



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

Meeting Date: March 10, 2021
Meeting Time: 6:00 p.m.
Meeting Place: WebEx Webinar

	<u>Name</u>	<u>Organization</u>
Panelist	Willington Lin (R)	Department of Navy (Navy) Base Realignment and Closure (BRAC) Program Management Office (PMO)
	Brian Helland (R)	Navy BRAC PMO
	Jennifer Good	Navy BRAC PMO
	Dave Barclift	Navy BRAC PMO
	Greg Preston	Navy BRAC PMO
	Jason Speicher	NAVFAC Atlantic
	Tricia Moore	Tetra Tech (Consultant to the Navy)
	Keith Freihofer	Air National Guard (ANG)
	Lee dePersia	ANG
	Margaret Patterson	Air Force Civil Engineer Center (AFCEC)
	Matt Machusick	Leidos (Consultant to ANG)
	Timothy Runkle	Leidos
	Sarah Kloss (R)	Environmental Protection Agency (EPA) Region 3
	Kristeen Gaffney	EPA Region 3
	Rick Rogers	EPA Region 3
	Lisa Trakis	EPA Region 3
	Leah Zedella	EPA Region 3
	Colin Wade (R)	Pennsylvania Department of Environmental Projection (PADEP) Southeast
	Thomas Magge	PADEP Southeast
	Susan Schrack Wood	Pennsylvania Department of Health (PADOH)
	Lora Werner	Agency for Toxic Substances and Disease Registry (ATSDR) Region 3
	Tara Wilson	Blum-Moore Reporting Services
Attendees	Tina O'Rourke	Horsham Water and Sewer Authority
	Thomas Ames	Horsham Land Redevelopment Authority (HLRA)
	Larry Burns	HLRA
	Mike McGee	HLRA
	Leslee Everett	Member of the public
	Joseph Foulke	Member of the public
	Suzanne Fairlie	Member of the public

<u>Name</u>	<u>Organization</u>
Robin Huag	Member of the public
Joseph McGrath (R)	Member of the public and former employee
Joe Messina	Member of the public
Dawn DeFreitas	Navy BRAC PMO
Tim Cherry	PADEP Southeast
Virginia Cain	PADEP Southeast
Rob Fogel	PADEP Southeast
Bonnie McClennen	PADEP Southeast
Kathleen Joyce	Congresswoman Dean's Office
Sean O'Connor	Pennsylvania Representative Schroeder's Office
Dustin Lipik	Tetra Tech
Kevin Soffera	Tetra Tech
Lisa Senior	USGS
Timothy Hagey	Warminster Municipal Water Authority
Eric Stahl	Weston Solutions
Jim Rugh	Willow Grove Caretaker's Office
Martin Schy	Willow Grove Caretaker's Office

(R) Designates RAB Member

Willie Lin, the Navy's BRAC Environmental Coordinator and Restoration Advisory Board (RAB) co-chair, opened the virtual meeting by greeting the attendees. Mr. Lin explained that the Horsham Library's regular meeting location was unavailable due to the COVID-19 social distancing requirements. Mr. Lin noted that the meeting would include presentations from the Navy, ANG, and EPA. RAB meeting notices were published in the newspaper on February 25 and March 3, 2021, posted to the Navy website, mailed to the mailing list, and an e-mail went out as well. For those unable to attend the meeting, an opportunity to download the presentations and have a copy sent by mail was provided.

Mr. Lin informed the attendees that questions could be submitted via WebEx during the meeting. Mr. Lin explained that questions would be answered at the end of each presentation by the presenters. Mr. Lin also noted that the ATSDR is available after the RAB meeting to discuss health concerns. Mr. Lin introduced RAB members and government representatives known to be present on the call. Mr. Lin added that participants in the meetings should be able to see all the attendees on Webex, based on community feedback from the previous meeting.

A brief overview of the features of WebEx was presented to the attendees to explain the commenting process during the presentations.

Brian Helland commenced the Navy presentation with an update on the cleanup sites, including landfill Sites 3 and 12, and Site 5. Mr. Helland provided background on Sites 3 and 12, stating that they were former landfills used by the Public Works Department. The Site 3 Proposed Remedial Action Plan (PRAP) was for soil with no action required for groundwater. And the Site 12 PRAP was for soil only. The public comment period and the date of the planned virtual public meeting were advertised in the local paper and announced during the September RAB meeting. The proposed plans were presented in a virtual public meeting on September 23, 2020 due to COVID-19 restrictions. The initial 45-day public comment period was extended to November 25, 2020 and is now closed. Additional sampling will be performed to determine if a groundwater remedy is needed at Site 12. The plan was submitted in December 2020. The Navy prepared a draft Record of Decision (ROD) for regulatory review in February 2021. The final decision document is expected in June.

Mr. Helland discussed the remediation for Site 5 groundwater. The anaerobic bioremediation system continues to operate at Site 5, and performance monitoring is being conducted in accordance with the approved plan. In December 2020, the injection of amendments was completed. Quarterly monitoring was completed in February 2021. Sampling results continue to show a breakdown of volatile organic compounds (VOCs) is occurring. The addition of amendments will now be conducted twice per year instead of annually as was done before to improve performance. The latest annual report was submitted in February 2021.

Mr. Lin began the presentation for the next agenda item, per- and polyfluoroalkyl substances (PFAS). Mr. Lin provided a summary of the Navy's funding support for the Horsham Water and Sewer Authority. He then summarized the Navy's private well sampling activities. Mr. Lin explained that private drinking water sampling was temporarily suspended in March 2020 due to COVID-19 restrictions and that testing resumed in June 2020. Since June 2020, 250 private wells were sampled with no results being above the lifetime health advisory levels. Mr. Lin stated

samples are being collected from outside spigots and faucets due to COVID-19 restrictions. This will be reevaluated in April 2021 based upon the COVID-19 situation.

Tricia Moore discussed the remedial investigation (RI) for PFAS. The final Phase I report was issued in October 2019 and identified several data gaps that are currently being addressed in Phase II. The investigation includes but is not limited to periodic surface water and sediment monitoring, evaluation of groundwater extraction and treatment systems using pilot test information, installation of additional monitoring wells and soil sampling in source areas, limited evaluation of PFAS treatment technologies, sampling of off-base monitoring wells and further investigation of on-base stormwater systems.

