

Former Fort Devens Army Installation Project Status Update 18 October 2018

Restoration
Advisory Board
Meeting





Agenda

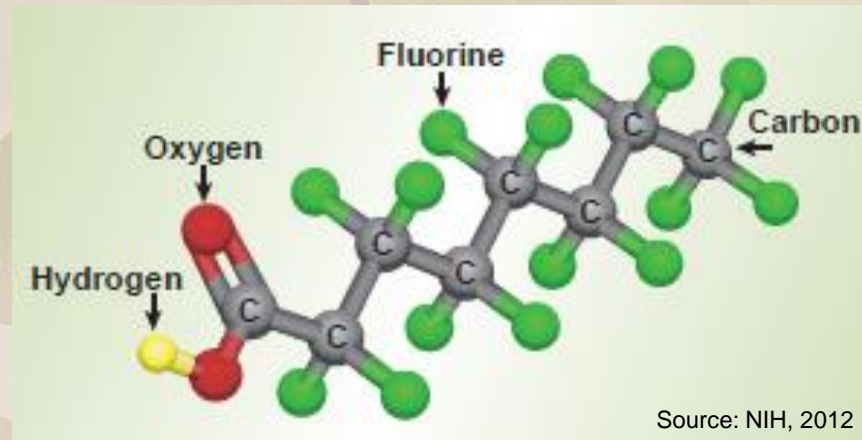
- Per- and Polyfluoroalkyl Substances (PFAS)
 - ▶ Community and private well sampling update
 - ▶ Town of Ayer and Devens water supply well sampling update
 - ▶ Remedial Investigation (RI) updates
 - Area 1 sampling (ongoing)
 - Area 2 work plan (draft currently under review)
 - Area 3 work plan (draft planned for mid-November)





What is PFAS?

- PFAS is a family of synthetic chemicals
 - ▶ diverse compounds
 - ▶ used in the U.S. since the 1940s
- Two most studied PFAS are:
 - ▶ perfluorooctane sulfonate (PFOS)
 - ▶ perfluorooctanoic acid (PFOA)





Background – PFAS

- PFAS are ubiquitous due to a wide variety of commercial, industrial, and household consumer uses, such as:
 - ▶ Aqueous fire-fighting foams (AFFF)
 - ▶ Various plastics and coatings, carpeting, water-proof clothing, rain gear, Teflon pans, food wrappers, certain cosmetics, paints, pesticides, herbicides
 - ▶ Metal plating operations, electronics manufacturing
 - ▶ For more information, see the *History and Use of Per- and Polyfluoroalkyl Substances* (2017 fact sheet by the Interstate Technology & Regulatory Council [ITRC])
- Concerns
 - ▶ Very persistent and mobile in the environment
 - ▶ Bioaccumulation
 - ▶ Known or suspected toxicity, especially for PFOS and PFOA
 - ▶ Still an area of ongoing research





Background – Regulatory

- 2012 – EPA’s Safe Drinking Water Act (SDWA) (as amended in 1996)
 - ▶ Unregulated Contaminant Monitoring Rule (UCMR)
 - ▶ Provides EPA with information on potential contaminants in drinking water in order to help make regulatory decisions
 - ▶ UCMR 3 added PFAS to the list of unregulated compounds to be monitored by public water systems
 - PFOS, PFOA, PFBS, PFHxS, PFHpA, PFNA

- 2014 – EPA identified PFOS and PFOA as “emerging contaminants”
 - ▶ PFOS & PFOA most-widely produced PFAS compounds in U.S.
 - ▶ Adverse effects identified in laboratory animals





Background – Regulatory

- 2016 – EPA Lifetime Health Advisory (LHA) for PFOS & PFOA
 - ▶ EPA LHA of 0.07 micrograms per liter ($\mu\text{g/L}$) (70 parts per trillion [ppt])
 - ▶ Applies to PFOS and PFOA, and the sum of PFOS and PFOA in drinking water
- 2018 – MassDEP issued public health guideline, Office of Research and Standards Guideline (ORSG) for drinking water
 - ▶ 70 ppt for PFOS, PFOA, PFNA, PFHxS, and PFHpA (individually or in total)





Background – Army

- Army is evaluating PFAS at the former Fort Devens under the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (aka Superfund)
- 2016/2017 – Preliminary Assessment (PA) completed
- 2017 – Site Inspection (SI) completed
 - ▶ April 2017 – SI work plan
 - ▶ June 2017 – SI sampling of soil, sediment, groundwater, surface water
 - ▶ Jan. 2018 – Supplemental sampling of LTM wells for PFAS
 - ▶ Jan. 2018 – Supplemental SI sampling of the Devens Fire Station
 - ▶ May 2017 – SI report
 - ▶ Aug. 2018 – Supplemental SI report
- 2018 – Remedial Investigation (RI) ongoing
- 2018 – Sampling of selected municipal, community, and private wells for PFAS

