FINAL
Site Inspection Report
Army Aviation Support Facility #3
Meridian, Mississippi

Site Inspection for Perfluorooctanoic acid (PFOA), Perfluorooctanesulfonic acid (PFOS), Perfluorohexanesulfonic acid (PFHxS), Perfluorononanoic acid (PFNA), Hexafluoropropylene oxide dimer acid (HFPO-DA), and Perfluorobutanesulfonic acid (PFBS) at ARNG Installations, Nationwide

July 2023

Prepared for:

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

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RPG Certification

ARNG PFAS Report:	Site Inspection (SI) Report for Army Aviation Support Facility (AASF) #3
Activity:	Site Inspection for Perfluorooctanoic acid (PFOA), Perfluorooctanesulfonic acid (PFOS), Perfluorohexanesulfonic acid (PFHxS), Perfluorononanoic acid (PFNA), Hexafluoropropylene oxide dimer acid (HFPO-DA), and Perfluorobutanesulfonic acid (PFBS)
Prepared for:	U.S. Army Corps of Engineers, Baltimore District
Prepared by:	AECOM Technical Services, Inc.
SI Location:	AASF #3, Meridian Mississippi
Date:	28 June 2023

This report, prepared by AECOM Technical Services, Inc. (AECOM), documents the referenced Site Investigation activities and findings associated with the April 2022 field investigation. I, Troy Brumfield, have reviewed this document in sufficient depth to accept responsibility for its contents related to the geologic discussion contained herein.

Troy Brumfield, RPG (Mississippi)
28 June 2023

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Acronyms and Abbreviations

%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
µg/kg	micrograms per kilogram
AASF	Army Aviation Support Facility
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film-forming foam
ANG	Air National Guard
AOI	Area of Interest
ARNG	Army National Guard
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CoC	chain of custody
CSM	conceptual site model
DA	Department of the Army
DoD	Department of Defense
DOT	Department of Transportation
DPT	direct push technology
DQO	data quality objective
DUA	data usability assessment
EDR™	Environmental Data Resources, Inc.™
ELAP	Environmental Laboratory Accreditation Program
EM	Engineer Manual
GPRS	Ground Penetrating Radar Systems, LLC
HDPE	high-density polyethylene
HFPO-DA	hexafluoropropylene oxide dimer acid
IDW	investigation-derived waste
ITRC	Interstate Technology Regulatory Council
LC/MS/MS	liquid chromatography with tandem mass spectrometry
MIL-SPEC	military specification
MSARNG	Mississippi Army National Guard
NELAP	National Environmental Laboratory Accreditation Program
ng/L	nanograms per liter
OSD	Office of the Secretary of Defense
OWS	oil/water separator
PA	Preliminary Assessment
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic 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
SI	Site Inspection
SL	screening level
SOP	standard operating procedure
TOC	total organic carbon
TPP	Technical Project Planning
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
USGS	United States Geological Survey
WWTP	wastewater treatment plant

Executive Summary

The Army National Guard (ARNG) G-9 is performing Preliminary Assessments (PAs) and Site Inspections (SIs) on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) with a focus on the six compounds presented in the memorandum from the Office of the Secretary of Defense (OSD) dated 6 July 2022 (Assistant Secretary of Defense, 2022). The six compounds listed in the OSD memorandum include perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), hexafluoropropylene oxide dimer acid (HFPO-DA)[1], and perfluorobutanesulfonic acid (PFBS). These compounds are collectively referred to as "relevant compounds" throughout the document, and the applicable screening levels (SLs) are provided in **Table ES-1**.

The PA identified two Areas of Interest (AOIs) where PFAS-containing materials may have been used, stored, disposed, or released historically (see **Table ES-2** for AOI locations). The objective of the SI is to identify whether there has been a release to the environment from the AOIs identified in the PA and determine whether further investigation is warranted, a removal action is required to address immediate threats, or no further action is required based on SLs for relevant compounds. This SI was completed at the Army Aviation Support Facility (AASF) #3 in Meridian, Mississippi and determined further evaluation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is warranted for AOI 1 and AOI 2. AASF #3 will also be referred to as the "facility" throughout this document.

AASF #3 is located southwest of the City of Meridian, Mississippi. The facility is primarily in Lauderdale County, Mississippi, approximately 19 miles west of the Mississippi-Alabama Border. The facility is 3.5 acres in size and houses the B Company 111th. Seven buildings are located at the facility, including a hangar; storage, administration, hazardous material and used oil buildings; and a fire pump house. The facility provides aviation and maintenance support primarily for helicopters. The property is leased by the State of Mississippi from the Meridian Airport Authority.

The PA identified two AOIs for investigation during the SI phase. SI sampling results from the two AOIs were compared to OSD SLs. **Table ES-2** summarizes the SI results for each AOI. Based on the results of this SI, further evaluation under CERCLA is warranted in a Remedial Investigation for AOI 1 and AOI 2.

[1] Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI, as screening values were established after SI planning and execution. Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the conceptual site model (CSM) developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of military specification (MIL-SPEC) aqueous film forming foam (AFFF) and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

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

Analyte[b]	Residential (Soil) (µg/kg)[a] 0-2 feet bgs	Industrial/ Commercial Composite Worker (Soil) (µg/kg)[a] 2-15 feet bgs	Tap Water (Groundwater) (ng/L)[a]
PFOA	19	250	6
PFOS	13	160	4
PFBS	1,900	25,000	601
PFHxS	130	1,600	39
PFNA	19	250	6

Notes:
bgs = below ground surface; µg/kg = micrograms per kilogram; ng/L = nanograms per liter
a.) Assistant Secretary of Defense, 2022. Risk Based Screening Levels in Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. Hazard Quotient (HQ) = 0.1. 6 July 2022.
b.) Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the CSM developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of MIL-SPEC AFFF and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

Table ES-2: Summary of Site Inspection Findings and Recommendations

AOI	Potential Release Area	Soil – Source Area[a]	Groundwater – Source Area[a]	Groundwater – Facility Boundary	Future Action
1	Release Area A	◐ 14.9 µg/kg (PFNA)	● 3,160 ng/L (PFOA)	● 70.8 ng/L (PFHxS)	Proceed to RI
2	Release Area B	◐ 2.67 µg/kg (PFOS)	● 594 ng/L (PFOS)	● 70.8 ng/L (PFHxS)	Proceed to RI

Notes:
AOI = area of interest; ng/L = nanograms per liter; µg/kg = micrograms per kilogram
a.) The maximum relevant compound concentration is reported at each AOI.

Legend:
● = detected; exceedance of the screening levels
◐ = detected; no exceedance of the screening levels
○ = not detected

1. Introduction

1.1 Project Authorization

The Army National Guard (ARNG) G-9 is the lead agency in performing Preliminary Assessments (PAs) and Site Inspections (SIs) on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) with a focus on the six compounds presented in the memorandum from the Office of the Secretary of Defense (OSD) dated 6 July 2022 (Assistant Secretary of Defense, 2022). The six compounds listed in the OSD memorandum will be referred to as "relevant compounds" throughout this document and include perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA), hexafluoropropylene oxide dimer acid (HFPO-DA)[1], and perfluorobutanesulfonic acid (PFBS) at ARNG facilities nationwide. The ARNG performed this SI at the Meridian Army Aviation Support Facility (AASF) in Meridian, Mississippi. AASF #3 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; United States [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.

1.2 SI Purpose

A PA was performed at AASF #3 (AECOM Technical Services, Inc. [AECOM], 2020) that identified two Areas of Interest (AOIs) where PFAS-containing materials may have been used, stored, disposed, or released historically. The objective of the SI is to identify whether there has been a release to the environment from the AOIs identified in the PA and determine whether further investigation is warranted, a removal action is required to address immediate threats, or no further action is required based on screening levels (SLs) for the relevant compounds.

[1] Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the conceptual site model (CSM) developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of military specification (MIL-SPEC) aqueous film forming foam (AFFF) and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

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2. Facility Background

2.1 Facility Location and Description

AASF #3 is located southwest of the City of Meridian, Mississippi (**Figure 2-1**). The facility is primarily in Lauderdale County, Mississippi, approximately 19 miles west of the Mississippi-Alabama Border. The facility is 3.5 acres in size houses the B Company 111th. Seven buildings are located at the facility, including a hangar; storage, administration, hazardous material and used oil buildings; and a fire pump house. The facility provides aviation and maintenance support primarily for helicopters. The facility was established in 1979, and the property is leased by the State of Mississippi from the Meridian Airport Authority; the current lease is valid until 31 August 2061.

2.2 Facility Environmental Setting

Lauderdale County is located in the Atlantic Plain Physiographic Region, which runs along the eastern and southern coast of the US, extending from Massachusetts down to the Gulf of Mexico. The Atlantic Plain is separated into two provinces, the continental shelf beyond the coastline, and the interior portion known as the Coastal Plain, the inner edge of which is commonly accepted to be the extent of Cretaceous or Tertiary deposits (Fenneman, 1917). The facility is situated in the East Gulf Coastal Plain, a belted section of the Coastal Plain between the Mississippian Alluvial Plain and the Floridian Section that drains to the Gulf of Mexico (Fenneman, 1928). AASF #3 is relatively flat and predominately covered by impermeable surfaces that consist of asphalt, concrete, and tarmac. However, the ground surface in the eastern and western portion facilities consists of grassed land. The topography of the facility is presented on **Figure 2-2**.

2.2.1 Geology

The main geologic formation underlying the facility is the Wilcox Group (**Figure 2-3**). The Wilcox Group comprises, in stratigraphic order, the Hatchetigbee, Tuscahoma, and Nanafalia formations, which correspond to the Upper, Middle, and Lower Wilcox. The Hatchetigbee Formation consists of regressive nonmarine sediments, gray to brown cross-bedded sands, and lignitic clay. The formation has been eroded away beneath the facility to an approximate thickness of several dozen feet (Leidos, 2019). Underlying the Hatchetigbee Formation is the gray lignitic sand of the Tuscahoma Formation. The Tuscahoma Formation is often laminated with gray clay and fossiliferous marls and reaches a thickness of approximately 350 feet. The Nanafalia Formation underlies the Tuscahoma Formation and consists of buff-colored, fossiliferous, glauconitic, calcareous sands, dark lignitic silt, clay and some gravel. The Nanafalia Formation is approximately 300 feet thick (CH2M Hill, 1992). The Wilcox Group has not been significantly structurally deformed but does have a gentle regional dip of 25 to 30 feet per mile to the south-southeast (Leidos, 2019).

AASF #3 is located on a thin deposit of Quaternary floodplain alluvium. The soil underlying the facility is approximately 6 feet of fine sandy loam, which is the start of the Wilcox Group. This soil has been disturbed during historical construction activities. Unaltered soil in the uplands is loamy and clayey, well-drained, and typically highly acidic (Allgood, 1983).

During the SI, soil borings were completed to depths between 4 to 15 feet below ground surface (bgs). Fine-grained clayey sand and silts were observed as the dominant lithology of the unconsolidated sediments below AASF #3. The clayey sands were noted from surface elevations up to 13 feet bgs. Where identified, the silts were observed as shallow as 5 feet bgs to as deep as 15 feet bgs. Varying quantities of fine- to medium-grained sand were observed in all borings at nearly all depths. Lean clay was observed at AOI02-05 (8.5 to 10 feet bgs) near the southern

boundary of the facility and MER-01 (3 to 8 feet bgs), along the northern boundary. Poorly graded sand was observed at the bottom of borings AOI01-02 (13 to 15 feet bgs) and AOI02-02 (8 to 10 feet bgs), located along the southern boundary of the facility. The sandy and clayey soils observed within the borings are consistent with the nonmarine sediments of the Hatchetigbee Formation. Boring logs are presented in **Appendix E**.

2.2.2 Hydrogeology

The Middle and Lower Wilcox (Tuscahoma and Nanafalia formations, respectively) are the principal aquifers in the area. An Environmental Data Resources, Inc.™ [EDR™] report included a well search for a 1-mile radius surrounding the facility and listed 49 registered state and federal wells, with 88 percent (%) of the wells situated within these two formations. Wells within the Lower Wilcox are set from 740 to 870 feet bgs. Static water levels measured in the 1970s and 1980s within these wells are typically 12 to 21 feet bgs. Wells within the Middle Wilcox aquifer are set from 240 to 400 feet bgs; static water levels were measured from 42 to 78 feet bgs (EDR™, 2019). The facility is supplied potable water by the City of Meridian, which is sourced from eight potable wells screened within the Lower Wilcox aquifer. The city does not provide the precise or approximate locations of these water supply wells; however, their depths range from 747 to 948 feet bgs (City of Meridian, 2021). There are no reported confining layers within the Wilcox Group (US Geological Survey [USGS], 1998).

Using additional online resources, such as state and local Geographic Information System databases, wells were researched in a 4-mile radius of the facility. Well data from the USGS show one industrial well, six domestic wells, and 28 wells of unknown purpose within 4 miles downgradient of the facility (USGS, 2019). The domestic and unknown wells are drilled to depths of at least 135 feet bgs and screened in the Wilcox aquifers (Mississippi Automated Resource Information System, 2009). Approximately 2.5 to 3.5 miles to the south, southeast, and southwest of the facility, there are domestic wells that range in depth from 191 to 420 feet bgs (Leidos, 2019). Several shallow monitoring wells (15 to 27 feet bgs) are set within the Hatchetigbee Formation, about 1 mile to the south, in the center of Key Field, an adjacent Air National Guard (ANG) Base (Leidos, 2019). The groundwater within the Wilcox Group flows to the south-southwest, following the structural dip of the formation; however, local variations in flow direction were noted at Key Field, where groundwater flow is to the west. Groundwater flow direction at AASF #3 was approximated to follow a similar south to west trend.

Depths to water measured in April 2022 during the SI ranged from 2.33 to 5.56 feet bgs, with the shallowest groundwater encountered in the northern portion of the facility. Groundwater elevation contours from the SI are presented on **Figure 2-4** and indicate the groundwater flow direction at AASF #3 is primarily to the west, consistent with the regional flow directions noted above.

