



## ***Welcome to the RAB Meeting!***



Thank you for joining the  
Restoration Advisory Board (RAB) Meeting for NASJRB  
Willow Grove and the Biddle Air National Guard Base

The meeting will start at 6:00 p.m.

For closed captioning, select Panel Options icon (3 dots)  
and select Multimedia Viewer.

If you are experiencing technical difficulties, contact  
WebEx by telephone at 1-866-779-3239.



## *Virtual Meeting Instructions*



- The virtual meeting will show the presentations
- The presenters will be audio only

### **Questions:**

- Via telephone and e-mail prior to the meeting
- Q&A Feature available in WebEx
- BRAC PMO, ANG, EPA, and PADEP contacts after meeting
  
- WebEx sign-in names will be used for the record



## ***RAB Meeting Agenda***



- 
- |         |  |
|---------|--|
| 6:00 pm | Meeting starts   |
| 6:10 pm | Navy Environmental Restoration Presentation                    |
| 6:30 pm | RAB member or community comments/questions                     |
| 6:50 pm | Air National Guard Environmental Restoration Presentation      |
| 7:00 pm | RAB member or community comments/questions                     |
| 7:20 pm | Regulator comments   |
| 7:30 pm | RAB member or community comments/questions                     |
| 7:40 pm | Environmental updates conclude. Health professionals available |
| 8:00 pm | Virtual Meeting conclusion                                     |
-

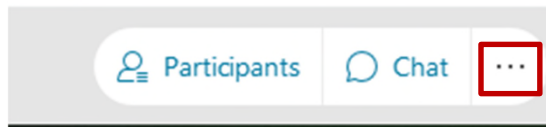


## HOW TO ASK A QUESTION



### On a Computer

1. In the bottom right of the screen, click on 3-dot 'Panel Options' icon



2. On the menu, click Q&A



3. Type your question/comment in the box

4. Click Send

### On a Mobile Device

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3. On iOS, More Options icon is 3 horizontal dots 

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5. Type your question in the box

6. Click Send



# **NASJRB Willow Grove**

**Restoration Advisory Board (RAB)**

**10 March 2021**

# *Navy Presentation*



- RAB background
- Environmental Restoration Status
- Per- and Polyfluoroalkyl Substances (PFAS)
- Action summary
- Questions

# RAB Meeting Background



- 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 Department of Defense (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.
- The community co-chair position is vacant. Please contact the BEC if you are interested.
- Health related issues are not addressed by the RAB. Health agency professionals will be available after the Navy and Air National Guard Environmental Restoration presentations.

Source: DoD RAB Rule Handbook

# **Environmental Restoration Status**



# Site 3 and Site 12 Landfills



- Proposed Remedial Action Plan (PRAP) Public Comment Period
  - Navy finalized the proposed plans in August 2020.
  - Initial 45-day public comment period from September 10 to October 25, 2020, for submittal of written comments was extended through November 25, 2020.
- Record of Decisions
  - The draft Record of Decisions for both Site 3 and Site 12 were provided for regulatory review in February 2021.
  - Record of Decision is expected to be completed by June 2021.
- Additional Groundwater Sampling
  - The EPA requested additional groundwater sampling for dioxins and chromium at Site 12. The SAP was submitted for regulatory review in December 2020.

