# Air Force Civil Engineer Center (AFCEC) Emerging Contaminants Update

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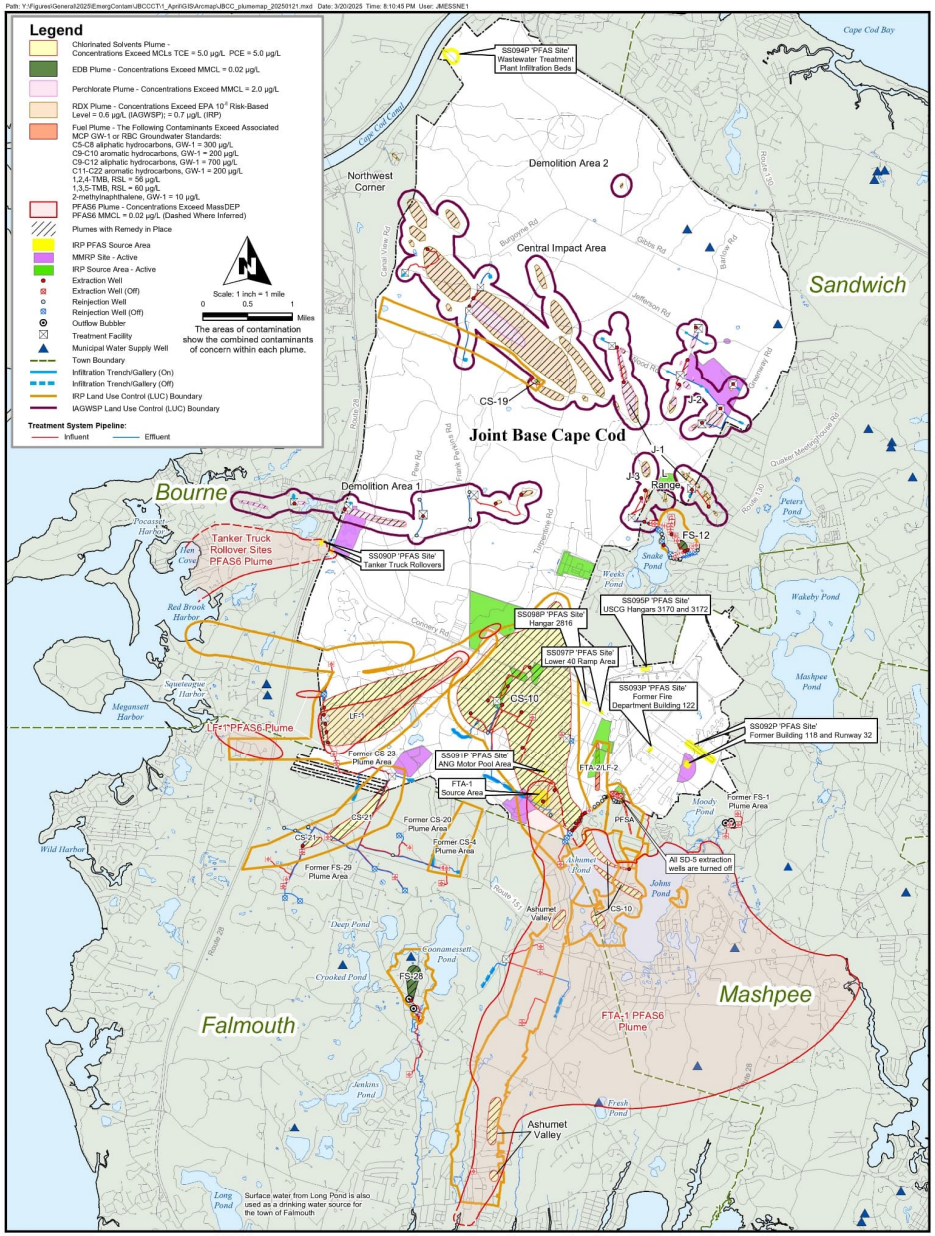
JBCC Cleanup Team Meeting

09 April 2025

## **Overview:**

- Per- and Polyfluoroalkyl Substances (PFAS) Standards
- Fire Training Area-1 (FTA-1)
  - Explanation of Significant Differences (ESD) for PFAS
  - Lysimeter Work Plan
  - Monitoring Well Sampling
- Tanker Truck Rollover Sites (TTRS)
  - Remedial Investigation (RI) for PFAS
  - Monitoring Well Sampling
- Flight Line Area Operable Unit (OU) – RI for PFAS
  - Former Building 118 - Runway 32
  - Western Flight Line Area, and
  - Downgradient Off-Base Area