2.2.3 Hydrology

Regionally, AASF #3 lies within the Burwell Creek-Okatibbee Creek Watershed. Okatibbee Creek is located approximately 0.25 miles west of the facility and is fed by Burwell Creek as well as other tributaries. Okatibbee Creek is fed by Lake Okatibbee, a lacustrine body covering about 5.5 square miles. Lake Okatibbee is located approximately 10 miles north of the facility. The Okatibbee Creek flows into the Chickasawhay River. Chickasawhay River is used for both small-size boating and fishing (Natural Atlas, Inc., 2022; The Meridian Star, 2010).

Surface drainage flows across the site to the west-northwest, towards Okatibbee Creek and several emergent wetlands via three outfalls. Outfall 001 receives and discharges water from the North Apron and is located northwest of the North Apron. Outfall 002 receives and discharges water from the South Apron and the storm sewer system. Outfall 003 receives water from a drainage swale south of the South Apron. Outfalls 002 and 003 are located in a drainage ditch to

the west of the south apron and receive water from the South (Bhate Associates, 2011; Mississippi ARNG [MSARNG], 2017). According to the National Wetlands Inventory, there are two small emergent wetland bodies within and immediately west of the facility's western boundary. Additionally, an excavated lacustrine waterbody is located along the length of Key Field to the west (US Fish and Wildlife Service [USFWS], 2019). Surface water features are presented on **Figure 2-5**.

2.2.4 Climate

Mississippi is located in the humid subtropical climate region and is characterized by temperate winters and long, hot summers (Mississippi State University, 2022). Summer temperatures in Meridian reach an average maximum of 92 degrees Fahrenheit (°F), with July being the hottest month. The coldest month in Meridian is January, with average maximum temperature of 56 °F and an average minimum temperature of 33 °F. Meridian averages an annual 56.19 inches of precipitation. Higher precipitation is generally reported between the months of January through March, July, and December. Snowfall in Mississippi is rare (World Climate, 2022).

2.2.5 Current and Future Land Use

The facility has a controlled access gate and is adjacent to Key Field and the Meridian Regional Airport. The facility provides aviation and maintenance support primarily for helicopters. Reasonably anticipated future land use is not expected to change from the current land use.

2.2.6 Sensitive Habitat and Threatened/ Endangered Species

The following mammals, birds, fishes, clams, and insects are federally endangered, threatened, proposed, and/ or are listed as candidate species in Lauderdale County, Mississippi (USFWS, 2022).

- **Mammals:** Northern Long-eared Bat, *Myotis septentrionalis* (Threatened)
- **Birds:** Wood Stork, *Mycteria americana* (Threatened)
- **Fishes:** Pearl Darter, *Percina aurora* (Threatened)
- **Clams:** Alabama Moccasinshell, *Medionidus acutissimus* (Threatened); Orangenacre Mucket, *Hamiota perovalis* (Threatened); Ovate Clubshell, *Pleurobema perovatum* (Endangered); Southern Clubshell, *Pleurobema decisum* (Endangered)
- **Insects:** Monarch Butterfly, *Danaus plexippus* (Candidate)

2.3 History of PFAS Use

Two AOIs were identified in the PA where AFFF may have been used, stored, disposed, or released historically at AASF #3 (AECOM, 2020). The onsite hangar is equipped with an AFFF fire suppression system. Evidence of leaked/spilled AFFF was observed on the outside of the AFFF-equipped upright tank during the visual inspection. Additionally, between 2007 to 2011/2012, approximately 10 portable Tri-Max™ mobile fire extinguisher units were stationed at the wash rack area. The potential release areas were grouped into two AOIs based on preliminary data and presumed groundwater flow directions. A description of each AOI is presented in **Section 3**.

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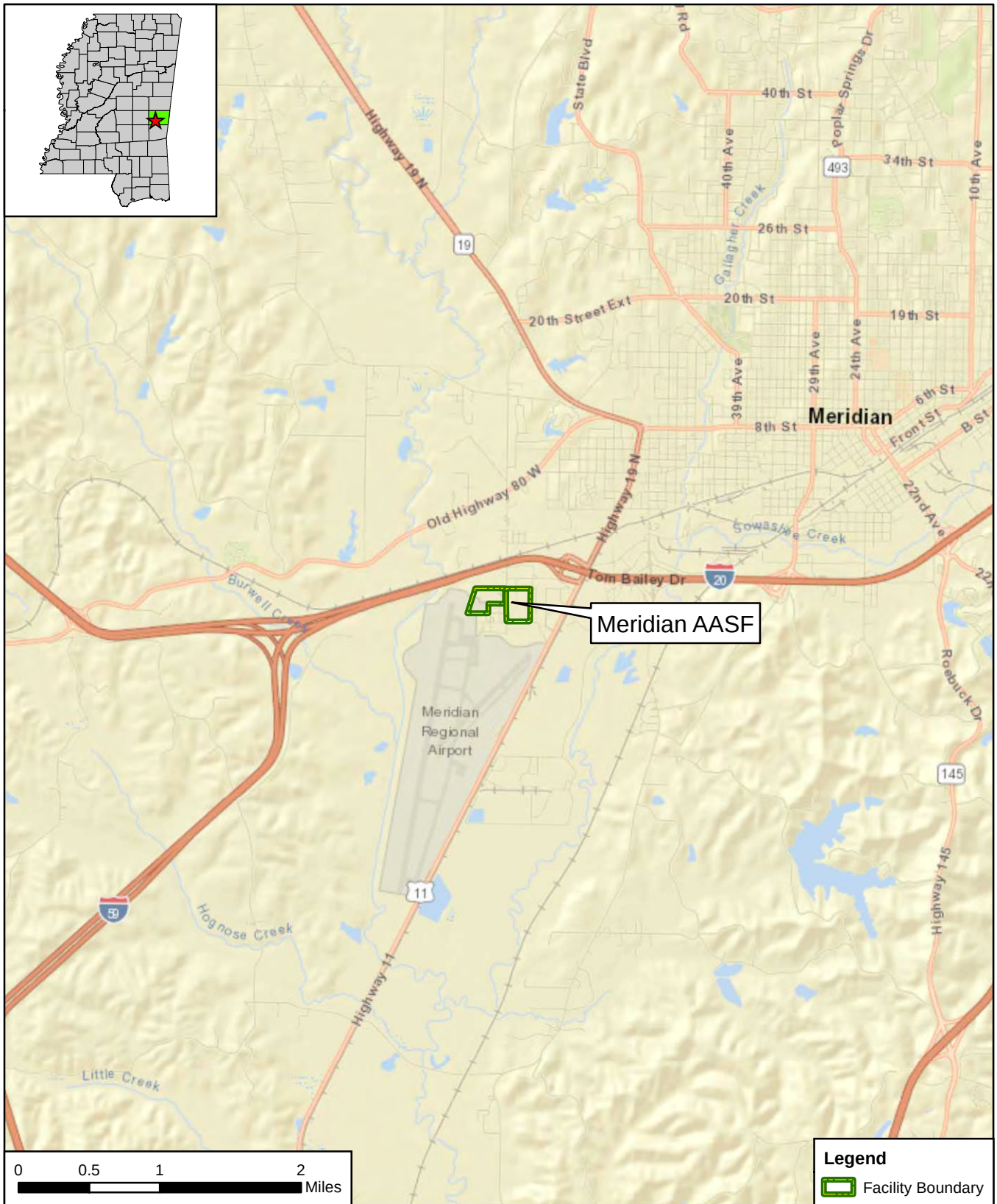

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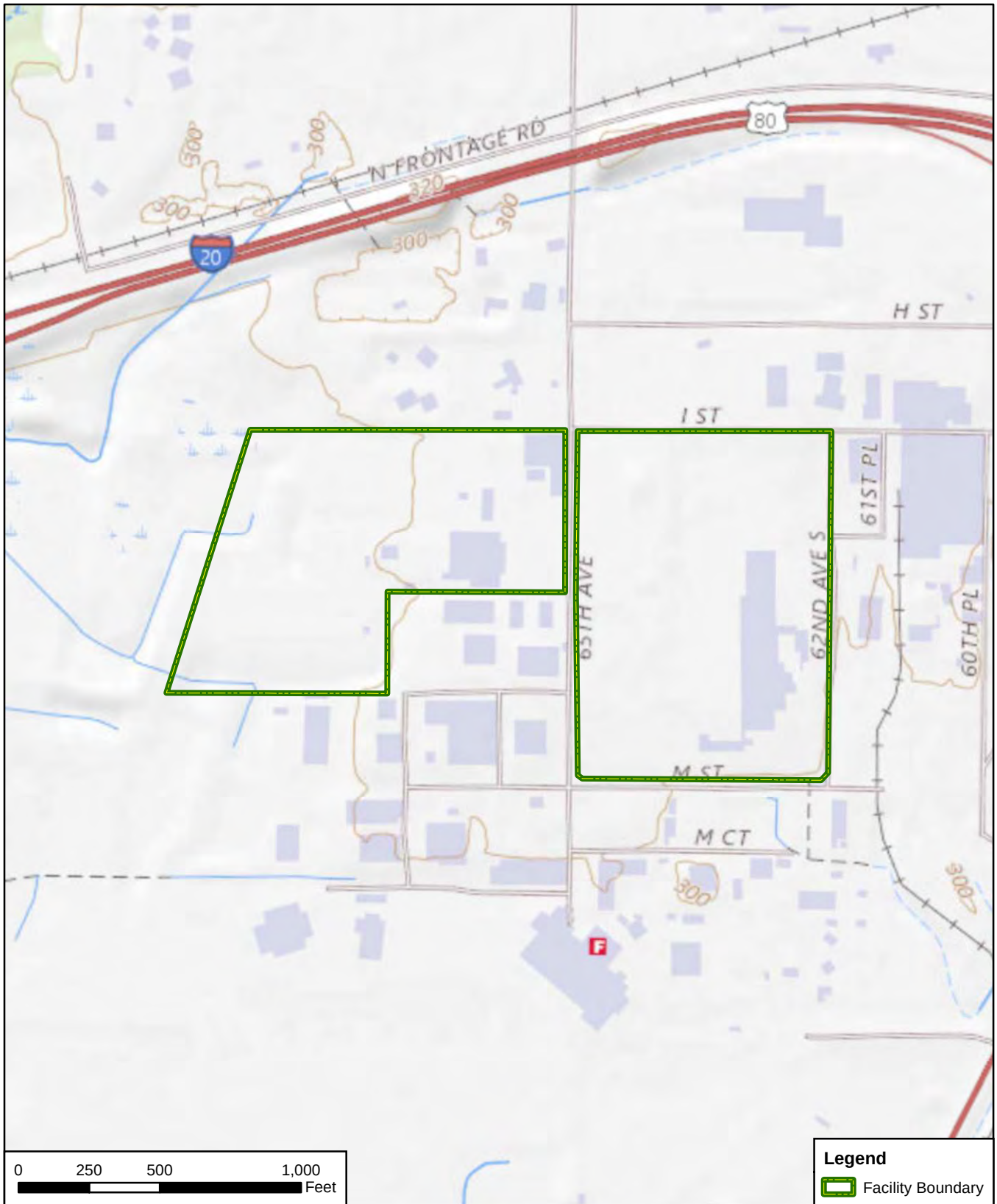
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	9/16/2022

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-1



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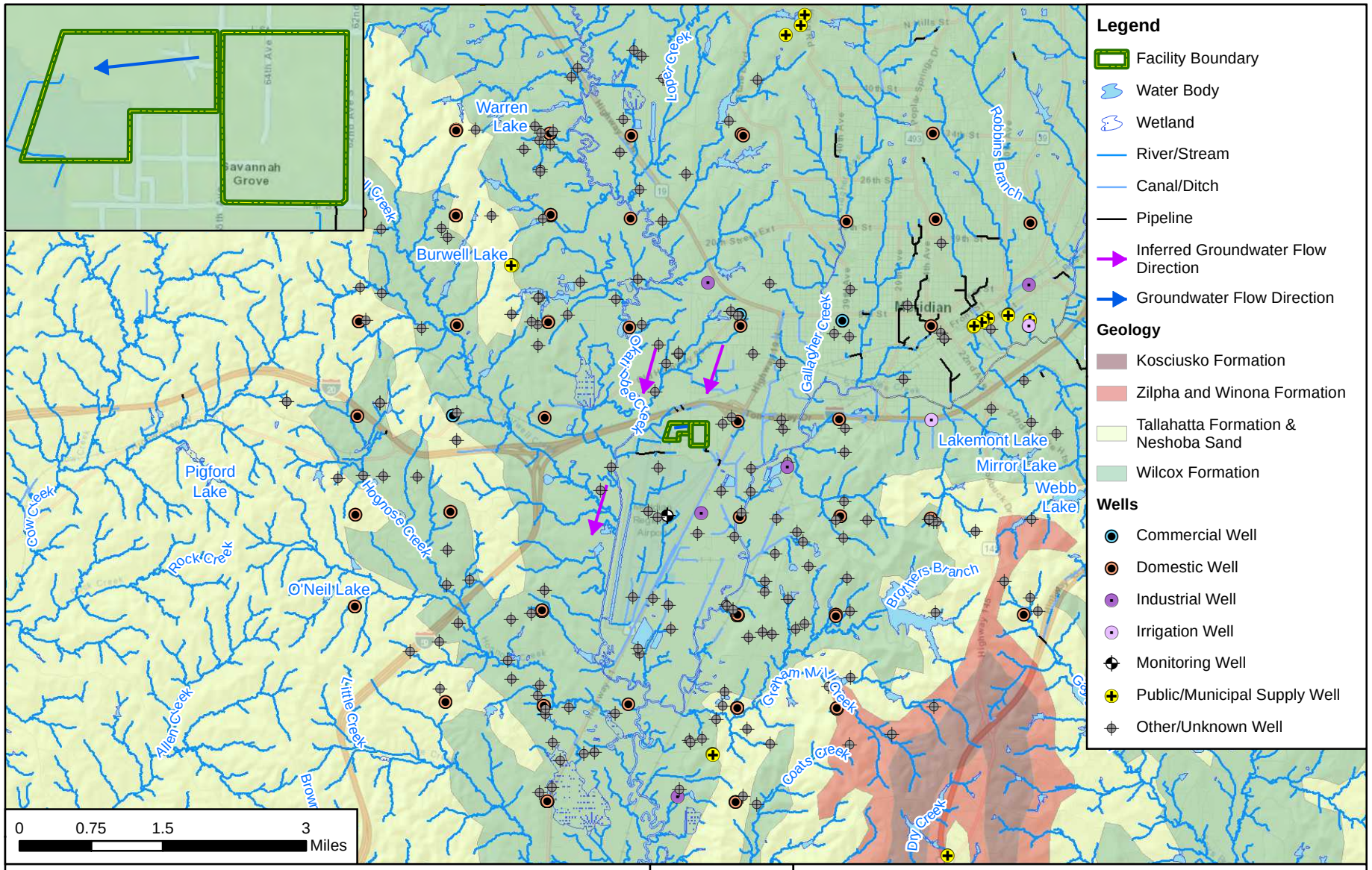
Facility Topography

