FINAL
Site Inspection Report
Saginaw Facility
Saginaw, Texas

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

December 2023

Prepared for:

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

UNCLASSIFIED

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LIST OF ACRONYMS AND ABBREVIATIONS

%	Percent
°C	Degrees Celsius
°F	Degrees Fahrenheit
µg/kg	Microgram(s) per kilogram
AECOM	AECOM Technical Services, Inc.
AFFF	Aqueous film forming foam
amsl	Above mean sea level
AOI	Area of interest
ARNG	Army National Guard
ASTM	ASTM International
bgs	Below ground surface
btoc	Below top of casing
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CoC	Chain-of-custody
CSM	Conceptual site model
CSMS	Combined Support Maintenance Shop
DoD	Department of Defense
DPT	Direct-push technology
DQO	Data quality objective
DUA	Data Usability Assessment
EA	EA Engineering, Science, and Technology, Inc., PBC
EB	Equipment blank
ELAP	Environmental Laboratory Accreditation Program
EM	Engineer Manual
FedEx	Federal Express
ft	Foot (feet)
GAC	Granular activated
gal	Gallon(s)
GIS	Geographic information system
GPRS	Ground Penetrating Radar Systems
HDPE	High-density polyethylene
HFPO-DA	Hexafluoropropylene oxide dimer acid
HAS	Hollow team auger
ID	Identification
IDW	Investigation-derived waste
in.	Inch(es)

LIST OF ACRONYMS AND ABBREVIATIONS

ITRC	Interstate Technology Regulatory Council
JP-4	Jet propulsion fuel (Grade 4)
LC/MS/MS	Liquid chromatography tandem mass spectrometry
MIL-SPEC	Military specification
MS	Matrix spike
MSD	Matrix spike duplicate
ND	Non-detect
NFA	No further action
ng/L	Nanogram(s) per liter
No.	Number
OSD	Office of the Secretary of Defense
PA	Preliminary Assessment
PCB	Polychlorinated biphenyl
PFAS	Per- and polyfluoroalkyl substances
PFBS	Perfluorobutanesulfonic acid
PFHxS	Perfluorohexanesulfonic acid
PFNA	Perfluorononanoic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PID	Photoionization detector
Ppmv	parts per million by volume
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
QSM	Quality Systems Manual
RI	Remedial investigation
RSMS	Readiness Sustainment Maintenance Site
SI	Site inspection
SL	Screening level
TCEQ	Texas Commission of Environmental Quality
TOC	Total organic carbon
TPP	Technical Project Planning
TXARNG	Texas Army National Guard
UFP	Uniform Federal Policy
USACE	U.S. Army Corps of Engineers

LIST OF ACRONYMS AND ABBREVIATIONS

USCS	Unified Soil Classification System
USEPA	U.S. Environmental Protection Agency
UST	Underground storage tank
VOC	Volatile organic compound
VSI	Visual site inspection

EXECUTIVE SUMMARY

The Army National Guard (ARNG) G-9 is performing Preliminary Assessments (PAs) and Site Inspections (SIs) at ARNG facilities nationwide based 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) (Assistant Secretary of Defense) dated 6 July 2022. The six compounds listed in the OSD memorandum include perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorobutanesulfonic acid (PFBS), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), and hexafluoropropylene oxide dimer acid (HFPO-DA).[1] 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 four Areas of Interest (AOIs) where PFAS-containing materials may have been used, stored, disposed, or released historically. During the SI field event, a fifth AOI was identified (**Table ES-2** for AOI listing). 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 (NFA) is required based on a comparison of SI results to SLs for the relevant compounds. This SI was completed at the Saginaw Facility in Saginaw, Texas, and determined further evaluation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is warranted in an RI for AOIs 1 through 4 and the boundary area. Saginaw Facility is also referred to as the "Facility" throughout this document.

The Saginaw Facility, operated by the Texas ARNG (TXARNG), encompasses 149.66 acres in Saginaw, Texas, within Tarrant County. The southern part of the Saginaw Facility is currently used by TXARNG as a Combined Support Maintenance Shop (CSMS) (also referred to as the CSMS #1).The northern part of the Facility is composed of several administrative buildings, hangars, and paved and unpaved surfaces. The northern portion of the Facility was previously operated as a Readiness Sustainment Maintenance Site (RSMS) for approximately 10 years between 1991 and 2001. The current SI investigated the northern portion of the Facility which is now primarily used for rigging of equipment and storage, and administrative offices. The Saginaw Facility is located in the Grand Prairie physiographic province with topography characterized as relatively flat and developed (AECOM Technical Services, Inc. 2022).