# Site 5 Groundwater

## Remedial Action

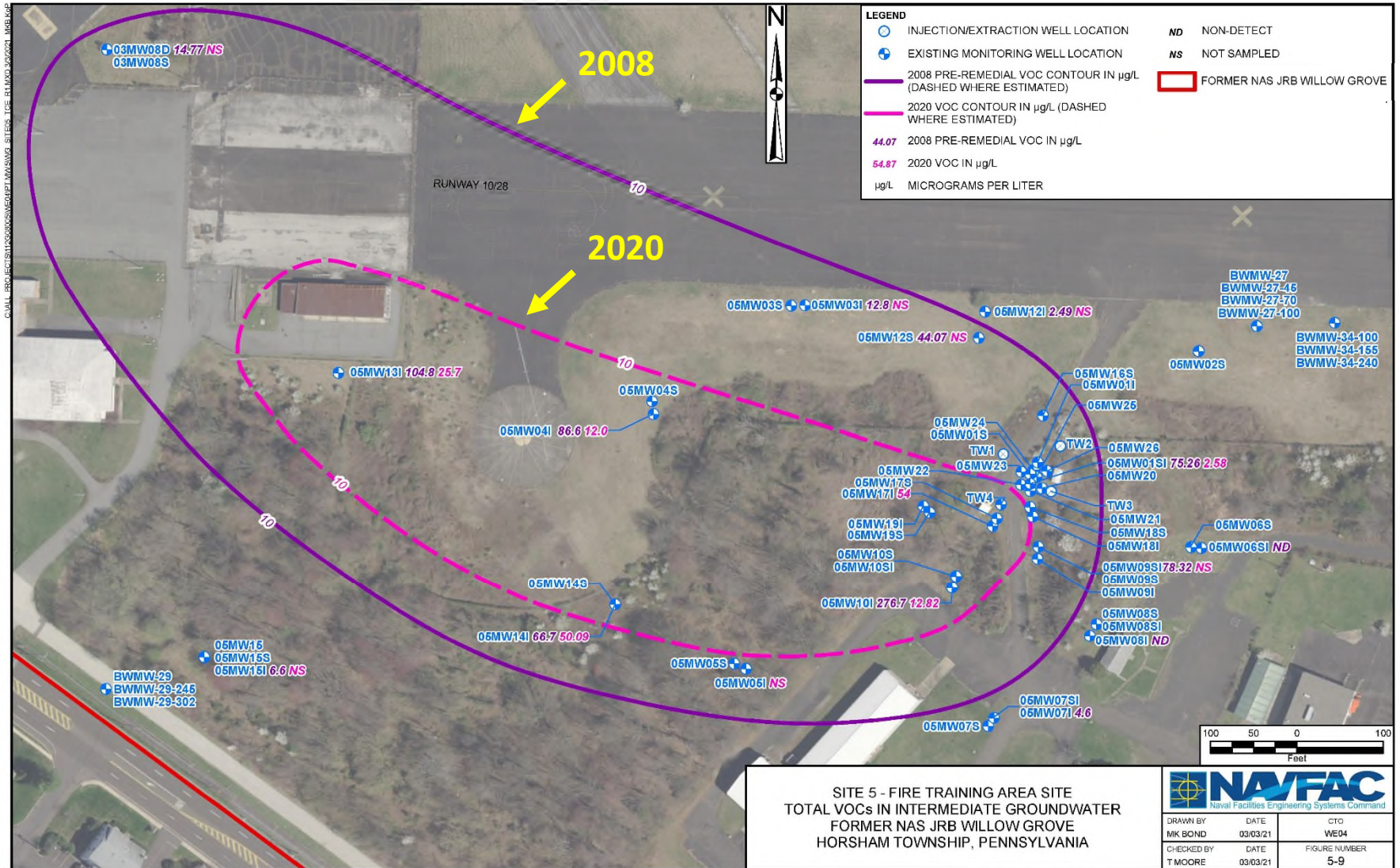


- Anaerobic bioremediation system continues to operate successfully.
- Annual performance monitoring is being conducted in accordance with approved Operation, Maintenance, and Monitoring Plan.
  - December 2020 – Injections of amendments.
  - February 2021 – Quarterly PIM monitoring was performed.
- Results continue to show good conditions for biodegradation of the volatile organic compounds (VOCs) and decreasing trends of the parent VOCs (PCE and TCE).
- Addition of amendments will now be conducted twice per year to ensure consistent conditions are maintained.
- Annual report is currently being reviewed by the regulators.
- The following figure shows the reduction in plume size since implementation of the remedy.

# Site 5 Groundwater VOC Reduction



Preliminary



**Per- and  
Polyfluoroalkyl  
Substances  
(PFAS)**

# Summary of Drinking Water Actions



*Due to the rise in COVID-19 cases in the region, private well sampling will only be from outside spigots/faucets until at least April 2021. Affected property owners are being notified.*

- The Navy has provided funds to HWSA for filtration system costs and drinking water connections above the HA. The total funding is over \$18 million. Additional funds were provided in 2019.
- The Navy has funded filtration systems at five Horsham Water and Sewer Authority (HWSA) public wells (#10, 17, 21, 26, and 40) which were found to be above the HA. All are back to drinking water service, some are being modified with improved treatment systems.
- Sampling was temporarily suspended March – June 2020 due to COVID-19. Since sampling resumed in June 2020, 244 private wells were sampled and provided validated results, none were above the LHA.

Private well sampling (as of 2 March 2021)	Current
Private wells sampled for PFOA/PFOS *	<u>569</u>
Private wells above lifetime HA (>70 ppt)	102
Private wells not yet connected **	7
Private wells below HA/monitored (>40 ppt) ***	<u>81</u>

\* Includes 102 wells sampled in Warrington, now managed by Air National Guard

\*\* This include rejected connection offers and connections inprogress

\*\*\* Some monitored wells are now below 40 ppt



# Private Drinking Water Well Sampling Area



Private drinking water well sampling for PFOA/PFOS and provision of bottled drinking water is being performed by Tetra Tech, a U.S. Navy contractor.

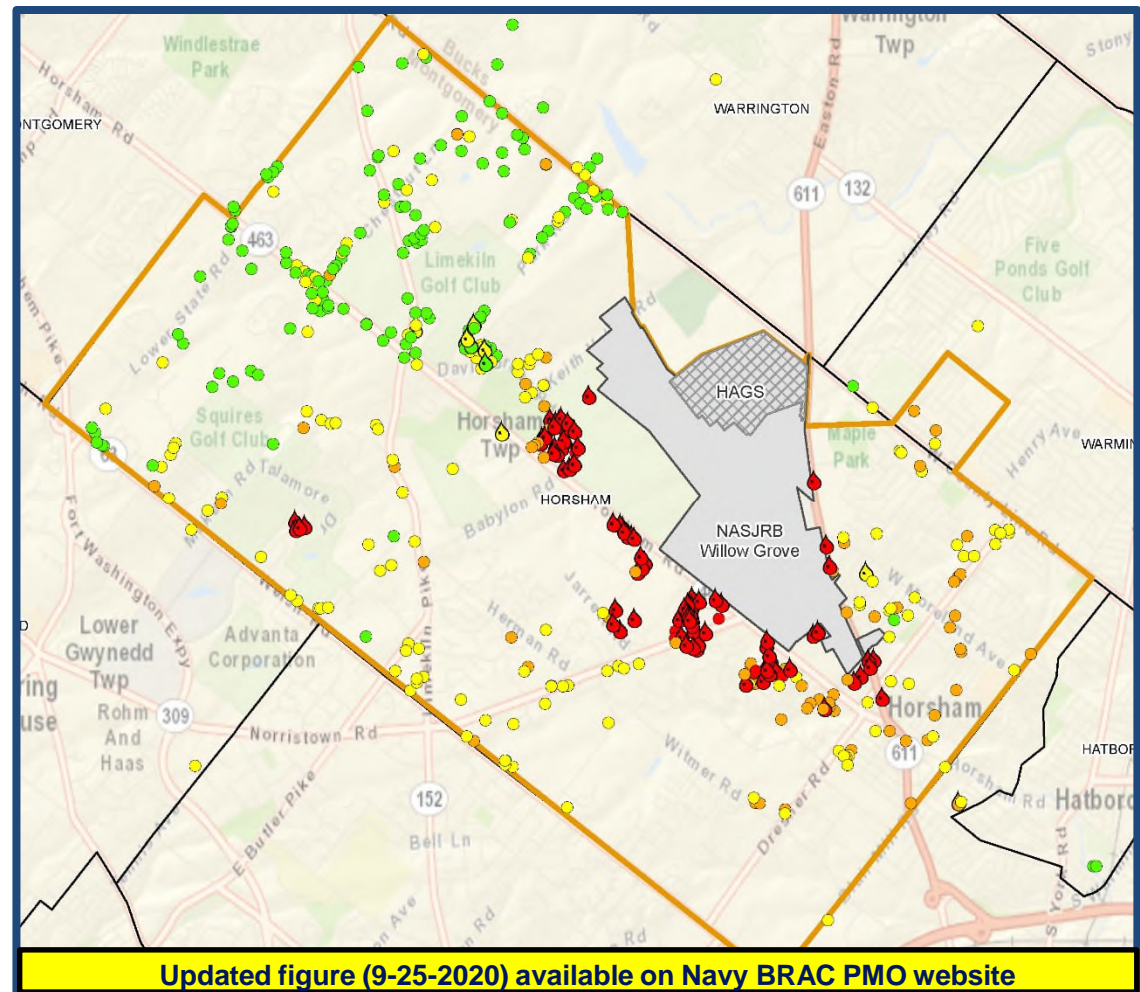
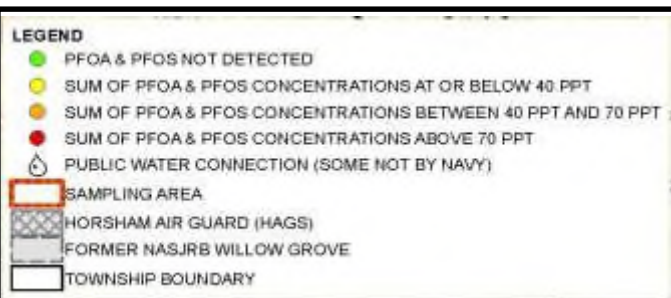
Point-of-contact is:

