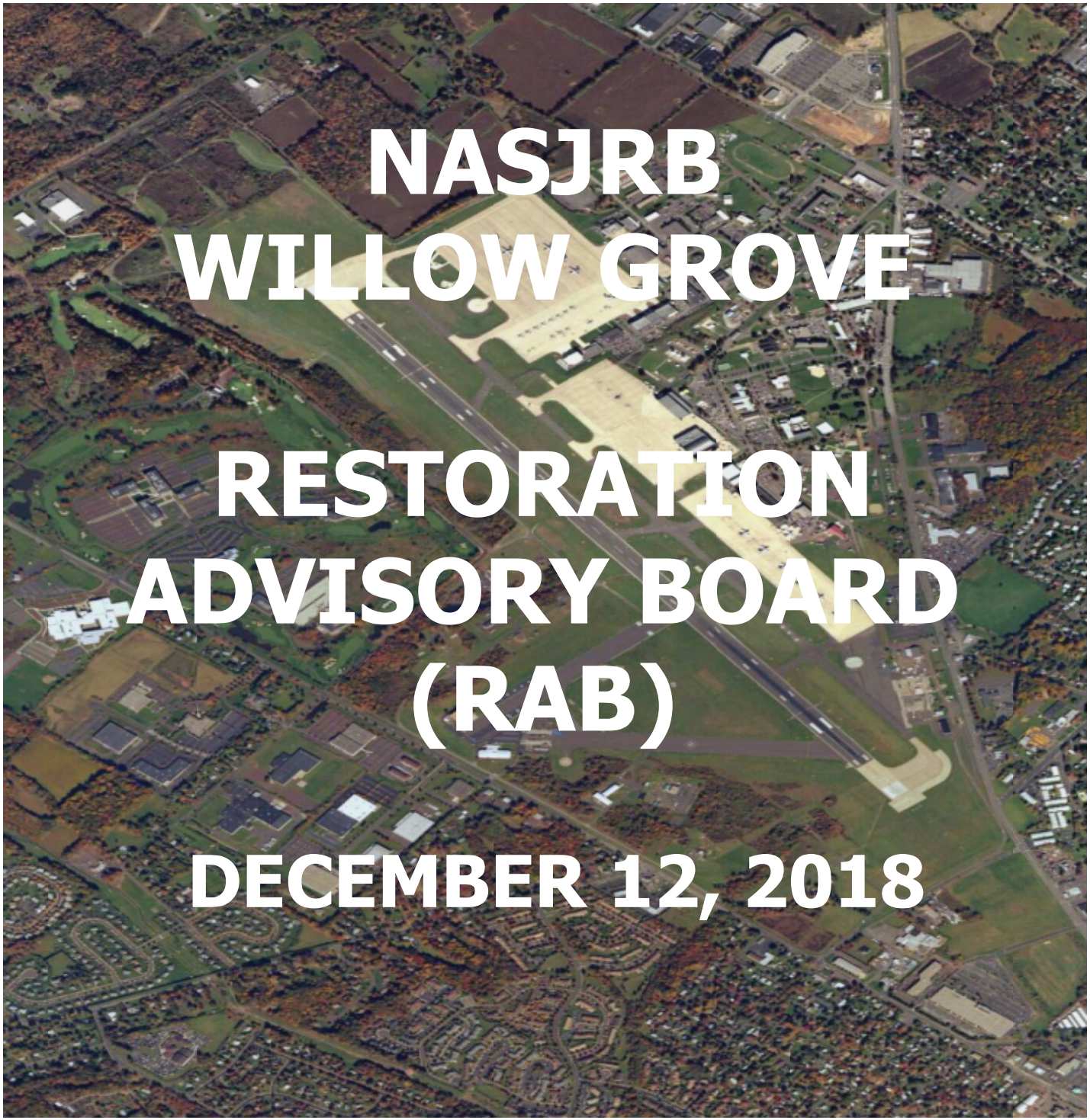
Ms. Gross requested to know if anything under 70 ppt was safe to consume. Mr. Reinhart replied that multiple animal and human studies were conducted. The Health Advisory Level that was established is for lifetime exposure assuming maximum consumption of water. It is designed to protect the most sensitive individuals of the population.

Mr. McGee inquired on whether PFOS/PFOA would be controlled under CERCLA. Mr. Reinhart answered that it is currently being discussed at EPA headquarters under the PFAS management's strategy plan. Both PFOS and PFOA are on the contaminant candidate list for being regulated through the drinking water standard. It is a detailed process that takes years.

Mr. Stephens requested to know if any environmental regulatory agency is currently monitoring the adjacent waterways. Mr. Lin answered that they is no regular monitoring for the surface water. Mr. Stephens expressed his frustration that active monitoring of the waterways is not occurring.

Larry Menkes stated that he believes there is a cost issue in dealing with the residents of the Willow Grove/Warminster area. Mr. Menkes continued that the health of the residents has been affected and requested that blood tests be given to the residents of the area for toxic stress. Ms. Kloss replied that the EPA is working for the people and are doing the utmost to remediate the site.

There were no other questions and Mr. Lin adjourned the RAB meeting. After a short break, Lora Werner of the Agency for Toxic Substances and Disease Registry (ATSDR) led a health discussion with community members.



NASJRB WILLOW GROVE

RESTORATION ADVISORY BOARD (RAB)

DECEMBER 12, 2018

RAB Agenda

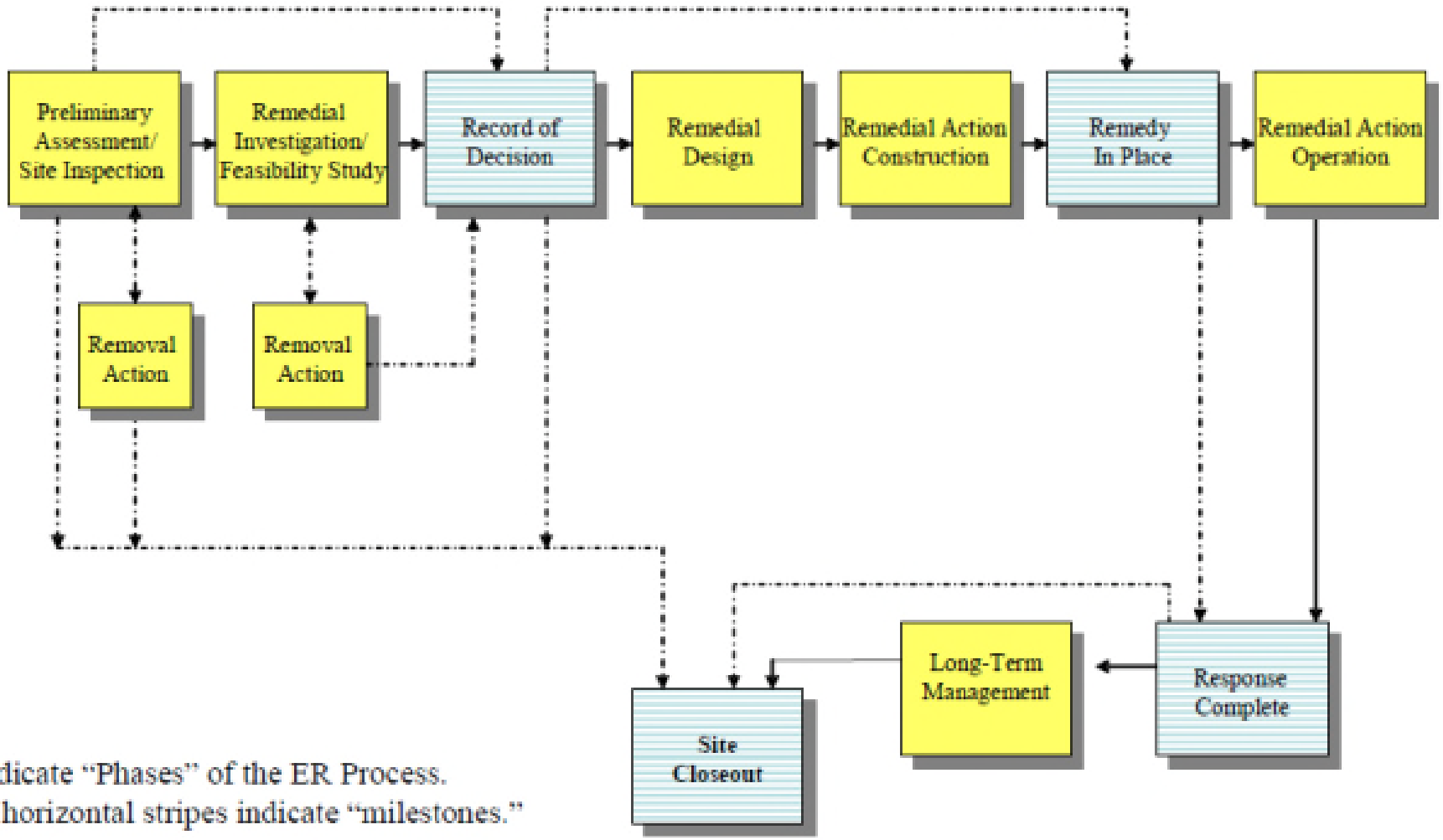
- Welcome Community and RAB Members
- Navy Environmental Restoration Status
- Perfluorinated Compounds (PFC)/Perfluoroalkyl Substances (PFAS) Status
- Questions for Navy
- Navy Closing Remarks
- Air National Guard Update
- EPA/Regulator Update
- RAB meeting adjournment