| Contaminant of Concern (COC) | Type of Contaminant | Risk-Based Level |
|---|---|---|
| TCE = trichloroethene | solvent | MCL = 5 µg/L |
| PCE = perchloroethene | solvent | MCL = 5 µg/L |
| $CCl_4$ = carbon tetrachloride | solvent | MCL = 5 µg/L |
| EDB = ethylene dibromide | fuel-related compound | MMCL = 0.02 µg/L |
| benzene | fuel-related compound | MCL = 5 µg/L |
| VC = vinyl chloride | solvent | MCL = 2 µg/L |
| 1,1,2,2-TeCa = 1,1,2,2-tetrachloroethane | solvent | GW-1 = 2 µg/L |
| 1,4-DCB = 1,4-dichlorobenzene | solvent | MMCL = 5 µg/L |
| Mn = manganese | metal | EPA Health Advisory = 300 µg/L |
| thallium | metal | MCL = 2 µg/L |
| lead | metal | 15 µg/L (treatment technique action level for water distribution systems) |
| toluene | fuel-related compound | MCL = 1,000 µg/L |
| RDX - hexahydro-1,3,5-trinitro-1,3,5-triazine | explosive | HA = 2 µg/L<br>GW-1 = 1 µg/L<br>$10^{-6}$ = 0.6 µg/L (IAGWSP); = 0.7 µg/L (IRP) |
| perchlorate | oxidizer | HA = 15 µg/L<br>MMCL = 2 µg/L |
| C5-C8 aliphatic hydrocarbons | fuel-related compound | GW-1 = 300 µg/L |
| C9-C10 aromatic hydrocarbons | fuel-related compound | GW-1 = 200 µg/L |
| C9-C12 aliphatic hydrocarbons | fuel-related compound | GW-1 = 700 µg/L |
| C11-C22 aromatic hydrocarbons | fuel-related compound | GW-1 = 200 µg/L |
| 1,2,4-TMB | fuel-related compound | RSL = 56 µg/L |
| 1,3,5-TMB | fuel-related compound | RSL = 60 µg/L |
| 2-methylnaphthalene | fuel-related compound | GW-1 = 10 µg/L |
| 1,4-dioxane | solvent | RG = 0.46 µg/L |

# Joint Base Cape Cod Groundwater Plume Map, and IRP and IAGWSP LUC Areas

**Issued January 2025**

Note: MCL – Maximum Contaminant Level
MMCL – Massachusetts Maximum Contaminant Level
HA – Federal Lifetime Health Advisory
PFAS - Per- and Polyfluoroalkyl substances
GW-1 – State default cleanup value to be used in lieu of site-specific risk-based level
$10^{-6}$ – EPA level resulting in an excess cancer risk of one in a million
RG – Site Specific Risk Based Remediation Goal
RSL – Regional Screening Level

**DoD Screening Levels[1] for PFAS for Use in DoD Preliminary Assessments/Site Inspections (November 2024)**

| Chemical | Chemical Abbreviation | DoD Screening Levels [2,3] | |
|---|---|---|---|
| | | Tap Water ng/L | Residential Soil (ng/g) |
| hexafluoropropylene oxide dimer acid | HFPO-DA (GenX) | 1.5 | 23 |
| perfluorobutanoic acid | PFBA | 1800 | 7800 |
| perfluorobutane sulfonic acid | PFBS | 600 | 1900 |
| perfluorohexanoic acid | PFHxA | 990 | 3200 |
| perfluorohexane sulfonic acid | PFHxS | 10(7) | 130 |
| perfluorononanoic acid | PFNA | 5.9 | 19 |
| perfluorooctanoic acid | PFOA | 4.0(5) | 0.070(6) |
| perfluorooctane sulfonic acid | PFOS | 4.0(5) | 0.63 |
| bis(trifluoromethylsulfonyl)amine | TFSI | 590 | 2300 |
| perfluoropropanoic acid | PFPrA | 980 | 3900 |
| perfluorodecanoic acid | PFDA | 0.52(6) | 0.06(6) |

Notes:

1 The DoD PFAS screening levels are based on EPA's RSL tables dated November 2024 except where the EPA RSLs were below the MDLs of EPA-approved analytical methods.

2 The PFAS screening levels in attachment 1 are provided with a level of precision to two significant figures, consistent with the EPA's RSL tables.

3 The DoD PFAS screening levels assume multiple PFAS are present and therefore use a HQ = 0.1.

4 Screening levels are for tap water and groundwater that is used for drinking water.

5 Certain PFAS RSLs have EPA-approved analytical methods, but with values that are below the MDL. For PFAS with RSLs below the MDL and with an established MCL, DoD uses the MCL as the screening level.

6 Certain PFAS RSLs have EPA-approved analytical methods, but with values that are below the method detection limit. For PFAS with RSLs below the MDL that do not have an MCL, DoD uses the method's pooled MDL to establish consistent and measurable values.

7 Certain PFAS RSLs have EPA-approved analytical methods and with RSLs higher than the established MCL. For PFAS with RSLs above the MCL, DoD uses the MCL as the screening level.

Key:

DoD = Department of Defense

EPA = U.S. Environmental Protection Agency

HQ = hazard quotient

MCL = Maximum Contaminant Level

MDL = method detection limit

PFAS = per- and polyfluoroalkyl substances

RSL = EPA Regional Screening Level

ng/kg = nanogram per kilogram

ng/g = nanogram per gram

# FTA-1 Summary:

- Previously referred to as Ashumet Valley, source areas include the former FTA-1 and former base Sewage Treatment Plant (STP); application of aqueous film-forming foam (AFFF) during fire training activities at FTA-1 is the primary source for PFAS contamination.
- *Final Supplemental RI Report for 1,4-Dioxane and PFAS at FTA-1* was submitted Apr 2024.
- *Draft ESD for PFAS at FTA-1* was prepared to modify the current remedy to implement an interim remedy for PFAS contamination in groundwater and land use controls and was submitted to the agencies for review on 05 Apr 2024.
  - Received MassDEP comments on 14 May 2024 and EPA comments on 16 Jul 2024; additional EPA comments regarding Federal Maximum Contaminant Levels (MCLs) for PFAS[1] will not be provided; Response to Comments Letter (RCL) was submitted on 19 Mar 2025.
- Resolution Meeting to resolve agency comments on the RCL for the *FTA-1 Lysimeter Work Plan* was held on 14 Feb 2025; the Memorandum of Resolution (MOR) was submitted on 27 Feb 2025; received EPA concurrence and additional MassDEP comments on 18 Mar 2025; MOR2 is in preparation.
- The *Revised Draft Feasibility Study Report for Per- and Polyfluoroalkyl Substances at Fire Training Area-1, JBCC, MA* is on hold pending contract action.
  - Selected 21 FTA-1 monitoring wells for resampling to support using current PFAS datasets for the Revised Draft Supplemental Feasibility Study (FS); sampling completed, and results are pending.