The first round of sampling of surface water and sediment was performed in July 2019, and quarterly sampling has continued. Round 6 of the sampling occurred on January 11 and 12, 2021. The January 2021 sampling was performed in conjunction with the USGS, and the local water purveyors were invited to participate. Monitoring will continue to be coordinated with the ANG, and the next round of sampling is scheduled to begin on March 15, 2021. The annual report is being drafted, and the results will be posted to the BRAC PMO website once the report is finalized. Additionally, the Navy has funded the USGS to install additional stream gages to assess mass loading. The USGS will present some additional information during the next RAB meeting in May. Ms. Moore gave a brief overview of the stream gages and the data that they provide.

Ms. Moore discussed the pilot test for groundwater treatment in the aircraft maintenance facility area around Hangar 680, where the highest PFAS levels were identified. On March 2, 2020, the system was placed online. All effluent results have met all the discharge requirements issued by the PADEP. Approval to extend the pilot test for another six months was granted by PADEP on January 27, 2021. A request to modify the system by adding an extra extraction well in that extension was also granted. An additional ten extraction/monitoring wells were installed in April 2020. These wells were sampled in August, and the data results were provided to the EPA and PADEP for their review. A summarized layout of the pilot was reviewed.

Ms. Moore discussed the Site 5 pilot test for PFAS treatment. The wells and treatment cannot interfere with the existing in-situ bio-stimulation treatment system for VOCs. Lessons learned from the Hangar 680 pilot test will be applied. The draft permit equivalency was provided on November 16, 2020 and is being reviewed by the Navy. The final work plan for the extraction well installation was approved in October 2020. Fifteen extraction/monitoring points were installed between October and November of 2020. This includes the two extraction wells that will be used for the Site 5 pilot test. The discharge application for the pilot test was approved in January 2021. A plan to sample these 15 wells is currently under development. Geophysical logging has been completed at 14 of the 15 extraction wells. Procurement of the pilot test is underway. The pilot test is expected to commence operations in the Summer of 2021. A brief overview of the process to supply power, treatment trailers, and piping for the pilot test were reviewed.

Additionally, a work plan for PlumeStop design verification tests at the Northern Ponding Area was submitted to the EPA and PADEP in January 2020. The purpose of this study is to evaluate the feasibility of PlumeStop as a permeable reactive barrier, which is also known as a PRB, to determine whether it would be effective along the Keith Valley Road property line. PlumeStop is an in-situ, which means in-ground technology, composed of very fine particles of activated carbon

suspended in water using a unique, organic polymer dispersion chemistry. The polymer is also food grade. The test is planned for a phased approach. Phase 1 will evaluate the overburdened groundwater and soil, and the second phase would be a PlumeStop injection test. Phase 1 occurred in late March 2020. The data is currently being evaluated before Phase 2 begins.

Ms. Moore provided an update on the off-base groundwater investigation and evaluation of existing off-base monitoring and production wells. HWSA has offered access to 15 existing observation and supply wells. Work was initiated in August 2020, and included geophysical logging and packer testing. Borehole geophysical logging has been conducted at 13 well locations to date. Packer testing has been performed at four well location. PADEP has also offered access to nine existing monitoring wells, and it is planned to sample those wells in the Spring of 2021. Additionally, a draft sampling and analysis plan for on-base soil was submitted for regulatory review in November 2020. The draft SAP for on-base groundwater sampling is in the process of being finalized.

Mr. Helland discussed the status of the stormwater system evaluation. Over four miles of stormwater lines have been evaluated, and a final tech memo with specific repair recommendations was submitted in July 2020. A subcontractor has been selected to perform joint repairs and was recently on-site preparing to mobilize. Separate efforts have also been completed to plug a pipe discharging groundwater to Outfall 2 and to repair collapsed sections of the line leading to Outfall 8.

Mr. Lin finished by giving an action summary of the current progress that had just been discussed. Then Jackie Boltz gave a brief overview of how the question and answer interface worked within WebEx for all the attendees before the floor was opened to questions regarding the Navy's presentation.

Mr. Lin read a question from Kathleen Joyce regarding the availability of the presentation. Mr. Lin responded that the presentation would be available for download once the website is finished undergoing maintenance. For the time, it can be e-mailed to those who request it.

Mr. Lin read a question from Joe Messina about the timeline and progress of the transfer of property to the township. Dave Barclift answered that the process had already begun earlier in 2021 with a small parcel known as the southeast clear zone area. The Navy has been working with the HLRA to help identify parcels to move forward with the transfer.

Mr. Lin read a question from Tom Ames about the source of contamination at EW-6I that was shown on a slide earlier in the presentation. Mr. Barclift replied that at this point, it is not known what the source of the contamination was, but the extent of the contamination will continue to be investigated and remediated.

Mr. Barclift read an additional question from Mr. Ames about the state of funding for the proposed plans and investigations begin presented. Mr. Barclift replied that the actions that have been identified are funded. Additional funding will be needed to continue the effort into the next year and beyond, and the Navy is currently in that process.

Mr. Lin read a question from Mr. Messina concerning lessons learned from previous contamination sites. Mr. Lin answered that Navy had worked closely with other services on sharing information on PFAS. The Navy is working closely with the Department of Defense on research projects relating to the study of PFAS.

With no further questions for the Navy, Mr. Lin introduced Keith Freihofer to commence with the ANG presentation.

Mr. Freihofer gave a brief update on changes that have occurred since the last RAB meeting. Phase 1 field investigations involving surface water and soil sampling, well installations, and groundwater sampling have continued. The draft tech memo for the Phase 1 field investigation activities has been completed. Regulatory approval of the work plan for regional surface water sampling has been accomplished. Regional surface water sampling has been conducted in coordination with the Navy. The draft National Pollutant Discharge Elimination System (NPDES) industrial stormwater permit is still under review. The water treatment system continues to operate at 180 gallons per minute, and the 500 gallon per minute surface water treatment system is under construction.

Mr. Freihofer continued with a review of the contamination history of the ST-01 POL site. A remedial action plan was approved by PADEP in February 2021. The remedial action is scheduled for the fiscal year of 2022.

Mr. Freihofer introduced Matt Machusick from Leidos to discuss the RI that they had been contracted to perform. Mr. Machusick explained that the RI would be conducted to determine the nature and extent of the contamination and the potential threat to human health and the environment. Leidos will be collecting soil, sediment, surface water, and groundwater on the Horsham Air Guard Station and off-site. A Baseline Risk Assessment will also be completed. There will be four quarters of groundwater sampling, twelve quarters of surface water sampling, and an annual stream gauging event.

