FINAL
Site Inspection Report
Sustained Airborne Training Facility, Salt Lake City, Utah

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

September 2023

Prepared for:

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

UNCLASSIFIED

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Acronyms and Abbreviations

%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
µg/kg	micrograms per kilogram
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
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
FedEx	Federal Express
FTA	Fire Training Area
HDPE	high-density polyethylene
HEF	high expansion foam
HFPO-DA	hexafluoropropylene oxide dimer acid
IDW	investigation-derived waste
ITRC	Interstate Technology Regulatory Council
JP-4	Jet Fuel
LC/MS/MS	liquid chromatography with tandem mass spectrometry
MIL-SPEC	military specification
NELAP	National Environmental Laboratory Accreditation Program
ng/L	nanograms per liter
NOAA	National Oceanic and Atmospheric Administration
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
SATF	Sustained Airborne Training Facility
SI	Site Inspection
SL	screening level
SOP	standard operating procedure
TOC	total organic carbon
TPP	Technical Project Planning
UDEQ	Utah Department of Environmental Quality
UDWR	Utah Division of Water Rights
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
UTANG	Utah Air National Guard
UTARNG	Utah Army National Guard

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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 one Area of Interest (AOI) 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 AOI 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 relevant compounds. This SI was completed at the Sustained Airborne Training Facility (SATF) in Salt Lake City, Utah and determined further evaluation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is warranted for AOI 1. The SATF will also be referred to as the "facility" throughout this document.

The SATF is located in north-central Utah, 6 miles west of Salt Lake City and adjacent to the southeast side of Salt Lake City International Airport. The facility is positioned in a mountain valley of the Basin and Range physiographic province within Salt Lake County, between the Wasatch Mountains to the east and the Oquirrh Mountains to the west. The facility is located within the Roland R. Wright Air National Guard Base and comprises approximately 1.3 acres used to support various training missions. The facility consists of an approximately 15,135 square foot building used to support various training missions (AECOM Technical Services, Inc. [AECOM], 2020).

The PA identified one AOI where PFAS-containing materials may have been used, stored, disposed, or released historically (see **Table ES-2** for AOI locations). SI sampling results from the one AOI was compared to OSD SLs. **Table ES-2** summarizes the SI results for the AOI. Based on the results of this SI, further evaluation under CERCLA is warranted in a Remedial Investigation for AOI 1.

[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.

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	Groundwater – Source Area	Groundwater – Facility Boundary	Future Action
1	2014 Fire Suppression System Test and Former Fire Station	●	●	●	Proceed to RI

Legend:
N/A = not applicable
● = 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)[2], and perfluorobutanesulfonic acid (PFBS) at ARNG facilities nationwide. The ARNG performed this SI at the Sustained Airborne Training Facility (SATF) in Salt Lake City, Utah. The SATF 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 SATF (AECOM Technical Services, Inc. [AECOM], 2020) that identified one Area of Interest (AOI) 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 AOI 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.

[2] 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

The SATF is located in north-central Utah, 6 miles west of Salt Lake City and adjacent to the southeast side of Salt Lake City International Airport (**Figure 2-1**). The facility is positioned in a mountain valley of the Basin and Range physiographic province within Salt Lake County, between the Wasatch Mountains to the east and the Oquirrh Mountains to the west. The facility is located within the Roland R. Wright Air National Guard (ANG) Base and comprises approximately 1.3 acres used to support various training missions (AECOM, 2020).

Prior to military use, the land currently occupied by the SATF was undeveloped wetland. The facility was constructed in the 1940s and used as a US Army Air Force facility until circa 1980, when the ANG acquired the facility and used it as their fire department. The building was used to store and maintain fire trucks and for storage of AFFF under the jurisdiction of the Air Force. In approximately 2013, the facility was leased to the Army and remodeled with the installation of a fire suppression system. According to lease documentation, the land is owned by Salt Lake City and leased to the US Government for use of the Utah ANG (UTANG), US Air Force, and Army Aviation flight activities. The lease term began on 1 January 1988 and extends until 30 September 2037.

The SATF building, also referred to as “Building 10”, is the location of Site 8, a remedial site managed by the ANG as an operable unit. Site 8 is the location of two former underground storage tanks containing aviation gasoline, jet fuel (JP-4), or diesel. The source of JP-4 contamination at Site 8 is attributed to possible releases from an oil-water separator (OWS). Groundwater monitoring is currently ongoing at Site 8 following groundwater remediation activities performed during 2014, which consisted of subsurface injections to promote anaerobic reductive dechlorination of contaminants of concern (CH2M Hill, 2015).

2.2 Facility Environmental Setting

The SATF occupies approximately 1.3 acres that are composed almost entirely of impervious surfaces (concrete and asphalt). The topography of the facility is generally level, sloping slightly to the southeast (**Figure 2-2**). The areas surrounding the SATF are primarily ANG, Air Force, and various facilities in support of the operations of the Salt Lake City International Airport to the west. The facility sits at an elevation of 4,221 feet above mean sea level, with a very slight topographic slope to the northeast. The Great Salt Lake is located approximately 11 miles west of the facility, and the foothills of the Wasatch mountains are located approximately 5.5 miles east of the facility.

2.2.1 Geology

The SATF is located in the Salt Lake valley, near the eastern edge of the Basin and Range physiographic province, which is generally composed of northerly-trending, fault-block ranges and intervening, drier basins (Woods et al., 2001). The geology underlying the facility is a quaternary alluvium dominated by deltaic (silt, sand, and clay) and lake deposits from historic Lake Bonneville during the Pleistocene epoch.

Soil borings completed during the SI found lean clays as the dominant lithology of the unconsolidated material observed below the SATF. The borings were completed at depths between 10 and 15 feet below ground surface (bgs). Isolated 1-inch layers of sandy silty clay were also observed in the boring logs. These facility observations are consistent with the fill material known to be present at SATF and the understood alluvia/deltaic depositional environment of the native soils. Samples for grain size analyses were collected at one location, AOI01-01, at a sample interval depth of 8 to 10 feet bgs and analyzed via American Society for Testing and Materials (ASTM) Method D-422. The results indicate that the soil sample is comprised primarily of silt (71.36 percent [%]) and clay (26.58%). Boring logs are presented in **Appendix E**, and grain size results are presented in **Appendix F**.

2.2.2 Hydrogeology

The Salt Lake Valley basin is filled with unconsolidated Quaternary deposits that likely exceed 2,000 feet in thickness. Four basin-fill aquifers are present within the Salt Lake Valley. From deepest to shallowest, these aquifers include 1) a deep, confined aquifer in the central and northern valley areas; 2) a deep, unconfined aquifer adjacent to the mountains; 3) a shallow, unconfined aquifer overlying the deep, confined aquifer; and 4) local perched aquifers. The shallow, unconfined aquifer is laterally extensive and is present across the facility to a depth of approximately 50 feet bgs. This shallow, unconfined aquifer is not used as a drinking water source. The regional confining layer is present beneath the shallow, unconfined aquifer and extends to a depth of 200 feet or more. The regional vertical hydraulic gradient is upward. Local perched aquifers have not been reported at the facility (ANG, 2014).

Previous investigations have indicated that the depth to groundwater at the facility ranges from approximately 3 to 6 feet bgs. The direction of groundwater flow is variable across the ANG base and is affected by seasonal precipitation and runoff, although the general groundwater flow is toward the north-northeast (ANG, 2014). Groundwater features are presented on **Figure 2-3**.

Depths to water measured in November 2021 during the SI ranged from 4.10 to 7.50 feet bgs. Groundwater elevation contours from the SI are presented on **Figure 2-4** and indicate groundwater flow direction is generally to the northeast.

Drinking water at the SATF is supplied by the local municipal water authority. Groundwater beneath and in the vicinity of the SATF is not used as a drinking water source. More than 60% of Salt Lake City's water originates in the mountain streams of the Wasatch Mountains, supplemented with deep wells throughout the Salt Lake Valley. An Environmental Data Resources, Inc. (EDR)™ Report conducted a well search for a 1-mile radius surrounding the facility as part of the PA (AECOM, 2020). Using additional online resources, such as state and local Geographic Information System databases, wells were researched to a 4-mile radius of the facility. The EDR™ search returned one public well and a number of stock watering, irrigation, domestic, and non-production groundwater wells in the vicinity of the facility (**Figure 2-3**). The closest underground public well is located approximately 0.5 miles north of the facility. It is unknown if there are any potable water wells using shallow groundwater down gradient of the facility. Data regarding US Geological Survey (USGS) wells in the area recorded depth to groundwater exists less than 10 feet bgs. A review of available well records showed numerous private wells downgradient from the facility screened at depths of 200 feet bgs or below. Records suggest that most of these wells are designated for use as irrigation (Utah Division of Water Rights [UDWR], 2022).

2.2.3 Hydrology

The facility is located within the Jordan Hydrologic Unit. The majority of groundwater recharge most likely comes from mountain precipitation and surface waters. The nearest surface water to the subject property is the Jordan River, located approximately 1.1 miles east of the subject property, and which flows into the Great Salt Lake to the north. Surface water on the south side of the facility is directed southeast by grade to an approximately 60-foot by 3-foot gravel area leading to a stormwater drain in the southeast corner. Surface water features are presented on **Figure 2-5**. Stormwater on the east side of the airport drains into a canal that conveys the stormwater to the City Drain. The City Drain closely follows the Jordan River and empties into

Farmington Bay in the Great Salt Lake (CH2M Hill, 2012). Trench drains in Building 10 flow to the oil/water separator before discharging to the municipal sewer system (AECOM, 2020).

Based on a desktop review of the National Wetlands Inventory online mapping system (US Fish and Wildlife Service [USFWS], 2021), the facility does not contain any mapped wetlands or surface waters; however, there are approximately 465 acres of wetlands west of the airport that were created in the 1990s to compensate for natural wetlands impacted by runway construction (Salt Lake City International Airport, 2019). Due to the close proximity to the wetlands, the depth to groundwater at the facility is expected to be very close to the surface.

2.2.4 Climate

The climate of north-central Utah is semiarid and characterized by mild winters, hot summers, and low humidity. The facility is located in an area characterized by a dry, mid-latitude desert climate, which is marked by hot summers and mild winters (Woods et al., 2001). The annual average high temperature in Salt Lake City is 78.7 degrees Fahrenheit (°F), and the annual low temperature is 29.5 °F, with an annual average temperature of 52.7 °F. The average annual precipitation is 16.10 inches, with most of it falling during the spring (March-May); the driest month is July, with average precipitation of 0.61 inches. The average annual snowfall is 56.2 inches (National Oceanic and Atmospheric Administration [NOAA], 2020).

2.2.5 Current and Future Land Use

The facility currently operates as a Utah ARNG (UTARNG) SATF and is comprised of a hangar, maintenance and storage areas, and an administrative office area. Reasonably anticipated future land use is not expected to change significantly from the current land use described above.

2.2.6 Sensitive Habitat and Threatened/ Endangered Species

The following insects, mammals, fishes, birds, and flowering plants are federally endangered, threatened, proposed, and/ or are listed as candidate species in Salt Lake County, Utah (USFWS, 2022).

- **Insects:** Monarch butterfly, *Danaus plexippus* (candidate)
- **Mammals**: Little brown bat, *Myotis lucifugus* (under review); Canada Lynx, *lynx canadensis* (threatened)
- **Fishes:** Least chub, *Iotichthys phlegethontis* (resolved taxon)
- **Birds:** Yellow-billed Cuckoo, *Coccyzus americanus* (threatened); Greater sage-grouse, *Centrocercus urophasianus* (resolved taxon)
- **Flowering plants:** Ute ladies'-tresses, *Spiranthes diluvialis* (threatened)

2.3 History of PFAS Use

Two potential release areas where AFFF may have been used or released historically were identified at the SATF (AECOM, 2020). Fire suppression foam potentially containing PFAS may have been released to soil and groundwater within the boundary of the SATF during a fire suppression system test in 2014. In addition, firetruck washing and maintenance activities conducted by the ANG prior to 2013 may have resulted in a release of AFFF to the subsurface or unpaved ground surface outside Building 10. The potential release areas were grouped into one AOI based on proximity to one another and presumed groundwater flow. A description of AOI 1 is presented in **Section 3**.