[1] Groundwater plumes were previously defined by the PFAS6 MMCL of 20 nanograms per liter (ng/L) for the sum of six PFAS: PFOS, PFOA, PFNA, PFHxS, Perfluoroheptanoic Acid (PFHpA), and PFDA.

Wakeby Pond

Mashpee Pond

Joint Base Cape Cod

FTA-1 Source Area

Former MMR Sewage Treatment Plant

Ashumet Pond

Route 151

Ashumet Valley Plume

Deep Pond

Round Pond

Coonamessett Pond

Crooked Pond

Grassy Pond

Johns Pond

Jenkins Pond

Pond 14

Flax Pond

Mill Pond

Fresh Pond

Waquoit Bay

Route 28

Quashnet River

Bourne's Pond River

28MW0032A
28MW0033B,C
28MW0034A,B
00EW0001
03MW2617A,B
00MW0554A,B
30MW0583A,B,C,D,E
USFW244XXX
USFW254XXX
03MW2620B
00MW0607B
95MW1170A,B
USFW722M01-02
03MW2621A,B
00MW0589B,C
03MW1015A,B
30MW0585A,B
95DP4007
00MW0606B
95DP4016
MAZOC003I
95DP4015
95DP4017
95DP4037
MAZOC001I,S
95DP4014
95MW1171A,B
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95DP4006
03MW1007A,B
95DP4010
03MW2626B
95MW0212A,B
00MW0592A,B
95DP4013
95DP4100
95MW1172A,B
95MW1174A,B
95DP4005
95DP4003
95MW1230A
95MW0208A
USFW350XXX
USFW356XXX
USFW357XXX
USFW460XXX
95DP4012
95DP4009
95MW1173A,B
95EW0703
95DP4004
95MW1231A
MAMW-TR1
MAOBS-TR1
95DP4044,A
USFW271141
USFW431013
USFW428XXX
95IG0003
95PZ0007B
95MW1232A,B
USFW474XXX
95DP4008
95DP4011
USFW459XXX
95DP4101
USFW433XXX
USFW430XXX
USFW438035
95MW1233A
95DP4045
MAMW-TR3
MAOBS-TR5
95DP4034
95DP4035
95DP4047
95DP4102
USFW375XXX
USFW502XXX
USFWB14-IR01
95MW0101
USFW435121
USFW443XXX
95DP4040
USFW436XXX
USFWB12-IR02
95MW1234C
USFW496043
95DP4103
USFW655075
USFWB09-IR03
USFW657078
USFW501XXX
95PZ0002A
95DP4046*
USFW660XXX
USFWB06-IR04
95MW0103
95DP4043*
95DP4041
95DP4002
95DP4001
95DP4000
95DP4042*
95IG0007
95MW1236A
95MW0104
USFW484XXX
95MW0106
USFW497XXX
95MW1235A

**Mashpee Village Public Water Supply Well #6**
Offline in February 2017; AFCEC installed Granular Activated Carbon wellhead treatment and returned well to service in February 2020

**Lakeside Estates Community Wells**
Both primary and backup wells disconnected; municipal connection to 93 units in 2018

**Sea Mist Resort Non-Community Water Supply Wells**

**Mashpee Turner Road Well Public Water Supply Well #5**
Taken offline in February 2019; Granular Activated Carbon wellhead treatment installed; returned to service November 2023

**Mashpee Turner Road Well Public Water Supply Well #2**
Taken offline in July 2020; Granular Activated Carbon wellhead treatment installed; returned to service November 2023

**Falmouth Fresh Pond Public Water Supply Well**
Taken offline in April 2017 due to perchlorate contamination; PFAS detected above PFAS6 MMCL in May 2019; Ion Exchange Resin wellhead treatment installed and well returned to service on 16 June 2022

**Rock Landing Public Water Supply Well #3**

**Rock Landing Public Water Supply Well #2**

Notes:
Multiple screen depths at locations ending in 'XXX.'
PFAS MCL: https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations#PFAS
PFAS6 MMCL: https://www.mass.gov/doc/supporting-documentation-for-drinking-water-standards-and-guidelines/download#page=262

0 1,600 3,200 Feet

## Legend

- Joint Base Cape Cod Boundary
- Ashumet Valley PCE/TCE Plume Boundary
- Revised FTA-1 PFAS Plume Boundary (Dashed Where Inferred)
- Treatment System Pipeline
- Infiltration Trench
- Abandoned Sewage Treatment Beds
- Wampanoag-Owned Parcel
- Bog/Wetland
- Public Water Supply Well
- Extraction Well
- Irrigation Well
- Private Community Water Supply Well
- Proposed FTA-1 LUC Boundary

Data Source: AFCEC, March 2025
JBCC Boundary from Massachusetts Air National Guard 2011, EA 2023

95MW0212A Monitoring Selected for Re-Sampling

**Sum of PFAS6 Detections in Groundwater:**
- No Detection for All PFAS of Concern
- Detection Below the PFAS6 MMCL and the PFAS MCL
- Exceedance of the PFAS6 MMCL or the PFAS MCL

* Above PFAS MCLs (Contamination Not Related To JBCC)
MCL = Maximum Contaminant Level
MMCL = Massachusetts Maximum Contaminant Level

