FINAL
Site Inspection Report
Fort Pickett
Blackstone, Virginia

Perfluorooctanesulfonic Acid (PFOS) and
Perfluorooctanoic Acid (PFOA) Impacted Sites
ARNG Installations, Nationwide

May 2022

Prepared for:

Army National Guard Bureau
111 S. George Mason Drive
Arlington, VA 22204

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Acronyms and Abbreviations

%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
µg/kg	micrograms per kilogram
6:2 FTS	6:2 Fluorotelomer sulfonic acid
8:2 FTS	8:2 Fluorotelomer sulfonic acid
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
AOI	Area of Interest
ARNG	Army National Guard
bgs	below ground surface
BRAC	Base Realignment and Closure
CCV	Continuing Calibration verification
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CoC	chain of custody
CSM	conceptual site model
DA	Department of the Army
DL	detection limit
DO	dissolved oxygen
DoD	Department of Defense
DPT	direct push technology
DQI	data quality indicator
DQO	data quality objective
DUA	data usability assessment
DVR	data validation report
EIS	extraction internal standards
ELAP	Environmental Laboratory Accreditation Program
EM	Engineer Manual
ERB	equipment rinsate blank
FedEx	FedEx Corporation
FORSCOM	United States Army Forces Command
FTA	Fire Training Area
GPS	global positioning system
GPRS	Ground Penetrating Radar Systems, LLC
HA	Health Advisory
HDPE	high-density polyethylene
HSA	hollow stem auger
IDW	investigation-derived waste
ITRC	Interstate Technology and Regulatory Council
LC/MS/MS	liquid chromatography with tandem mass spectrometry
LCS	laboratory control spike
LCSD	laboratory control spike duplicate
LOD	limit of detection

LOQ	limit of quantitation
LRA	(Nottoway County) Local Redevelopment Authority
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
NELAP	National Environmental Laboratory Accreditation Program
NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid
ng/L	nanograms per liter
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
OHA	Old Hospital Area
ORP	oxidation-reduction potential
OSD	Office of the Secretary of Defense
PA	Preliminary Assessment
PFAS	per- and polyfluoroalkyl substances
PFBA	perfluorobutyrate
PFBS	perfluorobutanesulfonic acid
PFCs	perfluorinated compounds
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUdA	perfluoroundecanoic acid
PID	photoionization detector
PQAPP	Programmatic UFP-QAPP
PVC	polyvinyl chloride
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RI	Remedial Investigation
RPD	relative percent differences
SI	Site Inspection
SL	screening level
SOP	standard operating procedure
TCRA	Time Critical Removal Action
TOC	total organic carbon
TPP	Technical Project Planning
UCMR 3	Unregulated Contaminant Monitoring Rule 3

UFP	Uniform Federal Policy
US	United States
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UXO	unexploded ordnance
VAARNG	Virginia Army National Guard
VDEQ	Virginia Department of Environmental Quality
WWTP	Wastewater Treatment Plant

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Executive Summary

The Army National Guard (ARNG) G9 is performing Preliminary Assessments (PAs) and Site Inspections (SIs) at per- and polyfluoroalkyl substances (PFAS)-impacted sites at ARNG facilities nationwide. The objective of the SI at each facility is to identify whether there has been a release to the environment from the Areas of Interest (AOIs) identified in the PA and determine the presence or absence of perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), and perfluorobutanesulfonic acid (PFBS) at or above screening levels (SLs). An SI was completed at Fort Pickett in Blackstone, Virginia. Fort Pickett will also be referred to as the "facility" throughout this document.

Fort Pickett encompasses approximately 45,160 acres in Brunswick, Dinwiddie, and Nottoway counties, Virginia. The Virginia ARNG (VAARNG) utilizes approximately 42,296 acres of Base Realignment and Closure (BRAC) property as part of the operational Fort Pickett. The majority of the remaining 2,864 acres and buildings of BRAC property have been transferred to the Nottoway County Local Redevelopment Authority (LRA) and Virginia Polytechnic Institute and State University, Southern Piedmont Agricultural Research and Extension Center (Tetra Tech, Inc., 2005). The facility is located approximately 60 miles southwest of Richmond, Virginia, and 3 miles east of the town of Blackstone. Fort Pickett was established on land purchased by the federal government and is currently a maneuver and training center operated by VAARNG. The facility is used year-round for military training of both active and reserve troops of the ARNG and other Department of Defense (DoD) and non-DoD units.

During the PA for PFAS, six potential PFAS release areas were identified at the facility (AECOM, 2020). PFAS-containing aqueous film forming foam (AFFF) may have been released during fire training exercises, AFFF storage/handling activities, controlled burns, and secondary release areas (landfills) at the identified release areas. The potential PFAS release areas were grouped into five Areas of Interest (AOIs) in the Final PA and expanded to 11 AOIs during the SI planning phase with the addition of other potential release areas. The SI field activities were conducted from 10 May to 23 June 2021 and included the collection of soil and groundwater samples.

To fulfill the project Data Quality Objectives set forth in the approved SI Quality Assurance Project Plan Addendum (AECOM, 2021a), samples were collected and analyzed for a subset of 18 PFAS by liquid chromatography with tandem mass spectrometry compliant with Quality Systems Manual 5.3 Table B-15. The 18 PFAS analyzed as part of the ARNG SI program are specified in **Section 5.7** of this Report.

The DoD has adopted a policy to retain facilities in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process based on risk-based SLs for soil and groundwater, as described in a memorandum from the Office of the Secretary of Defense (OSD) dated 15 September 2021 (Assistant Secretary of Defense, 2021). The ARNG program under which this SI was performed follows this DoD policy. Should the maximum site concentration for sampled media exceed the SLs established in the OSD memorandum, the AOI will proceed to the next phase under CERCLA. The SLs established in the OSD memorandum apply to three compounds: PFOS, PFOA, and PFBS.

The SLs are presented on **Table ES-1** below. All other results presented in this report are considered informational in nature and serve as an indication as to whether soil and groundwater contain or do not contain the 18 PFAS analyzed within the boundaries of the facility.

Sample chemical analytical concentrations were compared against the project SLs as described in **Table ES-1**. A summary of the results of the SI data relative to the SLs is as follows:

- At AOI 1, PFOA and PFOS in groundwater exceeded the SLs of 40 nanograms per liter (ng/L) with maximum concentrations of 2,780 ng/L (duplicate from FP-MW001) and 1,180

ng/L, respectively, at locations FP-MW001 and FP-MW003. Based on the results of the SI, further evaluation of AOI 1 is warranted in the Remedial Investigation (RI).

- At AOI 3, PFOS in soil exceeded the SL of 130 micrograms per kilogram (µg/kg), with a maximum concentration of 272 µg/kg at location AOI03-02 (0 to 2 feet below ground surface [bgs]). Additionally, PFOA, PFOS, and PFBS in groundwater exceeded the SLs of 40 ng/L for PFOA and PFOS and 600 ng/L for PFBS, with maximum concentrations of 10,600 ng/L, 43,600 ng/L, and 22,600 ng/L, respectively, at locations FP-MW009 and FP-MW011. Based on the results of the SI, further evaluation of AOI 3 is warranted in the RI.
- At AOI 5, PFOS in groundwater exceeded the SL of 40 ng/L, with a maximum concentration of 374 ng/L at location FP-MW015. Based on the results of the SI, further evaluation of AOI 5 is warranted in the RI.
- At AOI 6, PFOA, PFOS, and PFBS in groundwater exceeded the SLs of 40 ng/L for PFOA and PFOS and 600 ng/L for PFBS, with maximum concentrations of 3,020 ng/L, 11,700 ng/L, and 654 ng/L, respectively, at locations FP-MW019 and FP-MW020. Based on the results of the SI, further evaluation of AOI 6 is warranted in the RI.
- At AOIs 2, 4, and 7 through 11, the detected concentrations of PFOA, PFOS, and PFBS in soil and groundwater were below the SLs.

Table ES-2 summarizes the SI results for soil and groundwater. Based on the conceptual site models developed and revised in light of the SI findings, there is no potential for exposure to drinking water receptors caused by DoD activities at or adjacent to the facility.

Table ES-3 summarizes the rationale used to determine if an AOI should be considered for further investigation under CERCLA and undergo an RI. Based on the results of this SI, further evaluation is warranted in the RI for AOI 1, AOI 3, AOI 5, and AOI 6.

Table ES-1: Screening Levels (Soil and Groundwater)

Analyte	Residential (Soil) (µg/kg)[a,b] 0-2 feet bgs	Industrial/ Commercial Composite Worker (Soil) (µg/kg)[a,b] 2-15 feet bgs	Tap Water (Groundwater) (ng/L)[a,b]
PFOA	130	1,600	40
PFOS	130	1,600	40
PFBS	1,900	25,000	600

Notes:

a.) Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. Hazard Quotient (HQ) = 0.1. 15 September 2021.

b.) USEPA. 2016a. Drinking Water Health Advisory (HA) for Perfluorooctanoic Acid (PFOA). Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. USEPA Document Number: 822-R-16-005. May 2016. / USEPA. 2016b. Drinking Water HA for Perfluorooctane Sulfonic Acid (PFOS). Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. USEPA Document Number: 822-R-16-004. May 2016.

Table ES-2: Summary of Site Inspection Findings

AOI	Potential PFAS Release Area	Soil – Source Area	Groundwater – Source Area	Groundwater – Facility Boundary
1	Building 1485 (Current Fire Station)	◐	●	N/A
2	Northeast Range Rubber Mat Fire Area	◐	◐	N/A
3	Building 3006 (FORSCOM Petroleum Training Module Area)	●	●	N/A
4	Former Live Fire Burn Pit	◐	◐	N/A
5	Airfield Runway 1/19 – 1991 Aircraft Training Area	◐	●	N/A
	Airfield Runway 1/19 – 1999 Police Training Incident	◐	◐	N/A
6	Building 2860 (Former Fire Station)	◐	●	N/A
7	Building 977 (Petroleum Training Module Area)	◐	○	N/A
8	Trimble Road Landfill (Landfill No.1)	N/A	◐	N/A
9	Dearing Road Landfill (Landfill No.1)	◐	◐	N/A
10	Solar Array Former Burn Pit	◐	○	N/A
11	Old Hospital Area and OHA Dump Area (Landfill No.3)	◐	◐	N/A

Legend:
FORSCOM = United States Army Forces Command
N/A = not applicable
OHA = Old Hospital Area
● = detected; exceedance of the screening levels
◐ = detected; no exceedance of the screening levels
○ = not detected

Table ES-3: Site Inspection Recommendations

AOI	Description	Rationale	Future Action
1	Building 1485 (Current Fire Station)	Exceedances of SLs in groundwater at source areas. No exceedances of SLs in soil.	Proceed to RI
2	Northeast Range Rubber Mat Fire Area	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action
3	Building 3006 (FORSCOM Petroleum Training Module Area)	Exceedances of SLs in soil and groundwater at source areas.	Proceed to RI
4	Former Live Fire Burn Pit	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action
5	Airfield Runway 1/19 – 1991 Aircraft Training Area	Exceedances of SLs in groundwater at source areas. No exceedances of SLs in soil.	Proceed to RI
	Airfield Runway 1/19 – 1999 Police Training Incident	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action
6	Building 2860 (Former Fire Station)	Exceedances of SLs in groundwater at source areas. No exceedances of SLs in soil.	Proceed to RI
7	Building 977 (Petroleum Training Module Area)	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action
8	Trimble Road Landfill (Landfill No.1)	No exceedances of SLs in groundwater at source area.	No further action
9	Dearing Road Landfill (Landfill No.1)	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action
10	Solar Array Former Burn Pit	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action
11	Old Hospital Area and OHA Dump Area (Landfill No.3)	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action

Notes
FORSCOM = United States Army Forces Command
OHA = Old Hospital Area

1. Introduction

1.1 Project Authorization

The Army National Guard (ARNG) G9 is the lead agency in performing Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) at Impacted Sites, ARNG Installations, Nationwide. This work is supported by the United States (US) Army Corps of Engineers (USACE) Baltimore District and their contractor, AECOM Technical Services, Inc. (AECOM), under Contract Number W912DR-12-D-0014, Task Order W912DR17F0192, issued 11 August 2017. The ARNG performed this SI at Fort Pickett, Virginia. Fort Pickett is also referred to as the "facility" throughout this document.

The SI project elements were performed in compliance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; US Environmental Protection Agency [USEPA], 1980), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations Part 300; USEPA, 1994), and in compliance with US Department of the Army (DA) requirements and guidance for field investigations including specific requirements for sampling for PFOA, PFOS, and perfluorobutanesulfonic acid (PFBS), and the group of related compounds known in the industry as per- and polyfluoroalkyl substances (PFAS). The term PFAS is used throughout this report to encompass all PFAS chemicals being evaluated, including PFOA, PFOS, and PFBS, which are the key components of the suspected releases being evaluated, and the other 15 related compounds listed in the task order.

1.2 SI Purpose

A PA was performed at Fort Pickett (AECOM, 2020) that identified six potential PFAS release areas at the facility, which were grouped into five Areas of Interest (AOIs). During the planning phase of the SI, the list was increased to thirteen potential release areas and 11 AOIs. The objective of the SI is to identify whether there has been a release to the environment from the AOIs and determine the presence or absence of PFOA, PFOS, and PFBS at or above screening levels (SLs).

As stated in the *Federal Facilities Remedial Site Inspection Summary Guide* (USEPA, 2005), an SI has five goals:

1. Develop information to potentially eliminate a release from further consideration because it is determined that it poses no significant threat to human health or the environment;
2. Determine the potential need for a removal action;
3. Collect or develop data to evaluate potential release;
4. Collect data to better characterize the release for more effective and rapid initiation of a Remedial Investigation (RI), if determined necessary; and
5. Collect data to determine whether the release is more than likely the result of activities associated with the Department of Defense (DoD).

In addition to the USEPA-identified goals of an SI, the ARNG SI also identifies whether there are potential off-facility PFAS sources.

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2. Facility Background

2.1 Facility Location and Description

Fort Pickett encompasses approximately 45,160 acres in Brunswick, Dinwiddie, and Nottoway counties, Virginia. The facility is located approximately 60 miles southwest of Richmond, Virginia and 3 miles east of the town of Blackstone (**Figure 2-1**). Fort Pickett was established on land purchased by the federal government for use as a combat training facility, with the peak number of troops stationed at the facility during 1943. The facility was briefly closed in 1944 and then later fully re-activated in 1950 (Tetra Tech, Inc., 2005). Fort Pickett is currently a maneuver and training center operated by the Virginia ARNG (VAARNG), and the facility is used year-round for military training of both active and reserve troops of the ARNG and other DoD and non-DoD units.

In 1995 Fort Pickett was selected by the Base Realignment and Closure (BRAC) Commission and began undergoing closure. A total of 45,160 acres of the facility are BRAC property and subject to transfer or lease; the VAARNG utilizes approximately 42,296 acres of BRAC property as part of the operational Fort Pickett. The majority of the remaining 2,864 acres and buildings of BRAC property have been transferred to the Nottoway County Local Redevelopment Authority (LRA) and Virginia Polytechnic Institute and State University, Southern Piedmont Agricultural Research and Extension Center (Tetra Tech, Inc., 2005).

In 2005, an inventory of the property identified about 41,000 acres as operational training and maneuver areas. The remaining approximately 3,500 acres were identified as non-operational (Army Range Inventory Database-Geodatabase, 2005).

2.2 Facility Environmental Setting

The facility is located within the Piedmont geologic province of Virginia; it is bounded on the east by the Coastal Plain and on the west by the Blue Ridge province. Topography at Fort Pickett is characterized by low, gently rolling terrain with generally level uplands dissected by stream drainages (**Figure 2-2**). The northwestern portion of the facility is considered a level upland, with a dendritic drainage pattern. The southeastern portion of the facility shows more relief than the majority of the facility, with deeply dissected topography with steeper slopes and ravines (EA, 2007).

2.2.1 Soil

Loams and sandy loams are the most common soil types on Fort Pickett. Soils at Fort Pickett generally consist of a quartz sandy loam surface layer that ranges in depth from 6 to 18 inches over a micaceous clay loam, with a frost depth of 24 inches (EA, 2007). The majority of the upland soils found at Fort Pickett are not frequently flooded, have a slow to moderate infiltration rate, and are non-hydric.

There are four wetland soils found at Fort Pickett: Chewacla, Wehadkee, Worsham, and Chastain. These soils share many of the same characteristics: thermic, slow infiltration rates, and are found on low slopes ranging from 0 to 2 percent (%). The large number of wetlands that occur throughout Fort Pickett significantly improves water quality by filtering groundwater and surface run-off (EA, 2007).

2.2.2 Geology

Fort Pickett is located in the Piedmont physiographic province, where the geology is primarily folded metamorphic rocks with igneous intrusions (EA, 2001). A layer of saprolite, resulting from the weathering of the metamorphic and igneous rock, overlies the bedrock across the

installation. Alluvial deposits consisting of sand, silt, and clay are also present within the floodplains of the streams that drain the facility. These alluvial deposits are similar in grain size to the saprolite deposits and can be difficult to differentiate (EA, 2007). The typical sequence from ground surface to bedrock includes a thin layer of soil, a variable layer of saprolite (as much as 45 feet thick), and a narrow band of fractured bedrock. The depth to bedrock can vary significantly across the facility—from ground surface to more than 30 feet below ground surface (bgs). The regional geology is shown on **Figure 2-3**.

2.2.3 Hydrogeology

Groundwater systems within the Piedmont province include a combination of saprolite and fractured bedrock occurrences (EA, 2007). Groundwater at Fort Pickett may occur in a multi-aquifer system, with water-producing zones existing in local silt, sand, and/or gravel lenses; broken rock, gravel, sand, silt, and clay within the saprolite; and perhaps in fractures within the bedrock. These water-producing zones may be separated both laterally and vertically by impermeable sediments or unfractured rock or by differentially weathered rock. The original rock texture is generally impermeable.

Precipitation infiltrates into water producing zones and recharges the water table aquifer. A component of groundwater flows horizontally, while another component flows vertically downward into interconnected fractures in the underlying bedrock aquifers. The shallow water table aquifer is presumed to be unconfined; therefore, groundwater flows under the influence of gravity, with flow patterns resembling a subdued reflection of local topography. It is assumed that groundwater discharges to local streams in the area. The general shallow groundwater flow direction across the entire facility likely follows topography and ranges from northwest to southeast. For deeper aquifers, groundwater is under the influence of the presumed controlling hydraulic head for the region, namely the Nottoway River. Deep groundwater may underflow small streams and tributaries present at the facility, but it will ultimately discharge to the Nottoway River.

A study conducted in 1989 showed depth to groundwater ranges from 7 to 33 feet bgs at Fort Pickett (Woodward Clyde, 1996). The water table begins to fall in April and is replenished in the winter months. The majority of the natural springs at Fort Pickett occur at the head of major drainages and are associated with seepage wetlands. Depths to water measured during the June 2021 SI synoptic gauging event ranged from 5.51 to 36.32 feet bgs at the 11 AOIs investigated (see **Section 3** for greater details on each AOI). The location of each AOI is shown in **Figure 2-4** and groundwater elevation contours from the SI are presented on **Figure 2-5** through **Figure 2-14.**

No drinking water wells exist at Fort Pickett; the facility is provided drinking water by the Nottoway Reservoir. The Virginia Department of Environmental Quality (VDEQ) maintains a database of registered wells in the area. Several domestic, industrial, public/municipal/government, and unknown-use wells exist within 4 miles of the facility to the west, northwest, and northeast (**Figure 2-3**). These wells are cross-gradient and upgradient, and they are not likely to be influenced by potential PFAS releases at Fort Pickett. Aerial imagery of the area shows the presence of residences in the rural areas to the east, west, and south surrounding Fort Pickett. It is possible that unregistered domestic wells associated with the residences exist and are not included in the VDEQ database.

2.2.4 Hydrology

Fort Pickett is primarily located within the Nottoway River drainage basin. A small section in the northeast corner of the facility is drained by Butterwood Creek. The major stream networks on the facility include the Nottoway River; Hurricane Branch; and Birchin,

Tommeheton, and Butterwood Creeks. Hurricane Branch, Birchin Creek, and Tommeheton Creek drain into the Nottoway River within the boundaries of the facility. The headwaters of Hurricane Branch, Birchin, Tommeheton, and Butterwood creeks largely originate within the boundaries of the facility (**Figure 2-15**).

The Nottoway River drains into the Blackwater River at the Virginia/North Carolina border, which in turn drains into the Albemarle Sound in North Carolina. Butterwood Creek eventually drains into the Nottoway River farther downstream of the facility. On-facility streams partly originate as groundwater discharge from shallow aquifers; stream sections within the facility boundary are likely groundwater discharge points or gaining streams. However, the Nottoway River and Butterwood Creek may also have stream segments that act as groundwater recharge points or losing streams downstream of the facility boundary. Many portions of the drainages mentioned above are slow-moving and marshy, forming extensive wetlands.

There are approximately 13 lakes, ponds, and surface water impoundments (totaling approximately 600 acres in water surface area) at Fort Pickett (EA, 2007). The largest impoundment, the Nottoway Reservoir, is located in the southwest corner of the facility and covers approximately 384 acres in water surface area. Other lakes and ponds include Twin Lakes, Lewis Pond, Floyd Pond, Birchin Lake, and Tommeheton Lake.

The Nottoway Reservoir, owned by Fort Pickett, is the source of drinking water for Fort Pickett, the town of Blackstone, and several private residences within a 4-mile radius of the facility boundary (EA, 2007). The Nottoway Reservoir is located within Fort Pickett near the southwestern corner of the operational range boundary, and cross-gradient of most of Fort Pickett. The next nearest surface water intake downstream of the operational range boundary is on the Nottoway River, approximately 30 miles downstream of the Nottoway River's operational range exit point. Water drawn from the reservoir is treated at a freshwater treatment plant located adjacent to the town of Blackstone wastewater treatment plant (WWTP) in the Fort Pickett cantonment area. The water treatment plant is shared by the town of Blackstone and the facility. Although the WWTP is located within the Fort Pickett cantonment area, the WWTP property is owned and operated by the town of Blackstone, not the VAARNG. In addition to the plant, water distribution mains, three elevated storage tanks, and three pumping stations are located throughout the area within the boundaries of Fort Pickett (US General Services Administration, 2012). The Nottoway Reservoir is also used for recreational fishing.

2.2.5 Climate

The climate of the Fort Pickett area is characterized as humid sub-tropical, with hot, humid summers and mild winters (EA, 2007). The annual average temperature is 56.7 degrees Fahrenheit (°F). Frequent, short cold spells occur in winter, with temperatures in the low teens. The average lowest temperature (25.1 °F) occurs in January, and the average highest temperature (87.7 °F) occurs in July (National Oceanic and Atmospheric Administration, 2019).

Although precipitation is fairly well distributed throughout the year, on average, the least precipitation occurs in the months of February, November, and December, and the most precipitation occurs in the month of August (4.47 inches) (National Oceanic and Atmospheric Administration, 2019). However, short dry periods occur most years, and several severe droughts have occurred. Prevailing winds come from the southwest except when frontal systems pass through (EA, 2007).

2.2.6 Current and Future Land Use

Fort Pickett is currently a maneuver and training center for the VAARNG and provides realistic joint and combined arms training. The facility is used year-round for military training of both active

and reserve troops of the Army, Navy, Marines, and Air Force, as well as other government agencies. Future land use is not anticipated to change.

2.2.7 Sensitive Habitat and Threatened/ Endangered Species

The following birds, plants, mammals, and reptiles are federally endangered, threatened, proposed, and/ or are listed as candidate species in Brunswick, Dinwiddie, and Nottoway counties, Virginia (US Fish and Wildlife Service [USFWS], 2021a-c).

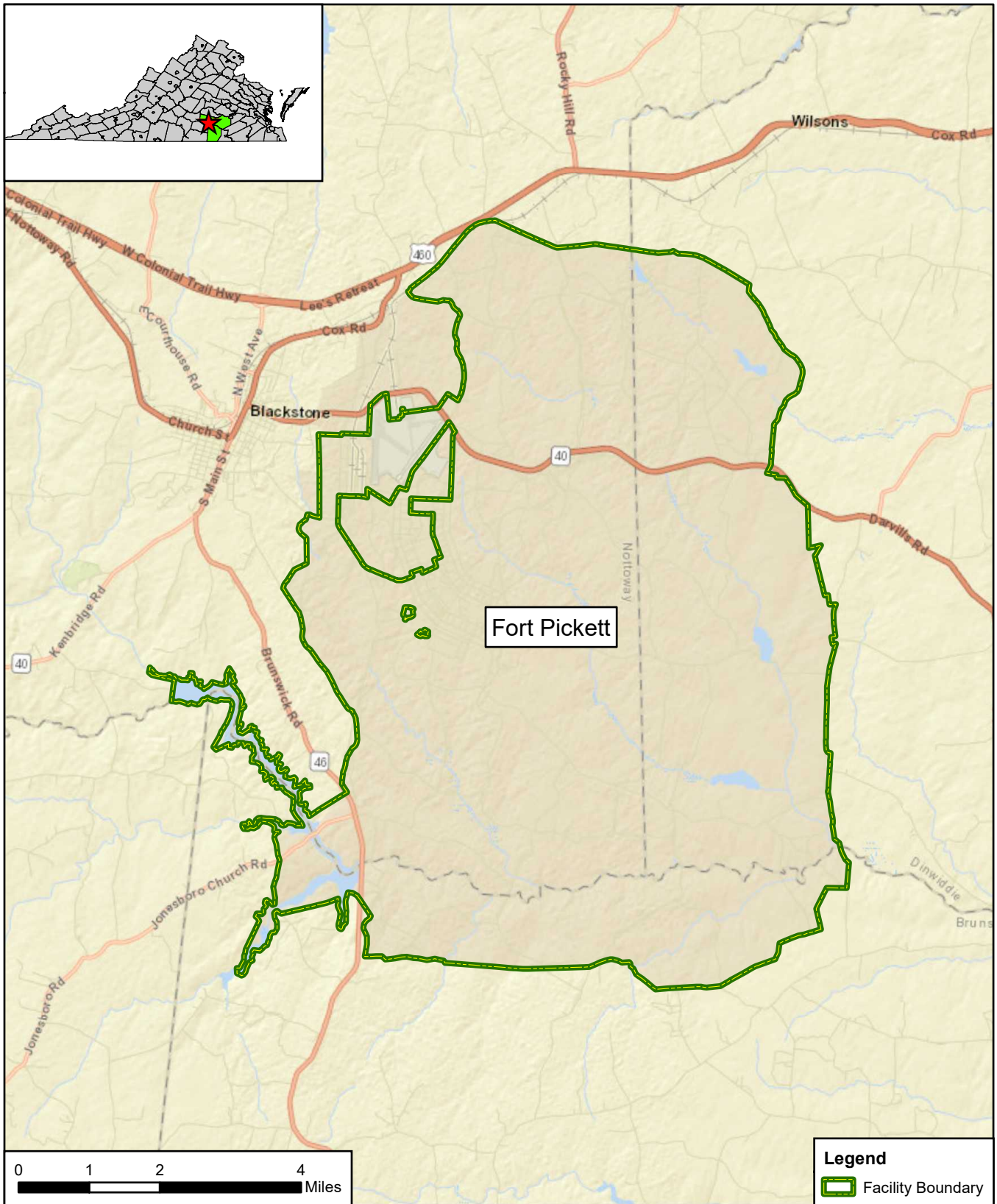
- **Insects:** Monarch butterfly, *Danaus plexippus* (candidate)
- **Mammals**: Northern long-eared bat, *Myotis septentrionalis* (threatened), Eastern pipistrelle, *Pipistrellus subflavus* (status undefined, listed only for Nottoway County)
- **Clams:** Yellow lance, *Elliptio lanceolata* (threatened), Dwarf wedgemussel, *Alasmidonta heterodon* (endangered), Green floater, *Lasmigona subviridis* (under review), Atlantic pigtoe, *Fusconaia masoni* (proposed threatened)
- **Birds:** Bachman's sparrow, *Aimophila aestivalis* (species of concern), Bald eagle, *Haliaeetus leucocephalus* (recovery)
- **Fish:** Roanoke logperch, *Percina rex (*endangered)
- **Flowering plants:** Least Virginia trillium, Trillium pusillum virginianum (species of concern), New Jersey rush, Juncus caesariensis (species of concern), Michaux's sumac, Rhus michauxii (endangered)

2.3 History of PFAS Use

PFAS were potentially released to soil and groundwater within the boundary of Fort Pickett through fire training exercises, AFFF storage/handling activities, controlled burns, and secondary release areas (landfills). Six release areas were identified at the facility during the PA and grouped into five AOIs. However, during the development of the SI QAPP, an additional seven potential release areas were added to the original and re-grouped into 11 AOIs. These AOIs are described in **Section 3** and presented on **Figure 2-4**.

2.4 Other PFAS Investigations

Based on the USEPA (UCMR 3) data, it was indicated that no PFAS were detected in a public water system above the USEPA Health Advisory (HA) level within 20 miles of the facility (USEPA, 2017a). PFAS analyses performed in 2016 had method detection limits (MDLs) that were higher than currently achievable. Thus, it is possible that low concentrations of PFAS were not detected during the UCMR 3 but might be detected if analyzed today.



CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE	1:126,720	CHK BY	AB	7/29/2021
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	7/29/2021

N

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-1

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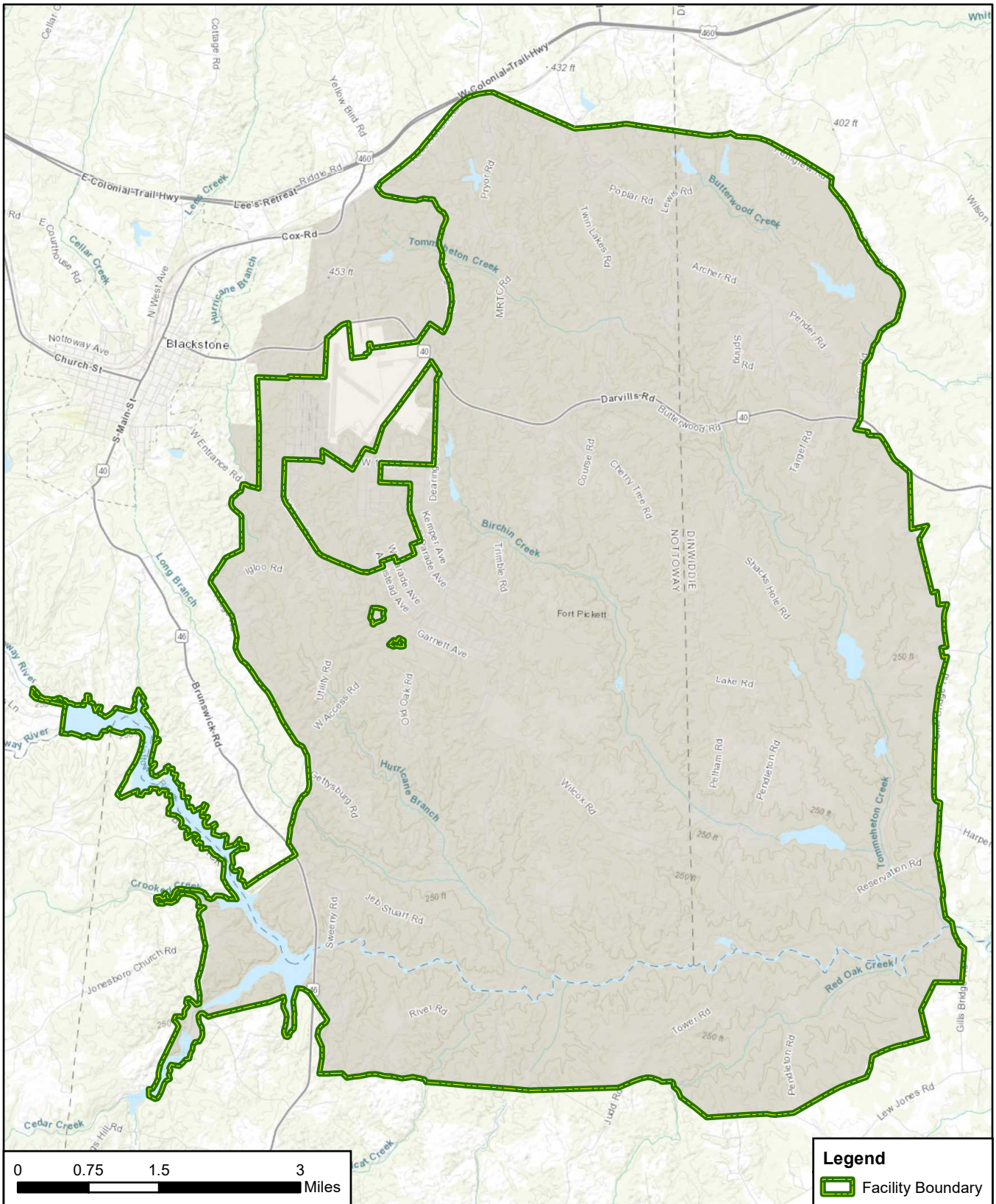

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	7/29/2021	GIS BY	MS	7/29/2021
SCALE	1:95,040	CHK BY	AB	7/29/2021
Base Map: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN,		PM	CM	7/29/2021

Facility Topography

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-2

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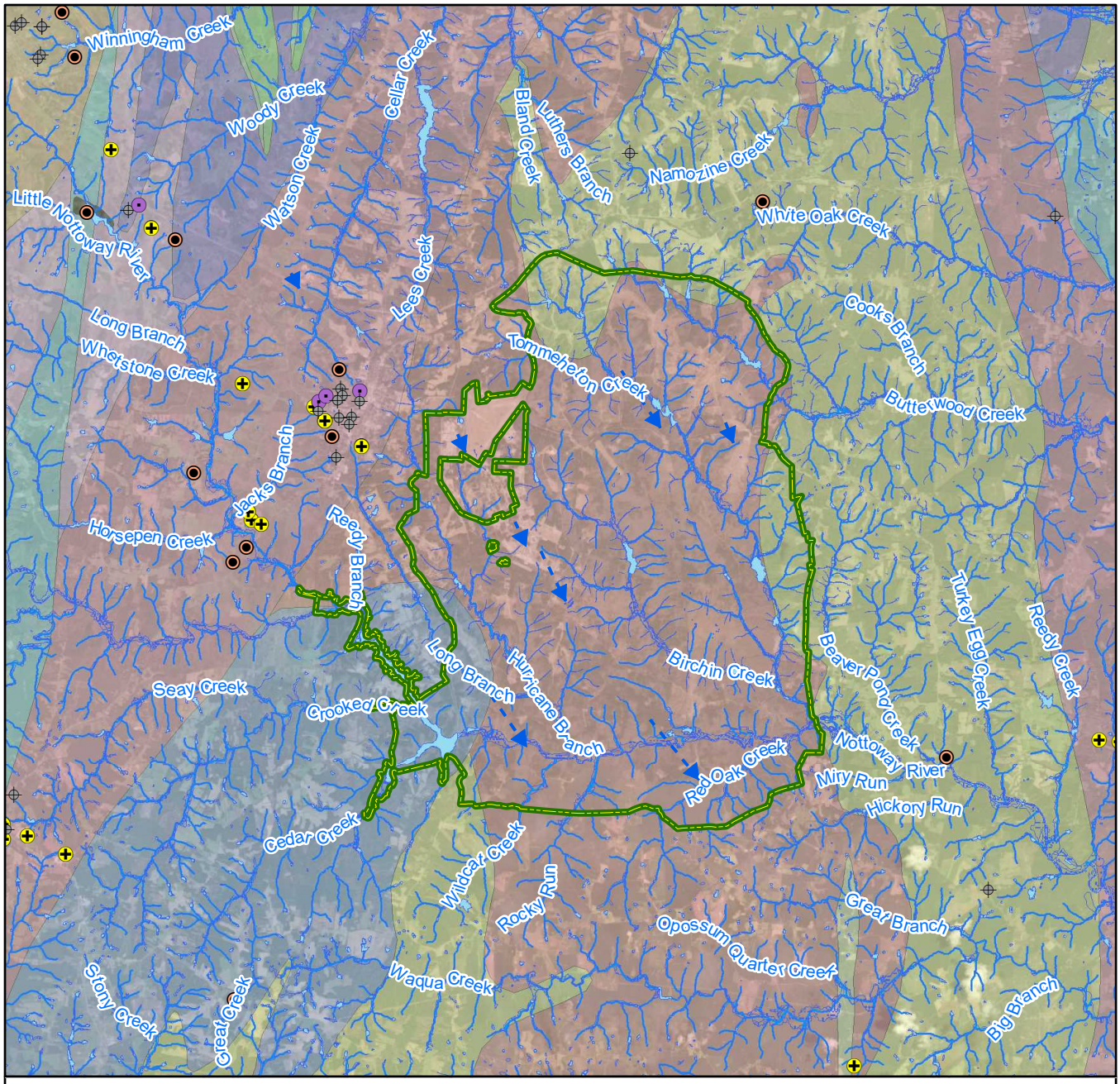

Facility Boundary
Water Body
Wetland
River/Stream
Canal/Ditch
Inferred Groundwater Flow Direction

Geology

Upper Triassic conglomerate
Upper Triassic sandstone
Proterozoic to Paleozoic mylonite
Proterozoic to Paleozoic phyllonite
Proterozoic to Pennsylvanian felsic gneiss
Proterozoic to Pennsylvanian granitic gneiss
Proterozoic granodiorite
Proterozoic mafic metavolcanic rock
Proterozoic biotite gneiss
Proterozoic granite
Proterozoic granite
Proterozoic biotite gneiss
Proterozoic schist

Wells

Domestic
Industrial
Public / Municipal / Government
Unknown

0 1.5 3 6 Miles

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	7/29/2021	GIS BY	MS	7/29/2021
SCALE	1:190,080	CHK BY	AB	7/29/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	7/29/2021

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Groundwater Features

AECOM
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Figure 2-3

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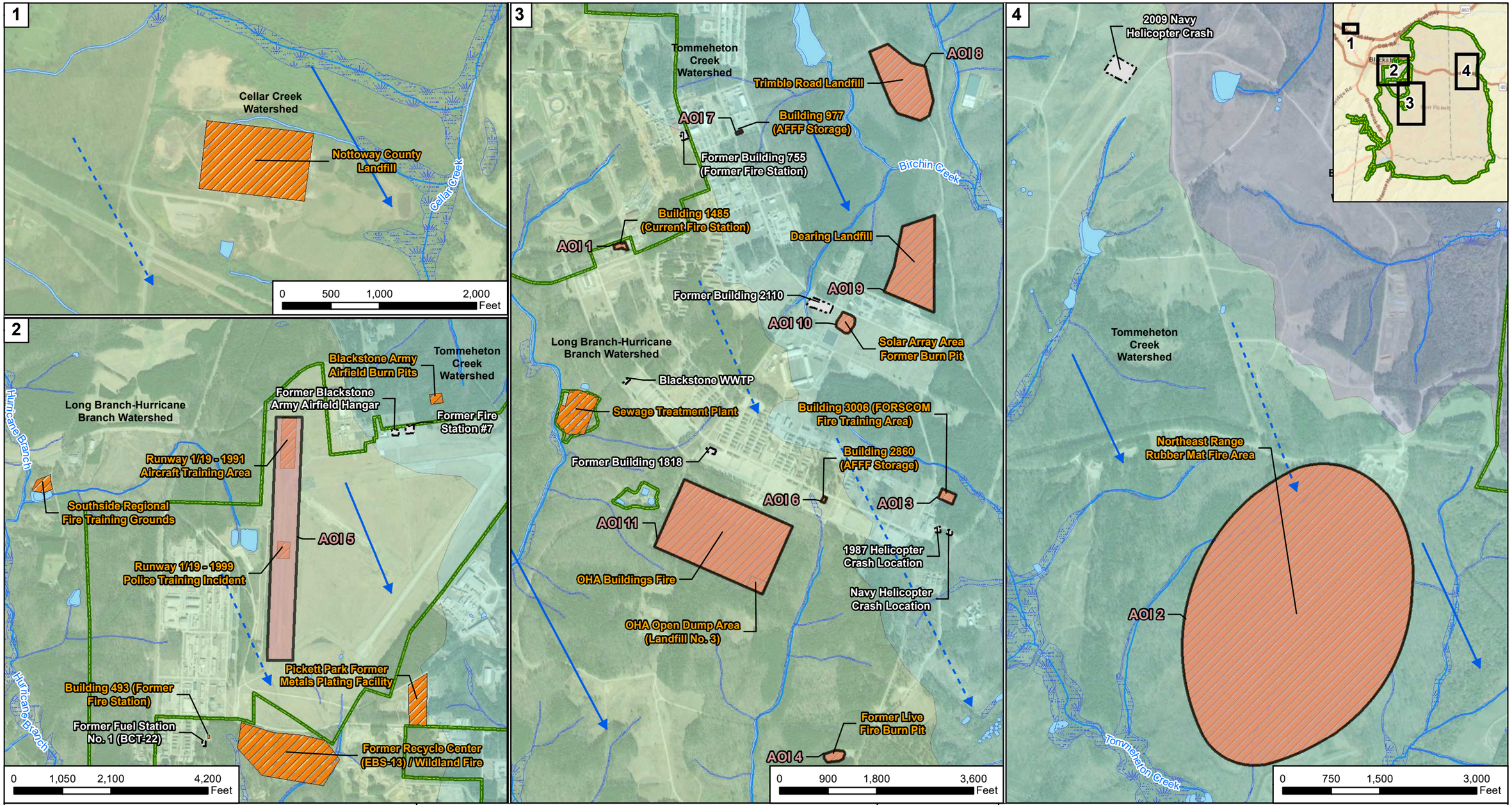

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE	1:25,200	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

- Area of Interest
- Potential PFAS Release
- No Suspected Release
- Facility Boundary
- Water Body
- Wetland
- River/Stream
- Surface Water Flow Direction
- Inferred Groundwater Flow Direction

N

Areas of Interest

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 2-4

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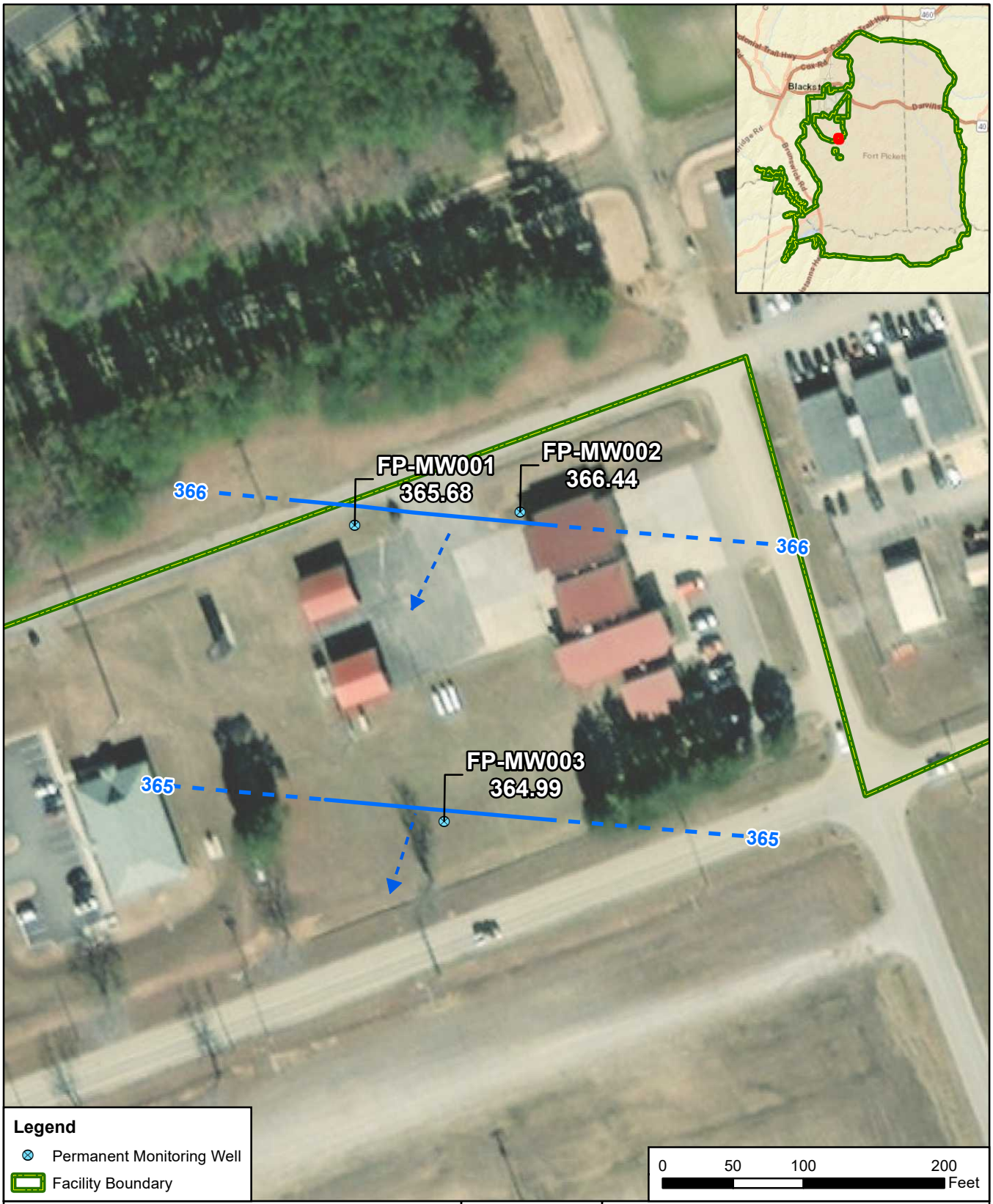

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE		CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	11/17/2021

Groundwater Elevations AOI 1, June 2021

AECOM
12420 Milestone Center Drive
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Figure 2-5