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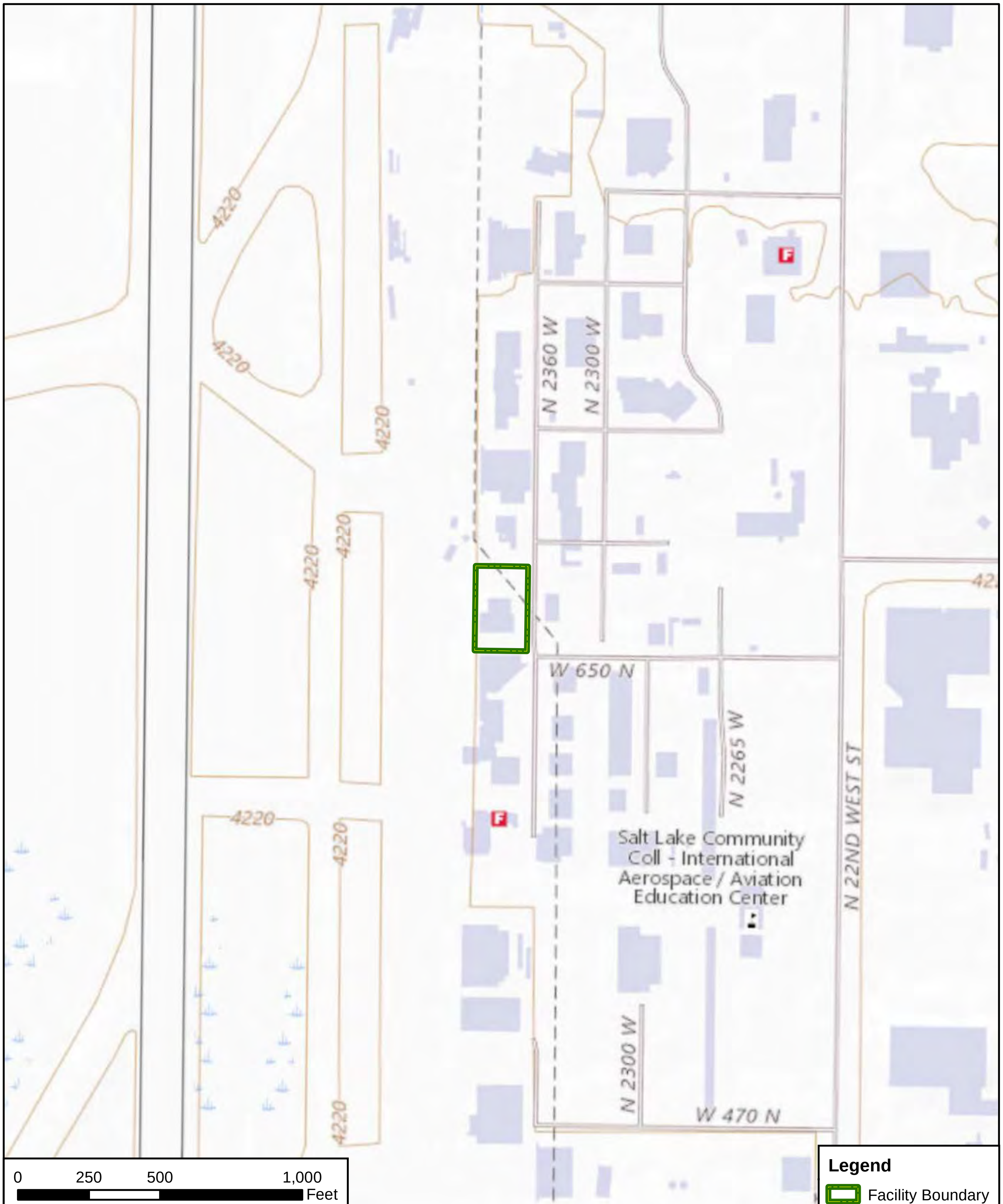
CLIENT	ARNG			
PROJECT	Site Inspection at Sustained Airborne Training Facility, UT			
REVISED	7/29/2022	GIS BY	MS	7/29/2022
SCALE	1:63,360	CHK BY	AD	7/29/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	7/29/2022

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-1



CLIENT	ARNG					**Facility Topography**
PROJECT	Site Inspection at Sustained Airborne Training Facility, UT					
REVISED	7/29/2022	GIS BY	MS	7/29/2022	AECOM 12420 Milestone Center Drive Germantown, MD 20876	**Figure 2-2**
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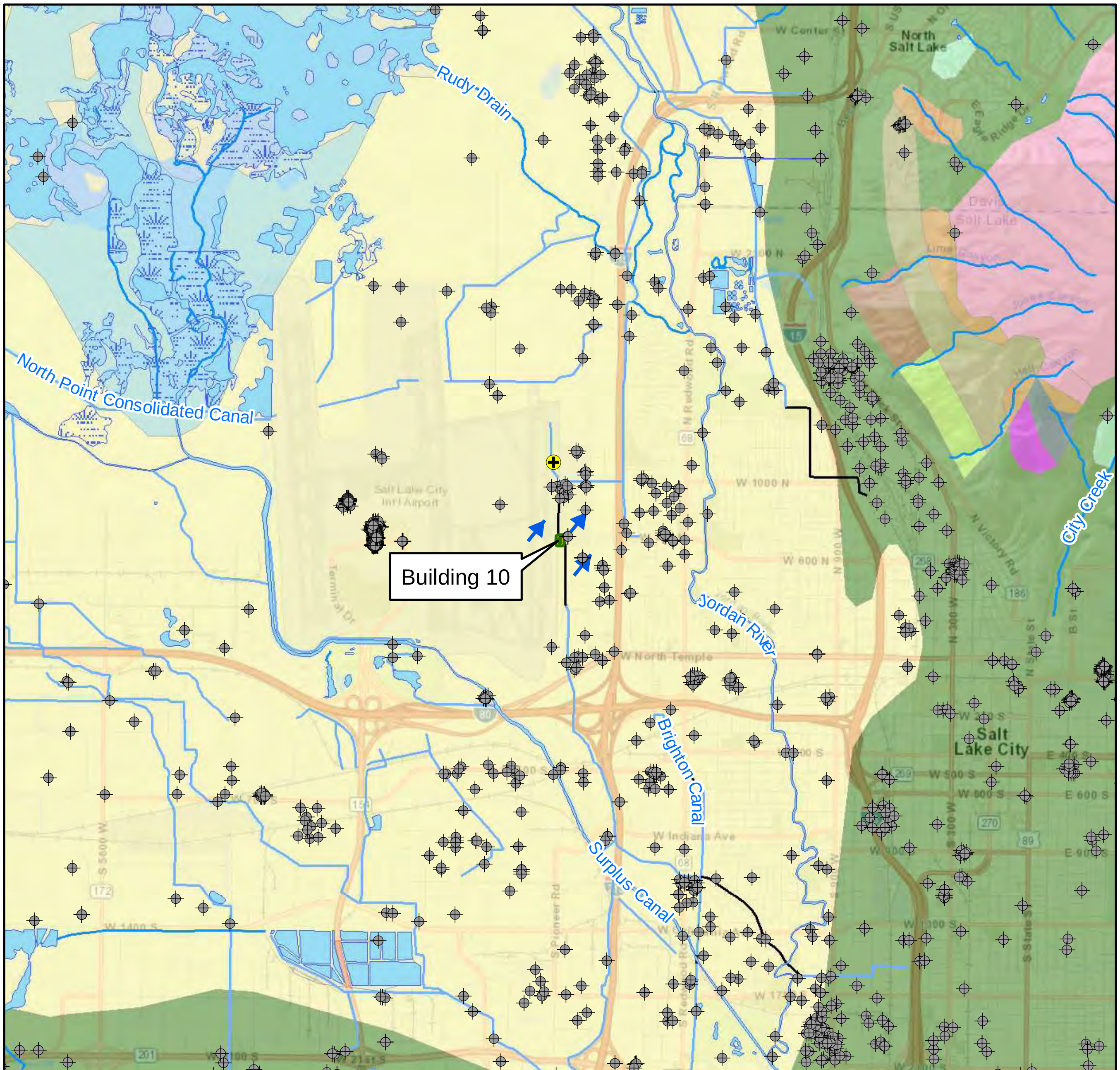
Base Map: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program,		PM	CM	7/29/2022		



Facility Boundary
Water Body
SwampMarsh
River/Stream
Canal/Ditch
Pipeline
Groundwater Flow Direction

Geology

Marshes
Unconsolidated alluvium and colluvium
Lake Bonneville deposits
Late Eocene to Oligocene Volcanics
Wasatch Formation
Frontier Formation
Morrison Formation
Stump and Preuss Sandstones and Twin Creek Limestone
Hambug Formation and Deseret Limestone
Beirdneau Sandstone, Hyrum Dolomite, and Water Canyon Formation
St. Charles Formation and Nounan Dolomite
Bloomington Formation, Maxfield Limstone, and Ophir Formations

Wells

Public Well
Other/Unknown Well

0 3,250 6,500 13,000
Feet

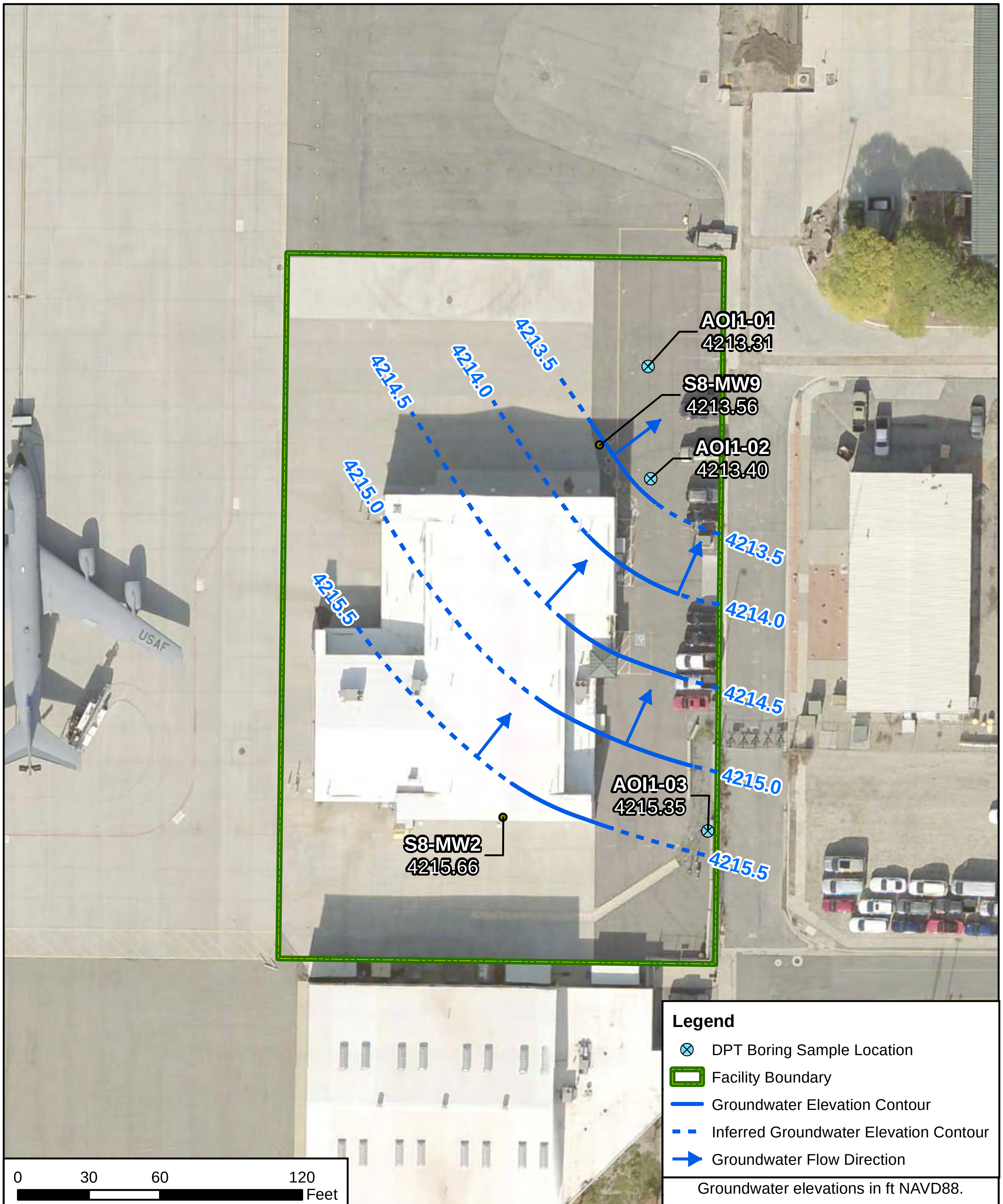
CLIENT	ARNG			
PROJECT	Site Inspection at Sustained Airborne Training Facility, UT			
REVISED	8/1/2022	GIS BY	MS	8/1/2022
SCALE	1:78,000	CHK BY	AD	8/1/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	8/1/2022