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-2



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Groundwater Features

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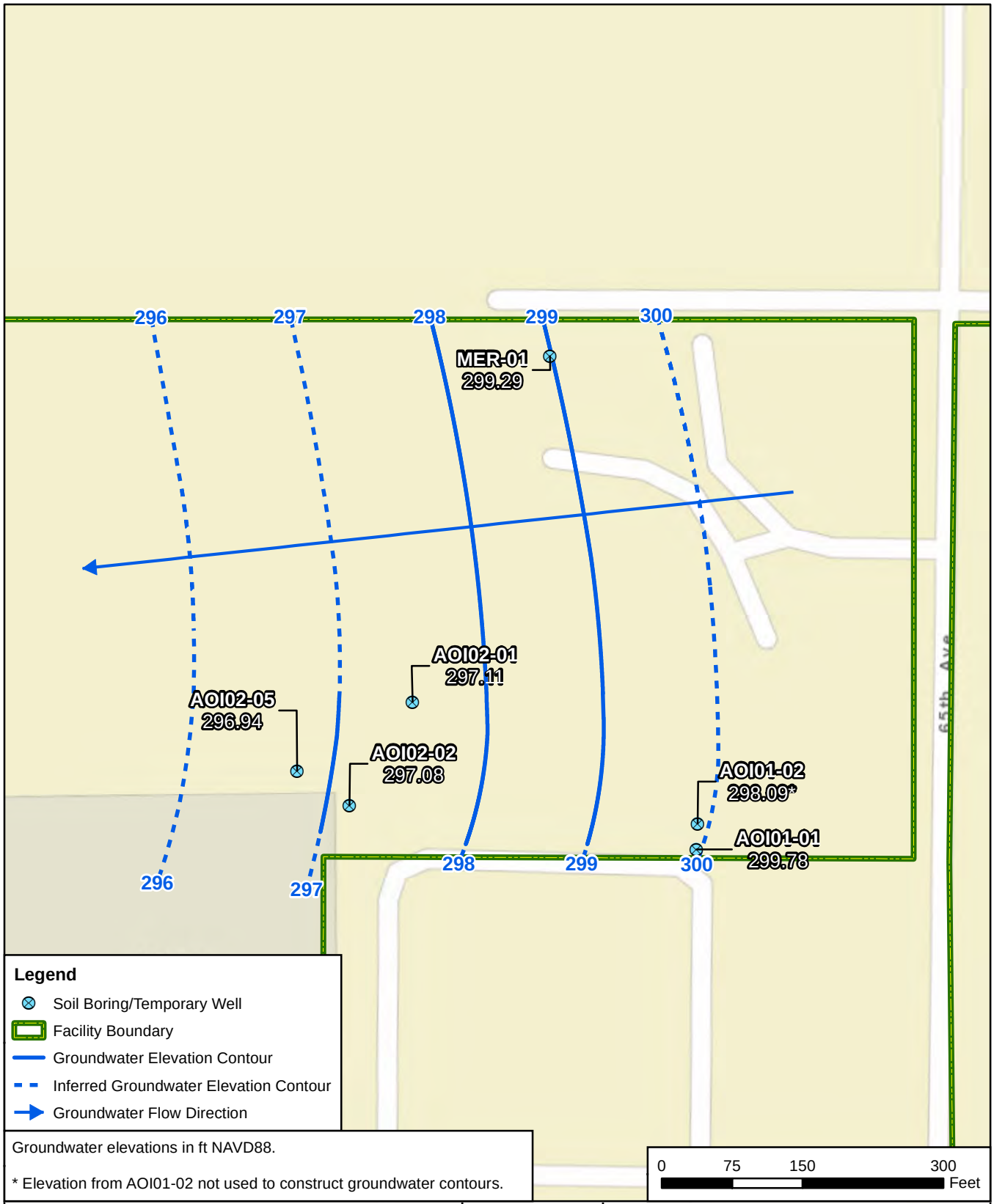
Germantown, MD 20876

Figure 2-3



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Groundwater Elevations, April 2022

AECOM
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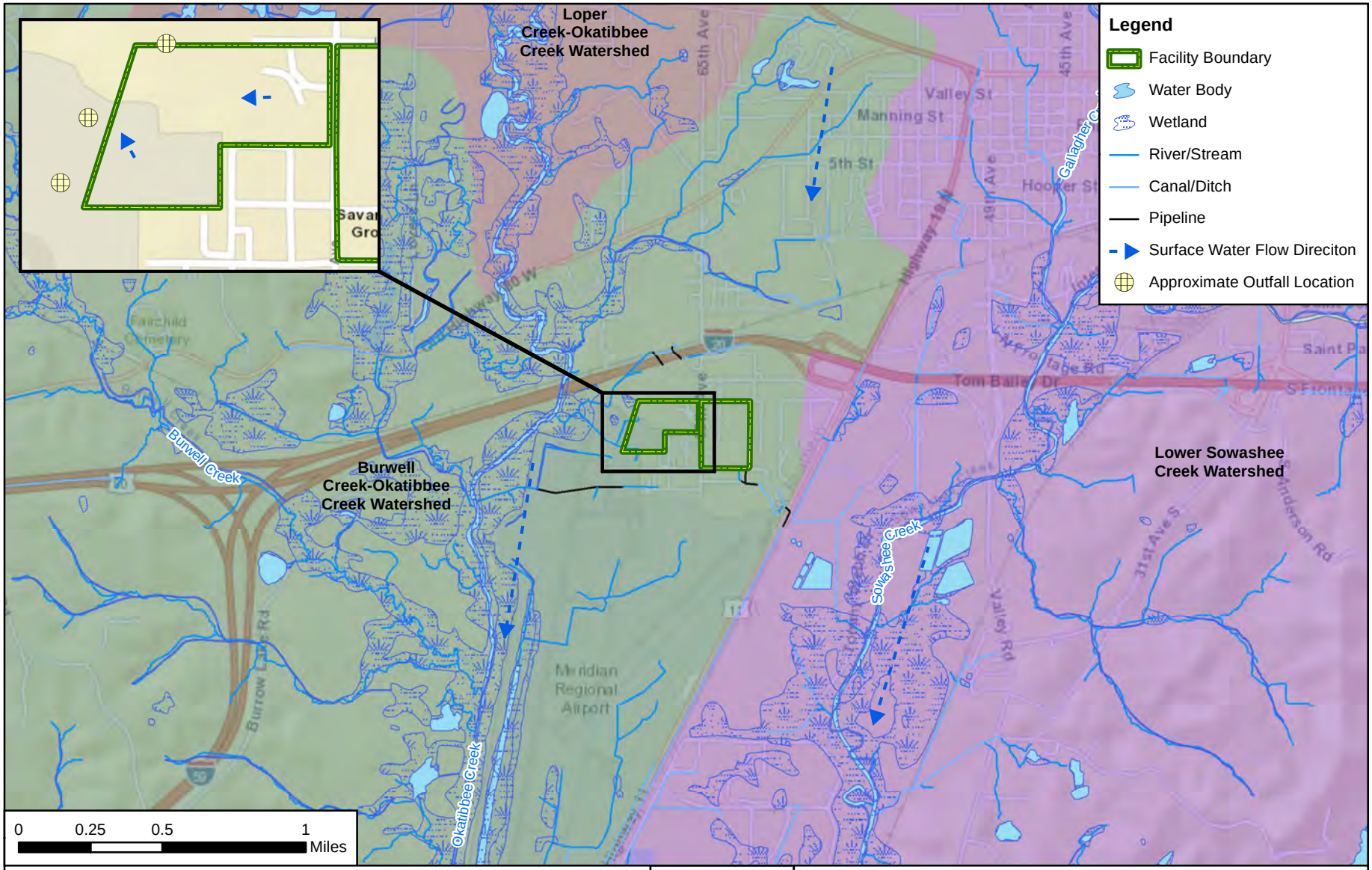
Figure 2-4



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Surface Water Features

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Germantown, MD 20876

Figure 2-5

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3. Summary of Areas of Interest

The PA evaluated areas where PFAS-containing materials may have been used, stored, disposed, or released historically. Based on the PA findings, two AOIs were identified at AASF #3 and are shown on **Figure 3-1** (AECOM, 2020).

3.1 AOI 1

AASF #3 hangar (Release Area A) is equipped with an AFFF fire suppression system. The system consists of an approximately 500-gallon upright tank that is located outside the hangar and connects to the pump room through the wall along the southeast corner. Floor drains within the pump room connect to an oil/water separator (OWS) that discharges to the sanitary sewer. The sanitary sewer discharges to the City of Meridian's Wastewater Treatment Plant (WWTP). The system was installed in 2007, and initial testing was completed with water only. Since installation, the system has not been activated; however, the bladder was reportedly replaced by an outside contractor between 2015 to 2016. Evidence of leaked/spilled AFFF was observed on the outside of the tank during the visual site inspection. The volume of AFFF released to the ground underneath the tank is unknown.

3.2 AOI 2

Between 2007 to 2011/2012, approximately 10 portable Tri-Max™ units equipped with AFFF were kept at AASF #3 and stationed at the wash rack area at Release Area B. The capacity of the units and the AFFF concentration within are unknown. According to the PA, a contractor for the State of Mississippi emptied the units prior to removing them from the facility (AECOM, 2020). It is unknown whether the extinguishers were emptied in a way that allowed AFFF to be captured, or if they were emptied into the wash rack area and allowed to disperse. Had AFFF been emptied in the vicinity of the wash rack, the potential release pathways for AFFF would be identical to the pathways described above. AFFF may have drained through the wash rack to the OWS and subsequently to the Meridian WWTP via the sanitary sewer. Stormwater drains are located adjacent to the wash rack, any wash water or stormwater that is not captured by wash rack drains could carry potential releases via the storm drains off-facility to Okatibbee Creek.

3.3 Adjacent Sources

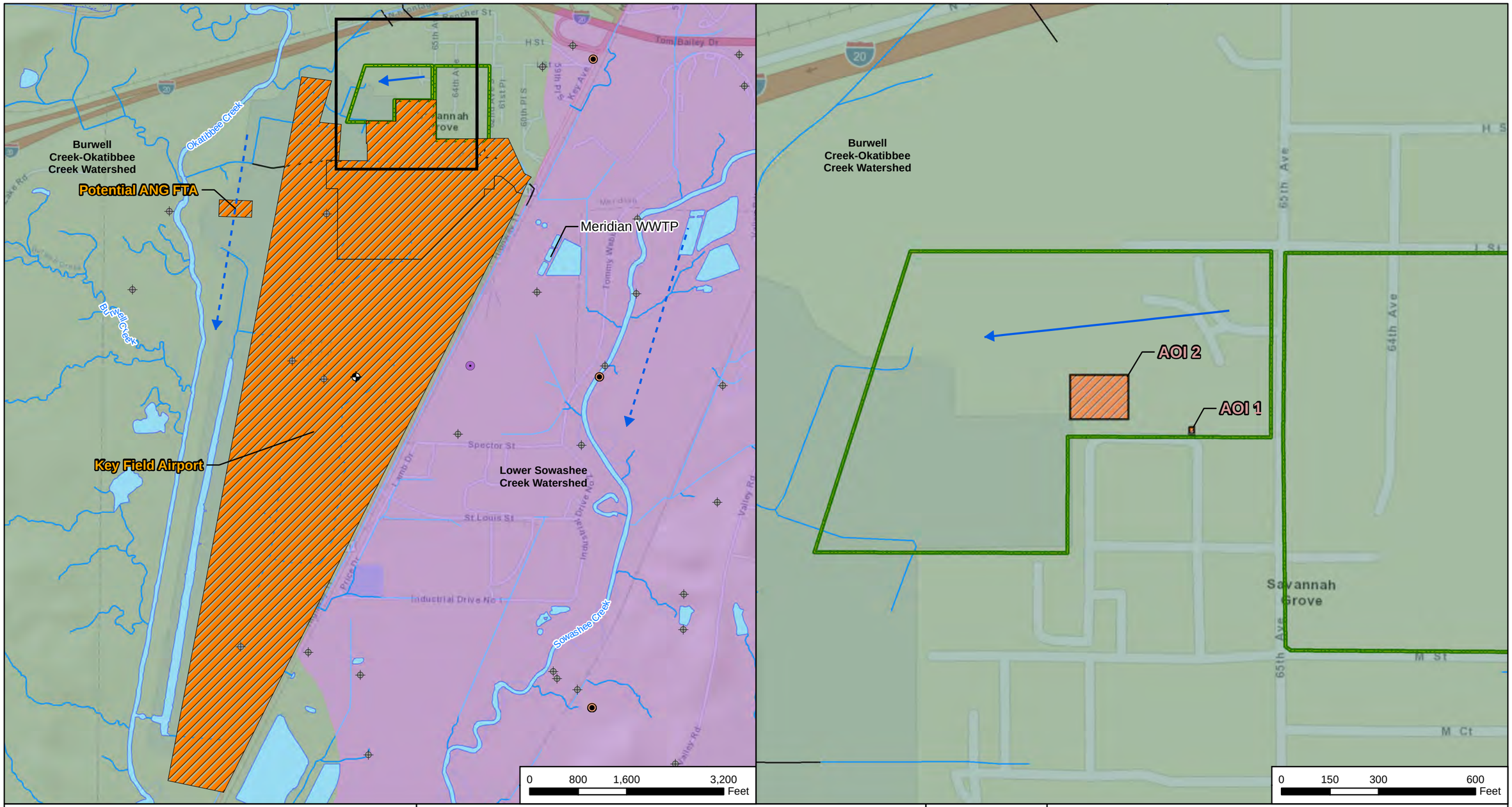
One off-facility, potential source, which is not associated with ARNG activities, was identified adjacent to AASF #3 during the PA. The adjacent potential source is shown on **Figure 3-1** and described in the following sections for informational purposes only, and will not be investigated as part of this SI.