What is a RAB?

- A Restoration Advisory Board (RAB) is a stakeholder group that meets on a regular basis to discuss environmental restoration at a specific property that is either currently or was formerly owned by DoD, but where DoD oversees the environmental restoration process.
- RABs enable people interested in the environmental cleanup at a specific installation to exchange information with representatives of regulatory agencies, the installation, and the community.
- RABs may only address issues associated with environmental restoration activities.
- Health related issues are not addressed by the RAB. The Pennsylvania Department of Health will be available after the Navy and Air National Guard Environmental Restoration presentations.

Source: DoD RAB Rule Handbook

Environmental Restoration Program

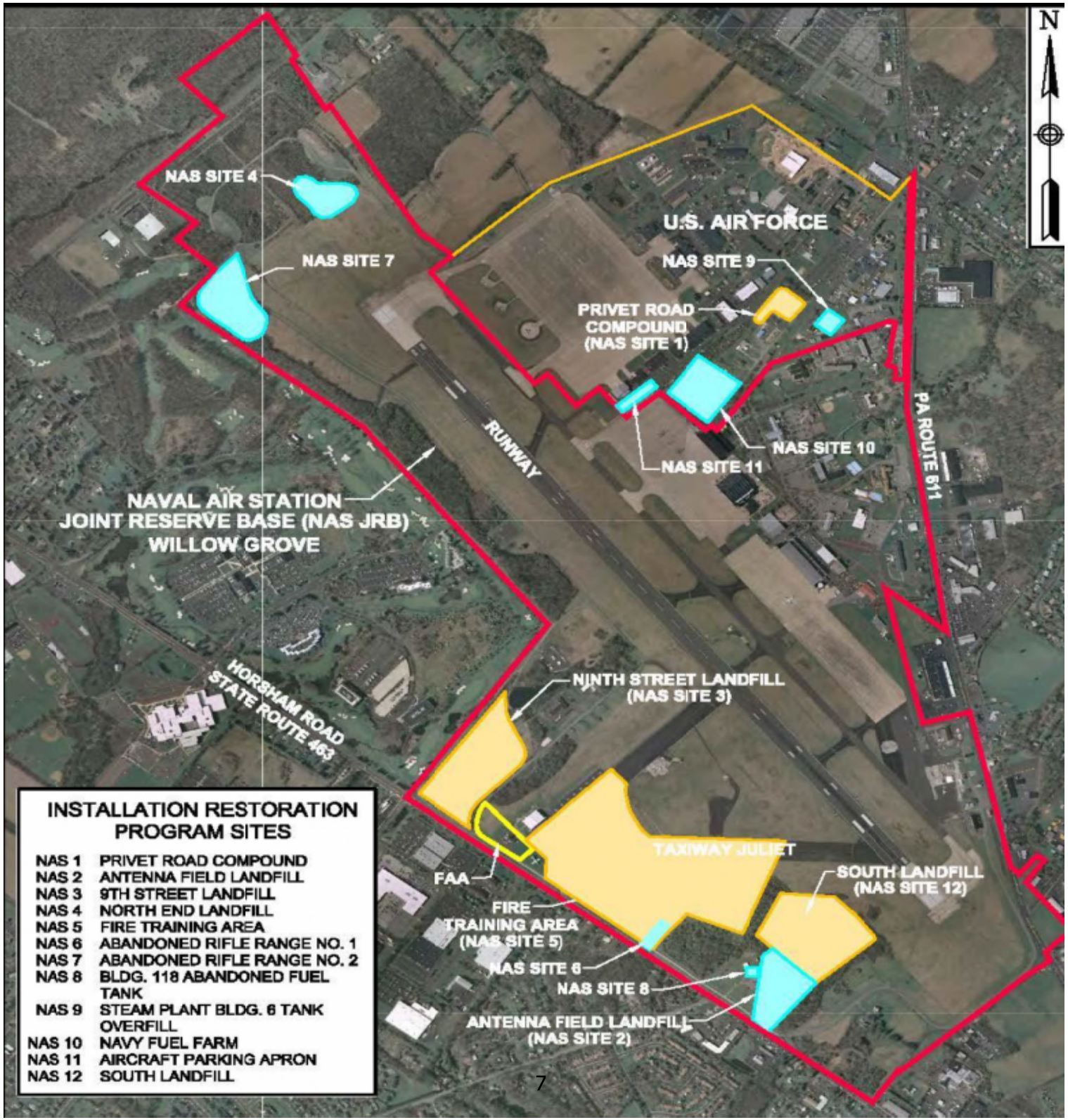


Notes:
Yellow boxes indicate "Phases" of the ER Process.
Boxes with blue horizontal stripes indicate "milestones."

Environmental Restoration Status

Environmental Restoration Sites

Site	Name	Operable Unit (OU)	Status
2	Antenna Field Landfill	Soil - OU 5 Groundwater - OU 9	No Action ROD Signed June 17, 2010
3	Ninth Street Landfill	Soil - OU 6 Groundwater - OU 10	RI Completed Oct. 2011/FS Pending
4	North End Landfill	. . .	Consensus Agreement for No Action Jan. 2009
5	Fire Training Area	Soil - OU 4 Groundwater - OU 2	Soil (OU 4) NFA ROD signed Sept. 2007 Groundwater (OU 2) ROD signed Sept. 2012 Groundwater (OU 2) RACR Signed Sept. 2014 Groundwater (OU 2) Final OPS and OM&M Plan May 2015
6	Abandoned Rifle Range No. 1	. . .	Consensus Agreement for No Action Dec. 2007
7	Abandoned Rifle Range No. 2	. . .	Consensus Agreement for No Action Aug. 2008
8	Building 118 Abandoned Fuel Tank	. . .	NFA Agreement Oct. 2006
SSA 11	Aircraft Parking Apron	. . .	Eliminated From Consideration
12	South Landfill	OU 11	Final RI Feb. 2014, FS to follow
PFCs/PFAS	Perflourinated Compounds/Per- and Polyfluoroalkyl substances	OU 12	TCRA Sept. 2015, Final PA/SI Mar. 2016, RI in progress.