# FTA-1 PFAS6 DETECTIONS IN GROUNDWATER (MASSDEP PFAS6 MMCL OF 0.02 µg/L) AND MONITORING WELLS SELECTED FOR RE-SAMPLING

AFCEC - Joint Base Cape Cod

*09 April 2025 JBCCCT Meeting*

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## TTRS RI/FS Summary:

- The source of the PFAS was the application of AFFF as part of an emergency response to two tanker truck rollovers at or near the Route 28 traffic rotary in 1997 and 2000.
- MOR2 for the *Revised Draft RI Report for PFAS at TTRS* was submitted to the agencies on 19 Dec 2024, received EPA concurrence on 15 Jan 2025 and MassDEP concurrence on 12 Mar 2025.
  - Submitted the *Final Remedial Investigation Report for Per- and Polyfluoroalkyl Substances at Tanker Truck Rollover Sites, JBCC, MA* on 28 Mar 2025.
- The Revised *Draft Feasibility Study Report for Per- and Polyfluoroalkyl Substances at Tanker Truck Rollover Sites, JBCC, MA* is on hold pending contract action.
  - Selected nine TTRS monitoring wells for resampling to support using current PFAS datasets for the Revised Draft FS; sampling completed, and results are pending.

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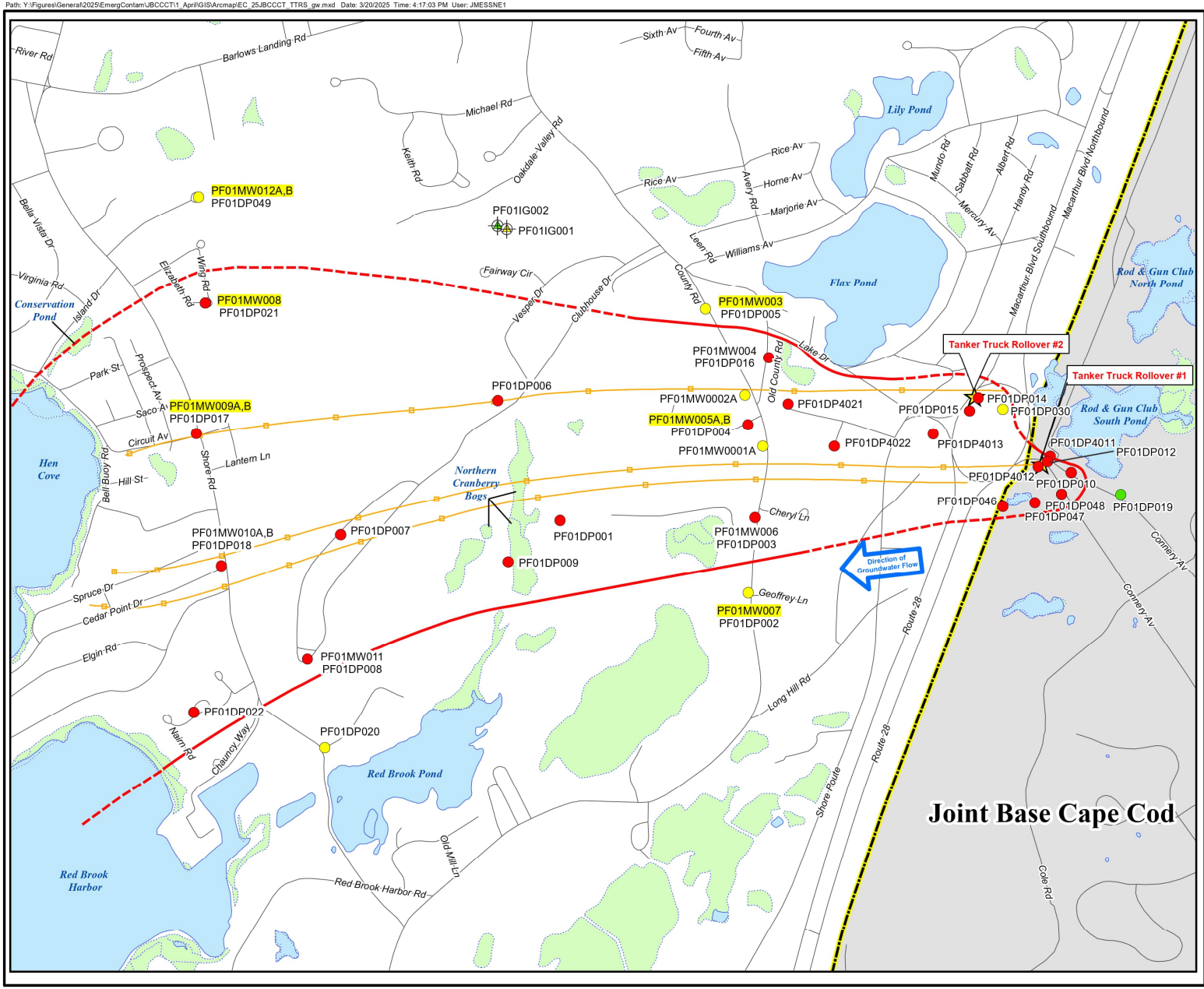


## Legend

- Tanker Truck Rollover Site
- Joint Base Cape Cod Boundary
- Particle Track With 1-Year Tiime Markers
- TTRS PFAS6 Plume Boundary (Dashed Where Inferred)
- Irrigation Well
- PF01MW003 — Monitoring Selected for Re-Sampling