3.3.1 Key Field

An SI was performed at Key Field, the adjacent ANG Base, located south and side-gradient of AASF #3. A total of six potential release locations were evaluated; PFOA, PFOS, PFBS, PFHxS, and PFNA were detected in soil, groundwater, and surface water. The maximum concentrations reported in the sampled environmental media are summarized below:

- In soil, maximum concentrations of PFOA, PFOS, PFBS, PFHxS, and PFNA were reported at 6.4 micrograms per kilogram (g/kg), 350 J g/kg, 0.66 g/kg, 34 J g/kg, and 5 g/kg, respectively.

- In groundwater, the maximum concentrations of PFOA, PFOS, PFBS, PFHxS, and PFNA in groundwater were reported at 4,100 J nanograms per liter (ng/L), 67,000 J ng/L, 3,700 ng/L, 34,000 J ng/L, and 280 J ng/L, respectively.
- In surface water, the maximum concentrations of PFOA, PFOS, PFBS, PFHxS, and PFNA were reported at 340 ng/L, 2,200 J ng/L, 270 ng/L, 1,900 J ng/L, and 26 ng/L, respectively.



CLIENT	ARNG			
PROJECT	Site Inspection at Meridian AASF, MS			
REVISED	2/9/2023	GIS BY	MS	2/9/2023
SCALE	1:3,600	CHK BY	LC	2/9/2023
Base Map: National Agricultural Imagery Program, 2017. Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong),		PM	CM	2/9/2023

- Area of Interest
- Potential Release Area
- Facility Boundary
- Water Body
- Wetland
- River/Stream
- Canal/Ditch
- Pipeline
- Surface Water Flow Direciton
- Groundwater Flow Direction

Wells

- Domestic Well
- Industrial Well
- Monitoring Well
- Other/Unknown Well

N

Area of Interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 3-1

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4. Project Data Quality Objectives

As identified during the Data Quality Objective (DQO) process and outlined in the SI Quality Assurance Project Plan (QAPP) Addendum (AECOM, 2022a), the objective of the SI is to identify whether there has been a release to the environment at the AOIs identified in the PA. For each AOI, ARNG determines if further investigation is warranted, a removal action is required to address immediate threats, or whether no further action is warranted. This SI evaluated groundwater and soil for presence or absence of relevant compounds at each of the sampled AOIs.

4.1 Problem Statement

ARNG will recommend an AOI for Remedial Investigation (RI) if related soil and groundwater samples have concentrations of the relevant compounds above the OSD risk-based SLs. The SLs are presented in **Section 6.1** of this report.

4.2 Information Inputs

Primary information inputs included:

- The PA for AASF #3 (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)-QAPP Addendum (AECOM, 2022a); and
- Field data collected during the SI, including groundwater elevation and water quality parameters measured at the time of sampling.

4.3 Study Boundaries

The scope of the SI was bounded by the property limits of the facility (**Figure 2-2**). 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). The SI scope was bounded vertically by the observed depths of the surficial groundwater table. Temporal boundaries of the study were limited by seasonal conditions present during the Spring 2022 field work.

4.4 Analytical Approach

Samples were analyzed by Pace Analytical Gulf Coast, accredited under the Department of Defense (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 within this document and decision rules as defined in the SI QAPP Addendum (AECOM, 2022a).

4.5 Data Usability Assessment

The Data Usability Assessment (DUA), which is provided in **Appendix A**, 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 (DoD, 2019a; DoD, 2019b; USEPA, 2017).

Based on the DUA, the environmental data collected during the SI were found to be acceptable and usable for this SI evaluation with the qualifications documented in the DUA and its associated data validation reports. These data are of sufficient quality to meet the objectives and requirements of the SI QAPP Addendum (AECOM, 2022a).

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 Site Inspection Programmatic Uniform Federal Policy-Quality Assurance Project Plan (PQAPP)* dated March 2018 (AECOM, 2018a);
- *Final Programmatic Accident Prevention Plan* dated July 2018 (AECOM, 2018b);
- *Final Preliminary Assessment Report, Army Aviation Support Facility, Meridian* dated September 2020 (AECOM, 2020);
- *Final Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Addendum, Army Aviation Support Facility, Meridian, Mississippi* dated March 2022 (AECOM, 2022a); and
- *Final Site Safety and Health Plan, Army Aviation Support Facility, Meridian, Mississippi* dated April 2022 (AECOM, 2022b).

The SI field activities were conducted from 18 to 20 April 2022 and consisted of utility clearance, direct push boring, soil sample collection, temporary monitoring well installation, grab groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2022a), except as previously noted in **Section 5.8**.

The following samples were collected during the SI and analyzed by liquid chromatography with tandem mass spectrometry (LC/MS/MS) compliant with Quality Systems Manual (QSM) 5.3 Table B-15 to fulfill the project DQOs:

- Eighteen (18) soil samples from 10 borings;
- Six grab groundwater samples from six temporary wells; and
- Fourteen (14) quality assurance (QA)/quality control (QC) 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**, a Field Change Request form is provided in **Appendix B3**, and land survey data are provided in **Appendix B4**. 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 US Army Corps of Engineers (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 DQOs, and formulating a sampling approach to address the AOIs identified in the PA.

A combined TPP Meeting 1 and 2 was held on 10 March 2022, 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, USACE, MSARNG, Mississippi Department of Environmental Quality, and representatives familiar with the facility, the regulations, and the community. 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, 2022a).

A TPP Meeting 3 will be held (date to be determined) after the field event to discuss the results of the SI. Meeting minutes for TPP 3 will be 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 submitted a locate ticket with the Mississippi 811 utility clearance provider to notify them of intrusive work prior to field activities. Additionally, AECOM contracted Ground Penetrating Radar Systems, LLC (GPRS), a private utility location service, to perform utility clearance. GPRS performed utility clearance of the proposed boring locations on 18 April 2022 with input from the AECOM field team and AASF #3 facility staff. General locating services and ground-penetrating radar were used to complete the clearance. Additionally, the first 5 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 Sampling Equipment Acceptability

Two potable water sources at AASF #3 were sampled on 23 February 2022 to assess usability for decontamination of drilling equipment (MER-DECON-01 and MER-DECON-02). Results of the sample collected at the northwestern spigot (MER-DECON-01) confirmed this source to be acceptable for use in this investigation; therefore, it was used throughout the field activities. Specifically, the samples were analyzed by LC/MS/MS compliant with QSM 5.3 Table B-15. The results of the decontamination water samples used during the SI are provided in **Appendix F**. A discussion of the results is presented in the DUA (**Appendix A**).

Materials that were used within the sampling zone were confirmed as acceptable for use in the sampling environment. The checklist of acceptable materials for use in the sampling environment was provided in the Standard Operating Procedures (SOPs) appendix to the SI QAPP Addendum (AECOM, 2022a). Prior to the start of field work each day, a 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

Borings were installed in grass areas to avoid disturbing concrete or asphalt surfaces. Soil samples were collected via direct push technology (DPT), in accordance with the SI QAPP Addendum (AECOM, 2022a). A GeoProbe® 7730DT macrocore sampling system was used to collect continuous soil cores to the target depth. A hand auger was used to collect soil from the top 5 feet of the boring, in accordance with AECOM utility clearance procedures. Four soil boring locations, AOI01-03, AOI01-04, AOI02-03, and AOI02-04, were advanced only using a hand auger. Borings AOI01-03 and AOI01-04 were intended to be advanced only using a hand auger per the SI QAPP Addendum. Borings AOI02-03 and AOI02-04 were originally intended to be

converted into temporary wells once the target depth was reached; however, hand auger refusal was encountered at 4 feet bgs. Two additional offset locations were attempted at both locations in accordance with the SI QAPP Addendum, but refusal was encountered during each attempted offset. The soil boring locations are shown on **Figure 5-1**, and depths are provided **Table 5-1**.

Due to shallow groundwater encountered throughout the facility, two 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) and one subsurface soil sample approximately 2 feet above the groundwater table. This field change is further discussed in **Section 5.8**.

The soil cores were continuously logged for lithological descriptions by an AECOM 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 were completed to depths between 4 to 15 feet bgs. Fine-grained clayey sand and silty soils were observed as the dominant lithology of the unconsolidated sediments below AASF #3. The clayey sands were noted from surface elevations up to 13 feet bgs. Where identified, the silts were observed as shallow as 5 feet bgs to as deep as 15 feet bgs. Varying quantities of fine- to medium-grained sand were observed in all borings at nearly all depths. Lean clay was observed at AOI02-05 (8.5 to 10 feet bgs) near the southern boundary of the facility and MER-01 (3 to 8 feet bgs) along the northern boundary. Poorly graded sand soils were observed at the bottom of borings AOI01-02 (13 to 15 feet bgs) and AOI02-02 (8 to 10 feet bgs), located along the southern boundary of the facility. The sandy and clayey soils observed within the borings are consistent with the nonmarine sediments of the Hatchetigbee Formation.

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 FedEx under standard chain of custody (CoC) procedures to the laboratory and analyzed by LC/MS/MS compliant with QSM 5.3 Table B-15, total organic carbon (TOC) (USEPA Method 9060A) and pH (USEPA Method 9045D) in accordance with the SI QAPP Addendum (AECOM, 2022a).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. Matrix spike (MS)/MS duplicates (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 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.

DPT borings were converted to temporary wells, which were subsequently abandoned in accordance with the SI QAPP Addendum (AECOM, 2022a) using bentonite chips at completion of sampling activities. Borings were installed in grass areas to avoid disturbing concrete or asphalt surfaces.

5.3 Temporary Well Installation and Groundwater Grab Sampling

Temporary wells were installed using a GeoProbe® 7730 macrocore sampling system. Once the borehole was advanced to the desired depth, a temporary well was constructed of a 5-foot section of 1-inch Schedule 40 poly-vinyl chloride (PVC) screen with sufficient casing to reach ground surface. New PVC pipe and screen were used to avoid cross contamination between locations.

Temporary wells could not be installed at two boring locations, AOI02-02 and AOI02-04, due to an unknown, plastic-like object encountered at 4 feet bgs. Two additional offset locations were attempted at both locations in accordance with the SI QAPP Addendum, but refusal was encountered during each attempted offset. The screen intervals for the temporary wells are provided in **Table 5-2**.

Groundwater samples were collected after a period of time following well installation to allow groundwater to infiltrate and recharge the temporary well screen intervals. After the recharge period, groundwater samples were collected using a peristaltic pump with PFAS-free HDPE tubing. The temporary wells were purged at a rate determined in the field to reduce turbidity and draw down prior to sampling. Water quality parameters (e.g., temperature, specific conductance, pH, dissolved oxygen, and oxidation-reduction potential) were measured using a water quality meter and recorded on the field sampling form (**Appendix B2**) before each grab sample was collected. Additionally, a subsample of each groundwater sample was collected in a separate container, and a shaker test was completed to identify if there were any foaming. No foaming was noted in any of the groundwater subsamples.

Each 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 by LC/MS/MS compliant with QSM 5.3 Table B-15 in accordance with the SI QAPP Addendum (AECOM, 2022a).

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.

Following well surveying (described below in **Section 5.5**), temporary wells were abandoned in accordance with the SI QAPP Addendum (AECOM, 2022a) by removing the PVC and backfilling the hole with bentonite chips. Upon completion of well abandonment, the ground surface at each location was patched to match existing surrounding conditions.

5.4 Synoptic Water Level Measurements

A synoptic groundwater gauging event was performed on 20 April 2022. Groundwater elevation measurements were collected from the six new temporary monitoring wells. Water level measurements were taken from the northern side of the well casing. Groundwater depths ranged between 2.33 to 5.56 feet bgs. A groundwater flow contour map is provided in **Figure 2-4**. Groundwater elevation data are provided in **Table 5-2**.

5.5 Surveying

The northern side of each well casing was surveyed by Mississippi-licensed land surveyors following guidelines provided in the SOPs provided in the SI QAPP Addendum (AECOM, 2022a). Survey data from the newly installed wells on the facility were collected on 20 April 2022 in the applicable Universal Transverse Mercator zone projection with Mississippi State Plane-East North American Datum 1983 (NAD83, horizontal) and North American Vertical Datum 1988 (NAVD88, vertical). The surveyed well data are provided in **Appendix B4**.

5.6 Investigation-Derived Waste

As of the date of this report, the disposal of investigation-derived waste (IDW) is not regulated federally. IDW generated during the SI is considered non-hazardous waste and was managed in

accordance with the SI QAPP Addendum (AECOM, 2022a) and with the Army Guidance for Addressing Releases of PFAS, Q18 (DA, 2018).

Soil IDW (i.e., soil cuttings) generated during the SI activities were containerized in labeled, 55-gallon Department of Transportation (DOT)-approved steel drums and left onsite in a designated waste storage area immediately south of AOI 2. The soil IDW was not sampled and assumes the characteristics of the associated soil samples collected from that source location. Containerized soil IDW will be managed and disposed of by ARNG (either by offsite disposal or onsite disposal with treatment, as appropriate) under a separate contract. ARNG will further manage soil IDW in accordance with the Army Guidance for Addressing Releases of PFAS, Q18 (DA, 2018). ARNG will coordinate transportation and disposal of the soil IDW.

Liquid IDW generated during SI activities (i.e., purge water, development water, and decontamination fluids) were containerized in labeled, 55-gallon DOT-approved steel drums, and left onsite next to the soil IDW. The liquid IDW was not sampled and assumes the characteristics of the associated groundwater samples collected from that source location. Containerized liquid IDW will be managed and disposed of by ARNG (either by offsite disposal or onsite disposal with treatment, as appropriate) under a separate contract in accordance with SOP No. 042A (EA Engineering, Science, and Technology, Inc., 2021). ARNG will further manage liquid IDW in accordance with the Army Guidance for Addressing Releases of PFAS, Q18 (DA, 2018). ARNG will coordinate transportation and disposal of the liquid IDW.

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

5.8 Deviations from the SI QAPP Addendum

One deviation from the SI QAPP Addendum was identified during review of the field documentation. The deviation is noted below and is documented in Field Change Request Forms (**Appendix B3**).