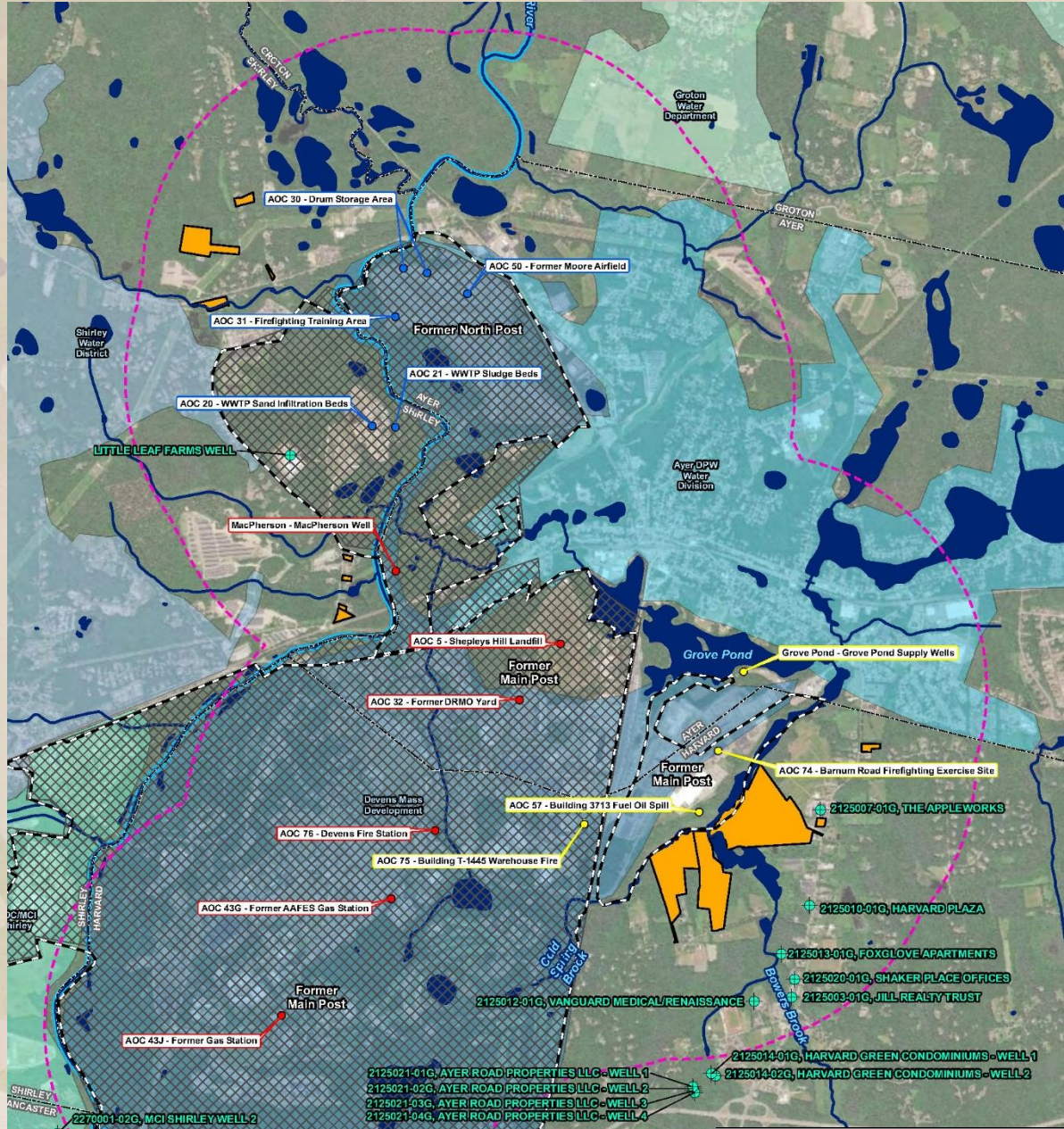




Community and Private Well Sampling

- Identified community and private wells located within 1 mile of PFAS detections at Fort Devens
 - ▶ Devens, Ayer, Shirley, Harvard, Groton, Lancaster
- July 2018 – Issued work plan to proactively sample selected community and private wells in that 1 mile radius
 - ▶ Selected based on their proximity to Devens and the PFAS detections
- Aug.-Sept. 2018 – Collected samples
- Sept.-Oct. 2018 – Mailed results to well owners
 - ▶ All results were below the EPA LHA of 70 ppt for PFOS and PFOA
 - ▶ PFAS was detected in 12 of 22 wells sampled
 - ▶ In those 12 wells, PFOS+PFOA ranged from <2 to 31 ppt
 - average = 8 ppt