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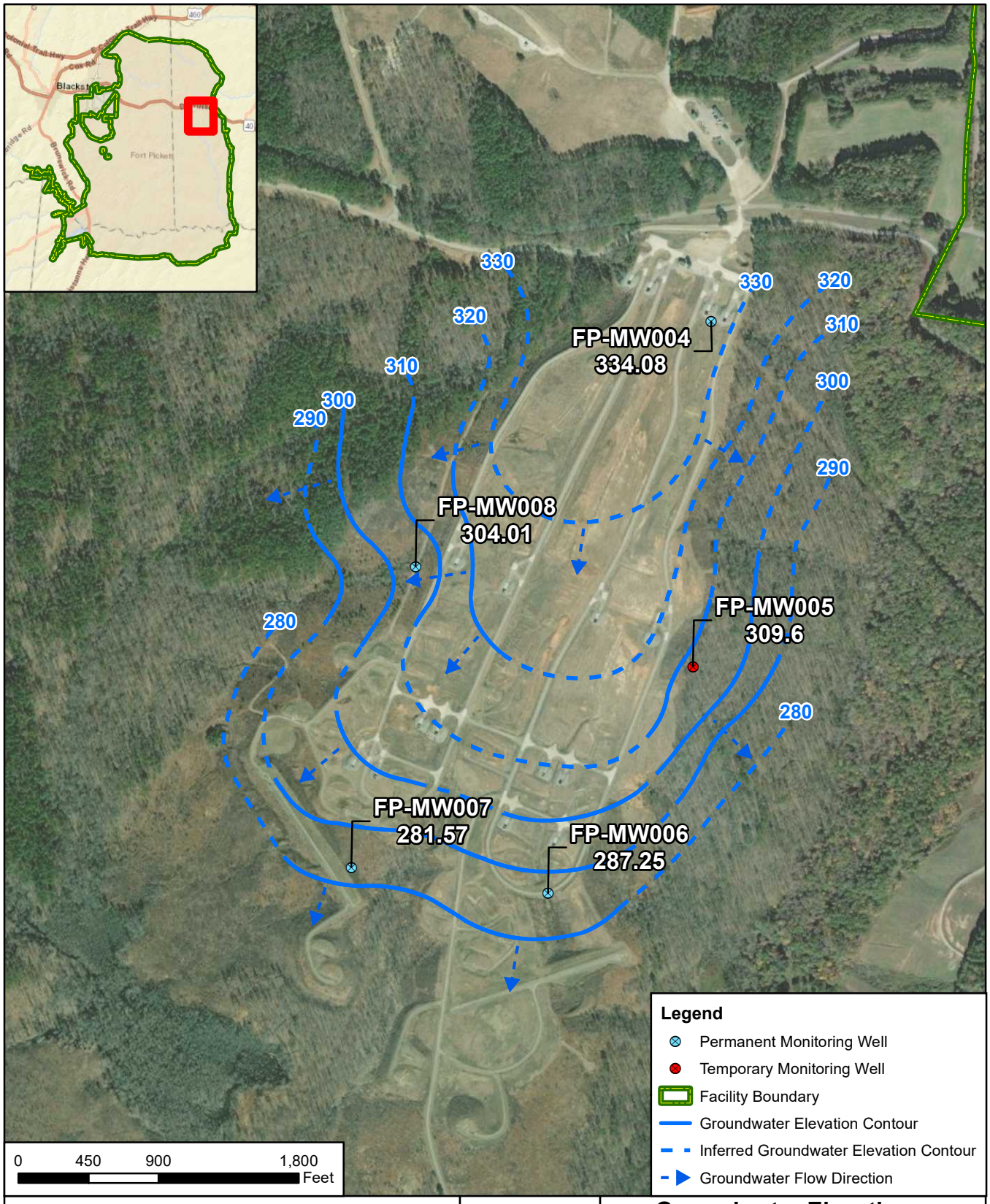

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SCALE		CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	11/17/2021

Groundwater Elevations AOI 2, June 2021

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Figure 2-6

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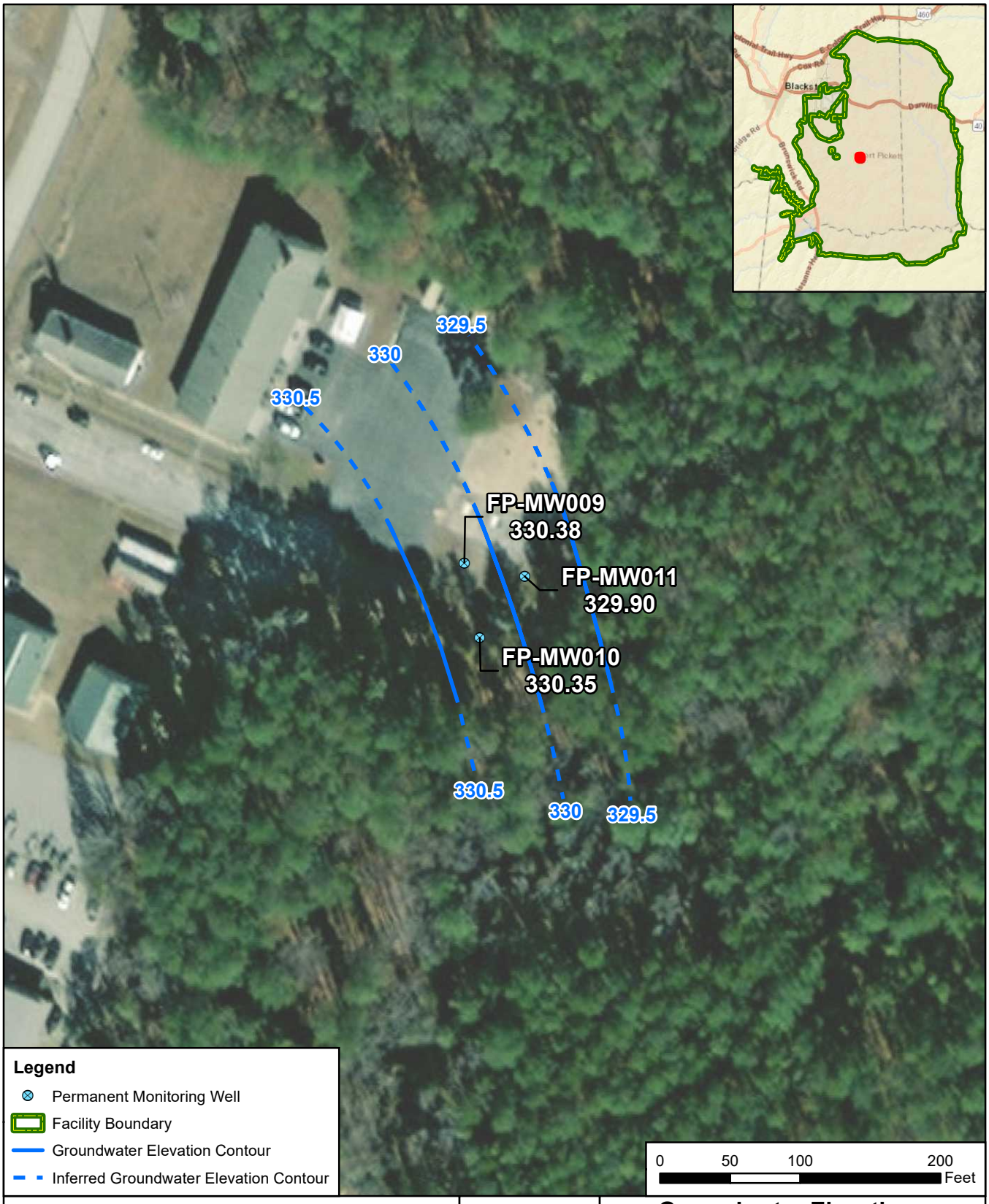

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE		CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	11/17/2021

Groundwater Elevations AOI 3, June 2021

AECOM
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Figure 2-7

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CLIENT	ARNG			
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SCALE		CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	11/17/2021

Groundwater Elevations AOI 4, June 2021

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12420 Milestone Center Drive
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Figure 2-8

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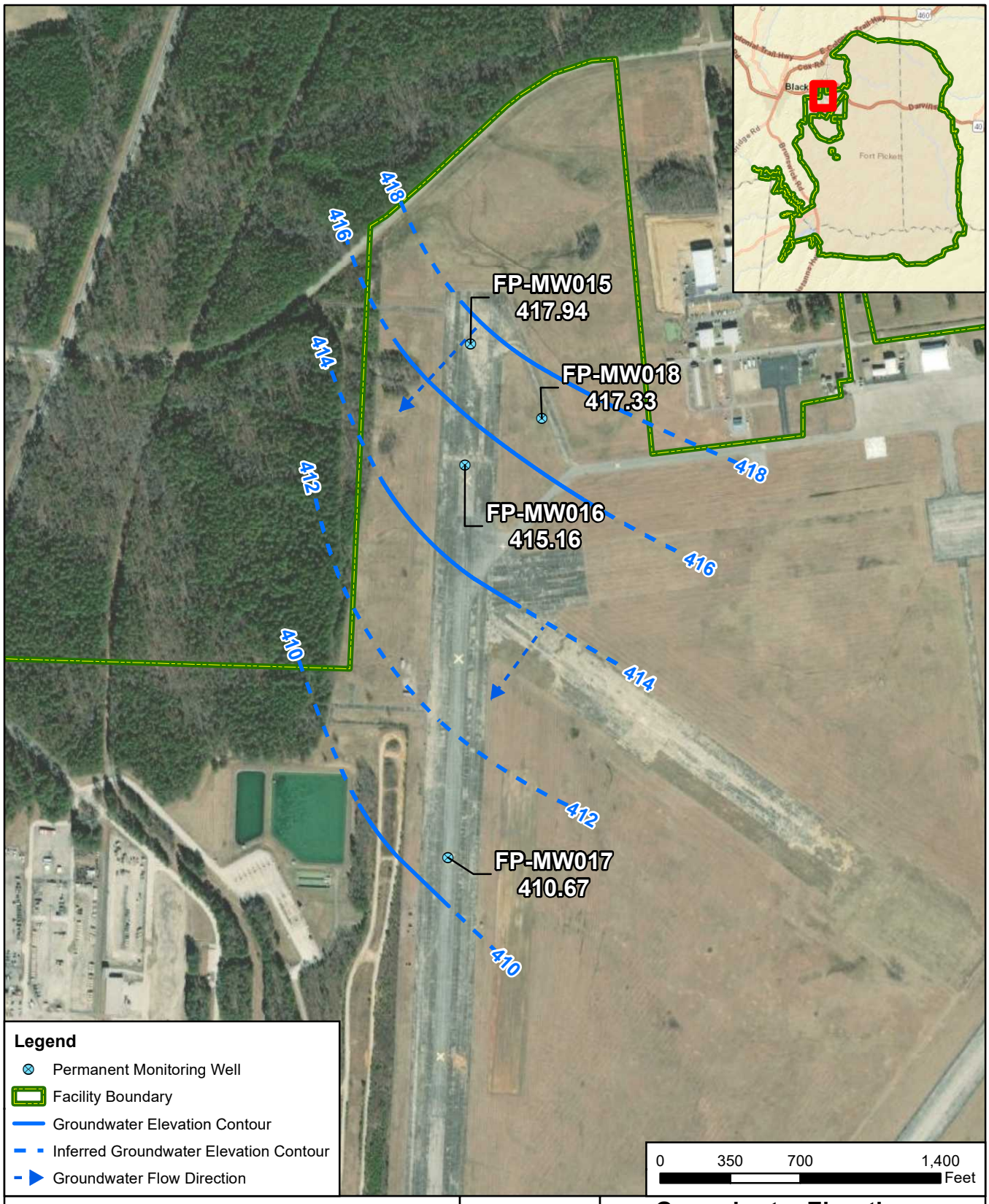

CLIENT	ARNG			
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SCALE		CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	11/17/2021

Groundwater Elevations AOI 5, June 2021

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Figure 2-9

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CLIENT	ARNG			
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SCALE		CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	11/17/2021

Groundwater Elevations
AOI 6, June 2021

AECOM
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Figure 2-10

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CLIENT	ARNG			
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SCALE		CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	11/17/2021

Groundwater Elevations
AOI 7, June 2021

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Figure 2-11

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CLIENT	ARNG			
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SCALE		CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	11/17/2021

Groundwater Elevations
AOI 8, June 2021

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Figure 2-12

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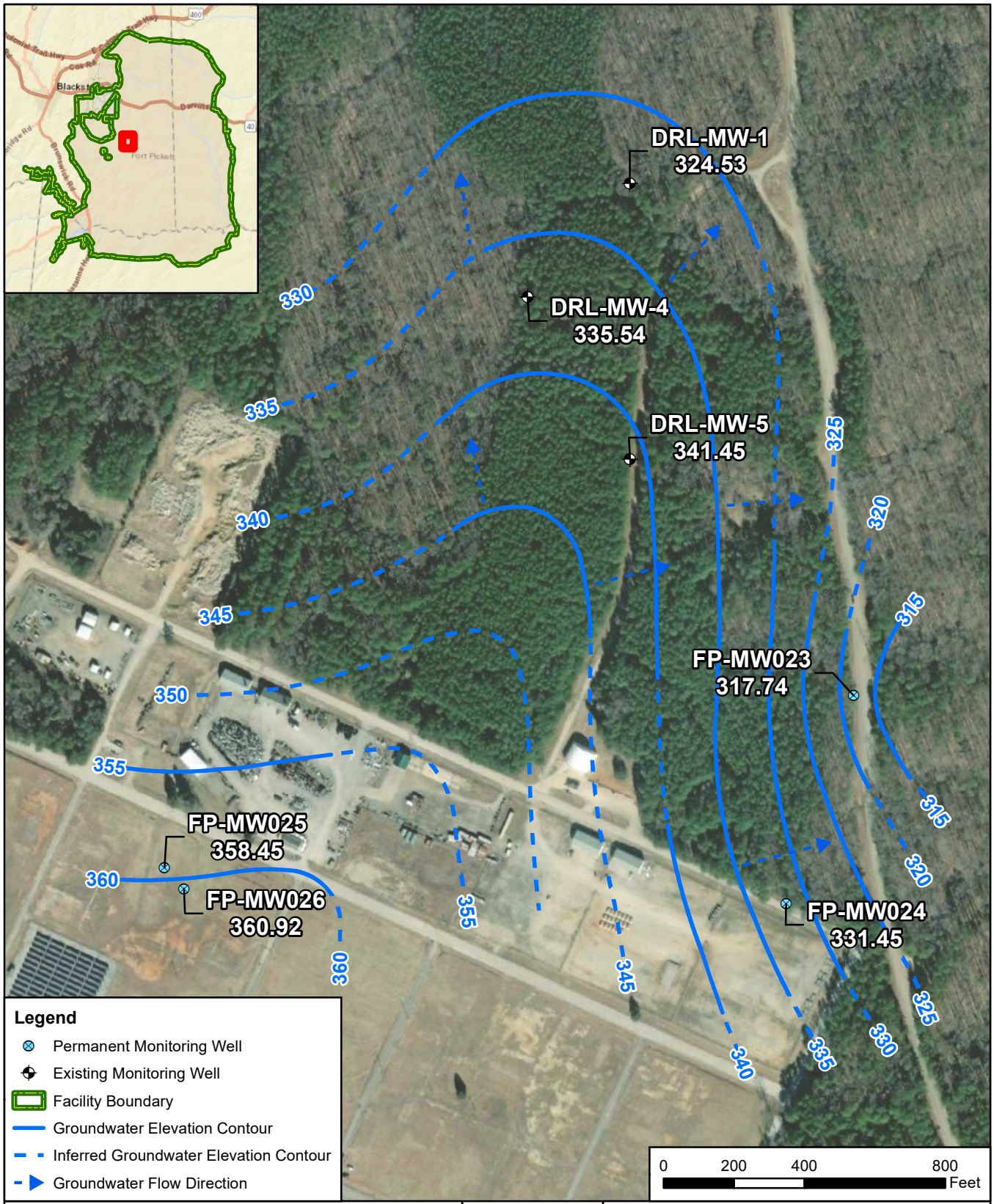

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE		CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	11/17/2021

Groundwater Elevations AOIs 9 and 10, June 2021

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Figure 2-13

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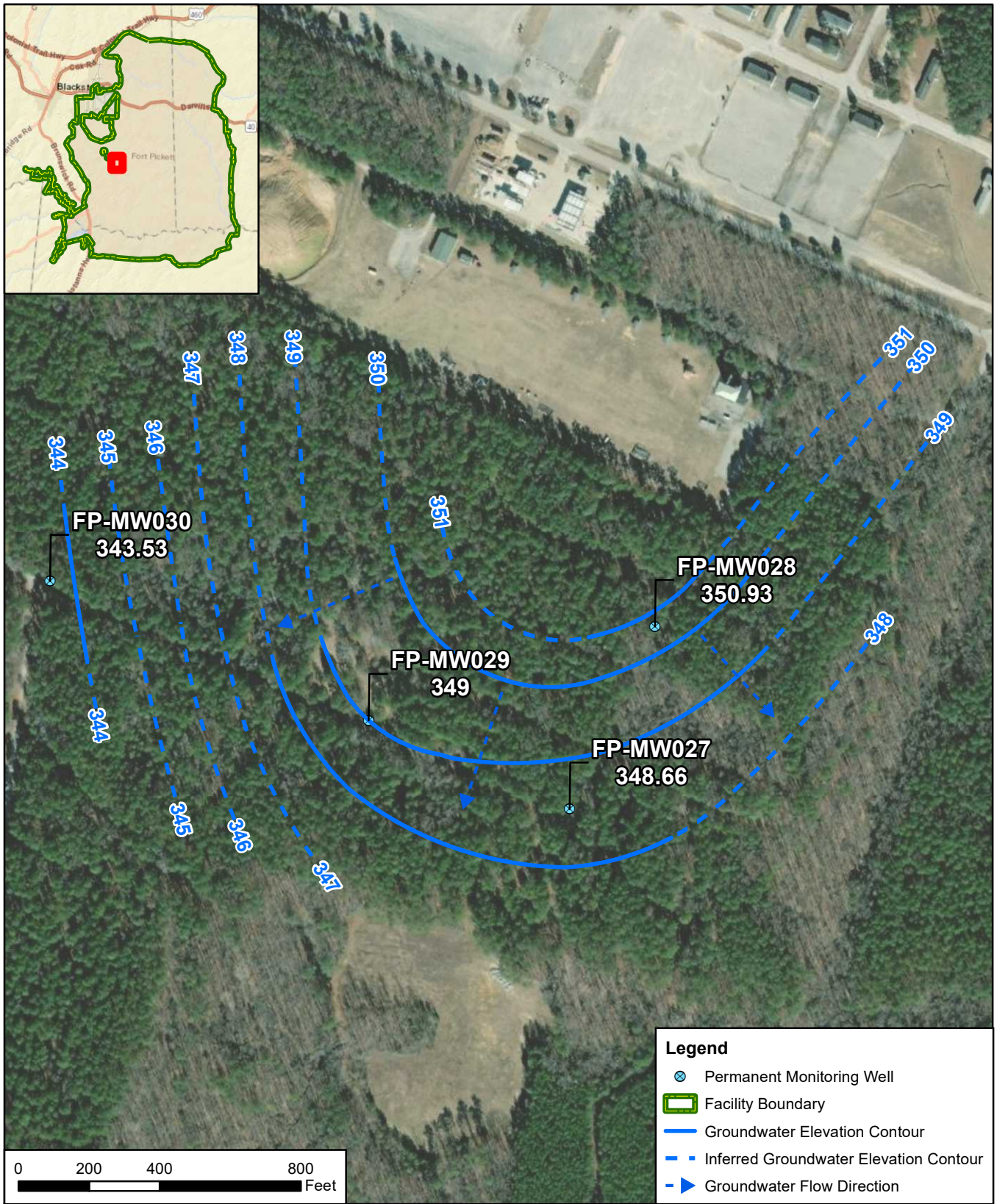

CLIENT	ARNG			
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SCALE		CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	11/17/2021

N

Groundwater Elevations
AOI 11, June 2021

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Figure 2-14

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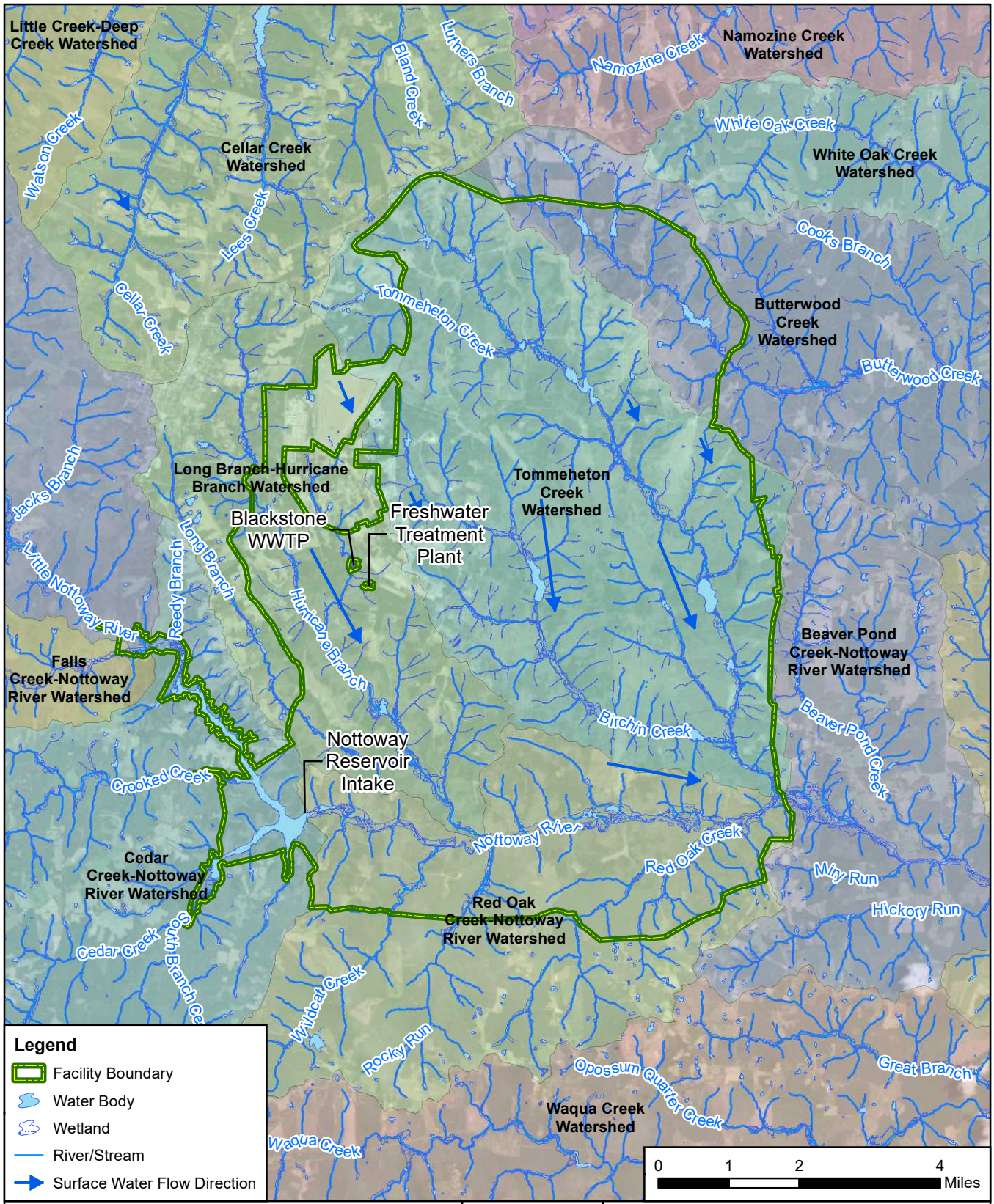

CLIENT	ARNG			
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Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	11/17/2021

Surface Water Features

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-15

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3. Summary of Areas of Interest

This section presents a summary of each potential PFAS release area by AOI. Based on the PA findings and the release areas added during development of the SI QAPP, thirteen potential PFAS release areas were identified at Fort Pickett and grouped into eleven AOIs (AECOM, 2021). The potential PFAS release areas are shown on **Figure 2-4**.

3.1 AOI 1

Building 1485 (Current Fire Station), its parking area, and two support buildings west of the fire station comprises AOI 1. This AOI1 consists of one potential PFAS release area, as described below.

The AOI is used for fire equipment maintenance and storage, as well as fire training. Approximately 40 5-gallon buckets of Ansulite® Alcohol Resistant Concentrate 3% and 6% AFFF are stored in the maintenance bays at the fire station. Additionally, approximately 200 gallons of the same AFFF are also stored in tanks on two fire rescue trucks; one truck stores 70 gallons, and one truck stores 130 gallons. No AFFF fire suppression system exists at the fire station

AFFF releases at AOI 1 occurred on both paved areas and grassy surfaces. Fire training has occurred in the area outside and to the west of Building 1485 approximately every other year between 1996 and 2015. Records of the routine fire training exercises are not kept by the Fort Pickett Fire Department. Approximately 5 to 10 gallons of AFFF were used during each fire training event. AFFF was typically sprayed towards sanitary sewer manhole 460, located near the northwest corner of Building 1485, or sprayed towards the woods north of the building. Sanitary sewer manhole 460 channels runoff west along a sanitary sewer pipe that connects to several other sanitary sewer pipes west of Garnett Avenue (Timmons Group, 2017). Some AFFF releases occurred directly onto surface soil but may also have infiltrated subsurface soil via cracks in pavement or joints between areas that are paved with different materials. If AFFF released at the AOI infiltrated the subsurface, then ground-disturbing activities in the grassy and wooded areas as well as beneath the pavement may result in potential PFAS exposure to construction workers. Accidental ingestion of groundwater may also occur during construction activities due to the potential for shallow depth to groundwater across Fort Pickett.

3.2 AOI 2

The Northeast Range footprint comprises AOI 2. This AOI consists of one potential PFAS release area, as described below.

AFFF was released by the Fort Pickett Fire Department in response to a range fire at the range firing points in 2012. AFFF was left in place following the range fire. The range has multiple firing positions, and the exact firing position where the fire occurred is unknown.

AFFF releases to any firing point within the AOI could have occurred directly onto surface soil or migrated a short distance to surface soil. PFAS releases to surface soil at the AOI may have infiltrated subsurface soil. Ground-disturbing activities on the range may result in exposure of PFAS in subsurface soil and groundwater to construction workers.

3.3 AOI 3

Building 3006, the US Army Forces Command (FORSCOM) Petroleum Training Module Area comprises AOI 3. This AOI consists of one potential PFAS release area, as described below.

The area was used as a fire training area (FTA) beginning in 1989 and has been used for fire training ever since. The FORSCOM Program Manager's tenure spans 2003 to 2017. Fire training includes igniting fuel pans containing diesel west of Building 3006 and extinguishing them with AFFF. The FTA is used by DoD and non-DoD units, including units not stationed at Fort Pickett. The FTA is located on a concrete surface, with gravel beneath the fuel pans, and is surrounded by undeveloped woods to the north, east, and south.

The FORSCOM Program Manager stated during interviews that approximately 5 gallons of 6% AFFF were used per year during training between 2003 and 2005, and approximately 15 gallons of 6% AFFF were used per year from 2005 to 2017. AFFF has not been used for training purposes at the FTA since August 2017, following an Army directive to cease AFFF use except in emergency situations.

During training, AFFF runoff that escaped the paved training area would flow downslope into the wooded areas east of the FTA. AFFF released to surface soils and/or paved surfaces at AOI 3 may have infiltrated subsurface soil, where it could create an exposure pathway in subsurface soil and groundwater to construction workers during ground-disturbing activities.

3.4 AOI 4

The Former Live Burn Pit comprises AOI 4. This AOI consists of one potential PFAS release area, as described below.

The former live fire burn pit was used for a fire training exercise in 1998 that involved the discharge of approximately 130 gallons of AFFF. The AFFF was left in place following the exercise.

The one-time AFFF release at AOI 4 occurred directly onto surface soil. AFFF released may have infiltrated subsurface soil, where it may create an exposure pathway to PFAS in groundwater and subsurface soil during potential ground-disturbing activities.

3.5 AOI 5

The Airfield Runway 1/19, including the Aircraft Training Area and the southern portion of Airfield Runway 1/19, comprise AOI 5. This AOI consists of two potential PFAS release areas, as described below.

3.5.1 Airfield Runway 1/19 1991 Aircraft Training Area

AOI 5 encompasses the entire Airfield Runway 1/19, including the northern portion, where the US Army ignited an aircraft fuselage and used Army-provided AFFF to extinguish the flames as part of a one-time fire training exercise on the north end of the runway circa 1991. A P-4 Pumper firefighting vehicle was used to spray AFFF during the exercise, and AFFF was captured using a large canvas or tin pad beneath the fuselage. Runway 1/19 is paved but surrounded by grass on all sides. The paved runway currently has many cracks in the pavement, but the quality of the runway at the time of the 1991 and 1999 releases is unknown.

3.5.2 Airfield Runway 1/19 1999 Police Training Incident

AOI 5 also includes a release area in the southern portion of Airfield Runway 1/19. During a police training event in 1999, approximately 5 gallons of AFFF were accidentally released by the fire department. This release occurred during the event at the time when water was sprayed on the runway to create wet road conditions, and the small volume of AFFF was accidentally sprayed onto the runway

3.6 AOI 6

Building 2860 comprises AOI 6. This AOI consists of one potential PFAS release area, as described below.

AOI 6 is used by the Fort Pickett Fire Department to store equipment and materials, and it formerly operated as a fire station, but its dates of use as a fire station are unknown. Fort Pickett Fire Department vehicles, including AFFF-capable firetrucks, have been stored intermittently at Building 2860, as necessary. Currently, two 55-gallon drums containing approximately 100 gallons of AFFF concentrate are stored at Building 2860.

AFFF releases at AOI 6 may have occurred on paved surfaces but could have migrated a short distance onto the surrounding surface soil. As a result, AFFF may have infiltrated subsurface soil.

3.7 AOI 7

Building 977, the Petroleum Training Module Storage Area, comprises AOI 7. This AOI consists of one potential PFAS release area, as described below.

AOI 7 is used for AFFF storage and, as of the PA, had approximately 40 to 60 5-gallon buckets of Ansulite® 6% AFFF stored inside. AFFF stored at Building 977 was transported to the Building 3006 FTA on a trailer equipped to mix and spray AFFF. Trailers used for fire training at the Petroleum Training Module FTA have also been stored at Building 977.

AFFF releases at AOI 7 may have occurred on paved surfaces. These releases could have migrated a short distance onto the surrounding surface soil and may have infiltrated subsurface soil.

3.8 AOI 8

The Trimble Road Landfill comprises AOI 8. This AOI consists of one potential PFAS release area, as described below.

AOI 8 is a closed trench-and-fill landfill that comprises 20 acres and accepted construction debris and household waste. The landfill has been in operation since 1982 and contained a volume of 199,160 cubic yards at the time of 1995 memorandum (PRC Environmental Management, Inc., 1995).

PFAS releases at AOI 8 would have been the result of debris and waste in the landfill. Therefore, there is no potential pathway to surface soil or subsurface soil since the landfill closed.

3.9 AOI 9

The Dearing Road Landfill comprises AOI 9. This AOI consists of one potential PFAS release area, as described below.

AOI 9 is a trench-and-fill landfill comprising 25 acres located adjacent to the southeastern portion of the Fort Pickett cantonment area. From the mid-1960s until 1982, the landfill accepted construction debris, household waste, and waste herbicides. Sludge from the town of Blackstone WWTP clarifiers was disposed of by land spreading at the landfill

PFAS releases at AOI 9 would have been the result of waste in the landfill and WWTP sludge spread at the landfill. There is no cover or engineered cap at the landfill, so the pathways for surface and subsurface soils are considered potentially complete.

3.10 AOI 10

The Solar Array Former Burn Pit comprises AOI 10. This AOI consists of one potential PFAS release area, as described below.

AOI 10 is a former burn pit used for burning construction debris in the mid-1980s. Materials disposed of in burn pits may create a secondary source of PFAS contamination; however, no AFFF is known to have been used in association with the pit.

AFFF releases at AOI 10 may have occurred during potential fire training exercises at the burn pit. AFFF could have been released to the ground surface and may have infiltrated subsurface soil.

3.11 AOI 11

The Old Hospital Area (OHA) and its associated Dump Area comprise AOI 11. This AOI consists of two potential PFAS release area, as described below.

3.11.1 Old Hospital Area

The Old Hospital Area (OHA) included a complex with numerous buildings and facilities. According to interviewees, a controlled fire was used to demolish 100 OHA buildings circa 1977; no fire retardants were reportedly used to control the fire. The Fort Pickett Forestry Service routinely used a bulldozer and fire plow (a tractor with a plow for constructing a fire line by exposing mineral soil). No AFFF is known to have ever been used, trained with, or disposed of at the OHA.

3.11.2 OHA Dump Area

A former open dump/burn pit and potential live burn fire training event also existed within the OHA. The former dump was unlined, approximately 10-acres in area, and used for trench and fill operations as well as burning refuse from approximately 1945 to 1982. Wastes typically dumped in the landfill consisted of construction debris and household wastes. The closed landfill has a volume of 132,780 cubic yards (PRC Environmental Management, Inc., 1995). The burn pit was used between 1980 and 1982, but AFFF was never used in association with the burn pit.

4. Project Data Quality Objectives

Project Data Quality Objectives (DQOs) are qualitative and quantitative statements that specify the quality of data and define the level of certainty required to support project decision-making process. The specific DQOs established for this facility are described below. These DQOs were developed in accordance with the USEPA's seven-step iterative process (USEPA, 2006).

4.1 Problem Statement

The following problem statement was developed during project planning:

The presence of PFAS, which may pose a risk to human health or the environment, in environmental media at the facility is currently unknown. PFAS are classified as emerging environmental contaminants that are garnering increasing regulatory interest due to their potential risks to human health and the environment. The regulatory framework for managing PFAS at both the federal and state level continues to evolve.

The DoD has adopted a policy to retain facilities in the CERCLA process based on risk-based SLs for soil and groundwater, as described in a memorandum from the Office of the Secretary of Defense (OSD) dated 15 September 2021 (Assistant Secretary of Defense, 2021). The ARNG program under which this SI was performed follows this DoD policy. Should the maximum site concentration for sampled media exceed the SLs established in the OSD memorandum, the AOI will proceed to the next phase under CERCLA. The SLs established in the OSD memorandum apply to three compounds: PFOS, PFOA, and PFBS. The SLs are presented in **Section 6.1** of this Report.

The following quotes from the DA policy documents form the basis for this project (DA, 2016; DA, 2018):

- "The Army will research and identify locations where PFOS- and/or PFOA-containing products, such as AFFF, are known or suspected to have been used. Installations shall coordinate with installation/facility fire response or training offices to identify AFFF use or storage locations. The Army will consider FTAs, AFFF storage locations, hangars/buildings with AFFF suppression systems, fire equipment maintenance areas, and areas where emergency response operations required AFFF use as possible source areas. In addition, metal plating operations, which used certain PFOS-containing mist suppressants, shall be considered possible source areas.".
- "Based on a review of site records…determine whether a CERCLA PA is appropriate for identifying PFOS/PFOA release sites. If the PA determines a PFOS/PFOA release may have occurred, a CERCLA SI shall be conducted to determine presence/absence of contamination.".
- "Identify sites where perfluorinated compounds are known or suspected to have been released, with the priority being those sites within 20 miles of the public systems that tested above USEPA HA levels." (USEPA, 2016a; USEPA, 2016b).

4.2 Goals of the Study

The following goals were established for this SI:

1. Determine the presence or absence of PFOA, PFOS, and PFBS at or above SLs.
2. Develop information to potentially eliminate a release from further consideration because it is determined that it poses no significant threat to human health or the environment.

3. Determine the potential need for a Time Critical Removal Action (TCRA) (applies to drinking water only). The primary actions that will be considered include provision of alternative water supplies or wellhead treatment.

4. Collect data to better characterize the release areas for more effective and rapid initiation of a Remedial Investigation (RI) (if determined necessary).

5. If PFOA, PFOS, and PFBS are determined to be present, aim to evaluate whether the concentrations can be attributed to on-facility or off-facility sources that were identified within 4 miles of the installation as part of the PA (e.g., fire stations, major manufacturers, other DoD facilities).

6. Determine whether a potentially complete pathway exists between the source and potential receptors and whether ARNG is the likely source of the contamination.

4.3 Information Inputs

Primary information inputs included:

- The PA for Fort Pickett (AECOM, 2020);
- Analytical data from groundwater and soil samples collected as part of this SI in accordance with the site-specific Uniform Federal Policy (UFP)-Quality Assurance Project Plan (QAPP) Addendum (AECOM, 2021a); and
- Field data collected during the SI, including groundwater elevation and water quality parameters measured at the time of sampling.

4.4 Study Boundaries

The scope of the SI was bounded by the property limits of the facility (**Figure 2-1**). Off-facility sampling was not included in the scope of this SI. If future off-facility sampling is required, the proper stakeholders will be notified, and necessary rights of entry will be obtained by ARNG with property owner(s).

4.5 Analytical Approach

Samples were analyzed by Pace Analytical Gulf Coast, accredited under the DoD Environmental Laboratory Accreditation Program (ELAP; Accreditation Number 74960) and the National Environmental Laboratory Accreditation Program (NELAP; Certificate Number 01955). Data were compared to applicable SLs and decision rules as defined in the SI QAPP Addendum (AECOM, 2021a). These rules governed response actions based on the results of the SI sampling effort.

The decision rules described in the **Worksheet #11** of the SI QAPP Addendum identify actions based on the following:

Groundwater:

- Is there a human receptor within 4 miles of the facility?
- What is the concentration of PFOA, PFOS, and PFBS at the potential release areas?
- What is the concentration of PFOA, PFOS, and PFBS at the facility boundary upgradient and downgradient of the potential release areas?

- What does the conceptual site model (CSM) suggest in terms of source, pathway and receptor?

Soil:

- What is the concentration of PFOA, PFOS, and PFBS in shallow surface soil (0 to 2 feet bgs)?
- What is the concentration of PFOA, PFOS, and PFBS in deep soil (i.e., capillary fringe)?
- What does the CSM suggest in terms of source, pathway, and receptor?

Soil and groundwater samples were collected from each of the potential release areas. Groundwater was encountered at approximately 5.86 to 34.25 feet bgs.

4.6 Data Usability Assessment

The Data Usability Assessment (DUA) is an evaluation at the conclusion of data collection activities that uses the results of both data verification and validation in the context of the overall project decisions or objectives. Using both quantitative and qualitative methods, the assessment determines whether project execution and the resulting data have met installation specific DQOs. Both sampling and analytical activities are considered to assess whether the collected data are of the right type, quality, and quantity to support the decision-making.

Data Quality Indicators (DQIs) (Precision, Accuracy, Representativeness, Comparability, Completeness and Sensitivity) are important components in assessing data usability. These DQIs were evaluated in the subsequent sections and demonstrate that the data presented in this SI report are of high quality. Although the SI data are considered reliable, some degree of uncertainty can be associated with the data collected. Specific factors that may contribute to the uncertainty of the data evaluation are described below. The Data Validation Report (DVR) (**Appendix A**) presents explanations for all qualified data in greater detail.

Precision

Precision is the degree of agreement among repeated measurements of the same characteristic on the same sample or on separate samples collected as close as possible in time and place. Field sampling precision is measured with the field duplicate relative percent differences (RPD); laboratory precision is measured with calibration verification, internal standard recoveries, laboratory control spike (LCS) and matrix spike (MS) duplicate RPD.

Injection internal standards (IIS) were added by the laboratory after sample extraction and prior to analysis as a requirement of DoD QSM 5.1 to measure relative responses of target analytes. Even though not required, the IIS are still added to the sample after extraction as an additional quality control (QC) measure. The IIS percent recoveries were within the established precision limits presented in the QAPP Addendum (AECOM, 2021a) with limited exceptions.

LCS/LCS duplicate (LCSD) pairs were prepared by addition of known concentrations of each analyte in a matrix-free media known to be free of target analytes. LCS/LCSD pairs were analyzed for every analytical batch to demonstrate the ability of the laboratory to detect similar concentrations of a known quantity in matrix-free media. The LCS/LCSD samples were within the project established precision limits presented in the QAPP Addendum (AECOM, 2021a).

MS/MS duplicate (MSD) samples were prepared, analyzed, and reported for all preparation batches. MS/MSD samples demonstrated that the analytical system was in control for the matrix being tested with limited exceptions. MS/MSD samples were submitted to the laboratory for analysis at a rate of 5%. Several MS/MSDs displayed relative percent difference exceedances.

The associated parent sample results were either non-detect or previously qualified due to an MS/MSD percent recovery exceedance and should be considered usable as qualified as estimated values.

Field duplicate samples were collected at a rate of 10% to assess the overall sampling and measurement precision for this sampling effort. The field duplicate samples were analyzed for PFAS and general chemistry parameters. The field duplicate samples were within the project established precision limits presented in the QAPP Addendum (AECOM, 2021a) with limited exceptions. Nine separate field duplicate pairs displayed positive results in one sample and non-detect results in the other sample. The positive associated field duplicate pair results were qualified “J”, while non-detects were qualified “UJ”. The qualified field duplicate pair results should be considered usable as estimated values.

Accuracy

Accuracy is a measure of confidence in a measurement. The smaller the difference between the measurement of a parameter and its "true" or expected value, the more accurate the measurement. The more precise or reproducible the result, the more reliable or accurate the result. Accuracy is measured through percent recoveries in the LCS/LCSD, MS/MSD, and surrogates.

LCS/LCSD samples were prepared by addition of known concentrations of each analyte in a matrix free media known to be free of target analytes. LCS/LCSD samples were analyzed for every analytical batch and demonstrated that the analytical system was in control during sample preparation and analysis. The LCS/LCSD samples were within the project established accuracy limits presented in the QAPP Addendum (AECOM, 2021a).

MS/MSD samples were prepared, analyzed, and reported at a rate of 5%. MS/MSD samples demonstrated that the analytical system was in control for the matrix being tested, with several exceptions. Several parent samples displayed MS/MSD percent recoveries outside the QC limits for multiple target analytes. The parent sample and duplicate results associated with native concentrations greater than four times the spiked concentrations were not qualified based on the MS/MSD percent recovery anomalies. The associated field sample results should be considered usable as reported. In total, four positive field sample results associated with high percent recoveries were qualified “J+” and should be considered usable as estimated values with a positive bias. Two field sample results associated with the indeterminate bias were non-detect and were qualified “UJ” and should be considered usable as qualified.

Extraction internal standards (EIS) were added by the laboratory during sample extraction to measure relative responses of target analytes and used to correct for bias associated with matrix interferences and sample preparation efficiencies, injection volume variances, mass spectrometry ionization efficiencies, and other associated preparation and analytical anomalies. The EIS area counts were within the project-established precision limits presented in the QAPP Addendum (AECOM, 2021a), with several exceptions. The field sample result associated with high EIS area counts displayed a dilution factor greater than 10; no data qualifying action was required, and the field sample result should be considered usable as reported. The positive field sample results associated with low EIS area counts were qualified as estimate with a high bias and should be considered usable as qualified. The non-detect field sample results associated with low EIS area counts were qualified as estimate and should be considered usable as qualified. Thirteen results for FP-ERB-09 were initially flagged “X” due to extremely low EIS area counts (<20%). No determination was made by the project team for final flagging of these results, as the re-extracted results are recommended for data use, and the initial results were not retained in the data set.

Calibration verifications (CCV) were performed routinely to ensure that instrument responses for all calibrated analytes were within established QC criteria. The calibration verifications performed

during the laboratory analyses were within the project established precision limits presented in the QAPP Addendum (AECOM, 2021a), with multiple exceptions. Several CCVs recovered outside the QC limits for multiple target analytes. The CCV anomalies were not associated with any target analytes in the reported batches.

Representativeness

Representativeness qualitatively expresses the degree to which data accurately reflect facility conditions. Factors that affect the representativeness of analytical data include appropriate sample population definitions, proper sample collection and preservation techniques, analytical holding times, use of standard analytical methods, and determination of matrix or analyte interferences.

Relating to the use of standard analytical methods, the laboratory followed the method as established in PFAS by liquid chromatography with tandem mass spectrometry (LC/MS/MS) Compliant with Quality Systems Manual (QSM) 5.3 Table B-15, including the specific preparation requirements (i.e. ENVI-Carb or equivalent used), mass calibration, spectra, all the ion transitions identified in Table B-15 were monitored, standards that contained both branch and linear isomers were used when available, and isotopically labeled standards were used for quantitation.

Field QC samples were collected to assess the representativeness of the data collected. Field duplicates were collected at a rate of 10% for all field samples, while MS/MSD samples were collected at a rate of 5%. All preservation techniques were followed by the field staff, and all technical and analytical holding times were met by the laboratory, with limit exceptions. The sample submitted in SDG 221051578 and 221052478 exceeded the temperature range of 6 degrees Celsius (°C). The associated field sample results were qualified as estimate and should be considered usable as qualified. The laboratory used approved standard methods in accordance with the QAPP Addendum (AECOM, 2021a) for all analyses.

Instrument blanks and method blanks were prepared by the laboratory in each batch as a negative control. Several laboratory and method blanks displayed concentrations for multiple target analytes greater than the detection limits (DLs). Two investigative field samples (FP-MW021-SB-11-13 and FP-MW023-SB-6-8) had a field sample result for PFOS qualified as a likely false positive due to a blank detection.

Equipment blanks and field blanks were also collected for groundwater and soil samples. Nine groundwater results for PFOS (six), PFHxA (two), and/or PFHxS (one) qualified as likely false positives due to a blank detection. The field sample results were qualified “U”, and the results are usable as qualified but considered to be false positives and are treated as non-detects by the project team.

A sample of the water used for decontamination of the drill rig was collected in advance of the field effort. The drill rig decontamination sample FP-PW-01 displayed concentrations greater than the DL for several target analytes. The associated field sample results were greater than five times the concentration found in the decontamination sample; no impact on the data is anticipated.

Field samples were extracted and analyzed within the appropriate holding time in order to qualitatively express the degree to which data accurately reflect site conditions with limited exceptions. Multiple PFAS field samples were re-extracted and reanalyzed outside of technical holding time due to QC failures. For all samples with re-extracted results, the data reviewer recommended one usable result from either the initial or re-extracted analysis based on professional judgement of data quality. Additionally, the holding time for pH analysis is “immediate”, all field samples analyzed for pH were qualified “J” and should be considered usable as estimated values.

Overall, the data are usable for evaluating the presence or absence of PFAS at the Site. Sufficient usable data were obtained to meet the objectives of the SI and to complete the risk assessment.

Comparability

Comparability is the extent to which data from one study can be compared directly to either past data from the current project or data from another study. Using standardized sampling and analytical methods, units of reporting, and site selection procedures help ensure comparability. Standard field sampling and typical laboratory protocols were used during the SI and are considered comparable to ongoing investigations.

Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount of data expected under normal conditions. The laboratory provided data meeting system QC acceptance criteria for all samples tested. Project completeness was determined by evaluating the planned versus actual quantities of data. Percent completeness per parameter is as follows and reflects the exclusion of “X” flagged data, if applicable:

- PFAS in groundwater by DoD QSM Table B-15 at 100%
- PFAS in soil by DoD QSM Table B-15 at 99.6%
- pH in soil by USEPA Method 9045D at 100%
- Total organic carbon (TOC) by USEPA Method 9060 at 100%

Sensitivity

Sensitivity is the capability of a test method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. Examples of QC measures for determining sensitivity include laboratory fortified blanks, an MDL study, and calibration standards at the limit of quantitation (LOQ). In order to meet the needs of the data users, project data must meet the measurement performance criteria for sensitivity and project LOQs specified in the QAPP Addendum (AECOM, 2021a). This was achieved with limited exceptions. Two instrument sensitivity checks displayed percent recoveries outside QC limits for several analytes. The ISC anomalies were not associated with any target analytes in the reported batch. The laboratory provided the requested MDL studies and provided applicable calibration standards at the LOQ. In order to achieve the DQOs for sensitivity outlined in the QAPP Addendum (AECOM, 2021a), the laboratory reported all field sample results at the lowest possible dilution. Additionally, any analytes detected below the LOQ and above the MDL were reported and qualified “J” as estimated values by the laboratory.