SI sampling results from the AOIs were compared to OSD SLs. **Table ES-2** summarizes the SI results for the AOIs. Based on the results of this SI, further evaluation under CERCLA is warranted in a remedial investigation (RI) for AOIs 1 through 5.

[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.

It is further recommended that the RI for PFAS-containing materials and the ongoing, separate action addressing TCE and 1,1-DCE be combined in a single action under CERCLA that encompasses PFAS, TCE, and 1,1-DCE contamination at the Saginaw Facility. Based on the results of this SI and those of the separate TCE and 1,1-DCE investigation, the contamination is likely comingled. Such a combined effort will ensure adequate protectiveness of human and ecological health and will aid in evaluating restoration approaches.

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

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

Notes:
1. Assistant Secretary of Defense. 2022. Risk-Based SLs in Groundwater and Soil using U.S. Environmental Protection Agency's Regional SL Calculator. Hazard Quotient=0.1. May 2022.
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 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.

µg/kg = Microgram(s) per kilogram
ng/L = Nanogram(s) per liter
bgs = below ground surface
ft = foot (feet)

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	Former Burn Pits	●	●	●	Proceed to RI
2	Former JP-4 Storage Building	●	●	●	Proceed to RI
3	Hangar and Apron	●	●	●	Proceed to RI
4	Former Warehouse, Apron, and Former UST	◐	●	●	Proceed to RI
5	Former Helicopter Tie-Down Area	◐	Not sampled	Not sampled	No Further Action
N/A	Boundary Areas	◐	●	●	Proceed to RI

Legend:
● = Detected; exceedance of SLs
◐ = Detected; no exceedance of SLs
○ = Not detected
N/A = Not applicable
NFA = No Further Action
JP-4 = Jet propulsion fuel (Grade 4)

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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) at ARNG facilities nationwide based on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) with a focus on 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 perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorobutanesulfonic acid (PFBS), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), and hexafluoropropylene oxide-dimer acid (HFPO-DA)[2] at ARNG facilities nationwide. The ARNG performed this SI at Saginaw Facility in Saginaw, Texas. Saginaw Facility is also referred to as the "Facility" throughout this report.

The SI project elements were performed in compliance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (U.S. 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 Army requirements and guidance for field investigations.

1.2 SITE INSPECTION PURPOSE

A PA was performed at Saginaw Facility (AECOM Technical Services, Inc. [AECOM] 2022) that identified four Areas of Interest (AOIs) where PFAS-containing materials were used, stored, disposed, or released historically. During the SI field event, an additional AOI was identified and investigated. 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 (NFA) 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 Saginaw Facility is located on East Industrial Avenue in Saginaw, Tarrant County, Texas. **Figure 2-1** illustrates the location of Saginaw Facility, which is in North Central Texas and approximately 10 miles north of Fort Worth, Texas.

The Facility was originally established in 1941 as the Saginaw Army Aircraft Plant, which was an Army Material Command facility operated under the U.S. Army Aviation Systems Command. From 1941 to 1949, the Facility was leased to the Globe Aircraft Corporation and used for aircraft manufacturing and flight testing. In 1949, the Facility was deeded to the U.S. Department of the Navy and then subsequently leased to Bell Helicopter-Textron. Bell Helicopter-Textron operated the Facility between 1949 and 1989 for flight testing, maintenance, and storage of Department of Defense (DoD) helicopters. In 1991, the U.S. Government entered a lease agreement with Texas ARNG (TXARNG) for the use of 114.31 acres, and in 1996, an additional lease agreement added 35.35 acres to the leased area (for a total of 149.66 acres).

A figure from 1991 showed various buildings in the northeastern portion of the Facility that were used by Bell Helicopter-Textron to service aircraft. These included a Main Assembly Building, a Paint and Assembly Building, a Warehouse, and an Underground Diesel Fuel Pit, which were all located directly west of South Blue Mound Road. When TXARNG took over the lease in 1991, the facility boundaries were re-assigned to their current designation, leaving the Former Paint and Assembly building and the Main Assembly building off-facility. The aforementioned buildings were demolished sometime between 2007 and 2018, based on Google imagery. The 1991 figure also showed a Final Assembly Hangar located on the western portion of the Facility, directly west of the chain-link security fence that bisected the Facility in the center. Various fueling points and apron parking areas for aircraft were located to the north and south of the Final Assembly Hangar, respectively. The Final Assembly Hangar, or “Hangar,” is currently used by TXARNG for rigging equipment.