N

Groundwater Features

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-3



CLIENT	ARNG				N	**Groundwater Elevations, November 2021**
PROJECT	Site Inspection at Sustained Airborne Training Facility, UT					
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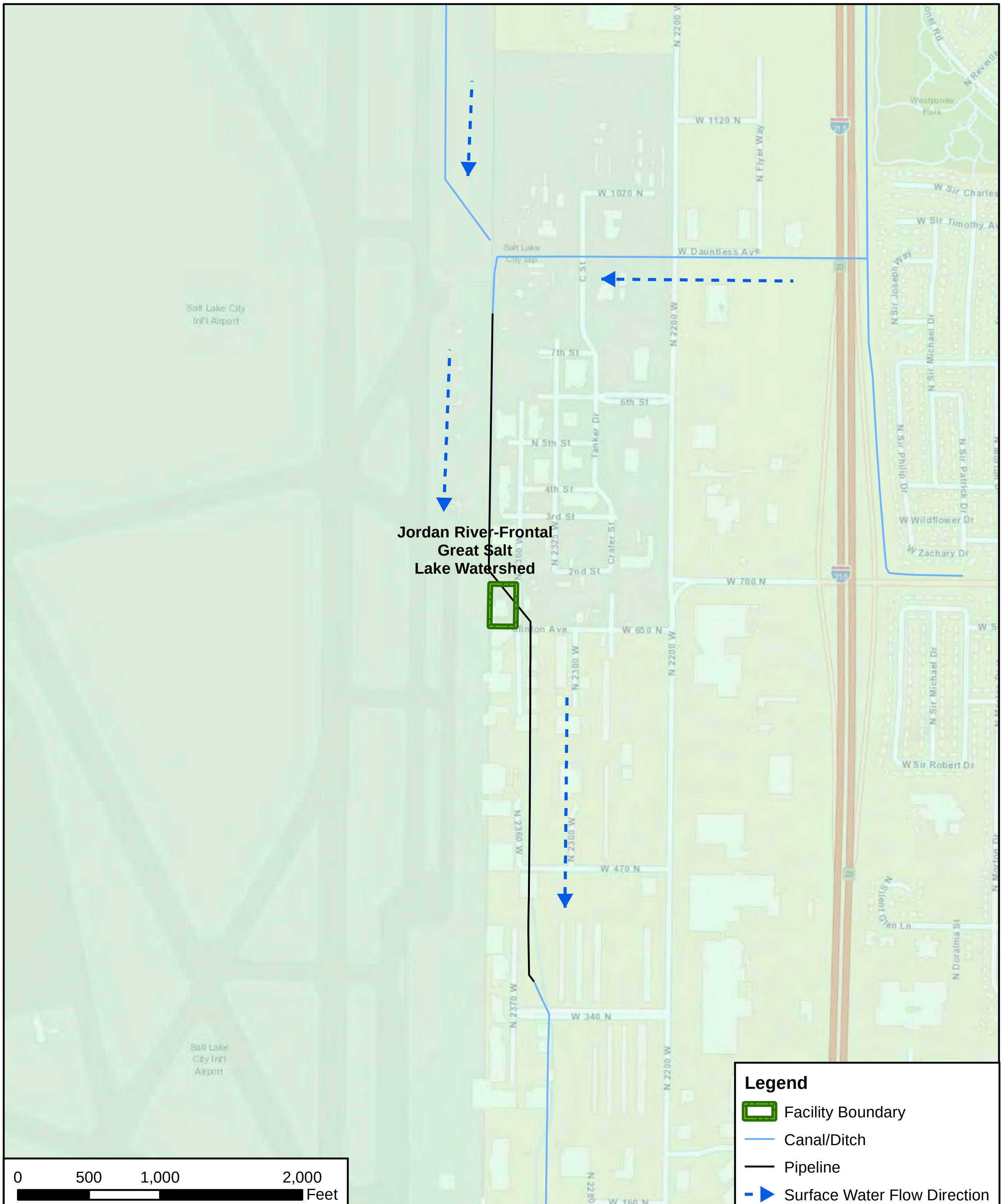
SCALE	1:720	CHK BY	AD	10/20/2022		**Figure 2-4**
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	10/20/2022		



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PROJECT	Site Inspection at Sustained Airborne Training Facility, UT			
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Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	7/29/2022

N

Surface Water Features

AECOM
12420 Milestone Center Drive
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 potential release areas were identified at SATF and grouped into one AOI (AECOM, 2020). The potential release areas are shown on **Figure 3-1**. This figure also shows nearby off-facility potential releases for informational purposes.

3.1 AOI 1

AOI 1 consists of two potential release areas, as described below. The PA and Quality Assurance Project Plan (QAPP) refer to AOI 1 as Building 10 (AECOM, 2020; AECOM, 2021a). Based on the current understanding of the various Building 10 activities, what was originally called Building 10 is now detailed into two release areas, as described below.

3.1.1 2014 Fire Suppression System Test

Since the UTARNG has occupied Building 10, there has been one known discharge of foam potentially containing PFAS. The Building 10 fire suppression system is equipped with Jet-X 2% high expansion foam (HEF). The discharge of HEF in the hangar area during a fire suppression system test in 2014 may have resulted in a release to the subsurface via a potentially broken pipe that conveyed wastewater from building drains to an OWS at the time. The exact location of the break in the pipe is not known but could reasonably be assumed to be between Building 10 and the OWS near the northeast corner of Building 10. Additionally, foam that was not captured by the trench drains may have spilled out of the hangar and onto the unpaved ground surface outside Building 10.

3.1.2 Former Fire Station

Building 10 operated as an ANG fire station circa 1980 until 2013. Firetruck washing and maintenance at the Former Fire Station may have resulted in a release of AFFF to the unpaved ground surface outside Building 10 via runoff not captured by building drains. Surface water on the south side of the facility is directed southeast by grade to an approximately 60-foot by 3-foot gravel area that leads to a stormwater drain in the southeast corner of the facility. The stormwater drains in this area flow into a canal that conveys the stormwater to the City Drain. The City Drain closely follows the Jordan River and empties into Farmington Bay in the Great Salt Lake (CH2M Hill, 2012).

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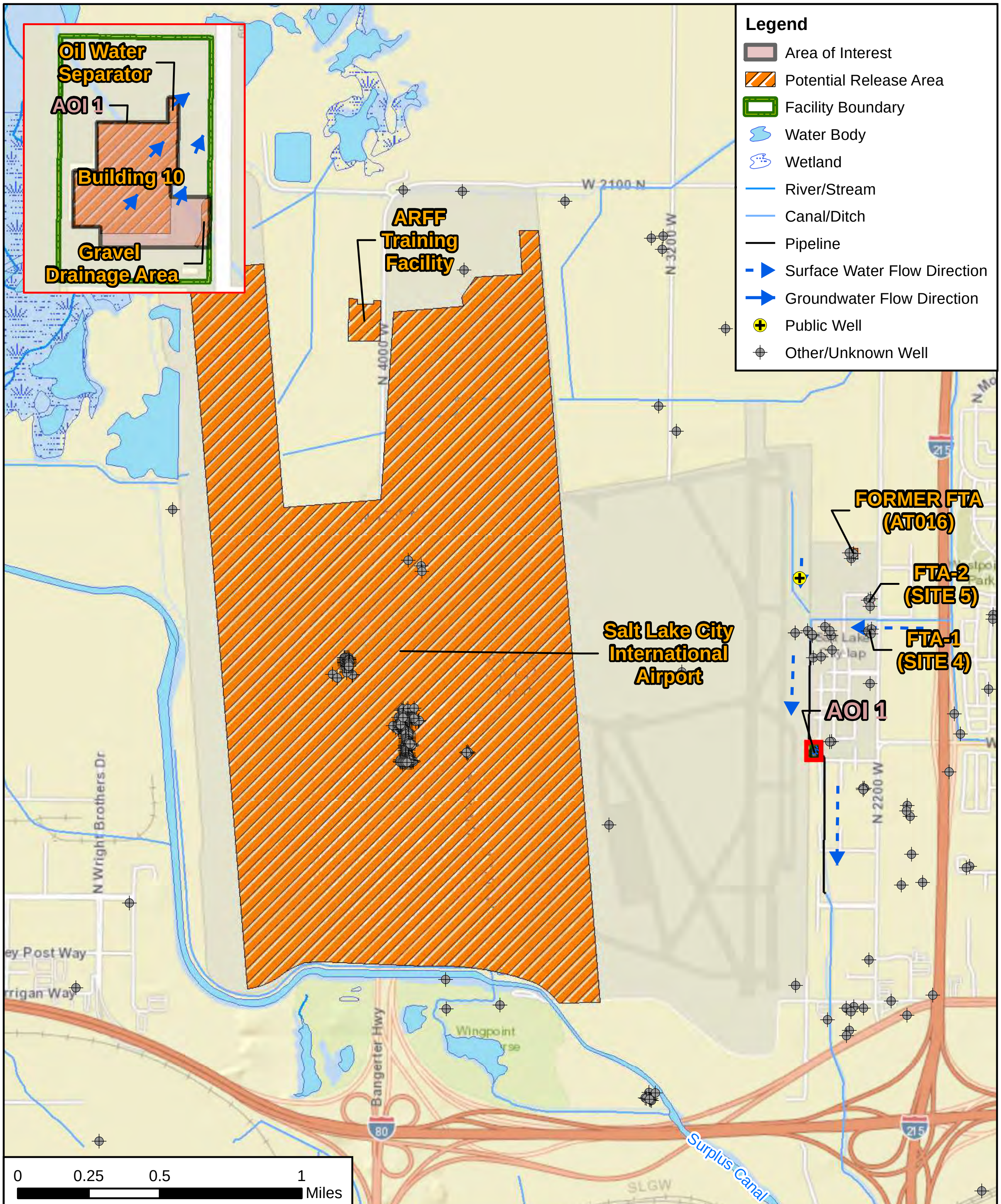

CLIENT	ARNG			
PROJECT	Site Inspection at Sustained Airborne Training Facility, UT			
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SCALE	1:31,680	CHK BY	AD	8/31/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	8/31/2022

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 QAPP Addendum (AECOM, 2021a), 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 the SATF (AECOM, 2020);
- Analytical data collected as part of UTANG sampling efforts around the facility (Aerostar SES LLC, 2018; 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, 2021a); 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 to the Fall to avoid winter storms and freezing condition.

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, 2021a).

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, 2021a).

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, Sustained Airborne Training Facility, Salt Lake City, Utah* dated September 2020 (AECOM, 2020);
- *Final Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Addendum, Sustained Airborne Training Facility, Salt Lake City, Utah* dated June 2021 (AECOM, 2021a);
- *Final Site Safety and Health Plan, Sustained Airborne Training Facility, Salt Lake City, Utah* dated August 2021 (AECOM, 2021b).