Public Water Supply Service Boundaries

- Ayer DPW Water Division
- Groton Water Department
- DOC/MCI Shirley
- Shirley Water District
- Devens Mass Development
- West Groton Water Department





Summary of Public Supply Wells PFAS Sampling

- Ongoing sampling of public water supply wells since Sept. 2016
 - ▶ Ayer – Grove Pond wellfield
 - ▶ Devens – MacPherson, Patton, and Shaboken wells
- The finished drinking water distributed to the public has not exceeded the EPA LHA for PFOS and PFOA
- March 2018 – MassDEP issued letters to Ayer and Devens indicating that, out of an abundance of caution, MassDEP recommended PFAS concentrations in drinking water be reduced
 - ▶ Using the five compounds (PFOS, PFOA, PFNA, PFHxS, and PFHpA), Grove Pond well #8 and the MacPherson well have exceeded 70 ppt
 - ▶ Ayer and Devens changed operations and issued public notices
 - Ayer Well #8 and MacPherson well are not used for water supply





Summary of Public Supply Wells Operations

- MacPherson water supply well (Devens) was taken out of service on February 27, 2018
- Grove Pond Wellfield (Ayer)
 - ▶ All distributed/finished drinking water is below the EPA LHA for PFOS and PFOA
 - ▶ Operations were revised
 - Well #8 was taken out of service on February 26, 2018
 - Well #1 was brought on-line
 - ▶ Aug./Sept. 2018 sampling indicates that the distributed/finished water is below the 70 ppt EPA LHA for PFOS and PFOA
- Army will continue routine PFAS sampling of public water supply wells for Devens and Town of Ayer





Ayer & Devens Public Supply Wells Detected PFAS, Aug-Sep 2018

	Grove Pond Wells (ppt)					Spectacle Pond Wells (ppt)		
	Well 1	Well 6	Finished Water (wells 1,6)	Well 7	Finished Water (wells 1,6,7)	Well 1A	Well 2A	Finished Water
PFBS	1.90	3.04	2.98	2.87	2.84	2.37	< 1.85	2.06
PFHxA	3.33	14.9	14.9	59.9	37.1	3.65	30.7	17.8
PFHpA	2.32	7.33	7.65	40	23.8	2.33	12.9	7.93
PFHxS	6.06	6.84	6.91	14.2	10.8	5.55	3.00	4.13
PFOA	7.63	8.56	9.22	24.1	16.6	7.54	10.5	9.10
PFOS	3.71	3.66	3.57	23.2	13.5	7.32	8.08	7.82
PFOS+PFOA			12.79		30.1			16.92

	PATTON WELL (ppt)	SHABOKEN WELL (ppt)
PFHxA	7.64	2.00
PFHpA	4.47	< 1.74
PFHxS	7.46	14.1
PFOA	9.97	5.64
PFOS	3.46	3.70
PFOS+PFOA	13.43	9.34

Green shading shows concentrations below the EPA LHA in finished waters





Public Water Supply – Finished Water Quality PFOS+PFOA Data – 2018



Location	Well ID	Date	PFOS (ppt)	PFOA (ppt)	PFOS+PFOA (ppt)
Ayer	Ayer Finished Water	1/9/2018	32	15	47
		3/7/2018	7	8	15
		4/23/2018	5	6	11
		8/24/2018	4	9	13
		9/11/2018	14	17	30
	Spectacle Pond Finished	3/1/2018	7	7	14
		8/24/2018	8	9	17
Devens	Patton Well 05G	5/14/2018	5	10	15
		8/3/2018	3	10	13
	Shabokin Well 06G	5/14/2018	6	5	10
		8/3/2018	4	6	9





Remedial Investigation Work Plan

- Field activities for the RI were grouped into three areas based on site locations, public water supply well locations, and direction of groundwater flow
 - ▶ Area 1 – Grove Pond wellfield, AOC 57, AOC 74, AOC 75
 - ▶ Area 2 – MacPherson water supply well, AOC 5, AOC 32/43A, AOC 43G, AOC 43J, AOC 76
 - ▶ Area 3 – AOC 20, AOC 21, AOC 30, AOC 31, AOC 50
- Comprehensive public and private well inventory performed concurrently, plus extensive sampling of off-base wells