Tricia Moore

Tetra Tech Project Manager

[tricia.moore@tetrattech.com](mailto:tricia.moore@tetrattech.com)

Phone: (610) 382-1171



A simplified figure, without connected properties shown, is being prepared for May 2021 RAB Meeting.

# ***PFAS Investigation***

## ***Overview***



- The Navy completed a Phase I remedial investigation in October 2019. Data gaps are being addressed in Phase II (see backup for more information).
  
- PFAS Phase II investigation includes, but is not limited to:
  - Periodic surface water and sediment monitoring.
  - Evaluation of groundwater extraction and treatment systems using pilot test information.
  - Limited evaluation of PFAS treatment technologies.
  - Installation of additional monitoring wells and soil sampling.
  - Sampling of off-base monitoring wells.
  - Further evaluation of on-base storm water systems.

# ***Phase II PFAS Investigation***

## ***Surface Water / Sediment Monitoring***



- Quarterly surface water sampling event (Round 6) was performed January 11 and 12, 2021. Results are currently being validated, preliminary results appear consistent with other sampling rounds.
- The Navy will continue quarterly sampling in cooperation with the Air National Guard. USGS will support the sampling efforts. Next event being planned for mid-March 2021.
- Annual report, which includes results from July/October 2019 and January/May 2020 sampling events, and the Round 5 surface water/Round 2 sediment sampling event technical memo are being drafted. Results from these events have been posted to BRAC PMO website.
- The Navy funded the USGS to install additional stream flow gages to assess mass loading at select sampling locations. USGS will present further information at the May 2021 RAB, initial information is provided on the next few slides.



# Phase II PFAS Investigation

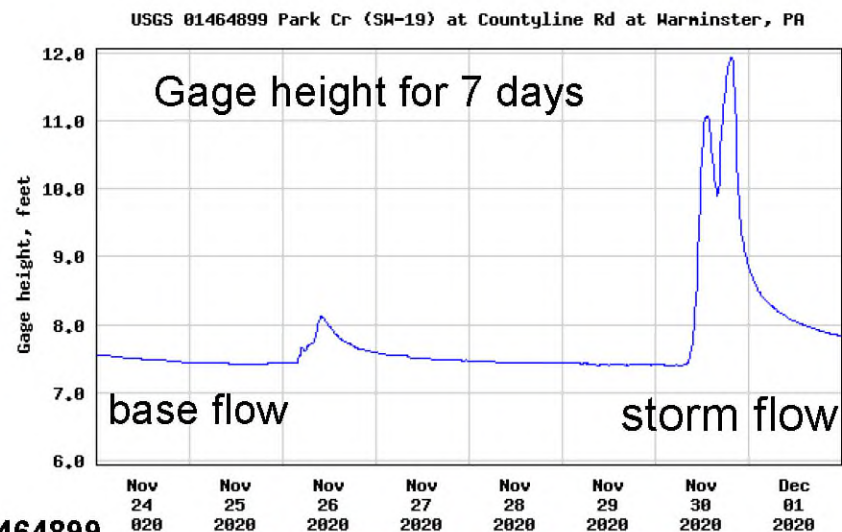
## USGS Stream Gaging (Flow Volume) Support



**NEW continuous stream gage, 2020**

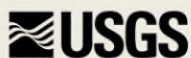


**Gage height, feet**  
Most recent instantaneous value: 7.91 02-17-2021 20:15 EST



---- Provisional Data Subject to Revision ----

[USGS 01464899 Park Cr \(SW-19\) at Countyline Rd at Warminster, PA](https://waterdata.usgs.gov/nwis/uv/?site_no=01464899)



URL [https://waterdata.usgs.gov/nwis/uv/?site\\_no=01464899](https://waterdata.usgs.gov/nwis/uv/?site_no=01464899)