5. Site Inspection Activities

This section describes the environmental investigation and sampling activities that occurred as part of the SI. The SI sampling approach was based on the findings of the PA and implemented in accordance with the following approved documents:

- *Final Preliminary Assessment Report, Fort Pickett, Virginia* dated May 2020 (AECOM, 2020);
- *Final Site Inspection Programmatic Uniform Federal Policy-Quality Assurance Project Plan* (PQAPP) dated March 2018 (AECOM, 2018a);
- *Final Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Addendum, Fort Pickett, Virginia* dated March 2021 (AECOM, 2021a);
- *Final Programmatic Accident Prevention Plan* dated July 2018 (AECOM, 2018b); and
- *Final Site Safety and Health Plan, Fort Pickett, Virginia* dated May 2021 (AECOM, 2021b).

The SI field activities were conducted from 10 May to 23 June 2021 and consisted of utility clearance, direct push and hollow stem auger boring, soil sample collection, temporary and permanent monitoring well installation, grab groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2021a), except as noted in **Section 5.8**.

The following samples were collected during the SI and analyzed for a subset of 18 PFAS by LC/MS/MS compliant with QSM 5.3 Table B-15 to fulfill the project DQOs:

- One hundred ten (110) soil samples from 51 boring locations;
- Forty-one (41) grab groundwater samples from 40 permanent well locations and one temporary well location;
- Forty (40) quality assurance (QA) samples.

Figure 5-1 provides the sample locations for all media across the facility. **Table 5-1** presents the list of samples collected for each media. Field documentation is provided in **Appendix B**. A Log of Daily Notice of Field Activity was completed throughout the SI field activities, which is provided in **Appendix B1**. Sampling forms are provided in **Appendix B2**, well development forms in **Appendix B3,** field change request forms in **Appendix B4,** land survey data are provided in **Appendix B5**, and investigation-derived waste (IDW) polygons are provided in **Appendix B6**. Additionally, a photographic log of field activities is provided in **Appendix C**.

5.1 Pre-Investigation Activities

In preparation for the SI field activities, project team members participated in Technical Project Planning (TPP) meetings, performed utility clearance, and sampled decontamination source water. Details for each of these activities are presented below.

5.1.1 Technical Project Planning

The USACE TPP Process, Engineer Manual (EM) 200-1-2 (USACE, 2016) defines four phases to project planning: 1.) defining the project phase; 2.) determining data needs; 3.) developing data collection strategies; and 4.) finalizing the data collection plan. The process encourages stakeholder involvement in the SI, beginning with defining overall project objectives, including

quantitative and qualitative DQOs, and formulating a sampling approach to address the AOIs identified in the PA.

A combined TPP Meeting 1 and 2 was held on 29 January 2021, prior to SI field activities. The combined TPP Meeting 1 and 2 was conducted in general accordance with EM 200-1-2. The stakeholders for this SI include the ARNG, VAARNG, and USACE. Stakeholders were provided the opportunity to make comments on the technical sampling approach and methods at the combined TPP Meeting 1 and 2. The outcome of the combined TPP Meeting 1 and 2 was memorialized in the SI QAPP Addendum (AECOM, 2021a).

A TPP Meeting 3 was held on (to be determined [TBD] 2022), after the field, event to discuss the results of the SI. Meeting minutes for TPP 3 are included in **Appendix D** of this report. Future TPP meetings will provide an opportunity to discuss the results and findings, and future actions, where warranted.

5.1.2 Utility Clearance

AECOM's drilling subcontractor, Cascade Technical Services, LLC, placed a ticket with the Virginia 811 utility clearance provider to notify them of intrusive work on 6 May 2021. However, because Fort Pickett is a private facility, the participating "Call Before You Dig" locators did not clear utilities at the entire facility. Therefore, AECOM contracted Ground Penetrating Radar Systems, LLC (GPRS), a private utility location service, to perform utility clearance. GPRS performed utility clearances of the proposed boring locations on 11, 12, and 14 May 2021 with input from the AECOM field team and Fort Pickett facility staff. General locating services and ground-penetrating radar were used to complete the clearance. Additionally, the first 6 feet of each boring were pre-cleared using a hand auger to verify utility clearance in shallow subsurface where utilities would typically be encountered.

5.1.3 Source Water and PFAS Sampling Equipment Acceptability

The potable water source used for decontamination of drilling equipment was confirmed to be acceptable for use in a PFAS investigation prior to the start of field activities. A sample from a potable water source at Fort Pickett was collected on 23 February 2021, prior to mobilization, and analyzed for PFAS by LC/MS/MS, compliant with QSM 5.3 Table B-15. The results of the decontamination water sample are provided in Appendix F. A discussion of the results is presented in **Section 4.6**.

Materials that were used within the sampling zone were confirmed as acceptable for use in the PFAS sampling environment. The checklist of acceptable materials for use in the PFAS sampling environment was provided in the Standard Operating Procedures (SOPs) appendix to the SI QAPP Addendum (AECOM, 2021a). Prior to the start of field work each day, a PFAS Sampling Checklist was completed as an additional layer of control. The checklist served as a daily reminder to each field team member regarding the allowable materials within the sampling environment.

5.2 Soil Borings and Soil Sampling

Soil samples were collected via direct push technology (DPT), in accordance with the SI QAPP Addendum (AECOM, 2021a). A GeoProbe® 8040DT dual-tube sampling system was used to collect continuous soil cores to the target depth. A hand auger was used to collect soil from the top 6 feet of the boring, in accordance with AECOM utility clearance procedures. Furthermore, the top 10 feet of each boring was screened by an AECOM Unexploded ordnance (UXO) Technician III using a Schonstedt GA-52Cx magnetic locator and BHG downhole gradiometer to verify clearance from potential UXO hazards (per Fort Pickett requirements). The soil boring locations are shown on **Figure 5-1** through **Figure 5-10** and depths are provided **Table 5-1**.

In general, three discrete soil samples were collected from the vadose zone for chemical analysis from each soil boring: one surface soil sample (0 to 2 feet bgs), one subsurface soil sample approximately 1 foot above the groundwater table, and one 2-foot subsurface soil sample at the mid-point between the surface and the groundwater table. One surface soil sample was collected from 21 additional boring locations (via hand auger). In borings where groundwater was encountered at 6 feet bgs or shallower, only two soil samples were collected per boring, in accordance with the QAPP Addendum (AECOM, 2021a). Specifically, only two soil samples were collected at location FP-MW005.

The soil cores were continuously logged for lithological descriptions by a field geologist using the Unified Soil Classification System (USCS). A photoionization detector (PID) was used to screen the breathing zone during boring activities as part of personal safety requirements. Observations and measurements were recorded on sampling forms (**Appendix B2**) and in a non-treated field logbook (i.e., composition notebook). Depth interval, recovery thickness, PID concentrations, moisture, relative density, color (using a Munsell soil color chart), and texture (using the USCS) were recorded. The boring logs are provided in **Appendix E**.

Soil borings completed during the SI were logged as containing clay- and silt-rich saprolites as the dominant lithology of the unconsolidated soils underlying Fort Pickett. The borings were completed at depths ranging between 4 and 39 feet bgs. Bedrock was encountered at one location (FP-MW016) at 17.5 feet bgs. Isolated layers of poorly to well graded sand and silty sand up to several feet thick were observed in soil cores, with some of these sand beds containing trace to little fine- to medium-grained gravel. Some of these sand beds exhibited fining-upward textures. These observations are consistent with alluvium and fill material overlying saprolite, which grades down into weathered and competent bedrock. The facility-specific geology is consistent with the shallow lithologic landscape of the area and larger Piedmont geologic province.

Each soil sample was collected into laboratory-supplied PFAS-free high-density polyethylene (HDPE) bottles and labeled using a PFAS-free marker or pen. Samples were packaged on ice and transported via Federal Express (FedEx) under standard chain of custody (CoC) procedures to the laboratory and analyzed for PFAS (LC/MS/MS compliant with QSM 5.3 Table B-15), TOC (USEPA Method 9060A), and pH (USEPA Method 9045D), in accordance with the SI QAPP Addendum (AECOM, 2021a). Additionally, where clay layers more than 3 feet thick occurred within or close to proposed screen intervals, one sample was collected for grain size analysis (ASTM D-422) in accordance with the SI QAPP Addendum (AECOM, 2021a).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. MS/MSDs were collected at a rate of 5% and analyzed for the same parameters as the accompanying samples. In instances when non-dedicated sampling equipment was used, such as a hand auger for the shallow soil samples, equipment rinsate blanks (ERBs) were collected at a rate of 5% and analyzed for the same parameters as the soil samples. A temperature blank was placed in each cooler to ensure that samples were preserved at or below 6 degrees Celsius (°C) during shipment.

With the exception of one location that was converted to a temporary well, DPT borings were converted to permanent wells by widening the borehole to 6-inch diameter using hollow stem auger (HSA) technology in accordance with the SI QAPP Addendum (AECOM, 2021a). The temporary well was abandoned in accordance with the SI QAPP Addendum (AECOM, 2021a) using bentonite chips at completion of sampling activities. Where possible, borings were installed in grassy areas to avoid disturbing concrete or asphalt surfaces.

5.3 Permanent Well Installation and Groundwater Sampling

During the SI, 29 permanent monitoring wells and one temporary monitoring well were installed within or downgradient of potential source areas. The locations are shown on **Figure 5-1** through **Figure 5-10**.

A GeoProbe® 8040DT drill rig was used to install 29, 2-inch diameter monitoring wells. The monitoring wells were constructed with Schedule 40 polyvinyl chloride (PVC), flush threaded 10-foot sections of riser, 0.010-inch slotted well screen, and a threaded bottom cap. The locations and depths of the permanent wells were determined by the observed depth to the soil vadose-saturated zone interface with at least 5 feet of saturated screen depth. The annular space was backfilled with a 20/40 silica sand filter pack to a minimum of 2-foot above the well screen. Medium bentonite chips were placed above the filter sand to 2 feet bgs and hydrated with PFAS-free potable water. All monitoring wells were completed with flush mount well vaults. One temporary well (FP-MW005) was installed instead of a permanent well due to the depth to groundwater at that location. Once the hand auger hole was advanced to the desired depth, a 3-foot section of 2-inch Schedule 40 PVC screen was installed with the top of screen coinciding with the top of groundwater (see **Section 5.8**). The screen interval of each of the groundwater monitoring wells is provided in **Table 5-2**.

Development and sampling of wells was completed in accordance with the SI QAPP Addendum (AECOM, 2021a). The newly installed monitoring wells were developed no sooner than 24 hours following installation by pumping and surging using a variable speed submersible pump (**Appendix B2)**. Samples were collected no sooner than 24 hours following development via low-flow sampling methods using a Geopump® peristaltic pump or QED MicroPurge bladder pump and QED MicroPruge10 Controller with disposable PFAS-free, HDPE tubing. New tubing was used at each well and the pumps were decontaminated between each well. The wells were purged at a rate determined in the field to reduce drawdown prior to sampling. Water quality parameters (e.g., temperature, specific conductance, pH, dissolved oxygen [DO], oxidation-reduction potential [ORP], and turbidity) were measured using a Horiba U-52 water quality meter and recorded on the field sampling form (**Appendix B3**). Additionally, eleven existing groundwater monitoring wells were sampled at two AOIs. Water levels were measured to the nearest 0.01 inch and recorded. A subsample of each groundwater sample was collected in a separate container and a shaker test was completed to identify foaming associated with high PFAS content. No foaming was noted in any of the groundwater samples.

Each groundwater sample was collected into laboratory-supplied PFAS-free HDPE bottles and labeled using a PFAS-free marker or pen. Samples were packaged on ice and transported via FedEx under standard CoC procedures to the laboratory and analyzed for PFAS by LC/MS/MS, compliant with QSM 5.3 Table B-15, in accordance with the SI QAPP Addendum (AECOM, 2021a).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. MS/MSDs were collected at a rate of 5% and analyzed for the same parameters as the accompanying samples. One field reagent blank was collected in accordance with the PQAPP (AECOM, 2018a). A temperature blank was placed in each cooler to ensure that samples were preserved at or below 6°C during shipment.

5.4 Synoptic Water Level Measurements

A synoptic groundwater gauging event was performed on 23 June 2021. Groundwater elevation measurements were collected from all groundwater sampling locations. Water level measurements were taken from the northern side of the well casing. Groundwater flow contour

maps are provided in **Figure 2-5** through **Figure 2-14**. Groundwater elevation data are provided in **Table 5-2**.

5.5 Surveying

The ground surface and top of well casing were surveyed on the northern side of each new permanent and existing well location by Virginia-licensed AECOM land surveyors following guidelines provided in the SOPs provided in the SI QAPP Addendum (AECOM, 2021a). The ground surface of the temporary well location was also surveyed. Survey data from the newly installed wells on the facility were collected from 21 to 23 June 2021 in the applicable Universal Transverse Mercator zone projection with World Geodetic System 84 datum (horizontal) and North American Vertical Datum 1988 (vertical). The surveyed well data are provided in **Appendix B5**.

5.6 Investigation-Derived Waste

As of the date of this report, the disposal of PFAS IDW is not regulated federally. PFAS IDW generated during the SI is considered non-hazardous waste and was managed in accordance with the SI QAPP Addendum (AECOM, 2021a) and with the DA Guidance for Addressing Releases of PFAS, Q18 (DA, 2018).

Soil IDW (i.e., soil cuttings) generated during the SI activities were left in place at the point of the source. The soil cuttings were distributed on the ground surface at each boring location. The soil IDW was not sampled and assumes the PFAS characteristics of the associated soil samples collected from that source location.

Liquid IDW generated during SI activities (i.e. purge water, development water, and decontamination fluids) were discharged directly to the ground surface slightly downgradient of the source. The liquid IDW was not sampled and assumes the PFAS characteristics of the associated groundwater samples collected from that source location.

Geographic coordinates were collected using a global positioning system (GPS) around each location where IDW was placed (i.e., an IDW polygon). The IDW polygons are displayed on the figure in **Appendix B6**.

Other solids, such as spent personal protective equipment, plastic sheeting, tubing, rope, unused monitoring well construction materials, and other environmental media generated during the field activities, were disposed of at a licensed solid waste landfill.

5.7 Laboratory Analytical Methods

Samples were analyzed for a subset of 18 PFAS by LC/MS/MS compliant with QSM 5.3 Table B-15 at Pace Analytical Gulf Coast in Baton Rouge, Louisiana, a DoD ELAP and NELAP certified laboratory. The 18 PFAS analyzed as part of the ARNG SI program include the following:

- 6:2 fluorotelomer sulfonic acid (6:2 FTS)
- 8:2 fluorotelomer sulfonic acid (8:2 FTS)
- N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)
- N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorohexanoic acid (PFHxA)
- Perfluorohexanesulfonic acid (PFHxS)
- Perfluorononanoic acid (PFNA)
- Perfluorooctanoic acid (PFOA)
- Perfluorooctanesulfonic acid (PFOS)

- Perfluorobutyrate (PFBA)
- Perfluorobutanesulfonic acid (PFBS)
- Perfluorodecanoic acid (PFDA)
- Perfluorododecanoic acid (PFDoA)
- Perfluoropentanoic acid (PFPeA)
- Perfluorotetradecanoic acid (PFTeDA)
- Perfluorotridecanoic acid (PFTrDA)
- Perfluoroundecanoic acid (PFUdA)

Soil samples were also analyzed for TOC using USEPA Method 9060A and pH by USEPA Method 9045D.

5.8 Deviations from SI QAPP Addendum

Four deviations from the SI QAPP Addendum were identified during completion of field activities. The deviations are noted below and are documented in Field Change Request Forms (**Appendix B4**).

- FCR001: A large construction project was underway immediately south of the Fire Station (AOI 1) parking lot in the proposed location of monitoring well FP-MW003. The boring location was moved to the southwest, outside of the footprint of the construction area, on the downhill, and presumed downgradient, side of AOI 1. This action was documented in a field change request form provided in **Appendix B4**.
- FCR002: Three hand auger locations (AOI5-01, AOI5-03, and AOI5-05) were originally proposed on the runway at AOI 5. However, the tarmac was too competent to collect any surface soil using hand tools. The three hand auger locations were shifted approximately 120 feet east, to the grassy edge of the runway. This action was documented in a field change request form provided in **Appendix B4**.
- FCR003: Original proposed location of monitoring well FP-MW007 was located on a man-made berm at AOI 2. The boring location was moved approximately 140 feet to the north to avoid the berm and install well in native material. This action was documented in a field change request form provided in **Appendix B4**.
- FCR004: Original proposed location of monitoring well FP-MW005 was located in a low area downhill, and presumably downgradient, of several berms and firing positions at AOI 2. While clearing the hole for utilities, the static water level was 8 inches bgs. Additionally, the unconsolidated material was a fat clay from 0-4 feet bgs. To avoid puncturing the clay layer, the proposed permanent well was installed as a shallow temporary well screened within the saturated clay layer. As a result, FP-MW005 was not developed, and a grab groundwater sample was collected no sooner than 24 hours after installation. The temporary well PVC was removed, and the borehole abandoned after sampling. This action was documented in a field change request form provided in **Appendix B4**.

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, Fort Pickett, Virginia

Sample Identification	Sample Collection Date/Time	Sample Depth (feet bgs)	PFAS by LC/MS/MS compliant with QSM 5.3 Table B-15	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Grain Size (ASTM D-422)	Comments
Soil Samples							
AOI02-01	5/14/2021 15:40	0 - 2	x				
AOI02-02	5/14/2021 13:55	0 - 2	x				
AOI02-03	5/14/2021 14:45	0 - 2	x				
AOI02-04	5/14/2021 13:00	0 - 2	x				
AOI02-05	5/14/2021 10:55	0 - 2	x				
AOI02-06	5/14/2021 12:30	0 - 2	x				
AOI02-07	5/14/2021 10:20	0 - 2	x				
AOI03-01	5/13/2021 13:35	0 - 2	x				
AOI03-02	5/17/2021 9:15	0 - 2	x				
AOI03-02-D	5/17/2021 9:15	0 - 2	x				FD
AOI04-01	5/13/2021 15:20	0 - 2	x				
AOI04-02	5/13/2021 14:30	0 - 2	x				
AOI05-01	5/12/2021 15:45	0 - 2	x				
AOI05-02	5/12/2021 14:30	0 - 2	x				
AOI05-03	5/12/2021 13:30	0 - 2	x				
AOI05-04	5/12/2021 15:00	0 - 2	x				
AOI05-05	5/12/2021 12:30	0 - 2	x				
AOI05-06	5/12/2021 10:35	0 - 2	x				
AOI06-01	5/17/2021 8:25	0 - 2	x				
AOI06-01-D	5/17/2021 8:25	0 - 2	x				FD
AOI06-01-MS	5/17/2021 8:25	0 - 2	x				MS
AOI06-01-MSD	5/17/2021 8:25	0 - 2	x				MSD
AOI07-01	5/13/2021 8:10	0 - 2	x				
AOI10-01	5/13/2021 9:25	0 - 2	x				
AOI10-02	5/13/2021 10:00	0 - 2	x				
FP-MW001-SB-0-2	6/15/2021 8:30	0 - 2	x	x	x		
FP-MW001-SB-0-2-D	6/15/2021 8:30	0 - 2		x	x		FD
FP-MW001-SB-7-9	6/15/2021 9:35	7-9	x				
FP-MW001-SB-7-9-D	6/15/2021 9:35	7-9	x				FD
FP-MW001-SB-14.8-15.8	6/15/2021 9:45	14.8-15.8	x				
FP-MW002-SB-0-2	6/15/2021 11:30	0-2	x				
FP-MW002-SB-0-2-MS	6/15/2021 11:30	0-2	x				MS
FP-MW002-SB-0-2-MSD	6/15/2021 11:30	0-2	x				MSD
FP-MW002-SB-4-6	6/15/2021 12:40	4-6	x				
FP-MW002-SB-4-6-D	6/15/2021 12:40	4-6	x				FD
FP-MW002-SB-10.5-11.5	6/15/2021 12:50	10.5-11.5	x				
FP-MW003-SB-0-2	6/24/2021 14:20	0-2	x				
FP-MW003-SB-4-6	6/24/2021 14:55	4-6	x				
FP-MW003-SB-10.5-11.5	6/16/2021 9:40	10.5-11.5	x				
FP-MW004-SB-0-2	5/19/2021 14:45	0-2	x				
FP-MW004-SB-10-12	5/19/2021 15:00	10-12	x				
FP-MW004-SB-20-21	5/19/2021 14:50	20-21	x				
FP-MW005-SB-0-2	5/26/2021 14:15	0-2	x				
FP-MW005-SB-3-4	5/26/2021 14:25	3-4	x			x	
FP-MW006-SB-0-2	5/18/2021 10:00	0-2	x				
FP-MW006-SB-4-6	5/18/2021 10:05	4-6	x	x	x		
FP-MW006-SB-4-6-D	5/18/2021 10:05	4-6		x	x		FD
FP-MW006-SB-4-6-MS	5/18/2021 10:05	4-6		x	x		MS
FP-MW006-SB-4-6-MSD	5/18/2021 10:05	4-6		x	x		MSD
FP-MW006-SB-10.8-11.8	5/18/2021 10:25	10.8-11.8	x				
FP-MW007-SB-0-2	5/17/2021 12:15	0 - 2	x				
FP-MW007-SB-0-2-D	5/17/2021 12:15	0 - 2	x				FD
FP-MW007-SB-0-2-MS	5/17/2021 12:15	0 - 2	x				MS

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, Fort Pickett, Virginia

Sample Identification	Sample Collection Date/Time	Sample Depth (feet bgs)	PFAS by LC/MS/MS compliant with QSM 5.3 Table B-15	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Grain Size (ASTM D-422)	Comments
FP-MW007-SB-0-2-MSD	5/17/2021 12:15	0 - 2	x				MSD
FP-MW007-SB-12.5-14.5	5/17/2021 12:40	12.5-14.5	x				
FP-MW007-SB-28-29	5/17/2021 12:35	28-29	x				
FP-MW008-SB-0-2	5/19/2021 9:55	0-2	x				
FP-MW008-SB-4-6	5/19/2021 10:05	4-6	x				
FP-MW008-SB-10-11	5/19/2021 10:20	10-11	x				
FP-MW009-SB-0-2	5/19/2021 13:05	0-2	x				
FP-MW009-SB-0-2-D	5/19/2021 13:05	0-2	x				FD
FP-MW009-SB-11-13	5/19/2021 14:15	11-13	x				
FP-MW009-SB-22-23	5/19/2021 14:25	22-23	x				
FP-MW010-SB-0-2	5/25/2021 9:55	0-2	x				
FP-MW010-SB-11-13	5/25/2021 10:05	11-13	x				
FP-MW010-SB-22-23	5/25/2021 10:10	22-23	x				
FP-MW011-SB-0-2	5/26/2021 9:55	0-2	x				
FP-MW011-SB-0-2-MS	5/26/2021 9:55	0-2	x				MS
FP-MW011-SB-0-2-MSD	5/26/2021 9:55	0-2	x				MSD
FP-MW011-SB-8-10	5/26/2021 10:00	8-10	x				
FP-MW011-SB-17.8-18.8	5/26/2021 10:20	17.8-18.8				x	
FP-MW011-SB-20.8-21.8	5/26/2021 10:10	20.8-21.8	x				
FP-MW012-SB-0-2	5/28/2021 8:40	0-2	x				
FP-MW012-SB-10-12	5/28/2021 12:40	10-12	x				
FP-MW012-SB-23.9-24.9	5/28/2021 12:50	23.9-24.9	x				
FP-MW013-SB-0-2	5/27/2021 12:10	0-2	x	x	x		
FP-MW013-SB-13-15	5/27/2021 14:25	13-15	x				
FP-MW013-SB-29-30	5/27/2021 14:30	29-30	x				
FP-MW014-SB-0-2	5/26/2021 14:10	0-2	x				
FP-MW014-SB-8-10	5/26/2021 17:10	8-10	x				
FP-MW014-SB-20.4-21.4	5/26/2021 17:05	20.4-21.4	x				
FP-MW015-SB-1-3	6/7/2021 15:55	0-2	x				
FP-MW015-SB-1-3-MS	6/7/2021 15:55	0-2	x				MS
FP-MW015-SB-1-3-MSD	6/7/2021 15:55	0-2	x				MSD
FP-MW015-SB-5-7	6/7/2021 16:15	5-7	x				
FP-MW015-SB-13.5-14.5	6/7/2021 16:25	13.5-14.5	x				
FP-MW016-SB-0.5-2	6/8/2021 13:15	0-5.2	x				
FP-MW016-SB-4-6	6/8/2021 13:20	4-6	x				
FP-MW016-SB-11-12	6/8/2021 13:30	11-12	x				
FP-MW017-SB-1-3	6/7/2021 11:30	1-3	x	x	x		
FP-MW017-SB-1-3-D	6/7/2021 11:30	1-3	x				FD
FP-MW017-SB-5-7	6/7/2021 12:05	5-7	x				
FP-MW017-SB-14.5-15.5	6/7/2021 12:15	14.5-15.5	x				
FP-MW018-SB-0-2	6/8/2021 9:10	0-2	x				
FP-MW018--SB-2-4	6/8/2021 10:30	2-4	x				
FP-MW018-SB-5-6	6/8/2021 10:40	5-6	x				
FP-MW019-SB-0-2	6/4/2021 11:45	0-2	x				
FP-MW019-SB-0-2-D	6/4/2021 11:45	0-2	x				FD
FP-MW019-SB-5-7	6/4/2021 13:30	5-7	x				
FP-MW019-SB-13-14	6/4/2021 13:40	13-14	x				
FP-MW020-SB-0-2	6/4/2021 8:50	0-2	x	x	x		
FP-MW020-SB-5-7	6/4/2021 11:10	5-7	x				
FP-MW020-SB-13-14	6/4/2021 11:20	13-14	x				
FP-MW021-SB-0-2	6/14/2021 9:30	0-2	x				
FP-MW021-SB-0-2-D	6/14/2021 9:30	0-2	x				FD
FP-MW021-SB-0-2-MS	6/14/2021 9:30	0-2	x				MS
FP-MW021-SB-0-2-MSD	6/14/2021 9:30	0-2	x				MSD

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, Fort Pickett, Virginia

Sample Identification	Sample Collection Date/Time	Sample Depth (feet bgs)	PFAS by LC/MS/MS compliant with QSM 5.3 Table B-15	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Grain Size (ASTM D-422)	Comments
FP-MW021-SB-11-13	6/14/2021 11:25	11-13	x				
FP-MW021-SB-25.5-26.5	6/14/2021 12:30	25.5-26.5	x				
FP-MW022-SB-0-2	6/10/2021 13:06	0-2	x	x	x		
FP-MW022-SB-10-12	6/11/2021 9:20	10-12	x				
FP-MW022-SB-20.9-21.9	6/11/2021 9:40	20.9-21.9	x				
FP-MW023-SB-0-2	6/16/2021 12:15	0-2	x				
FP-MW023-SB-6-8	6/16/2021 12:40	6-8	x				
FP-MW023-SB-15.2-16.2	6/16/2021 13:05	15.2-16.2	x				
FP-MW024-SB-0-2	6/8/2021 16:40	0-2	x				
FP-MW024-SB-8-10	6/9/2021 9:05	8-10	x				
FP-MW024-SB-18-19	6/9/2021 9:15	18-19	x				
FP-MW025-SB-0-2	6/9/2021 12:05	0-2	x	x	x		
FP-MW025-SB-0-2-D	6/9/2021 12:05	0-2	x				FD
FP-MW025-SB-8-10	6/9/2021 14:00	8-10	x				
FP-MW025-SB-18-19	6/9/2021 14:15	18-19	x				
FP-MW026-SB-0-2	6/10/2021 10:55	0-2	x				
FP-MW026-SB-8-10	6/10/2021 10:35	8-10	x				
FP-MW026-SB-18-19	6/10/2021 10:55	18-19	x				
FP-MW027-SB-0-2	5/21/2021 9:10	0-2	x				
FP-MW027-SB-6-8	5/21/2021 10:30	6-8	x				
FP-MW027-SB-15-16	5/21/2021 10:35	15-16	x				
FP-MW028-SB-0-2	5/21/2021 15:00	0-2	x				
FP-MW028-SB-7-10	5/21/2021 15:30	7-10	x				
FP-MW028-SB-16.5-18	5/21/2021 15:40	16.5-18	x			x	
FP-MW029-SB-0-2	5/20/2021 14:05	0-2	x				
FP-MW029-SB-4-6	5/20/2021 15:35	4-6	x				
FP-MW029-SB-12-13	5/20/2021 15:30	12-13	x			x	
FP-MW030-SB-0-2	5/20/2021 11:10	0-2	x				
FP-MW030-SB-4-6	5/20/2021 11:20	4-6	x	x	x		
FP-MW030-SB-4-6-D	5/20/2021 11:20	4-6	x				FD
FP-MW030-SB-10-11	5/20/2021 11:25	10-11	x				
Groundwater Samples							
DRL-MW-1-GW	6/21/2021 11:40	NA	x				
DRL-MW-4-GW	6/21/2021 16:50	NA	x				
DRL-MW-5-GW	6/21/2021 10:14	NA	x				
FP-MW001-GW	6/23/2021 9:42	NA	x				
FP-MW001-GW-D	6/23/2021 9:42	NA	x				FD
FP-MW002-GW	6/23/2021 13:27	NA	x				
FP-MW002-GW-MS	6/23/2021 13:27	NA	x				MS
FP-MW002-GW-MSD	6/23/2021 13:27	NA	x				MSD
FP-MW003-GW	6/23/2021 15:45	NA	x				
FP-MW004-GW	5/27/2021 10:40	NA	x				
FP-MW004-GW-D	5/27/2021 10:40	NA	x				FD
FP-MW004-GW-MS	5/27/2021 10:40	NA	x				MS
FP-MW004-GW-MSD	5/27/2021 10:40	NA	x				MSD
FP-MW005-GW	5/27/2021 16:27	NA	x				
FP-MW006-GW	5/26/2021 13:12	NA	x				
FP-MW007-GW	5/26/2021 10:55	NA	x				

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, Fort Pickett, Virginia

Sample Identification	Sample Collection Date/Time	Sample Depth (feet bgs)	PFAS by LC/MS/MS compliant with QSM 5.3 Table B-15	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Grain Size (ASTM D-422)	Comments
FP-MW008-GW	5/26/2021 15:12	NA	x				
FP-MW009-GW	6/10/2021 10:33	NA	x				
FP-MW010-GW	6/10/2021 13:02	NA	x				
FP-MW011-GW	6/10/2021 10:40	NA	x				
FP-MW012-GW	6/18/2021 15:30	NA	x				
FP-MW012-GW-D	6/18/2021 15:30	NA	x				FD
FP-MW013-GW	6/7/2021 14:55	NA	x				
FP-MW014-GW	6/7/2021 12:16	NA	x				
FP-MW015-GW	6/16/2021 11:52	NA	x				
FP-MW016-GW	6/17/2021 15:00	NA	x				
FP-MW017-GW	6/16/2021 10:05	NA	x				
FP-MW017-GW-D	6/16/2021 10:05	NA	x				FD
FP-MW017-GW-MS	6/16/2021 10:05	NA	x				MS
FP-MW017-GW-MSD	6/16/2021 10:05	NA	x				MSD
FP-MW018-GW	6/23/2021 10:16	NA	x				
FP-MW019-GW	6/14/2021 9:44	NA	x				
FP-MW020-GW	6/14/2021 12:02	NA	x				
FP-MW021-GW	6/21/2021 9:15	NA	x				
FP-MW022-GW	6/23/2021 13:50	NA	x				
FP-MW023-GW	6/23/2021 14:51	NA	x				
FP-MW024-GW	6/17/2021 14:00	NA	x				
FP-MW025-GW	6/17/2021 9:57	NA	x				
FP-MW026-GW	6/18/2021 13:15	NA	x				
FP-MW027-GW	6/21/2021 11:10	NA	x				
FP-MW028-GW	6/17/2021 15:40	NA	x				
FP-MW029-GW	6/4/2021 8:15	NA	x				
FP-MW030-GW	6/18/2021 9:15	NA	x				
TRL-MW-1-GW	6/11/2021 11:07	NA	x				
TRL-MW-1-GW-D	6/11/2021 11:07	NA	x				FD
TRL-MW-5-GW	5/21/2021 11:07	NA	x				
TRL-MW-9-GW	6/11/2021 13:13	NA	x				
TRL-MW-10R-GW	5/21/2021 15:45	NA	x				
TRL-MW-12R-GW	5/24/2021 15:55	NA	x				
TRL-MW-13R-GW	6/11/2021 10:15	NA	x				
TRL-MW-15-GW	5/21/2021 12:43	NA	x				
TRL-MW-17-GW	6/11/2021 13:24	NA	x				
Quality Control Samples							
FP-ERB-01	5/13/2021 10:35	NA	x				from hand auger
FP-ERB-02	5/21/2021 12:20	NA	x				from drill rods
FP-ERB-03	5/27/2021 11:40	NA	x				from hand auger
FP-ERB-04	6/7/2021 15:15	NA	x				from water level meter
FP-ERB-05	6/8/2021 12:55	NA	x				from trowel
FP-ERB-06	6/14/2021 16:20	NA	x				from hand auger
FP-ERB-07	6/15/2021 11:40	NA	x				from drill rods
FP-ERB-08	6/16/2021 8:40	NA	x				from trowel
FP-ERB-09	6/18/2021 9:40	NA	x				from water level meter
FP-ERB-10	6/18/2021 16:29	NA	x				from bladder pump
FP-ERB-11	6/23/2021 15:27	NA	x				from water level meter
FP-FRB-01	5/21/2021 9:20	NA	x				

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, Fort Pickett, Virginia

Sample Identification	Sample Collection Date/Time	Sample Depth (feet bgs)	PFAS by LC/MS/MS compliant with QSM 5.3 Table B-15	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Grain Size (ASTM D-422)	Comments

Notes:
ASTM = American Society for Testing and Materials
bgs = below ground surface
ERB = equipment rinsate blank
FD = field duplicate
FRB = field reagent blank
LC/MS/MS = Liquid Chromatography Mass Spectrometry
MS/MSD = matrix spike/ matrix spike duplicate
NA = not available
PFAS = per- and polyfluoroalkyl substances
QSM = Quality Systems Manual
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

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Table 5-2
Soil Boring Depths, Permenant Well Screen Intervals, and Groundwater Elevations
Site Inspection Report, Fort Pickett, Virginia

Area of Interest	Boring Location	Soil Boring Depth (feet bgs)	Permanent Well Screen Interval (feet bgs)	Top of Casing Elevation (feet NAVD88)	Ground Surface Elevation (feet NAVD88)	Depth to Water (feet btoc)	Depth to Water (feet bgs)	Groundwater Elevation (feet NAVD88)
1	FP-MW001	28	13 - 23	385.01	385.128	19.33	19.45	365.68
	FP-MW002	23	11 - 21	381.161	381.381	14.72	14.94	366.44
	FP-MW003	19	9 - 19	379.419	379.672	14.43	14.68	364.99
2	FP-MW004	30	19 - 29	353.812	354.121	19.73	20.04	334.08
	FP-MW005[1]	4	1 - 4	311.625	310.325	2.19	0.89	309.44
	FP-MW006	20	9 - 19	302.139	302.346	14.89	15.10	287.25
	FP-MW007	39	27 - 37	310.030	310.030	28.46	28.46	281.57
	FP-MW008	25	8 - 18	317.848	318.058	13.84	14.05	304.01
3	FP-MW009	33	20 - 30	351.988	352.306	21.61	21.93	330.38
	FP-MW010	33	20 - 30	351.171	351.444	20.82	21.09	330.35
	FP-MW011	30	20 - 30	351.680	352.005	21.77	22.10	329.91
4	FP-MW012	33	21 - 31	343.698	343.868	26.76	26.93	316.94
	FP-MW013	38	27 - 37	340.627	340.689	23.99	24.05	316.64
	FP-MW014	33	20 - 30	335.548	335.679	19.13	19.26	316.42
5	FP-MW015	18	12 - 22	424.167	424.534	6.22	6.59	417.94
	FP-MW016	17.5	7.5-17.5	422.982	423.766	7.83	8.61	415.16
	FP-MW017	23	12 - 22	422.172	422.336	11.51	11.67	410.67
	FP-MW018	18	5 - 15	422.736	423.081	5.51	5.86	417.22
6	FP-MW019	23	11 - 21	365.709	366.043	12.72	13.05	322.99
	FP-MW020	23	11 - 21	364.472	364.659	12.21	12.40	352.26
7	FP-MW021	38	24 - 34	365.568	366.129	17.06	17.62	348.51
	FP-MW022	33	21 - 31	366.407	366.877	17.74	18.21	348.67
8	TRL-MW-1	NA	5.07 - 15.07	324.682	323.871	10.66	9.85	314.02
	TRL-MW-5	NA	31.16 - 41.16	327.559	326.854	17.59	16.89	309.96
	TRL-MW-9	NA	40.20 - 50.20	332.802	330.732	36.32	34.25	296.48
	TRL-MW-10R	NA	16.61 - 26.61	322.930	320.184	14.43	11.68	308.50
	TRL-MW-12R	NA	27.54 - 37.54	329.180	327.382	34.11	32.31	295.07
	TRL-MW-13R	NA	33.21 - 43.21	343.507	342.103	27.12	25.72	316.83
	TRL-MW-15	NA	10.61 - 25.61	319.875	318.573	19.28	17.98	300.59
	TRL-MW-17	NA	29.22 - 39.22	337.057	335.322	25.08	23.35	311.97
9	DRL-MW-1	NA	27.21 - 37.21	359.888	357.579	25.36	23.05	334.53
	DRL-MW-4	NA	36.55 - 46.55	370.066	367.825	34.53	32.29	335.54
	DRL-MW-5	NA	31.74 - 41.74	374.196	372.011	32.74	30.56	341.45
	FP-MW023	28	14 - 24	333.78	333.865	16.04	16.13	317.74
	FP-MW024	26	16 - 26	348.76	349.186	17.31	17.74	331.45

Table 5-2
Soil Boring Depths, Permenant Well Screen Intervals, and Groundwater Elevations
Site Inspection Report, Fort Pickett, Virginia

10	FP-MW025	33	17-27	369.423	369.970	10.97	11.52	358.45
	FP-MW026	28	17 - 27	371.007	371.450	10.09	10.53	360.92
11	FP-MW027	30	16 - 26	371.598	371.886	22.94	23.23	348.66
	FP-MW028	35	17 - 27	368.799	369.032	17.87	18.10	350.93
	FP-MW029	25	10 - 20	366.296	366.490	17.3	17.49	349.00
	FP-MW030	20	9 - 19	354.787	355.095	11.26	11.57	343.53

Notes:

[1] Temporary well installed due to shallow groundwater table

bgs = below ground surface

btoc = below top of casing

NA = not applicable

NAVD88 = North American Vertical Datum 1988

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	7/29/2021	GIS BY	MS	7/29/2021
SCALE		CHK BY	AB	7/29/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	7/29/2021

N

Site Inspection Sample Locations AOI 1

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-1

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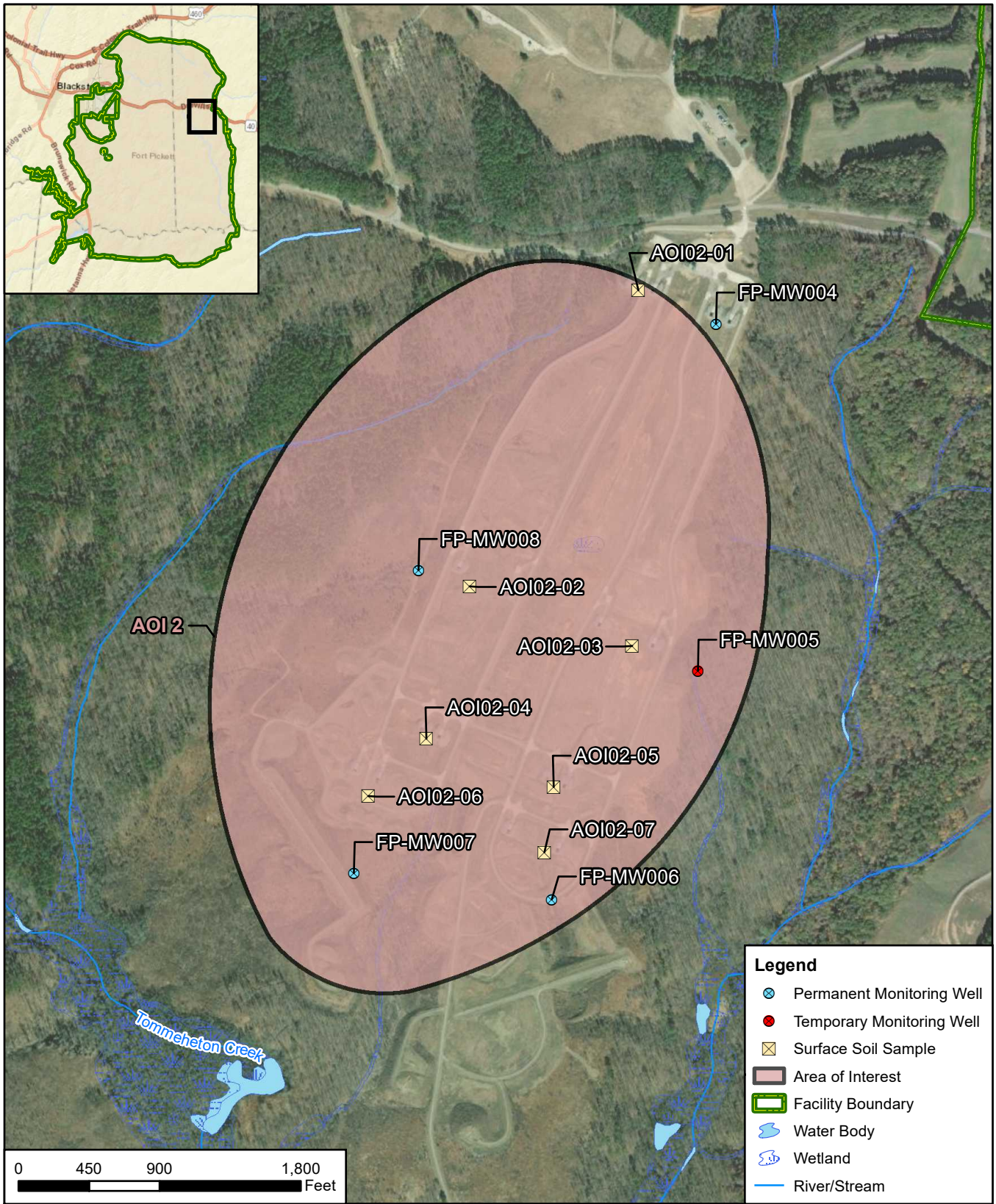

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE		CHK BY	AB	7/29/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	7/29/2021

Site Inspection Sample Locations AOI 2

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-2

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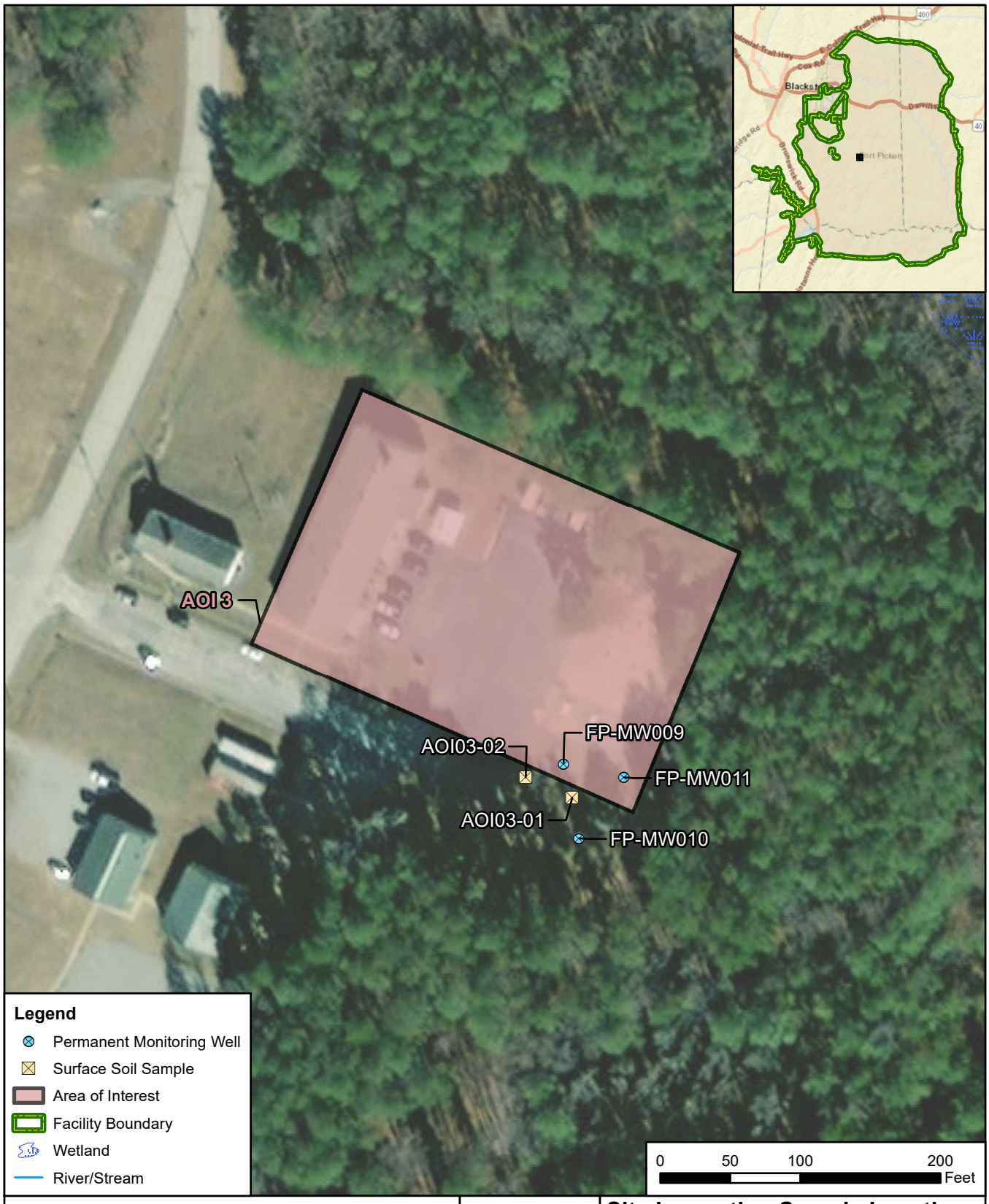