- According to the SI QAPP Addendum, three soil samples were planned to be collected from each soil boring that was converted to a temporary well. All samples were supposed to target the soil above the water table in the vadose zone. However, due to shallow groundwater encountered at the facility (less than 6 feet bgs), only two samples could be collected.

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Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, AASF #3, Meridian, Mississippi

Sample Identification	Sample Collection Date/Time	Sample Depth (feet bgs)	LC/MS/MS compliant with QSM 5.3 Table B-15	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Comments
Soil Samples						
AOI01-01-SB-00-02	4/19/2022 8:55	0 - 2	x			
AOI01-01-SB-03-05	4/19/2022 9:00	3 - 5	x			
AOI01-01-SB-03-05-D	4/19/2022 9:00	3 - 5	x			Duplicate
AOI01-02-SB-00-02	4/19/2022 9:10	0 - 2	x			
AOI01-02-SB-03-05	4/19/2022 9:20	3 - 5	x	x	x	
AOI01-02-SB-03-05-MS	4/19/2022 9:20	3 - 5		x	x	MS
AOI01-02-SB-03-05-MSD	4/19/2022 9:20	3 - 5		x	x	MSD
AOI01-03-SB-00-02	4/18/2022 13:45	0 - 2	x			
AOI01-03-SB-00-02-MS	4/18/2022 13:45	0 - 2	x			MS
AOI01-03-SB-00-02-MSD	4/18/2022 13:45	0 - 2	x			MSD
AOI01-04-SB-00-02	4/18/2022 14:05	0 - 2	x			
AOI02-01-SB-00-02	4/18/2022 13:00	0 - 2	x			
AOI02-01-SB-03-05	4/18/2022 13:05	3 - 5	x			
AOI02-02-SB-00-02	4/18/2022 14:40	0 - 2	x			
AOI02-02-SB-03-05	4/18/2022 14:45	3 - 5	x			
AOI02-03-SB-00-02	4/19/2022 8:30	0 - 2	x			
AOI02-03-SB-02-04	4/19/2022 8:35	2 - 4	x			
AOI02-04-SB-00-02	4/18/2022 16:00	0 - 2	x	x	x	
AOI02-04-SB-00-02-D	4/18/2022 16:00	0 - 2		x	x	Duplicate
AOI02-04-SB-02-04	4/18/2022 16:00	2 - 4	x			
AOI02-05-SB-00-02	4/18/2022 13:45	0 - 2	x			
AOI02-05-SB-00-02-D	4/18/2022 13:45	0 - 2	x			Duplicate
AOI02-05-SB-03-05	4/18/2022 13:50	3 - 5	x			
MER-01-SB-00-02	4/18/2022 10:40	0 - 2	x			
MER-01-SB-03-05	4/18/2022 12:10	3 - 5	x			

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, AASF #3, Meridian, Mississippi

Sample Identification	Sample Collection Date/Time	Sample Depth (feet bgs)	LC/MS/MS compliant with QSM 5.3 Table B-15	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Comments
Groundwater Samples						
AOI01-01-GW	4/20/2022 8:30	NA	x			
AOI01-02-GW	4/20/2022 9:25	NA	x			
AOI02-01-GW	4/19/2022 15:45	NA	x			
AOI02-01-GW-D	4/19/2022 15:45	NA	x			Duplicate
AOI02-01-GW-MS	4/19/2022 15:45	NA	x			MS
AOI02-01-GW-MSD	4/19/2022 15:45	NA	x			MSD
AOI02-02-GW	4/19/2022 17:25	NA	x			
AOI02-05-GW	4/19/2022 16:40	NA	x			
MER-01-GW	4/19/2022 8:30	NA	x			
Quality Control Samples						
MER-FRB-01	4/18/2022 14:45	NA	x			FRB
MER-ERB-01	4/18/2022 11:20	NA	x			Drill rig shoe
MER-ERB-02	4/20/2022 8:20	NA	x			Driller hand auger
MER-ERB-03	4/20/2022 8:25	NA	x			AECOM hand auger
MER-DECON-01	2/23/2022 8:08	NA	x			Northwestern spigot
MER-DECON-02	2/23/2022 8:15	NA	x			Northeastern spigot
MER-DECON-03	4/19/2022 11:40	NA	x			Rig tank

Notes:
ASTM = American Society for Testing and Materials
bgs = below ground surface
ERB = equipment rinsate blank
FRB = field reagent blank
LC/MS/MS = Liquid Chromatography Mass Spectrometry
MS/MSD = matrix spike/ matrix spike duplicate
QSM = Quality Systems Manual
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

Table 5-2
Soil Boring Depths, Temporary Well Screen Intervals, and Groundwater Elevations
Site Inspection Report, AASF #3, Meridian, Mississippi

Area of Interest	Boring Location	Soil Boring Depth (feet bgs)	Temporary 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	AOI01-01	15	8-13	307.38	303.54	7.60	3.76	299.78
	AOI01-02[1]	15	9-14	304.37	303.65	6.28	5.56	298.09
2	AOI02-01	15	10-15	303.00	301.86	5.89	4.75	297.11
	AOI02-02	10	5-10	300.69	300.14	3.61	3.06	297.08
	AOI02-03[2]	4	N/A	N/A	N/A	N/A	N/A	N/A
	AOI02-04[2]	4	N/A	N/A	N/A	N/A	N/A	N/A
	AOI02-05	10	5-10	301.52	300.51	4.58	3.57	296.94
Facility-wide	MER-01	10	5-10	303.28	301.62	3.99	2.33	299.29

Notes:
1. Depth to water was measured immediately prior to sampling. Sampling occurred within 16 hours of the synoptic gauging measurement (9.62 feet btoc).
2. No temporary well was installed due to early refusal.

bgs = below ground surface
btoc = below top of casing
NAVD88 = North American Vertical Datum 1988

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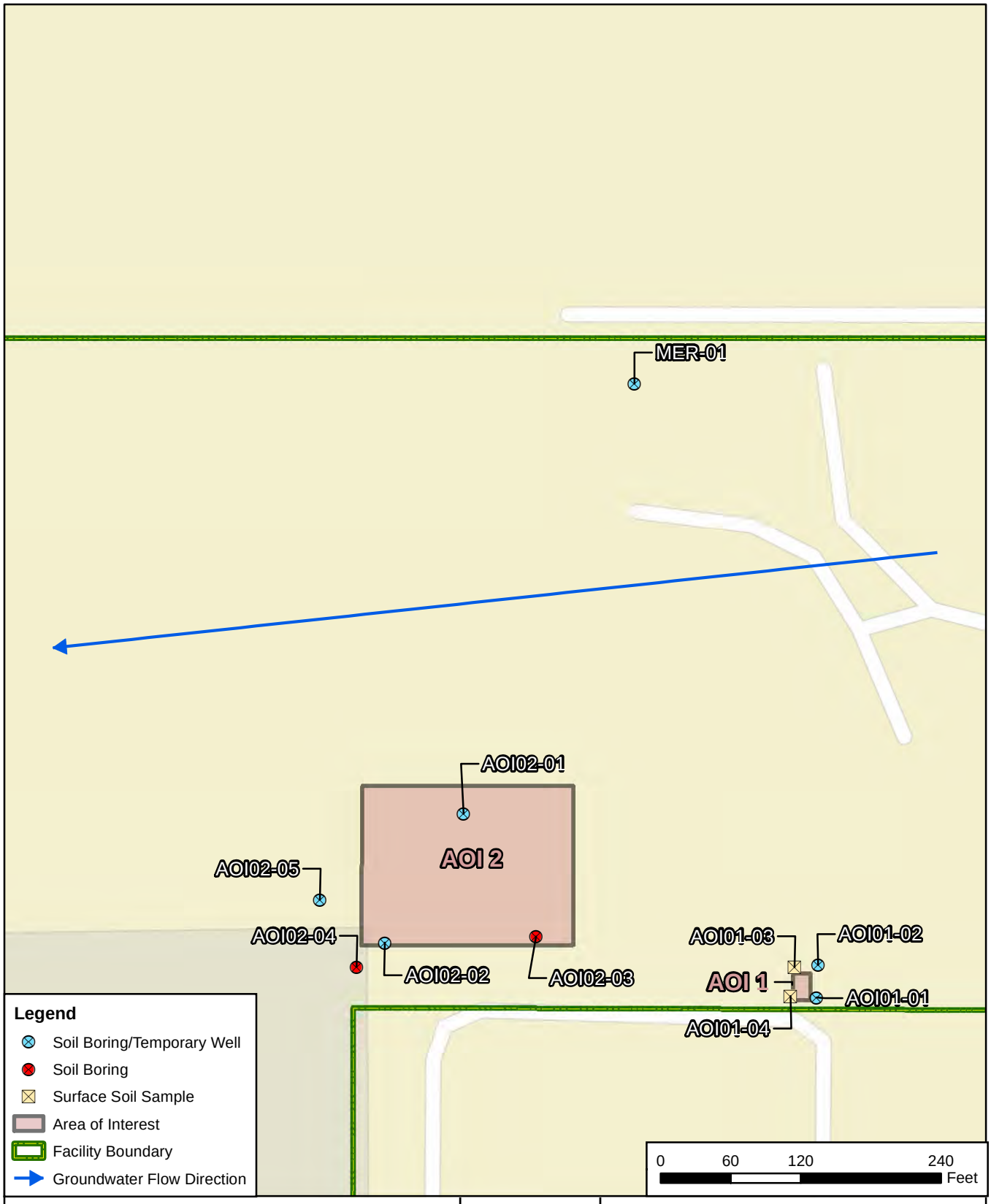

CLIENT	ARNG			
PROJECT	Site Inspection at Meridian AASF, MS			
REVISED	11/8/2022	GIS BY	MS	11/8/2022
SCALE		CHK BY	CD	11/8/2022
Base Map: National Agricultural Imagery Program, 2017. Sources: Esri, HERE, Garmin, USGS, Intermap,		PM	CM	11/8/2022

N

Site Inspection Sample Locations

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-1

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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 6.4**. **Table 6-2** through **Table 6-4** present results in soil or groundwater for the relevant compounds. 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 OSD dated 6 July 2022 (Assistant Secretary of Defense, 2022). 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 the five compounds presented on **Table 6-1** below.

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

Analyte[b]	Residential (Soil) (µg/kg)[a] 0-2 feet bgs	Industrial/ Commercial Composite Worker (Soil) (µg/kg)[a] 2-15 feet bgs	Tap Water (Groundwater) (ng/L)[a]
PFOA	19	250	6
PFOS	13	160	4
PFBS	1,900	25,000	601
PFHxS	130	1,600	39
PFNA	19	250	6

Notes:
bgs = below ground surface; µg/kg = micrograms per kilogram; ng/L = nanograms per liter

a.) Assistant Secretary of Defense, 2022. Risk Based Screening Levels in Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. Hazard Quotient (HQ) = 0.1. 6 July 2022.

b.) Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the CSM developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of MIL-SPEC AFFF and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

The data in the subsequent sections are compared to 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 facility: 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, select 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. According to the Interstate Technology Regulatory Council (ITRC), several important 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: Release Area A. The soil and groundwater results are summarized on **Table 6-2** through **Table 6-4**. Soil and groundwater results are presented on **Figure 6-1** through **Figure 6-7**.

6.3.1 AOI 1 Soil Analytical Results

Figure 6-1 through **Figure 6-5** present the ranges of detections in soil. **Table 6-2** through **Table 6-3** summarize the soil results.

Surface soil was sampled from 0 to 2 feet bgs from boring locations AOI01-01 through AOI01-04. Soil was also sampled from shallow subsurface soil (3 to 5 feet bgs) from boring locations AOI01-01 and AOI01-02. Deep subsurface soil was not collected due to shallow groundwater. PFOA, PFOS, PFBS, PFHxS, and PFNA and were detected in soil, at concentrations below their SLs in the surface and shallow subsurface soil.

In surface soil, PFOA, PFOS, PFHxS, and PFNA were detected at all four locations, and PFBS was detected at one of four locations. The constituents were all detected at concentrations below their SLs. The maximum detected concentration was for PFNA, detected at 14.9 µg/kg at AOI01-04, below the SL of 19 µg/kg.

In shallow subsurface soil, PFOA, PFOS, PFHxS, and PFNA were detected at both locations, and PFBS was only detected at AOI01-02. The relevant compounds were all detected at concentrations at least one order of magnitude below the SLs. The maximum concentration detected was PFNA at 12.9 J µg/kg at AOI01-01.

6.3.2 AOI 1 Groundwater Analytical Results

Groundwater was sampled from temporary monitoring wells AOI01-01 and AOI01-02. **Figure 6-6** and **Figure 6-7** present the ranges of detections in groundwater. **Table 6-4** summarizes the groundwater results. The following exceedances of the SLs were measured:

- PFOA was detected above the SL of 6 ng/L, with concentrations of 3,160 ng/L at AOI01-01 and 45.5 ng/L at AOI01-02.
- PFOS was detected above the SL of 4 ng/L, with concentrations of 391 ng/L at AOI01-01 and 15.7 ng/L at AOI01-02.

- PFHxS was detected above the SL of 39 ng/L, with concentrations of 473 ng/L at AOI01-01 and 47.4 ng/L at AOI01-02.
- PFNA was detected above the SL of 6 ng/L, with a concentration of 988 ng/L at AOI01-01.

PFBS did not exceed the SL of 601 ng/L at either temporary well. The maximum detected concentration of PFBS was 61.7 ng/L at AOI01-01.

6.3.3 AOI 1 Conclusions

Based on the results of the SI, PFOA, PFOS, PFBS, PFHxS, and PFNA and were detected in soil below their SLs. PFOA, PFOS, PFHxS, and PFNA were detected in groundwater at concentrations above their SLs. Based on the exceedances of the SLs 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: Release Area B. The results in soil and groundwater are summarized on **Table 6-2** through **Table 6-4**. Soil and groundwater results are presented on **Figure 6-1** through **Figure 6-7**.

6.4.1 AOI 2 Soil Analytical Results

Figure 6-1 through **Figure 6-5** present the ranges of detections in soil. **Table 6-2** through **Table 6-3** summarize the soil results.