# Phase II PFAS Investigation

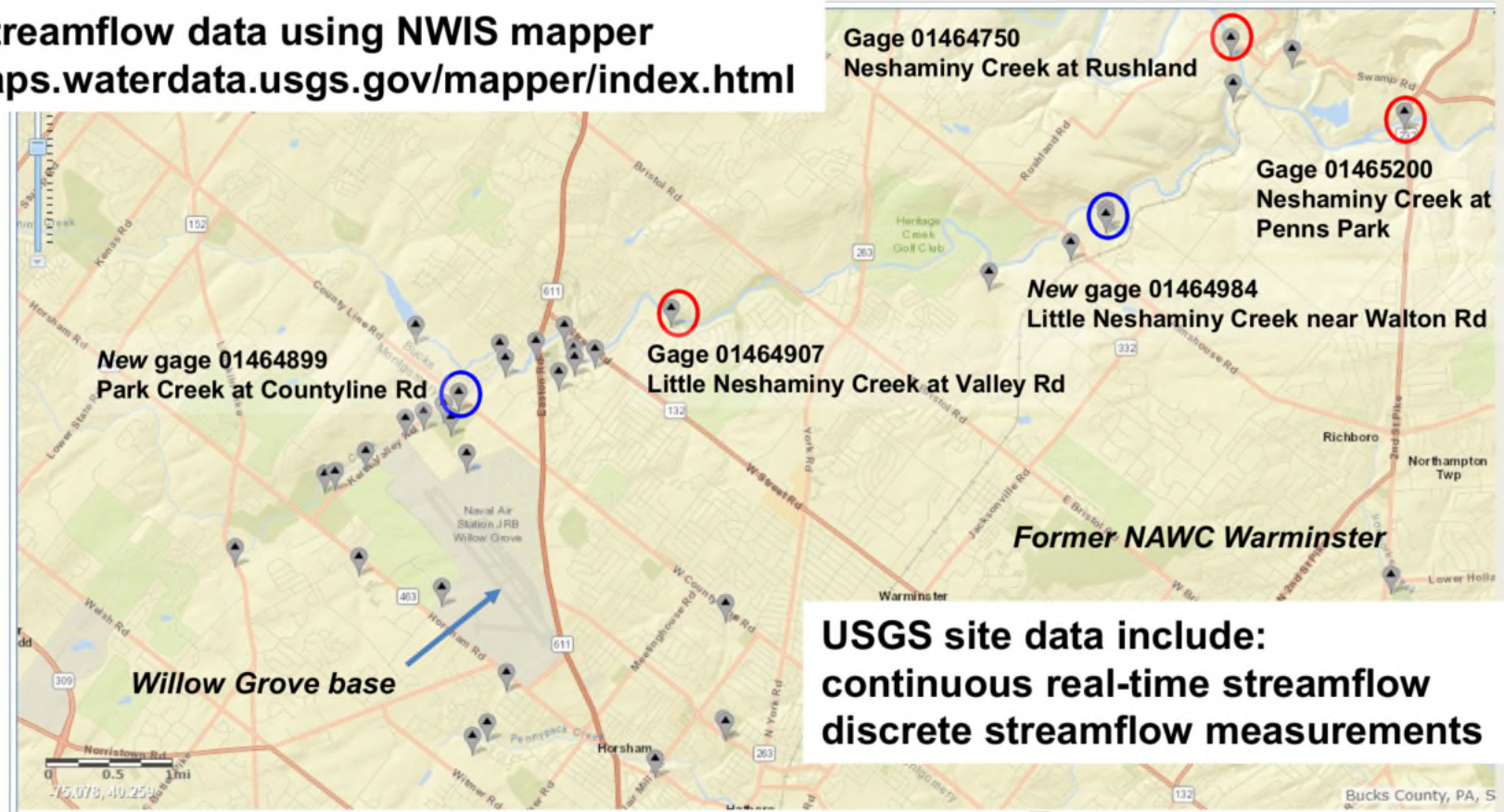
## USGS Stream Gaging (Flow Volume) Support



science for a changing world

National Water Information System: Mapper

Access streamflow data using NWIS mapper  
<https://maps.waterdata.usgs.gov/mapper/index.html>



USGS site data include:  
continuous real-time streamflow  
discrete streamflow measurements



# Phase II PFAS Investigation

## USGS Stream Gaging (Flow Volume) Support



Access data through NWIS, see URL <https://waterdata.usgs.gov/nwis>

Map interface →

Data listed by site



### Types of streamflow data

#### Continuous –

Collected at fixed time intervals (15 minutes)  
 Transmitting gages  
 Provisional data uploaded to web near real time  
 Gage height (stage) used to compute flow  
 Streamflow computed from gage height (rating)  
 (Water quality, if available)

#### Discrete –

Flow measured in the field  
 Measurements used to develop ratings at gages  
 Measurements at sites used for other studies

This information is preliminary or provisional and is subject to revision. It is being provided to meet the need for timely best science. The information has not received final approval by the U.S. Geological Survey (USGS) and is provided on the condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the information

USGS is scheduled to present further information at the May 2021 RAB meeting



# **Phase II PFAS Investigation**

## **Hangar 680 Groundwater Treatment Pilot Test**



- Pilot Test at former Aircraft Maintenance Hangar 680
  - Full-time operations commenced in March 2020. Over 9 million gallons of water have been treated to date.
  - Influent concentrations of combined PFOA and PFOS range
    - 17,700 to 73,300 ppt in the shallow extraction well
    - 8,100 to 47,000 ppt in the intermediate extraction well
    - 9,400 to 46,800 ppt in the system influent
  - System effluent meets all PADEP discharge requirements.
  - An extension to continue the pilot test another 6-months was granted by the PADEP on January 27, 2021.
  - The PADEP also approved the request to add one additional extraction point into the pilot test system on January 27, 2021. Planning for the modification is currently underway.