N
NAS SITE 4
NAS SITE 7
U.S. AIR FORCE
NAS SITE 9
PRIVET ROAD COMPOUND (NAS SITE 1)
RUNWAY
NAS SITE 10
NAS SITE 11
PA ROUTE 611
NAVAL AIR STATION JOINT RESERVE BASE (NAS JRB) WILLOW GROVE
HORSHAM ROAD STATE ROUTE 463
NINTH STREET LANDFILL (NAS SITE 3)
TAXIWAY JULIET
FAA
SOUTH LANDFILL (NAS SITE 12)
FIRE TRAINING AREA (NAS SITE 5)
NAS SITE 6
NAS SITE 8
ANTENNA FIELD LANDFILL (NAS SITE 2)
INSTALLATION RESTORATION PROGRAM SITES
NAS 1 PRIVET ROAD COMPOUND
NAS 2 ANTENNA FIELD LANDFILL
NAS 3 9TH STREET LANDFILL
NAS 4 NORTH END LANDFILL
NAS 5 FIRE TRAINING AREA
NAS 6 ABANDONED RIFLE RANGE NO. 1
NAS 7 ABANDONED RIFLE RANGE NO. 2
NAS 8 BLDG. 118 ABANDONED FUEL TANK
NAS 9 STEAM PLANT BLDG. 6 TANK OVERFILL
NAS 10 NAVY FUEL FARM
NAS 11 AIRCRAFT PARKING APRON
NAS 12 SOUTH LANDFILL

Site 3 and Site 12 Landfills

- Both sites are former landfills used by the Base.
- Remedial Investigations showed elevated levels of metals and PAHs in surface and subsurface soils.
- Site 3 groundwater showed low levels of PCE.
- Feasibility Studies (FS) evaluated remedial alternatives.
- EPA/PADEP have reviewed drafts of both FS. Navy has prepared responses and is awaiting EPA/PADEP concurrence before finalizing the documents.
- Proposed Remedial Action Plans and Records of Decision (ROD) will be prepared in 2019.

Site 5 – Fire Training Area Groundwater

Site 5 Groundwater Remedial Action

- Anaerobic bioremediation system continues to operate successfully.
- Annual performance monitoring is being conducted in accordance with approved Operation, Maintenance, and Monitoring Plan.
  - Annual performance monitoring sampling conducted in May 2018
- Quarterly monitoring of anaerobic conditions conducted
  - Last monitoring conducted in November 2018
- Additional injections of amendments will be conducted based on monitoring results.
- Results continue to show good conditions for biodegradation of volatile organic compounds (VOCs) and decreasing trends of VOCs.

Perfluorinated Compounds (PFC)
Perfluoroalkyl Substances (PFAS)
Status

PFOA / PFOS Background

- In mid-2014, PFCs known as Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) were found in public drinking water wells near NASJRB Willow Grove through an EPA program known as the Unregulated Contaminant Monitoring Rule (UCMR).
- The health advisory levels at that time were 0.4 micrograms per liter (µg/L), or 400 parts-per trillion (ppt), for PFOA and 0.2 µg/L, or 200 ppt, for PFOS.
- PFOA/PFOS are man-made chemicals used in many products, including fire-fighting solutions known as aqueous film-forming foam (AFFF), which were used at NASJRB Willow Grove.
- In the summer of 2014, the Navy began sampling for PFOA/PFOS in private drinking water wells and worked with Horsham Water and Sewer Authority (HWSA) on the municipal drinking water wells.

PFOA / PFOS Background (cont.)

- In May 2016, the Environmental Protection Agency established a lifetime Health Advisory (HA) level of 70 parts-per-trillion (0.07 µg/L) for combined PFOA and PFOS.

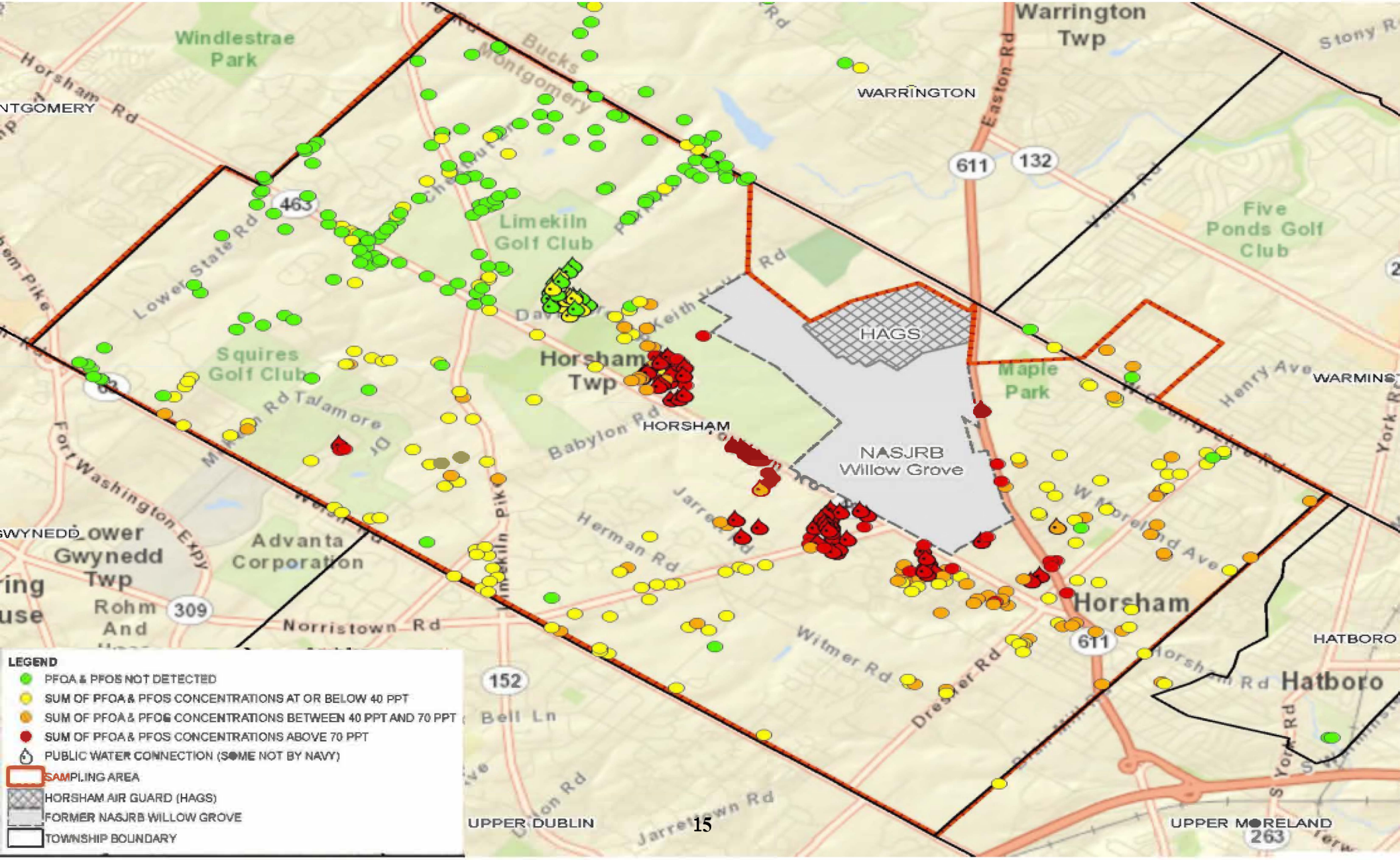
- The Navy's priority continues to be eliminating exposure to PFOA/PFOS above health advisory levels in drinking water.