The SI field activities were conducted on 15 November 2021 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, 2021a), except as noted in **Section 5.8**.

The following samples were collected during the SI and analyzed for a subset of 18 compounds 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:

- Eight (8) soil samples from four (4) boring locations;
- Three (3) grab groundwater samples from three (3) temporary wells;
- Two (2) grab groundwater samples from two (2) existing permanent monitoring wells; and
- Eleven (11) quality assurance (QA)/quality control (QC) samples (three (3) soil, three (3) groundwater, two (2) equipment blank, two (2) decontamination water, and one (1) field reagent blank 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 and is provided in **Appendix B1**. Sampling forms are provided in **Appendix B2**, a Nonconformance and Corrective Action Report 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 5 April 2021, prior to SI field activities. The combined TPP Meeting 1 and 2 was conducted in general accordance with EM 200-1-2. The stakeholders for this SI include the ARNG, UTARNG, USACE, Utah Department of Environmental Quality (UDEQ), 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, 2021a).

A TPP Meeting 3 was held on DATE TBD to discuss the results of the SI. Meeting minutes for TPP 3 are included in **Appendix D** of this report. Future TPP meetings will provide an opportunity to discuss the results and findings, and future actions, where warranted.

5.1.2 Utility Clearance

AECOM's drilling subcontractor, Cascade Technical Services, LLC placed a ticket with Blue Stakes of Utah 811 utility clearance provider to notify them of intrusive work on 28 October 2021. However, because the SATF is a private facility, the participating Blue Stakes of Utah 811 locators did not clear utilities at the entire facility. Therefore, AECOM contracted ESI Engineering, Inc., a private utility location service, to perform utility clearance. ESI Engineering, Inc. performed utility clearance of the proposed boring locations on 12 October 2021 with input from the AECOM field team and SATF facility staff. General locating services and ground-penetrating radar were used to complete the clearance. Additionally, on 15 November 2021, 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

One potable water source at SATF was sampled on 12 May 2021, prior to mobilization, to assess usability for decontamination of drilling equipment. Results of the sample (SATF-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. A second sample of the same water, but run through the decontamination equipment, was collected on 15 November 2021 during the SI. The results of the decontamination water samples associated with the water source and decontamination of drilling equipment 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, 2021a). 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

Soil samples were collected via direct push technology (DPT), in accordance with the SI QAPP Addendum (AECOM, 2021a). A direct push 7730DT dual-tube sampling system was used to collect continuous soil cores to the target depth. A hand auger was used to collect soil from the top five feet of the boring, in accordance with AECOM utility clearance procedures. The soil boring locations are shown on **Figure 5-1** and depths are provided **Table 5-1**.

In general, three discrete soil samples were collected from the vadose zone for chemical analysis from each soil boring: one surface soil sample (0 to 2 feet bgs), one subsurface soil sample approximately 2 feet above the groundwater table, and one subsurface soil sample at the mid-point between the surface and the groundwater table. In borings where groundwater was encountered at 6 feet bgs or shallower, only two soil samples were collected per boring, in accordance with the QAPP Addendum (AECOM, 2021a). Specifically, only two soil samples were collected at locations AOI01-02 and AOI01-03 for this reason. As a result of deviations in the field due to a marked utility, one additional surface soil sample, AOI01-04, was collected as 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 boring logs (**Appendix E**) and in a non-treated field logbook (i.e., composition notebook). Depth interval, recovery thickness, PID concentrations, moisture, relative density, color (using a Munsell soil color chart), and texture (using the USCS) were recorded. The boring logs are provided in **Appendix E**.

Soil borings completed during the SI found lean clays as the dominant lithology of the unconsolidated material observed below the SATF. Isolated 1-inch layers of sandy silty clay were also observed. The borings were completed at depths between 10 and 15 feet bgs. The shallow subsurface lithology at the facility is consistent with the fill material known to be present at the SATF and the understood alluvial/deltaic depositional environment of the native soils.

Each soil sample was collected into laboratory-supplied PFAS-free high-density polyethylene (HDPE) bottles and labeled using a PFAS-free marker or pen. Samples were packaged on ice and transported via Federal Express (FedEx) under standard chain of custody (CoC) procedures to the laboratory and analyzed by LC/MS/MS compliant with QSM 5.3 Table B-15, total organic carbon (TOC) (USEPA Method 9060A), pH (USEPA Method 9045D), and grain size (ASTM Method D-422) in accordance with the SI QAPP Addendum (AECOM, 2021a).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. MS/MSDs were collected at a rate of 5% and analyzed for the same parameters as the accompanying samples. In instances when non-dedicated sampling equipment was used, such as a hand auger for the shallow soil samples, equipment rinsate blanks 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, 2021a) using bentonite chips at completion of sampling activities. Asphalt was hot patched at AOI01-01 and AOI01-02; AOI01-03 and AOI01-04 were installed in the unpaved drainage ditch.

5.3 Temporary Well Installation and Groundwater Grab Sampling

Temporary wells were installed using a GeoProbe® 7730DT dual-tube 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. 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. Groundwater samples were also collected from two existing permanent wells using a peristaltic pump and 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 was any foaming. No foaming was noted in any of the groundwater samples. 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, 2021a).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. Matrix spike/matrix spike duplicate (MS/MSD) samples 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, 2021a) by removing the PVC and backfilling the hole with neat cement grout. Upon completion of well abandonment, the ground surface at each location was patched to match existing surrounding conditions. Asphalt was hot patched at locations AOI01-01 and AOI01-02; AOI01-03 and AOI01-04 were installed in the unpaved drainage ditch.

5.4 Synoptic Water Level Measurements

A synoptic groundwater gauging event was performed on 15 November 2021. Groundwater elevation measurements were collected from the three new temporary monitoring wells and two existing permanent wells. Water level measurements were taken from the northern side of the well casing. Depths to water measured in November 2021 during the synoptic gauging ranged from 4.10 to 7.50 feet bgs. Based on the calculated groundwater elevations, the shallow groundwater flow direction at the facility is to the northeast. 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 Utah-licensed land surveyors following guidelines provided in the SOPs provided in the SI QAPP Addendum (AECOM, 2021a). Survey data from the newly installed and previously existing wells on the facility were collected on 15 November 2021 in the applicable Universal Transverse Mercator zone projection with World

Geodetic System 84 datum (horizontal) and North American Vertical Datum 1988 (vertical). The surveyed well data are provided in **Appendix 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, 2021a) and with the DA Guidance for Addressing Releases of PFAS, Q18 (DA, 2018). Consistent with the SI QAPP, soil cuttings and liquid IDW were distributed or discharged to the ground surface on the immediate downgradient side of the borehole, except where otherwise noted below.

Due to the pavement, soil IDW (i.e., soil cuttings) generated during the SI activities at AOI01-01 and AOI01-02 were containerized in one 55-gallon Department of Transportation (DOT)-approved steel drum and placed in the southeast corner of the facility as indicated in the Photographic Log (**Appendix C**). The drum was labeled to indicate the type of media (e.g., soil or water) and the source locations. ARNG will coordinate waste profiling, transportation, and disposal of the solid IDW.

Soil IDW generated during the SI activities at AOI01-03 and AOI01-04 were left in place at the point of the source and used to restore the ground surface to match the surrounding area. The soil IDW was not sampled and assumes the PFAS characteristics of the associated soil samples collected from that source location.

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

Geographic coordinates were collected using a Global positioning system (GPS) around each location where IDW was placed (i.e., an IDW polygon). The IDW polygons are displayed on the figure in **Appendix B5**.

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. One soil sample was analyzed for grain size using ASTM Method D-422.

5.8 Deviations from SI QAPP Addendum

Three deviations from the SI QAPP Addendum were identified during review of the field documentation. The deviations are noted below and documented in Field Change Request Forms (**Appendix B3**) and Nonconformance and Corrective Action Reports (**Appendix B4**):

- A total of three soil borings/temporary wells were scoped for the SI, one of which was to be within an unlined ditch downslope of the wash area. Utility markings revealed that the originally selected location for AOI01-03 was within 3 feet of a water line. Recommended safe practices are to not drill within 5 feet of a known utility. Therefore, location AOI01-03 was adjusted approximately 5 feet northeast from where originally shown in the Final SI QAPP. This adjustment placed the soil boring/temporary well sample location slightly outside of the centerline of the ditch. An additional surface soil sample (AOI01-04) was collected at the originally proposed location so that soil could still be evaluated where surface runoff flow from the area around the building is most concentrated. This action was documented in a Field Change Request form provided in **Appendix B3**.

- Three soil samples were scoped to be collected at each soil boring: one at the surface (0 to 2 feet bgs), one subsurface soil sample approximately 2 feet above the groundwater table, and one subsurface soil sample at the mid-point between the surface and the groundwater table. Groundwater was observed in the soil borings at AOI01-02 and AOI01-03 at approximately 5 feet bgs. The shallow unsaturated zone observed at SATF did not allow for the collection of three distinct soil samples. Therefore, the midpoint soil sample was omitted and only a surface soil sample and a capillary fringe soil sample (just above water table) were collected at AOI01-02 and AOI01-03. This action was documented in a Field Change Request form provided in **Appendix B3**.

- The subcontracted licensed surveyor collected the coordinates and top of casing elevations of the temporary monitoring wells, but inadvertently failed to record the ground surface elevations at these temporary well locations. The SI QAPP stated that all three measurements would be collected. The error was not recognized until the surveyor's data package was provided to AECOM several weeks after the field event. The coordinates and top of casing elevations are considered sufficient to meet the data quality objectives for the temporary wells. Groundwater elevations are calculated using the recorded top of casing elevations and depths to water, which were measured from the top of casing. This action was documented in a nonconformance and corrective action report provided in **Appendix B3**.

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, SATF, Utah

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)	Grain Size (ASTM D-422)	Comments
Soil Samples							
AOI01-01-SB-00-02	11/15/2021 10:45	0 - 2	x				
AOI01-01-SB-03-05	11/15/2021 10:55	3 - 5	x				
AOI01-01-SB-08-10	11/15/2021 11:15	8 - 10	x			x	
AOI01-02-SB-00-02	11/15/2021 10:10	0 - 2	x	x	x		
AOI01-02-SB-00-02-D	11/15/2021 10:10	0 - 2	x	x	x		FD
AOI01-02-SB-03-05	11/15/2021 10:15	3 - 5	x				
AOI01-03-SB-00-02	11/15/2021 9:00	0 - 2	x				
AOI01-03-SB-03-05	11/15/2021 9:05	3 - 5	x				
AOI01-04-SB-00-02	11/15/2021 8:45	0 - 2	x	x	x		
AOI01-04-SB-00-02-MS	11/15/2021 8:45	0 - 2	x	x	x		MS
AOI01-04-SB-00-02-MSD	11/15/2021 8:45	0 - 2	x	x	x		MSD
Groundwater Samples							
AOI01-01-GW	11/15/2021 13:05	NA	x				
AOI01-02-GW	11/15/2021 13:30	NA	x				
AOI01-03-GW	11/15/2021 11:40	NA	x				
S8-MW2-111521	11/15/2021 11:20	NA	x				
S8-MW2-111521-D	11/15/2021 11:20	NA	x				FD
S8-MW9-111521	11/15/2021 9:55	NA	x				
S8-MW9-111521-MS	11/15/2021 9:55	NA	x				MS
S8-MW9-111521-MSD	11/15/2021 9:55	NA	x				MSD
Quality Control Samples							
SATF-FRB-01	11/15/2021 10:30	NA	x				
SATF-ERB-01	11/15/2021 8:35	NA	x				from hand auger
SATF-ERB-02	11/15/2021 10:00	NA	x				from DPT shoe
SATF-DECON-01	5/12/2021 10:00	NA	x				from source
SATF-DECON-02	11/15/2021 9:45	NA	x				from driller tank