***Pilot tests provide valuable groundwater and treatment information for design of a full-scale treatment system.***

# Phase II PFAS Investigation

## Hangar 680 Groundwater Treatment Pilot Test (cont.)



Location of Hangar 680 treatment system

# ***Phase II PFAS Investigation***

## ***Hangar 680 Groundwater Treatment Pilot Test (cont.)***

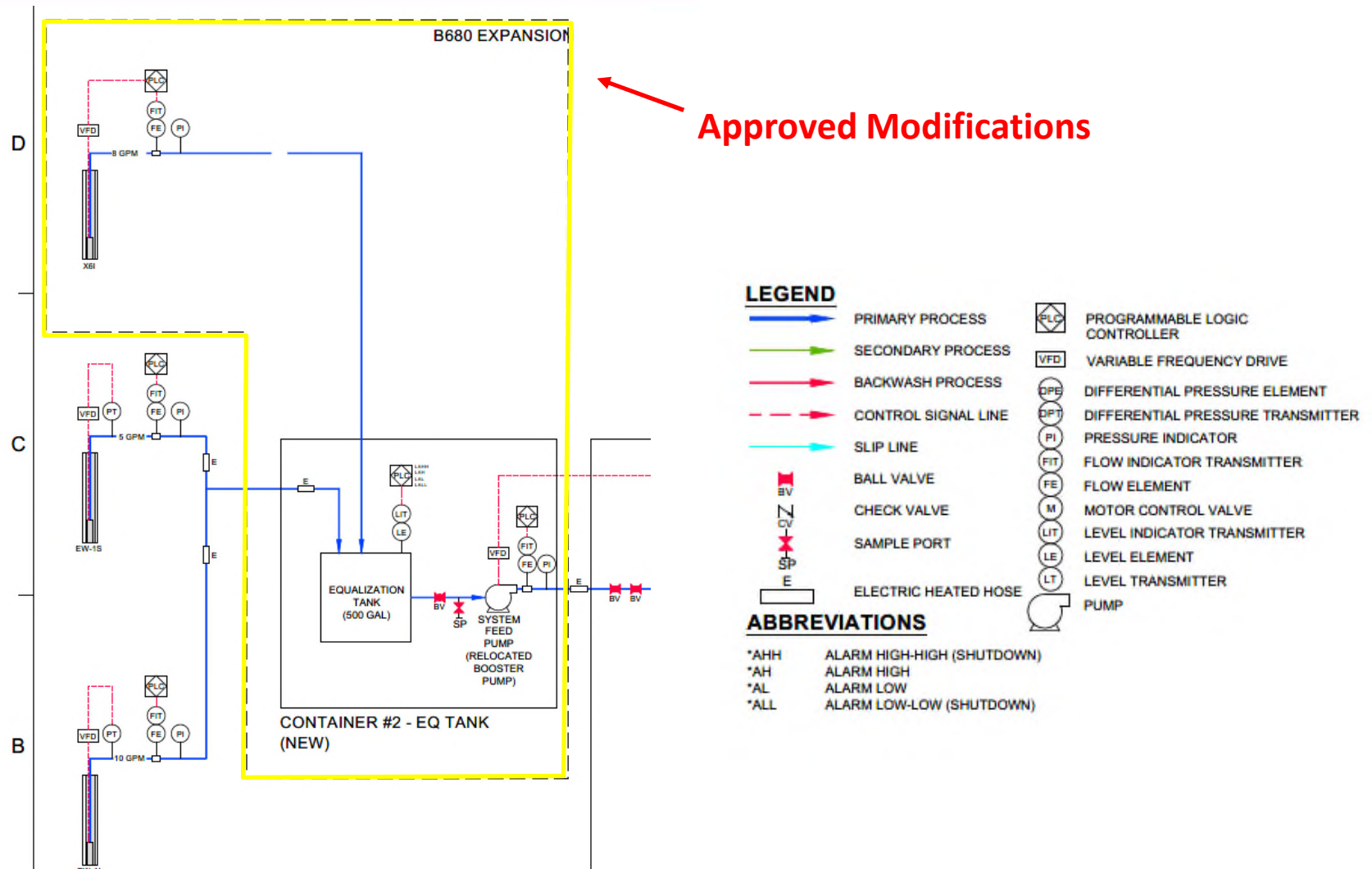


- Planned modifications to the Hangar 680
  - PADEP approved modifications to the Hangar 680 system on January 27, 2021.
  - Modifications will include:
    - Connection of an additional extraction well defined as EW6I.
      - 8-inch diameter open borehole from 70 to 150 feet.
      - PFOS and PFOA detected at 56,600 ppt.
      - Located along ANG property line.
    - Place a second Conex box to house a equalization tank.
    - Reroute piping and electrical from existing extraction wells to the equalization tank.
  - Goal is to optimize mass removal and test IX resin with high levels of PFOA and PFOS.



# Phase II PFAS Investigation

## Hangar 680 Groundwater Treatment Pilot Test (cont.)



# **Phase II PFAS Investigation**

## **Former Fire Training Area Groundwater Treatment Pilot Test**



- Pilot Test at the former Fire Training Area (Site 5)
  - An in-situ bio-stimulation remedy is operating successfully to reduce VOCs.
    - PFAS extraction wells and treatment cannot interfere with that remedy.
    - Extraction wells will likely be between the VOC plume and the base boundary.
  - The draft pilot test work plan was submitted to regulators in September 2020. The work plan uses lessons learned from the Hangar 680 pilot test. The Navy is preparing responses to regulator comments.
  - A discharge application was submitted to PADEP in September 2020. The PADEP issued the WRM approval No. 0920203 on January 12, 2021. The approval is effective February 1, 2021.
  - Procurement of pilot system is underway. Expect operation to commence summer 2021.
  - Complete geophysical logging at 14 of 15 extraction wells.

2<sup>nd</sup> Pilot Test – located near Horsham Road, close to FAA radar tower



# Phase II PFAS Investigation

## Former Fire Training Area Groundwater Treatment Pilot Test (cont.)



# ***Phase II PFAS Investigation***

## ***PlumeStop Design Verification Test (DVT)***



- A workplan for a PlumeStop Design Verification Test (DVT) at the Northern Poned Area was submitted to the EPA and PADEP in January 2020. The purpose of the study is to evaluate the feasibility of PlumeStop as a permeable reactive barrier (PRB) along the Keith Valley Road property line.
- PlumeStop is an in-situ (in ground) technology composed of very fine particles of activated carbon suspended in water using unique organic polymer dispersion chemistry.
- The test is planned for a phased approach:
  - Phase I – Overburden groundwater and soil study
  - Phase II – PlumeStop injection test
- Phase I occurred in late March 2020. A draft technical memo summarizing Phase I results are being reviewed by the Navy. The DVT was redesigned based on the conclusions.

# ***Phase II PFAS Investigation***

## ***Off-Base Groundwater Investigation***



- Evaluation of Existing Off-Base Monitoring and Production Wells
  - HWSA has offered access to fifteen existing observation and supply wells.
    - Work was initiated in August 2020 and includes geophysical logging and packer testing.
    - Borehole geophysical logging has been performed at 13 of 15 well locations.
    - Packer testing has been performed at 4 of 15 well locations.
  - PADEP has offered access to nine existing monitoring wells. Sampling is anticipated in Spring 2021.

# Phase II PFAS Investigation

## Other Plans



- Other plans in development:
  - Draft Sampling and Analysis Plan (SAP) for on-base soil submitted for regulatory review in November 2020. Comments received in February 2021. SAP is being finalized
  - Draft SAP for on-base groundwater is anticipated in early 2021. Scoping meeting with regulators was held on February 24.

# Stormwater System Evaluation



- The NASJRB storm water system was evaluated to locate portions where PFAS impacted groundwater may infiltrate and discharge to surface water. Over four miles of storm sewer lines reviewed, using remote video inspections.
- A Tech Memo with recommended repairs was finalized in July 2020.
- Subcontractor performing repair work started in February. Expected completion in June 2021.
  - Joint Rehabilitation on 6,136 LF of concrete pipe (cleaning, joint sealing, testing)
  - Abandonment of four pipes and three structures
  - Replacement of 201 LF of 24” metal pipe
- Separate efforts have been completed to plug a sewer line discharging to Outfall 2 and to repair collapsed portions of line to Outfall 8.