- Any health concerns should be addressed with your health professional. Weblinks to health information is provided at the end of this presentation.

Private Drinking Water Well Sampling

- From 2014 – mid 2017, the Navy requested support from the EPA to sample nearby private drinking water wells for PFOA and PFOS.
- Private drinking water well sampling for PFOA/PFOS and provision of bottled drinking water is now being performed by Tetra Tech, a U.S. Navy contractor.
- The primary point-of-contact is:
  - **Mr. Andrew Frebowitz, Tetra Tech Project Manager**
  - **E-mail: andy.frebowitz@tetratech.com**
  - **Phone: (610) 382-1170**

Private Drinking Water Well Sampling



Summary of Drinking Water Actions

- Private drinking water wells sampled for PFOA/PFOS near NASJRB Willow Grove:
  - Private wells sampled: ~ 500
  - Private wells above lifetime HA (>70 ppt): 99
  - Private wells remaining to be connected: 11
  - Private wells below HA/monitored (>40 ppt): 64
- The Navy has funded filtration systems at five Horsham Water and Sewer Authority (HWSA) public wells (#10, 17, 21, 26, and 40) which are above the HA. All are back to drinking water service.
- The Navy has provided funds to HWSA for filtration system costs and drinking water connections above the HA. The total funding is nearly $18 million. Additional funds were provided in 2018.

PFAS Investigation

- The Navy is performing a Remedial Investigation (RI) to better understand the nature and extent of the PFAS contamination at the Navy base.
- Draft RI Data Report prepared November 2016.
  - Identified data gaps for further investigation
  - Additional field investigation performed in 2017
  - Source control actions are being developed from RI information
  - Copy available at Horsham Township Library
- A Draft Phase I RI Report will be issued for regulatory review this month.

PFAS Stormwater Evaluation

Outfalls/Storm Sewers

- Outfall sampling conducted in August 2017 showed PFOA/PFOS concentrations in northern outfalls to Park Creek and Pennypack Creek were significantly lower after a rain event.
- Outfalls along the northern end of the base that discharge to Park Creek have been closed. The retention basin has been modified to hold additional storm water. Additional actions are being evaluated.

PFAS Stormwater Evaluation (cont.)

Outfalls/Storm Sewers (continued)

- Stormwater system being evaluated to locate portions where contaminated groundwater may infiltrate and discharge to local surface water. Over two miles of storm sewer lines reviewed.
- A survey of the systems identified several storm sewer lines for remote TV inspections. Inspection was conducted in October 2018.
- A report with recommendations for storm sewer rehabilitation and inlet closures planned late December.

Phase II PFAS Investigation

- Work Plans in Development
- Scoping Session with Regulators planned in December
- Focused on source areas identified in phase I.
  - Aircraft Maintenance Facilities
    - Draft Pilot Test Work Plan submitted to EPA/PADEP in Nov. 2018
  - Former Fire Training Area
    - Pilot Test Work Plan in preparation

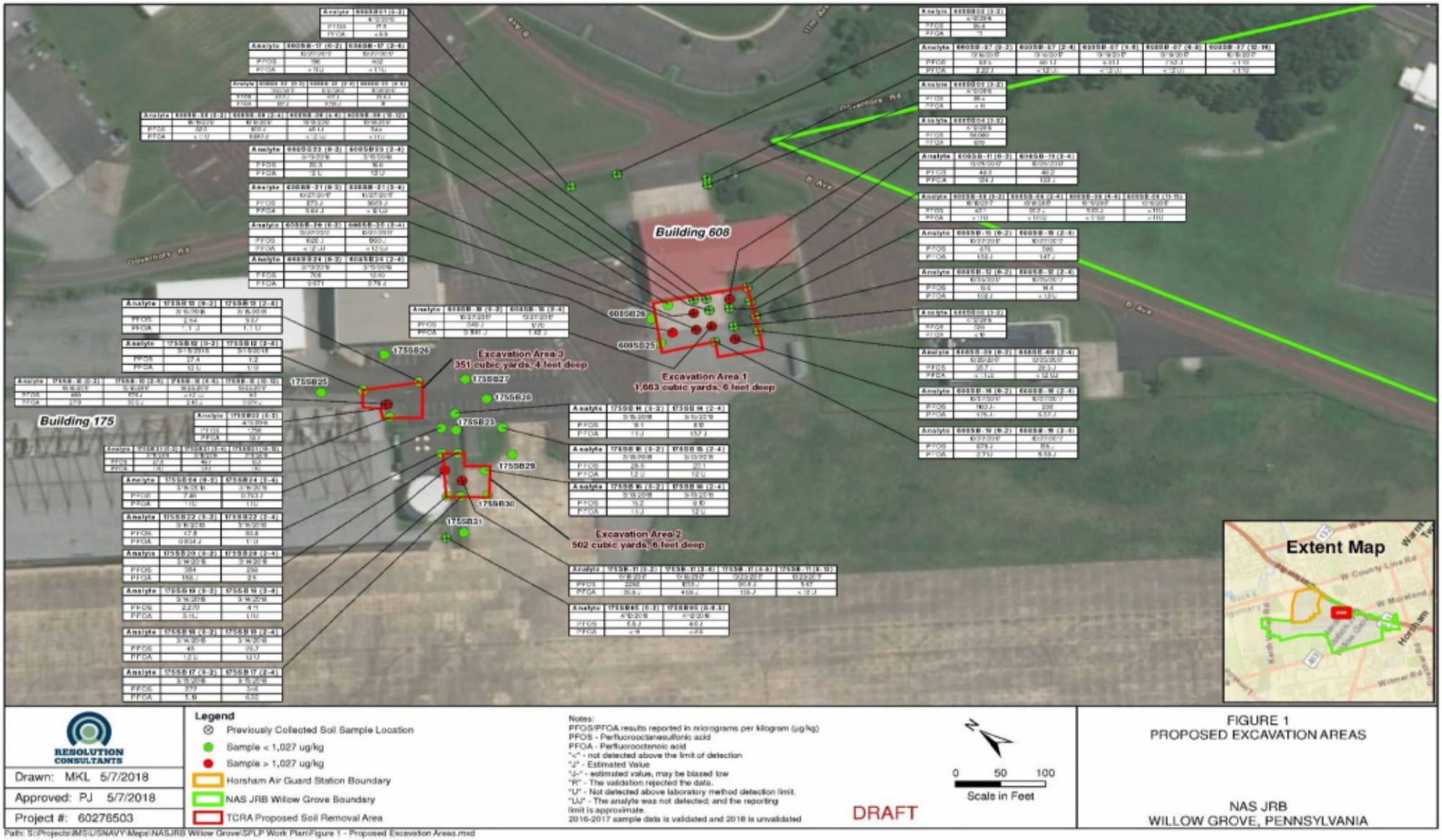
Phase II PFAS Investigation (cont.)

- The Phase II investigation includes, but is not limited to:
  - Additional monitoring wells and soil sampling in source areas
  - Evaluation of groundwater extraction and treatment systems
  - Further evaluation of on-base storm water systems
  - Periodic surface water monitoring

PFAS Removal Action

- A removal action to excavate soils with high levels of PFAS began in November and is expected to complete in January 2019.
- Soil is planned to be disposed at a RCRA Subtitle D lined landfill in central New Jersey.
- Soil-to-Groundwater leachability criteria for PFOA and PFOS have not been established.
- In the absence of established leachability criteria for soil, a statistical analysis was performed to identify the extent of removal. PFOS had the highest magnitude concentrations detected at the site in both soil and groundwater and was the focus of the statistical analysis.
- 1,027 µg/kg (or 1 mg/kg) for PFOS was calculated as the 95th upper percentile level and is used to establish the removal action boundaries
- The Time-Critical Removal Action Memorandum and work plan is available in the administrative record or the library.