Mr. Machusick discussed the progress of the RI as of the time of the RAB meeting. Leidos has completed Phase 1, and the draft tech memo has been finished. Phase 1 field investigations involved surface water and soil sampling, well installations, and groundwater sampling. Phase 2 is in the planning process with a goal of an RI report in the Fall of 2022. Drilling activities for multiport wells were completed in February 2021 to help characterize PFAS contamination in the subsurface. A sampling of these wells was completed from late February through March 2021. A graphic showing the locations of surface water and sediment sampling was displayed to the attendees. The data that Leidos collected during the surface water event will be summarized in an upcoming tech memo. Additionally, a figure showing the newly installed wells was shown and discussed.

Mr. Machusick then gave an overview of the planned activities for the next three months of the RI. Leidos will be participating in the surface water sampling event scheduled for later in March. Leidos is looking into obtaining access for off-site well locations as well as sampling the ST-01 wells along Park Creek. A comprehensive groundwater sampling event is also planned as part of the Phase 2. Mr. Machusick turned the presentation back over to Lee DePersia.

Mr. DePersia provided an overview of perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) in the surface water on the Horsham Air Guard Station. The ANG has taken action to reduce PFOS and PFOA's release by implementing the treatment system discussed earlier in the meeting. There has been a temporary treatment system that is currently in operation at the stormwater basin. This system captures and treats 100 percent of the base flow, which is groundwater that infiltrates during non-rain events. That flow amounts to about 60 gallons per minute (gpm). Since May 2020, when the treatment system began, it is estimated that 26 million gallons of base flow groundwater have been treated.

This system is in the process of being replaced by a permanent treatment plant with a treatment capacity of 500 gpm. The new plant consists of a sand filter, zeolite filter, granular activated carbon (GAC), and ion exchange (IX) resin. Construction on the new plant began in October of 2020, it is scheduled to be completed in the Summer of 2021. Warminster Township is coordinating and managing that project. A graphic showing the plans for the new system was presented to the audience.

Mr. Freihofer then discussed PFOS and PFOA results in drinking water. There was an agreement with Warrington Township to install carbon filtration on five of their supply wells and extend water mains for connections. Warrington Township has sold its water system to the North Wales Water Authority. The ANG has transferred the agreement and will continue the installation. Private well locations with detections above 70 parts per trillion (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 the number of connections completed.

Mr. Freihofer presented the actions that are planned for the following three months from the RAB meeting. Regional surface water sampling, obtaining access to off-site monitoring wells, and sampling existing wells along the tributary to Park Creek are all planned. Construction on the permanent treatment plant will continue and the draft NPDES permit for stormwater is still under review. It was noted that the Horsham Air Guard Base was renamed Biddle Air National Guard Base. Mr. Freihofer then concluded the ANG presentation.

Ms. Boltz reminded the attendees to utilize the question and answer box in the WebEx during the meeting. The floor was opened to questions.

Mr. Freihofer read a question from Mr. Messina about the funding to support the projects that were just discussed. Mr. Freihofer responded the RI that was discussed is funded through completion. The private drinking water well sampling is funded through fiscal year 2022.

Mr. Freihofer delivered a question from Mr. Messina about the funding to support the projects that were just discussed. Mr. Freihofer responded the RI that was discussed is funded through completion. The private drinking water well sampling is funded through fiscal year 2022.

Mr. Freihofer read a question from Joseph McGrath about the renaming of the base. Mr. DePersia responded that he did not know why the change was made, but the base is now named after General Biddle who was a major general during the 1950's for the Pennsylvania National Guard.

Mr. Freihofer read another question from Mr. McGrath about the possibility of allowing the community to have an on-site view of the pilot test area at Building 680. Mr. Lin responded that the Navy would be happy to set up a tour, but it will depend on making it feasible due to the COVID-19 situation in addition to maintaining property security. Mr. DePersia concurred with that statement.

With no more questions regarding the ANG presentation, Ms. Kloss commenced the EPA's discussion. Ms. Kloss explained that based on suggestions from the RAB mailing list, she would revisit the topic from the September RAB meeting regarding the environmental cleanup and investigations at the Navy and ANG. It is anticipated that the ANG will use the same long-term process that the Navy is using.

Ms. Kloss expanded upon the regulations used at both the ANG sites and the Navy sites. With the history of environmental work being done under CERCLA at the Navy and the need for both short-term and long-term actions, the Navy agreed to continue this work under the existing cleanup agreement. In contrast, the ANG environmental cleanup work was limited, and they were ordered to address more short-term risks through the Safe Drinking Water Act order. Ms. Kloss displayed a slide with the Superfund process and went through the steps in the diagram.

Ms. Kloss recapped the ANG and Navy short-term actions in the past year that were covered earlier during the ANG and Navy presentations. The long-term processes for the ANG were then discussed. The ANG has prepared the facility investigation under the Safe Drinking Water Act order, and the information gained from this will feed into the remedial investigation (RI). The ANG has also submitted a tech memo with the Phase 1 data and will be conducting additional sampling of off-site wells.

Ms. Kloss detailed the Navy's long-term actions next. The Navy has completed Phase 1 of their investigation. That report has been finalized and is available in the administrative record. During Phase 2, there will be surface water sampling, packer testing, and off-site well sampling. Work plans for on-site soil and groundwater sampling are being discussed as well.

Ms. Kloss concluded the EPA discussion. Following a brief refresher on how to submit questions in WebEx by Ms. Boltz, the floor was opened for questions.

Mr. Freihofer responded to a question that had been asked by Ms. Joyce about informing the local congressional offices of the funding for the 2022 budget. Mr. Freihofer replied that he appreciated the suggestion and that they will follow up on the request.

Ms. Kloss read a question that had been asked by Mr. Ames about the reason for both the ANG and the Navy to both complete a Baseline Risk Assessment. Ms. Kloss responded that there are geographical differences between the sites. Areas may have higher PFAS concentrations, and those will slightly change the risk they calculate.

Ms. Kloss read a question that had been posed by Mr. Ames about addressing the high PFAS levels in the short-term actions for the ANG. Rick Rogers replied that the EPA is working with the ANG on the issue of addressing groundwater PFAS contamination leaving the site. As part of the directive under the administrative order, the EPA asks for an acceleration of effort in order to

address the groundwater migration that could be threatening private and public drinking water wells.