Notes:
AOI = area of interest
ASTM = American Society for Testing and Materials
bgs = below ground surface
DECON = decontamination
DPT = direct push technology
ERB = equipment rinsate blank
FD = field duplicate
FRB = field reagent blank
GW = groundwater
LC/MS/MS = Liquid Chromatography Mass Spectrometry
MS/MSD = matrix spike/ matrix spike duplicate
MW = monitoring well
NA = not applicable
QSM = Quality Systems Manual
SATF = Sustained Airborne Training Facility
SB = soil boring
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, SATF, Utah

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	10 - 15	4220.81	NM	7.5	NA	4213.31
	AOI01-02	10	5 - 10	4220.80	NM	7.4	NA	4213.40
	AOI01-03	10	5 - 10	4219.45	NM	4.1	NA	4215.35

Notes:

AOI = area of interest

bgs = below ground surface

btoc = below top of casing

NA = not applicable

NM = not measured

NAVD88 = North American Vertical Datum 1988

SATF = Sustained Airborne Training Facility

Table 5-3
Permanent Monitoring Well Screen Intervals and Groundwater Elevations
Site Inspection Report, SATF, Utah

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	S8-MW2	13.3	Unknown	4220.26	NM	4.6	NA	4215.66
	S8-MW9	18.9	Unknown	4220.16	NM	6.6	NA	4213.56

Notes:

bgs = below ground surface

btoc = below top of casing

MW = monitoring well

NA = not applicable

NM = not measured

NAVD88 = North American Vertical Datum 1988

SATF = Sustained Airborne Training Facility

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CLIENT	ARNG				N	Site Inspection Sample Locations
PROJECT	Site Inspection at Sustained Airborne Training Facility, UT					AECOM 12420 Milestone Center Drive Germantown, MD 20876 — Figure 5-1
REVISED	8/31/2022	GIS BY	MS	8/31/2022		
SCALE	1:720	CHK BY	AD	8/31/2022		
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	8/31/2022		

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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 the AOI is provided in **Section 6.3**. **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 against the SLs presented in **Table 6-1**. The SLs for groundwater are based on direct ingestion. The SLs for soil are based on incidental ingestion and are applied to the depth intervals reasonably anticipated to be encountered by the receptors identified at the 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, soil samples were analyzed in accordance with American Society for Testing and Materials [ASTM] D-422 for TOC, pH, and grain size, which are important for evaluating transport through the soil medium. **Appendix F** contains the results of the TOC, pH, and grain size 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: the 2014 fire suppression system test and the former fire station. 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.

Soil near the discharge area for the 2014 fire suppression system test potential release was sampled from surface soil (0 to 2 feet bgs) and shallow subsurface soil (3 to 5 feet and 8 to 10 feet bgs) from boring location AOI01-01. Soil was sampled from surface soil (0 to 2 feet bgs) and shallow subsurface soil (3 to 5 feet bgs) from boring location AOI01-02. Soil near the former fire station drainage ditch was sampled from surface soil (0 to 2 feet bgs) and shallow subsurface soil (3 to 5 feet bgs) from boring location AOI01-03. A surface soil sample (0 to 2 feet bgs) was also sampled closer to the discharge area at AOI01-04. Due to shallow groundwater encountered during the SI, deep subsurface soil samples were not collected.

In surface soil, PFOS was detected exceeding its SL of 13 micrograms per kilogram (µg/kg) at AOI01-02, with a concentration of 32.2 J µg/kg. PFOS in the remaining surface soil samples ranged between 2.29 µg/kg to 5.00 J (estimated concentration) µg/kg. PFOA, PFBS, PFHxS, and PFNA were detected in surface soil at concentrations below their respective SLs. Detected PFOA concentrations ranged between 0.412 J µg/kg to 7.28 µg/kg, with the maximum concentration at AOI01-03. PFBS concentrations ranged between 0.111 J µg/kg to 0.569 µg/kg, with the maximum concentration at AOI01-04. PFHxS concentrations ranged between 0.770 J µg/kg to 8.79 J µg/kg, with the maximum concentration at AOI01-04. PFNA concentrations ranged between 0.026 J µg/kg to 0.397 J µg/kg, with the maximum concentration at AOI01-02.

In shallow subsurface soil, PFOA, PFOS, PFBS, PFHxS, and PFNA were detected at concentrations at least one order of magnitude below their respective SLs. PFOA concentrations ranged between 0.100 J µg/kg to 4.69 J µg/kg, with the maximum concentration at AOI01-03 (3 to 5 feet bgs). PFOS concentrations ranged between 1.01 J µg/kg to 17.2 µg/kg, with the maximum concentration at AOI01-01 (8 to 10 feet bgs). PFBS concentrations ranged between

0.033 J µg/kg to 0.597 J µg/kg, with the maximum concentration at AOI01-01 (8 to 10 feet bgs). PFHxS concentrations ranged between 0.435 J µg/kg to 4.47 µg/kg, with the maximum concentration at AOI01-01 (8 to 10 feet bgs). Detected PFNA concentrations ranged between 0.024 J µg/kg to 0.027 J µg/kg, with the maximum concentration at AOI01-02 (3 to 5 feet bgs).

6.3.2 AOI 1 Groundwater Analytical Results

Figure 6-6 and **Figure 6-7** present the ranges of detections in groundwater. **Table 6-4** summarizes the groundwater results.

PFOS and PFHxS exceeded their respective SLs at all locations. PFOA and PFNA exceeded the SL at all locations except AOI01-02. PFBS exceeded the SL at only one location, AOI01-03. The highest concentrations of PFOA, PFBS, and PFHxS were detected at AOI01-03. The highest concentration of PFOS was detected at AOI01-01, and the highest concentration of PFNA was detected at S8-MW2.

PFOA was detected above the SL of 6 nanograms per liter (ng/L) at four of the five well locations (AOI01-01, AOI01-03, S8-MW2, and S8-MW9), with concentrations ranging between 749 ng/L to 41,600 ng/L. PFOA was detected below the SL at AOI01-02 (1.20 J ng/L). PFOS was detected above the SL of 4 ng/L at all five well locations, at concentrations ranging between 8.55 ng/L to 4,300 ng/L. PFBS was detected above the SL of 601 ng/L at one of the five well locations (AOI01-03), with a concentration of 1,650 ng/L. PFBS was below the SL at the remaining wells at concentrations ranging between 5.45 ng/L to 211 ng/L. PFHxS was detected above the SL of 39 ng/L at all five well locations, with concentrations ranging between 51.1 ng/L to 17,100 ng/L. PFNA was detected above the SL of 6 ng/L at four of the five well locations (AOI01-01, AOI01-03, S8-MW2, and S8-MW9), with concentrations ranging between 7.93 ng/L to 31.9 ng/L. PFNA was not detected in AOI01-02.

6.3.3 AOI 1 Conclusions

Based on the results of the SI, PFOS was detected in the soil at concentrations above the SL. PFOA, PFOS, PFBS, PFHxS, and PFNA were detected in groundwater at concentrations above their respective SLs. Based on the exceedances of the SLs in soil and groundwater, further evaluation at AOI 1 is warranted.

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Table 6-2
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, Sustained Airborne Training Facility

	Area of Interest	AOI01									
	Sample ID	AOI01-01-SB-00-02		AOI01-02-SB-00-02		AOI01-02-SB-00-02-D		AOI01-03-SB-00-02		AOI01-04-SB-00-02	
	Sample Date	11/15/2021		11/15/2021		11/15/2021		11/15/2021		11/15/2021	
	Depth	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
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)											
PFBS	1900	0.111	J	0.177	J	0.198	J	0.230	J	0.569	J
PFHxS	130	0.770	J	2.26		3.88		4.61		8.79	J
PFNA	19	0.026	J	0.227	J	0.397	J	0.028	J	0.044	J
PFOA	19	ND	U	0.412	J	0.742	J	7.28		4.10	
PFOS	13	2.69		19.4	J	32.2	J	2.29		5.00	J

Grey Fill: Detected concentration exceeded OSD Screening Levels

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

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

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

Chemical Abbreviations

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

Acronyms and Abbreviations

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
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, Sustained Airborne Training Facility

	Area of Interest	AOI01							
	Sample ID	AOI01-01-SB-03-05		AOI01-01-SB-08-10		AOI01-02-SB-03-05		AOI01-03-SB-03-05	
	Sample Date	11/15/2021		11/15/2021		11/15/2021		11/15/2021	
	Depth	3-5 ft		8-10 ft		3-5 ft		3-5 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)									
PFBS	25000	0.212	J	0.597	J	0.033	J	0.205	J
PFHxS	1600	1.58		4.47		0.435	J	3.55	
PFNA	250	0.024	J	ND	U	0.027	J	ND	U
PFOA	250	0.208	J	0.415	J	0.100	J	4.69	
PFOS	160	7.54		17.2		2.31		1.01	J

Grey Fill Detected concentration exceeded OSD Screening Levels

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

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

Chemical Abbreviations

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

Acronyms and Abbreviations

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
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, Sustained Airborne Training Facility

	Area of Interest	AOI01											
	Sample ID	AOI01-01-GW		AOI01-02-GW		AOI01-03-GW		S8-MW2-111521		S8-MW2-111521-D		S8-MW9-111521	
	Sample Date	11/15/2021		11/15/2021		11/15/2021		11/15/2021		11/15/2021		11/15/2021	
Analyte	OSD Screening Level [a]	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	211		5.45		1650		172		160		73.9	
PFHxS	39	2700		51.1		17100		2380		2170		1230	J+
PFNA	6	9.19		ND	U	22.0		31.9		29.9		7.93	
PFOA	6	3360		1.20	J	41600		867		821		749	
PFOS	4	4300		8.55		1110		3890		3640		1560	J

Grey Fill: Detected concentration exceeded OSD Screening Levels

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

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 high

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

Chemical Abbreviations

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

Acronyms and Abbreviations

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
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

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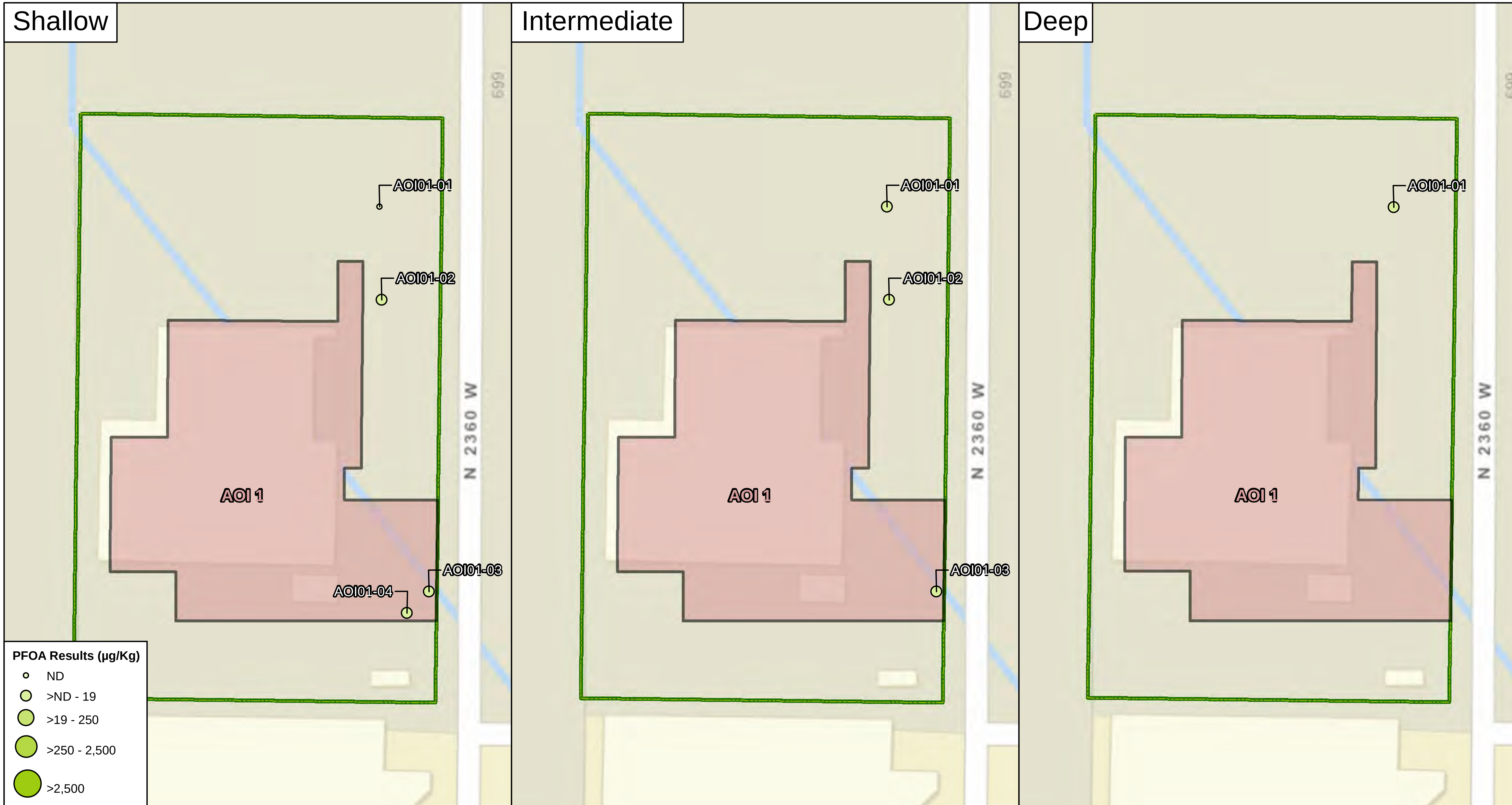