PFAS RI Areas of Investigation

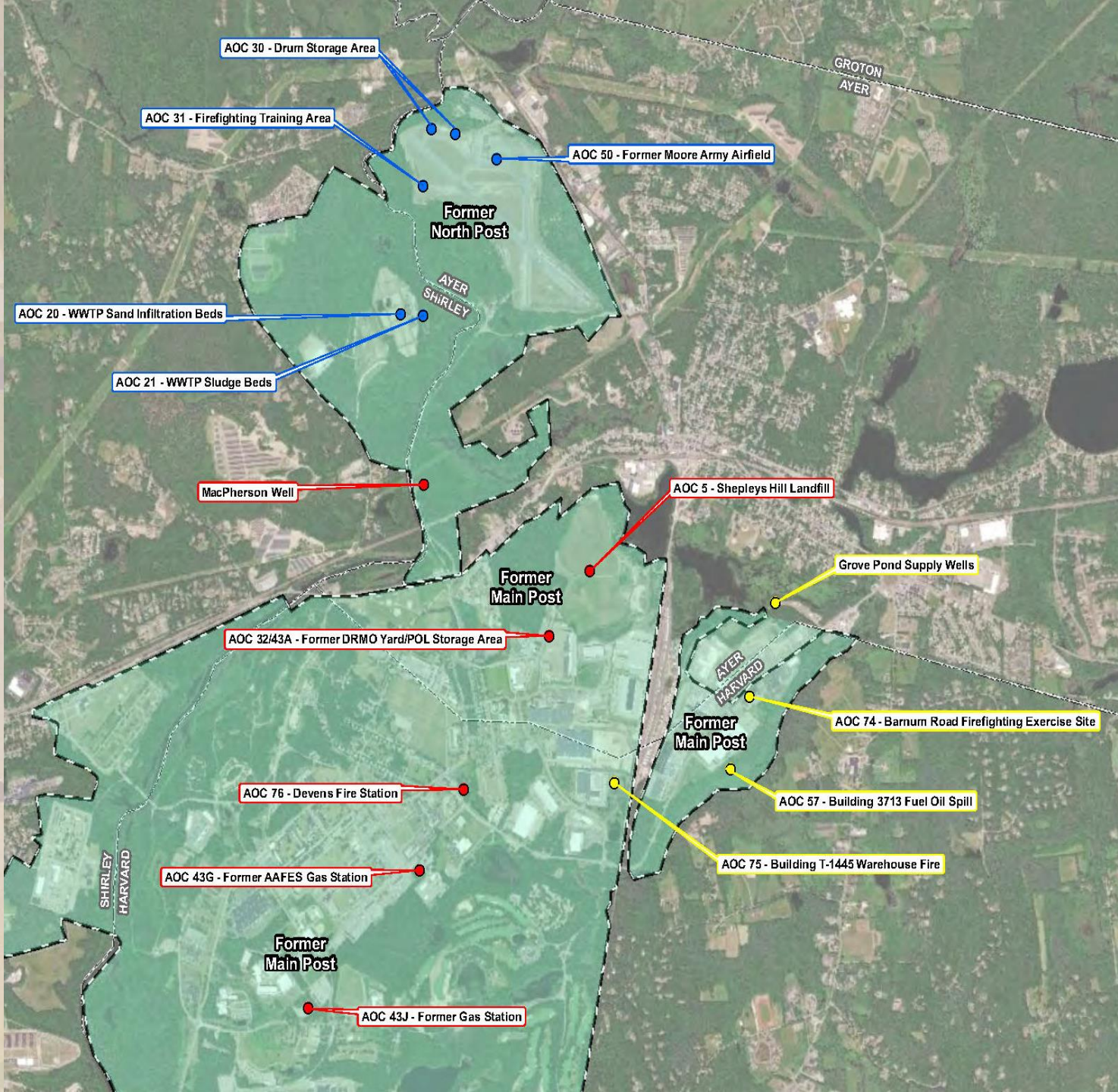
Area 1 = yellow

Area 2 = red

Area 3 = blue



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Remedial Investigation Work Plan (cont.)