There were no other questions. Mr. Lin announced the next RAB meeting would be held on May 19, 2021 and adjourned the RAB meeting. After a short break, Lora Werner of the ATSDR led a health discussion with community members.

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RAB Meeting Agenda



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|---------|--|
| 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 |
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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

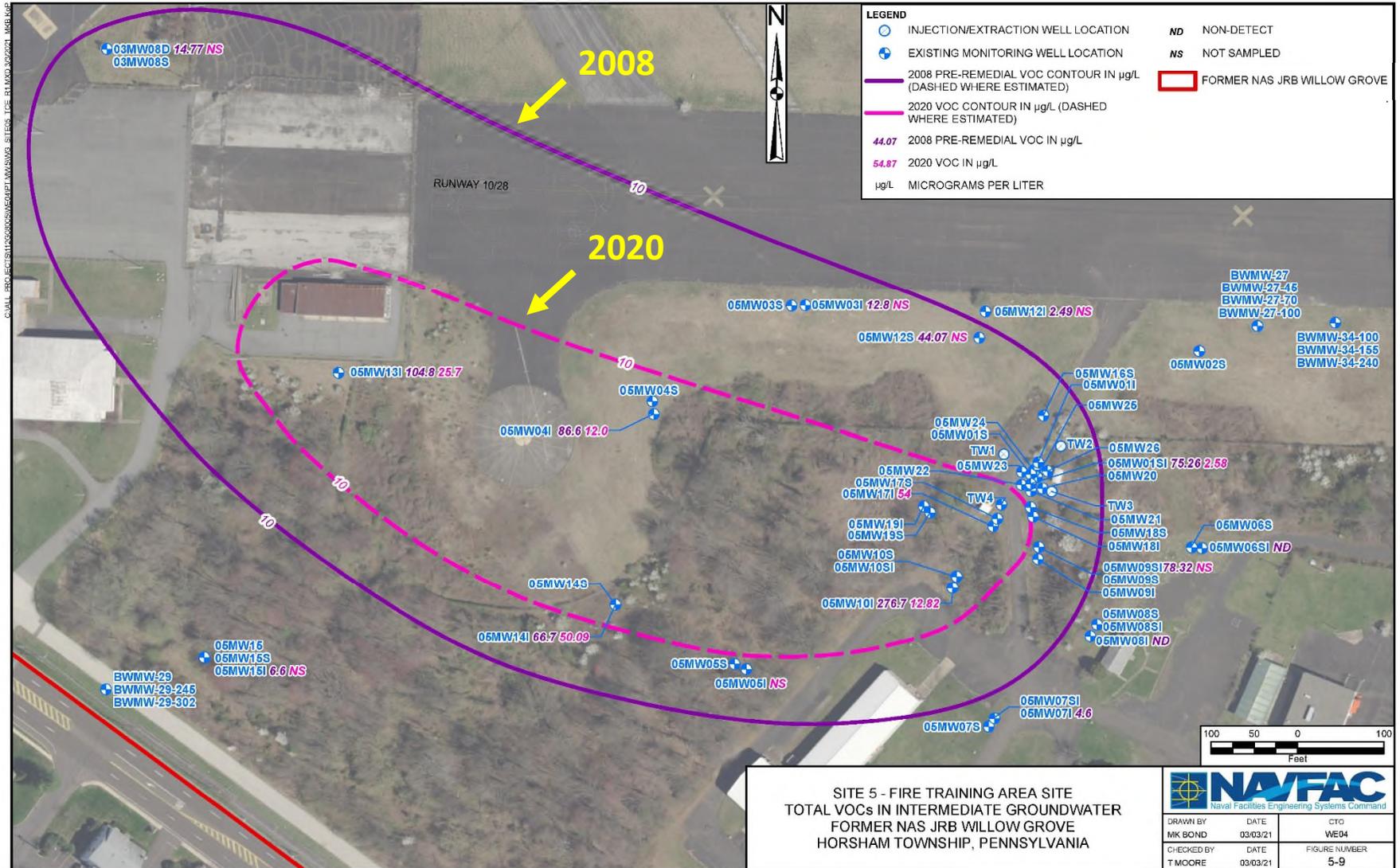


- Anaerobic bioremediation system continues to operate successfully.
- Annual performance monitoring is being conducted in accordance with approved Operation, Maintenance, and Monitoring Plan.
 - December 2020 – Injections of amendments.
 - February 2021 – Quarterly PIM monitoring was performed.
- Results 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.