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE		CHK BY	AB	7/29/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	7/29/2021

Site Inspection Sample Locations AOI 3

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-3

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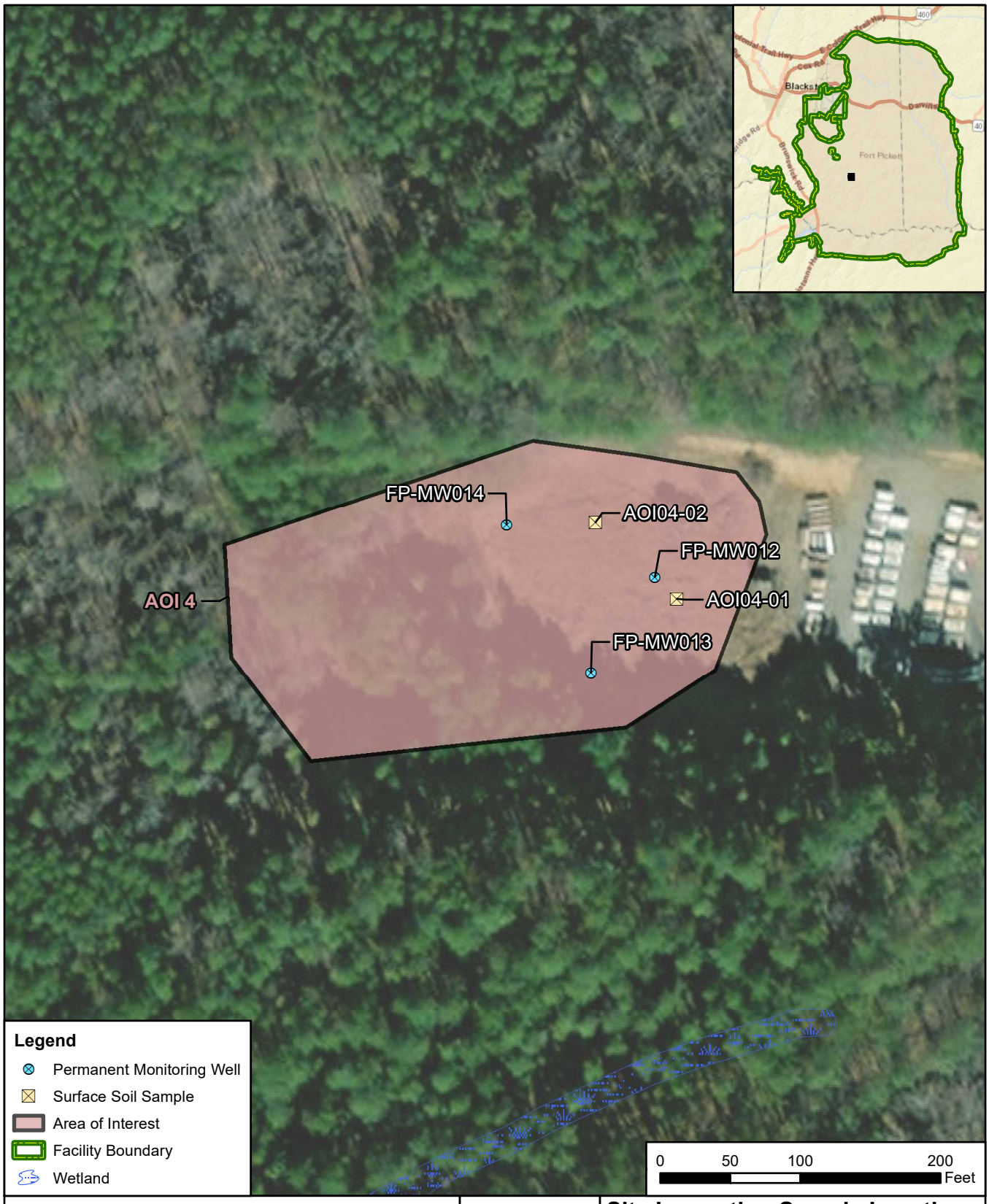

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE		CHK BY	AB	7/29/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	7/29/2021

N

Site Inspection Sample Locations AOI 4

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-4

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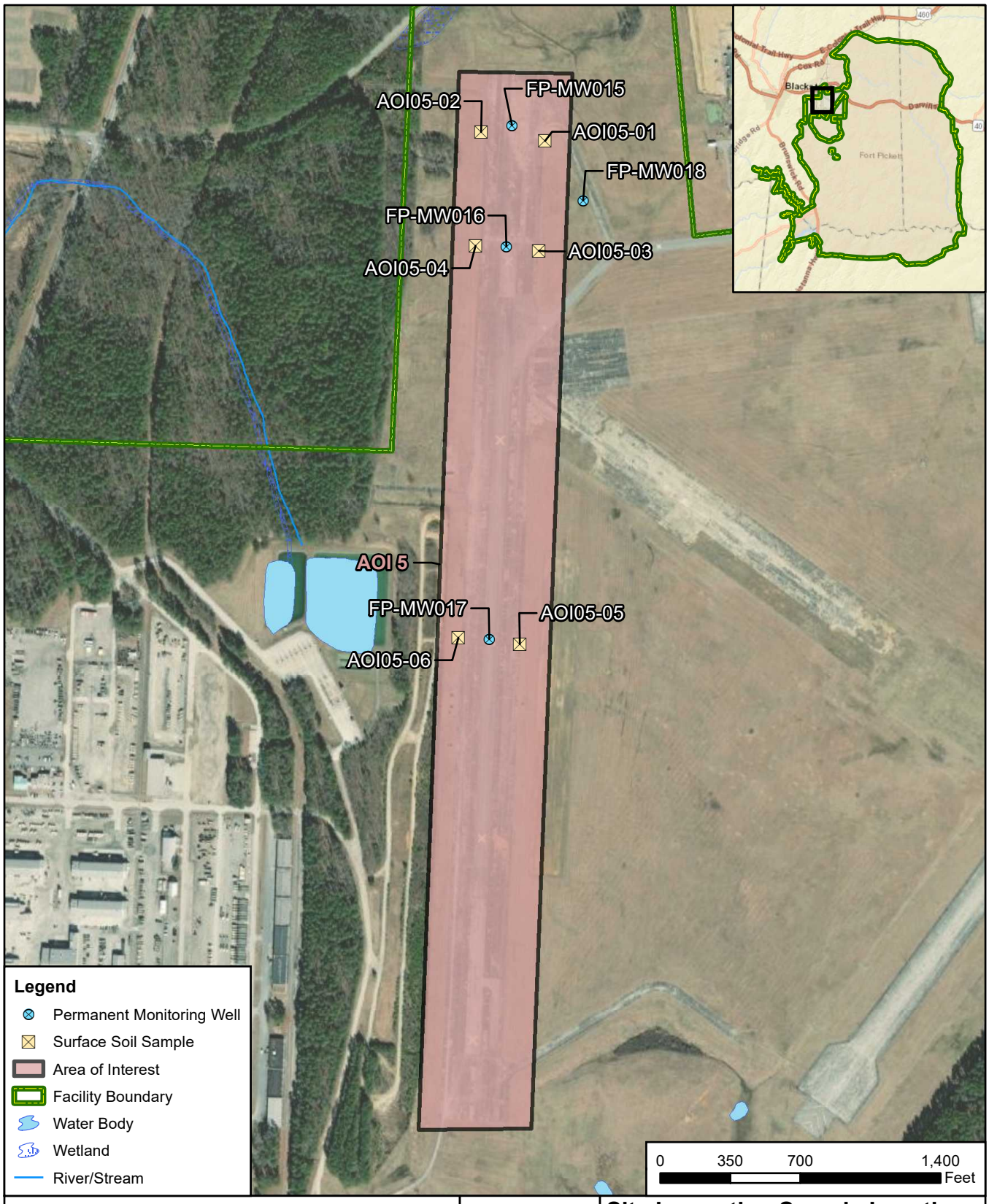

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE		CHK BY	AB	7/29/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	7/29/2021

N

Site Inspection Sample Locations
AOI 5

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-5

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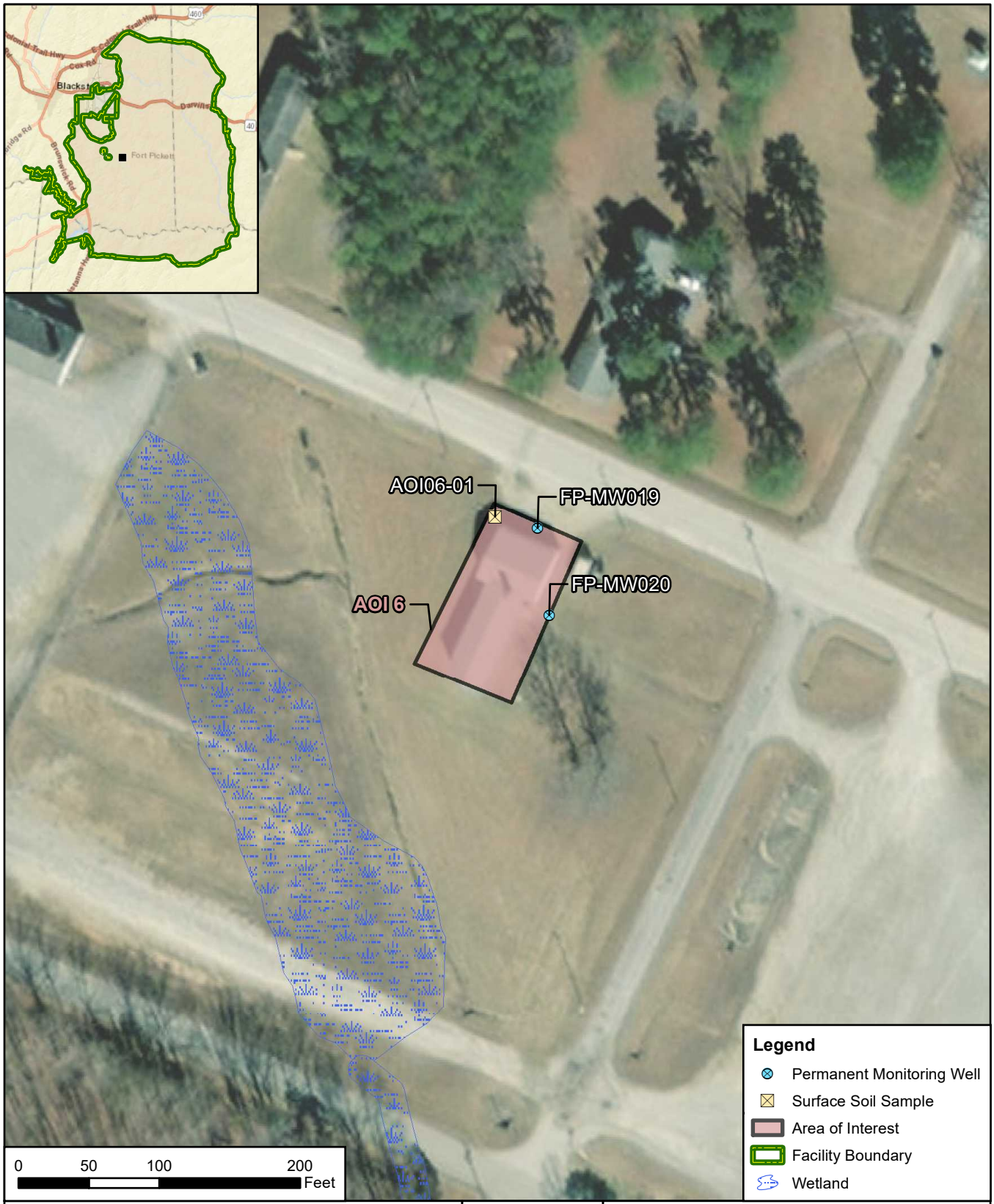

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE		CHK BY	AB	7/29/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	7/29/2021

Site Inspection Sample Locations AOI 6

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-6

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CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE		CHK BY	AB	7/29/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	7/29/2021

Site Inspection Sample Locations AOI 7

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-7

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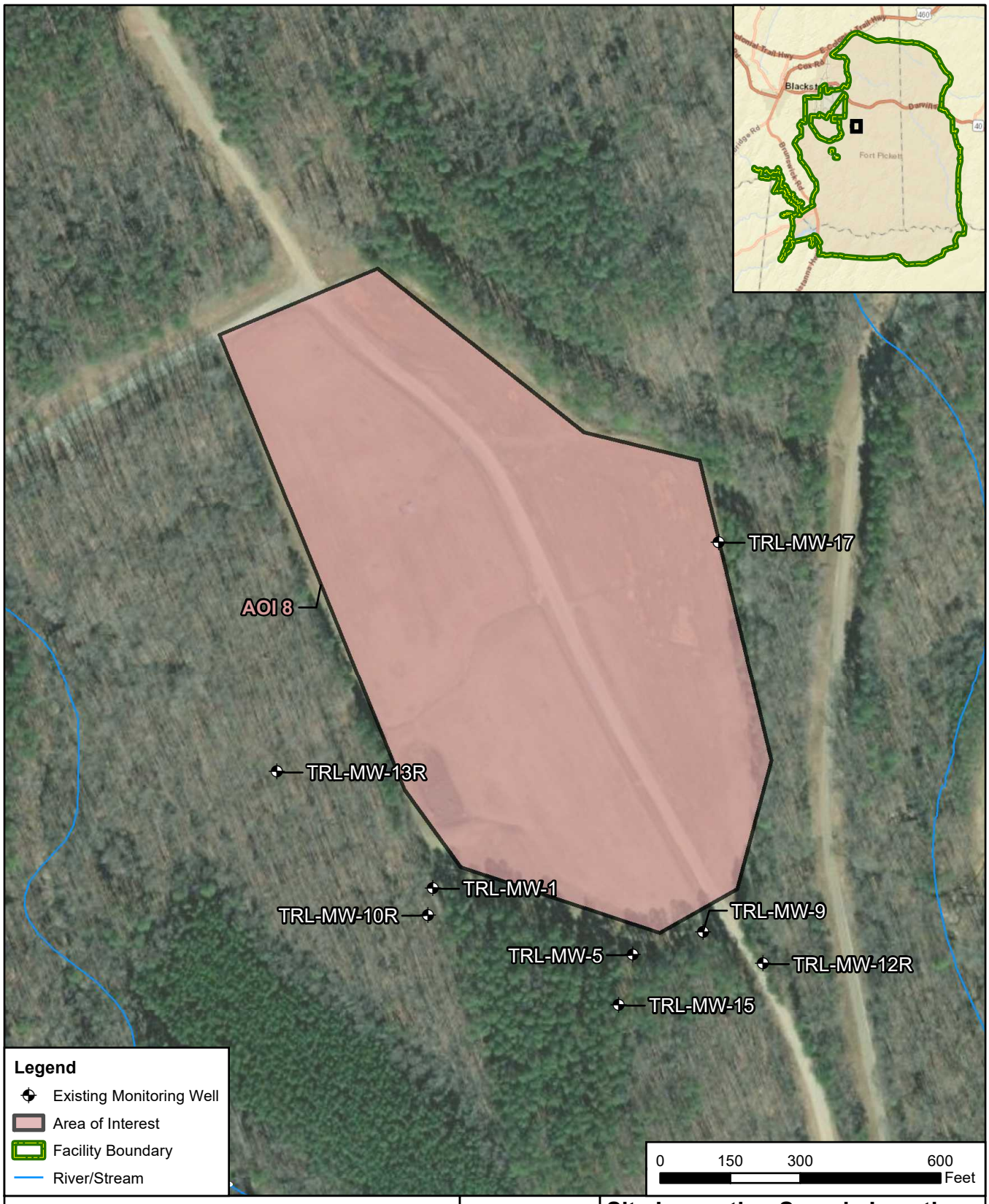

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE		CHK BY	AB	7/29/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	7/29/2021

N

Site Inspection Sample Locations AOI 8

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-8

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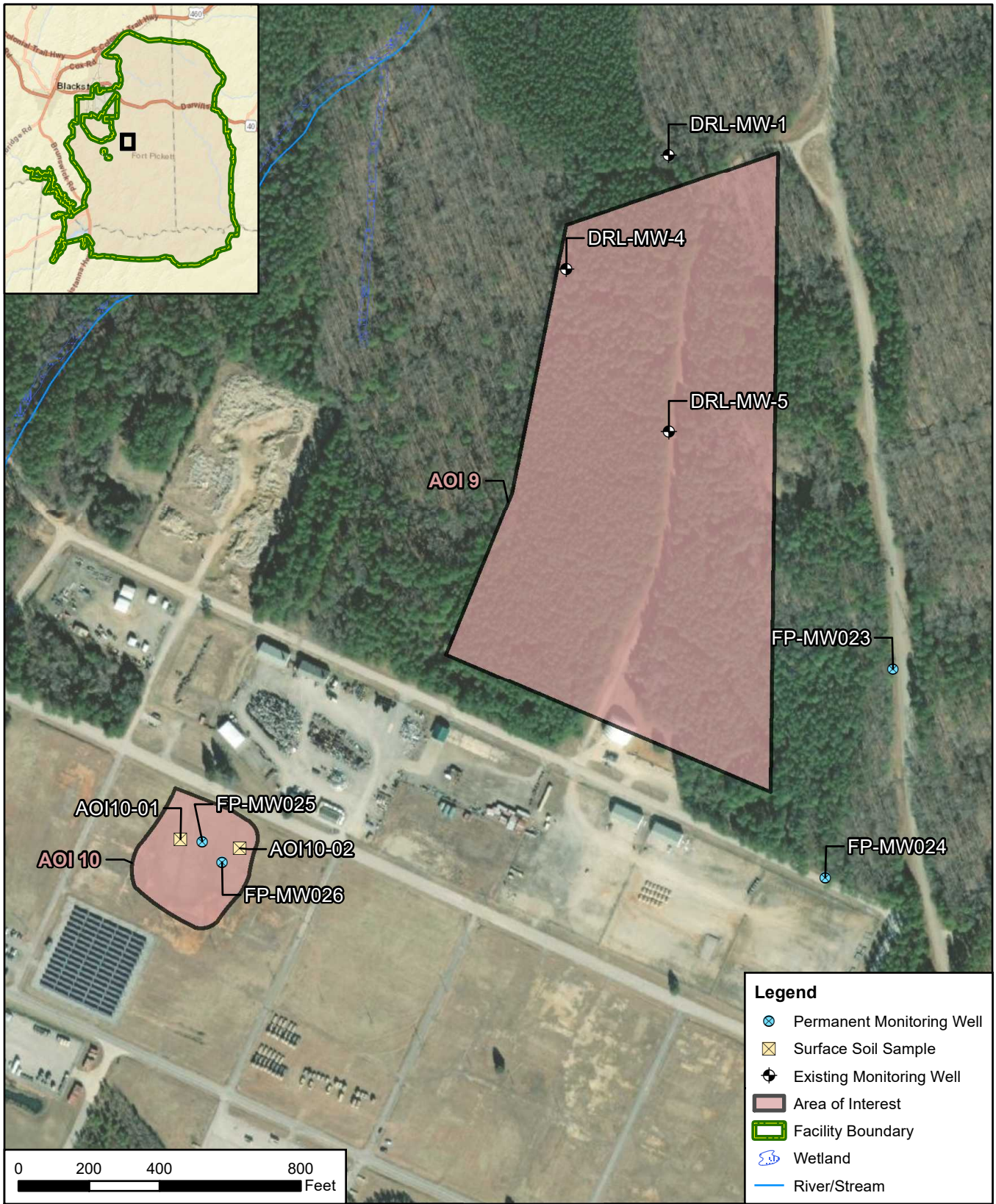

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	7/29/2021	GIS BY	MS	7/29/2021
SCALE		CHK BY	AB	7/29/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	7/29/2021

Site Inspection Sample Locations AOI 9 and AOI 10

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-9

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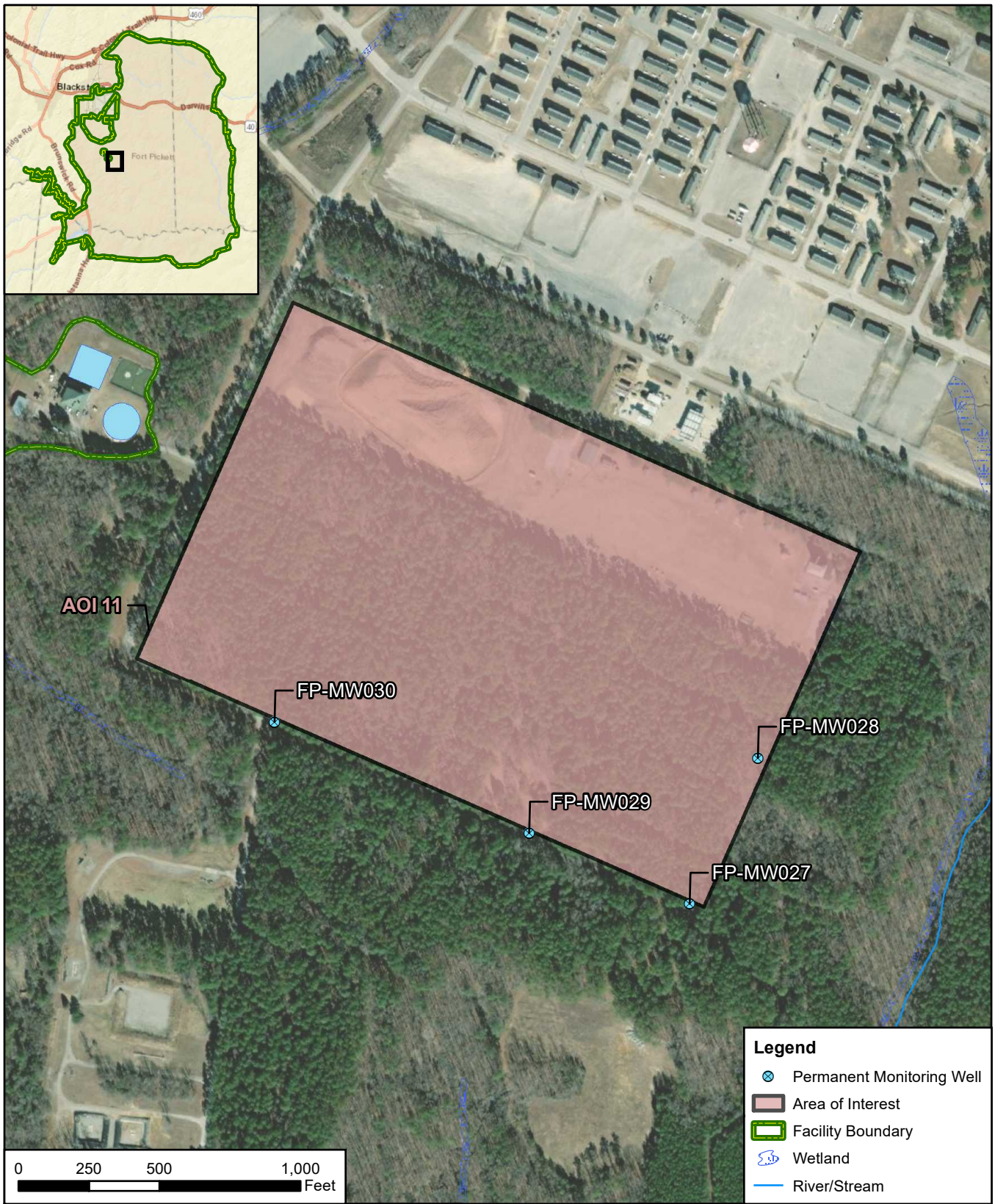

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	7/29/2021	GIS BY	MS	7/29/2021
SCALE		CHK BY	AB	7/29/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	CM	7/29/2021

Site Inspection Sample Locations AOI 11

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-10

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6. Site Inspection Results

This section presents the analytical results of the SI. The SLs used in this evaluation are presented in **Section 6.1**. A discussion of the results for each AOI is provided in **Section 6.3** through **Section 6.13**. **Table 6-2** through **Table 6-5** present PFAS results for samples with detections in soil and groundwater; only constituents detected in one or more samples are included. Tables that contain all results are provided in **Appendix F**, and the laboratory reports are provided in **Appendix G**.

6.1 Screening Levels

The DoD has adopted a policy to retain facilities in the CERCLA process based on risk-based SLs for soil and groundwater, as described in a memorandum from the Office of the Secretary of Defense dated 15 September 2021 (Assistant Secretary of Defense, 2021). The ARNG program under which this SI was performed follows this DoD policy. Should the maximum site concentration for sampled media exceed the SLs established in the OSD memorandum, the AOI will proceed to the next phase under CERCLA. The SLs established in the OSD memorandum apply to three compounds: PFOS, PFOA, and PFBS.

The SLs are presented on **Table 6-1** below. All other results presented in this report are considered informational in nature and serve as an indication as to whether soil and groundwater contain or do not contain PFAS within the boundaries of the facility.

Table 6-1: Screening Levels (Soil and Groundwater)

Analyte	Residential (Soil) (µg/kg)[a,b] 0-2 feet bgs	Industrial/ Commercial Composite Worker (Soil) (µg/kg)[a,b] 2-15 feet bgs	Tap Water (Groundwater) (ng/L)[a,b]
PFOA	130	1,600	40
PFOS	130	1,600	40
PFBS	1,900	25,000	600

Notes:

a.) Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. Hazard Quotient (HQ) = 0.1. 15 September 2021.

b.) USEPA. 2016a. Drinking Water HA for PFOA. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. USEPA Document Number: 822-R-16-005. May 2016. / USEPA. 2016b. Drinking Water HA for PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. USEPA Document Number: 822-R-16-004. May 2016.

The data in the subsequent sections are compared against the SLs presented in **Table 6-1**. The SLs for groundwater are based on direct ingestion. The SLs for soil are based on incidental ingestion and are applied to the depth intervals reasonably anticipated to be encountered by the receptors identified at the site: the residential scenario is applied to surface soil results (0 to 2 feet bgs), and the industrial/commercial worker scenario is applied to shallow subsurface soil results (2 to 15 feet bgs). The SLs are not applied to deep subsurface soil results (>15 feet bgs) because 15 feet is the anticipated limit of construction activities.

6.2 Soil Physicochemical Analyses

To provide basic soil parameter information, soil samples were analyzed for TOC and pH, which are important for evaluating transport through the soil medium. **Appendix F** contains the results of the TOC and pH sampling.

The data collected in this investigation will be used in subsequent investigations, where appropriate, to assess fate and transport of PFAS contaminants. According to the Interstate Technology Regulatory Council (ITRC), several important PFAS partitioning mechanisms include hydrophobic and lipophobic effects, electrostatic interactions, and interfacial behaviors. At relevant environmental pH values, certain PFAS are present as organic anions and are therefore relatively mobile in groundwater (Xiao et al., 2015), but tend to associate with the organic carbon fraction that may be present in soil or sediment (Higgins and Luthy 2006; Guelfo and Higgins, 2013). When sufficient organic carbon is present, organic carbon normalized distribution coefficients (K_{oc} values) can help in evaluating transport potential, though other geochemical factors (for example, pH and presence of polyvalent cations) may also affect PFAS sorption to solid phases (ITRC, 2018).

6.3 AOI 1

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 1, which includes one potential PFAS release area at Building 1485 (Current Fire Station). The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-5**. The detections of PFOA, PFOS, and PFBS in soil and groundwater are presented on **Figure 6-1**, **Figure 6-6, Figure 6-11,** and **Figure 6-16**.

6.3.1 AOI 1 Soil Analytical Results

PFOA, PFOS, and PFBS did not exceed the SLs in soil at the one potential PFAS release area at Building 1485 (Current Fire Station). **Figure 6-1**, **Figure 6-6**, and **Figure 6-11** present the ranges of detections of PFOA, PFOS, and PFBS, respectively, in soil. **Table 6-2** through **Table 6-4** summarize the detected compounds in soil.

At AOI 1, soil was sampled from surface soil (0 to 2 feet bgs), and shallow subsurface soil (4 to 15.8 feet bgs) was sampled from boring locations FP-MW001, FP-MW002, and FP-MW003. Generally, PFOA, PFOS, and PFBS were detected in soil at concentrations several orders of magnitude lower than the SLs, with several exceptions. In the surface soil, PFOA was detected at all three locations, with concentrations ranging from 0.255 J micrograms per kilogram (µg/kg) to 6.34 µg/kg. PFOS was detected at all three locations, with concentrations ranging from 3.60 J+ µg/kg to 63.2 µg/kg. PFBS was not detected in any surface soil samples. In the shallow subsurface soil, PFOA was detected at all three locations, with concentrations ranging from 0.105 J µg/kg to 9.35 µg/kg. PFOS was detected at all three locations, with concentrations ranging from 0.059 J µg/kg to 2.68 µg/kg. PFBS was detected at one location, at a concentration of 0.026 J µg/kg (this was collected from the duplicate, the normal sample was non-detect).

6.3.2 AOI 1 Groundwater Analytical Results

PFOA and PFOS in groundwater exceeded the SLs at one potential PFAS release area at Building 1485 (Current Fire Station). PFBS did not exceed the SL at this potential PFAS release area. **Figure 6-16** presents the ranges of detections of PFOA, PFOS, and PFBS in groundwater. **Table 6-5** summarizes the detected compounds in groundwater.

At AOI 1, groundwater was sampled from permanent monitoring well locations FP-MW001, FP-MW002, and FP-MW003. The SLs of 40 nanograms per liter (ng/L) for PFOA and PFOS were

exceeded at all three monitoring wells, with maximum concentrations of 2,780 ng/L (duplicate from FP-MW001) and 1,180 ng/L, respectively. PFBS was detected below the SL of 600 ng/L at all three monitoring well locations, with concentrations ranging from 119 ng/L to 172 ng/L(duplicate from FP-MW001).

6.3.3 AOI 1 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS were detected in soil at AOI 1; however, the detected concentrations were below the soil SLs. PFOA and PFOS in groundwater exceeded the individual SLs of 40 ng/L at all three monitoring wells. PFBS was detected in groundwater at concentrations below the SL. Based on the exceedances of the SLs for PFOA and PFOS in groundwater, further evaluation at AOI 1 is warranted.

6.4 AOI 2

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 2, which includes potential PFAS release areas at the Northeast Range Rubber Mat Fire Area. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-5**. The detections of PFOA, PFOS, and PFBS in soil and groundwater are presented on **Figure 6-1**, **Figure 6-6, Figure 6-11,** and **Figure 16**.

6.4.1 AOI 2 Soil Analytical Results

PFOA, PFOS, and PFBS did not exceed the SLs in soil at the potential PFAS release areas at the Northeast Range Rubber Mat Fire Area. **Figure 6-1**, **Figure 6-6,** and **Figure 6-11** present the ranges of detections of PFOA, PFOS, and PFBS, respectively, in soil. **Table 6-2** through **Table 6-4** summarize the detected compounds in soil.

At AOI 2, soil was sampled from surface soil (0 to 2 feet bgs), shallow subsurface soil (3 to 14.5 feet bgs), and deep subsurface soil (20 to 29 feet bgs), from boring locations FP-MW004 through FP-MW008 and AOI02-01 through AOI02-07. PFOA, PFOS, and PFBS were detected in soil at concentrations several orders of magnitude lower than the SLs. In the surface soil, PFOA was detected in two locations, with concentrations ranging from 0.152 J µg/kg to 0.213 J µg/kg . PFOS was detected in five locations, with concentrations ranging from 0.071 J µg/kg to 0.199 J µg/kg. PFBS was not detected in the surface soil. In the shallow subsurface intervals, PFOA was detected in one location, at a concentration of 0.101 J µg/kg. PFOS was detected in two locations and ranged in concentrations from 0.074 J µg/kg to 0.342 J µg/kg. PFBS was not detected. PFOA, PFOS, and PFBS were not detected in the deep interval at AOI 2.

6.4.2 AOI 2 Groundwater Analytical Results

PFOA and PFOS were detected in groundwater but did not exceeded the SLs at the Northeast Range Rubber Mat Fire Area. PFBS was not detected in any of the monitoring wells at the Northeast Range Rubber Mat Fire Area. **Figure 6-16** presents the ranges of detections for PFOA, PFOS, and PFBS in groundwater. **Table 6-5** summarizes the detected compounds in groundwater.

At AOI 2, groundwater was sampled from permanent monitoring well locations FP-MW004 through FP-MW008. None of the groundwater detections exceeded SLs. PFOA was detected in three monitoring wells, with concentrations ranging from 0.953 J ng/L to 24.4 J ng/L. PFOS was detected in three monitoring wells, with concentrations ranging from 1.11 J ng/L to 1.65 J ng/L. PFBS was not detected in any of the monitoring wells.

6.4.3 AOI 2 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS were detected in soil at the Northeast Range Rubber Mat Fire Area; however, the detected concentrations were several orders of magnitude lower than the soil SLs. PFOA and PFOS were detected in groundwater; however, the results did not exceed the individual SLs of 40 ng/L. PFBS was not detected in groundwater at any of the monitoring wells. Based on these results, no further evaluation at AOI 2 is warranted.

6.5 AOI 3

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 3, which includes one potential PFAS release area at Building 3006 (FORSCOM Petroleum Training Module Area). The detected compounds in soil and groundwater are presented in **Table 6-2** through **Table 6-5**. The detections of PFOA, PFOS, and PFBS in soil and groundwater are presented on **Figure 6-2**, **Figure 6-7, Figure 6-12,** and **Figure 6-17**.

6.5.1 AOI 3 Soil Analytical Results

PFOA and PFBS did not exceed the SLs in soil, but PFOS did exceed the SL in soil at the one potential PFAS release area at Building 3006 (FORSCOM Petroleum Training Module Area). **Figure 6-3, Figure 6-7,** and **Figure 6-12** present the ranges of detections of PFOA, PFOS, and PFBS, respectively, in soil. **Table 6-2** through **Table 6-4** summarize the detected compounds in soil.

At AOI 3, soil was sampled from surface soil (0 to 2 feet bgs), shallow subsurface soil (8 to 13 feet bgs), and deep subsurface soil (20.8 to 24.9 feet bgs), from boring locations FP-MW009, FP-MW010, and FP-MW011, as well as AOI03-01 and AOI03-02. Generally, PFOA and PFBS were detected in soil, at concentrations several orders of magnitude lower than the SLs, with several exceptions. PFOS was detected in several locations exceeding the soil SL. In the surface soil, PFOA was detected in five locations, with concentrations ranging from 0.150 J µg/kg to 19.2 J µg/kg . PFOS was detected in five locations, with concentrations ranging from 10 µg/kg to 272 J µg/kg. PFBS was detected in four locations, with concentrations ranging from 0.138 J µg/kg to 7.50 J µg/kg (duplicate from AOI03-02). In the shallow subsurface soil, PFOA was detected in three locations, with concentrations ranging from 0.334 J µg/kg to 2.43 µg/kg. PFOS was detected in three locations, with concentrations ranging from 1.33 µg/kg to 10 µg/kg. PFBS was detected in two locations, with concentrations ranging from 0.181 J µg/kg to 7.23 µg/kg. In the deep soil, PFOA was detected in three locations, with concentrations ranging from 1.26 J µg/kg to 1.77 µg/kg. PFOS was detected in three locations, with concentrations ranging from 0.076 J µg/kg to 21.9 µg/kg. Finally, PFBS was detected in three locations, with concentrations ranging from 0.085 J µg/kg to 1.65 µg/kg.

6.5.2 AOI 3 Groundwater Analytical Results

PFOA, PFOS, and PFBS exceeded the SLs at the one potential release area at Building 3006 (FORSCOM Petroleum Training Module Area). **Figure 6-12** presents the ranges of detections for PFOA, PFOS, and PFBS in groundwater. **Table 6-5** summarizes the detected compounds in groundwater.

At AOI 3, groundwater was sampled from permanent monitoring well locations FP-MW009, FP-MW010, and FP-MW011. The SLs of 40 ng/L for PFOA and PFOS and 600 ng/L were exceeded at all three monitoring wells, with maximum concentrations of 10,600 ng/L, 43,600 ng/L, and 22,600 ng/L, respectively.

6.5.3 AOI 3 Conclusions

Based on the results of the SI, PFOA , PFOS, and PFBS were all detected in soil, and PFOS exceeded the soil SL. PFOA, PFOS, PFBS were detected in groundwater, and all exceeded the SLs at the three monitoring wells. Based on the exceedances of the soil and groundwater SLs for PFOA, PFOS, and PFBS, further evaluation at AOI 3 is warranted.

6.6 AOI 4

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 4, which includes one potential PFAS release area at the Former Live Fire Burn Pit. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-5**. The detections of PFOA, PFOS, and PFBS in soil and groundwater are presented on **Figure 6-2**, **Figure 6-7, Figure 6-12,** and **Figure 6-17.**

6.6.1 AOI 4 Soil Analytical Results

PFOA, PFOS, and PFBS did not exceed the SLs in soil at the potential PFAS release area at the Former Live Fire Burn Pit. **Figure 6-2, Figure 6-7,** and **Figure 6-12** present the ranges of detections of PFOA, PFOS, and PFBS, respectively, in soil. **Table 6-2** through **Table 6-4** summarize the detected compounds in soil.

At AOI 4, soil was sampled from surface soil (0 to 2 feet bgs), shallow subsurface soil (8 to 15 feet bgs), and deep subsurface soil (20.4 to 30 feet bgs), from boring locations FP-MW012, FP-MW013, and FP-MW014, as well as AOI04-01 and AOI04-02. PFOA, PFOS, and PFBS were detected in soil, at concentrations several orders of magnitude lower than the SLs, with some exceptions. In the surface soil, PFOA was detected in four locations, with concentrations ranging from 0.165 J µg/kg to 0.323 J µg/kg. PFOS was detected in five locations, with concentrations ranging from 0.605 J µg/kg to 28.3 µg/kg. PFBS was detected in four locations, with concentrations ranging from 0.024 J µg/kg to 0.054 J µg/kg.

In the shallow subsurface intervals, PFOA was not detected. PFOS was detected in two locations, with concentrations ranging from 0.058 J µg/kg to 0.408 J µg/kg. PFBS was detected in one location, at a concentration of 0.085 J µg/kg. In the deep interval, PFOA and PFOS were not detected. PFBS was detected in one location, at a concentration of 0.074 J µg/kg.

6.6.2 AOI 4 Groundwater Analytical Results

PFOA, PFOS, and PFBS were detected in groundwater but did not exceeded the SLs at the Former Live Fire Burn Pit. **Figure 6-17** presents the ranges of detections for PFOA, PFOS, and PFBS in groundwater. **Table 6-5** summarizes the detected compounds in groundwater.

At AOI 4, groundwater was sampled from permanent monitoring well locations FP-MW012, FP-MW013, and FP-MW014. None of the groundwater detections exceeded SLs. PFOA was detected in one monitoring well, with a concentration of 2.69 J ng/L. PFOS was detected in one monitoring well, at a concentration of 1.27 J ng/L. PFBS was detected in all three monitoring wells, with concentrations ranging from 12.2 ng/L to 259 ng/L.

6.6.3 AOI 4 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS were detected in soil at the Former Live Fire Burn Pit; however, the detected concentrations were below the soil SLs. PFOA, PFOS, and PFBS were detected in groundwater; however, the results did not exceed the individual SLs of 40 ng/L or 600 ng/L. Based on these results, no further evaluation at AOI 4 is warranted.

6.7 AOI 5

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 5, which includes two potential PFAS release area: 1991 Aircraft Training Area and the 1999 Police Training Incident. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-5**. The detections of PFOA, PFOS, and PFBS in soil and groundwater are presented on **Figure 6-3**, **Figure 6-8, Figure 6-13,** and **Figure 6-18.**

6.7.1 AOI 5 Soil Analytical Results

PFOA, PFOS, and PFBS did not exceed the SLs in soil at the two potential PFAS release areas: 1991 Aircraft Training Area and the 1999 Police Training Incident. **Figure 6-3**, **Figure 6-8,** and **Figure 6-13** present the ranges of detections of PFOA, PFOS, and PFBS, respectively, in soil. **Table 6-2** through **Table 6-4** summarize the detected compounds in soil.

At the 1991 Aircraft Training Area, soil was sampled from surface soil (0 to 2 feet bgs) and shallow subsurface soil (2 to 14.5 feet bgs) at locations FP-MW015, FP-MW016, and FP-MW018, as well as AOI05-01 through AOI05-04. PFOA, PFOS, and PFBS were detected in soil, at concentrations several orders of magnitude lower than the SLs. In the surface soil, PFOA was detected at three locations, with concentrations ranging from 0.140 J µg/kg to 0.545 J µg/kg. PFOS was detected in four locations, with concentrations ranging from 0.295 J µg/kg to 1.49 J µg/kg. PFBS was detected in one location, at a concentration of 0.025 J µg/kg. In the shallow subsurface and deep soil interval, PFOA, PFOS, and PFBS were not detected.

At the 1999 Police Training Incident, soil was sampled from the surface soil (0 to 2 feet bgs) and shallow subsurface soil (5-15.5 feet bgs) at locations FP-MW017, AOI05-05, and AOI05-06. PFOA, PFOS, and PFBS were detected at concentrations several orders of magnitude lower than the SLs. In the surface soil, PFOA was detected at one location, at a concentration of 0.163 J µg/kg. PFOS was detected in two locations, with concentrations ranging from 0.082 J µg/kg to 0.309 J µg/kg. PFBS was not detected. In the shallow subsurface and deep soil interval, PFOA, PFOS, and PFBS were not detected.

6.7.2 AOI 5 Groundwater Analytical Results

PFOA, PFOS, and PFBS were detected in groundwater, and PFOS exceeded the SLs at one potential PFAS release area at AOI 5, 1991 Aircraft Training Area. PFOA, PFOS, and PFBS did not exceed the SLs in groundwater at the other potential PFAS release area, AOI 5, 1999 Police Training Incident. **Figure 6-18** presents the ranges of detections of PFOA, PFOS, and PFBS in groundwater. **Table 6-5** summarizes the detected compounds in groundwater.

Within the 1991 Aircraft Training Area potential PFAS release area, groundwater was sampled from permanent monitoring well locations FP-MW015, FP-MW016, and FP-MW018. PFOA was detected in all three monitoring wells, with concentrations ranging from 1.74 J ng/L to 17.7 ng/L. The SL of 40 ng/L for PFOS was exceeded, with a maximum concentration of 374 ng/L. PFBS was detected in all three monitoring wells, with concentrations ranging from 1.62 J ng/L to 33.8 ng/L.

Within the 1999 Police Training Incident potential PFAS release area, groundwater was sampled from permanent monitoring well location FP-MW017. PFOA was detected at a concentration of 4.02 ng/L, PFOS was detected at a concentration of 0.826 J ng/L, and PFBS was detected at a concentration of 1.56 J ng/L at FP-MW017.

6.7.3 AOI 5 Conclusions

Based on the results of the SI, PFOS, PFOA, and PFBS were detected in soil at the two potential release areas, but concentrations were below SLs. PFOA and PFBS were detected in groundwater at the two potential release areas, but concentrations were below SLs. PFOS was detected in exceedance of the SL at the 1991 Aircraft Training Area potential PFAS release area. Based on the exceedances of the groundwater SL for PFOS, further evaluation at AOI 5 is warranted.

6.8 AOI 6

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 6, which includes one potential PFAS release area at Building 2860 (Former Fire Station). The detected compounds in soil and groundwater are presented in **Table 6-2** through **Table 6-5**. The detections of PFOA, PFOS, and PFBS in soil and groundwater are presented on **Figure 6-3**, **Figure 6-8, Figure 6-13,** and **Figure 6-18**.

6.8.1 AOI 6 Soil Analytical Results

PFOA, PFOS, and PFBS did not exceed the SLs in soil at the one potential PFAS release area at Building 2860 (Former Fire Station). **Figure 6-3**, **Figure 6-8,** and **Figure 6-13** present the ranges of detections of PFOA, PFOS, and PFBS, respectively, in soil. **Table 6-2** through **Table 6-4** summarize the detected compounds in soil.

At AOI 6, soil was sampled from the surface (0 to 2 feet bgs) and shallow subsurface (5 to 14 feet bgs) at FP-MW019, FP-MW020, AOI06-01, and AOI06-02. Generally, PFOA, PFOS, and PFBS were detected in soil, at concentrations several orders of magnitude lower than the SLs, with several exceptions. In the surface soil, PFOA was detected in four locations, with concentrations ranging from 0.151 J µg/kg to 1.32 µg/kg. PFOS was detected in four locations, with concentrations ranging from 4.97 J µg/kg to 96.1 µg/kg. PFBS was detected in two locations, with concentrations ranging from 0.025 J µg/kg to 0.039 J µg/kg. In the shallow subsurface soil, PFOA was detected in two locations, with concentrations ranging from 0.174 J µg/kg to 1.65 µg/kg. PFOS was detected in two locations, with concentrations ranging from 0.296 J µg/kg to 79.9 µg/kg. PFBS was detected in two locations, with concentrations ranging from 0.034 J µg/kg to 0.069 J µg/kg. In the deep soil interval, PFOA, PFOS, and PFBS were not detected.

6.8.2 AOI 6 Groundwater Analytical Results

PFOA, PFOS, and PFBS exceeded the SLs at the one potential release area at Building 2860 (Former Fire Station). **Figure 6-18** present the ranges of detections for PFOA, PFOS, and PFBS in groundwater. **Table 6-5** summarizes the detected compounds in groundwater.

At AOI 6, groundwater was sampled from permanent monitoring well locations FP-MW019 and FP-MW020. The SLs of 40 ng/L for PFOA and PFOS and 600 ng/L for PFBS were exceeded at both monitoring wells, with maximum concentrations of 3,020 ng/L, 11,700 ng/L, and 654 ng/L, respectively.

6.8.3 AOI 6 Conclusions

Based on the results of the SI, PFOA , PFOS, and PFBS were all detected in soil. PFOA, PFOS, PFBS were detected in groundwater, and all exceeded the SLs at the two monitoring wells. Based on the exceedances of the soil and groundwater SLs for PFOA, PFOS, and PFBS, further evaluation at AOI 6 is warranted.

6.9 AOI 7

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 7, which includes one potential PFAS release area at Building 977 Petroleum Training Module Storage. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-5**. The detections of PFOA, PFOS, and PFBS in soil and groundwater are presented on **Figure 6-4**, **Figure 6-9, Figure 6-14,** and **Figure 6-19**.

6.9.1 AOI 7 Soil Analytical Results

PFOA, PFOS, and PFBS did not exceed the SLs in soil at the potential PFAS release area at Building 977 Petroleum Training Module Storage. **Figure 6-4**, **Figure 6-9,** and **Figure 6-14** present the ranges of detections of PFOA, PFOS, and PFBS, respectively, in soil. **Table 6-2** through **Table 6-4** summarize the detected compounds in soil.