PFAS Removal Action (cont.)



PFAS Removal Action (cont.)

PFAS Removal Action (cont.)

Participation in DOD Funded PFAS Research

- SERDP/ESTCP are environmental research programs funded by the U.S. DOD.
- NASJRB Willow Grove has supported ~$1.87M of SERDP funded research investigating new PFAS assessment and potential remediation technologies being completed by several nationwide universities and contractors.
- Potential participation in additional >$1M of SERDP/ESTCP PFAS related research over the next 12-months and beyond.

- SERDP Projects and Universities or Companies Leading Research:
  - ER18-1306 – Clarkson University
  - ER18-1599 – Clemson University
  - ER18-1515 – Auburn University
  - ER18-1570 – Drexel University
  - ER18-1593 – Geosyntec Consultants
  - ER18-1603 – Jacobs Engineering
  - ER18 1545 – University of Rhode Island
- NASJRB Willow Grove or NAWC Warminster may be considered for other SERDP/ESTCP PFAS research projects.

Additional information can be found on DOD's SERDP/ESTCP website:
https://www.serdp-estcp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater/Emerging-Issues

PFAS Information and Resources

Department of the Navy (DON) Perfluorinated Compounds (PFC) / Perfluoroalkyl Substances (PFAS) website

http://www.secnav.navy.mil/eie/pages/pfc-pfas.aspx#

NAVFAC BRAC PMO Websites (includes links to environmental information and the administrative record):

- http://bracpmo.navy.mil/brac_bases/northeast/reserve_base_willow_grove/documents.html
- http://bracpmo.navy.mil/brac_bases/northeast/former_warfare_center_warminster/documents.html

A subscription service is available on these websites to receive e-mail notification of new information.

PFAS Information and Resources (continued)

Environmental Protection Agency
https://www.epa.gov/pfas

Agency for Toxic Substances and Disease Registry
https://www.atsdr.cdc.gov/pfc/index.html

Pennsylvania Department of Environmental Protection
http://www.dep.pa.gov/Citizens/My-Water/drinking_water/Pages/default.aspx

Horsham Township
http://www.Horsham.org/default.aspx

Warminster Township
http://warminstertownship.org/information-on-perfluorinated-chemicals-pfoa-and-pfos/

PFAS Information and Resources (continued)

Horsham Water and Sewer Authority

https://www.horshamwater-sewer.com

Warminster Township Municipal Authority

https://www.warminsterauthority.com/

Pennsylvania Department of Health

http://www.health.pa.gov/My%20Health/Environmental%20Health/Pages/default.aspx

NASJRB Willow Grove

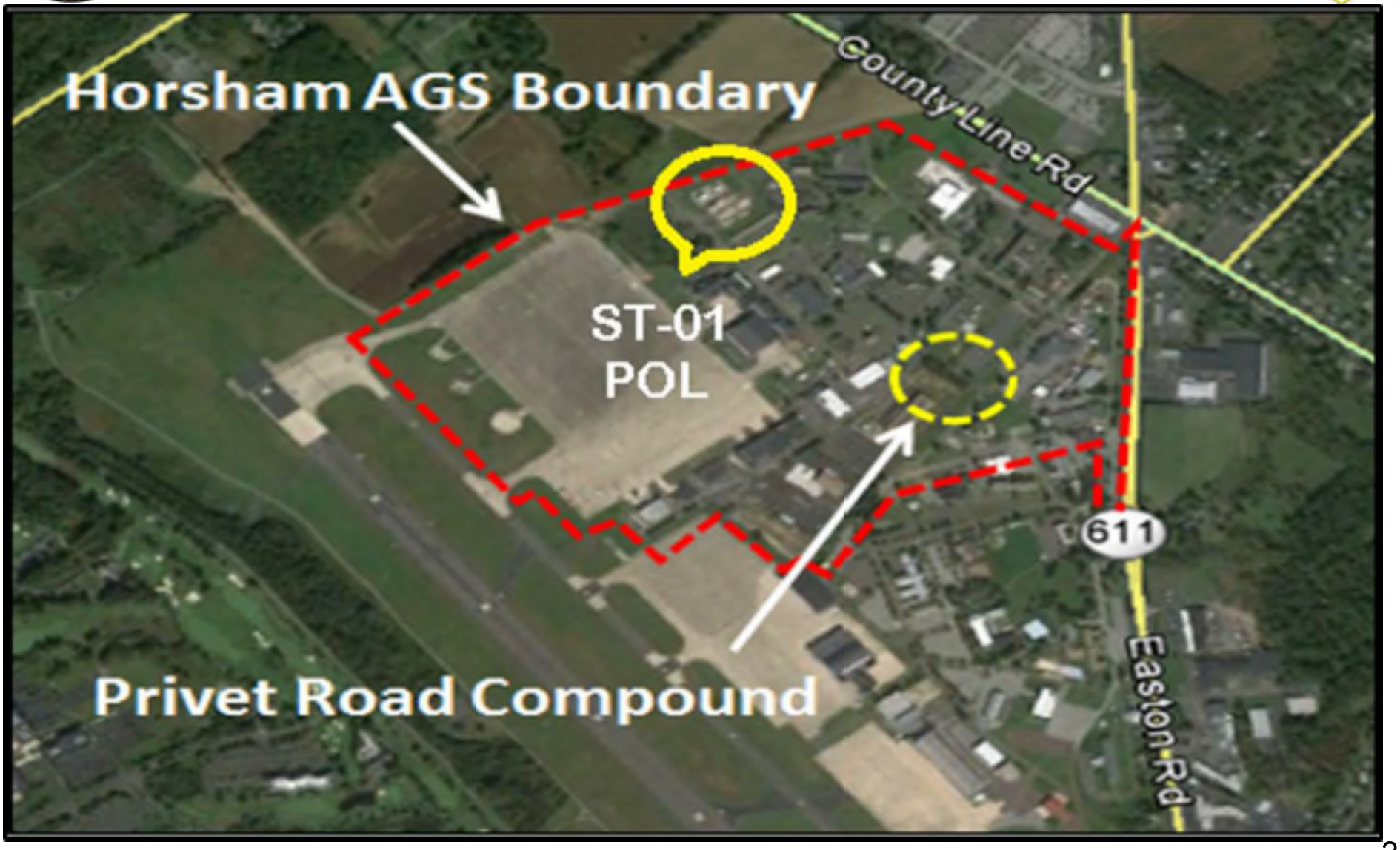
- Questions or comments from the RAB?
- Community questions or comments?
- Future RAB Meetings
  - March 14, 2019 @ 6:00 p.m. (Thurs.)
  - May 30, 2019 @ 6:00 p.m. (Thurs.)
- Closing Navy Remarks

Restoration Advisory Board Horsham Air Guard Station

Keith Freihofer
NGB/A4OR

12 December 2018

Environmental Restoration Program Sites



Air Force Reserve ST-01 POL

- Former Air Force Reserve Petroleum Tank Area
  - Originated from a jet fuel spill in the 1970's
  - Injections of persulfate and Epsom salt replaced the biosparge system in 2016
  - Petroleum tanks were dismantled in 2016
    - Disposed 175 tons of petroleum impacted soil at licensed facility
    - Confirmatory sampling contract underway in accordance with 25 Pennsylvania Code, Section 245.310 of the Department of Environmental Protection (DEP)'s Rules and Regulations
- Results will be provided in a Supplemental Remedial Investigation Report and a Site Characterization Report in accordance with:
  - Closure Requirements for Aboveground Storage Tank Systems Technical Guidance Number 263-4200-001 (PADEP, 2017)
  - Pennsylvania Code, Chapter 245-310 Site Characterization Report