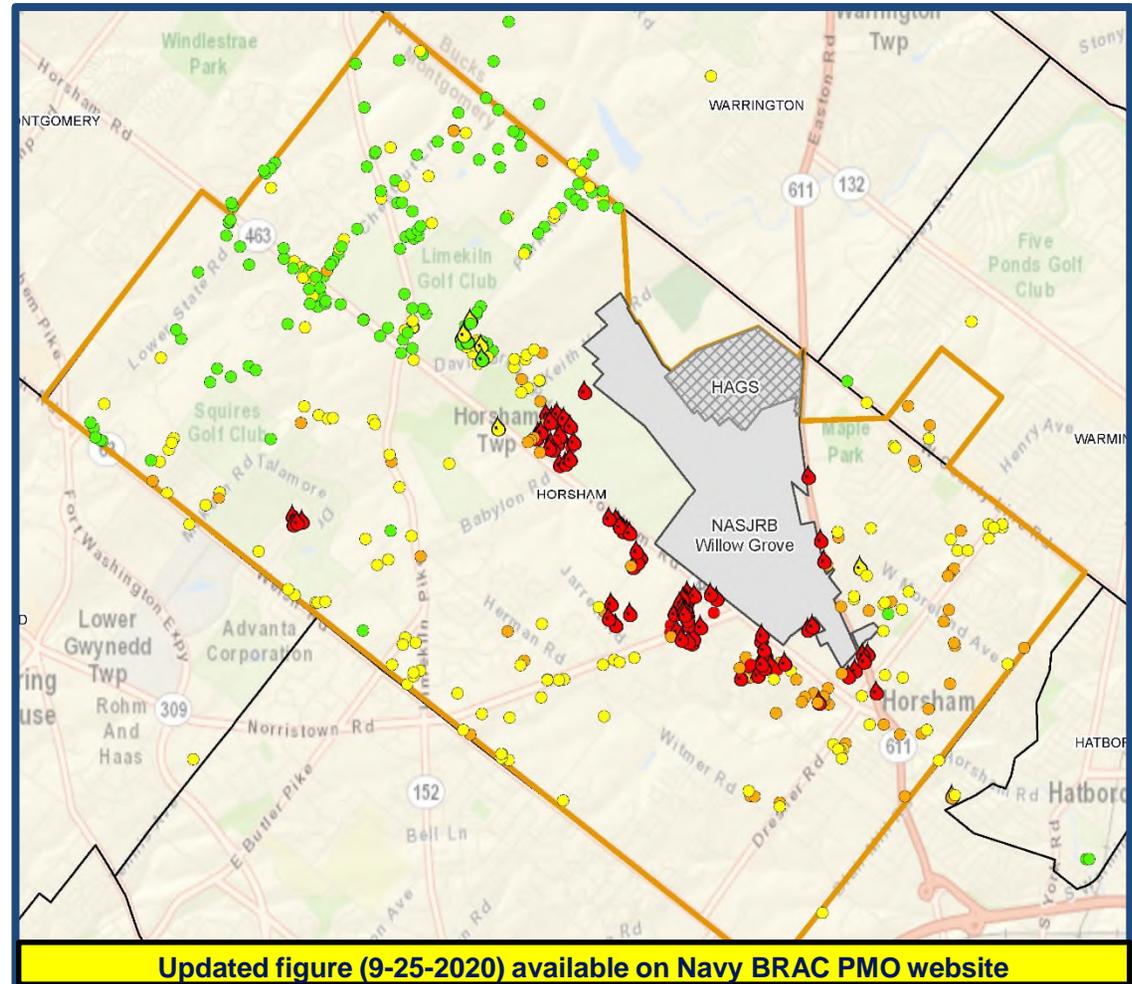
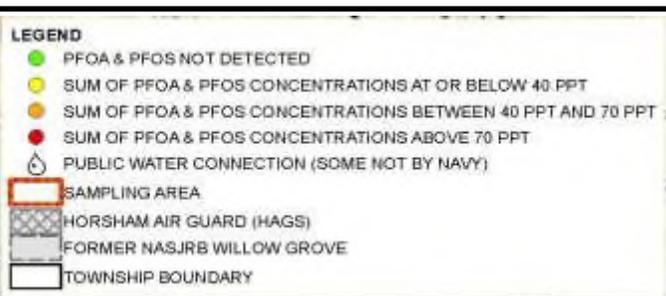
Point-of-contact is:

Tricia Moore

Tetra Tech Project Manager

tricia.moore@tetrattech.com

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

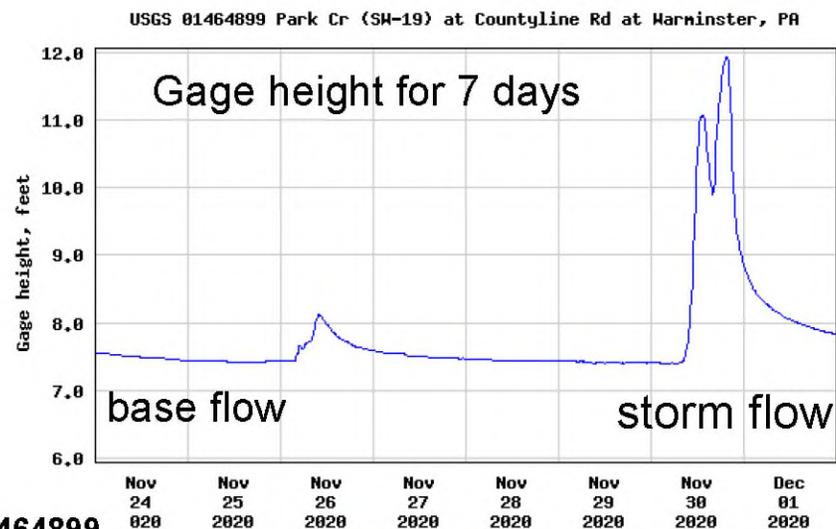
USGS Stream Gaging (Flow Volume) Support