The southern part of the Saginaw Facility is currently used by TXARNG as a Combined Support Maintenance Shop (CSMS) (also referred to as the CSMS #1). The northern portion of the Facility was previously operated as a Readiness Sustainment Maintenance Site (RSMS) for approximately 10 years between 1991 and 2001. The northern portion of the Facility is now primarily used for rigging of equipment and storage, and administrative offices. Currently there is an out-of-service TXARNG paint booth that is a remnant of the former RSMS. The CSMS has its own separate paint booth.

Portions of Saginaw Facility (Former Burn Pits) are currently undergoing a CERCLA investigation for volatile organic compounds (VOCs) including 1,1-dichloroethene (DCE) and trichloroethene (TCE). The Former Burn Pits have been sampled multiple times since 2002 under a separate ARNG Action. The possibility exists for comingling of contaminants (PFAS compounds and VOCs) in and slightly downgradient of the Former Burn Pit areas.

2.2 FACILITY ENVIRONMENTAL SETTING

The Saginaw Facility is located in the Grand Prairie physiographic province with topography characterized as relatively flat and developed (**Figure 2-2**). The general surface elevation is 692 feet (ft) above mean sea level with a slight topographic gradient to the south-southeast. The surrounding property includes light industrial and commercial areas to the east, south, and west. There are open fields and wooded areas to the north. Residential areas are located to the east and northwest. The nearest residential area is located to the east and directly across South Blue Mound Road (AECOM 2022).

The following sections include information on geology, hydrogeology, hydrology, climate, and current and future land use. The regional groundwater features are shown on **Figure 2-3**. The regional surface water features and drainage basins are shown on **Figure 2-4**. Groundwater elevations and contours are presented on **Figure 2-5.**

2.2.1 Geology

The underlying geology at the Facility is associated with the Fort Worth Limestone and Duck Creek Formation, as well as the younger-age Weno Limestone and Denton Clay (**Figure 2-3**. These geological formations are also collectively known as the Georgetown Formation, which is characterized by Cretaceous limestone deposits and interbedded clay. The Duck Creek formation is an aphanitic limestone unit that forms local topographic benches. Alluvial deposits can also be found near the Little Fossil Creek, which were deposited from the creek eroding the underlying limestone.

Surface soils at Saginaw Facility are from the Purves, Frio, Sanger, Mingo, and Slidell associations. These soils are characterized as clay, silty clay, and clay loam, are moderately well-drained to well-drained, and occur to a depth of approximately 14.5 ft below ground surface (bgs). The bedrock limestone is generally encountered at depths between 12–15 ft bgs (AECOM 2022).

Soils primarily composed of lean clay of low to no plasticity and silt, with varying amounts of sand and gravel were the dominant lithology encountered during the SI field events. Boring completion depths ranged between 2 to 20 ft bgs. Grain size analysis was performed on sample AOI01-03 and AOI04-01 and analyzed via ASTM International (ASTM) Method D-422. Results indicated soil comprised of between 45.5 to 52 percent (%) clay, 32.1 to 50% silt, 4.5 to 10.2% sand, and 0 to 5.7% gravel. Results are consistent with the reported depositional environment of the region.

2.2.2 Hydrogeology

The regional source for groundwater and main aquifer is the Trinity Aquifer, which lies several hundred feet beneath the ground surface. A shallow unconfined aquifer exists within the alluvial deposits near Little Fossil Creek, and the underlying competent limestone bedrock acts as an aquiclude. The shallow unconfined aquifer is considered a Class 2 groundwater resource; however, there are no known nearby production wells utilizing the unconfined aquifer. Based on previous groundwater monitoring events at the Facility unassociated with current investigation, it

was determined the shallow unconfined aquifer is laterally discontinuous and ephemerally saturated with generally low water yields (Corrigan 2004; AECOM 2020). Soil borings east of Little Fossil Creek encountered shallow refusal without reaching groundwater. Another deeper aquifer was encountered at 56 ft bgs within the facility property (AECOM 2022). Based on semiannual 2011-2015 groundwater results for monitoring well DB-1 (exact location unidentified), this aquifer does not appear to have been impacted by volatile organic compounds (USACE 2015).

