Former Naval Air Warfare Center (NAWC) Warminster

Technical Review Committee (TRC) Meeting

January 30, 2019

Outline

- Welcome
- Environmental Restoration Status
- Per- and polyfluoroalkyl substances (PFAS)
- Questions
- Closing remarks

Background Information

- A Technical Review Committee (TRC) 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.
- TRCs enable people interested in the environmental cleanup at a specific installation to exchange information with representatives of regulatory agencies, the installation, and the community.
- TRCs may only address issues associated with environmental restoration activities.
- Health related issues are not addressed by the TRC. Health information links are provided at the end of the presentation.

Source: DoD RAB Rule Handbook

Environmental Restoration Program

Remedial Action Summary

- Operable Units 1A (OU-1A), 3 (OU-3) and 4 (OU-4) have LUCs and a groundwater extraction and treatment system to remove Volatile Organic Compounds (VOCs). The system extracts groundwater from areas A, C, and D and uses air stripping and granular activated carbon to process up to 202,000 gallons-per-day, or 140 gallons-per-minute (gpm). The treated water is discharged to a tributary of Little Neshaminy Creek.

- Operable Units 7 (OU-7) and 9 (OU-9) have land-use controls (LUCs) which are monitored annually.

- The remaining Operable Units - OU-1B, OU-2, OU-5, OU-6, and OU-8 - have no further action.

Additional information about NAWC Warminster can be found in BACKUP

Groundwater Treatment System

- Effective flowrates for November 2018: 133.9 gpm (gpm = gallons-per-minute)
  - 69.0 gpm from Area A
  - 31.7 gpm from Area C
  - 33.2 gpm from Area D
- Through November 2018, over 1.1 billion gallons of groundwater have been treated, removing thousands of pounds of VOCs, since the treatment plant started operating in 1996.
- Beginning in 2014, additional extraction wells were turned on and new granular activated carbon was added to treat for PFOA and PFOS.

Additional information about NAWC Warminster Groundwater Treatment System can be found in BACKUP

Groundwater Treatment Plant Discharge Permits

- DRBC (Delaware River Basin Commission) Docket:
  - Docket renewal effective on 13 December 2017.
  - Valid for 5 years / mirrors NPDES (expires 2023).

- PADEP issued NPDES (National Pollutant Discharge Elimination System) permit:
  - Permit renewed on 1 August 2018. Removal of PFOA and PFOS to below 70 ppt is now required.
  - Valid for 5 years (expires 31 July 2023).
- Updated discharge permits will be obtained as appropriate for any future changes.

Monitoring Activities and Reports Update

- Fall 2018 LUC (Land-Use-Controls) Inspection:
  - On-site inspection completed on 20 November 2018.
  - No issues/ deficiencies observed during inspection.
  - Document search followed.
  - LUC Report prepared.

Monitoring Activities and Reports Update (cont.)

- Recent Monitoring Activities:
  - Fall 2018 groundwater sampling event performed in November 2018:
    - Area A – 25 wells sampled for select VOCs.
    - Area C – 11 wells sampled for select VOCs.
    - Area D – 9 wells sampled for select VOCs.
    - Area A, Area C, and Area D extraction wells sampled for select PFAS.
    - Area A and Area D extraction wells sampled for Cr+6.
  - Analytical data pending. Report to follow.
- Planned Monitoring Activities:
  - Spring 2019 groundwater sampling event scheduled for May 2019.

Per- and Poly-Fluoroalkyl Substances (PFAS)

PFAS Background Information

- In mid-2014, PFAS known as Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) were found in public drinking water wells near NAWC Warminster 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 found in a wide variety of consumer products and also in fire-fighting solution known as aqueous film-forming foam (AFFF), which was used at NAWC Warminster.
- In the summer of 2014, the Navy began sampling for PFOA/PFOS in private drinking water wells and worked with Warminster Municipal Authority (WTMA) on the municipal drinking water wells.

PFAS Background Information (continued)

- In May 2016, the Environmental Protection Agency established a lifetime Drinking Water 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. Health information weblinks are provided at the end of this presentation.

Private Drinking Water Well Sampling

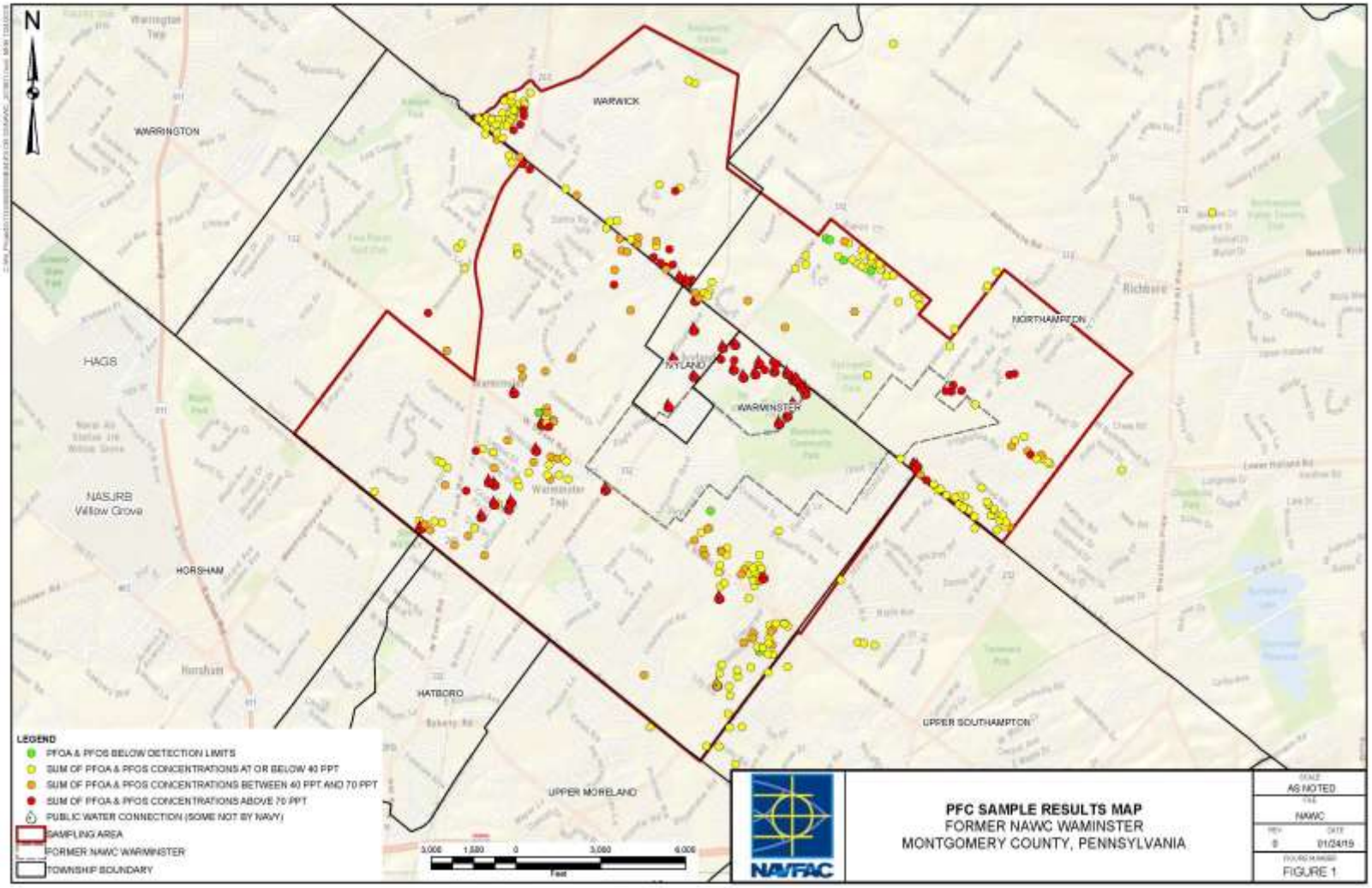
- Private drinking water well sampling for PFOA/PFOS and provision of bottled drinking water is being performed by Tetra Tech, a U.S. Navy contractor.
- The primary point-of-contact is:
  - Mr. Andrew Frebowitz, Tetra Tech Project Manager
  - E-mail: andy.frebowitz@tetratech.com
  - Phone: (610) 382-1170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