Surface soil was sampled from 0 to 2 feet bgs from boring locations AOI02-01 through AOI02-05, as well as the side-gradient boring location MER-01. Soil was also sampled from shallow subsurface soil (2 to 5 feet bgs) from boring locations AOI02-01 through AOI02-05 and side-gradient boring location MER-01. Deep subsurface soil was not collected. PFOA, PFOS, PFBS, PFHxS, and PFNA and were detected in soil, at concentrations below their SLs in the surface and shallow subsurface soil.

In surface soil, PFOA and PFOS were detected at all six locations, PFHxS and PFNA were detected in five of six surface samples, and PFBS was detected at one of six locations. The relevant compounds were all detected below their SLs. The maximum concentration detected was PFOS, which was detected at 2.67 µg/kg at AOI02-04, below the 13 µg/kg SL.

In shallow subsurface soil, PFOS and PFHxS were detected at all six locations, PFOA was detected at three of six locations, and PFNA was detected at two of six locations; PFBS was not detected. The relevant compounds were all detected at least two orders of magnitude below the SLs. The maximum concentration detected was PFOS at 0.669 J µg/kg at AOI02-03.

6.4.2 AOI 2 Groundwater Analytical Results

Groundwater at AOI 2 was sampled from temporary monitoring wells AOI02-01, AOI02-02, and AOI02-05. Groundwater was also sampled from the side-gradient temporary well MER-01. **Figure 6-6** and **Figure 6-7** present the ranges of detections in groundwater. **Table 6-4** summarizes the groundwater results. The following exceedances of the SLs were measured:

- PFOA was detected above the SL of 6 ng/L at all three temporary wells, with concentrations ranging from 6.38 ng/L at AOI02-02 to 69.0 ng/L at AOI02-05. PFOA was also detected above the SL at MER-01, with a concentration of 17.8 ng/L.

- PFOS was detected above the SL of 4 ng/L at all three temporary wells, with concentrations ranging from 4.94 ng/L at AOI02-02 to 594 at AOI02-05. PFOS was also detected above the SL at MER-01, with a concentration of 13.0 ng/L.
- PFHxS was detected above the SL of 39 ng/L at all three temporary wells, with concentrations ranging from 84.3 J- ng/L at AOI02-01 to 497 ng/L at AOI02-02. PFHxS was also detected above the SL at MER-01, with a concentration of 70.8 ng/L.
- PFNA was detected above the SL of 6 ng/L at one temporary well (AOI02-05), with a concentration of 18.8 ng/L.

PFBS did not exceed the SL of 601 ng/L at any of the temporary wells. The maximum detected concentration of PFBS was 43.6 ng/L at AOI02-02.

6.4.3 AOI 2 Conclusions

Based on the results of the SI, PFOA, PFOS, PFBS, PFHxS, and PFNA and were detected in soil below their respective SLs. PFOA, PFOS, PFHxS, and PFNA were detected in groundwater at concentrations above their respective SLs. Based on the exceedances of the SLs in groundwater, further evaluation at AOI 2 is warranted.

Table 6-2
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, Meridian AASF

Area of Interest		AOI01								AOI02											
Sample ID		AOI01-01-SB-00-02		AOI01-02-SB-00-02		AOI01-03-SB-00-02		AOI01-04-SB-00-02		AOI02-01-SB-00-02		AOI02-02-SB-00-02		AOI02-03-SB-00-02		AOI02-04-SB-00-02		AOI02-05-SB-00-02		AOI02-05-SB-00-02-D	
Sample Date		04/19/2022		04/19/2022		04/18/2022		04/18/2022		04/18/2022		04/18/2022		04/19/2022		04/18/2022		04/18/2022		04/18/2022	
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, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
PFBS	1900	ND	U	0.372	J	ND	U	ND	U	ND	U	ND	U	ND	U	0.022	J	ND	U	ND	U
PFHxS	130	0.045	J	2.10		0.043	J	0.087	J	0.072	J	ND	U	0.438	J	0.685	J	0.102	J	0.142	J
PFNA	19	4.54		0.160	J	12.2	J	14.9		0.308	J	0.042	J	0.046	J	0.036	J	0.611	J	0.839	J
PFOA	19	2.95		1.26		4.78	J-	3.96		0.301	J	0.103	J	0.604	J	0.244	J	0.596	J	0.740	J
PFOS	13	0.435	J	2.30		0.554	J	1.35		1.54		0.287	J	0.821	J	2.67		1.71		2.64	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on residential scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J- = Estimated concentration, biased low

U = The analyte was not detected at a level greater than or equal to the adjusted DL

Notes

ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

Limit of Detection (LOD) ranges for relevant compounds:

PFBS: 0.051-0.063 µg/kg

PFHxS: 0.102-0.127 µg/kg

PFNA: 0.051-0.063 µg/kg

PFOA: 0.204-0.253 µg/kg

PFOS: 0.204-0.253 µg/kg

Chemical Abbreviations

PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
D	duplicate
DL	detection limit
ft	feet
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
MER	Meridian
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

Table 6-2
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, Meridian AASF

Area of Interest		Facility-wide	
Sample ID		MER-01-SB-00-02	
Sample Date		04/18/2022	
Depth		0-2 ft	
Analyte	**OSD Screening Level [a]**	**Result**	**Qual**
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)			
PFBS	1900	ND	U
PFHxS	130	0.187	J
PFNA	19	ND	U
PFOA	19	0.148	J
PFOS	13	0.291	J

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on residential scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J- = Estimated concentration, biased low

U = The analyte was not detected at a level greater than or equal to the adjusted DL

Notes

ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

Limit of Detection (LOD) ranges for relevant compounds:

PFBS: 0.051-0.063 µg/kg

PFHxS: 0.102-0.127 µg/kg

PFNA: 0.051-0.063 µg/kg

PFOA: 0.204-0.253 µg/kg

PFOS: 0.204-0.253 µg/kg

Chemical Abbreviations

PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
D	duplicate
DL	detection limit
ft	feet
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
MER	Meridian
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

Table 6-3
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Shallow Subsurface Soil
Site Inspection Report, Meridian AASF

Area of Interest		AOI01						AOI02										Facility-wide	
Sample ID		AOI01-01-SB-03-05		AOI01-01-SB-03-05-D		AOI01-02-SB-03-05		AOI02-01-SB-03-05		AOI02-02-SB-03-05		AOI02-03-SB-02-04		AOI02-04-SB-02-04		AOI02-05-SB-03-05		MER-01-SB-03-05	
Sample Date		04/19/2022		04/19/2022		04/19/2022		04/18/2022		04/18/2022		04/19/2022		04/18/2022		04/18/2022		04/18/2022	
Depth		3-5 ft		3-5 ft		3-5 ft		3-5 ft		3-5 ft		2-4 ft		2-4 ft		3-5 ft		3-5 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, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																			
PFBS	25000	ND	U	ND	U	0.205	J	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PFHxS	1600	ND	UJ	0.039	J	0.891	J	0.040	J	0.536	J	0.284	J	0.216	J	0.584	J	0.064	J
PFNA	250	1.65	J	12.9	J	0.190	J	0.037	J	ND	U	0.035	J	ND	U	ND	U	ND	U
PFOA	250	2.33	J	5.14	J	1.36		ND	U	ND	U	0.307	J	0.139	J	0.173	J	ND	U
PFOS	160	0.375	J	1.06	J	1.57		0.312	J	0.092	J	0.669	J	0.065	J	0.162	J	0.059	J

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

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

Notes

ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

Limit of Detection (LOD) ranges for relevant compounds:

PFBS: 0.053-0.058 µg/kg

PFHxS: 0.105-0.117 µg/kg

PFNA: 0.053-0.058 µg/kg

PFOA: 0.211-0.233 µg/kg

PFOS: 0.211-0.233 µg/kg

Chemical Abbreviations

PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
D	duplicate
DL	detection limit
ft	feet
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
MER	Meridian
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

Table 6-4
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Groundwater
Site Inspection Report, Meridian AASF

Area of Interest		AOI01				AOI02								Facility-wide	
Sample ID		AOI01-01-GW		AOI01-02-GW		AOI02-01-GW		AOI02-01-GW-D		AOI02-02-GW		AOI02-05-GW		MER-01-GW	
Sample Date		04/20/2022		04/20/2022		04/19/2022		04/19/2022		04/19/2022		04/19/2022		04/19/2022	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Water, LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)															
PFBS	601	61.7		6.84		8.34		7.53		43.6		9.57		3.13	J
PFHxS	39	473		47.4		92.8	J-	84.3	J-	497		397		70.8	
PFNA	6	988		5.79		2.65	J	2.30	J	ND	U	18.8		ND	U
PFOA	6	3160		45.5		23.0		20.9		6.38		69.0		17.8	
PFOS	4	391		15.7		52.4		45.8		4.94		594		13.0	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022 Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

Interpreted Qualifiers

J = Estimated concentration

J- = Estimated concentration, biased low

U = The analyte was not detected at a level greater than or equal to the adjusted DL

Notes

ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

Limit of Detection (LOD) ranges for relevant compounds:

PFBS: 1.85-8.93 ng/L

PFHxS: 2.78-13.4 ng/L

PFNA: 1.85-8.93 ng/L

PFOA: 1.85-8.93 ng/L

PFOS: 1.85-8.93 ng/L

Chemical Abbreviations

PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
D	duplicate
DL	detection limit
GW	groundwater
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
MER	Meridian
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
USEPA	United States Environmental Protection Agency
ng/l	nanogram per liter

CLIENT	ARNG			
PROJECT	Site Inspection at Meridian AASF, MS			
REVISED	9/19/2022	GIS BY	MS	9/19/2022
SCALE	1:1,080	CHK BY	CD	9/19/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	9/19/2022