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SCALE	1:600	CHK BY	AD	11/17/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	11/17/2022

Legend

- Area of Interest
- Facility Boundary

0 25 50 100 Feet

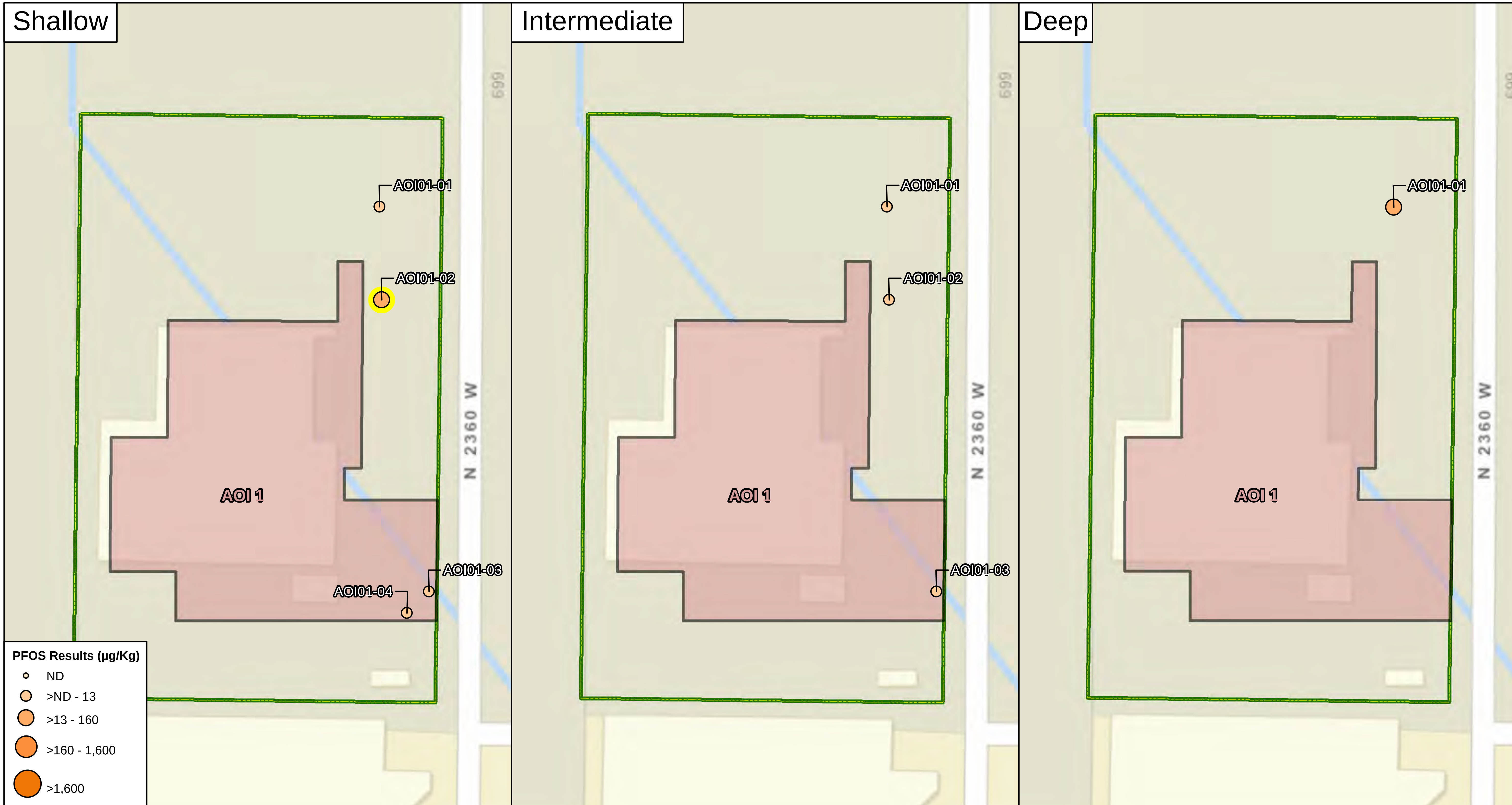
N

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

PFOA Detections in Soil

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 6-1



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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	11/17/2022	

Legend

Area of Interest

Facility Boundary

0 25 50 100 Feet

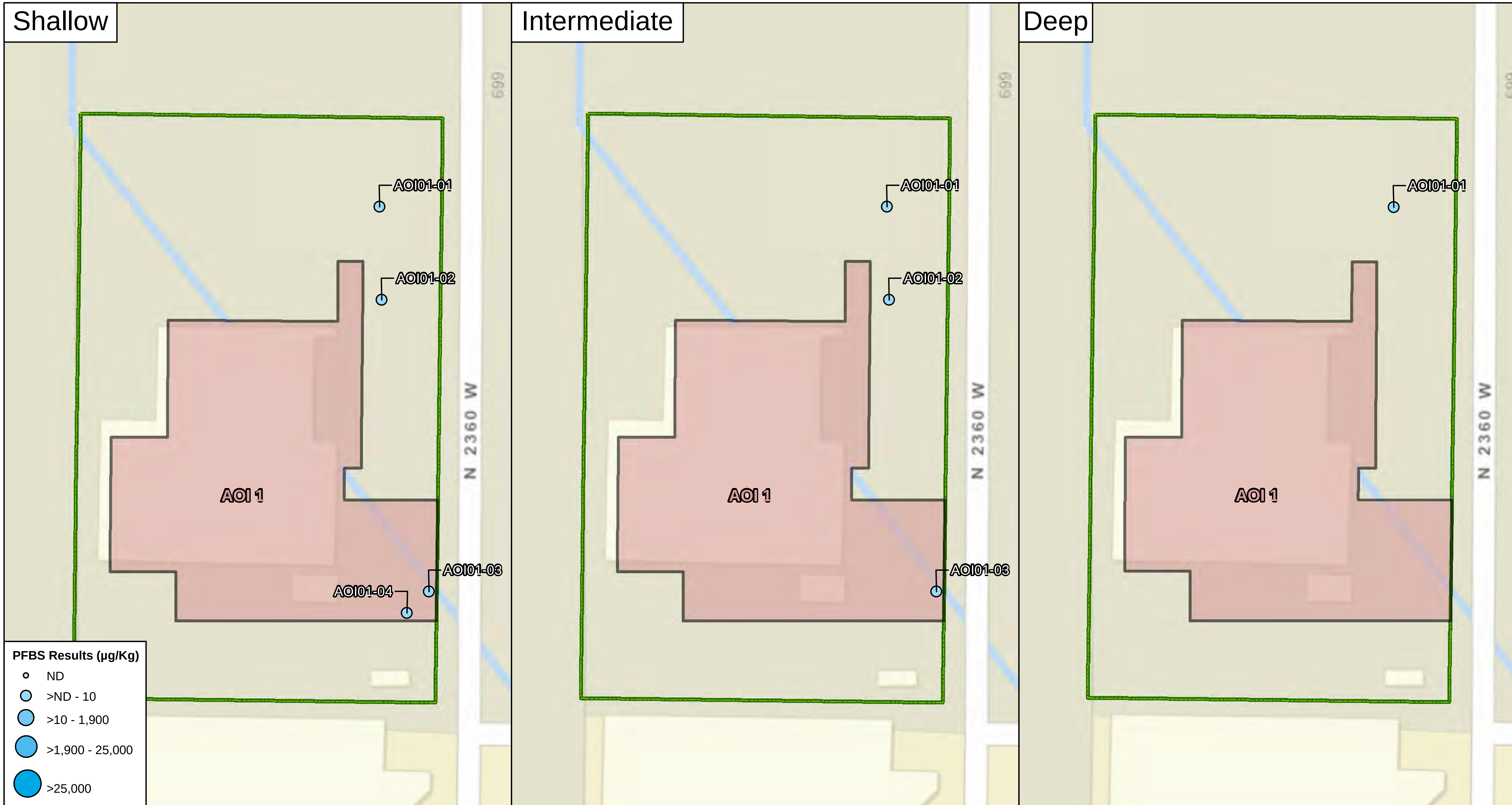
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

PFOS Detections in Soil

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 6-2



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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	11/17/2022

Legend

Area of Interest

Facility Boundary

0 25 50 100 Feet

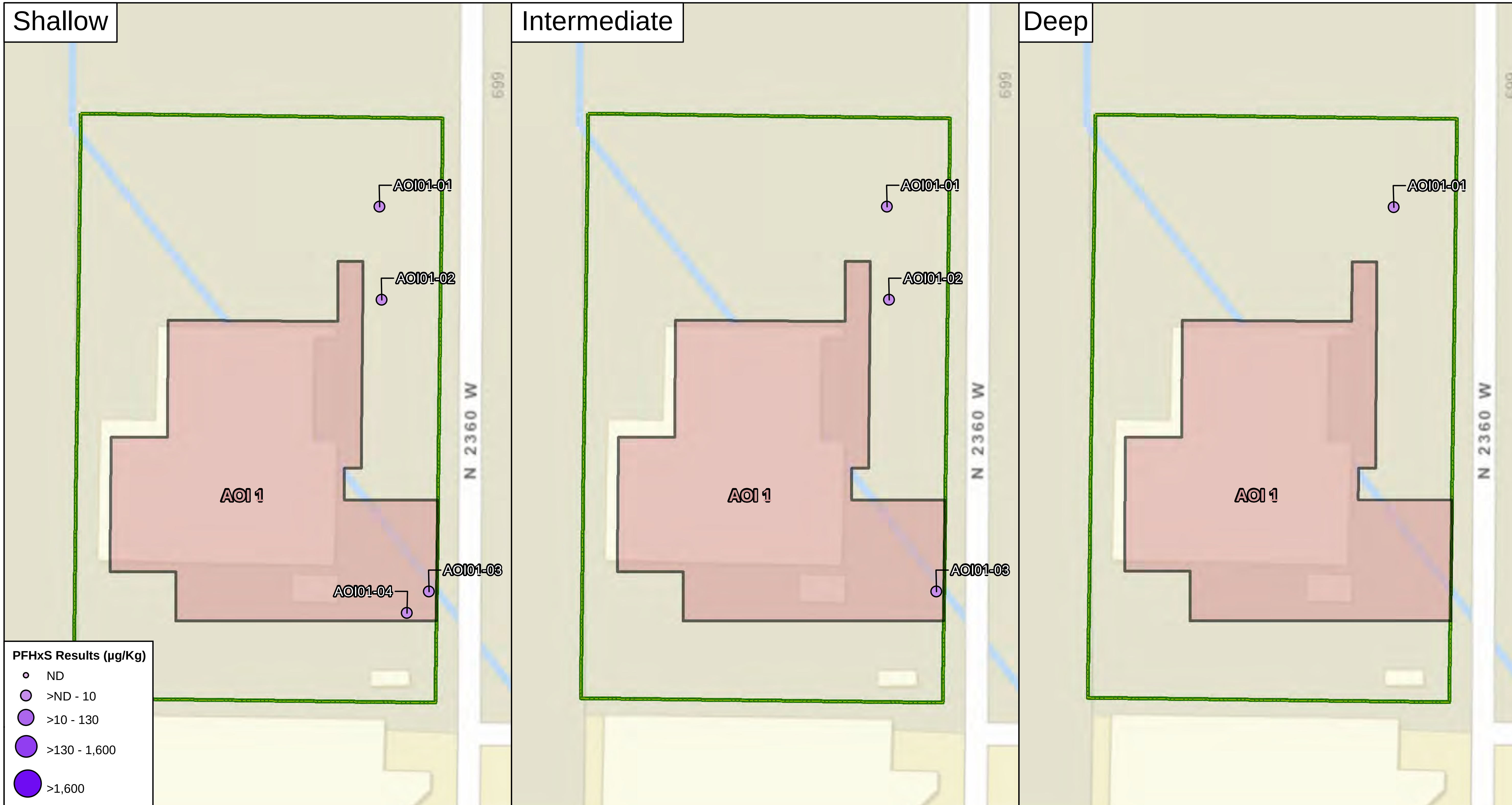
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