## ***Action Summary Since Previous RAB Meeting***



- Submitted the Site 3 and 12 draft RODs for regulatory review.
- Submitted the Site 12 draft SAP for dioxin/chromium sampling for regulatory review.
- Submitted the Site 5 annual monitoring report for regulatory review.
- Completed Site 5 bioremediation system quarterly performance monitoring.
- Completed 6<sup>th</sup> surface water sampling event.
- Continued operation of the Hangar 680 pilot test system.
- Secured 6-month extension for Hangar 680 pilot test system.
- Started construction for the Site 5 PFAS pilot test system.
- Secured the Site 5 PFAS pilot test discharge approval.
- Completed geophysics at 14 of 15 extraction/monitoring well locations.
- Continued off-base groundwater investigation at existing HWSA and PADEP wells.
- Began stormwater system repairs.
- Continued private well sampling.

# Action Summary Since Previous RAB Meeting



- Actions soon to be completed:
  - Conduct 7<sup>th</sup> surface water sampling event (March 2021)
  - Submit draft annual surface water/sediment report for regulatory review.
  - Submit draft 5<sup>th</sup> round surface water/2<sup>nd</sup> round sediment sampling technical memo for regulatory review.
  - Finalize Site 5 PFAS Pilot Test workplan.
  - Submit draft Phase I PlumeStop DVT technical memo for regulatory review.
  - Submit draft Phase II PlumeStop DVT workplan for regulatory review.
  - Continue off-base groundwater investigation at existing HWSA and PADEP wells.
  - Submit draft Phase II SAP for on-base groundwater for regulatory review.
  - Continue storm water system repairs.
  - Continue private drinking water well sampling.

# ***NASJRB Willow Grove***



**The Navy presentation has concluded.**

**RAB member or community comments/questions  
will now be addressed.**

**Additional Navy information is available at the NASJRB Willow Grove website:  
[https://www.bracpmo.navy.mil/brac\\_bases/northeast/reserve\\_base\\_willow\\_grove.html](https://www.bracpmo.navy.mil/brac_bases/northeast/reserve_base_willow_grove.html)**

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BRAC Program Mgmt. Office East  
4911 South Broad St.  
Philadelphia, PA 19112

Phone: (215) 897-4900; e-mail [jennifer.b.good@navy.mil](mailto:jennifer.b.good@navy.mil)



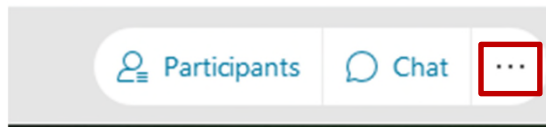


## HOW TO ASK A QUESTION



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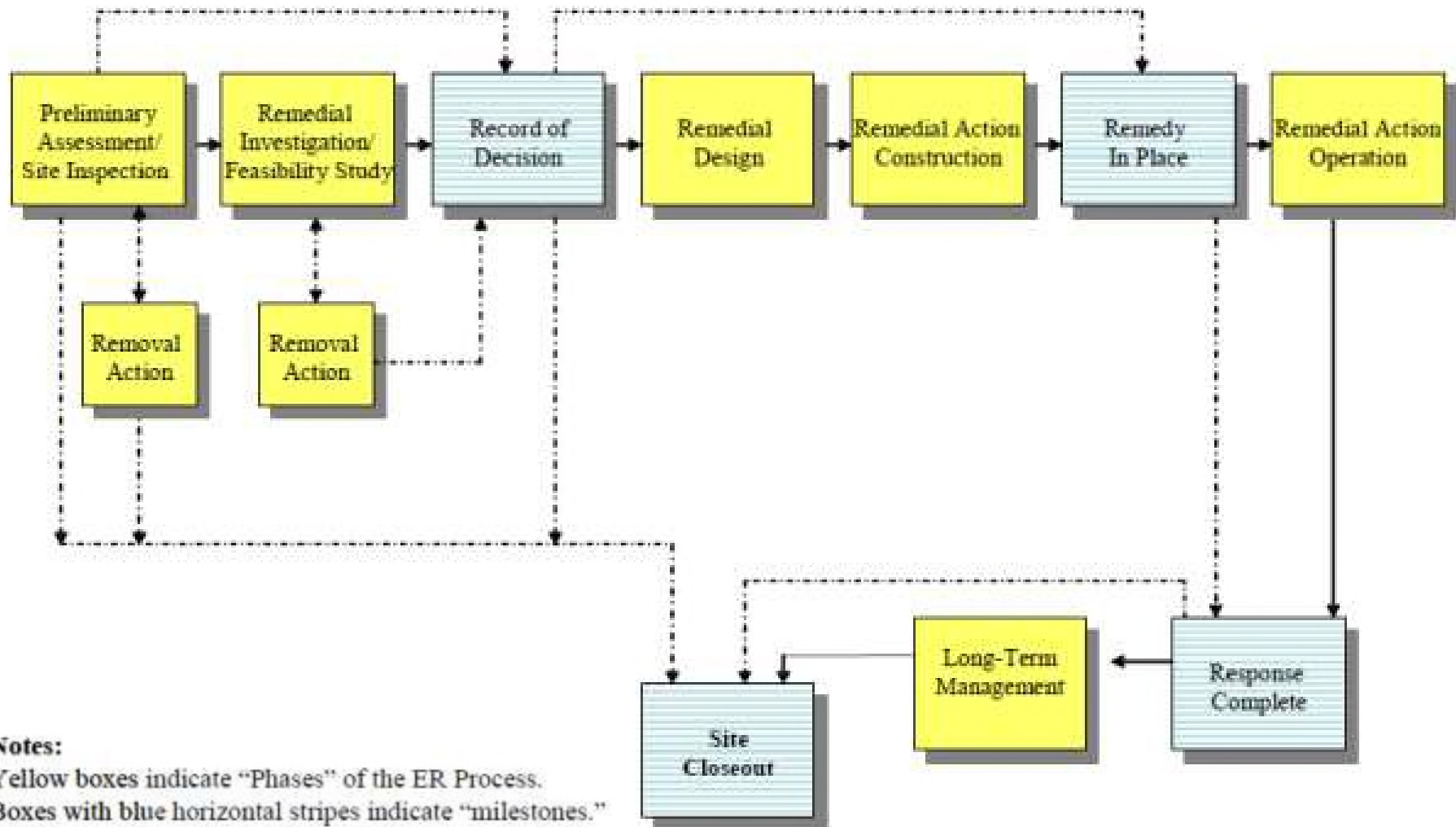
4. Select Q&A