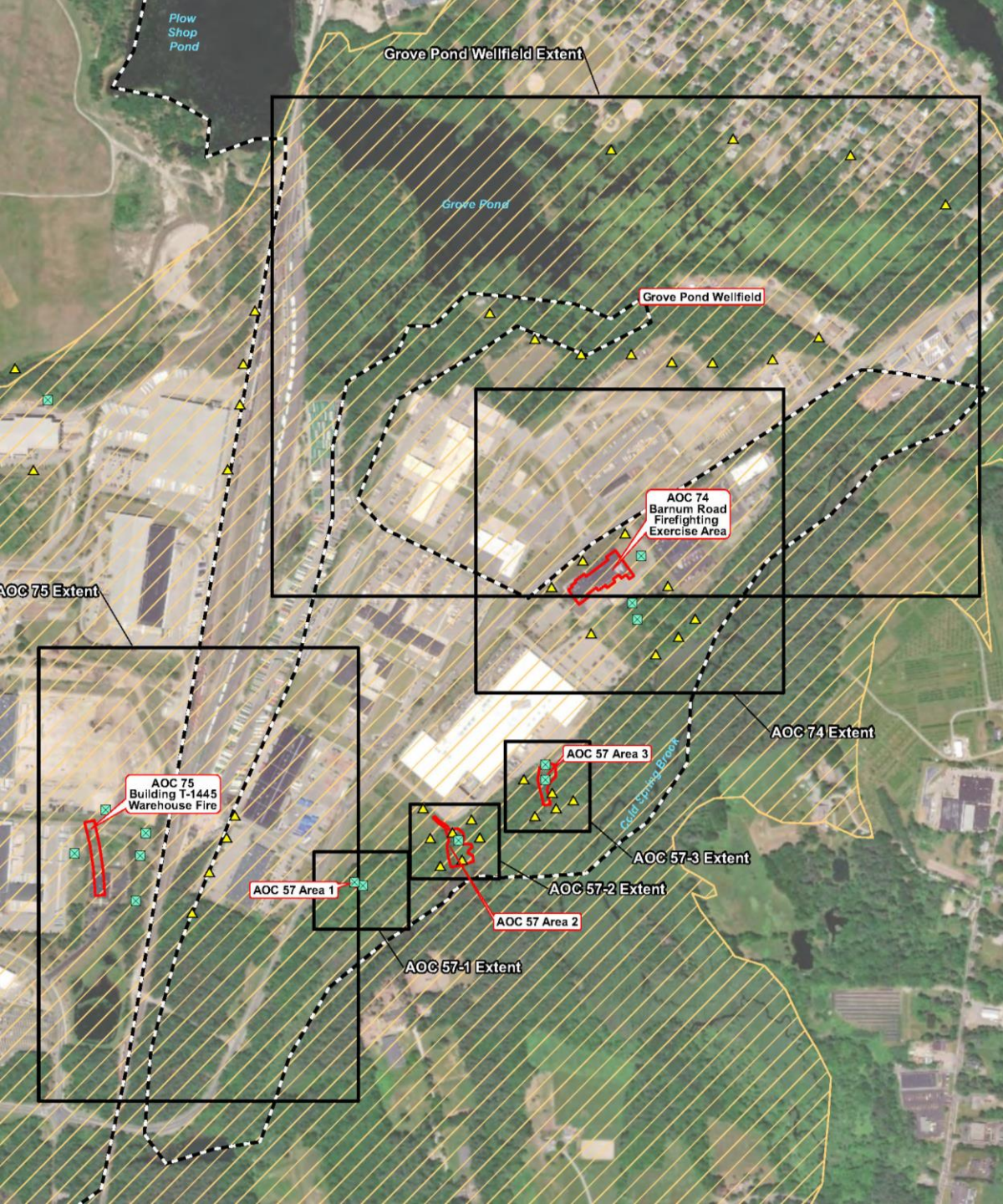
- Draft RI WP is being revised based on regulatory agency comments
- Draft Human Health and Ecological Risk Assessment Work Plan will be submitted for regulatory agency review in October
- Area 1 Field Sampling Plan (FSP) finalized on Sep. 22nd
- Area 2 FSP is being reviewed by the regulatory agencies
- Area 3 FSP is being developed with the regulatory agencies





Area 1

- Grove Pond Wellfield
- AOC 57
- AOC 74
- AOC 75



Legend

- Proposed Soil Boring and Vertical Profiling Location
- Proposed Vertical Profiling Location
- MassDEP Zone II Wellhead Protection Area
- Area of Contamination (AOC)
- Former Fort Devens Boundary





Ongoing Area 1 Field Activities

■ Completed:

- ▶ Existing groundwater wells at AOC 57 (17 wells), Grove Pond Wellfield (14 wells). There are no existing wells at AOCs 74 and 75.
- ▶ Irrigation well at AOC 74
- ▶ Surface water and sediment from Cold Spring Brook (8 locations) and Grove Pond (5 locations)
- ▶ Vertical profiles of groundwater at AOC 74 (4 locations)