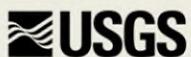
NEW continuous stream gage, 2020



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

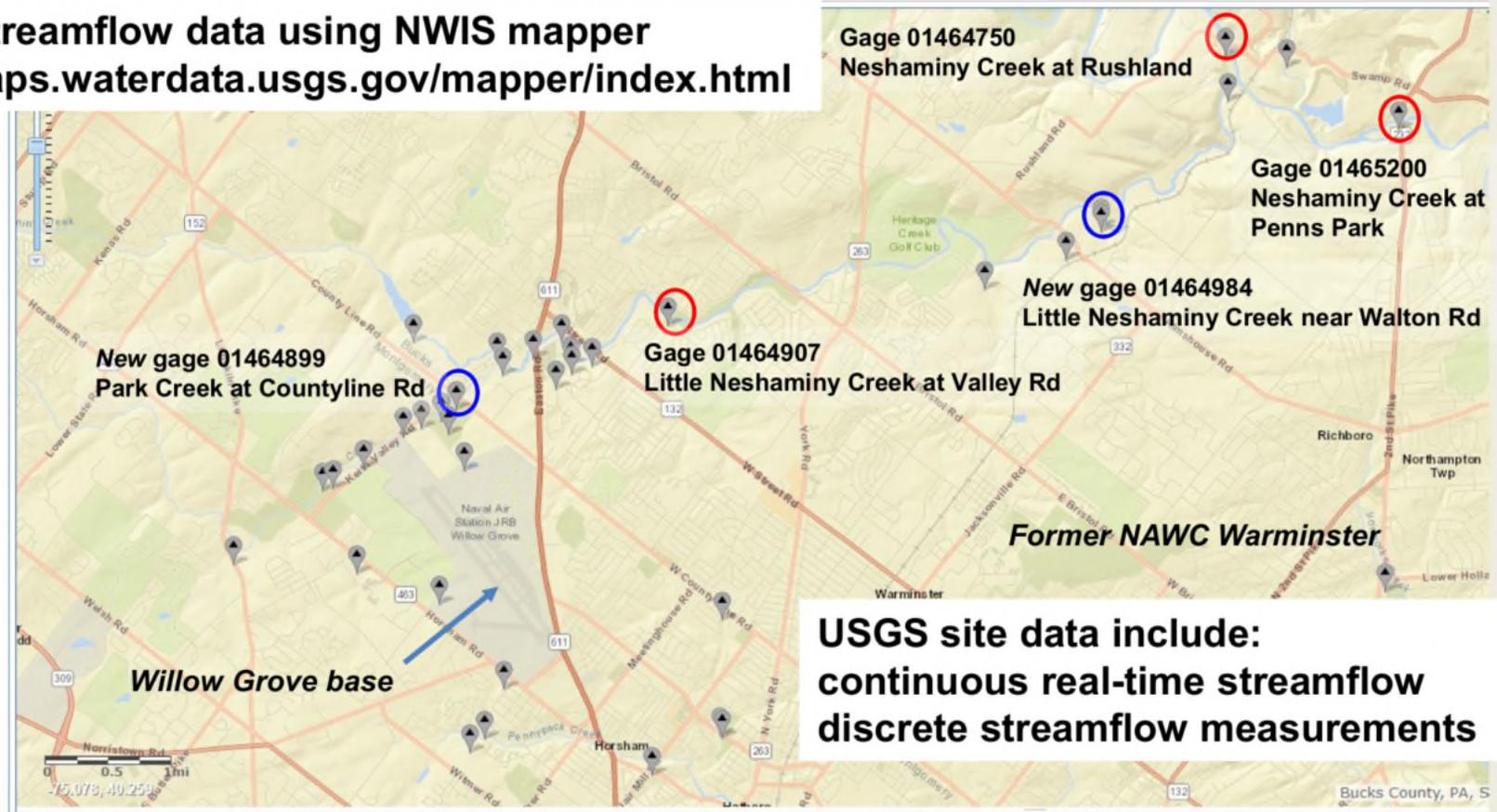
Phase II PFAS Investigation

USGS Stream Gaging (Flow Volume) Support



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>

USGS
science for a changing world

National Water Information System: Web Interface
USGS Water Resources (District Access)

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- Introducing The Next Generation of USGS Water Data for the Nation
- Full News

USGS Water Data for the Nation

Search for Sites With Data

Current Conditions
Sites with real-time or recent surface-water, groundwater, or water-quality data.

Site Information
Descriptive site information for all sites with links to all available water data for individual sites.

Map of all sites
Map of all sites with links to all available water data for individual sites.

Frequent Searches By Data Category

Surface Water
Water flow and levels in streams and lakes.

Groundwater
Water levels in wells.

Water Quality
Chemical and physical data for streams, lakes, springs, wells and other sites.

Water Use
Water use information.

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.)



More than 9 M gallons treated to date. Effluent meets all discharge requirements since operations commenced on March 2020. System influent PFOA+PFOS ranges: approx. 8,100 up to 73,300 ppt

Location of Hangar 680 treatment system

Phase II PFAS Investigation

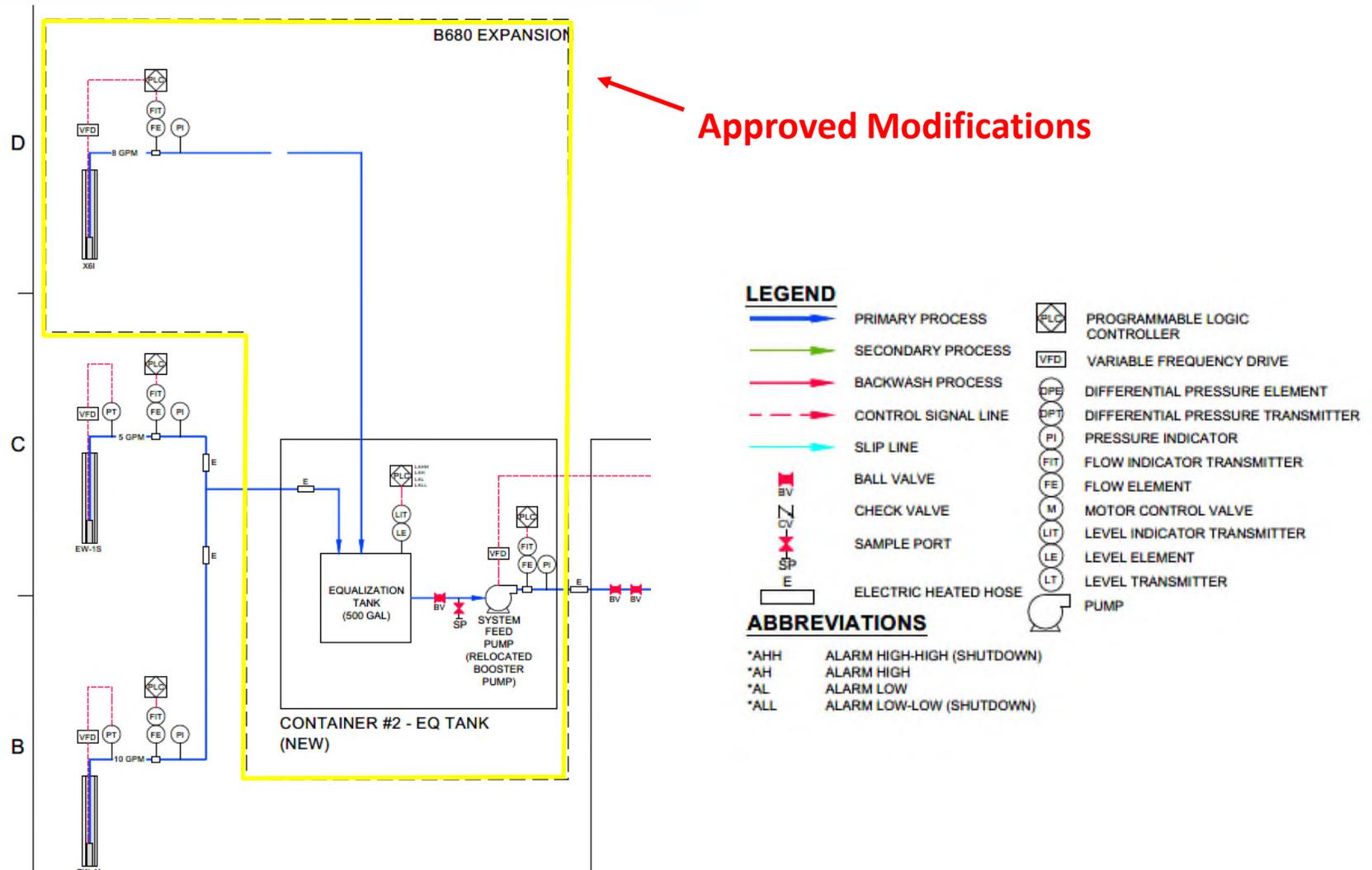
Hangar 680 Groundwater Treatment Pilot Test (cont.)