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# **Back-up / Additional Information**

# Environmental Restoration Program

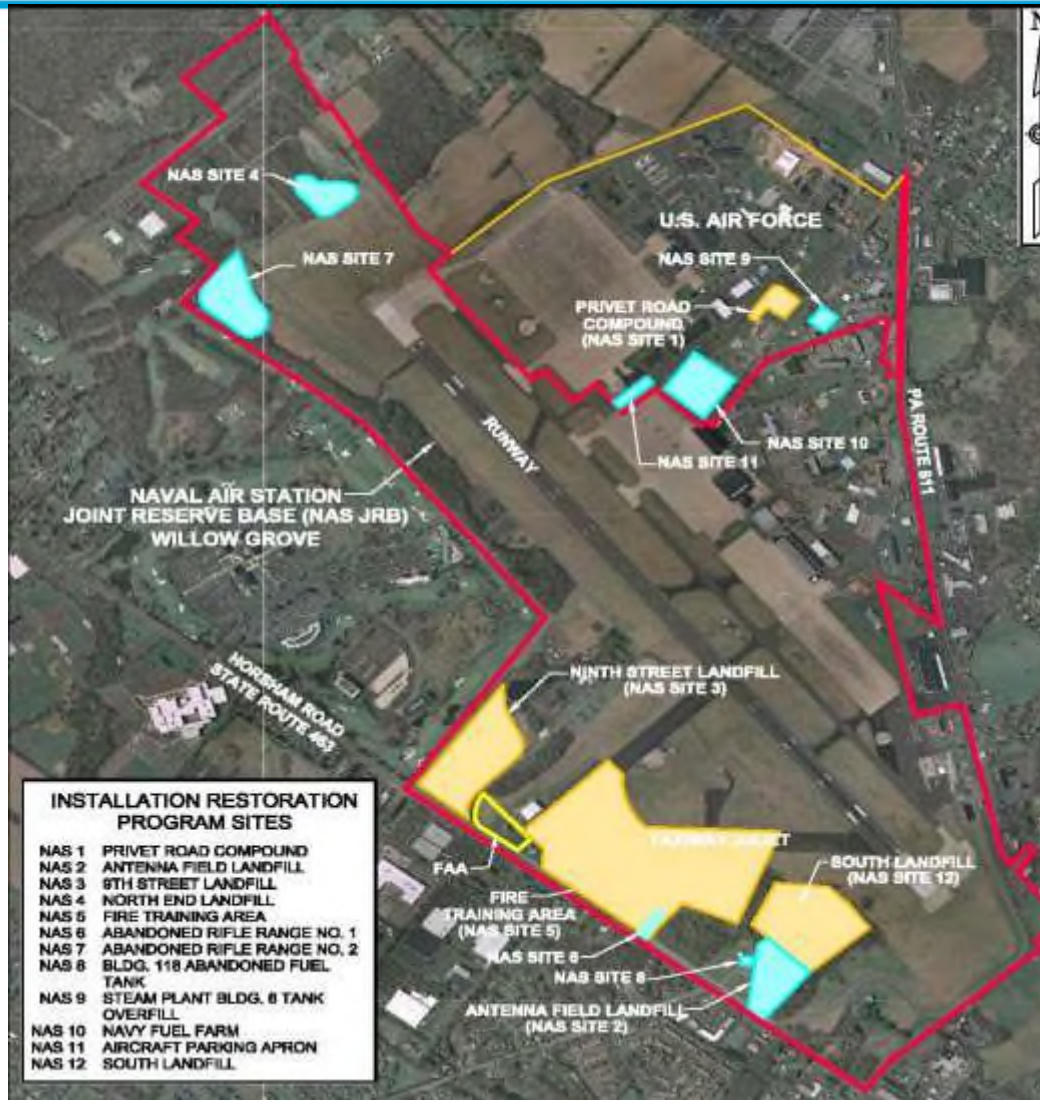


# Environmental Restoration Sites



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. F S completed. PRAP in progress.
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 completed. PRAP in progress.
PFCs/PFA S	Perfluorinated Compounds/Per- and Polyfluoroalkyl substances	OU 12	TCRA Sept. 2015, Final PA/SI Mar. 2016. RI phase I completed 2019. RI phase II in progress.

# NASJRB Willow Grove Environmental Restoration Sites



# ***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 ( $\mu\text{g/L}$ ), or 400 parts-per trillion (ppt), for PFOA and 0.2  $\mu\text{g/L}$ , 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.



# *Phase I PFAS Investigation Summary*



- Soil, groundwater, and surface water samples were collected in potential sources area.
- Human health screening assessment:
  - PFOS or PFOA sample results exceeding screening levels were detected in the soil, groundwater, and surface water.
  - The sediment samples did not contain any exceedances of the PFOS or PFOA screening levels.
  - PFBS detections did not exceed any screening level for any of the environmental media.

Download available from Administrative record or the  
Horsham Township Library Information Repository  
<http://oldhtl.mclinc.org/WillowGroveNASindex.html>



# *Phase I PFAS Investigation Summary (cont.)*



- Ecological screening assessments:
  - Screening levels for PFAS have not been developed by EPA, so the Navy identified criteria and performed the screening assessment based on a review of available literature.
  - PFOS or PFOA sample results exceeding these screening levels were detected in the soil and surface water.
  - The sediment samples did not contain any exceedances of the PFOS, while no screening benchmark is available for PFOA.
  - PFBS detections did not exceed any screening level.