Private Drinking Water Well Sampling (continued)

- Private drinking water wells sampled by the Navy for PFAS (all townships) near former NAWC Warminster:
  - Private wells sampled: 363
  - Private wells above HA level (>70 ppt): 73
  - Private wells below HA level/monitored (>40 ppt): 62

- If you are in the sampling area and your private drinking water well has not been sampled, please contact andy.frebowitz@tetratech.com; phone: (610) 382-1170

Private Drinking Water Well Sampling Area



PFAS Drinking Water Actions

- The Navy has provided over $14 million, via a cooperative agreement to WTMA, for filtration system costs and drinking water connections with PFOA/PFOS above the HA level. 40 municipal connections have been completed.

- The Navy has funded carbon filtration systems at four Warminster Township Municipal Authority (WTMA) public wells (#2, 10, 13, and 26) to remove PFOA/PFOS concentrations above the HA level. WTMA has recently finished construction on all four.

- The Navy has established cooperative agreements with Warwick Township Water and Sewer Authority (WTWSA) and Northampton Bucks County Municipal Authority (NBCMA) to provide municipal connections for private drinking water wells above the HA due to historical activities at former NAWC Warminster.

Other Warminster / Warrington Township Private Wells

- Actions at public and private wells in Warrington Township and western Warminster Township, near the Horsham Air National Station, are addressed separately by the Air Force/ Air National Guard.
- Contact:
  - Mr. Keith Freihofer
  - Environmental Restoration Program Manager
  - 3501 Fetchet Ave - Shepperd Hall
  - Joint Base Andrews, MD 20762-5157
  - Phone (240) 612-8762
  - e-mail: keith.e.freihofer.civ@mail.mil

PFAS Remedial Investigation (RI) performed

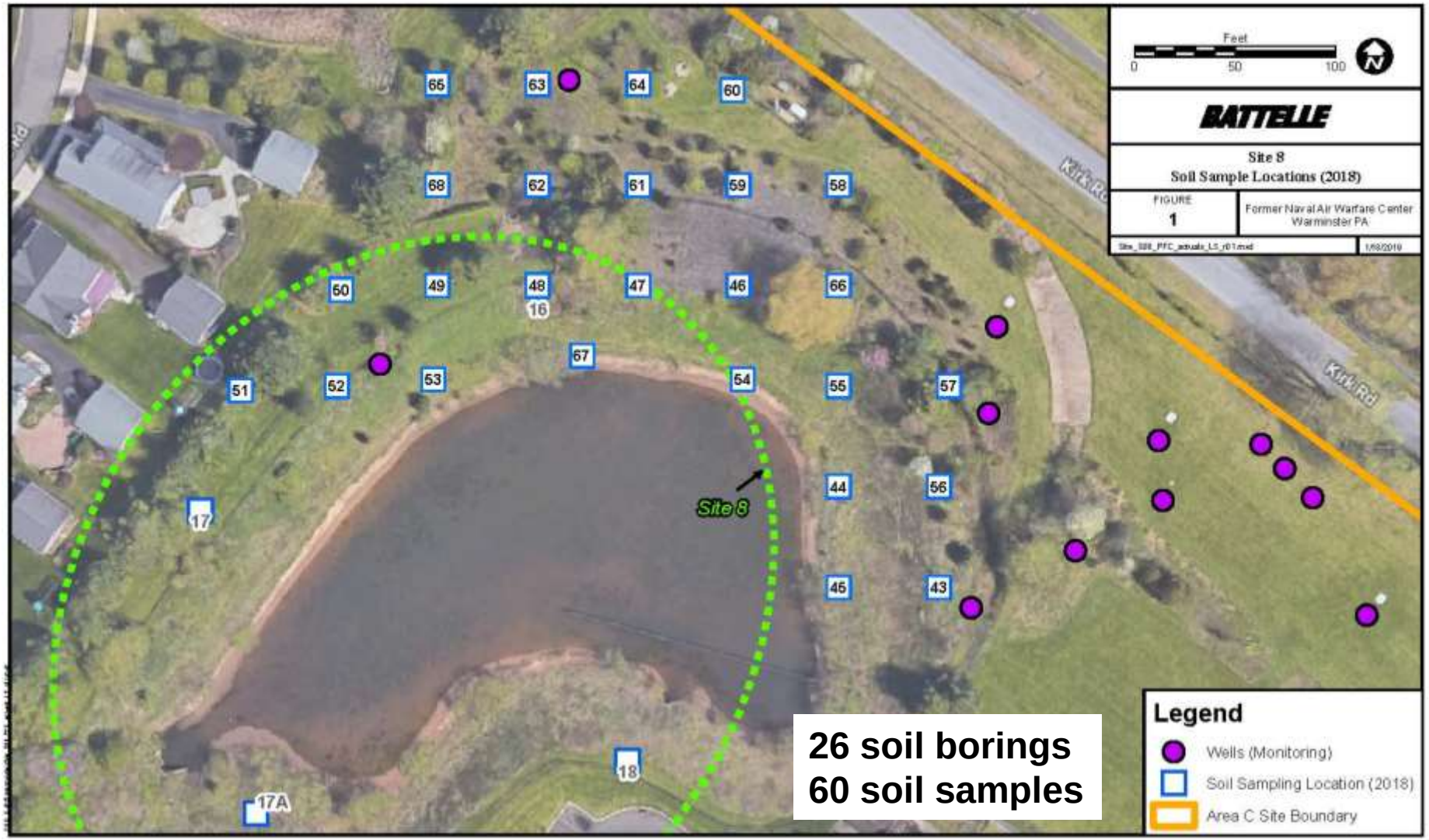
- Sampling and analysis plans (SAP) and addendums prepared in 2015 – 2017. Plans are available in the administrative record.
- Surface water/sediment sampling – Oct 2016
- Groundwater sampling from existing wells – Apr/May 2017
- Surface water/sediment sampling – May 2017
- Soil sampling (within suspected PFAS source areas) – Jun 2017