**Sum of PFAS6 Detections in Groundwater**

- PFAS6 = 0
- PFAS6 At or Below the MMCL
- PFAS6 Above the MMCL

MassDEP PFAS6 MMCL (sum of PFOS, PFOA, PFHxS, PFNA, PFHpA, and PFDA) = 0.02 µg/L
MMCL = Massachusetts Maximum Contaminant Level

0 400 800 Feet

Data Source:
AFCEC, March 2025
JBCC Boundary from Massachusetts Air National Guard 2011

**TANKER TRUCK ROLLOVER SITES PFAS6 DETECTIONS IN GROUNDWATER AND MONITORING WELLS SELECTED FOR RE-SAMPLING**

AFCEC - Joint Base Cape Cod

*09 April 2025 JBCCCT Meeting*

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## **Flight Line Area RI:**

- An RI is in process at six Flight Line Area sites collectively referred to as the Flight Line Area OU; field program includes groundwater, soil, surface water, and sediment sampling.
  - Air National Guard Motor Pool
  - Former Building 118 - Runway 32
  - Former Fire Department Building 122
  - Coast Guard Hangars 3170 and 3172
  - Lower 40 Ramp Area
  - Army Helicopter Hangar 2816
- RI field work was conducted at the following sites since the 13 Nov 2024 JBCCCT meeting:
  - Former Building 118 - Runway 32
  - Western Flight Line Area
  - Downgradient Off-Base Area
- AFCEC submitted a 27 Mar 2025 letter responding to EPA's request that AFCEC add interim Land Use Controls to the wastewater treatment plant, infrastructure, and infiltration beds.

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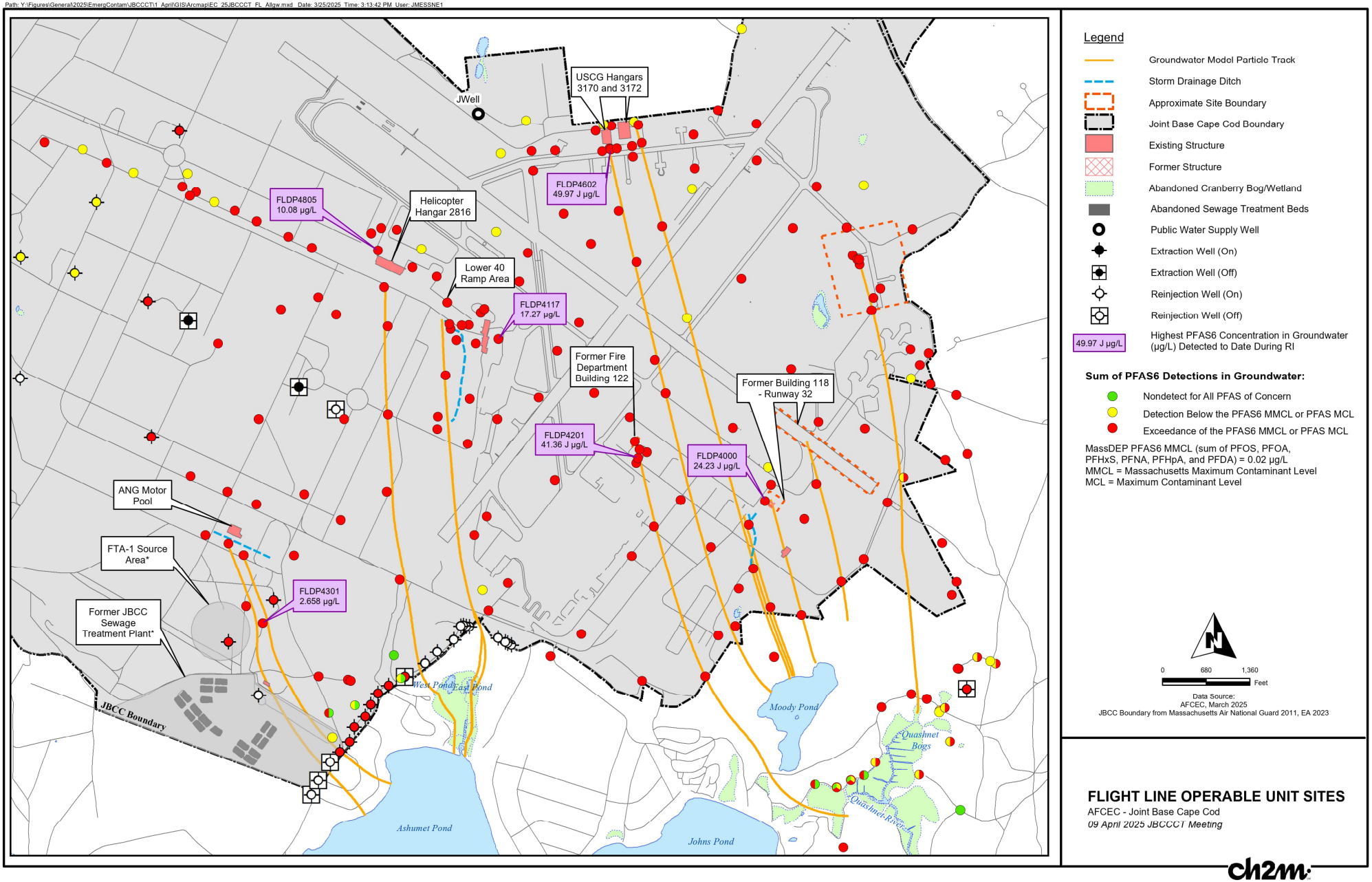