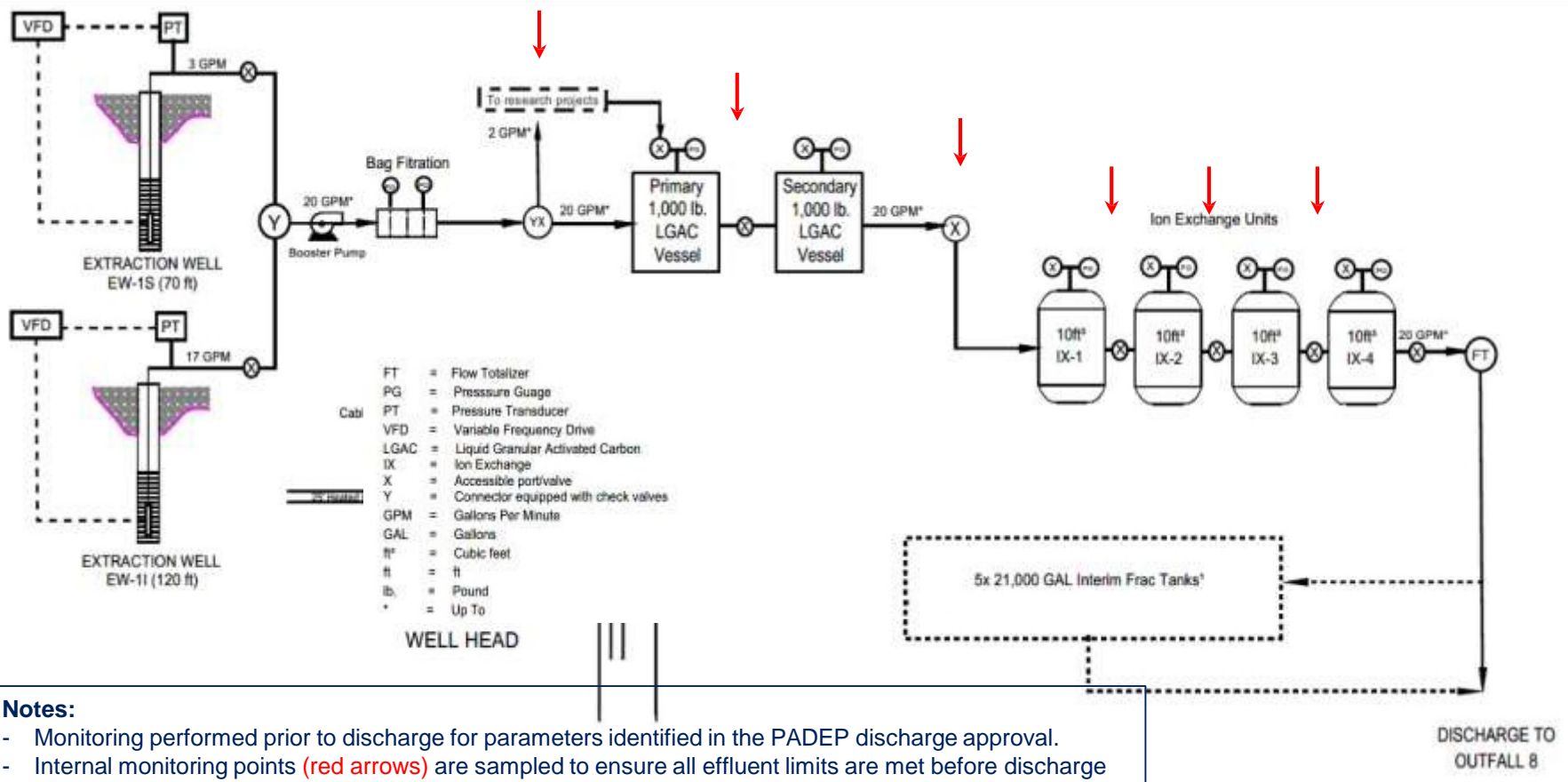
# Hangar 680 Pilot Test Treatment System



# Hangar 680 Pilot Test Treatment Process



Treatment Direction



# Participation in DoD Funded PFAS Research



- SERDP/ESTCP are DoD-funded environmental research programs.
- NASJRB Willow Grove is supporting ~\$8M of SERDP/ESTCP funded research investigating new PFAS assessment and remediation technologies.
- Will continue to seek participation in additional SERDP/ESTCP work at NASJRB Willow Grove or nearby NAWC Warminster.
- Participate in other Navy or USEPA funded research.

## SERDP/ESTCP Projects and organizations leading the research:

- Soil or Groundwater Treatment  
12 Total Projects Participated
  - ER18-1300 - College of Wooster  
Completed pilot column study with new absorption media in March/April 2020.
  - ER18-1063 - Colorado School of Mines  
Pilot column testing of different commercial resins to commence in late June at WG
- Passive Treatment of Storm Water  
ER18-1230 - Oregon St. University
- Assessment of Fate and Transport of PFAS in Surface Water  
ER19-1073 (New Start) – Academy of Natural Sciences of Drexel University  
ER19-1193 (New Start and potential participation) – Towson State University

**DoD's SERDP/ESTCP PFAS website:**  
[http://serdp-estcp-pfas.com/pfas\\_efforts/pfas\\_efforts.pdf](http://serdp-estcp-pfas.com/pfas_efforts/pfas_efforts.pdf)

## ***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/reserve_base_willow_grove/documents.html)
- [http://bracpmo.navy.mil/brac\\_bases/northeast/former\\_warfare\\_center\\_warminster/document\\_s.html](http://bracpmo.navy.mil/brac_bases/northeast/former_warfare_center_warminster/document_s.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>

<https://www.epa.gov/superfund/willowgrove>

## **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](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>**

**Horsham Township Library Information Repository**

**<http://oldhtl.mclinc.org/WillowGroveNASindex.html>**

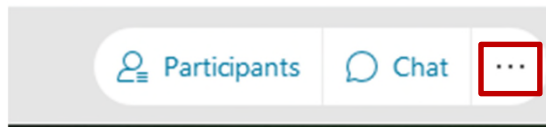


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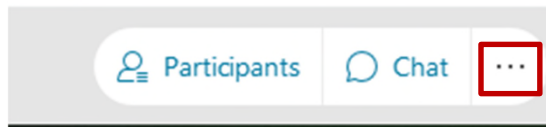


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6. Click Send



## ***For more Information***



Email and phone contact are preferred due to current COVID restrictions.

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Next Restoration Advisory Board (RAB) meeting:  
May 19, 2021 at 6:00 p.m. (virtual meeting anticipated)

Environmental Restoration discussions have concluded.

Health Professional discussions will now follow.





**Thank you for joining the Restoration Advisory Board (RAB) meeting for the former Naval Air Station Joint Reserve Base (NASJRB) Willow Grove and the Biddle Air National Guard Base.**

**The meeting has concluded.**