Additional information about NAWC Warminster PFAS RI investigation performed can be found in BACKUP

PFAS Remedial Investigation (RI) Actions

- Inactive municipal well profiling – Apr 2018 – present
- Groundwater monitoring well installation – May 2018 - present
- Groundwater sampling from Hazardous Sites Cleanup Act (HSCA) site monitoring wells – Aug 2018
- Supplemental Soil sampling (within suspected PFAS source areas) – Sep 2018

PFAS RI – Supplemental Soil Sample Locations



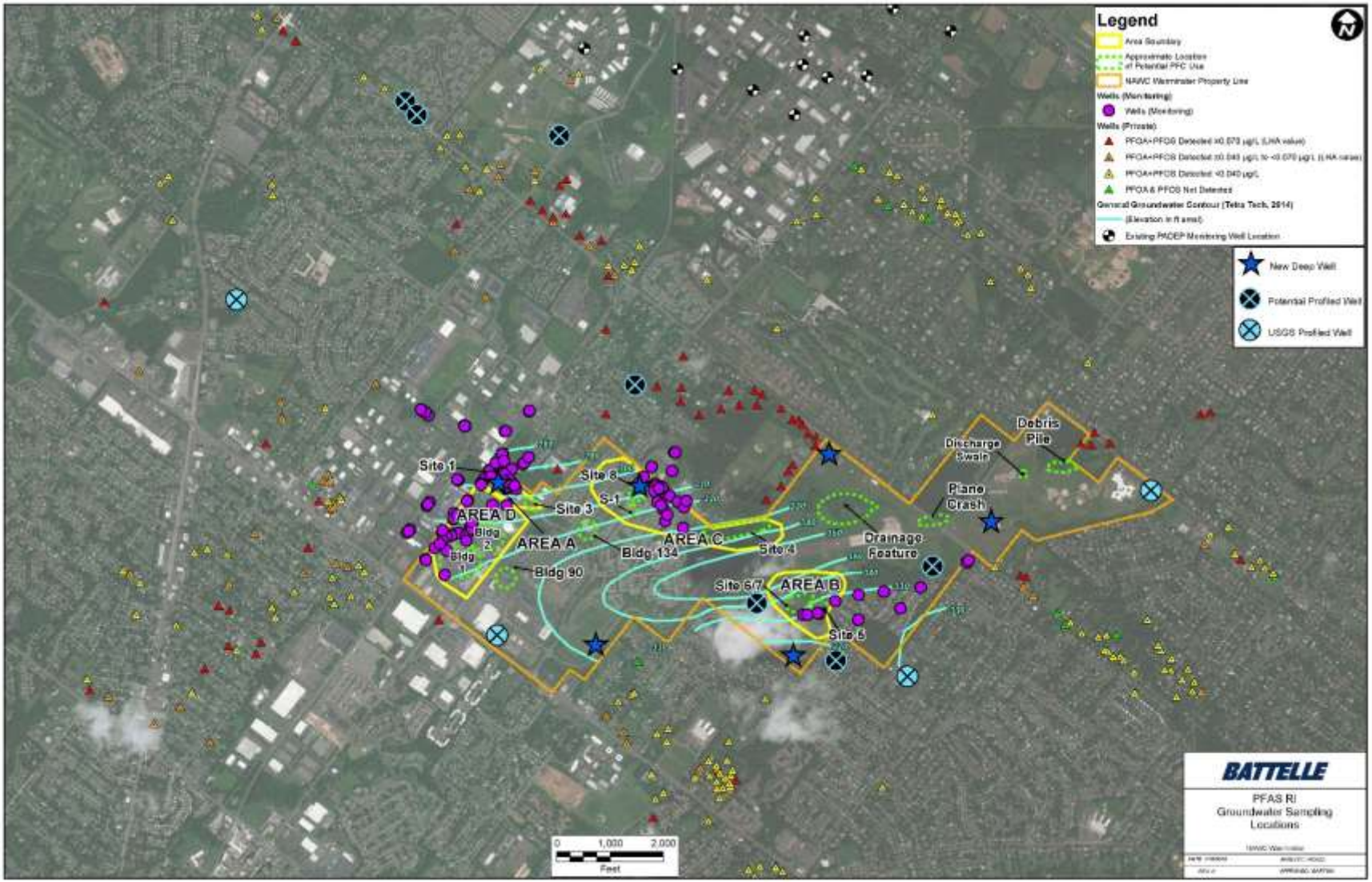
PFAS RI – Additional Groundwater Well Sampling

- Inactive municipal production well profiling – USGS
  - Discrete sampling depths based on video logs and geophysical testing data
  - Between 4 and 9 zones sampled per well
  - Four wells profiled to date; NAWC-10, NHBCMA-15, WMA-28, and WMA-36
  - WMA-25 scheduled for profiling in near future; continue to evaluate other potential wells
- Groundwater sampling from HSCA site monitoring wells
  - Railroad and Jacksonville TCE HSCA sites, located north of the NAWC, have wells used to monitor unrelated TCE plumes
  - Four well clusters (12 wells total) sampled after obtaining access agreements

PFAS RI – New Groundwater Well Installation and Sampling

- On-Site deep groundwater monitoring well installation
  - Initial RI groundwater data indicated PFAS above HA values in deepest wells sampled (HGU C)
  - Six (6) deep on-site well locations were selected to evaluate vertical and spatial PFAS distribution – total depth up to 600 feet, consistent with deepest former NAWC Warminster drinking water production wells
  - Phased approach for well installation:
    - Install initial 6-inch boring up to 600 feet deep and set temporary casing
    - Perform geophysical testing in initial borehole to identify water-bearing zones and collect discrete-depth samples to vertically delineate PFAS concentrations
    - Complete additional borings and install up to 4 monitoring wells at each location based on results of well profiling
    - Collect PFAS samples from developed wells

PFAS RI – Additional Monitoring Well Locations



PFAS RI - Path Forward

- Complete new deep groundwater monitoring well installation
- Sample groundwater from newly installed and developed monitoring wells
- Draft Phase I RI report anticipated in late Spring 2019
- Further investigation, known as Phase II, expected to be initiated later in 2019 and focus on potential source areas

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)/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 the BRAC PMO 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

Questions?