At AOI 7, soil was sampled from the surface (0 to 2 feet bgs), shallow subsurface (10 to 13 feet bgs), and deep subsurface (20.9 to 26.5 feet bgs) from boring locations FP-MW021, FP-MW022, and AOI07-01. PFOA, PFOS, and PFBS were detected in soil, at concentrations several orders of magnitude lower than the SLs, with some exceptions. In the surface soil, PFOA was detected in one location, at a concentration of 18.4 J µg/kg. PFOS was detected in two locations, with concentrations ranging from 0.063 J µg/kg (duplicate at FP-MW023) to 0.088 J µg/kg. PFBS was detected in one location, with a concentration of 0.023 J µg/kg. In the shallow subsurface and deep soil intervals, PFOA , PFOS, and PFBS were not detected.

6.9.2 AOI 7 Groundwater Analytical Results

PFOA, PFOS, and PFBS were not detected in groundwater at the Building 977 Petroleum Training Module Storage. **Figure 6-19** present the ranges of detections for PFOA, PFOS, and PFBS in groundwater. **Table 6-5** summarizes the detected compounds in groundwater. At AOI 7, groundwater was sampled from permanent monitoring well locations FP-MW021 and FP-MW022. PFOA, PFOS, PFBS were not detected in any of the monitoring wells sampled.

6.9.3 AOI 7 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS were detected in soil at the Building 977 Petroleum Training Module Storage; however, the detected concentrations were below the soil SLs. PFOA, PFOS, and PFBS were not detected in groundwater in any of the monitoring wells sampled. Based on these results, no further evaluation at AOI 7 is warranted.

6.10 AOI 8

This section presents the analytical results for groundwater in comparison to SLs for AOI 8, which includes one potential PFAS release area at the Trimble Road Landfill. The detected compounds in groundwater are summarized on **Table 6-5**. The detections of PFOA, PFOS, and PFBS in groundwater are presented on **Figure 6-19**.

6.10.1 AOI 8 Soil Analytical Results

No soil samples were collected at AOI 8.

6.10.2 AOI 8 Groundwater Analytical Results

PFOA, PFOS, and PFBS were detected in groundwater but did not exceed the SLs at the one potential release area at the Trimble Road Landfill. **Figure 6-19** presents the ranges of detections for PFOA, PFOS, and PFBS in groundwater. **Table 6-5** summarizes the detected compounds in groundwater.

At AOI 8, groundwater was sampled from eight existing permanent monitoring well locations. PFOA was detected in five locations, with concentrations ranging from 1.94 J ng/L to 7.62 ng/L, PFOS was detected in six locations, with concentrations ranging from 0.912 J ng/L to 7.34 ng/L, and PFBS was detected in three locations, with concentrations ranging from 1.23 J ng/L to 5.47 ng/L.

6.10.3 AOI 8 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS were detected in groundwater at the Trimble Road Landfill; however, the detected concentrations were below the groundwater SLs. Based on these results, no further evaluation at AOI 8 is warranted.

6.11 AOI 9

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 9, which includes one potential PFAS release area at the Dearing Road Landfill. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-5**. The detections of PFOA, PFOS, and PFBS in soil and groundwater are presented on **Figure 6-4**, **Figure 6-9, Figure 6-14,** and **Figure 6-20**.

6.11.1 AOI 9 Soil Analytical Results

PFOA, PFOS, and PFBS did not exceed the SLs in soil at the potential PFAS release area at the Dearing Road Landfill. **Figure 6-4**, **Figure 6-9,** and **Figure 6-14** present the ranges of detections of PFOA, PFOS, and PFBS, respectively, in soil. **Table 6-2** through **Table 6-4** summarize the detected compounds in soil.

At AOI 9, soil was sampled from the surface (0 to 2 feet bgs), the shallow subsurface (6 to 10 feet bgs), and the deep subsurface (15.2 to 19 feet bgs) from boring locations FP-MW023 and FP-MW024. PFOA, PFOS, and PFBS were detected in soil, at concentrations several orders of magnitude lower than the SLs. In the surface soil, PFOA and PFBS were not detected. PFOS was detected in one location, with a concentration of 0.283 J µg/kg. In the shallow subsurface, PFOS and PFBS were not detected. PFOA was detected in one location, with a concentration of 3.07 J µg/kg. In the deep subsurface, PFOA, PFOS, and PFBS were not detected.

6.11.2 AOI 9 Groundwater Analytical Results

PFOA was not detected, but PFOS and PFBS were detected below SLs at the Dearing Road Landfill. **Figure 6-20** presents the ranges of detections for PFOA, PFOS, and PFBS in groundwater. **Table 6-5** summarizes the detected compounds in groundwater.

At AOI 9, groundwater was sampled from several permanent existing monitoring well locations and new monitoring wells FP-MW023 and FP-MW024. PFOA was not detected, PFOS was detected in one location, with a concentration of 0.480 J ng/L, and PFBS was detected in two locations, with concentrations ranging from 0.907 J ng/L to 2.23 J ng/L.

6.11.3 AOI 9 Conclusions

Based on the results of the SI, PFOA and PFOS were detected in soil at the Dearing Road Landfill; however, the detected concentrations were below the soil SLs. PFOS and PFBS were detected in groundwater but were below the groundwater SLs. Based on these results, no further evaluation at AOI 9 is warranted.

6.12 AOI 10

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 10, which includes one potential PFAS release area at the Solar Array Former Burn Pit. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-5**. The detections of PFOA, PFOS, and PFBS in soil and groundwater are presented on **Figure 6-5**, **Figure 6-10, Figure 6-15,** and **Figure 6-20**.

6.12.1 AOI 10 Soil Analytical Results

PFOA, PFOS, and PFBS did not exceed the SLs in soil at the potential PFAS release area at the Solar Array Former Burn Pit. **Figure 6-5**, **Figure 6-10,** and **Figure 6-15** present the ranges of detections of PFOA, PFOS, and PFBS in soil. **Table 6-2** through **Table 6-4** summarize the detected compounds in soil.

At AOI 10, soil was sampled from the surface (0 to 2 feet bgs), the shallow subsurface (8 to 10 feet bgs), and the deep subsurface (18 to 19 feet bgs) from boring locations FP-MW025 and FP-MW026, as well as AOI10-01 and AOI10-02. PFOA, PFOS, and PFBS were detected in soil, at concentrations several orders of magnitude lower than the SLs. In the surface soil, PFOA was detected in two locations, with concentrations ranging from 0.124 J µg/kg to 0.154 J µg/kg. PFOS was detected in four locations, with concentrations ranging from 0.079 J µg/kg to 0.301 J µg/kg. PFBS was not detected. In the shallow subsurface and deep soil, PFOA , PFOS, and PFBS were not detected.

6.12.2 AOI 10 Groundwater Analytical Results

PFOA, PFOS, and PFBS were not detected in groundwater at the Solar Array Former Burn Pit. **Figure 6-20** present the ranges of detections for PFOA, PFOS, and PFBS in groundwater. **Table 6-5** summarizes the detected compounds in groundwater. At AOI 10, groundwater was sampled from permanent monitoring well locations FP-MW025 and FP-MW026. PFOA, PFOS, and PFBS were not detected in any of the monitoring wells sampled.

6.12.3 AOI 10 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS were detected in soil at the Solar Array Former Burn Pit; however, the detected concentrations were below the soil SLs. PFOA, PFOS, and PFBS were not detected in groundwater in any of the monitoring wells sampled. Based on these results, no further evaluation at AOI 10 is warranted.

6.13 AOI 11

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 11, which includes two potential PFAS release area at the OHA and OHA Dump Area. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-5**. The detections of PFOA, PFOS, and PFBS in soil and groundwater are presented on **Figure 6-5**, **Figure 6-10, Figure 6-15,** and **Figure 6-21**.

6.13.1 AOI 11 Soil Analytical Results

PFOA, PFOS, and PFBS did not exceed the SLs in soil at the potential PFAS release area at the OHA and OHA Dump Area. **Figure 6-5**, **Figure 6-10,** and **Figure 6-15** present the ranges of detections of PFOA, PFOS, and PFBS, respectively, in soil. **Table 6-2** through **Table 6-4** summarize the detected compounds in soil.

At AOI 11, soil was sampled from the surface (0 to 2 feet bgs), shallow subsurface (6 to 13 feet bgs), and deep subsurface (15 to 18 feet bgs) from boring locations FP-MW026 through FP-MW030. PFOA, PFOS, and PFBS were detected in soil, at concentrations several orders of magnitude lower than the SLs. In the surface soil, PFOA and PFBS were not detected. PFOS was detected in all four locations, with concentrations ranging from 0.099 J µg/kg to 0.178 J µg/kg. In the shallow subsurface, PFOA and PFBS were not detected. PFOS was detected in two locations, with concentrations ranging from 0.072 J µg/kg (duplicate sample at FP-MW030) to 0.097 J µg/kg. In the deep soil interval, PFOA , PFOS, and PFBS were not detected.

6.13.2 AOI 11 Groundwater Analytical Results

PFOA and PFBS were detected in groundwater at the OHA and OHA Dump Area but were below the groundwater SLs. **Figure 6-21** present the ranges of detections for PFOA, PFOS, and PFBS in groundwater. **Table 6-5** summarizes the detected compounds in groundwater. At AOI 11, groundwater was sampled from permanent monitoring well locations FP-MW026 through FP-MW030. PFOA was detected in one location, with a concentration of 1.60 J ng/L, PFOS was not detected, and PFBS was detected in one location, with a concentration of 0.780 J ng/L.

6.13.3 AOI 11 Conclusions

Based on the results of the SI, only PFOS was detected in soil at the OHA and OHA Dump Area; however, the detected concentrations were below the soil SL. Only PFOA and PFBS were detected in groundwater in any of the monitoring wells sampled, and concentrations were below SLs. Based on these results, no further evaluation at AOI 11 is warranted.

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Table 6-2
PFAS Detections in Surface Soil
Site Inspection Report, Fort Pickett

Area of Interest		AOI01						AOI02													
Sample ID		FP-MW001-SB-0-2		FP-MW002-SB-0-2		FP-MW003-SB-0-2		AOI02-01-SB-0-2		AOI02-02-SB-0-2		AOI02-03-SB-0-2		AOI02-04-SB-0-1		AOI02-05-SB-0-1		AOI02-06-SB-0-2		AOI02-07-SB-0-2	
Sample Date		06/15/2021		06/15/2021		06/24/2021		05/14/2021		05/14/2021		05/14/2021		05/14/2021		05/14/2021		05/14/2021		05/14/2021	
Depth		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 1 ft		0 - 1 ft		0 - 2 ft		0 - 2 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
6:2 FTS	-	3.59		ND		ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
8:2 FTS	-	3.31		ND		ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFBA	-	0.879	J	0.105	J	0.333	J	0.065	J	ND	UJ	ND	UJ	0.331	J	ND	UJ	0.100	J	0.062	J
PFBS	1900	ND		ND		ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFDA	-	1.47		ND		ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.046	J	ND	UJ
PFDoA	-	0.115	J	ND		ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFHpA	-	2.10		0.085	J	0.164	J	ND	UJ	0.034	J	ND	UJ	0.267	J	ND	UJ	0.072	J	ND	UJ
PFHxA	-	1.12	J	0.103	J	0.275	J	0.024	J	0.050	J	ND	UJ	0.309	J	ND	UJ	0.082	J	ND	UJ
PFHxS	-	0.274	J	0.103	J	0.162	J	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFNA	-	32.9		0.211	J	0.427	J	ND	UJ	0.031	J	ND	UJ	0.260	J	ND	UJ	0.113	J	ND	UJ
PFOA	130	6.34		0.555	J	0.255	J	ND	UJ	ND	UJ	ND	UJ	0.213	J	ND	UJ	0.152	J	ND	UJ
PFOS	130	63.2		3.60	J+	19.1		ND	UJ	0.118	J	ND	UJ	ND	UJ	ND	UJ	0.199	J	0.071	J
PFPeA	-	2.14		0.154	J	0.584	J	ND	UJ	0.044	J	ND	UJ	0.680	J	ND	UJ	0.090	J	ND	UJ
PFTeDA	-	0.028	J	ND		ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFTrDA	-	0.043	J	ND		ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFUnDA	-	0.579	J	ND		0.028	J	ND	UJ	0.029	J	ND	UJ	0.037	J	0.029	J	0.033	J	ND	UJ

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Soil screening levels based on residential scenario for direct ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

UJ = The analyte was not detected at a level greater than or equal to the adjusted detection limit (DL). However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
FP	Fort Pickett
ft	feet
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable

Table 6-2
PFAS Detections in Surface Soil
Site Inspection Report, Fort Pickett

Area of Interest		AOI02												AOI03							
Sample ID		FP-MW004-SB-0-2		FP-MW005-SB-0-2		FP-MW006-SB-0-2		FP-MW007-SB-0-2		FP-MW007-SB-0-2-D		FP-MW008-SB-0-2		AOI03-01-SB-0-2		AOI03-02-SB-0-2		AOI03-02-SB-0-2-D		FP-MW009-SB-0-2	
Sample Date		05/19/2021		05/26/2021		05/18/2021		05/17/2021		05/17/2021		05/19/2021		05/13/2021		05/17/2021		05/17/2021		05/25/2021	
Depth		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
6:2 FTS	-	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	1.17	J	80.7	J	85.9	J	10	
8:2 FTS	-	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	4.52	J	14.8	J	9.06	J	4.59	
PFBA	-	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.515	J	1.73	J	2.10	J	0.985	J
PFBS	1900	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	6.93	J	7.50	J	3.80	
PFDA	-	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.636	J	0.212	J	0.126	J	0.379	J
PFDoA	-	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.078	J	0.029	J	ND	UJ	0.128	J
PFHpA	-	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.382	J	5.62	J	4.67	J	2.19	
PFHxA	-	0.028	J	ND		0.037	J	0.025	J	0.023	J	ND	UJ	0.450	J	21.1	J	22.7	J	8.04	
PFHxS	-	0.038	J	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.672	J	56.3	J	40.8	J	20.7	
PFNA	-	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	3.57	J	1.73	J	1.19	J	2.29	
PFOA	130	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.708	J	19.2	J	16.4	J	7.41	
PFOS	130	0.071	J	0.089	J	ND	UJ	ND	UJ	ND	UJ	ND	UJ	157	J	272	J	227	J	10	
PFPeA	-	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	1.02	J	9.41	J	11.2	J	3.62	
PFTeDA	-	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.063	J
PFTrDA	-	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.074	J
PFUnDA	-	ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.263	J	0.049	J	ND	UJ	0.155	J

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Soil screening levels based on residential scenario for direct ingestion of contaminated soil.

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PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
FP	Fort Pickett
ft	feet
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable

Table 6-2
PFAS Detections in Surface Soil
Site Inspection Report, Fort Pickett

Area of Interest		AOI03						AOI04										AOI05			
Sample ID		FP-MW009-SB-0-2-D		FP-MW010-SB-0-2		FP-MW011-SB-0-2		AOI04-01-SB-0-2		AOI04-02-SB-0-2		FP-MW012-SB-0-2		FP-MW013-SB-0-2		FP-MW014-SB-0-2		AOI05-01-SB-0-2		AOI05-02-SB-0-2	
Sample Date		05/25/2021		05/25/2021		05/26/2021		05/13/2021		05/13/2021		05/28/2021		05/27/2021		05/26/2021		05/12/2021		05/12/2021	
Depth		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
6:2 FTS	-	10		2.05		1.17	J+	ND	UJ	ND	UJ	ND		ND		ND		ND	UJ	ND	UJ
8:2 FTS	-	5.51		2.64		17.1	J	ND	UJ	ND	UJ	ND		ND		ND		ND	UJ	ND	UJ
PFBA	-	0.673	J	0.107	J	0.381	J	0.060	J	0.056	J	ND		0.110	J	0.084	J	0.075	J	0.380	J
PFBS	1900	2.91		0.138	J	ND		0.053	J	0.041	J	0.024	J	ND		0.054	J	ND	UJ	ND	UJ
PFDA	-	0.488	J	0.238	J	1.68	J+	0.077	J	0.101	J	ND		ND		0.102	J	ND	UJ	0.052	J
PFDoA	-	0.171	J	0.168	J	0.127	J	0.035	J	0.035	J	ND		0.038	J	0.033	J	ND	UJ	0.025	J
PFHpA	-	2.03		0.118	J	0.526	J	0.091	J	0.068	J	ND		0.103	J	0.123	J	0.055	J	0.705	J
PFHxA	-	6.61		0.176	J	0.318	J	0.199	J	0.151	J	ND		0.332	J	0.296	J	0.058	J	0.722	J
PFHxS	-	20.1		2.64		0.342	J	1.64	J	1.15	J	0.037	J	0.458	J	1.71		0.081	J	0.123	J
PFNA	-	2.16		0.135	J	2.55	J+	0.115	J	0.138	J	ND		0.066	J	0.146	J	0.086	J	0.213	J
PFOA	130	6.97		0.150	J	0.813	J	0.227	J	0.165	J	ND		0.205	J	0.323	J	0.142	J	0.545	J
PFOS	130	10		44.7		31.8	J	15.7	J	23.5	J	0.605	J	3.62		28.3		1.49	J	0.304	J
PFPeA	-	2.53		0.150	J	0.848	J	0.111	J	0.065	J	ND		0.166	J	0.154	J	0.033	J	0.898	J
PFTeDA	-	0.097	J	0.043	J	ND		ND	UJ	ND	UJ	ND		ND		ND		ND	UJ	ND	UJ
PFTrDA	-	0.101	J	0.585	J	0.047	J	ND	UJ	ND	UJ	ND		ND		ND		ND	UJ	ND	UJ
PFUnDA	-	0.217	J	0.287	J	0.563	J	0.069	J	0.080	J	ND		ND		0.096	J	ND	UJ	0.045	J

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Soil screening levels based on residential scenario for direct ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

UJ = The analyte was not detected at a level greater than or equal to the adjusted detection limit (DL). However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
FP	Fort Pickett
ft	feet
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable

Table 6-2
PFAS Detections in Surface Soil
Site Inspection Report, Fort Pickett

Area of Interest		AOI05																		AOI06	
Sample ID		AOI05-03-SB-0-2		AOI05-04-SB-0-2		AOI05-05-SB-0-2		AOI05-06-SB-0-2		FP-MW018-SB-0-2		FP-MW016-SB-0.5-2		FP-MW015-SB-1-3		FP-MW017-SB-1-3		FP-MW017-SB-1-3-D		AOI06-01-SB-0-2	
Sample Date		05/12/2021		05/12/2021		05/12/2021		05/14/2021		06/08/2021		06/08/2021		06/07/2021		06/07/2021		06/07/2021		05/17/2021	
Depth		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0.5 - 2 ft		1 - 3 ft		1 - 3 ft		1 - 3 ft		0 - 2 ft	
Analyte	**OSD Screening Level [a]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
6:2 FTS	-	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND		ND		ND		ND		ND		ND	UJ
8:2 FTS	-	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND		ND		ND		ND		ND		ND	UJ
PFBA	-	0.059	J	0.124	J	0.161	J	ND	UJ	0.083	J	ND		ND		ND		ND		0.132	J
PFBS	1900	ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.025	J	ND		ND		ND		ND		ND	UJ
PFDA	-	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND		ND		ND		ND		ND		ND	UJ
PFDoA	-	ND	UJ	0.031	J	ND	UJ	ND	UJ	0.042	J	0.034	J	0.034	J	ND		ND		ND	UJ
PFHpA	-	ND	UJ	0.077	J	0.068	J	ND	UJ	0.028	J	ND		ND		ND		ND		0.137	J
PFHxA	-	0.045	J	0.123	J	0.073	J	ND	UJ	0.082	J	ND		ND		ND		ND		0.182	J
PFHxS	-	ND	UJ	0.038	J	ND	UJ	ND	UJ	0.121	J	ND		ND		ND		ND		0.112	J
PFNA	-	ND	UJ	0.055	J	0.098	J	ND	UJ	0.041	J	ND		ND		ND		ND		0.339	J
PFOA	130	ND	UJ	0.140	J	0.163	J	ND	UJ	ND		ND		ND		ND		ND		0.168	J
PFOS	130	ND	UJ	0.693	J	0.309	J	0.082	J	0.295	J	ND		ND		ND		ND		4.97	J
PFPeA	-	0.028	J	0.096	J	0.051	J	ND	UJ	0.049	J	ND		ND		ND		ND		0.356	J
PFTeDA	-	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND		0.061	J	0.043	J	ND	UJ	0.151	J	ND	UJ
PFTrDA	-	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND		ND		ND		ND		ND		ND	UJ
PFUnDA	-	ND	UJ	0.048	J	0.042	J	ND	UJ	ND		ND		ND		ND		ND		0.029	J

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Soil screening levels based on residential scenario for direct ingestion of contaminated soil.

Interpreted Qualifiers

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J+ = Estimated concentration, biased high

UJ = The analyte was not detected at a level greater than or equal to the adjusted detection limit (DL). However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
FP	Fort Pickett
ft	feet
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable

Table 6-2
PFAS Detections in Surface Soil
Site Inspection Report, Fort Pickett

Area of Interest		AOI06								AOI07								AOI09			
Sample ID		AOI06-01-SB-0-2-D		FP-MW019-SB-0-2		FP-MW019-SB-0-2-D		FP-MW020-SB-0-2		AOI07-01-SB-0-2		FP-MW021-SB-0-2		FP-MW021-SB-0-2-D		FP-MW022-SB-0-2		FP-MW023-SB-0-2		FP-MW024-SB-0-2	
Sample Date		05/17/2021		06/04/2021		06/04/2021		06/04/2021		05/13/2021		06/14/2021		06/14/2021		06/10/2021		06/16/2021		06/08/2021	
Depth		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
6:2 FTS	-	ND	UJ	1.48		0.456	J	ND		84.4	J	ND		ND		ND		ND		ND	
8:2 FTS	-	ND	UJ	21.9		14.1		0.224	J	2.62	J	ND		ND		ND		ND		ND	
PFBA	-	0.208	J	ND		ND		0.295	J	2.68	J	ND		ND		ND		ND		0.064	J
PFBS	1900	ND	UJ	0.039	J	ND	UJ	0.025	J	0.023	J	ND		ND		ND		ND		ND	
PFDA	-	ND	UJ	ND		ND		0.272	J	0.184	J	ND		ND		ND		ND		0.054	J
PFDoA	-	ND	UJ	ND		ND		0.071	J	ND	UJ	ND		ND		ND		ND		ND	
PFHpA	-	0.217	J	0.036	J	ND	UJ	0.364	J	15.4	J	ND		ND		ND		ND		0.067	J
PFHxA	-	0.236	J	0.132	J	0.046	J	0.275	J	12.8	J	0.029	J	0.029	J	ND		ND		0.099	J
PFHxS	-	0.123	J	0.765	J	0.244	J	0.319	J	0.070	J	ND		ND		ND		ND		ND	
PFNA	-	0.532	J	0.151	J	0.065	J	6.02		4.59	J	ND		ND		ND		ND		ND	
PFOA	130	0.280	J	0.151	J	ND		1.32		18.4	J	ND		ND		ND		ND		ND	
PFOS	130	6.84	J	96.1		59.7		18.1		0.088	J	0.082	J	0.063	J	ND		ND		0.283	J
PFPeA	-	0.563	J	0.082	J	0.034	J	0.539	J	18.2	J	0.038	J	0.034	J	ND		ND		0.088	J
PFTeDA	-	ND	UJ	ND		ND		ND		ND	UJ	ND	UJ	ND		ND		ND		ND	
PFTrDA	-	ND	UJ	ND		ND		ND		ND	UJ	ND	UJ	ND		0.065	J	ND		ND	
PFUnDA	-	0.031	J	ND		ND		0.141	J	0.056	J	ND		ND		ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Soil screening levels based on residential scenario for direct ingestion of contaminated soil.

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J+ = Estimated concentration, biased high

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PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
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PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
FP	Fort Pickett
ft	feet
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable

Table 6-2
PFAS Detections in Surface Soil
Site Inspection Report, Fort Pickett

Area of Interest		AOI10										AOI11							
Sample ID		AOI10-01-SB-0-2		AOI10-02-SB-0-2		FP-MW025-SB-0-2		FP-MW025-SB-0-2-D		FP-MW026-SB-0-2		FP-MW027-SB-0-2		FP-MW028-SB-0-2		FP-MW029-SB-0-2		FP-MW030-SB-0-2	
Sample Date		05/13/2021		05/13/2021		06/09/2021		06/09/2021		06/10/2021		05/21/2021		05/21/2021		05/20/2021		05/20/2021	
Depth		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		2 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																			
6:2 FTS	-	ND	UJ	ND	UJ	ND		ND		ND		ND		ND		ND	UJ	ND	UJ
8:2 FTS	-	ND	UJ	ND	UJ	ND		ND		ND		ND		ND		ND	UJ	ND	UJ
PFBA	-	0.156	J	0.107	J	ND	UJ	0.059	J	ND		0.073	J	0.057	J	ND	UJ	ND	UJ
PFBS	1900	ND	UJ	ND	UJ	ND		ND		ND		ND		ND		ND	UJ	ND	UJ
PFDA	-	0.048	J	ND	UJ	ND		ND		ND		ND		ND		ND	UJ	ND	UJ
PFDoA	-	ND	UJ	ND	UJ	ND		ND		ND		ND		ND		ND	UJ	ND	UJ
PFHpA	-	0.068	J	0.050	J	ND		ND		ND		0.030	J	0.036	J	ND	UJ	ND	UJ
PFHxA	-	0.066	J	0.060	J	0.039	J	ND	UJ	0.047	J	ND		ND		0.041	J	0.039	J
PFHxS	-	ND	UJ	ND	UJ	ND		ND		ND		ND		ND	UJ	ND	UJ	ND	UJ
PFNA	-	0.103	J	0.048	J	ND		ND		ND		0.041	J	0.058	J	0.039	J	ND	UJ
PFOA	130	0.154	J	0.124	J	ND		ND		ND		ND		ND		ND	UJ	ND	UJ
PFOS	130	0.301	J	0.221	J	0.079	J	0.092	J	0.079	J	0.099	J	0.112	J	0.178	J	0.150	J
PFPeA	-	0.078	J	0.046	J	0.034	J	ND	UJ	0.032	J	0.028	J	0.027	J	ND	UJ	ND	UJ
PFTeDA	-	ND	UJ	ND	UJ	ND		ND		0.035	J	ND		ND		ND	UJ	ND	UJ
PFTrDA	-	ND	UJ	ND	UJ	ND		ND		ND		ND		ND	UJ	ND	UJ	ND	UJ
PFUnDA	-	0.041	J	ND	UJ	ND		ND		ND		0.040	J	0.040	J	ND	UJ	ND	UJ

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Soil screening levels based on residential scenario for direct ingestion of contaminated soil.

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Chemical Abbreviations

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PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
FP	Fort Pickett
ft	feet
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable

Table 6-3
PFAS Detections in Shallow Subsurface Soil
Site Inspection Report, Fort Pickett

Area of Interest		AOI01																AOI02			
Sample ID		FP-MW001-SB-7-9		FP-MW001-SB-7-9-D		FP-MW001-SB-14.8-15.8		FP-MW002-SB-4-6		FP-MW002-SB-4-6-D		FP-MW002-SB-10.5-11.5		FP-MW003-SB-4-6		FP-MW003-SB-10.5-11.5		FP-MW004-SB-10-12		FP-MW005-SB-3-4	
Sample Date		06/15/2021		06/15/2021		06/15/2021		06/15/2021		06/15/2021		06/15/2021		06/24/2021		06/16/2021		05/19/2021		05/26/2021	
Depth		7 - 9 ft		7 - 9 ft		14.8 - 15.8 ft		4 - 6 ft		4 - 6 ft		10.5 - 11.5 ft		4 - 6 ft		10.5 - 11.5 ft		10 - 12 ft		3 - 4 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual			Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
6:2 FTS	-	44.8		39.4		17.0		ND		ND		ND		ND		ND		ND	UJ	ND	
8:2 FTS	-	ND		ND		0.045	J	ND		ND		ND		ND		ND		ND	UJ	ND	
PFBA	-	1.00	J	1.05	J	0.640	J	ND		ND		ND		ND		ND		ND	UJ	ND	
PFBS	25000	ND	UJ	0.026	J	ND		ND		ND		ND		ND		ND		ND	UJ	ND	
PFDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	UJ	ND	
PFDoA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	UJ	ND	
PFHpA	-	7.46		6.65		2.56		ND		ND		ND		ND		0.065	J	ND	UJ	ND	
PFHxA	-	4.61		4.38		2.29		ND		ND		ND		0.024	J	0.078	J	ND	UJ	ND	
PFHxS	-	1.62		1.51		1.39		ND		ND		0.079	J	0.050	J	1.38		ND	UJ	ND	
PFNA	-	0.258	J	0.327	J	0.107	J	ND		ND		ND		0.048	J	0.053	J	ND	UJ	ND	
PFOA	1600	9.35		8.26		3.15		ND		ND		0.105	J	ND		0.129	J	ND	UJ	ND	
PFOS	1600	0.480	J	0.652	J	0.465	J	2.06	J	2.09	J	0.059	J	2.68		2.61		ND	UJ	0.074	J
PFPeA	-	4.61		4.75		3.83		ND		ND		ND		0.026	J	0.053	J	ND	UJ	ND	
PFTeDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	UJ	ND	
PFUnDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	UJ	ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

UJ = The analyte was not detected at a level greater than or equal to the adjusted detection limit (DL). However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D/DUP	duplicate
FP	Fort Pickett
ft	feet
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable

Table 6-3
PFAS Detections in Shallow Subsurface Soil
Site Inspection Report, Fort Pickett

Area of Interest		AOI02										AOI03						AOI04			
Sample ID		FP-MW006-SB-4-6		FP-MW006-SB-10.8-11.8		FP-MW007-SB-12.5-14.5		FP-MW008-SB-4-6		FP-MW008-SB-10-11		FP-MW009-SB-11-13		FP-MW010-SB-11-13		FP-MW011-SB-8-10		FP-MW012-SB-10-12		FP-MW013-SB-13-15	
Sample Date		05/18/2021		05/18/2021		05/17/2021		05/19/2021		05/19/2021		05/25/2021		05/25/2021		05/26/2021		05/28/2021		05/27/2021	
Depth		4 - 6 ft		10.8 - 11.8 ft		12.5 - 14.5 ft		4 - 6 ft		10 - 11 ft		11 - 13 ft		11 - 13 ft		8 - 10 ft		10 - 12 ft		13 - 15 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
6:2 FTS	-	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	4.16		1.29		21.5		ND		ND	
8:2 FTS	-	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.102	J	2.56		8.83		ND		ND	
PFBA	-	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	2.41		ND		0.535	J	ND		ND	
PFBS	25000	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	7.23		ND		0.181	J	ND		ND	
PFDA	-	0.107	J	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND		ND		0.072	J	ND		ND	
PFDoA	-	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND		ND		ND		ND		ND	
PFHpA	-	0.033	J	ND	UJ	ND	UJ	ND	UJ	ND	UJ	4.26		0.072	J	1.64		ND		ND	
PFHxA	-	0.071	J	ND	UJ	ND	UJ	ND	UJ	ND	UJ	17.4		0.061	J	1.76		0.034	J	ND	
PFHxS	-	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	41.6		0.487	J	3.18		0.082	J	0.067	J
PFNA	-	0.144	J	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND		0.240	J	0.687	J	ND		ND	
PFOA	1600	0.101	J	ND	UJ	ND	UJ	ND	UJ	ND	UJ	0.611	J	0.334	J	2.43		ND		ND	
PFOS	1600	0.342	J	ND	UJ	ND	UJ	ND	UJ	ND	UJ	1.33		10		10		ND		0.058	J
PFPeA	-	0.280	J	0.160	J	ND	UJ	ND	UJ	ND	UJ	7.34		0.047	J	2.38		ND		ND	
PFTeDA	-	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND		ND		ND		ND		ND	
PFUnDA	-	0.073	J	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND		ND		ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

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8:2 FTS	8:2 fluorotelomer sulfonate
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PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D/DUP	duplicate
FP	Fort Pickett
ft	feet
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable

Table 6-3
PFAS Detections in Shallow Subsurface Soil
Site Inspection Report, Fort Pickett

	Area of Interest	AOI04		AOI05														AOI06	
	Sample ID	FP-MW014-SB-8-10		FP-MW015-SB-5-7		FP-MW015-SB-13.5-14.5		FP-MW016-SB-4-6		FP-MW016-SB-11-12		FP-MW017-SB-5-7		FP-MW017-SB-14.5-15.5		FP-MW018-SB-2-4		FP-MW018-SB-5-6		FP-MW019-SB-5-7	
	Sample Date	05/26/2021		06/07/2021		06/07/2021		06/08/2021		06/08/2021		06/07/2021		06/07/2021		06/08/2021		06/08/2021		06/04/2021	
	Depth	8 - 10 ft		5 - 7 ft		13.5 - 14.5 ft		4 - 6 ft		11 - 12 ft		5 - 7 ft		14.5 - 15.5 ft		2 - 4 ft		5 - 6 ft		5 - 7 ft	
Analyte	**OSD Screening Level [a]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
6:2 FTS	-	0.133	J	ND		ND		ND		ND		ND		ND		ND		ND		11.3	
8:2 FTS	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		0.061	J
PFBA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFBS	25000	0.085	J	ND		ND		ND		ND		ND		ND		ND		ND		0.069	J
PFDA	-	ND		ND		ND		ND		ND		ND		ND		0.061	J	ND		ND	
PFDoA	-	ND		0.036	J	ND		0.028	J	ND		ND		ND		0.062	J	ND		ND	
PFHpA	-	0.042	J	ND		ND		ND		ND		ND		ND		ND		ND		0.036	J
PFHxA	-	0.172	J	ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxS	-	0.889	J	ND		0.057	J	ND		ND		ND		ND		0.043	J	ND		1.56	
PFNA	-	ND		ND		ND		ND		ND		ND		ND		ND		0.035	J	0.478	J
PFOA	1600	ND		ND		ND		ND		ND		ND		ND		ND		ND		1.40	
PFOS	1600	0.408	J	ND		ND		ND		ND		ND		ND		ND		ND		79.9	
PFPeA	-	0.081	J	ND		ND		ND		ND		ND		ND		ND		ND		0.120	J
PFTeDA	-	ND		0.027	J	0.035	J	ND		ND		0.151	J	ND		0.032	J	ND		ND	
PFUnDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

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UJ = The analyte was not detected at a level greater than or equal to the adjusted detection limit (DL). However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
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PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D/DUP	duplicate
FP	Fort Pickett
ft	feet
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable

Table 6-3
PFAS Detections in Shallow Subsurface Soil
Site Inspection Report, Fort Pickett

Area of Interest		AOI06						AOI07				AOI09				AOI10				AOI11	
Sample ID		FP-MW019-SB-13-14		FP-MW020-SB-5-7		FP-MW020-SB-13-14		FP-MW021-SB-11-13		FP-MW022-SB-10-12		FP-MW023-SB-6-8		FP-MW024-SB-8-10		FP-MW025-SB-8-10		FP-MW026-SB-8-10		FP-MW027-SB-6-8	
Sample Date		06/04/2021		06/04/2021		06/04/2021		06/14/2021		06/11/2021		06/16/2021		06/09/2021		06/09/2021		06/10/2021		05/21/2021	
Depth		13 - 14 ft		5 - 7 ft		13 - 14 ft		11 - 13 ft		10 - 12 ft		6 - 8 ft		8 - 10 ft		8 - 10 ft		8 - 10 ft		6 - 8 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
6:2 FTS	-	8.20		ND		0.394	J	ND		ND		16.4		ND		ND		ND		ND	
8:2 FTS	-	0.470	J	0.055	J	ND		ND		ND		ND		ND		ND		ND		ND	
PFBA	-	0.092	J	0.064	J	0.094	J	ND		ND		0.528	J	ND		ND		ND		ND	
PFBS	25000	0.056	J	ND		0.034	J	ND		ND		ND		ND		ND		ND		ND	
PFDA	-	ND		ND		ND		ND		ND		ND		0.059	J	ND		ND		ND	
PFDoA	-	ND		ND		ND		ND		ND		ND		0.031	J	ND		ND	UJ	ND	
PFHpA	-	0.217	J	0.214	J	0.291	J	ND		ND		2.25	J	ND		ND		ND		ND	
PFHxA	-	0.314	J	0.077	J	0.305	J	ND		ND		1.95	J	0.044	J	ND		ND		ND	
PFHxS	-	4.29		0.529	J	0.426	J	ND		ND		1.21	J	ND		ND		ND	UJ	ND	
PFNA	-	0.076	J	0.034	J	ND		ND		ND		0.142	J	ND		ND		ND		ND	
PFOA	1600	1.65		0.355	J	0.174	J	ND		ND		3.07	J	ND		ND		ND		ND	
PFOS	1600	24.6		0.296	J	2.40		ND		ND		ND		ND		ND		ND		ND	
PFPeA	-	0.228	J	0.128	J	0.283	J	ND		ND		3.09	J	0.033	J	ND		ND		ND	
PFTeDA	-	ND		ND		ND		ND		ND		ND		ND		0.057	J	0.031	J	ND	
PFUnDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

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Chemical Abbreviations

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PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D/DUP	duplicate
FP	Fort Pickett
ft	feet
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable

Table 6-3
PFAS Detections in Shallow Subsurface Soil
Site Inspection Report, Fort Pickett

	Area of Interest	AOI11											
	Sample ID	FP-MW028-SB-7-10		FP-MW029-SB-4-6		FP-MW029-SB-12-13		FP-MW030-SB-4-6		FP-MW030-SB-4-6-DUP		FP-MW030-SB-10-11	
	Sample Date	05/21/2021		05/20/2021		05/20/2021		05/20/2021		05/20/2021		05/20/2021	
	Depth	7 - 10 ft		4 - 6 ft		12 - 13 ft		4 - 6 ft		4 - 6 ft		10 - 11 ft	
Analyte	**OSD Screening Level [a]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)													
6:2 FTS	-	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
8:2 FTS	-	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFBA	-	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFBS	25000	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFDA	-	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFDoA	-	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFHpA	-	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFHxA	-	ND		ND	UJ	0.032	J	0.024	J	0.028	J	0.026	J
PFHxS	-	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFNA	-	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFOA	1600	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFOS	1600	0.097	J	ND	UJ	ND	UJ	ND	UJ	0.072	J	ND	UJ
PFPeA	-	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFTeDA	-	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ
PFUnDA	-	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

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PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
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PFTeDA	perfluorotetradecanoic acid
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ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	not applicable

Table 6-4
PFAS Detections in Deep Subsurface Soil
Site Inspection Report, Fort Pickett

Area of Interest	AOI02				AOI03						AOI04						AOI07	
Sample ID	FP-MW004-SB-20-21		FP-MW007-SB-28-29		FP-MW009-SB-22-23		FP-MW010-SB-22-23		FP-MW011-SB-20.8-21.8		FP-MW012-SB-23.9-24-9		FP-MW013-SB-29-30		FP-MW014-SB-20.4-21.4		FP-MW021-SB-25.5-26.5	
Sample Date	05/19/2021		05/17/2021		05/25/2021		05/25/2021		05/26/2021		05/28/2021		05/27/2021		05/26/2021		06/14/2021	
Depth	20 - 21 ft		28 - 29 ft		22 - 23 ft		22 - 23 ft		20.8 - 21.8 ft		23.9 - 24.9 ft		29 - 30 ft		20.4 - 21.4 ft		25.5 - 26.5 ft	
Analyte	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																		
6:2 FTS	ND	UJ	ND	UJ	20.9		15.5		17.8		ND		ND		ND		ND	
8:2 FTS	ND	UJ	ND	UJ	0.992	J	ND		0.038	J	ND		ND		ND		ND	
PFBA	ND	UJ	ND	UJ	1.08	J	0.104	J	0.438	J	ND		ND		ND		ND	
PFBS	ND	UJ	ND	UJ	1.65		0.085	J	0.246	J	0.074	J	ND		ND		ND	
PFHpA	ND	UJ	ND	UJ	1.44		0.143	J	1.27		ND		ND		ND		ND	
PFHxA	ND	UJ	ND	UJ	5.23		0.457	J	1.56		0.033	J+	ND		ND		ND	
PFHxS	ND	UJ	ND	UJ	20.0		1.92		3.25		ND		0.032	J	ND		ND	
PFNA	ND	UJ	ND	UJ	0.060	J	ND		0.080	J	ND		ND		ND		ND	
PFOA	ND	UJ	ND	UJ	1.77		1.26	J	1.47		ND		ND		ND		ND	
PFOS	ND	UJ	ND	UJ	21.3		0.076	J	21.9		ND		ND		ND		ND	
PFPeA	ND	UJ	ND	UJ	4.06		0.365	J	1.75		0.043	J	ND		ND		ND	
PFTeDA	ND	UJ	ND	UJ	ND		ND		ND		ND		ND		ND		ND	

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

UJ = The analyte was not detected at a level greater than or equal to the adjusted detection limit (DL). However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FP	Fort Pickett
ft	feet
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
µg/kg	micrograms per Kilogram

Table 6-4
PFAS Detections in Deep Subsurface Soil
Site Inspection Report, Fort Pickett

Area of Interest	AOI07		AOI09				AOI10				AOI11			
Sample ID	FP-MW022-SB-20.9-21.9		FP-MW023-SB-15.2-16.2		FP-MW024-SB-18-19		FP-MW025-SB-18-19		FP-MW026-SB-18-19		FP-MW027-SB-15-16		FP-MW028-SB-16.5-18	
Sample Date	06/11/2021		06/16/2021		06/09/2021		06/09/2021		06/10/2021		05/21/2021		05/21/2021	
Depth	20.9 - 21.9 ft		15.2 - 16.2 ft		18 - 19 ft		18 - 19 ft		18 - 19 ft		15 - 16 ft		16.5 - 18 ft	
Analyte	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)														
6:2 FTS	ND		ND		ND		ND		ND		ND		ND	
8:2 FTS	ND		ND		ND		ND		ND		ND		ND	
PFBA	ND		ND		ND		ND		ND		ND		ND	
PFBS	ND		ND		ND		ND		ND		ND		ND	
PFHpA	ND		ND		ND		ND		ND		ND		ND	
PFHxA	ND		ND		ND		ND		ND		ND		ND	
PFHxS	ND		ND		ND		ND		ND		ND		ND	
PFNA	ND		ND		ND		ND		ND		ND		ND	
PFOA	ND		ND		ND		ND		ND		ND		ND	
PFOS	ND		ND		ND		ND		ND		ND		ND	
PFPeA	ND		ND		ND		ND		ND		ND		ND	
PFTeDA	ND		ND		ND		ND		ND		0.144	J	ND	

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

UJ = The analyte was not detected at a level greater than or equal to the adjusted detection limit (DL). However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FP	Fort Pickett
ft	feet
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
µg/kg	micrograms per Kilogram

Table 6-5
PFAS Detections in Groundwater
Site Inspection Report, Fort Pickett

Area of Interest			AOI01								AOI02									
Sample ID			FP-MW001-GW		FP-MW001-GW-D		FP-MW002-GW		FP-MW003-GW		FP-MW004-GW		FP-MW004-GW-D		FP-MW005-GW		FP-MW006-GW		FP-MW007-GW	
Sample Date			06/23/2021		06/23/2021		06/23/2021		06/23/2021		05/27/2021		05/27/2021		05/27/2021		05/26/2021		05/26/2021	
Analyte	OSD Screening Level [a]	USEPA HA [b]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Water, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)																				
6:2 FTS	-	-	7780	J	8290		1760	J	301		ND		ND		ND		81.7		5.62	
8:2 FTS	-	-	12.9		14.9		2.94	J	5.65		ND		ND		ND		ND		ND	
PFBA	-	-	2280	J	2360		521		169		ND		ND		2.72	J	39.2		2.96	J
PFBS	600	-	166		172		170		119		ND		ND		ND		ND		ND	
PFDA	-	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHpA	-	-	4360	J	4390		939		310		ND		ND		ND		41.5		3.00	J
PFHxA	-	-	6610	J	7500		1350		369		ND		ND		ND		91.9		7.96	
PFHxS	-	-	3690	J	3620		1440		24900		ND		ND		ND		ND		ND	
PFNA	-	-	33.0		33.5		21.0		139		ND		ND		ND		5.82		ND	
PFOA	40	70	**2660**	**J**	**2780**		**464**		**976**		ND		ND		0.953	J	24.4		1.16	J
PFOS	40	70	**379**		**371**		**322**		**1180**		ND	UJ	ND	UJ	1.11	J	1.48	J	ND	
PFPeA	-	-	11300	J	11200		1700	J	382		ND		ND		ND		151		11.0	
Total PFOA+PFOS	-	70	**3040**		**3150**		**786**		**2160**		ND		ND		2.06		25.9		1.16	

Grey Fill	Detected concentration exceeded OSD Screening Levels
Bold Font	Detected concentration exceeded USEPA HA Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

b. USEPA, 2016. Drinking Water Health Advisory for PFOA. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-005. May 2016. / EPA. 2016. Drinking Water Health Advisory for PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-004. May 2016.

Interpreted Qualifiers

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UJ = The analyte was not detected at a level greater than or equal to the adjusted detection limit (DL). However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
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NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
DRL	Dearing Road Landfill
FP	Fort Pickett
GW	groundwater
HA	Health Advisory
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
TRL	Trimble Road Landfill
USEPA	United States Environmental Protection Agency
ng/l	nanogram per liter
-	not applicable

Table 6-5
PFAS Detections in Groundwater
Site Inspection Report, Fort Pickett

		Area of Interest	AOI02		AOI03						AOI04								AOI05	
		Sample ID	FP-MW008-GW		FP-MW009-GW		FP-MW010-GW		FP-MW011-GW		FP-MW012-GW		FP-MW012-GW-D		FP-MW013-GW		FP-MW014-GW		FP-MW015-GW	
		Sample Date	05/26/2021		06/10/2021		06/10/2021		06/10/2021		06/18/2021		06/18/2021		06/07/2021		06/07/2021		08/06/2021	
Analyte	**OSD Screening Level [a]**	**USEPA HA [b]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Water, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)																				
6:2 FTS	-	-	ND		94400		8360		180000		1.86	J	1.82	J	1.79	J	2.16	J	ND	
8:2 FTS	-	-	ND		568		2.42	J	588		ND		ND		ND		ND		ND	
PFBA	-	-	ND		11900		988		4840		15.9		14.7		4.52		7.35		7.06	
PFBS	600	-	ND		22600		1410		4340		259		236		12.2		144		33.8	
PFDA	-	-	ND		ND		ND		3.91	J	ND		ND		ND		ND		ND	
PFHpA	-	-	ND		13300		1900		7090		ND		ND		4.31		ND		10.6	
PFHxA	-	-	ND		59700		4280		19800		ND		ND		11.8		14.7		34.0	
PFHxS	-	-	ND		121000		23000		34300		ND	UJ	ND		260		114		273	
PFNA	-	-	ND		154		269		84.0		ND		ND		ND		ND		1.40	J
PFOA	40	70	ND		**7790**		**3120**		**10600**		ND		ND		2.69	J	ND		17.7	
PFOS	40	70	1.65	J	**43600**		**9800**		**19800**		ND		ND		ND		1.27	J	**374**	
PFPeA	-	-	ND		43100		3540		16900		36.2		33.2		4.71		11.7		14.6	
Total PFOA+PFOS	-	70	1.65		**51400**		**12900**		**30400**		ND		ND		2.69		1.27		**392**	

Grey Fill	Detected concentration exceeded OSD Screening Levels
Bold Font	Detected concentration exceeded USEPA HA Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

b. USEPA, 2016. Drinking Water Health Advisory for PFOA. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-005. May 2016. / EPA. 2016. Drinking Water Health Advisory for PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-004. May 2016.