- POC: Ms. Margaret Patterson: margaret.patterson@us.af.mil

Privet Road Compound

- Former waste management area for Naval Air Station Joint Reserve Base Willow Grove
- Sampling completed in 2017 indicates trichloroethene (TCE) and tetrachloroethene (PCE) exist in the groundwater but levels are below maximum contaminant levels (MCL) set by the U.S. Environmental Protection Agency for drinking water quality
- Leidos, Inc. is contracted for continued long-term monitoring. Biannual groundwater sampling and land use control inspections will continue to be conducted pending a final site remedy
- Second Five-Year Review for Privet Road groundwater contamination was finalized in September 2018 and is available on the ANG Admin Record

PFOS/PFOA on Horsham AGS

- In 2015, ANG completed a Preliminary Assessment of potential PFOS/PFOA release sites at the Horsham Air Guard Station (AGS). Ten potential source areas identified in the PA include:
  - Buildings that contained foam fire suppression systems
  - Areas that may have received runoff from foam releases
  - Stormwater sediment basin
  - Former waste water treatment plant
  - Former storage area for wastewater treatment sludge
  - These potential source areas are being further investigated by Leidos in a PFOS/PFOA Facility Investigation

Potential PFOS/PFOA Source Areas

Field Investigation Update

- GW sampling event conducted in March 2018
- Joint gauging event conducted 8-9 March 2018
- Baseflow SW sampling conducted 19 March 2018
- Rain event SW sampling conducted 28-29 June 2018

Reporting Update

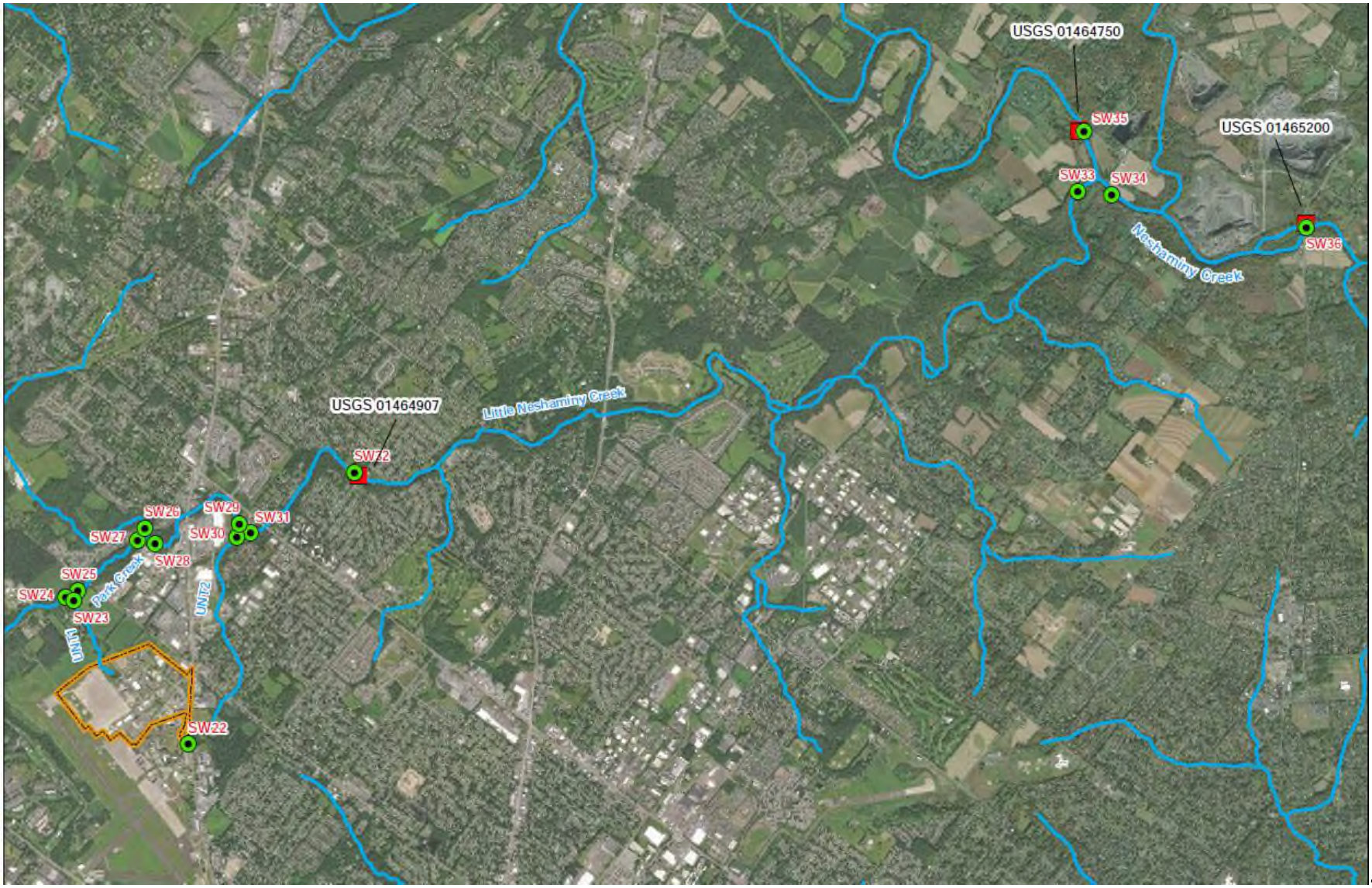
- Documents available on Administrative Record
  - Final Facility Investigation Report
  - Final Groundwater Monitoring Reports for December 2017 Sampling Event
  - Final Groundwater Monitoring Reports for March 2018 Sampling Event.
  - http://afcec.publicadmin-record.us.af.mil/Search.aspx
- Draft Final Stormwater Study Tech Memo submitted September 2018. Awaiting comments from EPA.
- Final Conceptual Design Report submitted to ANG.
- NPDES application submitted to PADEP 28 August.
  - Public notices submitted to township, county, and local newspaper
  - Awaiting comments from PADEP.

Surface Water Data Findings

- Study results indicate widespread detections of PFCs at Horsham AGS and in the regional watershed.
- The highest concentrations are observed within Horsham AGS and, in general, decrease with distance from Horsham AGS.
- Conclusions include:
  - Elevated PFC concentrations flow onto Horsham AGS from Willow Grove. At SW04 flows continue in dry weather.
  - Discharge of contaminated groundwater occurs within Horsham AGS and offsite.
  - Basin treatment system reduces (but does not eliminate) PFC concentrations discharges from the basin.
  - Concentrations increase downgradient of confluences with tributaries closer to Horsham AGS. PFCs also detected in upstream sample locations prior to confluence with impacted streams.
  - Potential residual sources contributing to PFC concentrations at sampling locations