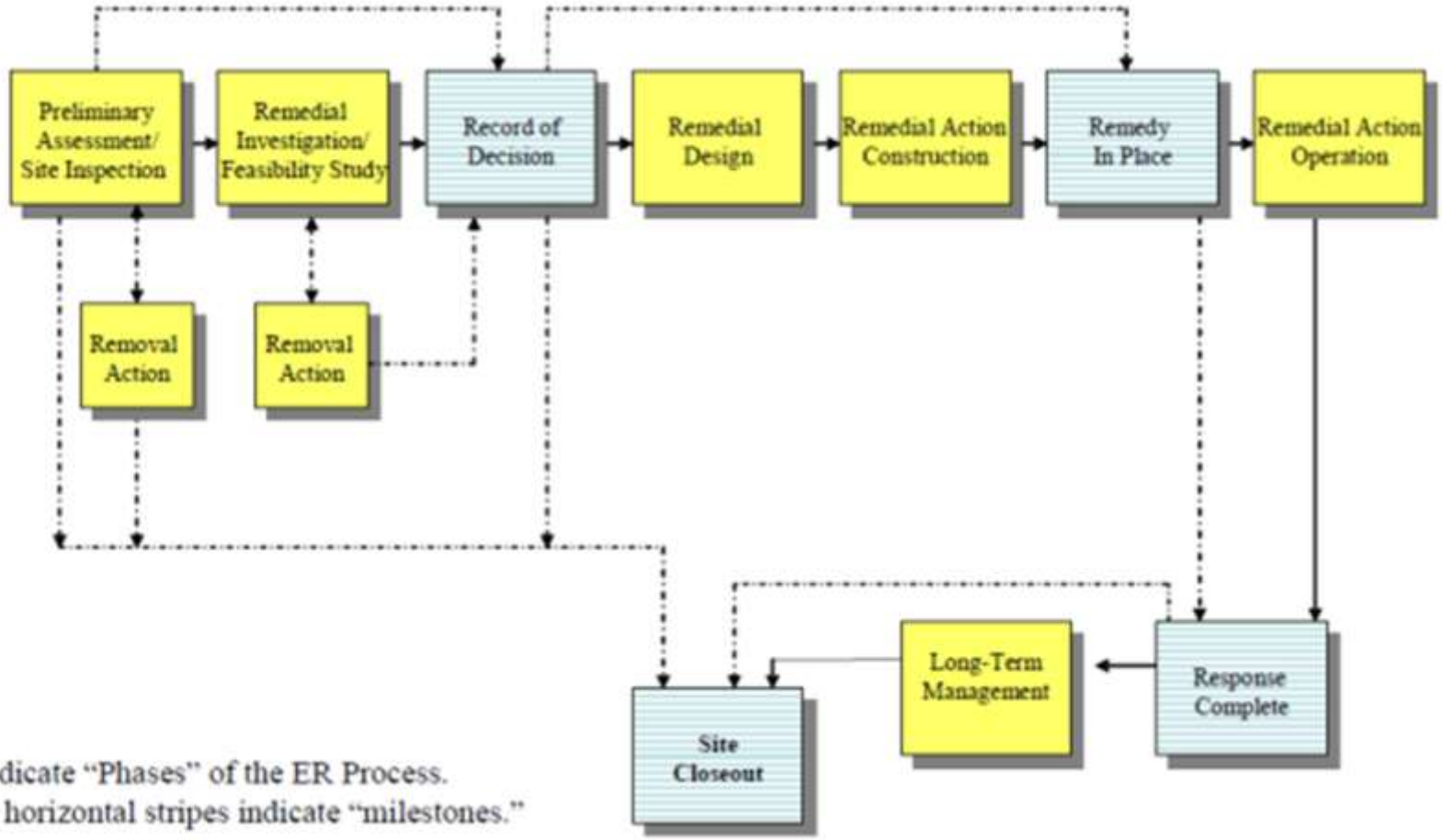
- Questions or comments from the TRC?
- Questions or comments from the community?
- Next Meetings
  - Summer 2019, time/date TBD
- Closing Remarks

BACK UP / ADDITIONAL INFORMATION

NAWC Warminster History

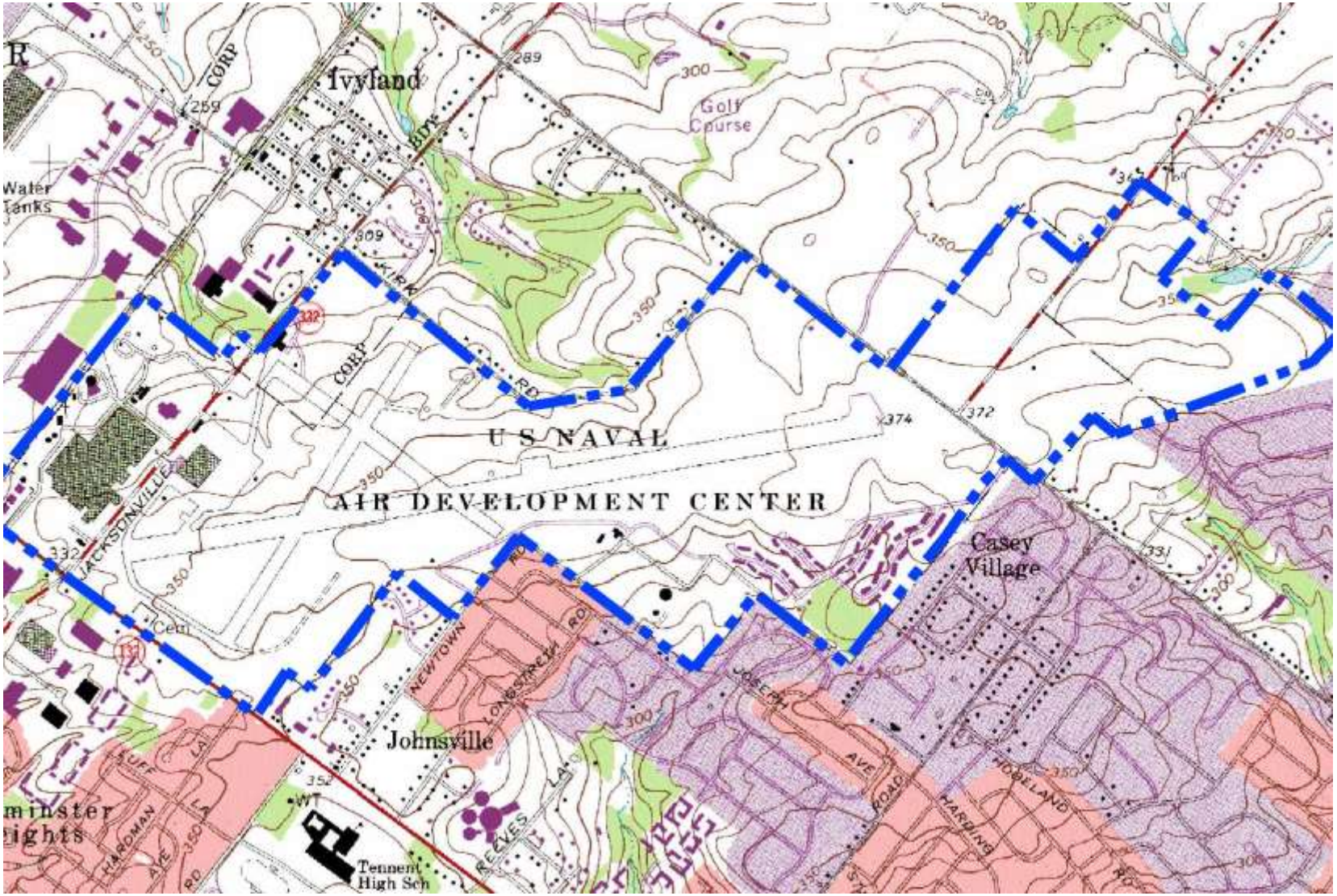
- Originally site of Brewster Aeronautical Corporation, acquired by the U.S. Government in 1944.
- Designated Naval Air Development Center (NADC) in 1949
- Was also known as Johnsville Naval Air Station.
- Listed in National Priorities List (NPL) in 1989 as Naval Air Development Center Warminster (Eight Waste Areas)
- Became Naval Air Warfare Center (NAWC) in January 1993.
- Closed by Base Realignment and Closure (BRAC) in 1995.
- Operations ceased in 1997, Naval Facilities Engineering Command became responsible for property disposal and environmental restoration.
- All property transferred by 2000. Former housing areas, Jacksonville Road and Shenandoah Woods, transferred to NASJRB Willow Grove.