■ To be completed:

- ▶ Vertical profiles of groundwater at AOC 57 (18 locations), AOC 74 (7 locations), AOC 75 (9 locations), upgradient of Grove Pond (initially 12 locations)
- ▶ Soil borings at AOC 57 Area 1 (2 locations), AOC 57 Area 2 (6 locations), AOC 57 Area 3 (4 locations), AOC 74 (7 locations), AOC 75 (7 locations)
- ▶ Surface water and sediment sampling at Balch Pond (1 location)





Ongoing Area 1 Field Activities (continued)

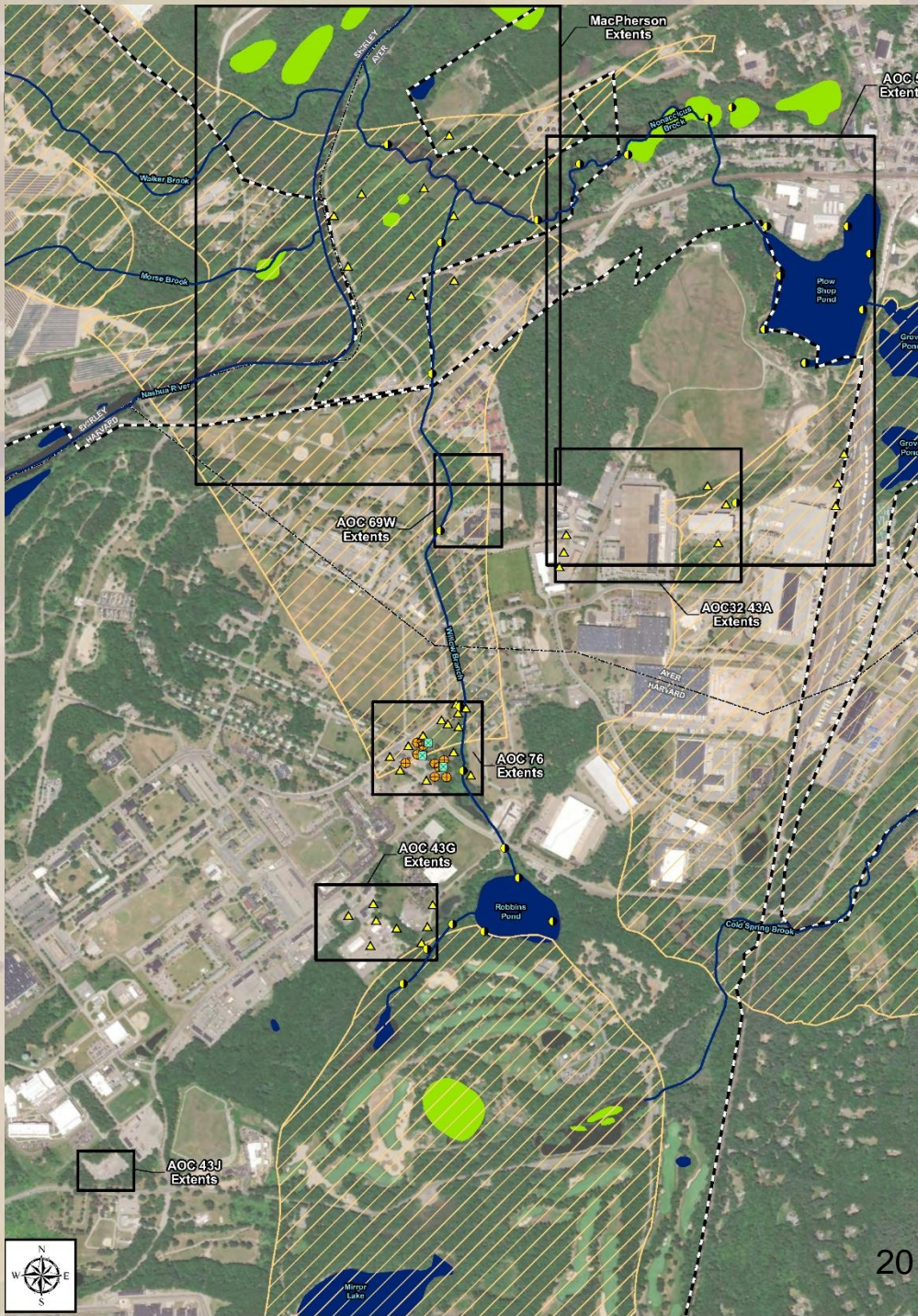
- Install overburden monitoring wells
 - ▶ 27 monitoring wells in Area 1, selected based on initial sampling results
- Install bedrock monitoring wells
 - ▶ 3 monitoring wells, selected based on initial sampling results
- Sample new monitoring wells
- Conduct synoptic water level monitoring event