Surface Water Sampling Locations

Surface Water Sampling Locations



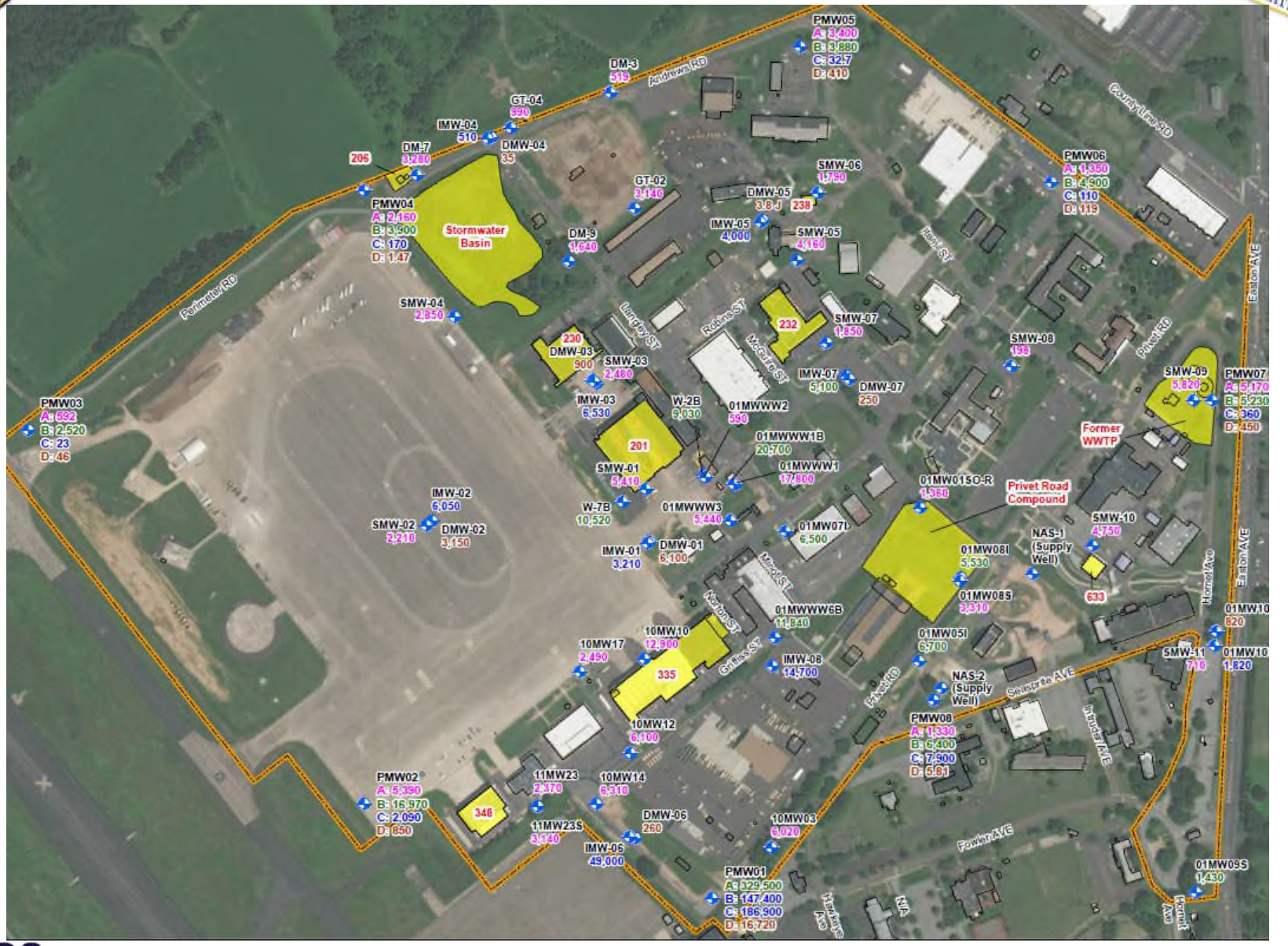
Surface Water: Recommendations

- Additional investigation to further characterize the nature and extent of PFC contamination to surface water at Horsham AGS.
- Evaluate the source of PFCs at interior sampling locations. Likely due to infiltration of contaminated groundwater, but need to evaluate the potential for residual sources at Horsham AGS.
- Additional investigation to determine the source of PFCs at locations SW12, SW13, SW14, SW20, and SW21.
- Enhanced treatment of surface water discharge from Basin.

Groundwater Data Update

- Gauging conducted 8-9 March 2018
  - Semi-confined multilayer aquifer system, subdivided into four zones for contouring
  - Gradients trends northwest in each zone
- Sampling event conducted 5-15 March, 2018
  - Concentrations similar to previous events
  - 78 of 85 locations exceeded 70 ng/l (combined PFOA/PFOS)
  - Highest concentrations found in three general areas: along the southern boundary, near Building 335, and near Building 201.
  - Highest concentrations at PMW01, Zones A, B, and C: 329,500 ng/l, 147,400 ng/l, and 186,900 ng/l, respectively.
  - Next highest concentration at IMW-06 (49,000 ng/L) along the southern boundary).
  - Four wells near Buildings 201 and 335 contained concentrations above 10,000 ng/L.
- No additional sampling or gauging planned at this time.

GW Results: March 2018



PFOS/PFOA in Surface Water on Horsham AGS

- PFOS/PFOA has been detected in surface water leaving the Horsham Air Guard Station. This water flows from a storm water detention basin on the northwest boundary of the Base to Park Creek which flows to the Little Neshaminy Creek.
  - ANG is taking action to reduce this release of PFOS/PFOA to the Creek:
    - An updated carbon filtration system was installed on the outfall in August 2018 replacing the original system from September 2017.
    - The system is designed to reduce dry weather flow PFOS/PFOA concentrations to below 70 PPT. Most recent sampling indicates effluent from the system is 7 PPT for PFOS and PFOA.
    - Additional funding was received in September 2018 to increase capacity of the surface water treatment system and improve efficiency of the stormwater basin.

PFOS/PFOA in Drinking Water

- The Air National Guard has a $13.5 million Cooperative Agreement with Warrington Township to:
  - Connect residents with PFOS/PFOA impacted drinking water wells above the Health Advisory to municipal water and abandon the impacted private wells
  - Install water mains as needed
  - Installation and maintenance of carbon filters on five Township wells
  - Install municipal water system interconnections with North Wales Water Authority to ensure Warrington Township has adequate access to water until carbon filtration is installed on municipal wells