Environmental Restoration Program



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

Environmental Restoration Site Location



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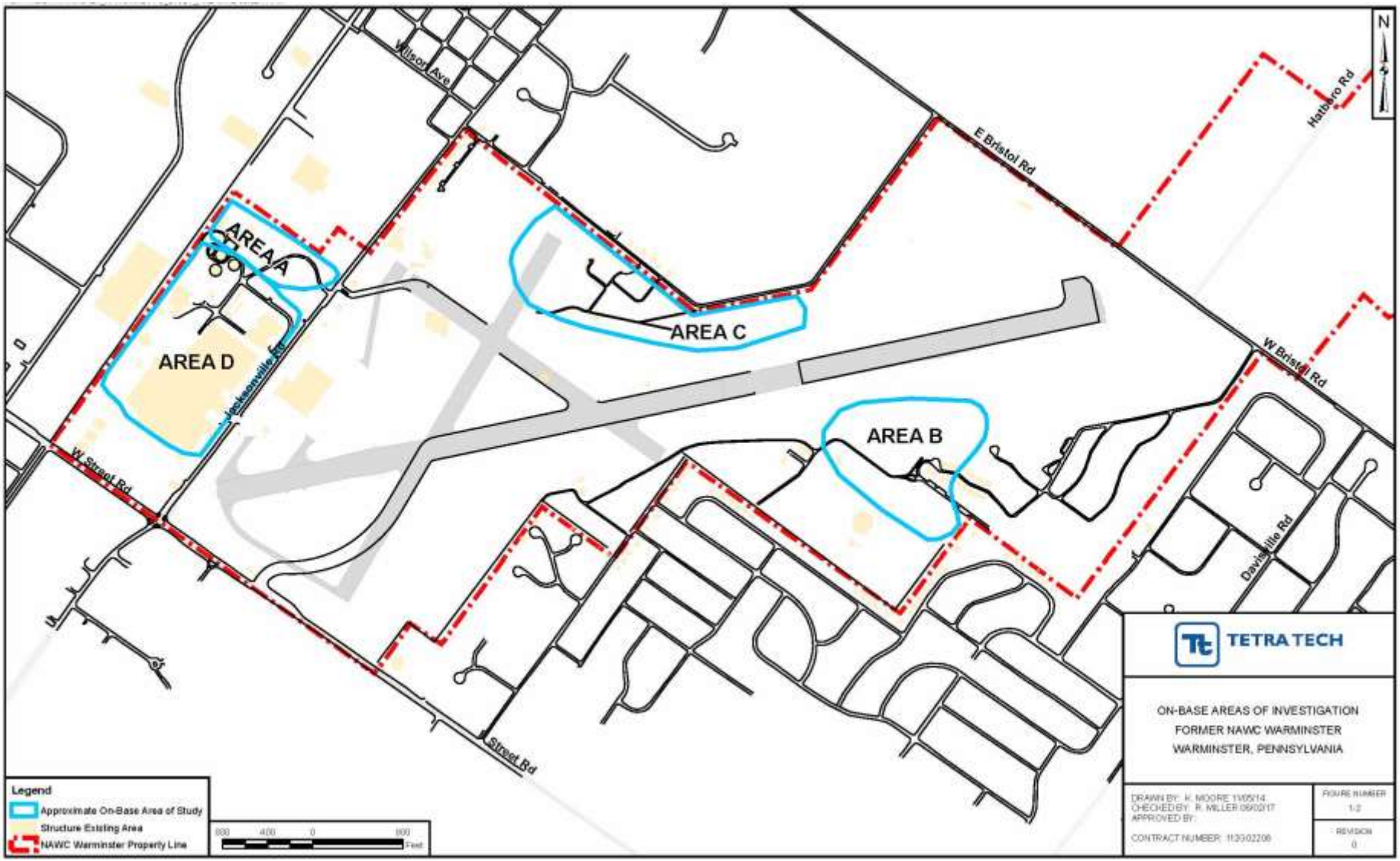