PFBS Detections in Soil

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 6-3



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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	11/17/2022	

Legend

Area of Interest

Facility Boundary

0 25 50 100 Feet

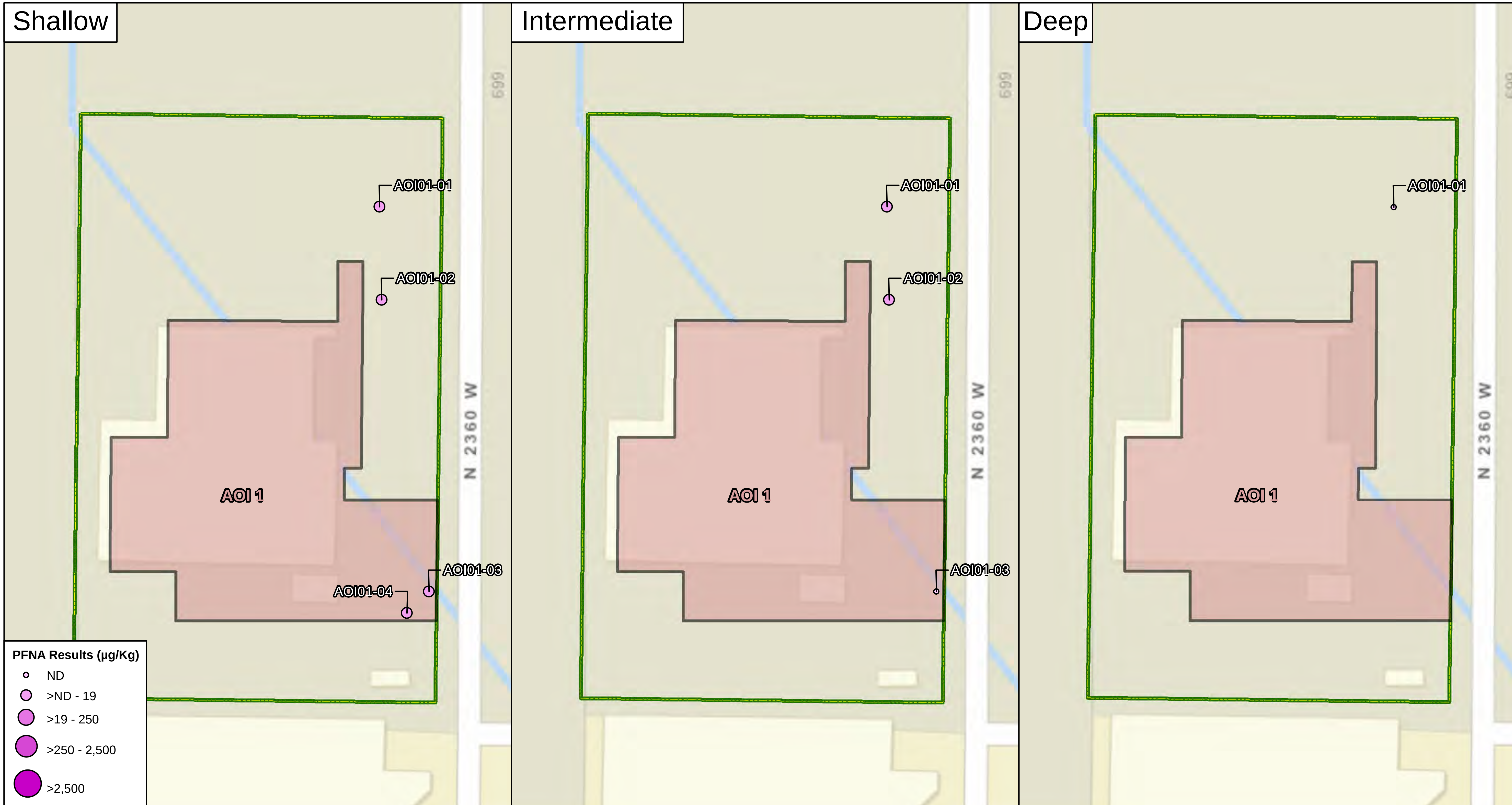
N

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

PFHxS Detections in Soil

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 6-4



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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	11/17/2022

Legend

Area of Interest

Facility Boundary

0 25 50 100 Feet

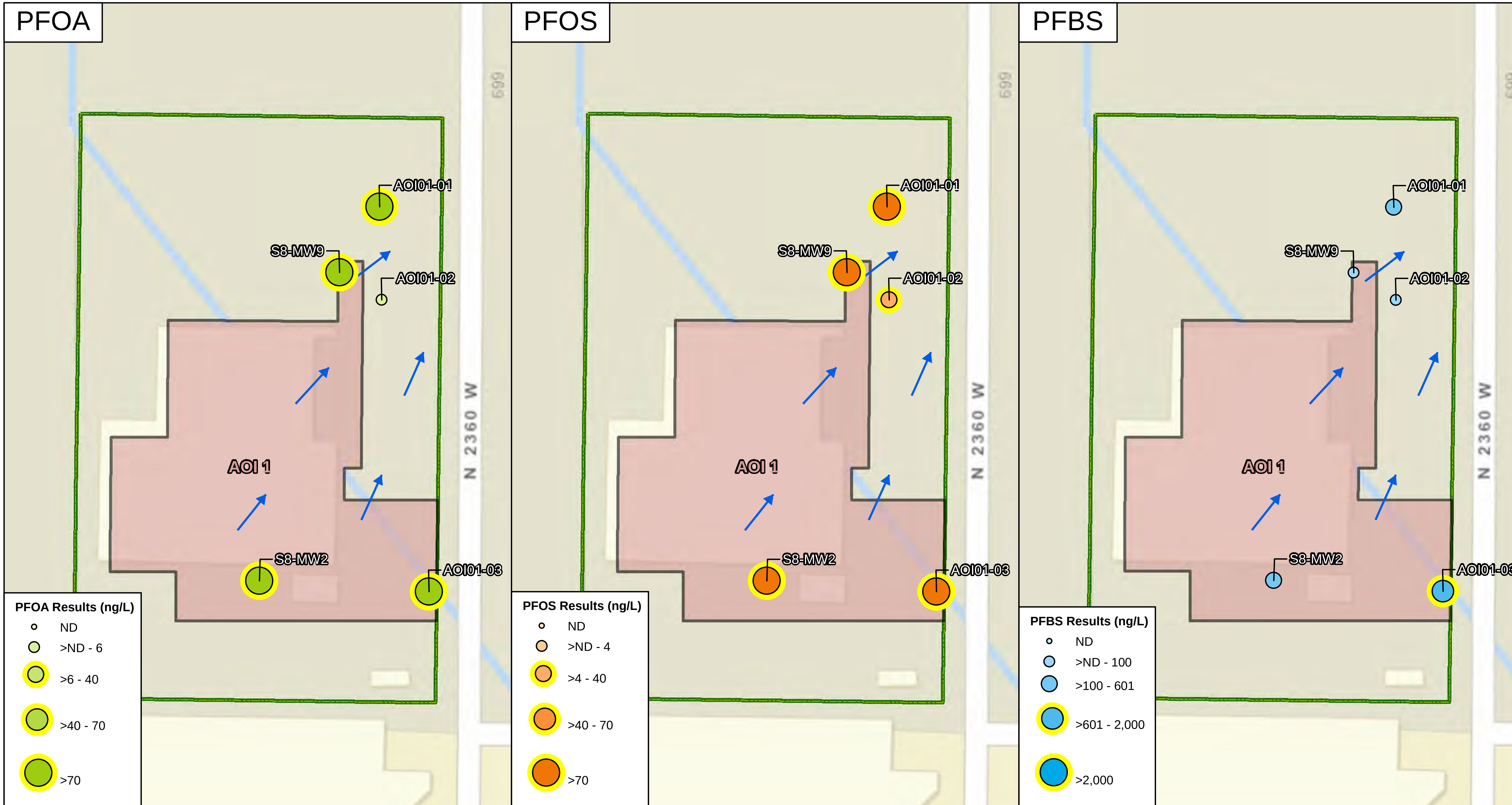
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

PFNA Detections in Soil

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 6-5



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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	11/17/2022

Legend

- Area of Interest
- Facility Boundary
- Groundwater Flow Direction

0 25 50 100 Feet

N

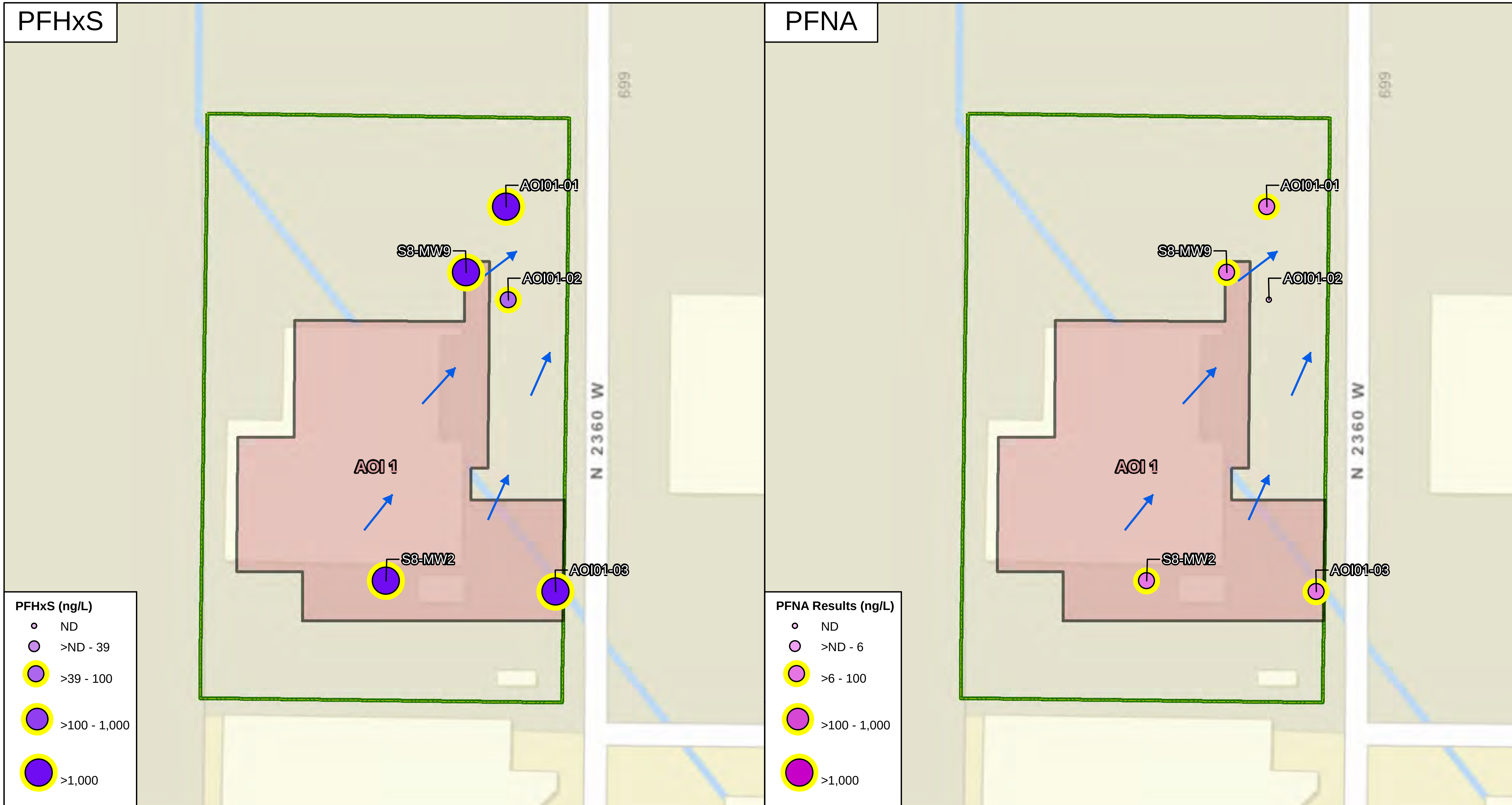
Exceedances of the OSD SL are depicted with a yellow halo.