- 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.

2nd 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 6th 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 7th surface water sampling event (March 2021)
 - Submit draft annual surface water/sediment report for regulatory review.
 - Submit draft 5th round surface water/2nd 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**

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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

1. Click the More Options icon.

2. On Android, More Options icon is 3 vertical dots 

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

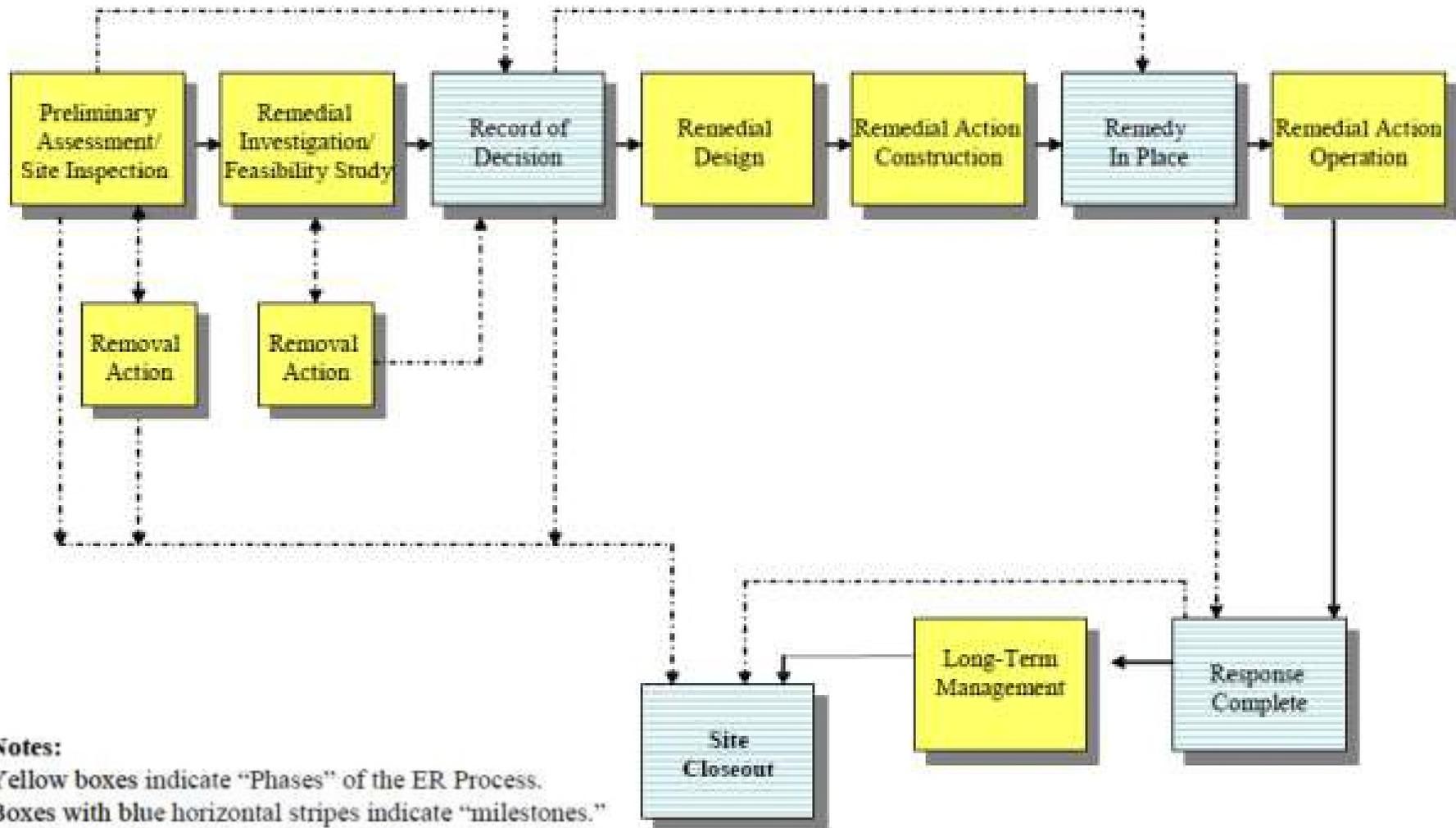
4. Select Q&A