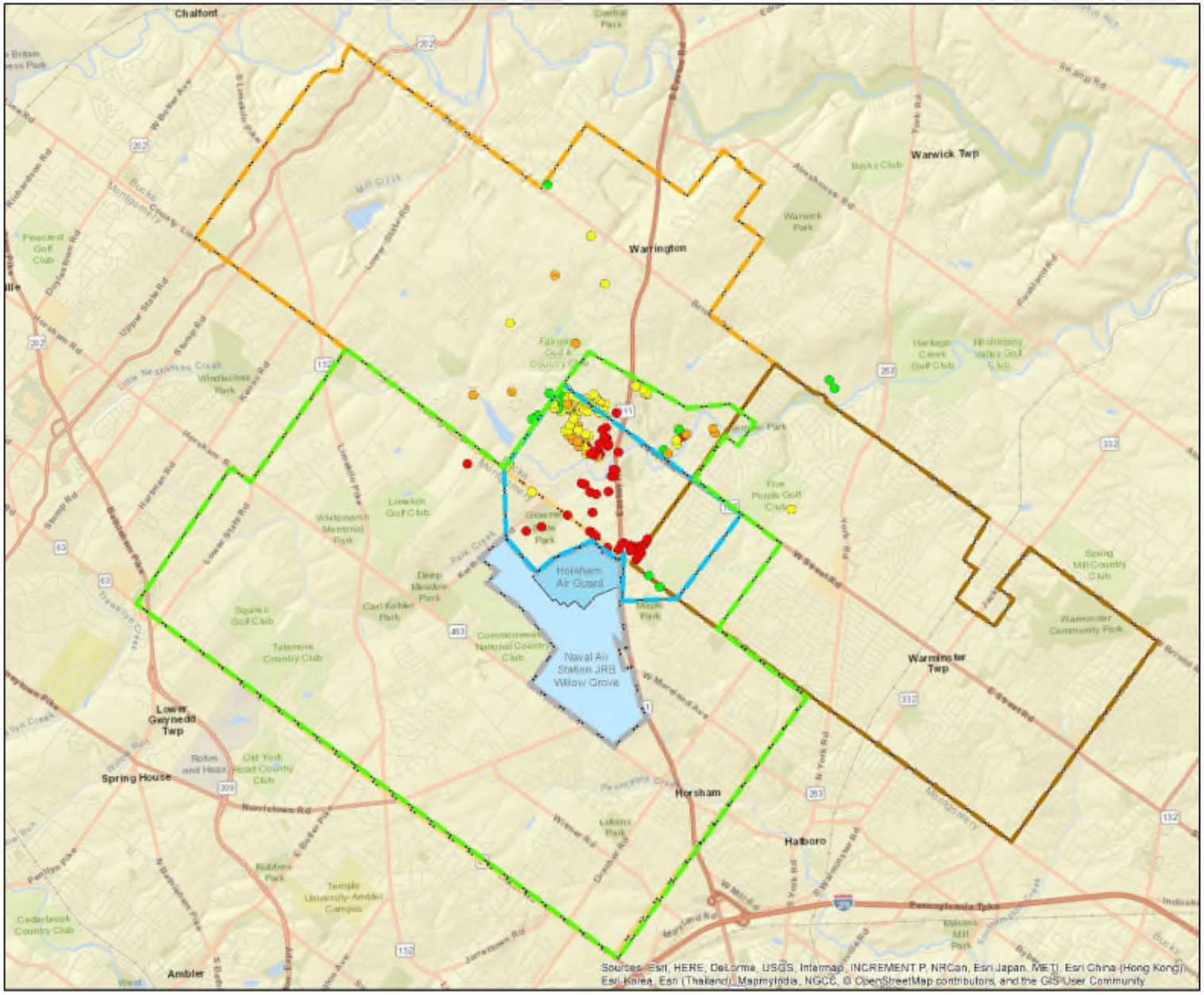
Private Well Sampling

- ANG has contract in place with Wood (formerly Amec Foster Wheeler) to provide PFOS/PFOA testing of private drinking water wells and supply bottled water to properties with PFOS/PFOA at or above the lifetime health advisory level (HAL) for residents within our area of responsibility in Horsham, Warminster, and Warrington
  - The number of private wells sampled by ANG are:
  - Horsham: 5, all above HAL; 4 have been connected to municipal water (remaining one not in use)
  - Warrington: 150, 46 are above HAL; 33 have been connected
  - Warminster: 12*, 11 are above HAL; 8 have been connected

    *Some of these properties are on Valley Road with Warminster mailing addresses but are located in Warrington Township
- Sampling contact for ANG area of responsibility: David Side at david.side@woodplc.com or (610) 877-6111

UNCLASSIFIED

Private Well Sampling Map



PFC Sample Location Map
as of April 2018

Horsham Air Guard Station
Horsham and Warrington Township

Legend

Health Advisory Level (HAL)
HAL is the sum of both PFOA+PFOS
(PFOA 0.070 ug/L, PFOS 0.70 ug/L)

- Sum of PFOA+PFOS concentrations above 0.070 ug/L
- Sum of PFOA+PFOS concentrations detected between 0.040 ug/L and 0.070 ug/L
- Sum of PFOA+PFOS concentrations detected at or below 0.040 ug/L
- PFOA & PFOS not detected
- Horsham Air Guard
- Former NAS JRB Willow Grove
- Sampling Area
- Air Force Administrative Order Boundary
- Horsham Township
- Warrington Township
- Warminster Township

Notes & Sources

Sources:
Street Base Map hosted by ESRI.

0 1,950 3,900 7,800 11,700 15,600 Feet

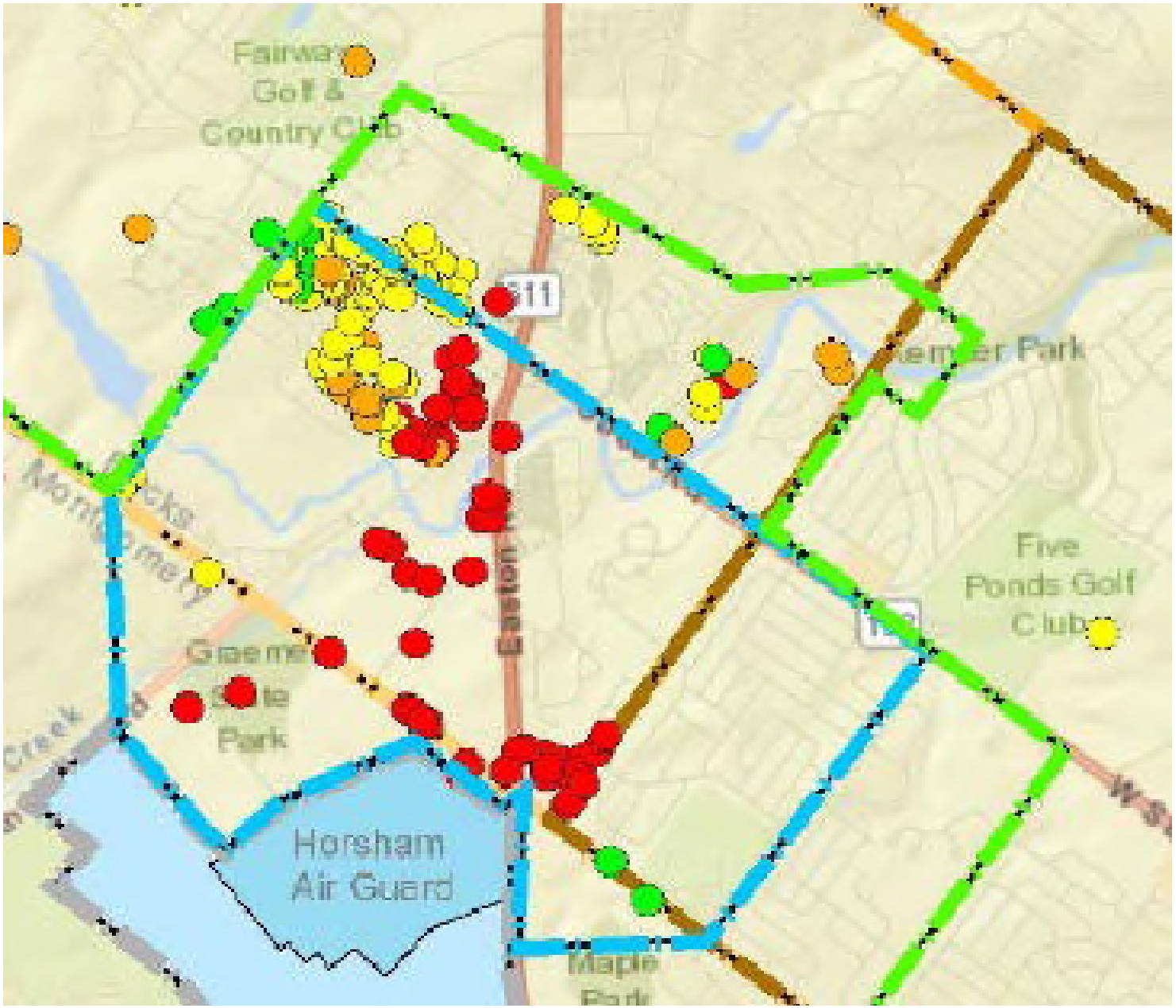
N

wood.

Wood
Environment & Infrastructure, Inc.
751 Arbor Way
Blue Bell, PA 19422
(610) 828-8100

Figure
2

Private Well Sampling Map



Questions?

Keith Freihofer
keith.e.freihofer.civ@mail.mil
240-612-8762

Air National Guard Administrative Record:
http://afcec.publicadmin-record.us.af.mil/Search.aspx
select “Air National Guard”, then “Horsham AGS”, then click Search