Area 2

- AOC 5 (Shepley's Hill Landfill)
- AOCs 32/43A
- AOC 43G
- AOC 43J
- AOC 76
- MacPherson Well



Legend

Proposed Surface Water and Sediment Sampling Location	Stream/River
Proposed Soil Boring and Vertical Profiling Location	Lake/Pond
Proposed Vertical Profiling Location	Swamp/Marsh
Proposed Soil Boring Location	MassDEP Zone II Wellhead Protection Area
City/Town Boundary	Former Fort Devens Boundary





Area 2 Proposed Field Activities

- **Sample Existing Groundwater Wells**
 - ▶ Shepley's Hill Landfill (SHL) (50 wells), AOCs 32/43A (25 wells), AOC 43G (13 wells), AOC 43J (10 wells), MacPherson well area (8 wells)
 - ▶ No existing wells available at AOC 76
- **Sample Surface Water and Sediment**
 - ▶ Plow Shop Pond (6 locations), Nonacoicus Brook (7 locations), Willow Brook (6 locations), Robbins Pond (3 locations), unnamed tributary (3 locations), detention pond (1 location)
- **Groundwater Vertical Profiles**
 - ▶ AOCs 32/43A (9 locations), AOC 43G (8 locations), AOC 76 (16 locations), MacPherson well area (8 locations), none planned for SHL and AOC 43J
 - ▶ Install 12 piezometers at AOC 76
- **Soil Borings**
 - ▶ AOC 76 (13 locations), contingency borings at AOCs 32/43A, 43G, 43J, and MacPherson





Proposed Area 2 Field Activities (continued)

- Install overburden monitoring wells
 - ▶ 22 monitoring wells in Area 2, selected based on initial sampling results
- Install bedrock monitoring wells
 - ▶ 1 monitoring well, selected based on initial sampling results
- Sample new monitoring wells
- Conduct synoptic water level monitoring event





Area 3

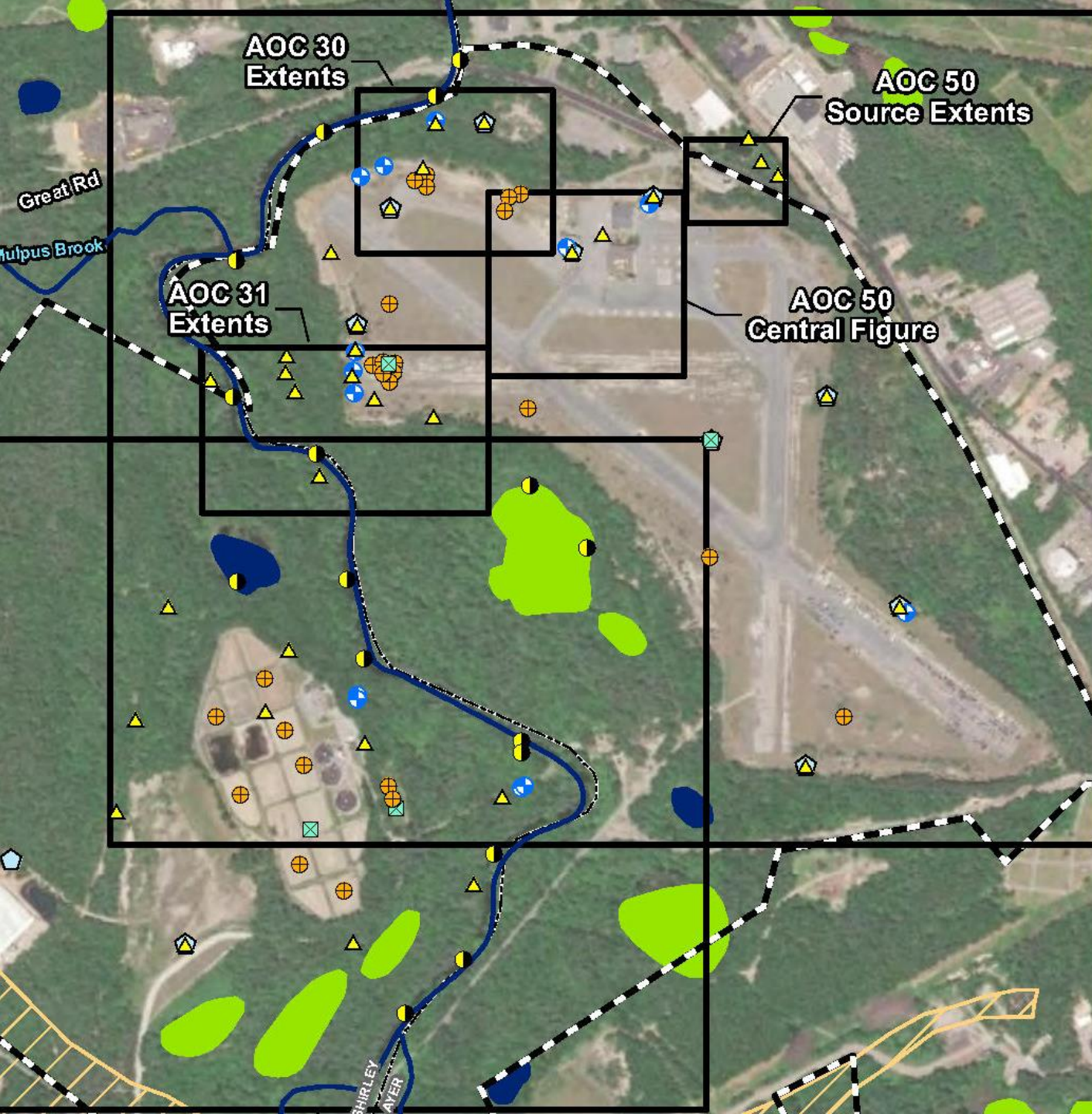
- AOC 20
- AOC 21
- AOC 30
- AOC 31
- AOC 50