Environmental Restoration Sites

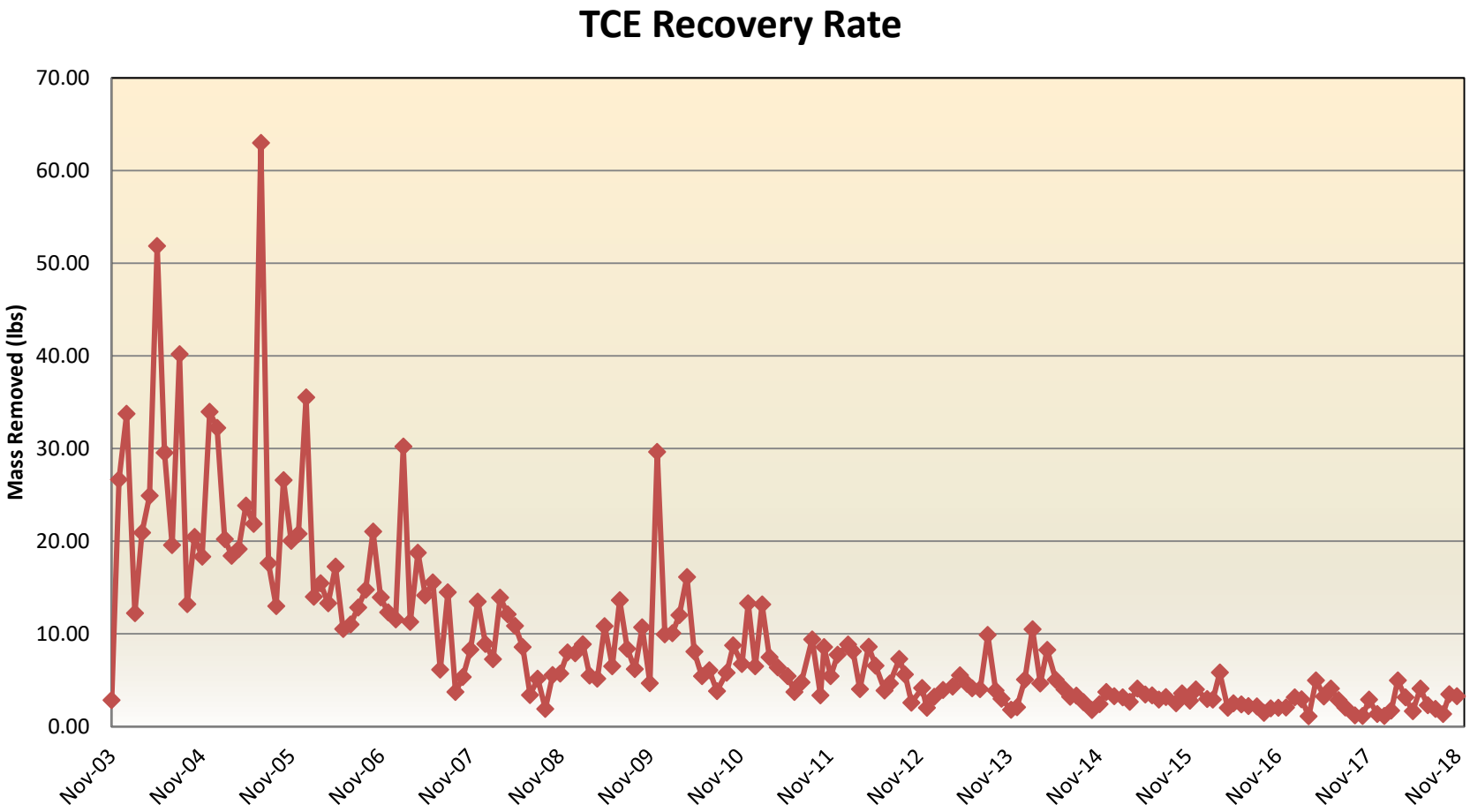
AREA	SITES	OPERABLE UNITS	SITE DESCRIPTION	STATUS
A	1	OU-1A (Groundwater) OU-9 (Soil, sediment, surface water)	Waste disposal	Groundwater (OU-1A) ROD Sept. 2000 Soil (OU-9) ROD June 2000.
	2	OU-1A (Groundwater) OU-9 (Soil, sediment, surface water)	Sludge disposal pit	Groundwater (OU-1A) ROD Sept. 2000 Soil (OU-9) ROD June 2000.
	3	OU-1A (Groundwater) OU-9 (Soil, sediment, surface water)	Waste disposal	Groundwater (OU-1A) ROD Sept. 2000 Soil (OU-9) ROD June 2000.
	Impoundment Area	OU-1A (Groundwater) OU-9 (Soil, sediment, surface water)	Unlined wastewater sludge impoundment areas	Groundwater (OU-1A) ROD Sept. 2000 Soil (OU-9) ROD June 2000.
B	5	OU-1B (Groundwater) OU-10 (Soil, sediment, surface water)	Landfills	Groundwater (OU-1B) NFA ROD Sept. 2000 Soil (OU-10) NFA ROD signed Sept. 2000
	6	OU-1B (Groundwater) OU-7 (Soils and wastes)	Waste disposal	Groundwater (OU-1B) NFA ROD Sept. 2000 Soil (OU-7) ROD signed June 2000
	7	OU-1B (Groundwater) OU-7 (Soils and wastes)	Sludge disposal pit	Groundwater (OU-1B) NFA ROD Sept. 2000 Soil (OU-7) ROD signed June 2000
	NA	OU-2 (Groundwater)	Off-base drinking water, Areas B and C	No ROD. Emergency action 1993-1994
C	4	OU-3 (Groundwater) OU-6 (Soil, sediment, surface water)	Landfills	Groundwater (OU-3) ROD March 1995 OU-3 ESD Sept. 1999 Soil (OU-6) NFA ROD June 2000
	8	OU-3 (Groundwater) OU-5 (Soil, sediment, Surface Water)	Fire Training Area	Groundwater (OU-3) ROD March 1995 OU-3 ESD Sept.1999 Soil (OU-5) NFA ROD Sept. 1999
D	NA	OU-4 (Groundwater) OU-8 (Soils)	Industrial Area	Groundwater (OU-4) ROD June 2000 Soil (OU-8) NFA ROD June 2000

Treatment System – VOC Removal

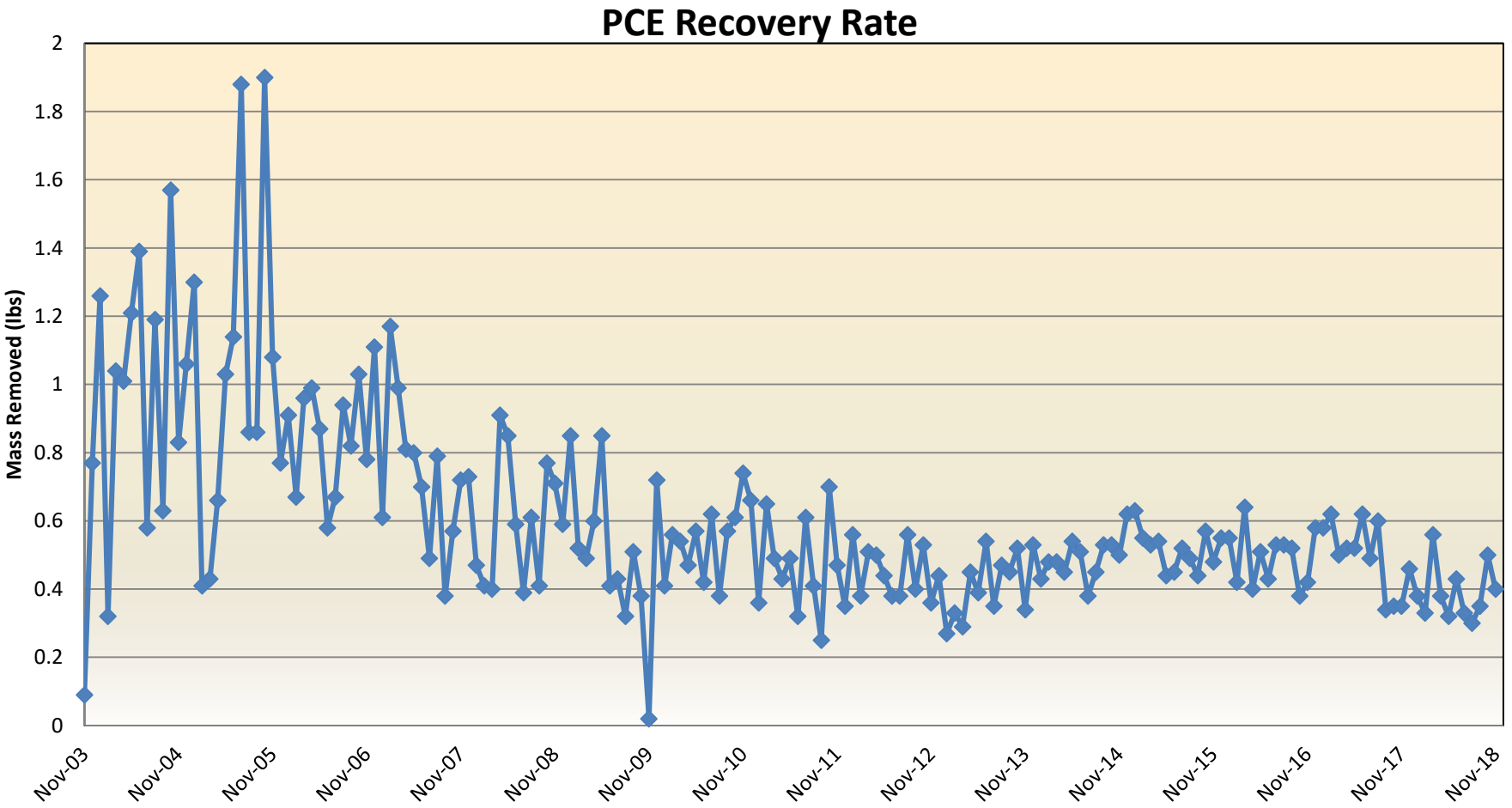
- Cumulative dissolved-phase VOC recovery through November 2018 reporting period (all Areas):
  - Trichloroethene (TCE) – 4,954 pounds (3.27 lbs in 11/18)
  - Tetrachloroethene (PCE) – 175 pounds (0.40 lbs in 11/18)
  - Carbon Tetrachloride (CCl_4) – 169 pounds (0.14 lbs in 11/18)