5. Type your question in the box

6. Click Send

Back-up / Additional Information

Environmental Restoration Program

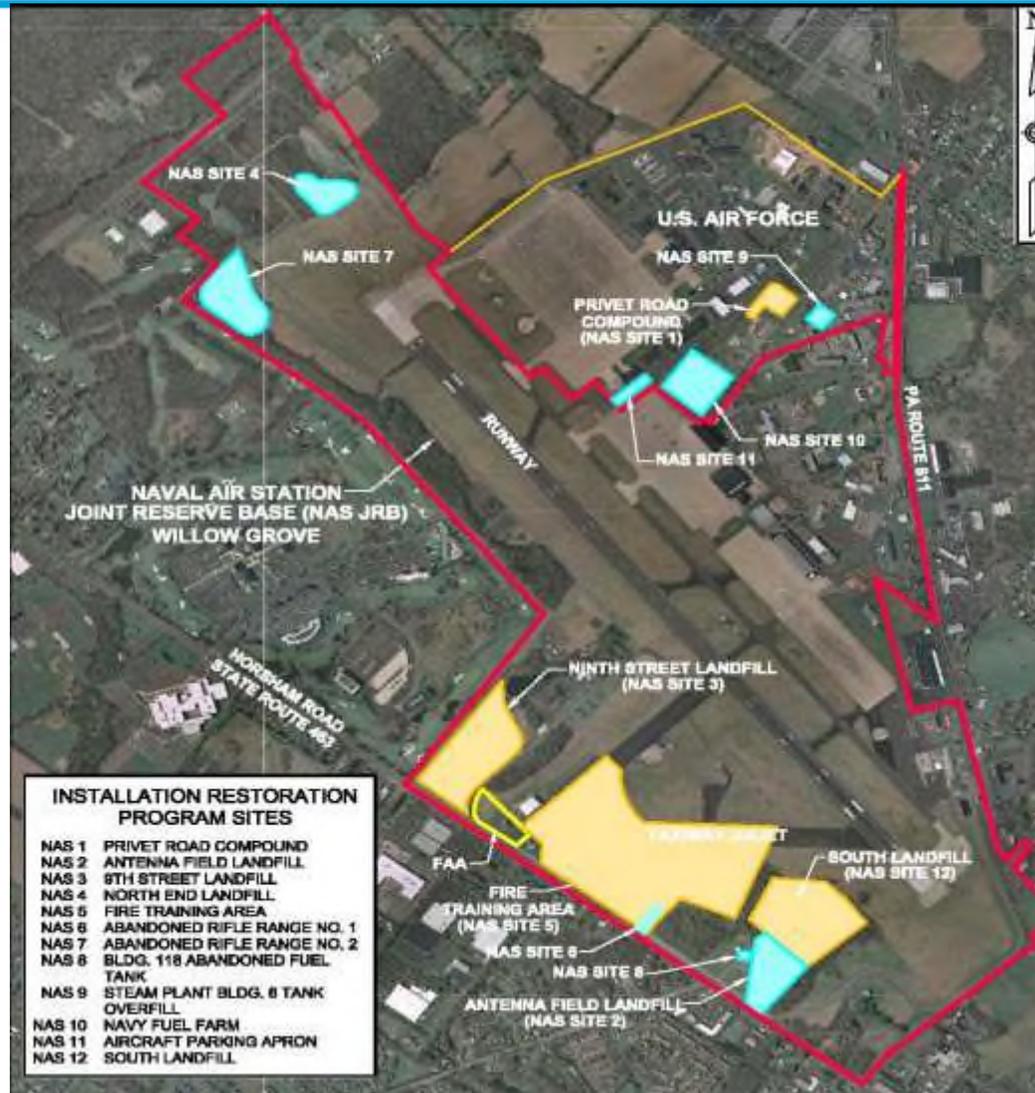


Environmental Restoration Sites



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 $\mu\text{g/L}$) 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.

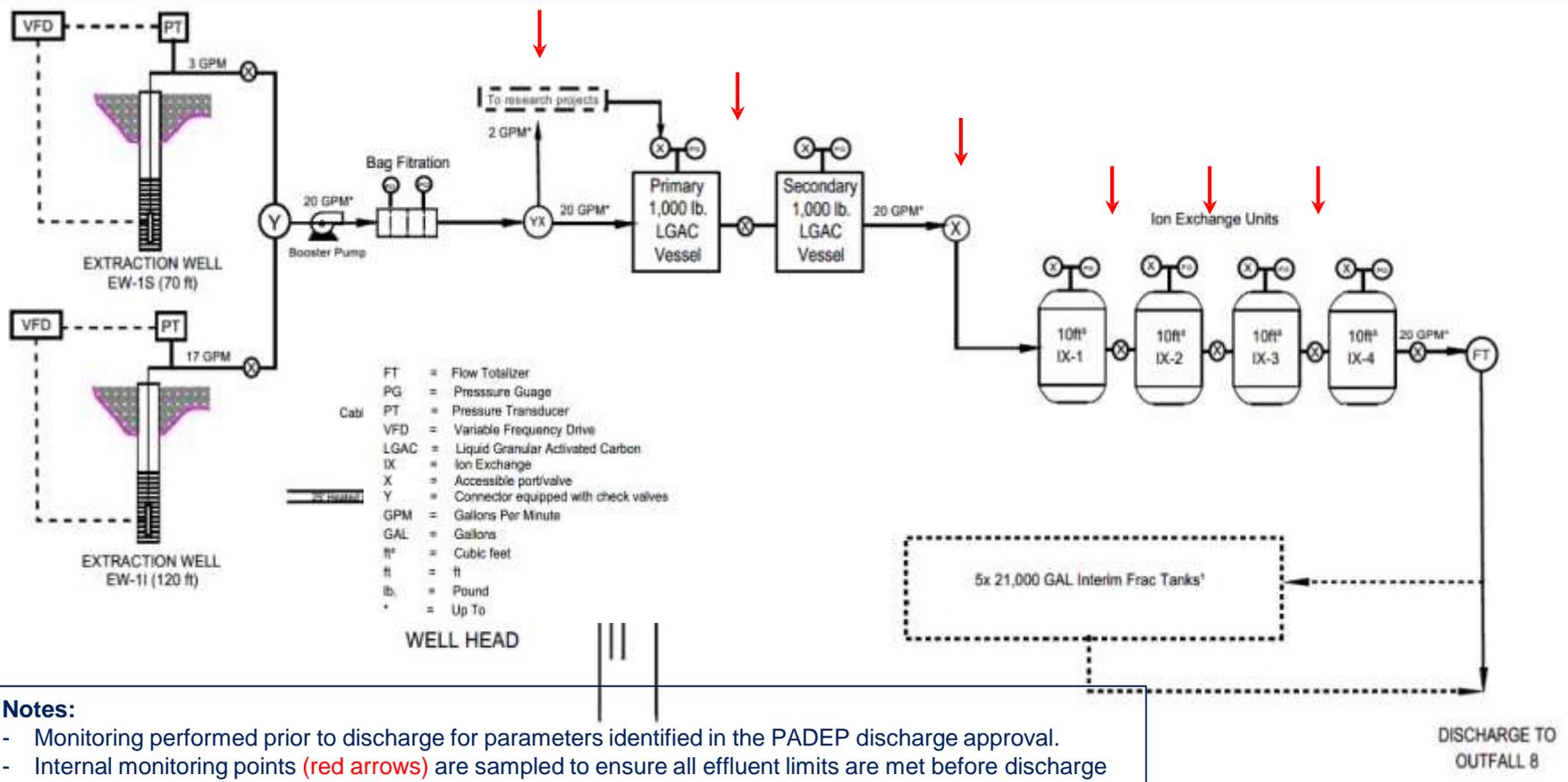
Hangar 680 Pilot Test Treatment System



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

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/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

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>



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.

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