Interpreted Qualifiers

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UJ = The analyte was not detected at a level greater than or equal to the adjusted detection limit (DL). However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
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PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
DRL	Dearing Road Landfill
FP	Fort Pickett
GW	groundwater
HA	Health Advisory
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
TRL	Trimble Road Landfill
USEPA	United States Environmental Protection Agency
ng/l	nanogram per liter
-	not applicable

Table 6-5
PFAS Detections in Groundwater
Site Inspection Report, Fort Pickett

	Area of Interest		AOI05										AOI06				AOI07			
	Sample ID		FP-MW015-GW-D		FP-MW016-GW		FP-MW017-GW		FP-MW017-GW-D		FP-MW018-GW		FP-MW019-GW		FP-MW020-GW		FP-MW021-GW		FP-MW022-GW	
	Sample Date		08/06/2021		06/17/2021		06/16/2021		06/16/2021		06/23/2021		06/14/2021		06/14/2021		06/21/2021		06/23/2021	
Analyte	**OSD Screening Level [a]**	**USEPA HA [b]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Water, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)																				
6:2 FTS	-	-	ND		ND		ND		ND		ND		2290		13700		ND		23.3	
8:2 FTS	-	-	ND		ND		ND		ND		ND		ND		289		ND		ND	
PFBA	-	-	6.69		ND		4.64		4.45		4.50		138		927		ND		ND	
PFBS	600	-	30.9		1.62	J	1.56	J	1.38	J	24.6		74.9		654		ND		ND	
PFDA	-	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHpA	-	-	10.0		ND		2.60	J	2.39	J	4.00		224		3920		ND		ND	
PFHxA	-	-	32.4		2.00	J	5.01		4.93		14.5		768		4960		ND		ND	
PFHxS	-	-	252		9.75		9.26		8.88		108		2710		5780		ND		ND	
PFNA	-	-	1.31	J	ND		ND		ND		ND		7.32		119		ND		ND	
PFOA	40	70	16.2		1.74	J	4.02		3.79	J	6.70		**524**		**3020**		ND		ND	
PFOS	40	70	**342**		6.21		0.826	J	ND	UJ	**141**		**892**		**11700**		ND		ND	
PFPeA	-	-	13.7		0.890	J	2.60	J	2.45	J	6.33		445		4770		ND		ND	
Total PFOA+PFOS	-	70	**358**		7.95		4.85		3.79		**148**		**1420**		**14700**		ND		ND	

Grey Fill	Detected concentration exceeded OSD Screening Levels
Bold Font	Detected concentration exceeded USEPA HA Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

b. USEPA, 2016. Drinking Water Health Advisory for PFOA. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-005. May 2016. / EPA. 2016. Drinking Water Health Advisory for PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-004. May 2016.

Interpreted Qualifiers

J = Estimated concentration

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Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
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NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
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PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
DRL	Dearing Road Landfill
FP	Fort Pickett
GW	groundwater
HA	Health Advisory
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
TRL	Trimble Road Landfill
USEPA	United States Environmental Protection Agency
ng/l	nanogram per liter
-	not applicable

Table 6-5
PFAS Detections in Groundwater
Site Inspection Report, Fort Pickett

Area of Interest			AOI08																	
Sample ID			TRL-MW-1-GW		TRL-MW-1-GW-D		TRL-MW-10R-GW		TRL-MW-12R-GW		TRL-MW-13R-GW		TRL-MW-15-GW		TRL-MW-17-GW		TRL-MW-5-GW		TRL-MW-9-GW	
Sample Date			06/11/2021		06/11/2021		05/21/2021		05/21/2021		06/11/2021		05/21/2021		06/11/2021		05/21/2021		06/11/2021	
Analyte	OSD Screening Level [a]	USEPA HA [b]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Water, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)																				
6:2 FTS	-	-	5.51	J	ND	UJ	ND		ND		ND		2.78	J	2.24	J	3.71	J	8.19	
8:2 FTS	-	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFBA	-	-	ND		ND		ND		ND		ND		1.85	J	ND		4.12		ND	
PFBS	600	-	ND		ND		ND		ND		ND		1.23	J	ND		2.69	J	5.47	
PFDA	-	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHpA	-	-	ND		ND		ND		ND		ND		1.70	J	ND		4.40		1.60	J
PFHxA	-	-	ND		ND		ND		ND		ND		3.85	J	3.40	J	10.1		5.75	
PFHxS	-	-	3.06	J	ND	UJ	ND		ND		ND		8.65		1.44	J	5.32		14.9	
PFNA	-	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFOA	40	70	ND		ND		1.97	J	ND		ND		2.80	J	5.39		7.62		1.94	J
PFOS	40	70	1.73	J	ND	UJ	0.912	J	ND		ND		7.34		5.07		0.940	J	3.49	J
PFPeA	-	-	ND		ND		ND		ND		ND		2.61	J	1.43	J	7.14		3.24	J
Total PFOA+PFOS	-	70	1.73		ND		2.88		ND		ND		10.1		10.5		8.56		5.43	

Grey Fill	Detected concentration exceeded OSD Screening Levels
Bold Font	Detected concentration exceeded USEPA HA Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

b. USEPA, 2016. Drinking Water Health Advisory for PFOA. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-005. May 2016. / EPA. 2016. Drinking Water Health Advisory for PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-004. May 2016.

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PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
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PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
DRL	Dearing Road Landfill
FP	Fort Pickett
GW	groundwater
HA	Health Advisory
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
TRL	Trimble Road Landfill
USEPA	United States Environmental Protection Agency
ng/l	nanogram per liter
-	not applicable

Table 6-5
PFAS Detections in Groundwater
Site Inspection Report, Fort Pickett

Area of Interest			AOI09										AOI10				AOI11			
Sample ID			DRL-MW-1-GW		DRL-MW-4-GW		DRL-MW-5-GW		FP-MW023-GW		FP-MW024-GW		FP-MW025-GW		FP-MW026-GW		FP-MW027-GW		FP-MW028-GW	
Sample Date			06/22/2021		06/21/2021		06/21/2021		06/22/2021		06/17/2021		06/17/2021		06/18/2021		06/21/2021		06/17/2021	
Analyte	**OSD Screening Level [a]**	**USEPA HA [b]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Water, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)																				
6:2 FTS	-	-	2.24		6.42		ND		2.53		ND		ND		ND		5.88		3.02	J
8:2 FTS	-	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFBA	-	-	ND		ND		1.81	J	ND		3.51	J	ND		ND		ND		3.59	J
PFBS	600	-	ND		ND		0.907	J	ND		2.23	J	ND		ND		ND		0.780	J
PFDA	-	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHpA	-	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxA	-	-	ND		ND		4.20		ND		2.84	J	ND		ND		ND		1.52	J
PFHxS	-	-	ND		ND		ND		ND		9.63		ND		ND		ND		ND	
PFNA	-	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFOA	40	70	ND		ND		ND		ND		ND		ND		ND		ND		1.60	J
PFOS	40	70	ND		ND		ND		0.480	J	ND		ND		ND		ND		ND	
PFPeA	-	-	ND		ND		2.63	J	ND		2.16	J	ND		ND		ND		1.45	J
Total PFOA+PFOS	-	70	ND		ND		ND		0.480		ND		ND		ND		ND		1.60	

Grey Fill	Detected concentration exceeded OSD Screening Levels
Bold Font	Detected concentration exceeded USEPA HA Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

b. USEPA, 2016. Drinking Water Health Advisory for PFOA. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-005. May 2016. / EPA. 2016. Drinking Water Health Advisory for PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-004. May 2016.

Interpreted Qualifiers

J = Estimated concentration

UJ = The analyte was not detected at a level greater than or equal to the adjusted detection limit (DL). However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
8:2 FTS	8:2 fluorotelomer sulfonate
NEtFOSAA	N-ethyl perfluorooctane- sulfonamidoacetic acid
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
DRL	Dearing Road Landfill
FP	Fort Pickett
GW	groundwater
HA	Health Advisory
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
TRL	Trimble Road Landfill
USEPA	United States Environmental Protection Agency
ng/l	nanogram per liter
-	not applicable

Table 6-5
PFAS Detections in Groundwater
Site Inspection Report, Fort Pickett

	Area of Interest	AOI11				
	Sample ID	FP-MW029-GW		FP-MW030-GW		
	Sample Date	06/04/2021		06/18/2021		
Analyte	OSD Screening Level [a]	USEPA HA [b]	Result	Qual	Result	Qual
Water, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)						
6:2 FTS	-	-	9.94		ND	
8:2 FTS	-	-	ND		ND	
PFBA	-	-	ND		ND	
PFBS	600	-	ND		ND	
PFDA	-	-	ND		ND	
PFHpA	-	-	ND		ND	
PFHxA	-	-	ND		ND	
PFHxS	-	-	ND		ND	
PFNA	-	-	ND		ND	
PFOA	40	70	ND		ND	
PFOS	40	70	ND		ND	
PFPeA	-	-	1.54	J	ND	
Total PFOA+PFOS	-	70	ND		ND	

Grey Fill	Detected concentration exceeded OSD Screening Levels
Bold Font	Detected concentration exceeded USEPA HA Screening Levels

References

a. Assistant Secretary of Defense, 2021. Risk Based Screening Levels Calculated for PFBS, PFOS, and PFOA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 September 2021. Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

b. USEPA, 2016. Drinking Water Health Advisory for PFOA. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-005. May 2016. / EPA. 2016. Drinking Water Health Advisory for PFOS. Office of Water (4304T). Health and Ecological Criteria Division, Washington, DC 20460. EPA Document Number: 822-R-16-004. May 2016.

Interpreted Qualifiers

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UJ = The analyte was not detected at a level greater than or equal to the adjusted detection limit (DL). However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

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6:2 FTS	6:2 fluorotelomer sulfonate
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NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
DRL	Dearing Road Landfill
FP	Fort Pickett
GW	groundwater
HA	Health Advisory
HQ	hazard quotient
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
TRL	Trimble Road Landfill
USEPA	United States Environmental Protection Agency
ng/l	nanogram per liter
-	not applicable

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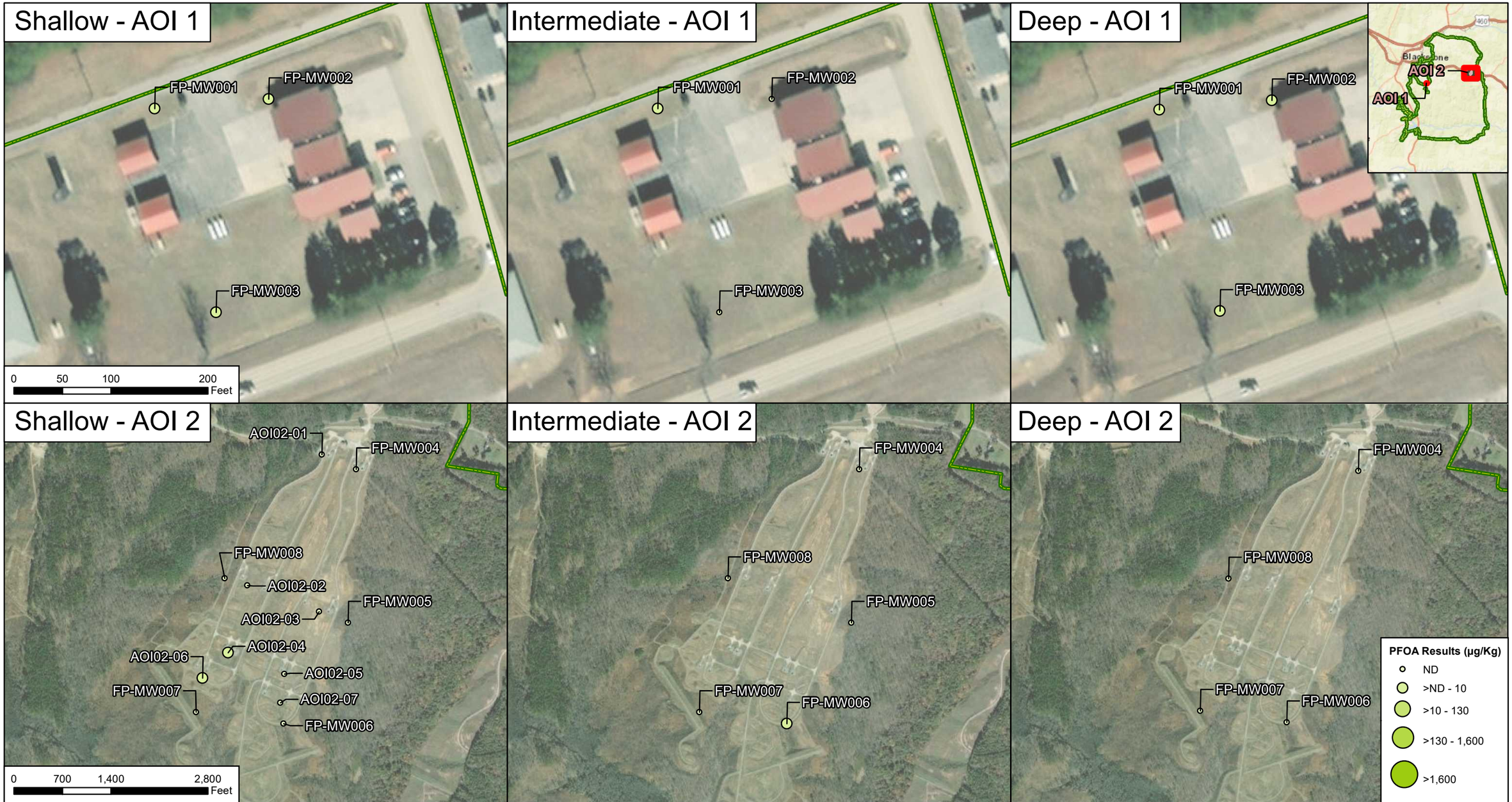

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SCALE	1:1,200	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

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Facility Boundary

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PFOA Results in Soil, AOI 1 and AOI 2

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Figure 6-1

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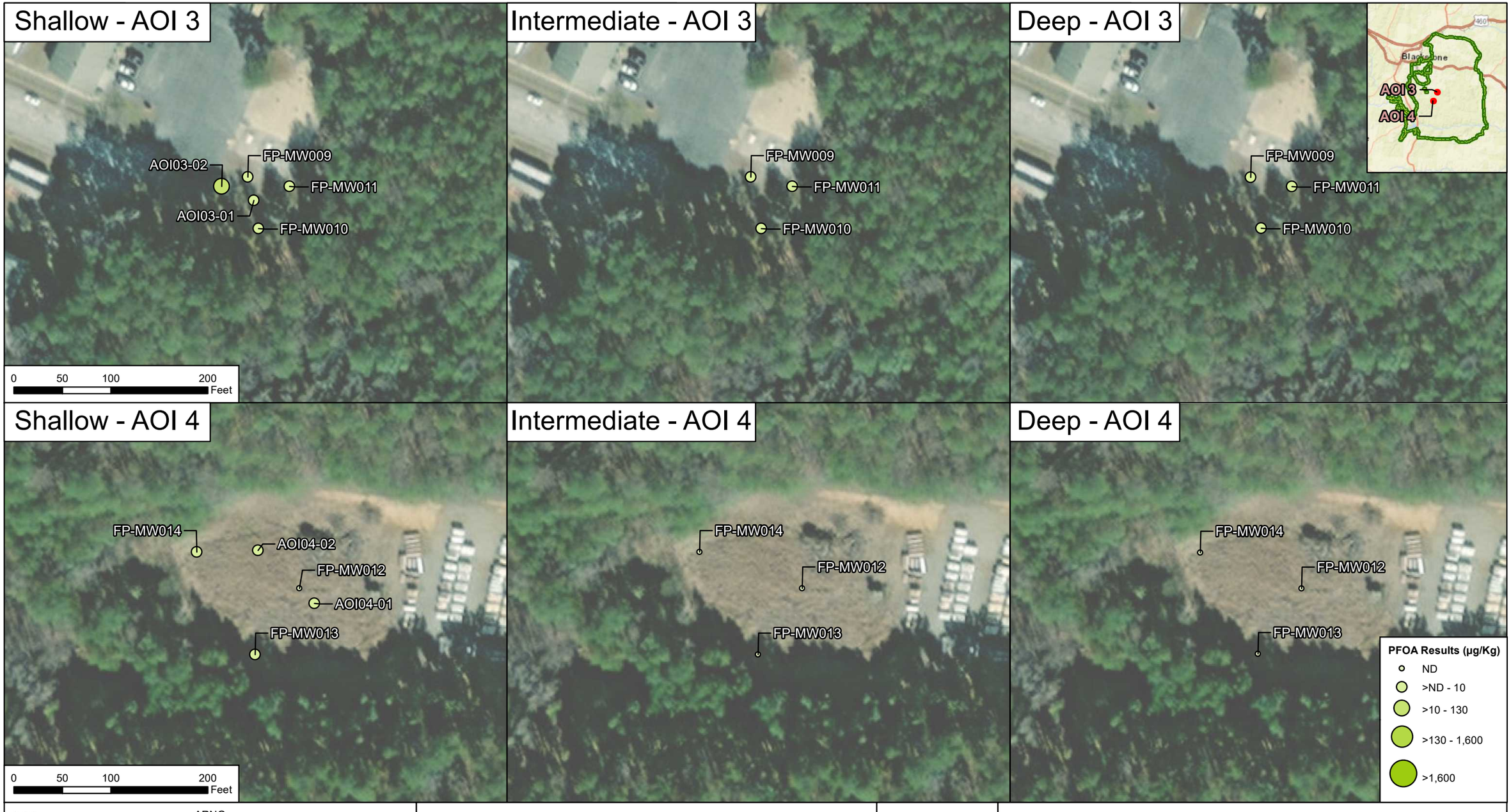

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Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

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PFOA Results in Soil, AOI 3 and AOI 4

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Figure 6-2

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Shallow - AOI 5

Intermediate - AOI 5

Deep - AOI 5

FP-MW015
AOI05-02
AOI05-01
FP-MW018
FP-MW016
AOI05-04
AOI05-03
FP-MW017
AOI05-05
AOI05-06

AOI 5
AOI 6

0 400 800 1,600 Feet

Shallow - AOI 6

Intermediate - AOI 6

Deep - AOI 6

AOI06-01
FP-MW019
FP-MW020

PFOA Results (µg/Kg)

- ND
- >ND - 10
- >10 - 130
- >130 - 1,600
- >1,600

0 50 100 200 Feet

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	11/17/2021	GIS BY	MS	11/17/2021
SCALE	1:9,600	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

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PFOA Results in Soil, AOI 5 and AOI 6

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Figure 6-3

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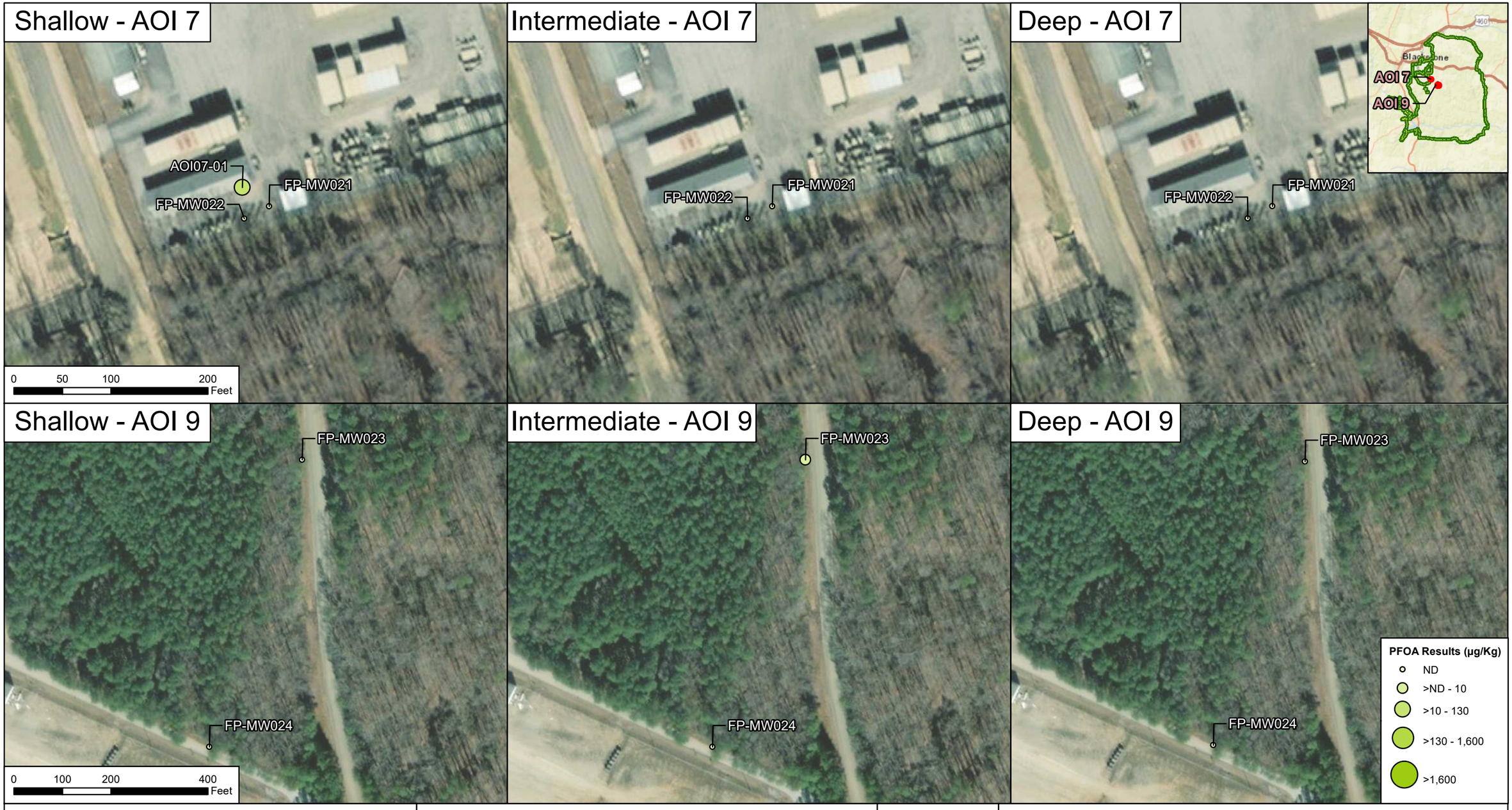

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PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE	1:1,200	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

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PFOA Results in Soil, AOI 7 and AOI 9

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Figure 6-4

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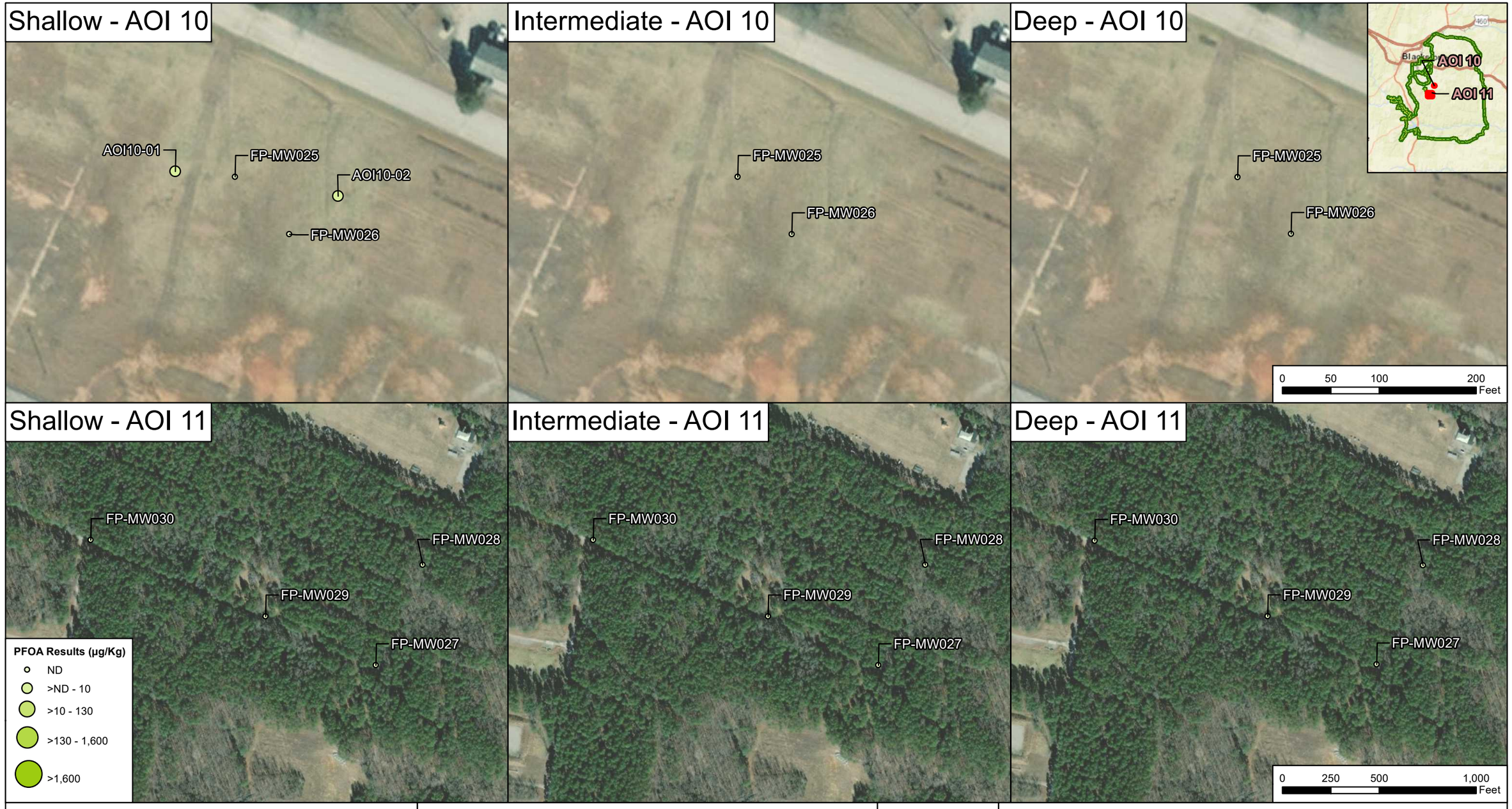

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PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
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Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	2/28/2022

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PFOA Results in Soil, AOI 10 and AOI 11

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Figure 6-5

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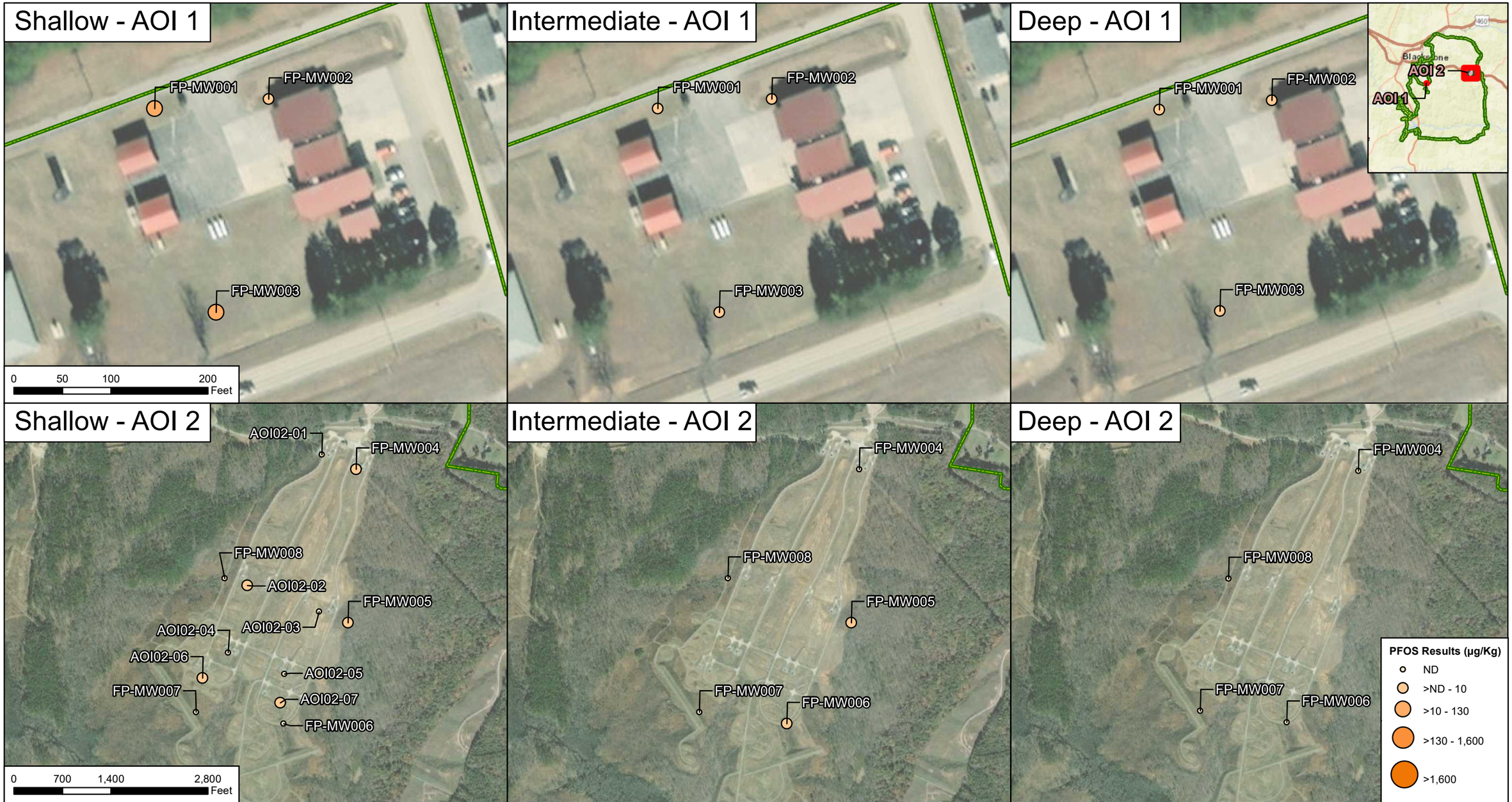

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	11/17/2021	GIS BY	MS	11/17/2021
SCALE	1:1,200	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

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PFOS Results in Soil, AOI 1 and AOI 2

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Figure 6-6

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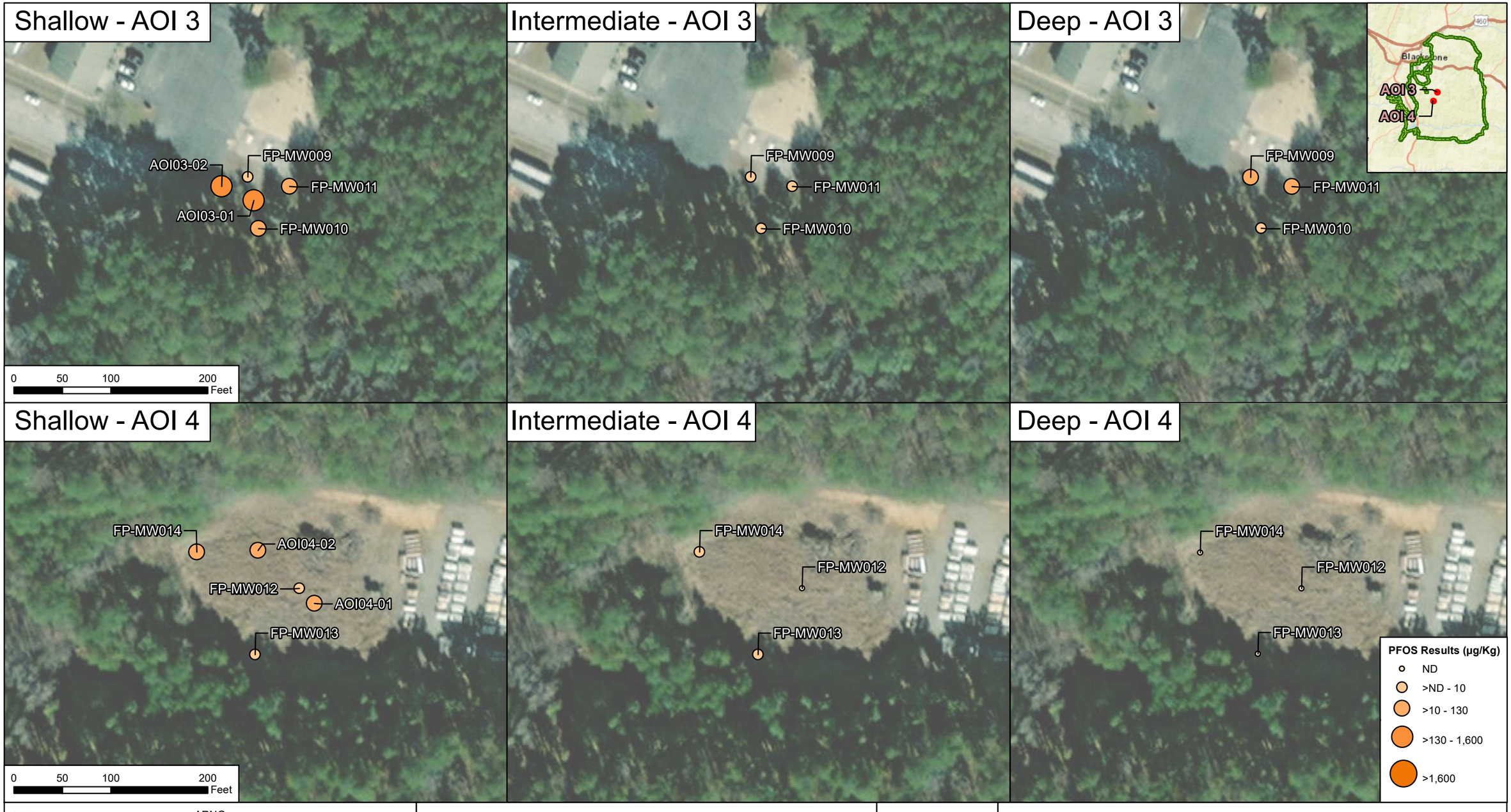

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PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
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Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

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PFOS Results in Soil, AOI 3 and AOI 4

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Figure 6-7

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Shallow - AOI 5

Intermediate - AOI 5

Deep - AOI 5

Shallow - AOI 6

Intermediate - AOI 6

Deep - AOI 6

PFOS Results (µg/Kg)

- ND
- >ND - 10
- >10 - 130
- >130 - 1,600
- >1,600

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	11/17/2021	GIS BY	MS	11/17/2021
SCALE	1:9,600	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

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PFOS Results in Soil, AOI 5 and AOI 6

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Figure 6-8

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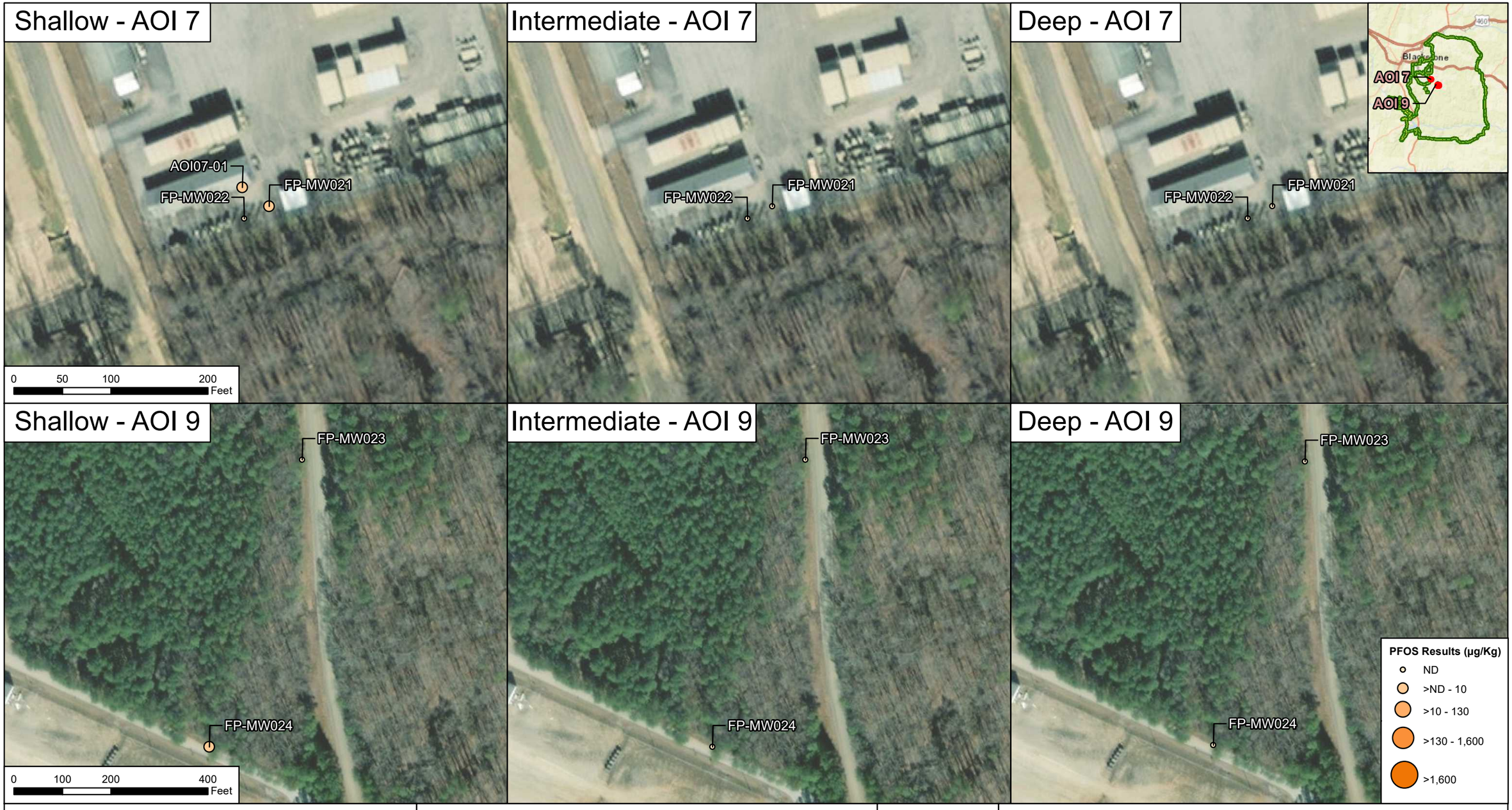

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Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

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PFOS Results in Soil, AOI 7 and AOI 9

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Figure 6-9

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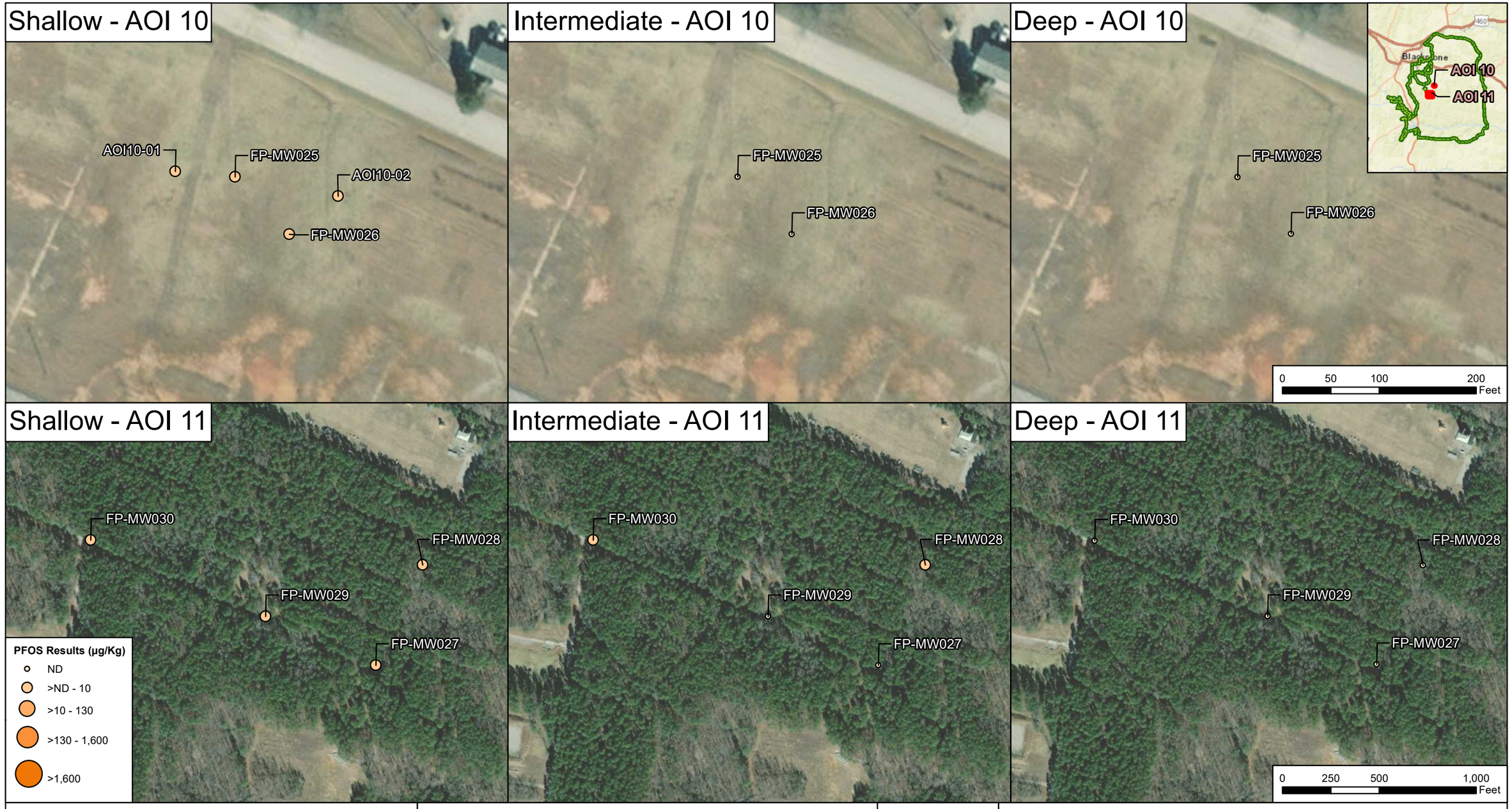

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PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE	1:1,200	CHK BY	AB	2/28/2022
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	2/28/2022

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PFOS Results in Soil, AOI 10 and AOI 11

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Figure 6-10

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Shallow - AOI 1

FP-MW001
FP-MW002
FP-MW003

0 50 100 200 Feet

Intermediate - AOI 1

FP-MW001
FP-MW002
FP-MW003

Deep - AOI 1

FP-MW001
FP-MW002
FP-MW003

AOI 2
AOI 1

Shallow - AOI 2

AOI02-01
FP-MW004
FP-MW008
AOI02-02
FP-MW005
AOI02-04
AOI02-03
AOI02-06
AOI02-05
FP-MW007
AOI02-07
FP-MW006

0 700 1,400 2,800 Feet

Intermediate - AOI 2

FP-MW004
FP-MW008
FP-MW005
FP-MW007
FP-MW006

Deep - AOI 2

FP-MW004
FP-MW008
FP-MW007
FP-MW006

PFBS Results (µg/Kg)

- ND
- >ND - 10
- >10 - 1,900
- >1,900 - 25,000
- >25,000

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	11/17/2021	GIS BY	MS	11/17/2021
SCALE	1:1,200	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

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PFBS Results in Soil, AOI 1 and AOI 2

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Figure 6-11

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PROJECT	Site Investigation for PFAS at Fort Pickett, VA			
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Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

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Facility Boundary

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PFBS Results in Soil, AOI 3 and AOI 4

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Figure 6-12

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CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
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SCALE	1:9,600	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

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Facility Boundary

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PFBS Results in Soil, AOI 5 and AOI 6

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Figure 6-13

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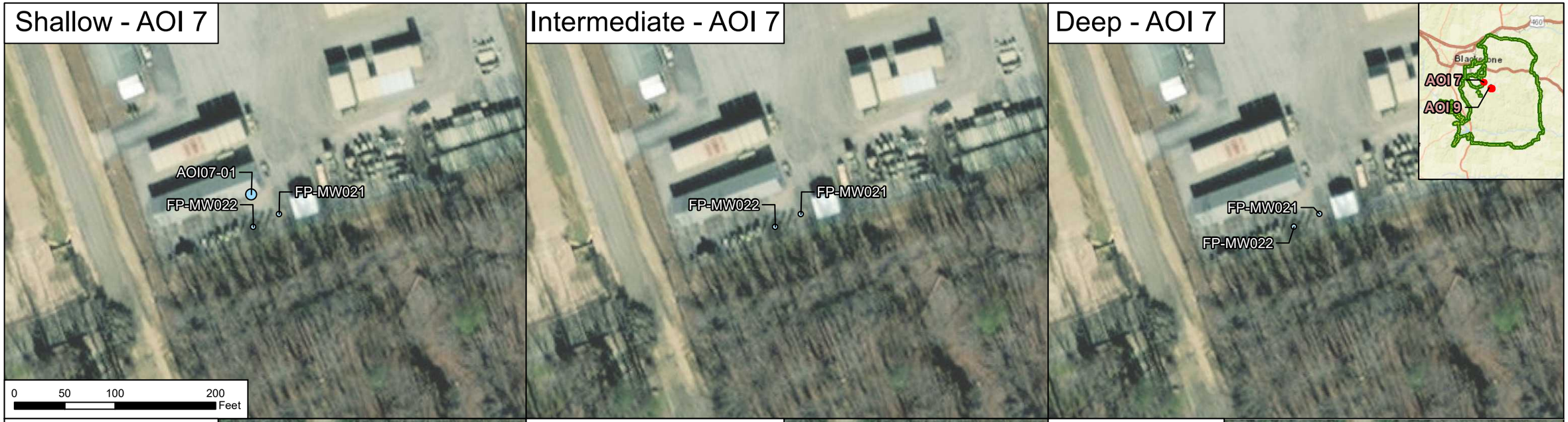