The PA Report stated that groundwater flow was to the south and southeast. Based on previous groundwater monitoring events at the Facility, localized on-site shallow groundwater flow ranges from southwest to southeast based on the time of year (season), recent precipitation events, and proximity to surface water features (Corrigan 2004; Terracon 2015; AECOM 2020). The on facility monitoring wells installed within the shallow unconfined aquifer have been measured dry in times of drought. When groundwater is present, the depth to groundwater is highly variable, depending on seasonal precipitation, and varies from 4 to 15 ft bgs. Regional groundwater flow at the Facility is towards the southeast. Groundwater data collected during the SI shows a varied flow direction which may be influenced by Little Fossil Creek. Flow direction ranged from west-southwest near AOI 4; to east towards Little Fossil Creek at AOI 3, and southeast at AOIs 1 and 2. Depths to groundwater observed during the synoptic gauging event ranged between 5.24 to 15.06 ft below top of casing (btoc). Groundwater features are presented in **Figure 2-3** (AECOM 2022)**.**

Using additional online resources, such as state and local geographic information system (GIS) databases, wells were researched to a 4-mile radius of the Facility. The Saginaw Facility receives potable water from the City of Saginaw, which purchases water from the City of Fort Worth. The City of Fort Worth has multiple surface water intakes from various surrounding reservoirs, lakes, and rivers. The Eagle Mountain Reservoir, located approximately 8 miles northwest of the Facility, is the main source of drinking water for the Facility (AECOM 2022). Several monitoring wells exist within the Saginaw Facility boundaries from ongoing CERCLA investigations as well as previous environmental studies. A domestic water well is located approximately 4 miles upgradient to and north of the Facility and two domestic water wells are located approximately 3 miles northwest and cross-gradient to the facility. Three irrigation water wells are located greater than 2 and 3 miles northwest of and cross-gradient and upgradient of the Facility. 13 irrigation wells are located within a few miles of the Facility; two are located 3- 4 miles east-northeast of the Facility; eight are located greater than 2 miles downgradient of the Facility; one is located at the Facility (plugged and abandoned); and the remaining two are less than ½ mile, west, and cross-gradient of the Facility. These well locations are shown on **Figure 2-3** (AECOM 2022)**.**

2.2.3 Hydrology

Little Fossil Creek bisects the Facility in the northwest to southeast direction. Little Fossil Creek is an intermittent stream that runs southeast and lies within the Sycamore Creek-West Fork Trinity River Watershed (AECOM 2022). Localized, shallow groundwater flow appears to be influenced by Little Fossil Creek, and groundwater discharge to the surface water can vary based on time of year, precipitation events, and proximity to surface features. Surface water features are presented on **Figure 2-4** (AECOM 2022).

The stormwater management system at the Facility is comprised of Little Fossil Creek, a series of swales, culverts, wetlands, and graded concrete pads that divert surface water. Water that accumulates on some of the paved areas north of AOI 1 and within AOI 1 is primarily diverted into a north-south bearing swale to the east of AOI 1 or as sheet flow across AOI 1. Sheet flow and flow through the swale is diverted into Little Fossil Creek near or at the eastern Facility boundary. At AOI 2 precipitation is diverted into Little Fossil Creek and to an east-west bearing swale that diverts water into Little Fossil Creek. There is a north-south bearing stormwater swale that runs along the western Facility Boundary. Stormwater from properties to the west of the facility enters this swale through off-facility east-west swales and through sheet flow. Some of the water that falls on paved and unpaved areas of AOI 3 is also diverted into this swale and another east-west swale that bisects the north-south bearing swale and diverts stormwater through AOI 3 to the east of Facility into Little Fossil Creek. Precipitation that falls within paved and unpaved portions of AOI 3 is also diverted into a series of swales that divert stormwater into Little Fossil Creek and wetlands that are interconnected with Little Fossil Creek. Preciptiation that falls on paved portions of AOI 4 is diverted to the west into a swale that diverts water into the north-south bearing swale along the eastern Facility boundary into Little Fossil Creek and to the south into an east-west bearing swale along the southern Facility boundary that diverts water into the same north-south bearing swale. Precipitation that falls within the paved areas where the off-Facility former UST and Former Paint and Assembly Building were located is also diverted through portions of AOI 4 and into the east-west bearing swale along the southern facility boundary. AOI 5 is situated along the west bank of Little Fossil Creek. Some stormwater originating from AOI 3 is diverted across AOI 5. Stormwater runoff from AOI 5 is diverted directly into Little Fossil Creek within the Facility boundary.