Legend

- Groundwater Model Particle Track
- Storm Drainage Ditch
- Approximate Site Boundary
- Joint Base Cape Cod Boundary
- Existing Structure
- Former Structure
- Abandoned Cranberry Bog/Wetland
- Abandoned Sewage Treatment Beds
- Public Water Supply Well
- Extraction Well (On)
- Extraction Well (Off)
- Reinjection Well (On)
- Reinjection Well (Off)
- 49.97 J µg/L — Highest PFAS6 Concentration in Groundwater (µg/L) Detected to Date During RI

**Sum of PFAS6 Detections in Groundwater:**

- Nondetect for All PFAS of Concern
- Detection Below the PFAS6 MMCL or PFAS MCL
- Exceedance of the PFAS6 MMCL or PFAS MCL

MassDEP PFAS6 MMCL (sum of PFOS, PFOA, PFHxS, PFNA, PFHpA, and PFDA) = 0.02 µg/L
MMCL = Massachusetts Maximum Contaminant Level
MCL = Maximum Contaminant Level

0 680 1,360 Feet

Data Source:
AFCEC, March 2025
JBCC Boundary from Massachusetts Air National Guard 2011, EA 2023

## FLIGHT LINE OPERABLE UNIT SITES

AFCEC - Joint Base Cape Cod
*09 April 2025 JBCCCT Meeting*

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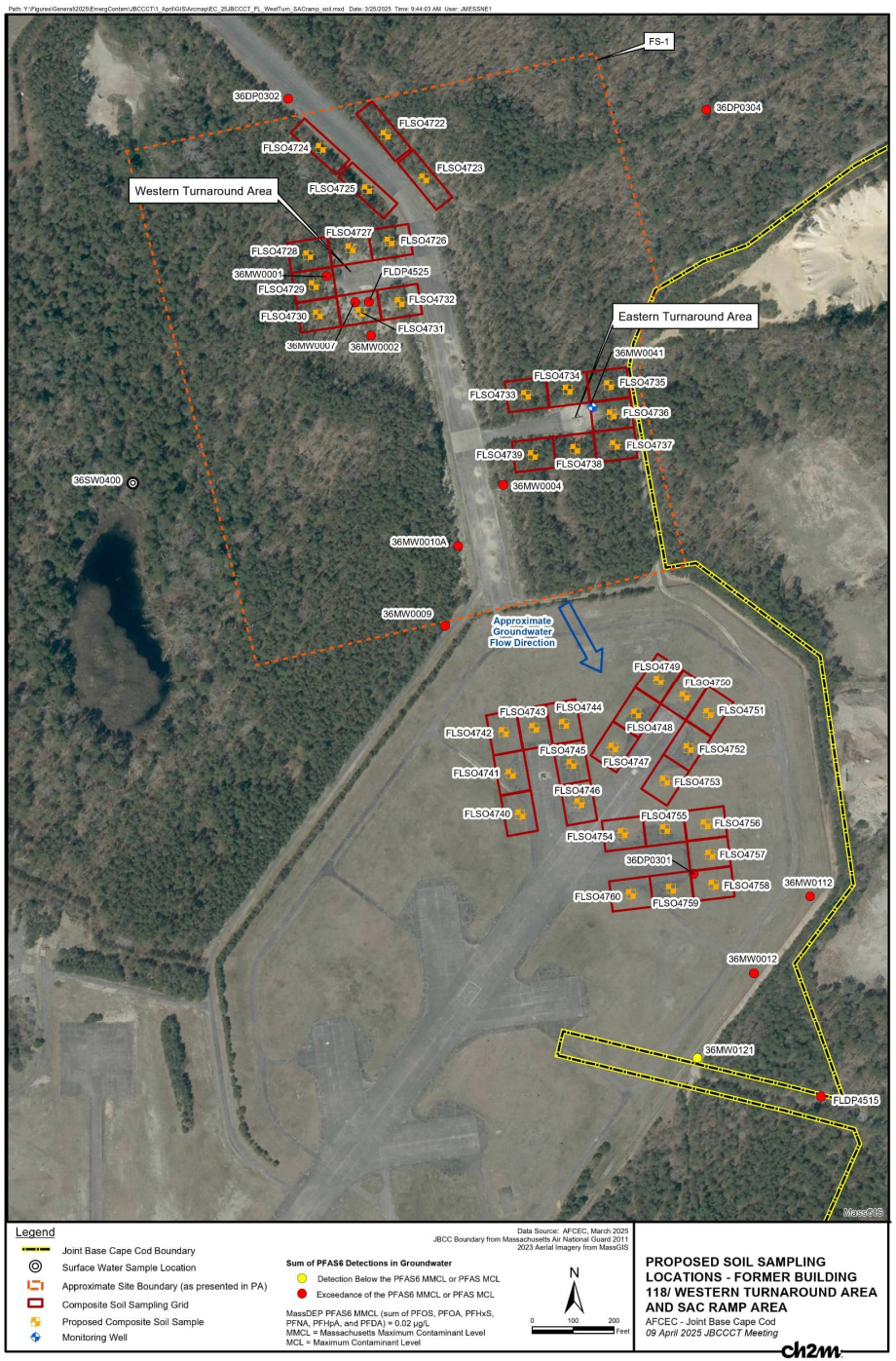
# Flight Line Area OU RI - Former Building 118 and Runway 32:




- Groundwater results from RI borings indicate an AFFF release may have happened within and/or to the north of the aircraft turnaround areas and the SAC Ramp Area.
- Eighteen areas were selected near the Western and Eastern Aircraft Turnaround areas and an additional 21 areas were selected near the SAC Ramp Area for composite soil sampling to evaluate the presence/absence of PFAS in soil in these areas.
- Completed sampling in the Western and Eastern Aircraft Turnaround areas.
- PFOS is the predominant PFAS detected, and the highest concentrations, 150 ng/g and 8.9 ng/g, were detected at FLSO4736 and FLSO4729, respectively. These sample areas are located at the end of each Turnaround area.
- Discrete soil sampling was completed at the end of each Turnaround area to further delineate the PFOS contamination in soil within these two sample areas and an existing water table monitoring well located near FLSO4739 was sampled for PFAS analysis, results are pending.