Legend

- Proposed Soil Boring and Vertical Profiling Location
- Proposed Vertical Profiling Location
- Proposed Soil Boring Location
- Proposed Surface Water and Sediment Sampling Location
- Proposed Piezometer
- Tentative Overburden Monitoring Well



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Area 3 Proposed Field Activities

- **Sample Existing Groundwater Wells**
 - ▶ AOC 20/21 (11 wells), AOC 50 (31 wells), no existing wells available at AOCs 30 and 31
- **Sample Surface Water and Sediment**
 - ▶ Nashua River (13 locations), AOC 50 wetland (2 locations), AOCs 20/21 pond (1 location) and stream (1 location)
- **Groundwater Vertical Profiles**
 - ▶ AOC 20 (10 locations), AOC 21 (2 locations), AOC 30 (4 locations), AOC 31 (8 locations), AOC 50 (15 locations)
 - ▶ Install 2 piezometers at AOC 20, and 9 piezometers at AOCs 30/31/50
- **Soil Borings**
 - ▶ AOC 20 (8 locations), AOC 21 (3 locations), AOC 30 (6 locations), AOC 31 (7 locations), AOC 50 (10 locations)





Proposed Area 3 Field Activities (continued)

- Install overburden monitoring wells
 - ▶ 4 monitoring wells in AOCs 20/21, selected based on initial sampling results
 - ▶ 10 monitoring wells in AOCs 30/31/50, selected based on initial sampling results

- Sample new monitoring wells

- Conduct synoptic water level monitoring event





Next Steps

- PFAS RI Work Plan
 - ▶ RI Work Plan is being finalized
 - ▶ Risk Assessment Work Plan will be submitted for regulatory review in October
 - ▶ Area 2 FSP – regulatory agency review in October
 - ▶ Area 3 FSP – draft planned for mid-November
- Continue RI Sampling Efforts in Area 1
- 4th Quarterly Town Water Supply Well Sampling (October)
- Begin sampling Area 2 upon finalization of FSP (November)





Former Fort Devens Army Installation Project Status Updates

Questions?



1 ppt (part per trillion)



= 1 DROP OF INK

**into 13,200,000 gallons of water or
20 OLYMPIC-SIZE SWIMMING POOLS**



Definitions

- Public water system – public water for human consumption at least 15 service connections or regularly serves an average of at least 25 individuals at least 60 days of the year
 - ▶ Community Water System – at least 15 service connections used by year-round residents, or regularly serves at least 25 year-round residents
 - ▶ Non-Community Water System
 - Non-Transient Non-Community Water System – at least 15 service connections, or regularly serves at least 25 of the same individuals or more approximately 4 or more hours per day, 4 or more days a week, more than 6 months or 180 days per year (e.g., workplace, etc.)
 - Transient Non-Community Water System – at least 15 service connections, or serves water to 25 different persons at least 60 days of the year (e.g., restaurants, motels, camp grounds, parks, golf courses, ski areas, etc.)