2.2.4 Climate

The Saginaw Facility is in a humid, subtropical climate zone characterized by long and warm summers and short and mild winters; the temperature and precipitation range widely throughout the year. The total monthly precipitation normal ranges from 2.08 inches (in.) in July to 4.78 in. in May, and the total annual precipitation normal is 37.01 in. Summer temperatures peak in August, with an average high of 95 degrees Fahrenheit (°F) and an average low of 75°F. Winter temperatures are lowest in January, with an average high of 56°F and an average low of 36°F. Snowfall is rare, but thunderstorms occur throughout the year and more frequently in the spring (AECOM 2022).

2.2.5 Current and Future Land Use

The Facility is used by TXARNG primarily as a CSMS. The primary function of the Facility is to maintain military vehicles. The active CSMS that includes a paint booth and a fuel point is located at the southern end of the Facility. The existing hangar and apron (AOI 3) are used by TXARNG personnel for rigging training. A fuel point and the combined support maintenance shop (CSMS) which includes a paint booth is located at the southern end of the Facility. The property is currently zoned for industrial uses with related infrastructure including buildings, parking lots, roadways, and other paved areas; a few areas of the property remain vacant. Reasonably anticipated future land use is not anticipated to change from the current land use (AECOM 2022).

2.2.6 Sensitive Habitat and Threatened/Endangered Species

The following species are listed as federally endangered, threatened, proposed, and/or candidate species in Tarrant County, Texas (U.S. Fish and Wildlife Services 2023):

- Amphibians: Strecker's Chorus Frog (*Pseudacris streckeri*) – Federally Threatened; Woodhouse's Toad (*Anaxyrus woodhousii*) – Federally Threatened

- Birds: Black rail (*Laterallus jamaicensis*) – Federally Threatened; Piping plove (*Charadrius melodus)* – Federally Threatened

2.3 HISTORY OF PFAS USE

Four AOIs were identified in the PA where AFFF may have been used, stored, disposed, or released historically at Saginaw Facility (AECOM 2022). An additional AOI (for a total of five) was identified during the SI field event. Each of these AOIs is identified and depicted on **Figure 2.5**. Areas where PFAS were potentially used, stored, disposed, or released to soil, groundwater, surface water, and sediment within the boundary of Saginaw Facility include the Former Burn Pits 1 and 2, Former jet propulsion fuel (Grade 4) (JP-4) storage building, the Hangar and Apron, the Former Warehouse, Apron, and former Underground Storage Tank (UST), and the Helicopter Tie-Down area. The potential release areas were grouped into five AOIs based on preliminary data and presumed groundwater flow directions. The PA concluded that PFAS releases present are likely from previous owners and operators, and likely not attributable to the TXARNG, given the site history. Further, no releases are known to have occurred since TXARNG took over the lease in 1991. A description of each AOI is presented in **Section 3**.

2.4 OTHER ENVIRONMENTAL INVESTIGATIONS

Saginaw Facility has an ongoing TCE investigation which is under a separate ARNG action. Groundwater sampling and analysis began in 2004 as part of the Affected Property Assessment Report (dated August 2004). Groundwater analytical results indicated that groundwater at the Facility has been impacted by chlorinated solvents including TCE, Cis-1,2-DCE, 1,1-DCE, and Vinyl Chloride (VC). On and off-site wells were sampled between 2006 and 2008 as recommendations of Affected Property Report and showed that contamination extended off-property to the east of the Former Burn Pits area. Delineation of the plume occurred in 2008 with the installation of 5 wells within the shallow aquifer and one deep well installed 100ft into the limestone lower water bearing unit. Results indicated only the shallow groundwater (0-15ft bgs) had been impacted. A Draft Response Action plan (RAP) was submitted to Texas Commission of Environmental Quality (TCEQ) in February 2010, which stated monitored natural attenuation (MNA) as the remedy for the Facility.

After a Five-Year review was completed in 2015, a revised RAP was submitted to TCEQ in August 2017 due to contamination levels remaining stable and not declining. The Revised RAP recommended using an In-Situ Permeable Reactive Barrier (ISPRB) with both Chemical Reduction and Enhanced Reductive De-Chlorination (ERD). However, although reviewed and approved by TCEQ and reviewed by the National Guard Bureau (NGB), the Revised RAP was never signed by NGB nor has the Revised RAP been implemented. Sampling was initiated in

Fiscal Year 2022 (FY22) and FY23, with results showing TCE concentrations slowly declining. Currently, MNA is the recommended remedial strategy.