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SCALE	1:1,200	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

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PFBS Results in Soil, AOI 7 and AOI 9

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Figure 6-14

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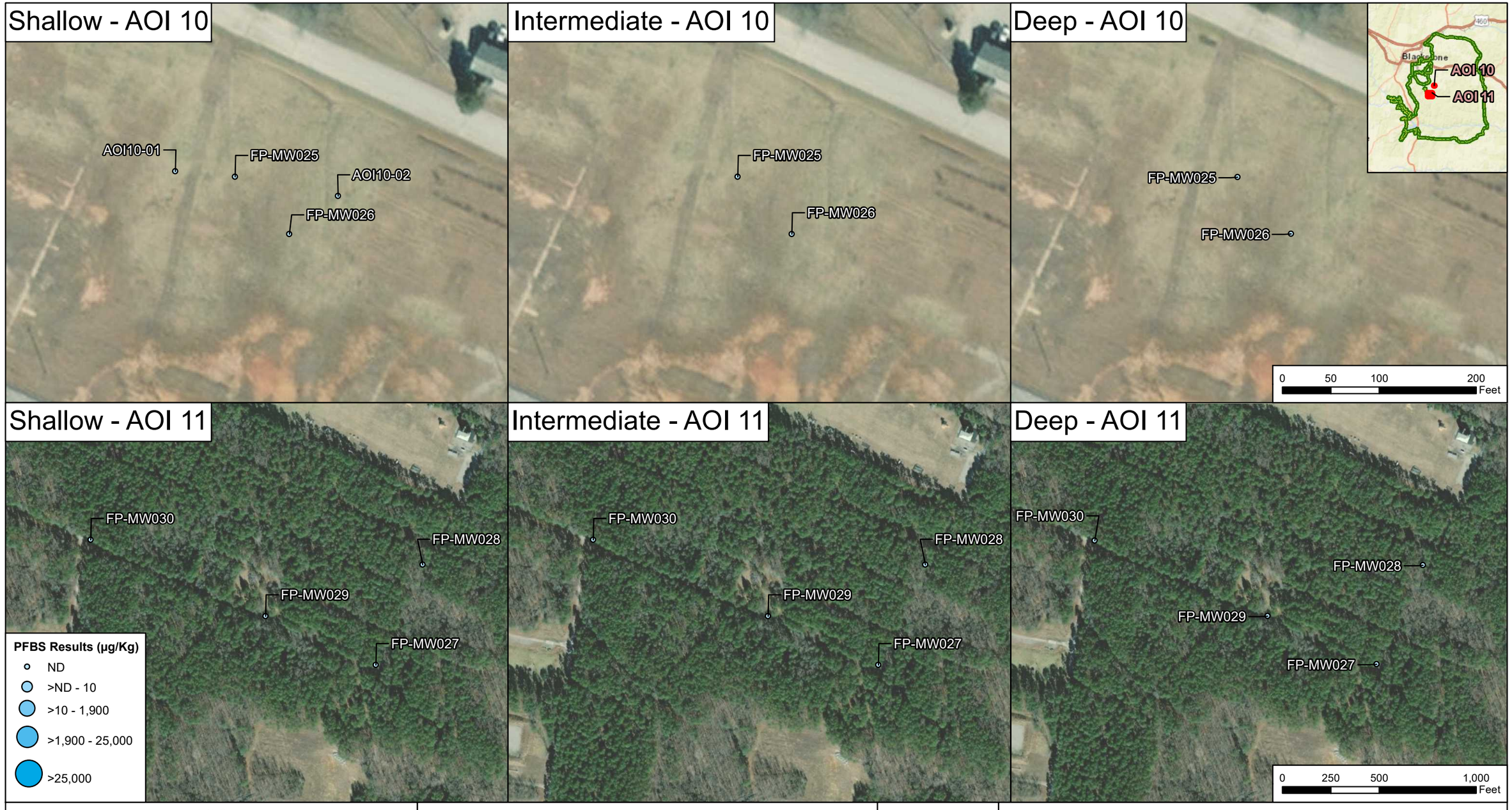

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	2/28/2022	GIS BY	MS	2/28/2022
SCALE	1:1,200	CHK BY	AB	2/28/2022
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	2/28/2022

Legend

Facility Boundary

N

PFBS Results in Soil, AOI 10 and AOI 11

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Figure 6-15

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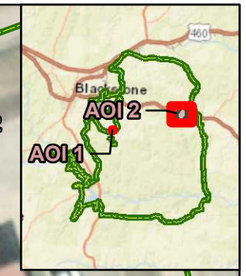
PFOA - AOI 1

PFOS - AOI 1

PFBS - AOI 1



FP-MW001
FP-MW002
FP-MW003

0 50 100 200 Feet

PFOA - AOI 2

PFOS - AOI 2

PFBS - AOI 2

FP-MW004
FP-MW008
FP-MW005
FP-MW007
FP-MW006

PFOA Results (ng/L)
- ND
- >ND - 10
- >10 - 40
- >40 - 70
- >70 - 400
- >400

PFOS Results (ng/L)
- ND
- >ND - 10
- >10 - 40
- >40 - 70
- >70 - 400
- >400

PFBS Results (ng/L)
- ND
- >ND - 100
- >100 - 600
- 600 - 1,000
- >1,000 - 6,000
- >6,000

0 700 1,400 2,800 Feet

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	11/17/2021	GIS BY	MS	11/17/2021
SCALE	1:1,200	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

Legend
- Facility Boundary
- Groundwater Flow Direction

N

PFOA, PFOS, and PFBS Results in Groundwater, AOI 1 and AOI 2

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Figure 6-16

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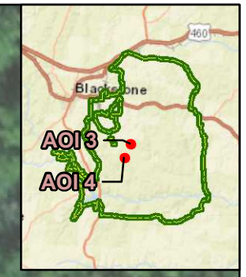
PFOA - AOI 3

PFOS - AOI 3

PFBS - AOI 3



PFOA - AOI 4

PFOS - AOI 4

PFBS - AOI 4

FP-MW009
FP-MW011
FP-MW010
FP-MW014
FP-MW012
FP-MW013

PFOA Results (ng/L)
- ND
- >ND - 10
- >10 - 40
- >40 - 70
- >70 - 400
- >400

PFOS Results (ng/L)
- ND
- >ND - 10
- >10 - 40
- >40 - 70
- >70 - 400
- >400

PFBS Results (ng/L)
- ND
- >ND - 100
- >100 - 600
- 600 - 1,000
- >1,000 - 6,000
- >6,000

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	11/17/2021	GIS BY	MS	11/17/2021
SCALE	1:1,200	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

Legend
- Facility Boundary
- Groundwater Flow Direction

0 50 100 200 Feet

N

PFOA, PFOS, PFBS Results in Groundwater, AOI 3 and AOI 4

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Figure 6-17

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PFOA - AOI 5

FP-MW015
FP-MW018
FP-MW016
FP-MW017

PFOS - AOI 5

FP-MW015
FP-MW018
FP-MW016
FP-MW017

PFBS - AOI 5

FP-MW015
FP-MW018
FP-MW016
FP-MW017

AOI 5
AOI 6

0 400 800 1,600 Feet

PFOA - AOI 6

FP-MW019
FP-MW020

PFOS - AOI 6

FP-MW019
FP-MW020

PFBS - AOI 6

FP-MW019
FP-MW020

PFOA Results (ng/L)
- ND
- >ND - 10
- >10 - 40
- >40 - 70
- >70 - 400
- >400

PFOS Results (ng/L)
- ND
- >ND - 10
- >10 - 40
- >40 - 70
- >70 - 400
- >400

PFBS Results (ng/L)
- ND
- >ND - 100
- >100 - 600
- 600 - 1,000
- >1,000 - 6,000
- >6,000

0 50 100 200 Feet

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	11/17/2021	GIS BY	MS	11/17/2021
SCALE	1:9,600	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

Legend
- Facility Boundary
- Groundwater Flow Direction

N

PFOA, PFOS, and PFBS Results in Groundwater, AOI 5 and AOI 6

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Figure 6-18

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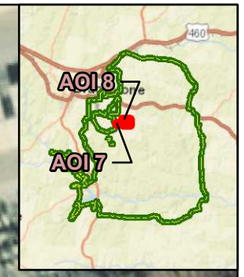
PFOA - AOI 7

PFOS - AOI 7

PFBS - AOI 7



FP-MW022

FP-MW021

0 50 100 200 Feet

PFOA - AOI 8

PFOS - AOI 8

PFBS - AOI 8

TRL-MW-17

TRL-MW-13R

TRL-MW-1

TRL-MW-5

TRL-MW-9

TRL-MW-12R

TRL-MW-15

TRL-MW-10R

PFOA Results (ng/L)

- ND
- >ND - 10
- >10 - 40
- >40 - 70
- >70 - 400
- >400

PFOS Results (ng/L)

- ND
- >ND - 10
- >10 - 40
- >40 - 70
- >70 - 400
- >400

PFBS Results (ng/L)

- ND
- >ND - 100
- >100 - 600
- 600 - 1,000
- >1,000 - 6,000
- >6,000

0 250 500 1,000 Feet

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	11/17/2021	GIS BY	MS	11/17/2021
SCALE	1:1,200	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

Legend

- Facility Boundary
- Groundwater Flow Direction

N

PFOA, PFOS, and PFBS Results in Groundwater, AOI 7 and AOI 8

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Figure 6-19

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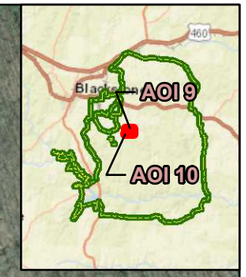
PFOA - AOI 9

PFOS - AOI 9

PFBS - AOI 9

DRL-MW-1
DRL-MW-4
DRL-MW-5
FP-MW023
FP-MW024



0 275 550 1,100 Feet

PFOA - AOI 10

PFOS - AOI 10

PFBS - AOI 10

FP-MW025
FP-MW026

0 50 100 200 Feet

PFOA Results (ng/L)
- ND
- >ND - 10
- >10 - 40
- >40 - 70
- >70 - 400
- >400

PFOS Results (ng/L)
- ND
- >ND - 10
- >10 - 40
- >40 - 70
- >70 - 400
- >400

PFBS Results (ng/L)
- ND
- >ND - 100
- >100 - 600
- 600 - 1,000
- >1,000 - 6,000
- >6,000

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	11/17/2021	GIS BY	MS	11/17/2021
SCALE	1:1,200	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

Legend
- Facility Boundary
- Groundwater Flow Direction

N

PFOA, PFOS, and PFBS Results in Soil, AOI 9 and AOI 10

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Figure 6-20

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PFOA

PFOS

PFBS

FP-MW030
FP-MW028
FP-MW029
FP-MW027

AOI 11

PFOA Results (ng/L)
- ND
- >ND - 10
- >10 - 40
- >40 - 70
- >70 - 400
- >400

PFOS Results (ng/L)
- ND
- >ND - 10
- >10 - 40
- >40 - 70
- >70 - 400
- >400

PFBS Results (ng/L)
- ND
- >ND - 100
- >100 - 600
- 600 - 1,000
- >1,000 - 6,000
- >6,000

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Fort Pickett, VA			
REVISED	11/17/2021	GIS BY	MS	11/17/2021
SCALE	1:4,800	CHK BY	AB	11/17/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	CM	11/17/2021

Legend
- Facility Boundary
- Groundwater Flow Direction

0 200 400 800 Feet

N

PFOA, PFOS, and PFBS Results in Groundwater, AOI 11

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Figure 6-21

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7. Exposure Pathways

The CSMs for each AOI, revised based on the SI findings, are presented on **Figure 7-1** through **Figure 7-11**. A CSM presents the current understanding of the site conditions with respect to known and suspected sources, potential transport mechanisms and migration pathways, and potentially exposed human receptors. A human exposure pathway is considered potentially complete when the following conditions are present:

1. Contaminant source;
2. Environmental fate and transport;
3. Exposure point;
4. Exposure route; and
5. Potentially exposed populations.

If any of these elements are missing, the pathway is incomplete. The CSM figures use an empty circle symbol to represent an incomplete exposure pathway. Areas with an incomplete pathway generally warrant no further action. However, the pathway is considered potentially complete if PFOA, PFOS, or PFBS are detected, in which case the CSM figure uses a half-filled circle symbol to represent a potentially complete exposure pathway. Additionally, a completely filled circle symbol is used to indicate when a potentially complete exposure pathway has detections of PFOA, PFOS, or PFBS above the SLs. Areas with an identified potentially complete pathway may warrant further investigation.

In general, the potential routes of exposure to PFAS are ingestion and inhalation. Human exposure via the dermal contact pathway may occur, and current risk practice suggests it is an insignificant pathway compared to ingestion; however, exposure data for dermal pathways are sparse and continue to be the subject of PFAS toxicological study. The receptors evaluated are consistent with those listed in USEPA guidance for risk screening (USEPA, 2001). Receptors at the facility include site workers (e.g., facility staff and visiting soldiers), construction workers, trespassers, residents outside the facility boundary, and recreational users outside of the facility boundary.

7.1 Soil Exposure Pathway

The SI results for PFOA, PFOS, and PFBS in soil were used to determine whether a potentially complete pathway exists between the source and potential receptors at AOI 1 though AOI 11 based on the aforementioned criteria.

7.1.1 AOI 1

AFFF releases at AOI 1 occurred on both paved areas and grassy surfaces. Fire training has occurred in the area outside and to the west of Building 1485 approximately every other year between 1996 and 2015. AFFF was typically sprayed towards sanitary sewer manhole 460, located near the northwest corner of Building 1485 or sprayed towards the woods north of the building. PFOA, PFOS, and PFBS were detected in soil at AOI 1 and confirm the release of PFAS to soil.

Based on the results of the SI in AOI 1, ground-disturbing activities could potentially result in site worker, construction worker, or trespasser (adjacent to non-secure facility boundary) exposure to PFOA, PFOS, and PFBS via inhalation of dust. Ground-disturbing activities could also potentially result in site worker, construction worker, or trespasser exposure via ingestion of surface soil.

Lasty, ground-disturbing activities could also potentially result in construction worker exposure to PFOA, PFOS, and PFBS in subsurface soil via ingestion. Construction activities were observed to be occurring at AOI 1 during the time of the SI field work. The CSM for AOI 1 is presented on **Figure 7-1**.

7.1.2 AOI 2

AFFF was released at AOI 2 in response to a range fire in 2012 at the range firing points. AFFF was left in place following the range fire. The range has multiple firing positions, and the exact firing position where the fire occurred is unknown.

Based on the results of the SI at AOI 2, ground-disturbing activities could potentially result in site worker, construction worker, or trespasser exposure to PFOA, PFOS, and PFBS via inhalation of dust. Additionally, off-facility residents and recreational users may potentially be exposed to PFOA, PFOS, and PFBS via inhalation of dust caused by on-facility ground disturbing activities, although this exposure is likely insignificant. Ground-disturbing activities could also potentially result in site worker, construction worker, or trespasser (adjacent to non-secure facility boundary) exposure via ingestion of surface soil. Lasty, ground-disturbing activities could also potentially result in construction worker exposure to PFOA, PFOS, and PFBS in subsurface soil via ingestion. The CSM for AOI 2 is presented on **Figure 7-2**.

7.1.3 AOI 3

AFFF releases at AOI 3 occurred on paved and grassy surfaces. The area was used as an FTA beginning in 1989 and has been used for fire training ever since. Fire training includes igniting fuel pans containing diesel west of Building 3006 and extinguishing them with AFFF.

Based on the results of the SI at AOI 3, ground-disturbing activities could potentially result in site worker and construction worker to PFOA, PFOS, and PFBS via inhalation of dust. Ground-disturbing activities could also potentially result in site worker and construction worker exposure via ingestion of surface soil. Lasty, ground-disturbing activities could also potentially result in construction worker exposure to PFOA, PFOS, and PFBS in subsurface soil via ingestion. The CSM for AOI 3 is presented on **Figure 7-3**.

7.1.4 AOI 4

AFFF was released at AOI 4 during a one-time fire training exercise in 1998 that involved the discharge of approximately 130 gallons of AFFF. Based on the results of the SI at AOI 4, ground-disturbing activities could potentially result in site worker and construction worker to PFOA, PFOS, and PFBS via inhalation of dust. Ground-disturbing activities could also potentially result in site worker and construction worker exposure via ingestion of surface soil. Lasty, ground-disturbing activities could also potentially result in construction worker exposure to PFOA, PFOS, and PFBS in subsurface soil via ingestion. The CSM for AOI 4 is presented on **Figure 7-4**.

7.1.5 AOI 5

AFFF was released during two training exercises on Airfield Runway 1/19. The first occurrence was a fire training activity, where the Army ignited an aircraft fuselage, and the second occurrence was during a police training event.

Based on the results of the SI at AOI 5, ground-disturbing activities could potentially result in site worker and construction worker exposure to PFOA, PFOS, and PFBS via inhalation of dust. Additionally, off-facility residents and recreational users may potentially be exposed to PFOA, PFOS, and PFBS via inhalation of dust caused by on-facility ground disturbing activities, although

this exposure is likely insignificant. Ground-disturbing activities could also potentially result in site worker and construction worker exposure via ingestion of surface soil. Lasty, ground-disturbing activities could also potentially result in construction worker exposure to PFOA, PFOS, and PFBS in subsurface soil via ingestion. The CSM for AOI 5 is presented on **Figure 7-5**.

7.1.6 AOI 6

AFFF was potentially released during the storage of firetrucks, equipment, and materials at Building 286. Currently, two 55-gallon drums that contain approximately 100 gallons of AFFF concentrate are stored at Building 286.

Based on the results of the SI at AOI 6, ground-disturbing activities could potentially result in site worker and construction worker to PFOA, PFOS, and PFBS via inhalation of dust. Ground-disturbing activities could also potentially result in site worker and construction worker exposure via ingestion of surface soil. Lasty, ground-disturbing activities could also potentially result in construction worker exposure to PFOA, PFOS, and PFBS in subsurface soil via ingestion. The CSM for AOI 6 is presented on **Figure 7-6**.

7.1.7 AOI 7

AFFF is stored at Building 977 and was transported to the Building 3006 FTA on a trailer equipped to mix and spray AFFF. Based on the results of the SI at AOI 7, ground-disturbing activities could potentially result in site worker and construction worker to PFOA, PFOS, and PFBS via inhalation of dust. Ground-disturbing activities could also potentially result in site worker and construction worker exposure via ingestion of surface soil. The CSM for AOI 7 is presented on **Figure 7-7**.

7.1.8 AOI 8

AOI 8 is a closed trench-and-fill landfill that comprises 20 acres and accepted construction debris and household waste. There is no history of AFFF use or disposal at the landfill. Soil sampling was not performed at AOI 8, as it is a capped actively managed landfill. As a result, all soil pathways are considered incomplete. The AOI 8 CSM is presented on **Figure 7-8**.

7.1.9 AOI 9

AOI 9 is a trench-and-fill landfill comprised of 25 acres located adjacent to the southeastern portion of the Fort Pickett cantonment area. The landfill accepted construction debris, household waste, and waste herbicides, as well as sludge from the town of Blackstone WWTP clarifiers, and they were disposed of by land spreading at the landfill.

Based on the results of the SI at AOI 9, ground-disturbing activities could potentially result in site worker and construction worker to PFOA, PFOS, and PFBS via inhalation of dust. Ground-disturbing activities could also potentially result in site worker and construction worker exposure via ingestion of surface soil. Lasty, ground-disturbing activities could also potentially result in construction worker exposure to PFOA, PFOS, and PFBS in subsurface soil via ingestion. The CSM for AOI 9 is presented on **Figure 7-9**.

7.1.10 AOI 10

AOI 10 is a former burn pit used for burning construction debris in the mid-1980s. Materials disposed of in burn pits may create a secondary source of PFAS contamination; however, no AFFF is known to have been used in association with the pit.

Based on the results of the SI at AOI 10, ground-disturbing activities could potentially result in site worker and construction worker to PFOA, PFOS, and PFBS via inhalation of dust. Ground-disturbing activities could also potentially result in site worker and construction worker exposure via ingestion of surface soil. There were no detections of PFOA, PFOS, or PFBS in the shallow subsurface, so the exposure pathway in subsurface soil via ingestion is considered incomplete. The CSM for AOI 10 is presented on **Figure 7-10**.

7.1.11 AOI 11

The OHA includes a complex with numerous buildings and facilities and a former open dump/burn pit. AFFF releases at AOI 11 may have occurred during potential fire training exercises at the OHA burn pit or during demolition of the OHA buildings.

Based on the results of the SI at AOI 11, ground-disturbing activities could potentially result in site worker and construction worker to PFOA, PFOS, and PFBS via inhalation of dust. Ground-disturbing activities could also potentially result in site worker and construction worker exposure via ingestion of surface soil. Lasty, ground-disturbing activities could also potentially result in construction worker exposure to PFOA, PFOS, and PFBS in subsurface soil via ingestion. The AOI 11 CSM is presented on **Figure 7-11**.

7.2 Groundwater Exposure Pathway

The SI results for PFOA, PFOS, and PFBS in groundwater were used to determine whether a potentially complete pathway exists between the source and potential receptors at AOI 1 though AOI 11 based on the aforementioned criteria.

7.2.1 AOI 1

PFOA and PFOS exceeded the SLs in permanent monitoring wells sampled at AOI 1. PFBS was detected, but did not exceed the SL. During the PA/SI, offsite potable wells were identified surrounding the facility; however, they were greater than 4 miles away and were not immediately downgradient of AOI 1.Therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is incomplete. Fort Pickett receives its potable water from a reservoir approximately 4 miles away from AOI 1. Therefore, the ingestion exposure pathway for site workers and trespassers is considered incomplete. Depths to water at AOI 1 measured during the SI ranged from 14.68 to 19.45 feet bgs. Therefore, groundwater may be encountered during construction activities, and the ingestion exposure pathway for construction workers is considered potentially complete, with an exceedance of SLs. Construction activities were observed at AOI 1 during the time of the SI field work. The CSM for AOI 1 is presented on **Figure 7-1**.

7.2.2 AOI 2

At AOI 2, groundwater was sampled from permanent monitoring well locations FP-MW004 through FP-MW008; none of the groundwater detections exceeded SLs. PFOA was detected in three monitoring wells, with concentrations ranging from 0.953 J ng/L to 1.16 J ng/L. PFOS was detected in three monitoring wells, with concentrations ranging from 1.11 J ng/L to 1.65 J ng/L. PFBS was not detected in any of the monitoring wells.

PFOA and PFOS were detected in permanent monitoring wells sampled at AOI 2. PFBS was not detected. During the PA/SI, offsite potable wells were identified surrounding the facility; however, they were greater than 4 miles away and were not immediately downgradient of AOI 2. Therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is incomplete. Fort Pickett receives its potable water from a reservoir approximately 7 miles away

from AOI 2. Therefore, the ingestion exposure pathway for site workers and trespassers is considered incomplete. Depths to water at AOI 2 measured during the SI ranged from 0.89 to 28.46 feet bgs. Therefore, groundwater may be encountered during construction activities, and the ingestion exposure pathway for construction workers is considered potentially complete. The CSM for AOI 2 is presented on **Figure 7-2**.

7.2.3 AOI 3

At AOI 3, groundwater was sampled from permanent monitoring well locations FP-MW009, FP-MW010, and FP-MW011. The SLs of 40 ng/L for PFOA and PFOS and 600 ng/L for PFBS were exceeded at all three monitoring wells, with maximum concentrations of 43,600 ng/L, 10,600 ng/L, and 22,600 ng/L, respectively.

PFOA, PFOS, and PFBS exceeded the SLs in permanent monitoring wells sampled at AOI 3. During the PA/SI, offsite potable wells were identified surrounding the facility; however, they were greater than 4 miles away and were not immediately downgradient of AOI 1. Therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is incomplete. Fort Pickett receives its potable water from a reservoir approximately 4 miles away from AOI 3. Therefore, the ingestion exposure pathway for site workers and trespassers is considered incomplete. Depths to water at AOI 3 measured during the SI ranged from 21.09 to 21.10 feet bgs. Therefore, groundwater is likely not to be encountered during construction activities and the ingestion exposure pathway for construction workers is considered incomplete. The CSM for AOI 3 is presented on **Figure 7-3**.

7.2.4 AOI 4

At AOI 4, groundwater was sampled from permanent monitoring well locations FP-MW012, FP-MW013, and FP-MW014. None of the groundwater detections exceeded SLs. PFOA was detected in one monitoring, well with a concentration of 2.69 J ng/L. PFOS was detected in one monitoring well, at a concentration of 1.27 J ng/L/. PFBS was detected in all three monitoring wells, with concentrations ranging from 12.2 ng/L to 259 ng/L.

PFOA, PFOS, and PFBS were detected in permanent monitoring wells sampled at AOI 4. During the PA/SI, offsite potable wells were identified surrounding the facility; however, they were greater than 4 miles away and were not immediately downgradient of AOI 4. Therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is incomplete. Fort Pickett receives its potable water from a reservoir approximately 3 miles away from AOI 4. Therefore, the ingestion exposure pathway for site workers and trespassers is considered incomplete. Depths to water at AOI 4 measured during the SI ranged from 19.26 to 26.93 feet bgs. Therefore, groundwater is likely not to be encountered during construction activities, and the ingestion exposure pathway for construction workers is considered incomplete. The CSM for AOI 4 is presented on **Figure 7-4**.

7.2.5 AOI 5

PFOA and PFOS were detected and PFOS exceeded the SL in permanent monitoring wells sampled at AOI 5. During the PA/SI, offsite potable wells were identified surrounding the facility; however, they were greater than 4 miles away and were not immediately downgradient of AOI 5. Therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is incomplete. Fort Pickett receives its potable water from a reservoir approximately 6 miles away from AOI 5. Therefore, the ingestion exposure pathway for site workers and trespassers is considered incomplete. Depths to water at AOI 5 measured during the SI ranged from 5.86 to 11.67 feet bgs. Therefore, groundwater may be encountered during construction activities, and

the ingestion exposure pathway for construction workers is considered potentially complete with an exceedance of SLs. The CSM for AOI 5 is presented on **Figure 7-5**.

7.2.6 AOI 6

At AOI 6, groundwater was sampled from permanent monitoring well locations FP-MW019 and FP-MW020. The SLs of 40 ng/L for PFOA and PFOS and 600 ng/L for PFBS were exceeded at both monitoring wells, with maximum concentrations of 3,020 ng/L, 11,700 ng/L, and 654 ng/L, respectively.

PFOA, PFOS, and PFBS exceeded the SLs in permanent monitoring wells sampled at AOI 6. During the PA/SI, offsite potable wells were identified surrounding the facility; however, they were greater than 4 miles away and were not immediately downgradient of AOI 6. Therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is incomplete. Fort Pickett receives its potable water from a reservoir approximately 3.5 miles away from AOI 6. Therefore, the ingestion exposure pathway for site workers and trespassers is considered incomplete. Depths to water at AOI 6 measured during the SI ranged from 12.40 to 13.05 feet bgs. Therefore, groundwater may be encountered during construction activities, and the ingestion exposure pathway for construction workers is considered potentially complete with an exceedance of SLs. The CSM for AOI 6 is presented on **Figure 7-6**.

7.2.7 AOI 7

PFOA, PFOS, PFBS were not detected in permanent monitoring wells sampled at AOI 7. Therefore, all ingestion pathways from shallow groundwater exposure are considered incomplete. The CSM for AOI 7 is presented on **Figure 7-7**.

7.2.8 AOI 8

PFOA, PFOS, and PFBS were detected in permanent monitoring wells sampled at AOI 8. During the PA/SI, offsite potable wells were identified surrounding the facility; however, they were greater than 4 miles away and were not immediately downgradient of AOI 8. Therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is incomplete. Fort Pickett receives its potable water from a reservoir approximately 5 miles away from AOI 8. Therefore, the ingestion exposure pathway for site workers and trespassers is considered incomplete. Depths to water at AOI 8 measured during the SI ranged from 9.85 to 34.25 feet bgs. Therefore, groundwater may be encountered during construction activities, and the ingestion exposure pathway for construction workers is considered potentially complete, though unlikely since AOI 8 is a capped landfill. The CSM for AOI 8 is presented on **Figure 7-8**.

7.2.9 AOI 9

At AOI 9, groundwater was sampled from several permanent existing monitoring well locations and new monitoring wells FP-MW023 and FP-MW024. PFOA was not detected, PFOS was detected in one location, with a concentration of 0.480 J ng/L, and PFBS was detected in two locations, with concentrations ranging from 0.907 J ng/L to 2.23 J ng/L.

PFOA, PFOS, and PFBS were detected in permanent monitoring wells sampled at AOI 9. During the PA/SI, offsite potable wells were identified surrounding the facility; however, they were greater than 4 miles away and were not immediately downgradient of AOI 9. Therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is incomplete. Fort Pickett receives its potable water from a reservoir approximately 4.5 miles away from AOI 9. Therefore, the ingestion exposure pathway for site workers and trespassers is considered incomplete. Depths to water at AOI 9 measured during the SI ranged from 16.13 to 30.56 feet

bgs. Therefore, groundwater may be encountered during construction activities, and the ingestion exposure pathway for construction workers is considered potentially complete. The CSM for AOI 9 is presented on **Figure 7-9**.

7.2.10 AOI 10

PFOA, PFOS, PFBS were not detected in permanent monitoring wells sampled at AOI 10. Therefore, all ingestion pathways from shallow groundwater exposure are considered incomplete. The CSM for AOI 10 is presented on **Figure 7-10**.

7.2.11 AOI 11

PFOA and PFBS were detected in permanent monitoring wells sampled at AOI 11. During the PA/SI, offsite potable wells were identified surrounding the facility; however, they were greater than 4 miles away and were not immediately downgradient of AOI 11. Therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is incomplete. Fort Pickett receives its potable water from a reservoir approximately 3 miles away from AOI 11. Therefore, the ingestion exposure pathway for site workers and trespassers is considered incomplete. Depths to groundwater at AOI 11 measured during the SI ranged from 11.57 to 18.10 feet bgs. Therefore, groundwater may be encountered during construction activities, and the ingestion exposure pathway for construction workers is considered potentially complete. The CSM for AOI 11 is presented on **Figure 7-11**.

7.3 Surface Water and Sediment Exposure Pathway

The SI results for PFOA, PFOS, and PFBS in surface soil and groundwater, in combination with knowledge of the fate and transport properties of PFAS, were used to determine whether a potentially complete pathway exists between the source and potential receptors.

7.3.1 AOI 1

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. The shallow water table aquifer is presumed to be unconfined; therefore, groundwater flows under the influence of gravity, with flow patterns resembling a subdued reflection of local topography. As a result, it is assumed that a portion of the shallow groundwater discharges to local streams and other surface water features. Because PFOA, PFOS, and PFBS were detected in soil and groundwater at AOI 1, it is possible that those compounds may have migrated from soil and groundwater to a tributary of the Hurricane Branch. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete.

The Nottoway Reservoir, owned by Fort Pickett, is the source of drinking water for Fort Pickett, the town of Blackstone, and several private residences within a 4-mile radius of the facility boundary (EA, 2007). AOI 1 is located in a different watershed than the Nottoway Reservoir and is not immediately near any off-facility surface water features. As a result, the surface water and sediment ingestion exposure pathway for off-facility residents and recreational users are considered incomplete. The CSM for AOI 1 is presented on **Figure 7-1**.

7.3.2 AOI 2

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. The shallow water table aquifer is presumed to be unconfined; therefore, groundwater flows under the influence of gravity, with flow patterns resembling a subdued reflection of local topography. As a result, it is assumed that a portion of the shallow groundwater

discharges to local streams and nearby wetlands. Because PFOA, PFOS, and PFBS were detected in soil and groundwater at AOI 2, it is possible that those compounds may have migrated from soil and groundwater to the surrounding wetlands and Tommeheton Creek. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete.

AOI 2 is located on the eastern side of the facility and is likely not contributing or otherwise hydraulically connected to the Nottoway Reservoir; however, given the location of AOI 2, the pathway to other off-facility surface water bodies may exist. Due to potential recreational use, the surface water and sediment ingestion exposure pathway for off-facility residents and recreational users is also considered potentially complete. The CSM for AOI 2 is presented on **Figure 7-2**.

7.3.3 AOI 3

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. The shallow water table aquifer is presumed to be unconfined; therefore, groundwater flows under the influence of gravity, with flow patterns resembling a subdued reflection of local topography. As a result, it is assumed that a portion of the shallow groundwater discharges to local streams and other surface water features. Because PFOA, PFOS, and PFBS were detected in soil and groundwater at AOI 3, it is possible that those compounds may have migrated from soil and groundwater to a tributary of the Birchin Creek. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete.

The Nottoway Reservoir, owned by Fort Pickett, is the source of drinking water for Fort Pickett, the town of Blackstone, and several private residences within a 4-mile radius of the facility boundary (EA, 2007). AOI 3 is located in a different watershed than the Nottoway Reservoir and is not immediately near any off-facility surface water features. As a result, the surface water and sediment ingestion exposure pathway for off-facility residents and recreational users are considered incomplete. The CSM for AOI 3 is presented on **Figure 7-3**.

7.3.4 AOI 4

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. The shallow water table aquifer is presumed to be unconfined; therefore, groundwater flows under the influence of gravity, with flow patterns resembling a subdued reflection of local topography. As a result, it is assumed that a portion of the shallow groundwater discharges to local streams and other surface water features. Because PFOA, PFOS, and PFBS were detected in soil and groundwater at AOI 4, it is possible that those compounds may have migrated from soil and groundwater to a tributary of the Hurricane Branch. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete.

The Nottoway Reservoir, owned by Fort Pickett, is the source of drinking water for Fort Pickett, the town of Blackstone, and several private residences within a 4-mile radius of the facility boundary (EA, 2007). AOI 4 is located in a different watershed than the Nottoway Reservoir and is not immediately near any off-facility surface water features. As a result, the surface water and sediment ingestion exposure pathway for off-facility residents and recreational users are considered incomplete. The CSM for AOI 4 is presented on **Figure 7-4**.

7.3.5 AOI 5

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. The shallow water table aquifer is presumed to be unconfined; therefore, groundwater

flows under the influence of gravity, with flow patterns resembling a subdued reflection of local topography. As a result, it is assumed that a portion of the shallow groundwater discharges to local streams and other surface water features. Because PFOA, PFOS, and PFBS were detected in soil and groundwater at AOI 5, it is possible that those compounds may have migrated from soil and groundwater to a tributary of the Hurricane Branch. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete.

The Nottoway Reservoir, owned by Fort Pickett, is the source of drinking water for Fort Pickett, the town of Blackstone, and several private residences within a 4-mile radius of the facility boundary (EA, 2007). AOI 5 is located in a different watershed than the Nottoway Reservoir and is not immediately near any off-facility surface water features. As a result, the surface water and sediment ingestion exposure pathway for off-facility residents and recreational users are considered incomplete. The CSM for AOI 5 is presented on **Figure 7-5**.

7.3.6 AOI 6

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. The shallow water table aquifer is presumed to be unconfined; therefore, groundwater flows under the influence of gravity, with flow patterns resembling a subdued reflection of local topography. As a result, it is assumed that a portion of the shallow groundwater discharges to local streams and other surface water features. Because PFOA, PFOS, and PFBS were detected in soil and groundwater at AOI 6, it is possible that those compounds may have migrated from soil and groundwater to nearby wetlands and a tributary of the Hurricane Branch. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete.

The Nottoway Reservoir, owned by Fort Pickett, is the source of drinking water for Fort Pickett, the town of Blackstone, and several private residences within a 4-mile radius of the facility boundary (EA, 2007). AOI 6 is located in a different watershed than the Nottoway Reservoir and is not immediately near any off-facility surface water features. As a result, the surface water and sediment ingestion exposure pathway for off-facility residents and recreational users are considered incomplete. The CSM for AOI 6 is presented on **Figure 7-6**.

7.3.7 AOI 7

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. The shallow water table aquifer is presumed to be unconfined; therefore, groundwater flows under the influence of gravity, with flow patterns resembling a subdued reflection of local topography. As a result, it is assumed that a portion of the shallow groundwater discharges to local streams. Because PFOA, PFOS, and PFBS were detected in soil at AOI 7, it is possible that those compounds may have migrated from soil to a nearby tributary of the Tommeheton Creek. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete. Similarly, due to the potential migration of PFOA, PFOS, and PFBS from soil to surface water and sediment and the potential recreational use of streams and other surface water bodies, the surface water and sediment ingestion exposure pathway for recreational users is also considered potentially complete.

However, off-facility streams are not considered a potable water source and surface water features near AOI 7 are not located within the same watershed as the Nottoway Reservoir. Therefore, given its location relative to the closest potable surface water source, the ingestion exposure pathway for off-facility residents is not complete. The CSM for AOI 7 is presented on **Figure 7-7**.

7.3.8 AOI 8

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. The shallow water table aquifer is presumed to be unconfined; therefore, groundwater flows under the influence of gravity, with flow patterns resembling a subdued reflection of local topography. As a result, it is assumed that a portion of the shallow groundwater discharges to local streams. Because PFOA, PFOS, and PFBS were detected in groundwater at AOI 8, it is possible that those compounds may have migrated from groundwater to a nearby tributary of the Tommeheton Creek. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete. Similarly, due to the potential migration of PFOA, PFOS, and PFBS from soil to surface water and sediment and the potential recreational use of streams and other surface water bodies, the surface water and sediment ingestion exposure pathway for recreational users is also considered potentially complete.

However, off-facility streams are not considered a potable water source and surface water features near AOI 8 are not within the same watershed as the Nottoway Reservoir. Therefore, given its location relative to the closest potable surface water source, the ingestion exposure pathway for off-facility residents is not complete. The CSM for AOI 8 is presented on **Figure 7-8**.

7.3.9 AOI 9

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. The shallow water table aquifer is presumed to be unconfined; therefore, groundwater flows under the influence of gravity, with flow patterns resembling a subdued reflection of local topography. As a result, it is assumed that a portion of the shallow groundwater discharges to local streams. Because PFOA, PFOS, and PFBS were detected in soil and groundwater at AOI 9, it is possible that those compounds may have migrated from soil and groundwater to the a nearby tributary of the Tommeheton Creek. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete. Similarly, due to the potential migration of PFOA, PFOS, and PFBS from soil to surface water and sediment and the potential recreational use of streams and other surface water bodies, the surface water and sediment ingestion exposure pathway for recreational users is also considered potentially complete.

However, off-facility streams are not considered a potable water source and surface water features near AOI 9 are not within the same watershed as the Nottoway Reservoir. Therefore, given its location relative to the closest potable surface water source, the ingestion exposure pathway for off-facility residents is not complete. The CSM for AOI 9 is presented on **Figure 7-9**.

7.3.10 AOI 10

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. The shallow water table aquifer is presumed to be unconfined; therefore, groundwater flows under the influence of gravity, with flow patterns resembling a subdued reflection of local topography. As a result, it is assumed that a portion of the shallow groundwater discharges to local streams. Because PFOA, PFOS, and PFBS were detected in soil at AOI 10, it is possible that those compounds may have migrated from soil to a nearby tributary of the Tommeheton Creek. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete. Similarly, due to the potential migration of PFOA, PFOS, and PFBS from soil to surface water and sediment and the potential recreational use of streams and other surface water bodies, the surface water

and sediment ingestion exposure pathway for recreational users is also considered potentially complete.

However, off-facility streams are not considered a potable water source and surface water features near AOI 10 are not within the same watershed as the Nottoway Reservoir. Therefore, given its location relative to the closest potable surface water source, the ingestion exposure pathway for off-facility residents is not complete.

7.3.11 AOI 11

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. The shallow water table aquifer is presumed to be unconfined; therefore, groundwater flows under the influence of gravity, with flow patterns resembling a subdued reflection of local topography. As a result, it is assumed that a portion of the shallow groundwater discharges to local streams and other surface water features. Because PFOA, PFOS, and PFBS were detected in soil and groundwater at AOI 11, it is possible that those compounds may have migrated from soil and groundwater to a tributary of the Hurricane Branch. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete.

The Nottoway Reservoir, owned by Fort Pickett, is the source of drinking water for Fort Pickett, the town of Blackstone, and several private residences within a 4-mile radius of the facility boundary (EA, 2007). AOI 11 is located in a different watershed than the Nottoway Reservoir and is not immediately near any off-facility surface water features. As a result, the surface water and sediment ingestion exposure pathway for off-facility residents and recreational users is considered incomplete. The CSM for AOI 11 is presented on **Figure 7-11**.

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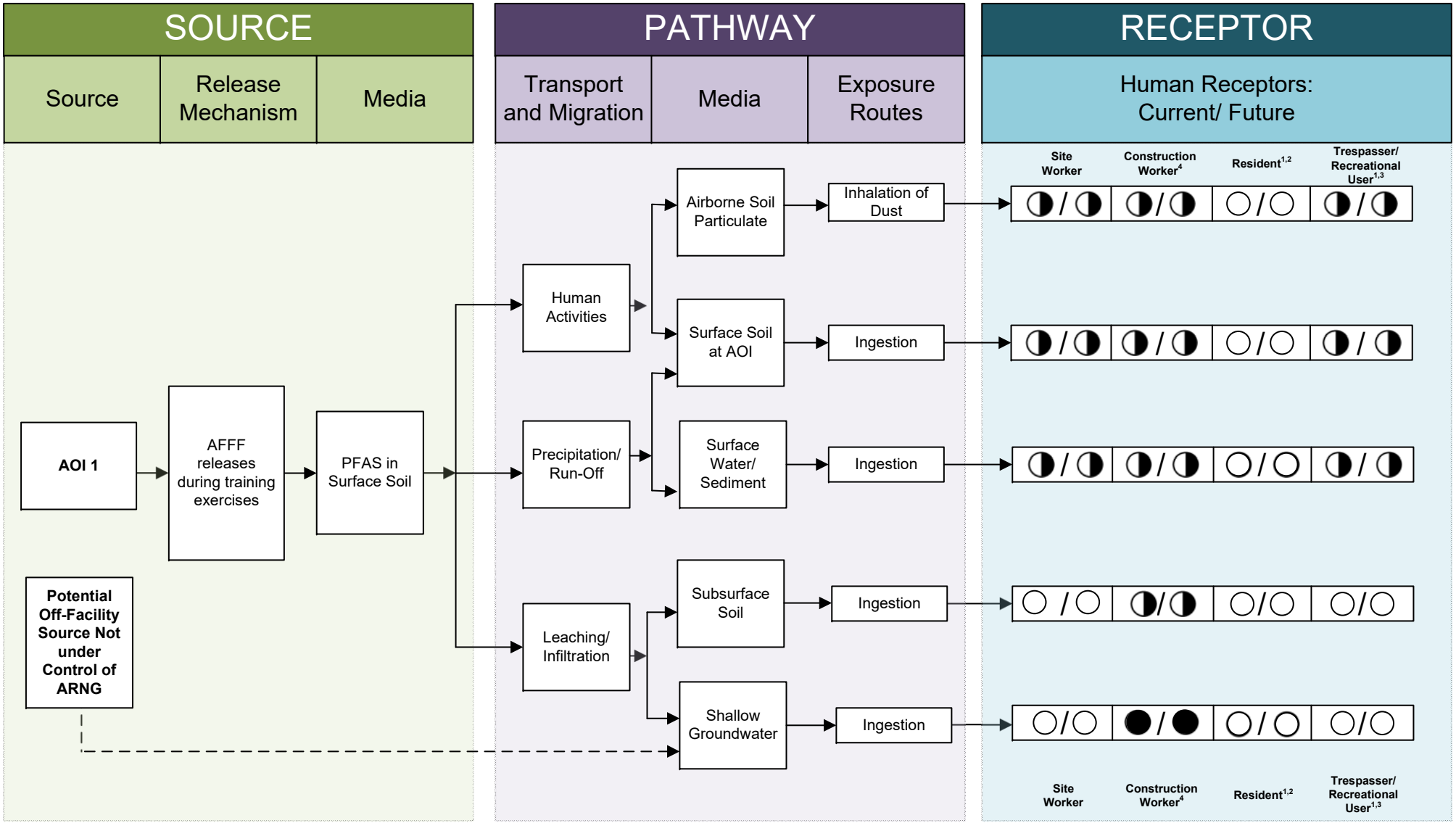


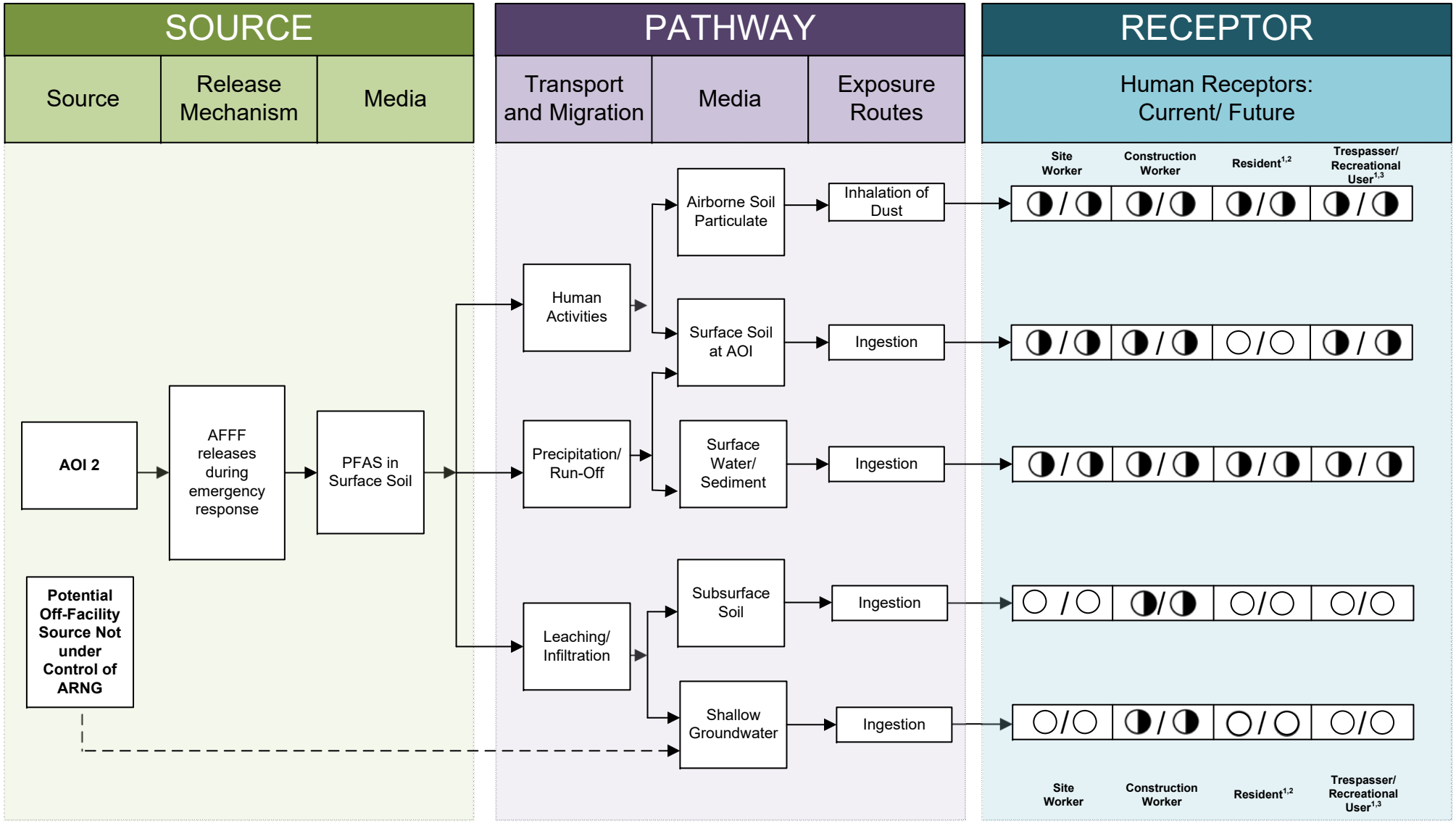
LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.
4. Active construction within AOI 1 was occurring as of the date of SI field work

Figure 7-1
Conceptual Site Model, AOI 1
Fort Pickett, VA



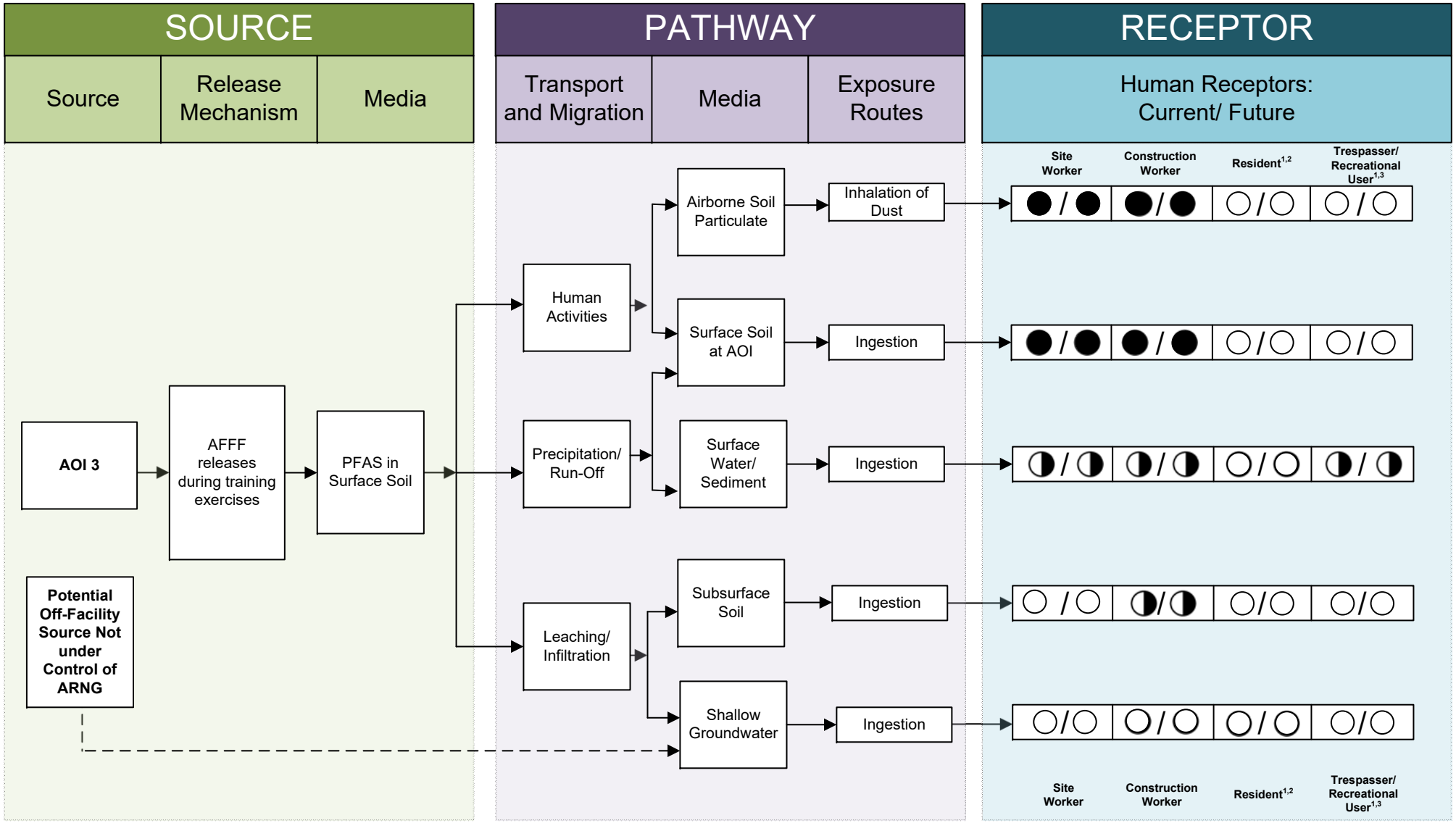
LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.