PFOA, PFOS, and PFBS Detections in Groundwater

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-6



CLIENT	ARNG			
PROJECT	Site Inspection at Sustained Airborne Training Facility, UT			
REVISED	11/17/2022	GIS BY	MS	11/17/2022
SCALE	1:600	CHK BY	AD	11/17/2022
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	11/17/2022

Legend

- Area of Interest
- Facility Boundary
- Groundwater Flow Direction

0 25 50 100 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 CSM for the AOI, revised based on the SI findings, is presented on **Figure 7-1**. 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 a 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, residents outside the facility boundary, and recreational users outside of the facility boundary.

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 based on the aforementioned criteria.

7.1.1 AOI 1

The discharge of HEF in the hangar area during the fire suppression system test in 2014 may have resulted in a release to the subsurface via a potentially broken pipe that led to an OWS, or a release to the unpaved ground surface outside of Building 10. Firetruck washing and maintenance at the Former Fire Station between 1980 and 2013 may have resulted in a release of AFFF to the unpaved ground surface outside Building 10 via runoff that was not captured by floor drains.

PFOA, PFOS, PFBS, PFHxS, and PFNA were detected in the surface soil at AOI 1, with PFOS above the SL. Therefore, site workers, construction workers, and trespassers could contact constituents in surface soil via incidental ingestion and inhalation of dust, and the soil exposure pathway for those receptors is potentially complete. Additionally, trespassers just outside the facility may potentially be exposed to constituents in soil via inhalation of dust caused by on-facility ground disturbing activities. PFOA, PFOS, PFBS, PFHxS, and PFNA were also detected in subsurface soil; however, all detections were below the respective SLs. Ground-disturbing activities could potentially result in construction worker exposure to constituents in subsurface soil via ingestion. Construction activities were observed to be occurring near the facility at the time of the SI field work. Therefore, current and future construction workers could contact constituents in shallow subsurface soil via incidental ingestion, and the soil exposure pathway for this receptor is potentially complete. The CSM for AOI 1 is presented on **Figure 7-1**.

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

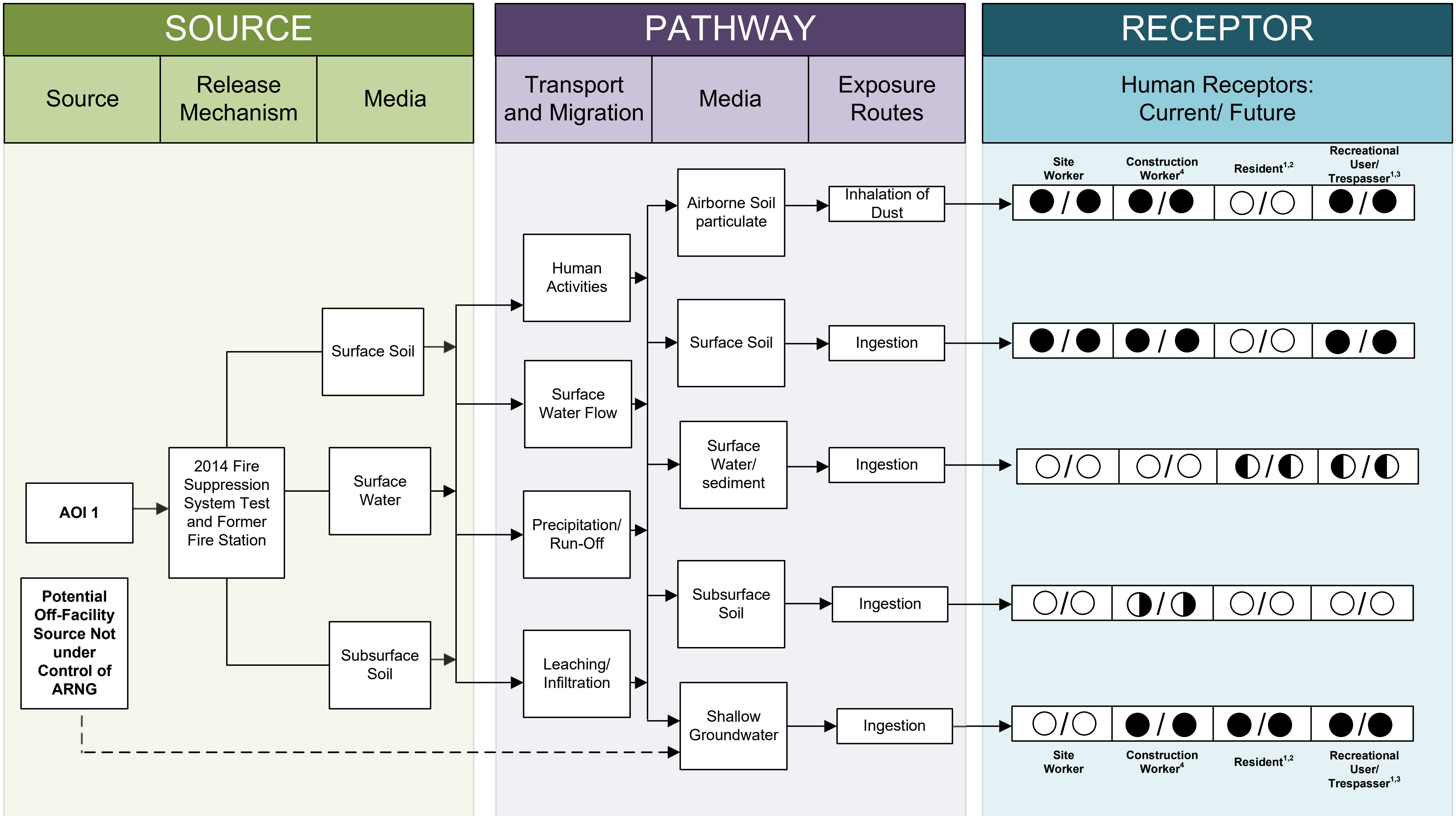
PFOA, PFOS, PFBS, PFHxS, and PFNA were detected above their respective SLs in groundwater samples collected at AOI 1. The SATF receives its potable water from the Salt Lake City public utilities, mostly sourced from mountain streams and supplemented with deep wells throughout the Salt Lake Valley (Salt Lake City Public Utilities, 2022). Groundwater is not used for drinking water at the facility; therefore, the ingestion pathway for site workers is considered incomplete. As discussed in **Section 2.2.2**, well logs in the area are considerably deeper than groundwater at the facility (UDWR, 2022). It is unknown whether offsite private potable wells using shallow groundwater are located downgradient of AOI 1; therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is considered potentially complete. Depths to water measured in November 2021 during the SI ranged from 4.10 to 7.5 feet bgs. Therefore, groundwater may be encountered during construction activities, and the ingestion exposure pathway for construction workers is considered potentially complete as well. Construction activities were observed to be occurring near the facility at the time of the SI field work. The CSM for AOI 1 is presented on **Figure 7-1**.

7.3 Surface Water and Sediment Exposure Pathway

The SI results soil and groundwater, in combination with knowledge of the fate and transport properties of PFOA, PFOS, PFBS, PFHxS, and PFNA, 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 runoff. Because PFOA, PFOS, PFBS, PFHxS, and PFNA were detected in soil and groundwater at AOI 1, it is possible that those compounds may have migrated from soil and groundwater to waters in the Jordan River. The Jordan River is the main source of irrigation water for farms in the Jordan Valley; therefore, the exposure pathway for surface water and sediment to the off-facility resident and recreational user receptors via ingestion of agricultural products is potentially complete.



LEGEND

Flow-Chart Stops

Flow-Chart Continues

Partial / Possible Flow

Incomplete Pathway

Potentially Complete Pathway

Potentially Complete Pathway with Exceedance of SL

NOTES

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

AECOM

Figure 7-1
Conceptual Site Model, AOI 1
Sustained Airborne Training Facility (SATF), Utah

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8. Summary and Outcome

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

8.1 SI Activities

The SI field activities were conducted on 15 November 2021 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, 2021a), except as previously noted in **Section 5.8**.

To fulfill the project DQOs set forth in the approved SI QAPP Addendum (AECOM, 2021a), samples were collected and analyzed for a subset of 18 compounds by LC/MS/MS compliant with QSM 5.3 Table B-15 as follows.

- Eight (8) soil samples from four boring locations;
- Three (3) grab groundwater samples from three (3) temporary well locations;
- Two (2) grab groundwater samples from two (2) existing permanent monitoring wells; and
- Eleven (11) QA/QC samples (three (3) soil, three (3) groundwater, two (2) equipment blank, two (2) decontamination water, and one (1) field reagent blank 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 AOI 1 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 CSM was refined to assess whether a potentially complete pathway exists between the source and potential receptors for potential exposure at the AOI, which is described in **Section 7**.

8.2 Outcome

Based on the results of this SI, further evaluation is warranted in an RI for AOI 1. Based on the CSM developed and revised in light of the SI findings, there is potential for exposure to drinking water receptors from AOI 1 from sources on the facility resulting from historical DoD activities. Sample analytical concentrations collected during the SI were compared against 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:
    - PFOS in soil exceeded the SL of 13 µg/kg at one location, AOI01-02, with a concentration of 32.2 J µg/kg. Based on the soil results of the SI, further evaluation of AOI 1 is warranted in an RI.
    - PFOA, PFOS, PFBS, PFHxS, and PFNA in groundwater exceeded their respective SLs. PFOA exceeded the SL of 6 ng/L at four of the five well locations (AOI01-01, AOI01-03, S8-MW2, and S8-MW9), with a maximum concentration of 41,600 ng/L at AOI01-03. PFOS was detected above the SL of 4 ng/L at all five well locations, with a maximum concentration of 4,300 ng/L at AOI01-01. PFBS exceeded the SL of 601

ng/L at one of the five well locations (AOI01-03), with a concentration of 1,650 ng/L. PFHxS exceeded the SL of 39 ng/L at all five well locations, with a maximum concentration of 17,100 ng/L at AOI01-03. PFNA exceeded the SL of 6 ng/L at four of the five well locations (AOI01-01, AOI01-03, S8-MW2, and S8-MW9), with a maximum concentration of 31.9 ng/L at S8-MW2. Based on the groundwater results of the SI, further evaluation of AOI 1 is warranted in an RI.

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	Groundwater – Source Area	Groundwater – Facility Boundary	Future Action
1	2014 Fire Suppression System Test and Former Fire Station	●	●	●	Proceed to RI

Legend:

● = detected; exceedance of the screening levels

◐ = detected; no exceedance of the screening levels

○ = not detected

9. References

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