- Majority of VOC recovery is from Area A (3.25 lbs TCE, 0.30 lbs PCE, and 0.14 lbs CCl_4 in 11/18)
  - Remainder of TCE recovery from Area D (0.01 lbs in 11/18)
  - Remainder of PCE recovery from Area C (0.09 lbs in 11/18) and Area D (0.01 lbs in 11/18).

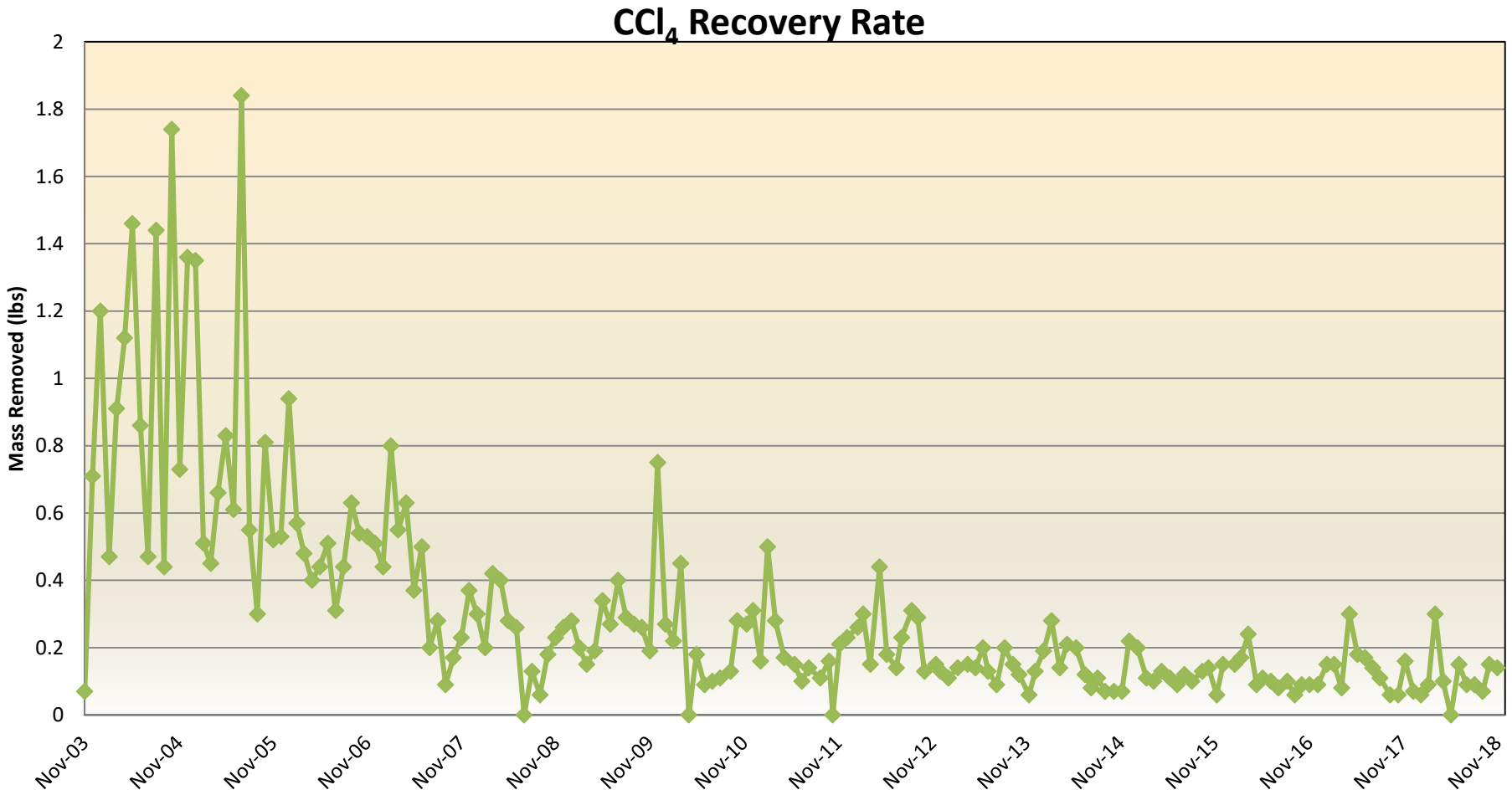
VOC Removal Evaluation – TCE Recovery Rate