# Flight Line Area OU RI – Western Area:

- The Flight Line Area OU RI field program was expanded to the west to investigate the extent of PFAS contamination detected in the influent of selected Chemical Spill-10 In-Plume extraction wells and in groundwater borings installed near Fuel Spill-13 which is located downgradient of the western end of the Flight Line.
- A transect of ten groundwater borings was completed along Richardson Road and Gaffney Street (FLDP5000 through FLDP5009); samples were collected from the water table to 120 ft below the water table.
  - PFAS concentrations exceeded standards in seven of the ten borings.
  - PFNA was the dominant PFAS and ranged up to 3,200 ng/L in a sample collected from 40 ft below the water table at FLDP5005; PFNA contamination extended to eastern boring FLDP5009, and concentrations decreased to 6.9 ng/L.
  - PFOS concentrations exceeded standards in shallower intervals at three borings and ranged up to 130 ng/L.

## Flight Line Area OU RI – Western Area (continued):

- PFHxS concentrations exceeded standards in two samples collected from two borings and concentrations ranged up to 110 ng/L.
- PFOA concentrations exceeded standards in three samples collected from three borings and concentrations ranged up 150 ng/L.
- Results indicate that there are potentially several different upgradient sources.
- No exceedances were detected at FLDP5001, FLDP5003, and FLDP5006.

- Five additional groundwater borings were identified to the north along Herbert Road (FLDP5010 through FLDP5014); completed borings FLDP5010 and FLDP5013; results are pending and sampling is ongoing.

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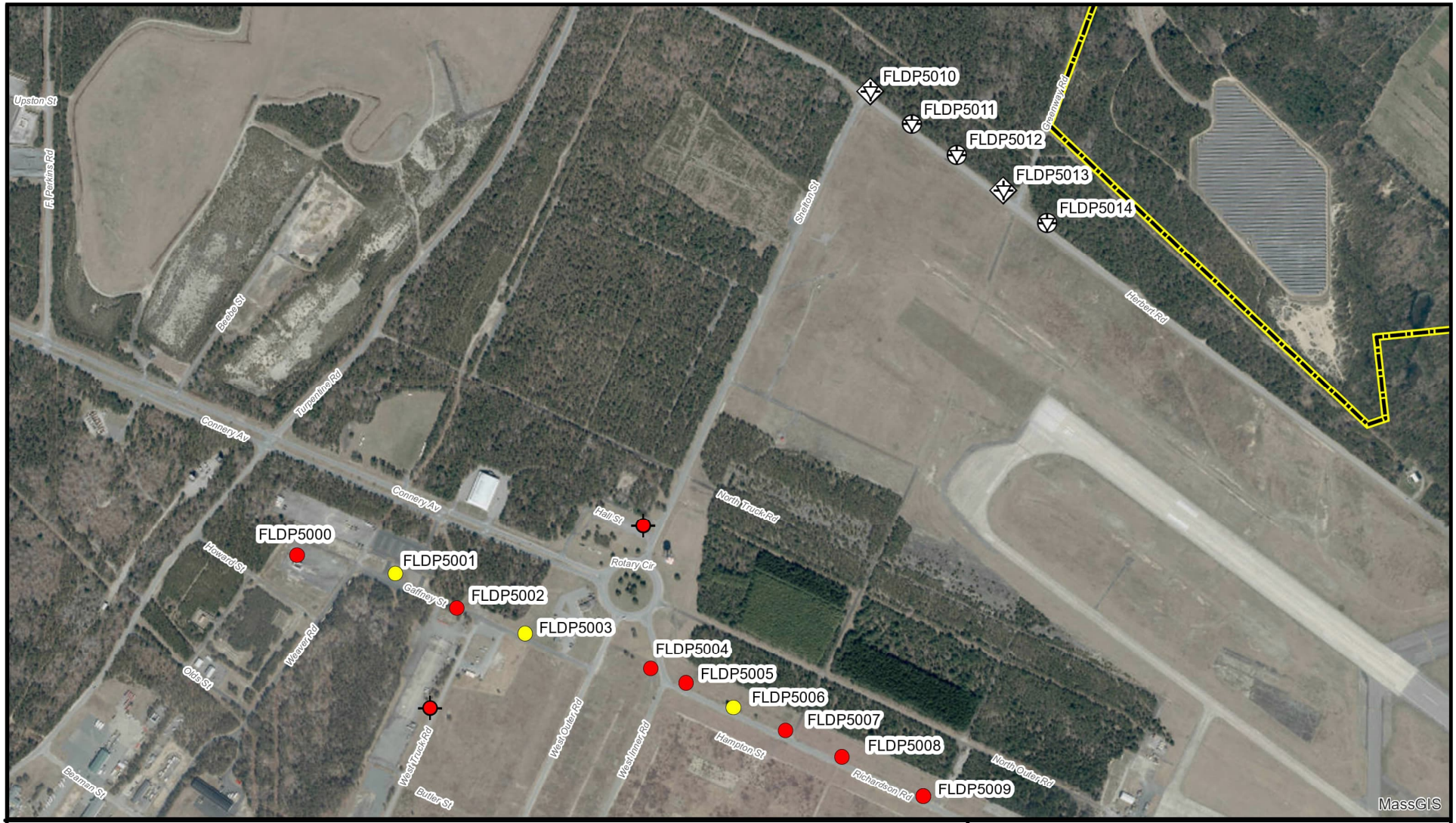