Legend

Facility Boundary

0 45 90 180 Feet

Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

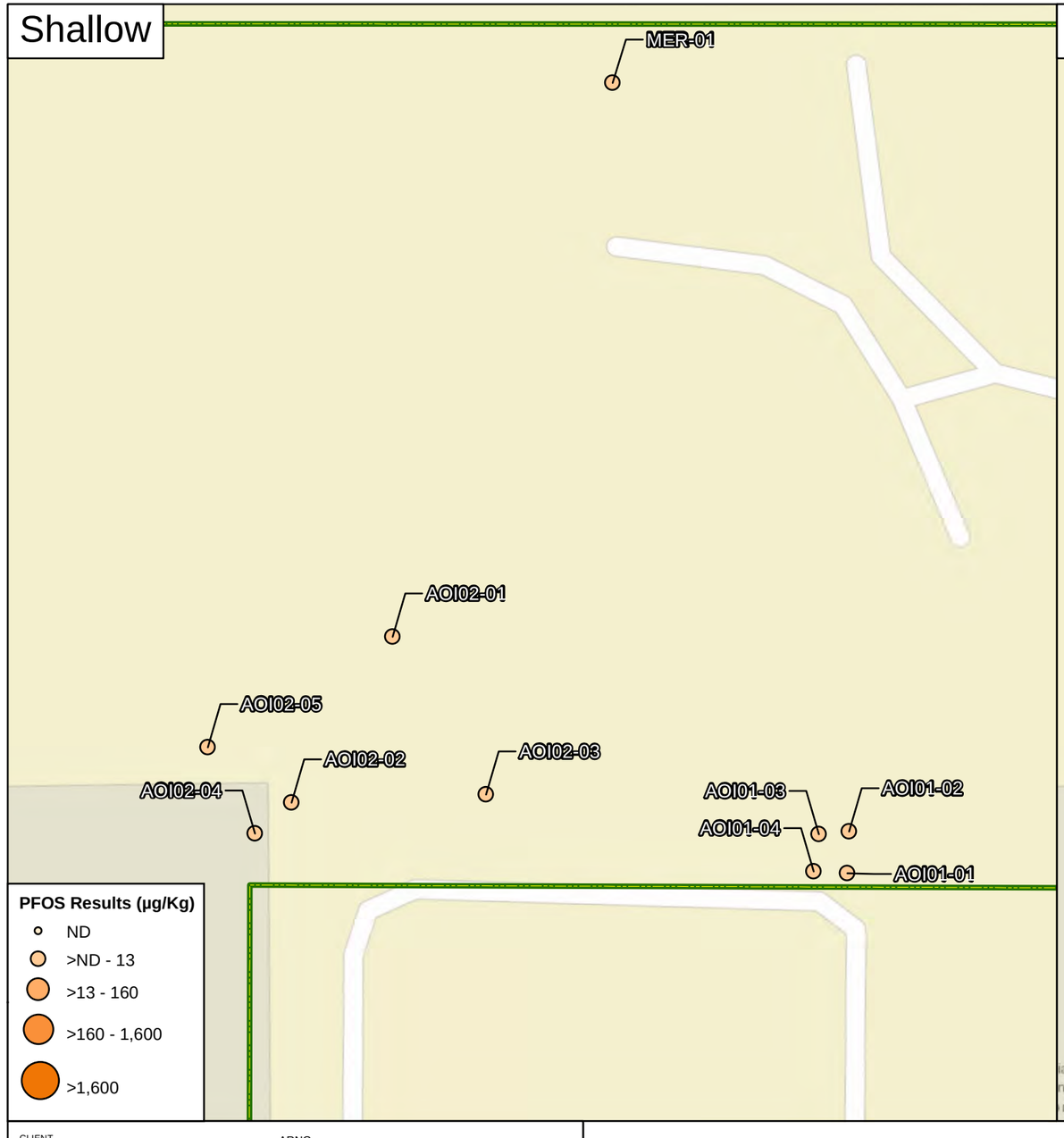
N

PFOA Detections in Soil

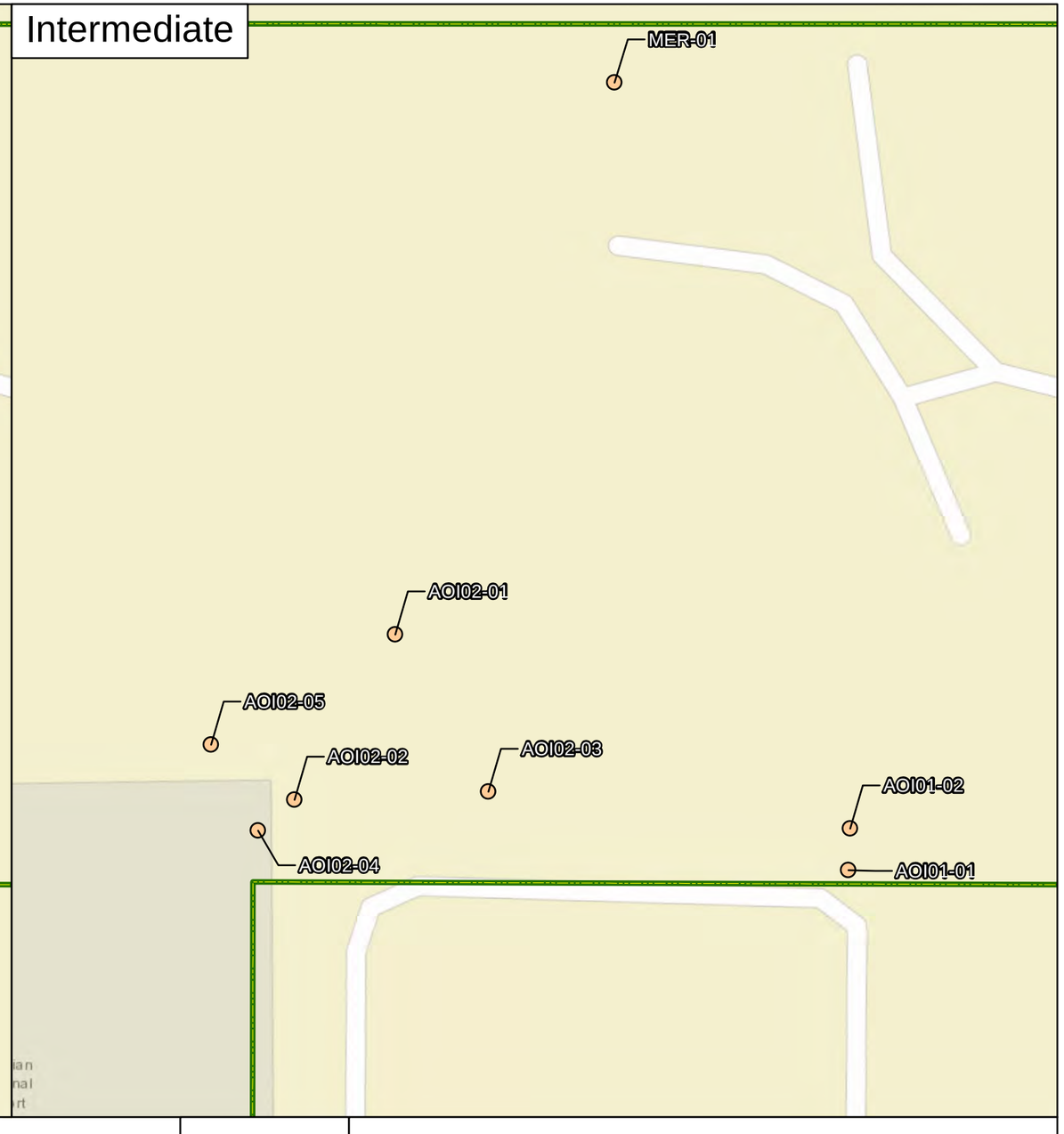
AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-1

Shallow



Intermediate



PFOS Results (µg/Kg)

- ND
- >ND - 13
- >13 - 160
- >160 - 1,600
- >1,600

CLIENT	ARNG			
PROJECT	Site Inspection at Meridian AASF, MS			
REVISED	9/19/2022	GIS BY	MS	9/19/2022
SCALE	1:1,080	CHK BY	CD	9/19/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	9/19/2022

Legend

Facility Boundary

0 45 90 180 Feet

Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

PFOS Detections in Soil

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-2

Shallow

Intermediate

MER-01

AOI02-01

AOI02-05

AOI02-02

AOI02-03

AOI02-04

AOI01-03

AOI01-02

AOI01-04

AOI01-01

PFBS Results (µg/Kg)

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

CLIENT	ARNG			
PROJECT	Site Inspection at Meridian AASF, MS			
REVISED	9/19/2022	GIS BY	MS	9/19/2022
SCALE	1:1,080	CHK BY	CD	9/19/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	9/19/2022

Legend

Facility Boundary

0 45 90 180 Feet

Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

PFBS Detections in Soil

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-3

Shallow

Intermediate

MER-01

AOI02-01

AOI02-05

AOI02-02

AOI02-03

AOI02-04

AOI01-03

AOI01-02

AOI01-04

AOI01-01

PFHxS Results (µg/Kg)

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

CLIENT	ARNG			
PROJECT	Site Inspection at Meridian AASF, MS			
REVISED	9/19/2022	GIS BY	MS	9/19/2022
SCALE	1:1,080	CHK BY	CD	9/19/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	9/19/2022

Legend

Facility Boundary

0 45 90 180 Feet

Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

PFHxS Detections in Soil

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-4

CLIENT	ARNG			
PROJECT	Site Inspection at Meridian AASF, MS			
REVISED	9/19/2022	GIS BY	MS	9/19/2022
SCALE	1:1,080	CHK BY	CD	9/19/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	9/19/2022

Legend

Facility Boundary

0 45 90 180 Feet

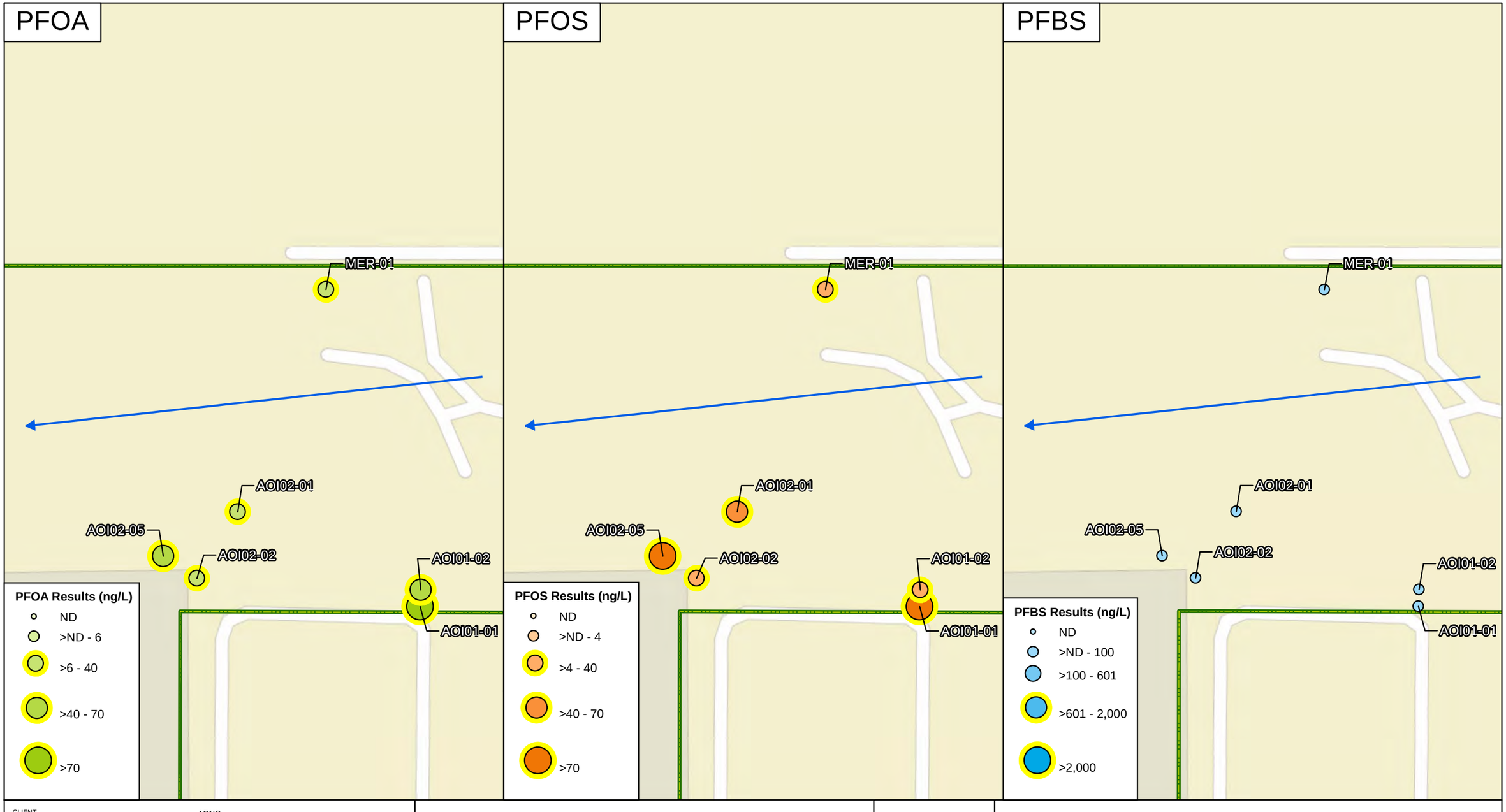
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

PFNA Detections in Soil

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-5



CLIENT	ARNG			
PROJECT	Site Inspection at Meridian AASF, MS			
REVISED	10/6/2022	GIS BY	MS	10/6/2022
SCALE	1:1,920	CHK BY	CD	10/6/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	10/6/2022

Legend

Facility Boundary

Groundwater Flow Direction

0 80 160 320 Feet

Exceedances of the OSD SL are depicted with a yellow halo.

N

PFOA, PFOS, and PFBS Detections in Groundwater

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-6

PFHxS

PFNA

MER-01

AOI02-01

AOI02-05

AOI02-02

AOI01-02

AOI01-01

PFHxS Results (ng/L)

- ND
- >ND - 39
- >39 - 100
- >100 - 1,000
- >1,000

PFNA Results (ng/L)

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

CLIENT	ARNG			
PROJECT	Site Inspection at Meridian AASF, MS			
REVISED	9/19/2022	GIS BY	MS	9/19/2022
SCALE	1:1,200	CHK BY	CD	9/19/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	9/19/2022

Legend

- Groundwater Flow Direction
- Facility Boundary

0 50 100 200 Feet

Exceedances of the OSD SL are depicted with a yellow halo.

N

PFHxS and PFNA Detections in Groundwater

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-7

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7. Exposure Pathways

The CSMs for each AOI, revised based on the SI findings, are presented on **Figure 7-1** and **Figure 7-2**. Please note that while the CSM discussion assists in determining if a receptor may be impacted, the decision to move from SI to RI or interim action is determined based upon exceedances of the SLs for the relevant compounds and whether the release is more than likely attributable to the DoD. 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 the relevant compounds 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 relevant compounds above the SLs. Areas with an identified potentially complete pathway that have detections of the relevant compounds above the SLs may warrant further investigation. Although the CSMs indicate whether potentially complete exposure pathways may exist, the recommendation for future study in an RI or no action at this time is based on the comparison of the SI analytical results for the relevant compounds to the SLs.

In general, the potential routes of exposure to the relevant compounds 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 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 (although unlikely due to restricted access), residents outside the facility boundary, and recreational users outside of the facility boundary. No construction was observed during SI field activities.

7.1 Soil Exposure Pathway

The SI results in soil were used to determine whether a potentially complete pathway exists between the source and potential receptors at AOI 1 and AOI 2 based on the aforementioned criteria.

7.1.1 AOI 1

An AFFF-equipped fire suppression system was installed in the hangar in 2007. The fire suppression system includes an outdoor upright 500-gallon tank. The bladder of the tank was replaced between 2015 to 2016. Evidence of leaked/spilled AFFF was observed on the outside

of the tank during the visual site inspection. Spills from the tank would have resulted in impacts to the surface soil.

PFOA, PFOS, PFBS, PFHxS, and PFNA were detected in surface soil at AOI 1. Site workers, future construction workers, and trespassers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathways for these receptors are potentially complete. PFOA, PFOS, PFBS, PFHxS, and PFNA were detected in shallow subsurface soil at AOI 1. Future construction workers could contact constituents in shallow subsurface soil via incidental ingestion, and therefore, the subsurface soil exposure pathway for future construction workers is potentially complete. The pathways for offsite residents and recreational users are incomplete. The CSM for AOI 1 is presented on **Figure 7-1**.

7.1.2 AOI 2

Approximately 10 Tri-Max™ carts were positioned at the wash rack area between 2007 to 2011/2012. A contractor for the State of Mississippi emptied the units prior to removing them from the facility. It is unknown if the AFFF were discharged down the wash rack or in the nearby, adjacent grassy areas. The wash rack conveys water to the OWS then to the sanitary sewer.

PFOA, PFOS, PFBS, PFHxS, and PFNA were detected in surface soil at AOI 2. Site workers, future construction workers, and trespassers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathways for these receptors are potentially complete. PFOA, PFOS, PFHxS, and PFNA were detected in shallow subsurface soil at AOI 2. Future construction workers could contact constituents in shallow subsurface soil via incidental ingestion; therefore, the subsurface soil exposure pathway for future construction workers is potentially complete. The pathways for offsite residents and recreational users are incomplete. The CSM for AOI 2 is presented on **Figure 7-2**.

7.2 Groundwater Exposure Pathway

The SI results in groundwater were used to determine whether a potentially complete pathway exists between the source and potential receptors based on the aforementioned criteria.

7.2.1 AOI 1

PFOA, PFOS, PFHxS, and PFNA were detected above their respective SLs in groundwater samples collected at AOI 1. Domestic wells and wells of unknown use are located within a 4-mile radius of the facility. These wells are screened in the unconfined Wilcox Group, at least 135 feet bgs; therefore, the pathway for exposure to off-facility residents via ingestion of groundwater is considered potentially complete. Additionally, drinking water at the facility is supplied by the City of Meridian and is sourced from eight potable wells pumping from the Lower Wilcox aquifer. Therefore, the pathway for exposure to site workers via ingestion of groundwater is considered potentially complete. Depths to water measured at AOI 1 in April 2022 during the SI ranged from 3.76 to 5.56 feet bgs. The construction worker exposure scenario assumes excavation occurs at depths at or above 15 feet bgs. Therefore, the ingestion exposure pathway for future construction workers is considered potentially complete with exceedance of SL. Additionally, during wet periods, the water level may rise to depths shallower than 2 feet bgs. Therefore, the incidental ingestion pathway for future site workers is considered potentially complete when the groundwater is shallower than 2 feet bgs. The incidental exposure pathway to recreational users is incomplete. The CSM for AOI 1 is presented on **Figure 7-1**.