Figure 7-2
Conceptual Site Model, AOI 2
Fort Pickett, VA



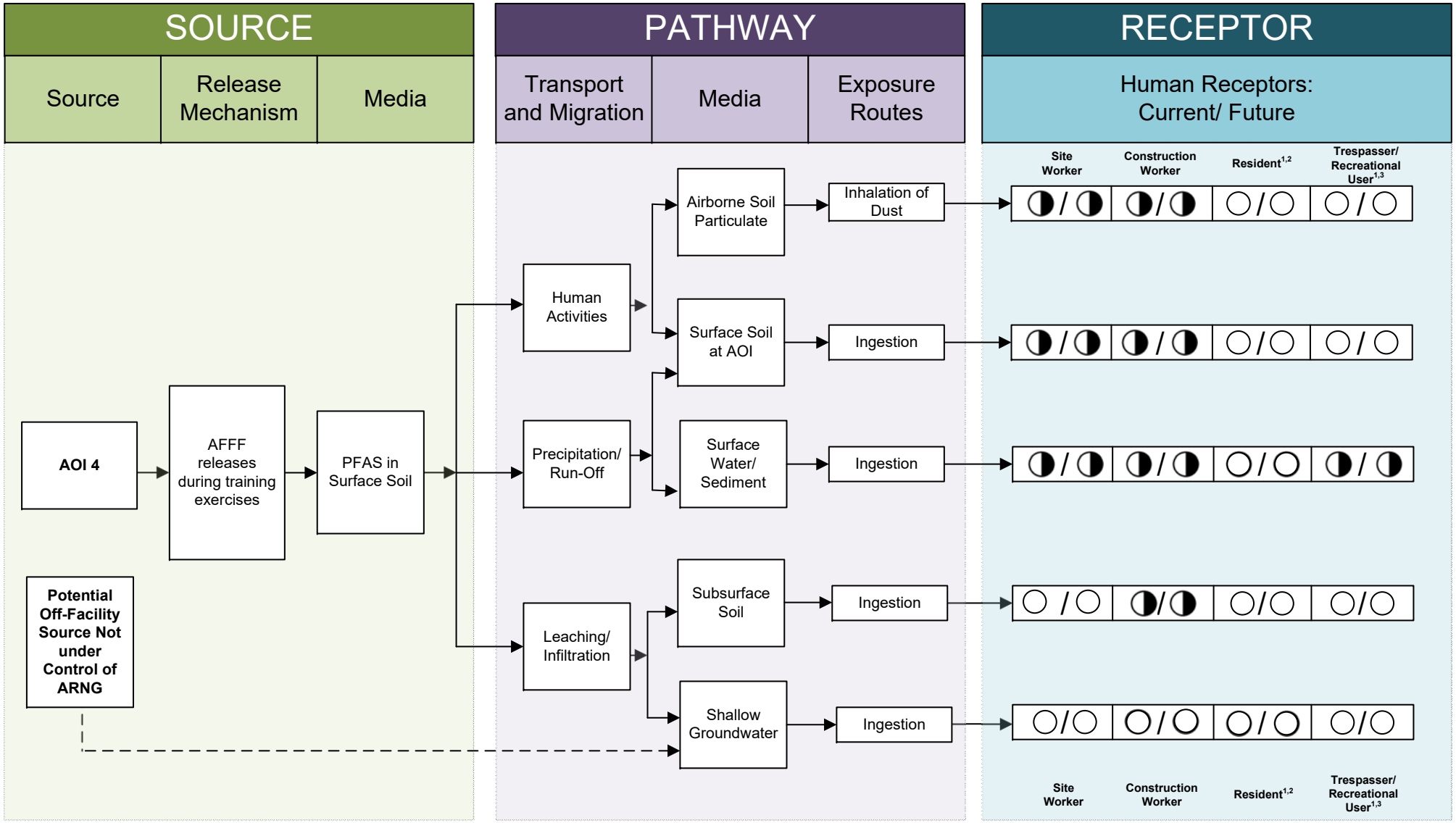
LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.

Figure 7-3
Conceptual Site Model, AOI 3
Fort Pickett, VA



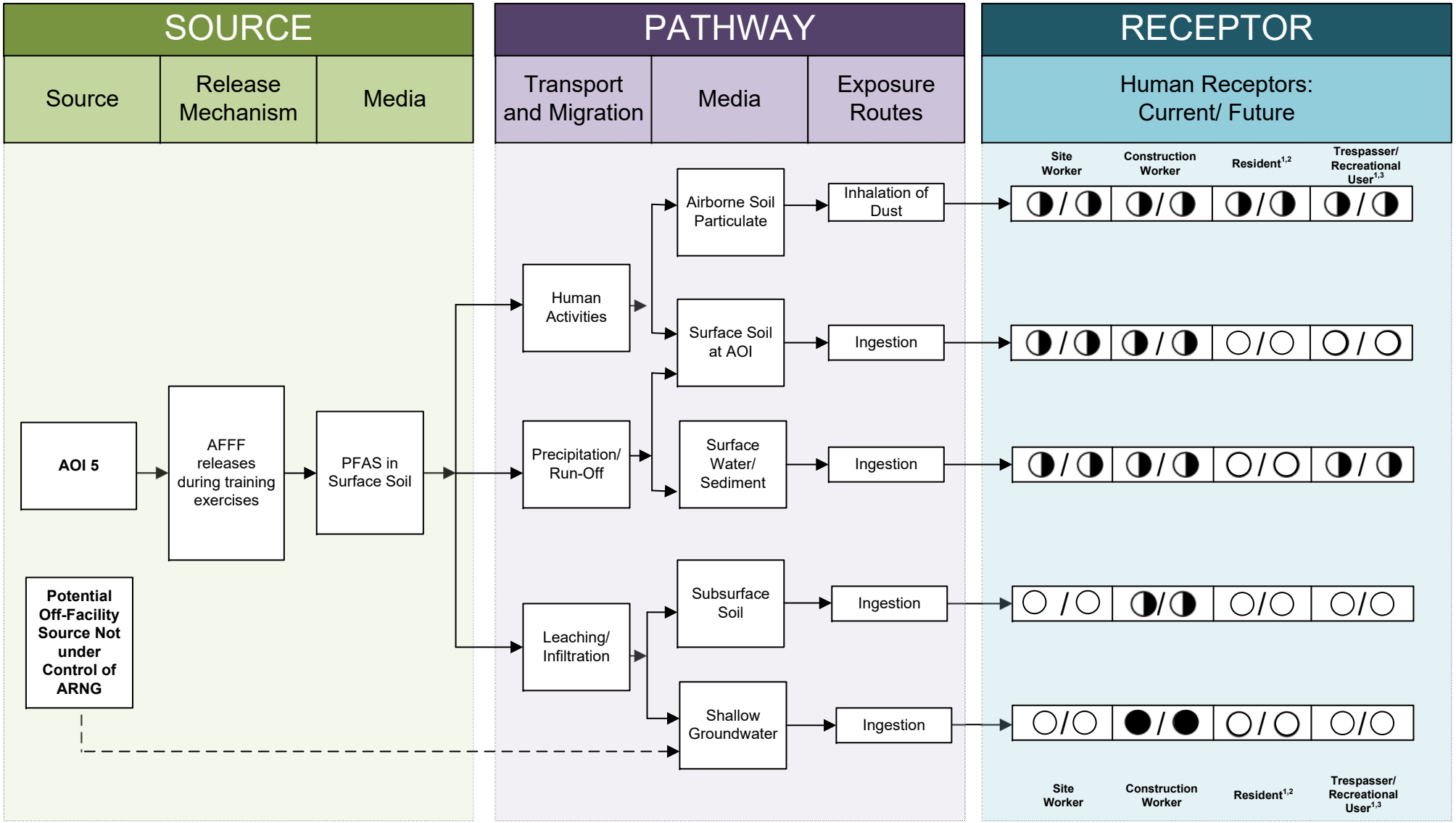
LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.

Figure 7-4
Conceptual Site Model, AOI 4
Fort Pickett, VA



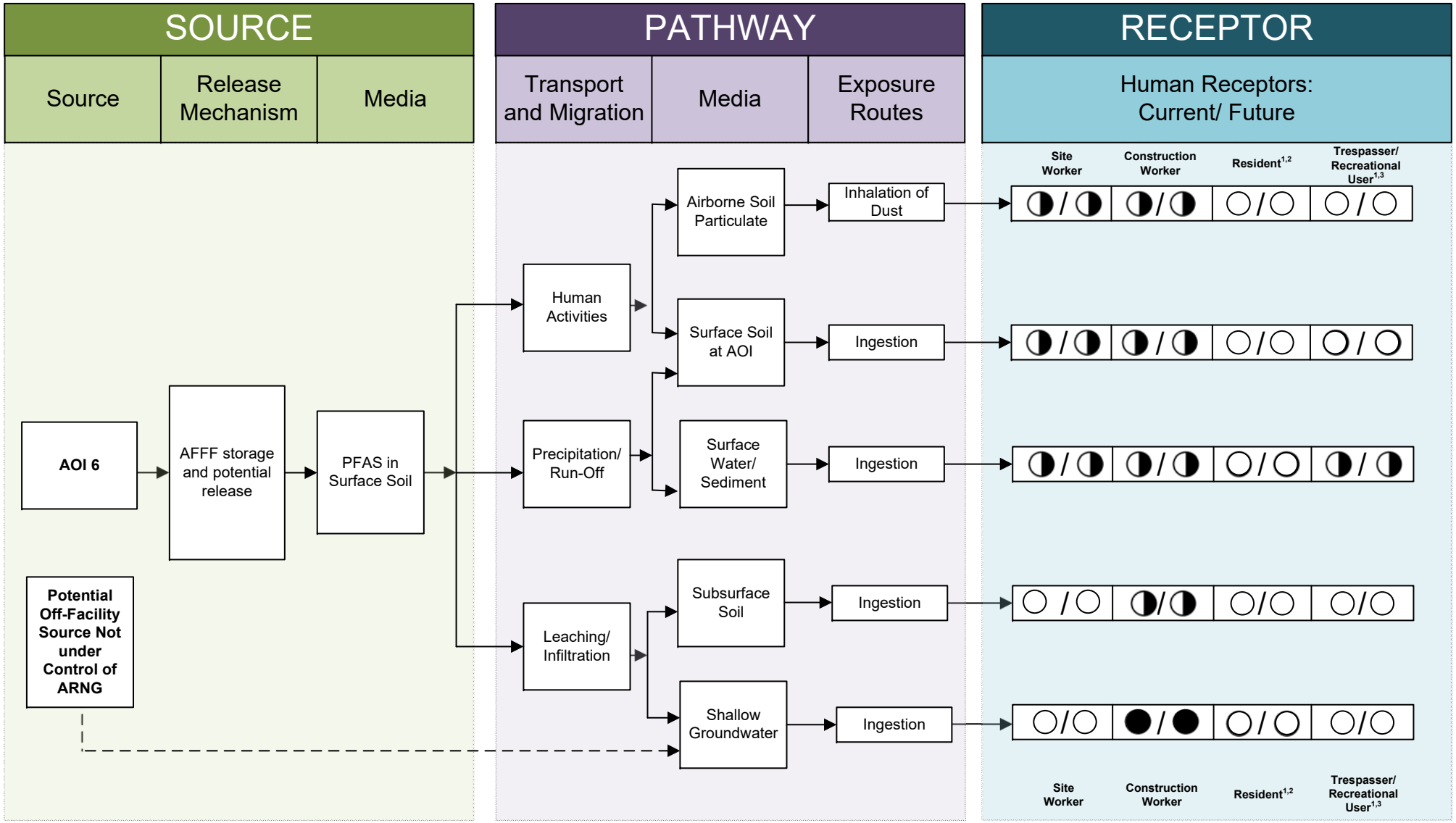
LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.

Figure 7-5
Conceptual Site Model, AOI 5
Fort Pickett, VA



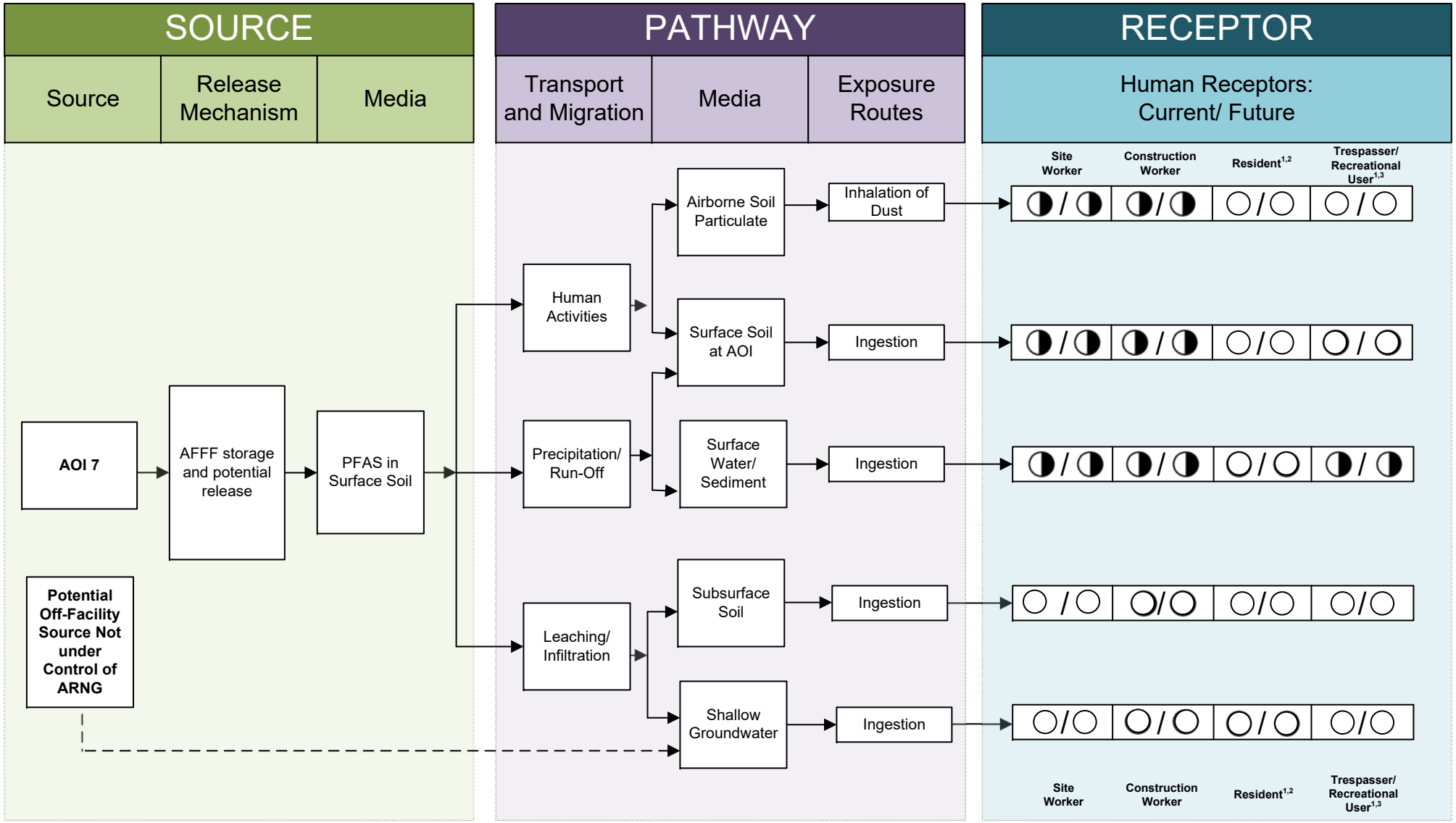
LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.

Figure 7-6
Conceptual Site Model, AOI 6
Fort Pickett, VA



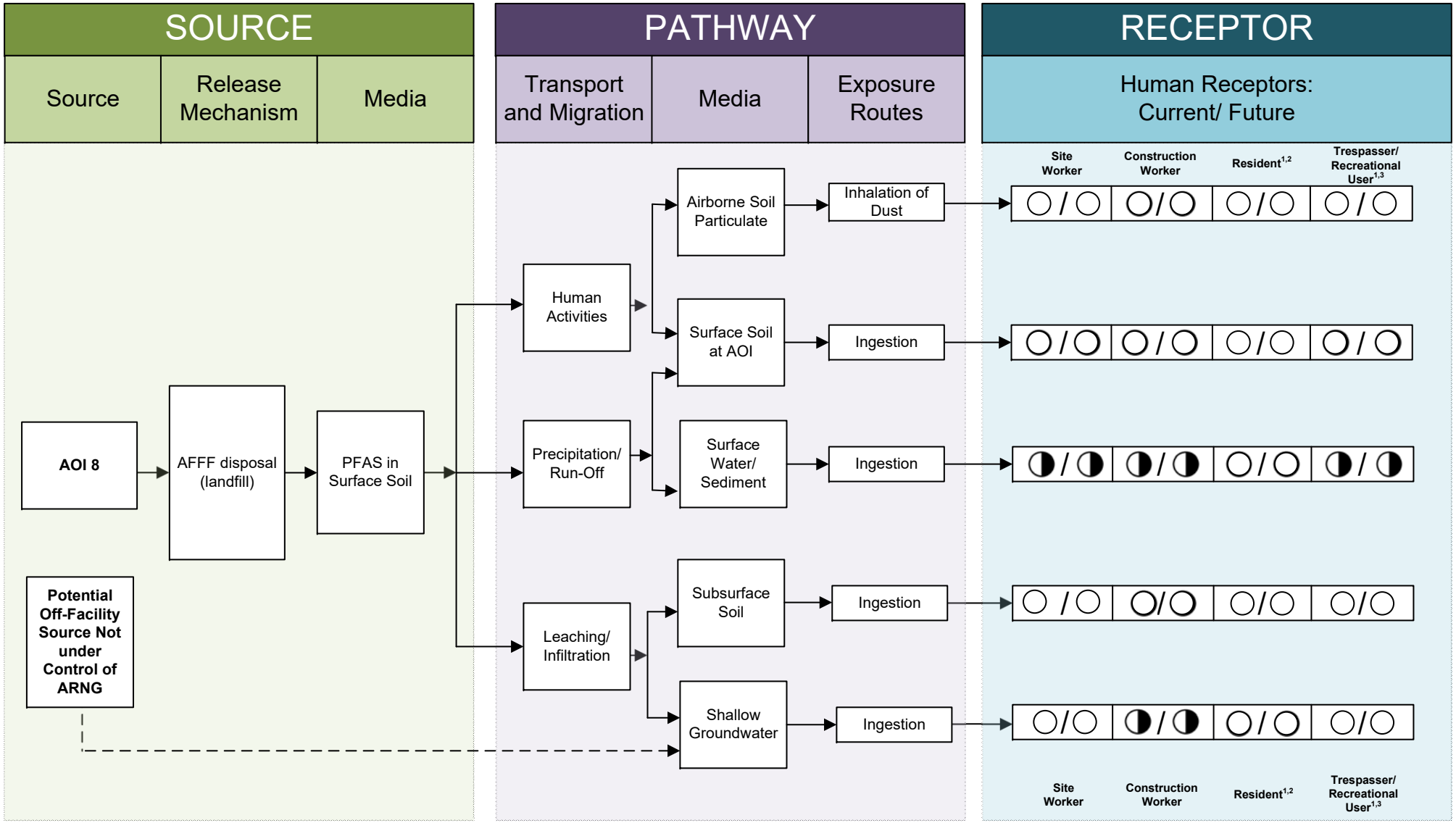
LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.

Figure 7-7
Conceptual Site Model, AOI 7
Fort Pickett, VA



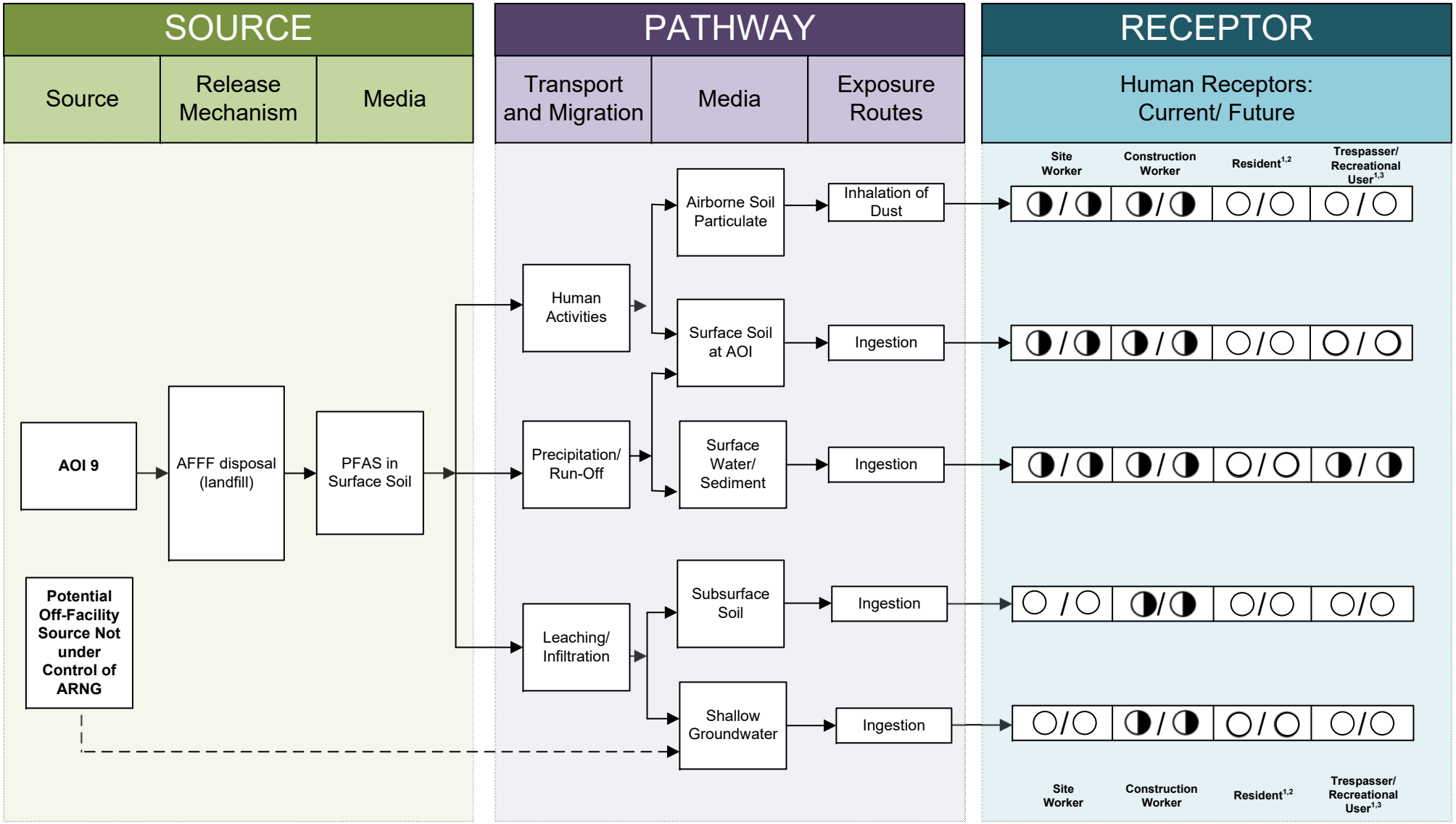
LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.

Figure 7-8
Conceptual Site Model, AOI 8
Fort Pickett, VA



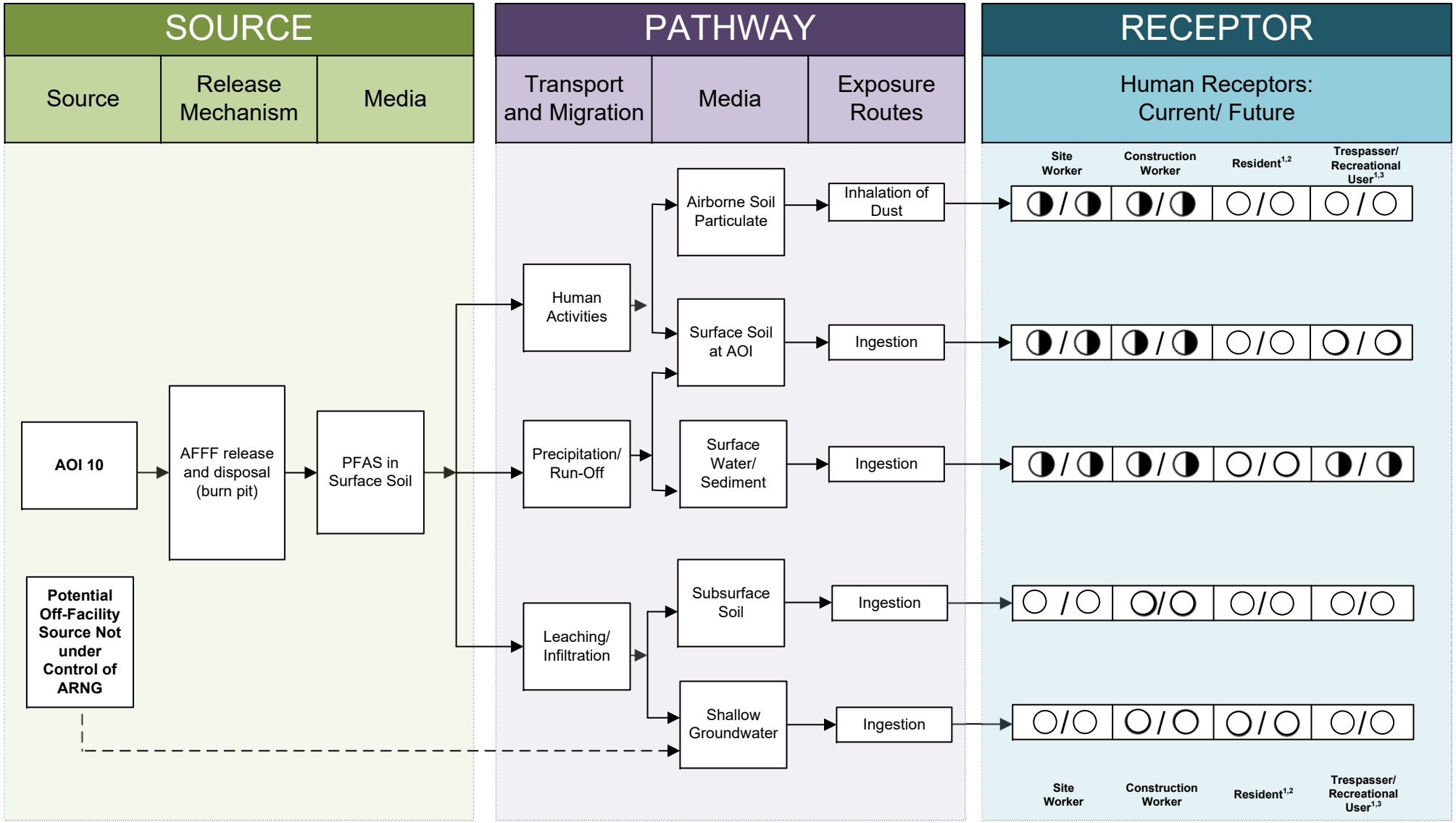
LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.

Figure 7-9
Conceptual Site Model, AOI 9
Fort Pickett, VA



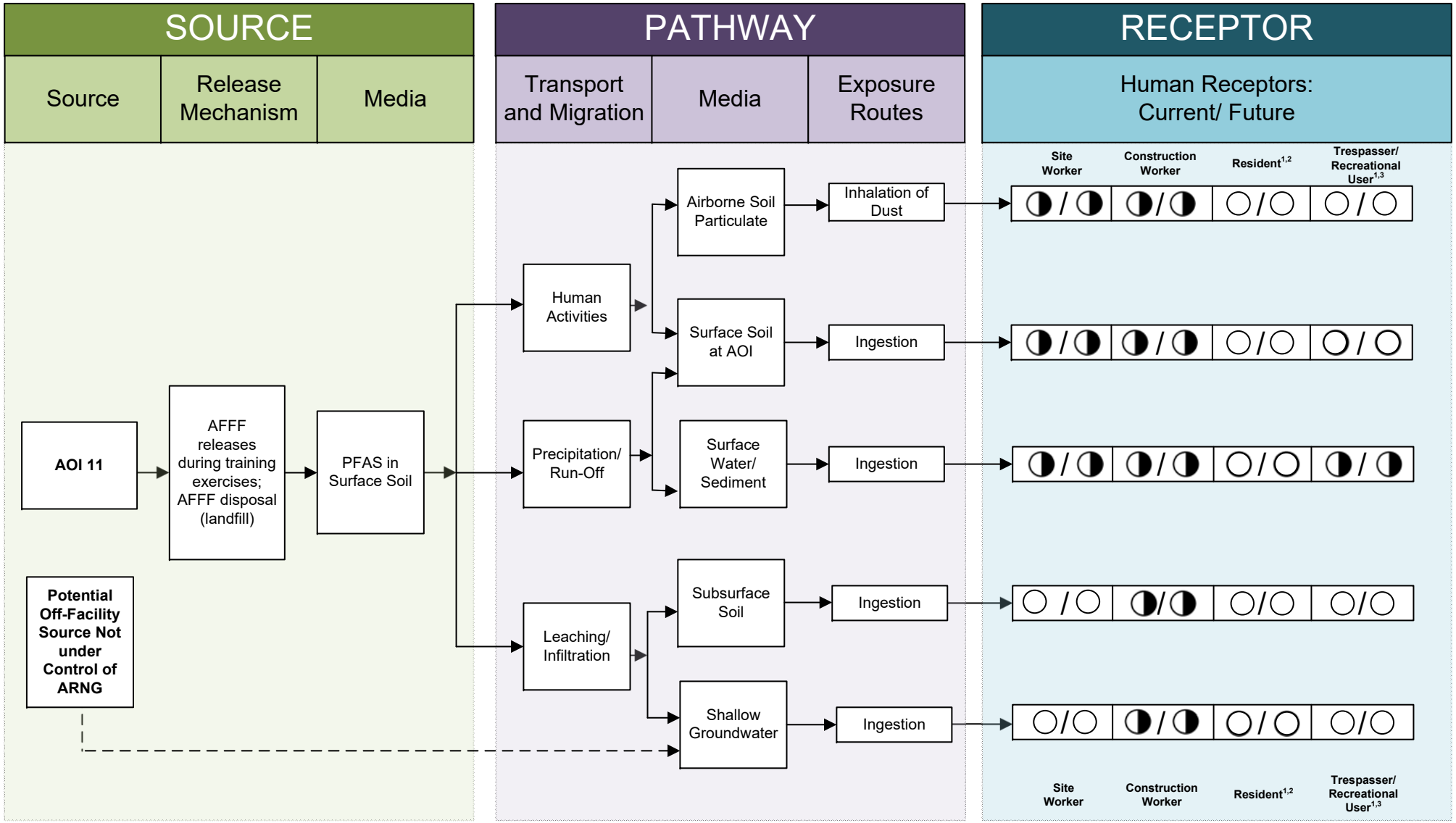
LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.

Figure 7-10
Conceptual Site Model, AOI 10
Fort Pickett, VA



LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.

Figure 7-11
Conceptual Site Model, AOI 11
Fort Pickett, VA

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8. Summary and Outcome

This section summarizes SI activities and findings. The most significant findings are summarized in this section and are reproduced directly or abstracted from information contained in this report. The outcome provides general and comparative interpretations of the findings relative to the SLs.

8.1 SI Activities

The SI field activities were conducted from 10 May to 23 June 2021 and consisted of utility clearance, direct push and hollow stem auger boring, soil sample collection, permanent and temporary monitoring well installation, grab groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2021a), except as previously noted in **Section 5.8**.

To fulfill the project DQOs set forth in the approved SI QAPP Addendum (AECOM, 2021a), samples were collected and analyzed for a subset of PFAS by LC/MS/MS compliant with QSM 5.3 Table B-15 as follows. The 18 PFAS analyzed as part of the ARNG SI program are specified in **Section 5.7** of this Report.

- One hundred ten (110) soil samples from 51 boring locations;
- Forty-one (41) grab groundwater samples from 40 permanent well locations and one temporary well location;
- Forty (40) QA samples

The information gathered during this investigation was used to determine if PFOA, PFOS, and/or PFBS were present at or above SLs. Additionally, the CSMs were refined to assess whether a potentially complete pathway exists between the source and potential receptors for potential exposure to PFOA, PFOS, and PFBS at the AOIs, which are described in **Section 7**.

8.2 SI Goals Evaluation

As described in **Section 4.2**, the SI activities were designed to achieve six main goals or DQOs. This section describes the SI goals and the conclusions that can be made for each based on the data collected during this investigation.

1. *Determine the presence or absence of PFOA, PFOS, and PFBS at or above SLs.*

   PFOA, PFOS, and PFBS were detected at the facility in soil and groundwater. PFOA, PFOS, and PFBS were detected primarily at the source areas. PFOA, PFOS, and PFBS were detected in soil and groundwater at all 11 AOIs. PFOS exceeded the residential soil SL at AOI 3, and PFOA, PFOS, and/or PFBS exceeded the groundwater SL at AOI 1, AOI 3, AOI 5, and AOI 6.

2. *Develop information to potentially eliminate a release from further consideration because it is determined that it poses no significant threat to human health or the environment.*

   Seven AOIs were removed from further consideration based on the groundwater and soil data collected during this SI: AOI 2, AOI 4, AOI 7, AOI 8, AOI 9, AOI 10, and AOI 11. At all seven AOIs, PFOA, PFOS, and PFBS were detected in soil and/or groundwater, but at concentrations below SLs. Given the magnitude of the detections from these AOIs, these areas pose no significant threat to human health or the environment.

3. *Determine the potential need for a TCRA (applies to drinking water only). The primary actions that will be considered include provision of alternative water supplies or wellhead treatment.*

   Based on the data collected during this SI and information provided from the Virginia Department of Energy (Geology Mineral Resources), there are several off-facility potable wells downgradient of Fort Pickett. However, these potable wells are more than 4 miles away from any of the potential release areas and are significantly deeper than the shallow groundwater sampled during the SI. Additionally, drinking water for the facility and surrounding area is provided by the Nottoway Reservoir, which is on Fort Pickett, but is located in a different watershed than any of the potential release areas. As a result, no TCRA or potable well sampling is required at this time.

4. *Collect data to better characterize the release areas for more effective and rapid initiation of a RI (if determined necessary).*

   Drilling during the SI found clay- and silt-rich saprolites as the dominant lithology of the unconsolidated soils underlying Fort Pickett. The borings were completed at depths ranging between 4 and 39 feet bgs. Bedrock was encountered at one location (FP-MW016) at 17.5 feet bgs. Isolated layers of poorly to well-graded sand and silty sand up to several feet thick were observed in soil cores, with some of these sand beds containing trace to little fine- to medium-grained gravel. Some of these sand beds exhibited fining-upward textures. These site observations are consistent with alluvium and fill material overlying saprolite, which grades down into weathered and competent bedrock. These observations are consistent with the shallow lithologic landscape of the area and larger Piedmont geologic province.

   Depth to water at the AOIs ranged from 5.86 to 34.25 feet bgs, and flow direction generally followed surface topography. Given the distance between the AOIs and the influence of topography, it was difficult to contour multiple AOIs together for a facility-wide potentiometric contour map. Additional investigations should study relationship between surface water and groundwater to better understand fate and transport.

5. *If PFOA, PFOS, and PFBS are determined to be present, aim to evaluate whether the concentrations can be attributed to on-facility or off-facility sources that were identified within 4 miles of the installation as part of the PA (e.g., fire stations, major manufacturers, other DoD facilities)*

   Based upon the evaluation of groundwater and soil results in comparison to SLs, in combination with the groundwater flow direction analysis, the results of the SI indicate that the source of detected concentrations of PFOA, PFOS, and PFBS at the facility is likely attributable to ARNG activities.

6. *Determine whether a potentially complete pathway exists between the source and potential receptors and whether ARNG is the likely source of the contamination.*

   Detections of PFOA, PFOS, and PFBS in soil and groundwater at source areas investigated during the SI confirm the source of contamination is likely from the ARNG. Potentially complete pathways do exist to site workers, construction workers, and trespassers/recreational users who are in close contact with groundwater/surface water. However, the distance to downgradient potable wells (groundwater) and reservoirs (surface water) makes the pathway to off-facility residents incomplete.

8.3 Outcome

Based on the CSMs developed and revised in light of the SI findings, there is no potential for exposure to drinking water receptors from AOI 1 through 11 from sources on facility resulting from historical DoD activities. Sample analytical concentrations collected during the SI were compared against the project SLs for PFOA, PFOS, and PFBS in soil and groundwater, as described in **Table 6-1**. A summary of the results of the SI data relative to the SLs is as follows:

- At AOI 1, PFOA and PFOS in groundwater exceeded the SLs of 40 ng/L, with maximum concentrations of 2,780 ng/L (duplicate from FP-MW001) and 1,180 ng/L, respectively, at locations FP-MW001 and FP-MW003. Based on the results of the SI, further evaluation of AOI 1 is warranted in the RI.
- At AOI 3, PFOS in soil exceeded the SL of 130 micrograms per kilogram (µg/kg), with a maximum concentration of 272 µg/kg at location AOI03-02 (0 to 2 feet below ground surface [bgs]). Additionally, PFOA, PFOS, and PFBS in groundwater exceeded the SLs of 40 ng/L for PFOA and PFOS and 600 ng/L for PFBS, with maximum concentrations of 10,600 ng/L, 43,600 ng/L, and 22,600 ng/L, respectively, at locations FP-MW009 and FP-MW011. Based on the results of the SI, further evaluation of AOI 3 is warranted in the RI.
- At AOI 5, PFOS in groundwater exceeded the SL of 40 ng/L, with a maximum concentration of 374 ng/L at location FP-MW015. Based on the results of the SI, further evaluation of AOI 5 is warranted in the RI.
- At AOI 6, PFOA, PFOS, and PFBS in groundwater exceeded the SLs of 40 ng/L for PFOA and PFOS and 600 ng/L for PFBS, with maximum concentrations of 3,020 ng/L, 11,700 ng/L, and 654 ng/L, respectively, at locations FP-MW019 and FP-MW020. Based on the results of the SI, further evaluation of AOI 6 is warranted in the RI.
- At AOIs 2, 4, and 7 through 11, the detected concentrations of PFOA, PFOS, and PFBS in soil and groundwater were below the SLs.

Table 8-1 summarizes the SI results for soil and groundwater. Based on the CSMs developed and revised in light of the SI findings, there is no potential for exposure to drinking water receptors caused by DoD activities at or adjacent to the facility.

Table 8-2 summarizes the rationale used to determine if an AOI should be considered for further investigation under CERCLA and undergo an RI. Based on the results of this SI, further evaluation is warranted in the RI for AOI 1, AOI 3, AOI 5, and AOI 6.

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Table 8-1: Summary of Site Inspection Findings

AOI	Potential PFAS Release Area	Soil – Source Area	Groundwater – Source Area	Groundwater – Facility Boundary
1	Building 1485 (Current Fire Station)	◐	●	N/A
2	Northeast Range Rubber Mat Fire Area	◐	◐	N/A
3	Building 3006 (FORSCOM Petroleum Training Module Area)	●	●	N/A
4	Former Live Fire Burn Pit	◐	◐	N/A
5	Airfield Runway 1/19 – 1991 Aircraft Training Area	◐	●	N/A
	Airfield Runway 1/19 – 1999 Police Training Incident	◐	◐	N/A
6	Building 2860 (Former Fire Station)	◐	●	N/A
7	Building 977 (Petroleum Training Module Area)	◐	○	N/A
8	Trimble Road Landfill (Landfill No.1)	N/A	◐	N/A
9	Dearing Road Landfill (Landfill No.1)	◐	◐	N/A
10	Solar Array Former Burn Pit	◐	○	N/A
11	Old Hospital Area and OHA Dump Area (Landfill No.3)	◐	◐	N/A

Legend:
FORSCOM = United States Army Forces Command
N/A = not applicable
OHA = Old Hospital Area
● = detected; exceedance of the screening levels
◐ = detected; no exceedance of the screening levels
○ = not detected

Table 8-2: Site Inspection Recommendations

AOI	Description	Rationale	Future Action
1	Building 1485 (Current Fire Station)	Exceedances of SLs in groundwater at source areas. No exceedances of SLs in soil.	Proceed to RI
2	Northeast Range Rubber Mat Fire Area	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action
3	Building 3006 (FORSCOM Petroleum Training Module Area)	Exceedances of SLs in soil and groundwater at source areas.	Proceed to RI
4	Former Live Fire Burn Pit	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action
5	Airfield Runway 1/19 – 1991 Aircraft Training Area	Exceedances of SLs in groundwater at source areas. No exceedances of SLs in soil.	Proceed to RI
	Airfield Runway 1/19 – 1999 Police Training Incident	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action
6	Building 2860 (Former Fire Station)	Exceedances of SLs in groundwater at source areas. No exceedances of SLs in soil.	Proceed to RI
7	Building 977 (Petroleum Training Module Area)	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action
8	Trimble Road Landfill (Landfill No.1)	No exceedances of SLs in groundwater at source area.	No further action
9	Dearing Road Landfill (Landfill No.1)	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action
10	Solar Array Former Burn Pit	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action
11	Old Hospital Area and OHA Dump Area (Landfill No.3)	No exceedances of SLs in groundwater at source area. No exceedances of SLs in soil.	No further action

Notes
FORSCOM = United States Army Forces Command
OHA = Old Hospital Area

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