## Legend

- Proposed Direct Push Boring
- Recently Completed Direct Push Boring
- Extraction Well (On)

**Sum of PFAS6 Detections in Groundwater**

- Detection Below the PFAS6 MMCL or PFAS MCL
- Exceedance of the PFAS6 MMCL or PFAS MCL

MassDEP PFAS6 MMCL (sum of PFOS, PFOA, PFHxS, PFNA, PFHpA, and PFDA) = 0.02 µg/L
MMCL = Massachusetts Maximum Contaminant Level
MCL = Maximum Contaminant Level

Data Source: AFCEC, March 2025
2023 Aerial Imagery From MassGIS

N

0 440 880
Feet

# WESTERN AREA PFAS DETECTIONS IN GROUNDWATER AND PROPOSED DIRECT PUSH LOCATIONS

AFCEC - Joint Base Cape Cod

*09 April 2025 JBCCCT Meeting*

ch2m

## Flight Line Area OU RI – Downgradient Area:

- Six proposed groundwater vertical profile borings were identified downgradient of the base boundary (FLDP6000 through FLDP6005); samples will be collected at ten-foot intervals from the water table to refusal.
  - Borings will be located along town-owned roads in adjacent unpaved areas.
  - Neighborhood Notices will be provided to residents located within 500 ft radius of the proposed borings.

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Legend

- Groundwater Model Particle Track
- Storm Drainage Ditch
- Approximate Site Boundary
- Joint Base Cape Cod Boundary
- Existing Structure
- Former Structure
- Abandoned Cranberry Bog/Wetland
- Public Water Supply Well
- Extraction Well (On)
- Extraction Well (Off)
- Reinjection Well (On)
- Reinjection Well (Off)
- Proposed Direct Push Boring

**Sum of PFAS6 Detections in Groundwater:**

- Nondetect for All PFAS of Concern
- Detection Below the PFAS6 MMCL or PFAS MCL
- Exceedance of the PFAS6 MMCL or PFAS MCL

MassDEP PFAS6 MMCL (sum of PFOS, PFOA, PFHxS, PFNA, PFHpA, and PFDA) = 0.02 µg/L
MMCL = Massachusetts Maximum Contaminant Level
MCL = Maximum Contaminant Level

0 325 650 Feet

Data Source:
AFCEC, March 2025
JBCC Boundary from Massachusetts Air National Guard 2011
2023 Aerial Imagery From MassGIS

**FLIGHT LINE OPERABLE UNIT SITES - SOUTHERN AREA PROPOSED GROUNDWATER BORINGS**

AFCEC - Joint Base Cape Cod

*09 April 2025 JBCCCT Meeting*

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## **Path Forward - Deliverables:**

The following deliverables will be completed with existing funding:

- Prepare and Submit the RCL for the *Draft FTA-1 ESD for PFAS*, receive agency concurrence and prepare and submit the Final ESD.
- Prepare and submit MOR2 *for Draft FTA-1 Lysimeter Work Plan.*
- Receive EPA comments/concurrence on AFCEC's response to EPA's request that AFCEC add interim Land Use Controls to the wastewater treatment plant, infrastructure, and infiltration beds.

## Path Forward – Deliverables (continued):

The following deliverables will be completed under contract modifications or follow-on contracts:

- Prepare and submit the *Final FTA-1 Lysimeter Work Plan*.
- Prepare and submit the *Revised Draft FTA-1 Supplemental FS Report* with an updated RCL for comments on the original *Draft FTA-1 Supplemental FS Report*.
- Prepare and submit the *Revised Draft TTRS FS Report* with an updated RCL for comments on the original *Draft TTRS FS Report*.
- Receive MassDEP comments on the RCL for the *Draft Landfill-1 (LF-1) ESD for 1,4-Dioxane and PFAS*; hold resolution meeting, prepare and submit the MOR.
- Prepare a technical memorandum incorporating the PFAS MCLs into the analysis of alternatives from the Supplemental LF-1 FS and prepare a Revised Draft LF-1 ESD.

## Path Forward – Private Wells:

- Continue private well sampling program. In addition, AFCEC will revisit most, or all of the homes previously sampled for PFAS under the IRP program to assess results against the EPA MCL within the next 12 months. An installation-wide effort is to be performed under an AFCEC Regional Contract.
- AFCEC will complete removal actions under an Installation-wide regional mitigation contract starting with private wells that exceed 3x EPA MCLs, per Department of Defense (DoD) guidance. These conditions do not currently exist for private drinking water wells around JBCC.
- An additional pending regional contract will mitigate private drinking water wells exceeding the EPA MCLs. There are currently three homes with concentrations exceeding the EPA MCL of 4 ng/L for PFOA (4.4 – 5.2 ng/L).
- Mitigation preference for the initial phase is:
    1. Temporary installation of a point-of-use treatment system (POUTS) prior to permanent connection to municipal water, or
    2. Installation of a point-of-entry treatment system (POETS) where connection to municipal water is not feasible.
- Providing bottled water is not recommended by DoD and requires AFCEC approval.

## **Path Forward: (continued)**

- Continue FTA-1 Lysimeter Study, collecting pore water samples after agency comments have been resolved.
- Continue Flight Line Area OU RI sampling program.
- Present sample results and field program updates to the agencies at future Technical Update Meetings and to the public at future JBCC Cleanup Team Meetings.