7.2.2 AOI 2

PFOA, PFOS, PFHxS, and PFNA were detected above their respective SLs in groundwater samples collected at AOI 2. Domestic wells and wells of unknown use that are screened within the unconfined Wilcox Group are located within a 4-mile radius of the facility. Therefore, the pathway for exposure to off-facility residents via ingestion of groundwater is considered potentially complete. Additionally, facility drinking water is sourced from the Lower Wilcox aquifer; consequently, the pathway for exposure to site workers via ingestion of groundwater is considered potentially complete. Depths to water measured at AOI 2 in April 2022 during the SI ranged from 3.06 to 4.75 feet bgs. The construction worker exposure scenario assumes excavation occurs at depths at or above 15 feet bgs. Therefore, the ingestion exposure pathway for future construction workers is considered potentially complete with exceedance of SL. Additionally, during wet periods, the water level may rise to depths shallower than 2 feet bgs. Therefore, the incidental ingestion pathway for future site workers is considered potentially complete when the groundwater is shallower than 2 feet bgs. The incidental exposure pathway to recreational users is incomplete. The CSM for AOI 2 is presented on **Figure 7-2**.

7.3 Surface Water and Sediment Exposure Pathway

The SI results in 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. PFOA, PFOS, PFBS, PFHxS, and PFNA were detected in soil and shallow groundwater at AOI 1; therefore, it is possible that those compounds may have migrated from soil and groundwater to the stormwater management area, wetlands, and/or Okatibbee Creek via shallow groundwater discharge, storm water flow, and overland flow. Chickasawhay River, an outfall of the Okatibbee Creek, adjoins numerous residences and is used recreationally. Therefore, the surface water and sediment ingestion exposure pathways for site workers, future construction workers, and recreational users are considered potentially complete. Drinking water is sourced from the Lower Wilcox aquifer; therefore, the residential exposure pathway is incomplete for surface water and sediment. The CSM for AOI 1 is presented on **Figure 7-1**.

7.3.2 AOI 2

PFOA, PFOS, PFBS, PFHxS, and PFNA were detected in soil and shallow groundwater at AOI 2, and it is possible that those compounds may have migrated from soil and groundwater to the stormwater management area, wetlands, and/or Okatibbee Creek via shallow groundwater discharge, storm water flow, and overland flow. Chickasawhay River, an outfall of the Okatibbee Creek, adjoins numerous residences and is used recreationally. Therefore, the surface water and sediment ingestion exposure pathways for site workers, future construction workers, and recreational users are considered potentially complete. Drinking water is sourced from the Lower Wilcox aquifer; therefore, the residential exposure pathway is incomplete for surface water and sediment. The CSM for AOI 2 is presented on **Figure 7-2**.

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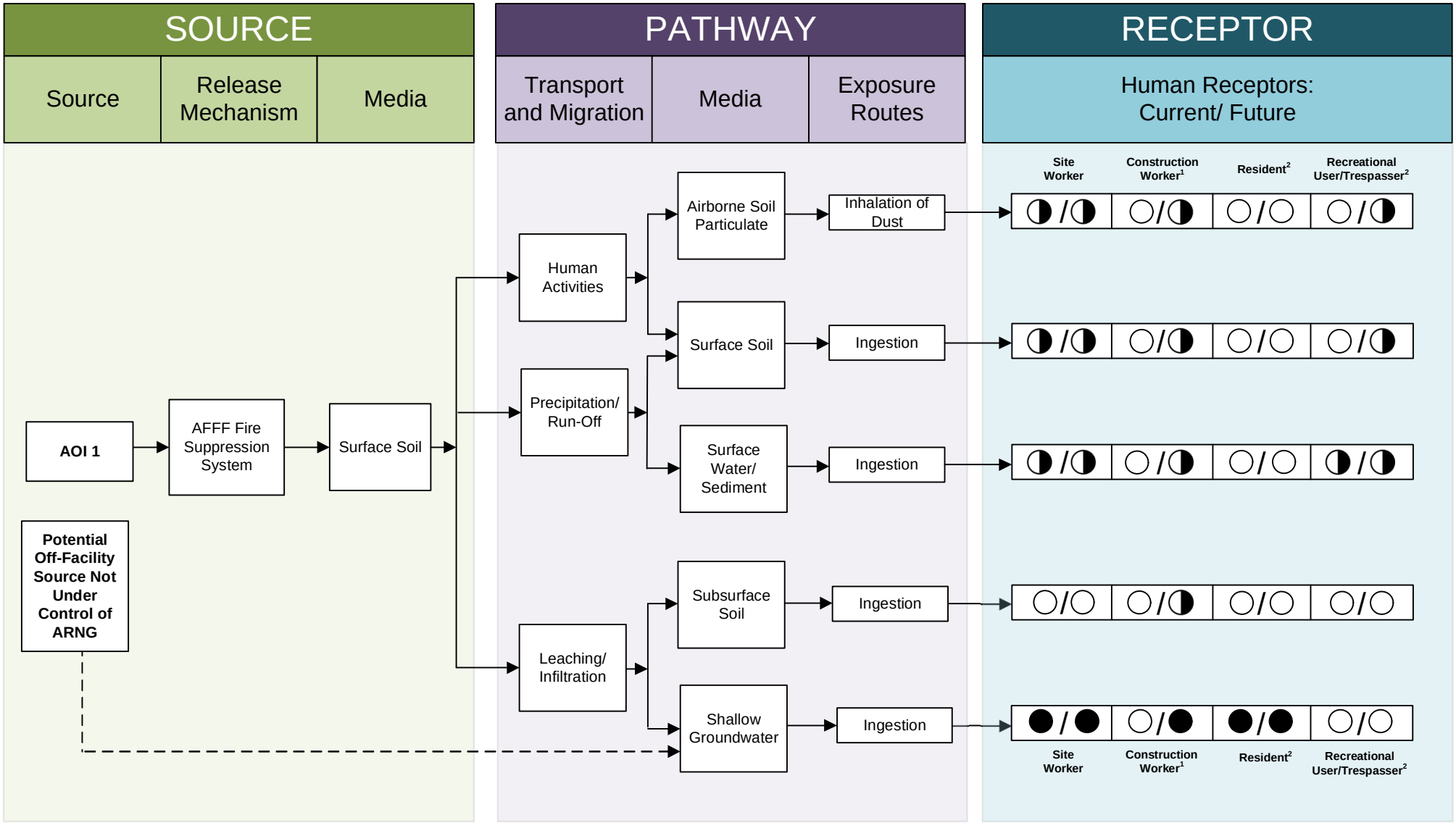


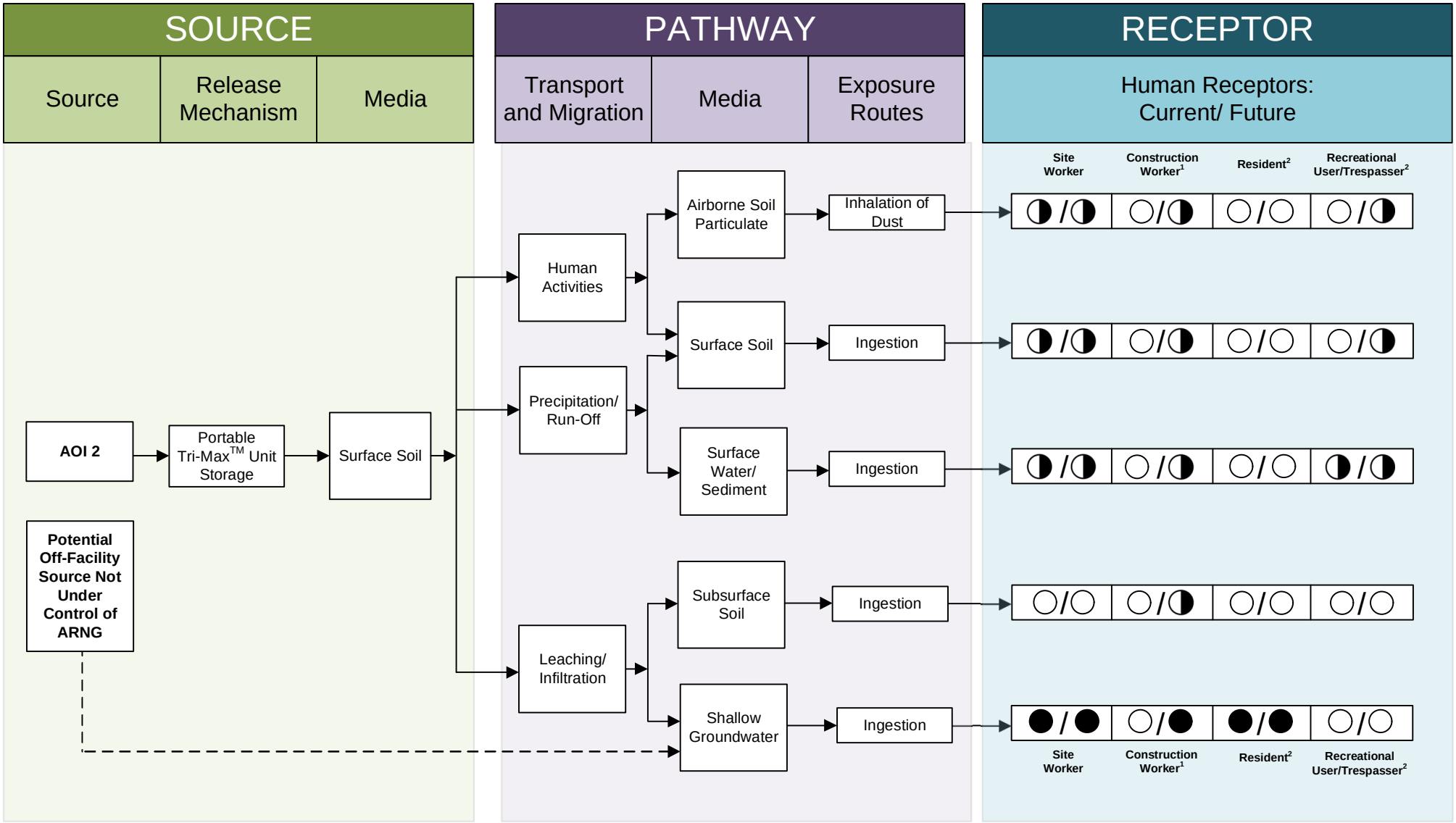
LEGEND

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

NOTES

1. No construction activities were observed during SI field activities.
2. The resident and recreational users refer to off-site receptors.

Figure 7-1
Conceptual Site Model, AOI 1
AASF #3, Meridian, Mississippi



LEGEND

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

NOTES

1. No construction activities were observed during SI field activities.
2. The resident and recreational users refer to off-site receptors.

Figure 7-2
Conceptual Site Model, AOI 2
AASF #3, Meridian, Mississippi

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 18 to 20 April 2022 and consisted of utility clearance, direct push boring, soil sample collection, temporary monitoring well installation, grab groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2022a), except as previously noted in **Section 5.8**.

To fulfill the project DQOs set forth in the approved SI QAPP Addendum (AECOM, 2022a), samples were collected and analyzed for a subset of 18 compounds by LC/MS/MS compliant with QSM 5.3 Table B-15 as follows.

- Eighteen (18) soil samples from 10 borings;
- Six grab groundwater samples from six temporary wells; and
- Fourteen (14) QA/QC samples.

An SI is conducted when the PA determines an AOI exists based on probable use, storage, and/or disposal of PFAS-containing materials. The SI includes multi-media sampling at AOIs to determine whether or not a release has occurred. The SI may conclude further investigation is warranted, a removal action is required to address immediate threats, or no further action is required. Additionally, the CSMs were refined to assess whether a potentially complete pathway exists between the source and potential receptors for potential exposure at the AOIs, which are described in **Section 7**.

8.2 Outcome

Based on the results of this SI, further evaluation is warranted in an RI for AOI 1 and AOI 2 (see **Table 8-1**). Based on the CSMs developed and revised in light of the SI findings, there is potential for exposure to residential drinking water receptors from AOI 1 and AOI 2 from sources on the facility resulting from historical DoD activities. Sample analytical concentrations collected during the SI were compared to the project SLs 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:
    - The detected concentrations of PFOA, PFOS, PFBS, PFHxS, and PFNA in soil at AOI 1 were below their SLs.
    - PFOA, PFOS, PFHxS, and PFNA in groundwater exceeded their SLs. PFOA and PFOS had maximum concentrations of 3,160 ng/L and 391 ng/L, respectively. PFHxS and PFNA had maximum concentrations of 473 ng/L and 988 ng/L, respectively. The maximum concentrations were all detected at AOI01-01.
    - Based on the exceedances of the groundwater SLs, further evaluation of AOI 1 is warranted.

- At AOI 2:
    - The detected concentrations of PFOA, PFOS, PFBS, PFHxS, and PFNA in soil at AOI 1 were below their SLs.
    - PFOA, PFOS, PFHxS, and PFNA in groundwater exceeded their SLs. PFOA and PFOS had maximum concentrations of 69.0 ng/L and 594 ng/L, respectively. PFHxS and PFNA had maximum concentrations of 497 ng/L and 18.8 ng/L, respectively.
    - Based on the exceedances of the groundwater SLs, further evaluation of AOI 2 is warranted.

Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the CSM developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of MIL-SPEC AFFF and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

Table 8-1 summarizes the SI results for soil and groundwater used to determine if an AOI should be considered for further investigation under CERCLA and undergo an RI.

Table 8-1: Summary of Site Inspection Findings and Recommendations

AOI	Potential Release Area	Soil – Source Area[a]	Groundwater – Source Area[a]	Groundwater – Facility Boundary	Future Action
1	Release Area A	◐ 14.9 µg/kg (PFNA)	● 3,160 ng/L (PFOA)	● 70.8 ng/L (PFHxS)	Proceed to RI
2	Release Area B	◐ 2.67 µg/kg (PFOS)	● 594 ng/L (PFOS)	● 70.8 ng/L (PFHxS)	Proceed to RI

Notes:
AOI = area of interest; ng/L = nanograms per liter; µg/kg = micrograms per kilogram
a.) The maximum relevant compound concentration is reported at each AOI.

Legend:
● = detected; exceedance of the screening levels
◐ = detected; no exceedance of the screening levels
○ = not detected

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