VOC Removal Evaluation – PCE Recovery Rate

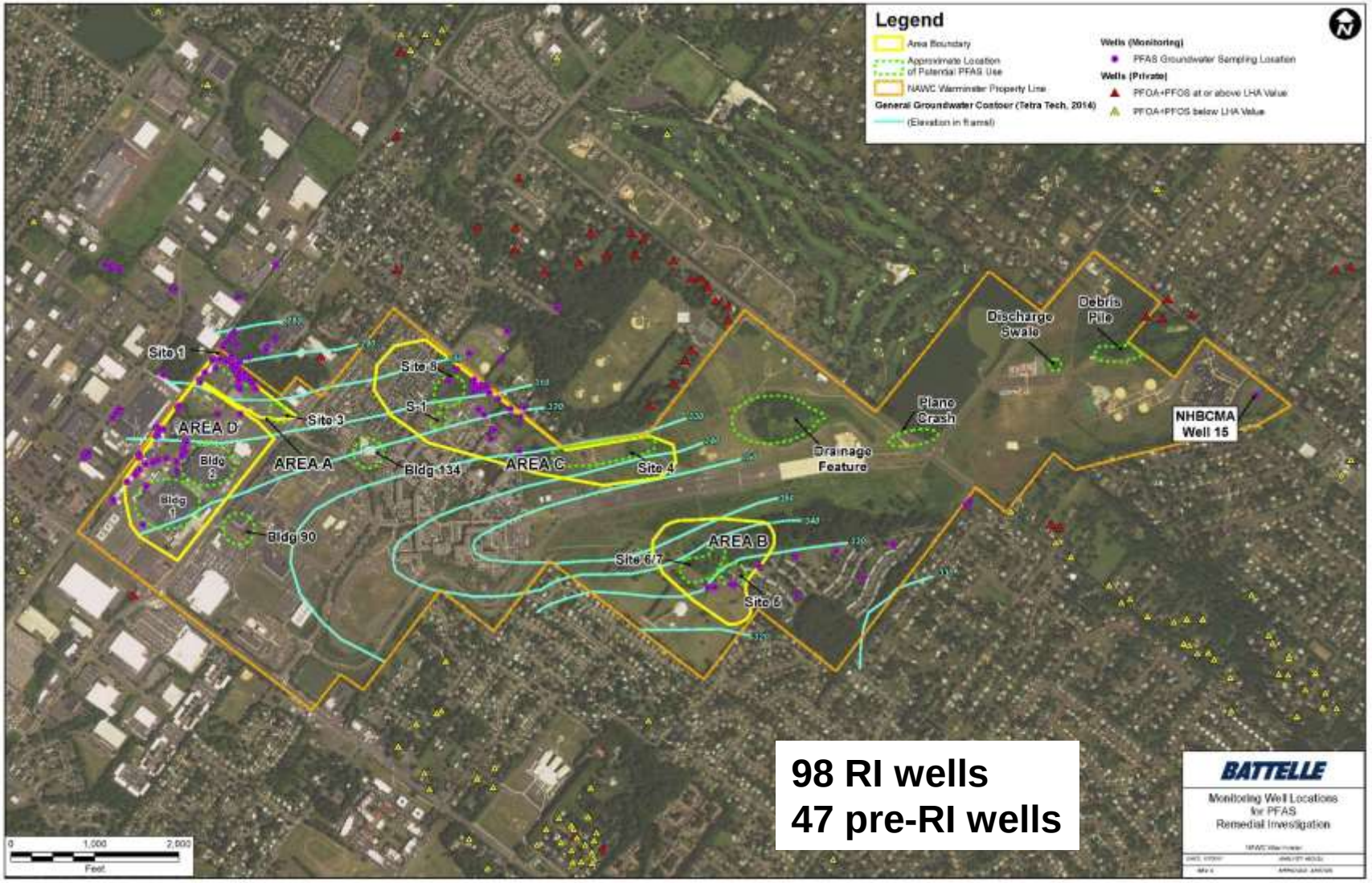


VOC Removal Evaluation - CCl_4 Recovery Rate

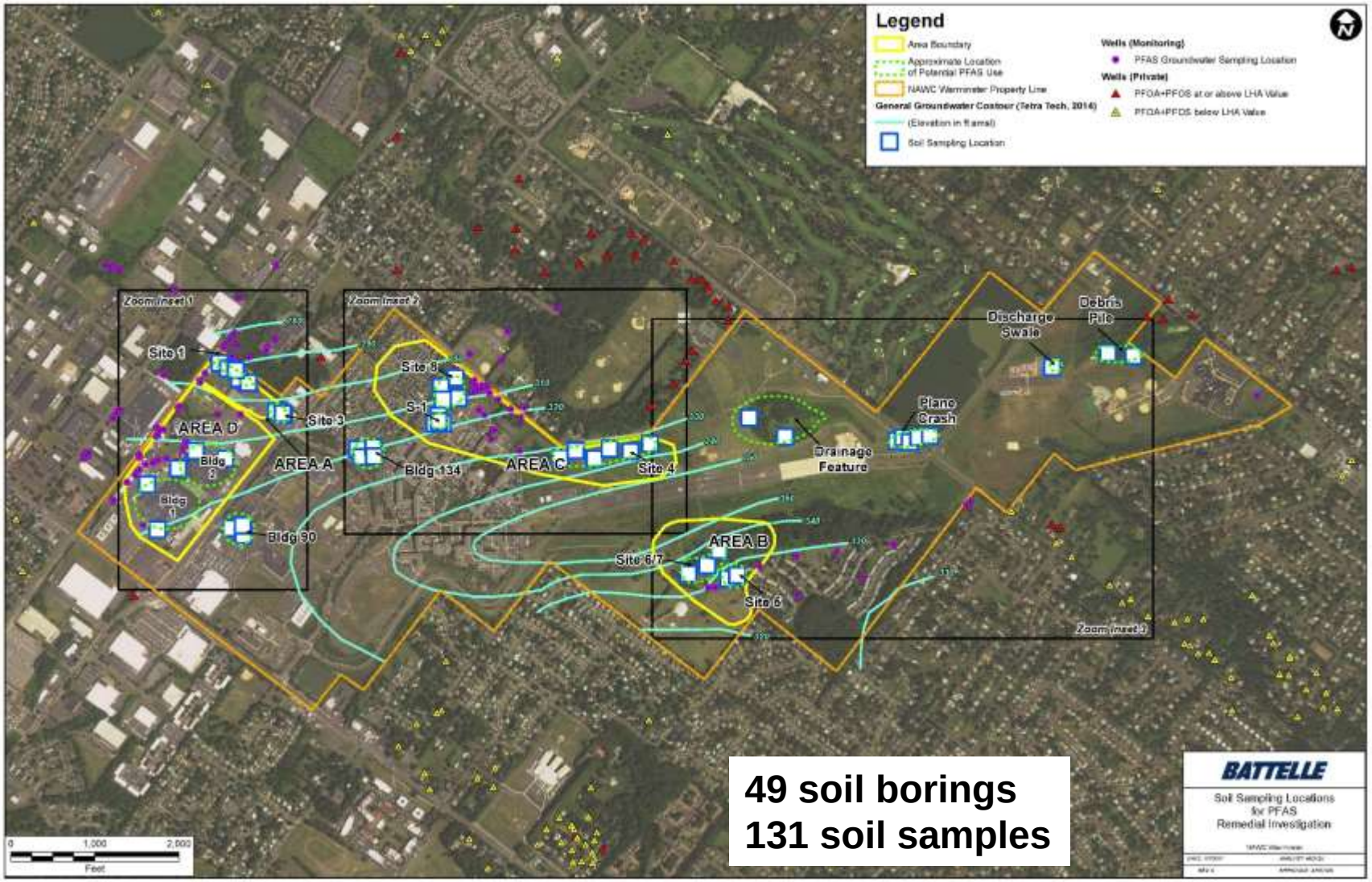


Warminster Potential PFAS Source Areas

PFAS RI Groundwater Sampling Locations



PFAS RI – Initial Soil Sample Locations



49 soil borings
131 soil samples

PFAS RI - Surface Water/Sediment Sampling

Date	No. of Samples	
	Surface Water	Sediment
Oct 2016	66	52
May 2017	72	59