Army National Guard Site Inspections
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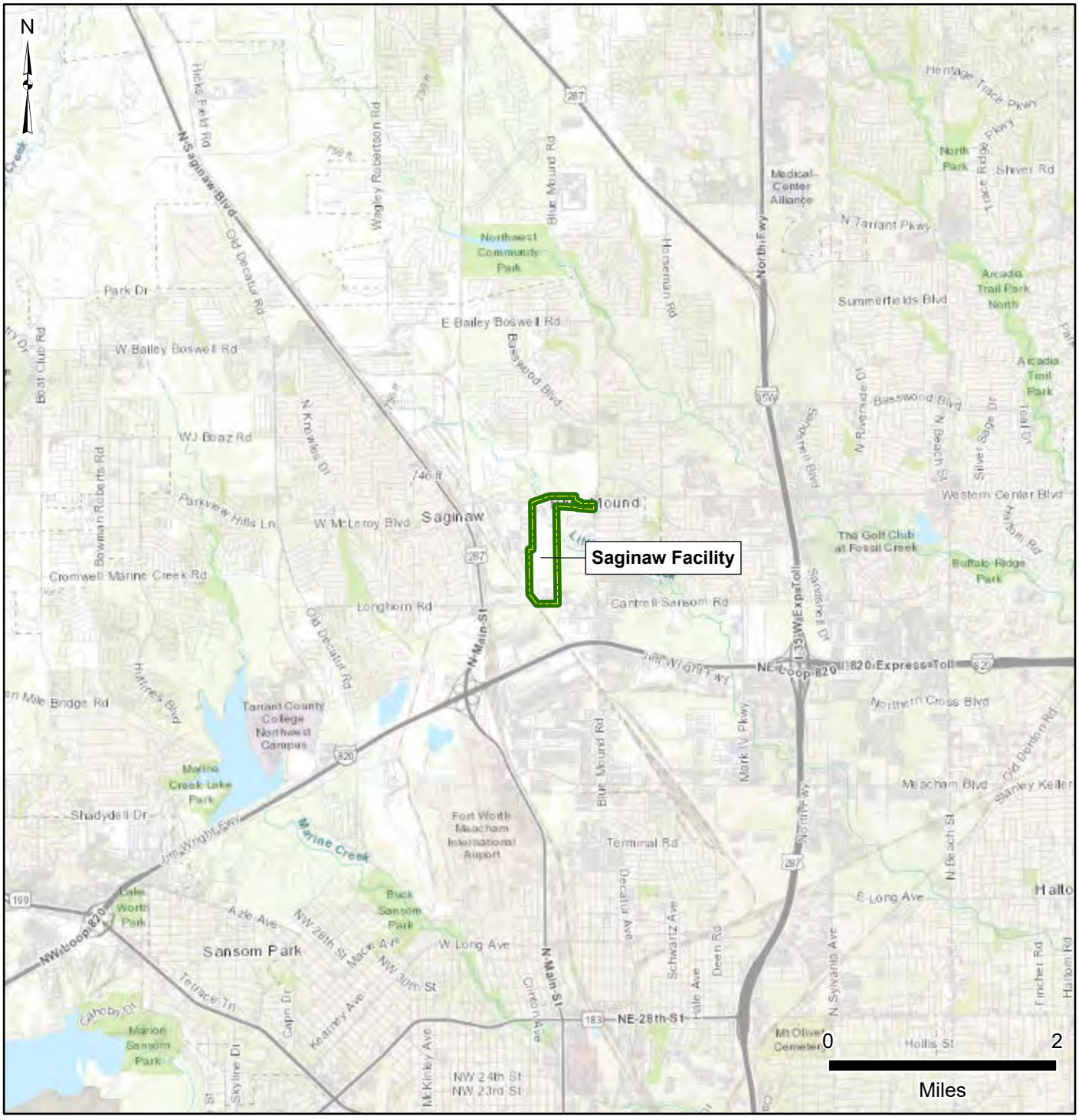
Figure 2-1
Facility Location



Facility Data

Facility Boundary

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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Site Inspection Report
Saginaw Facility, Texas

Figure 2-2
Topography

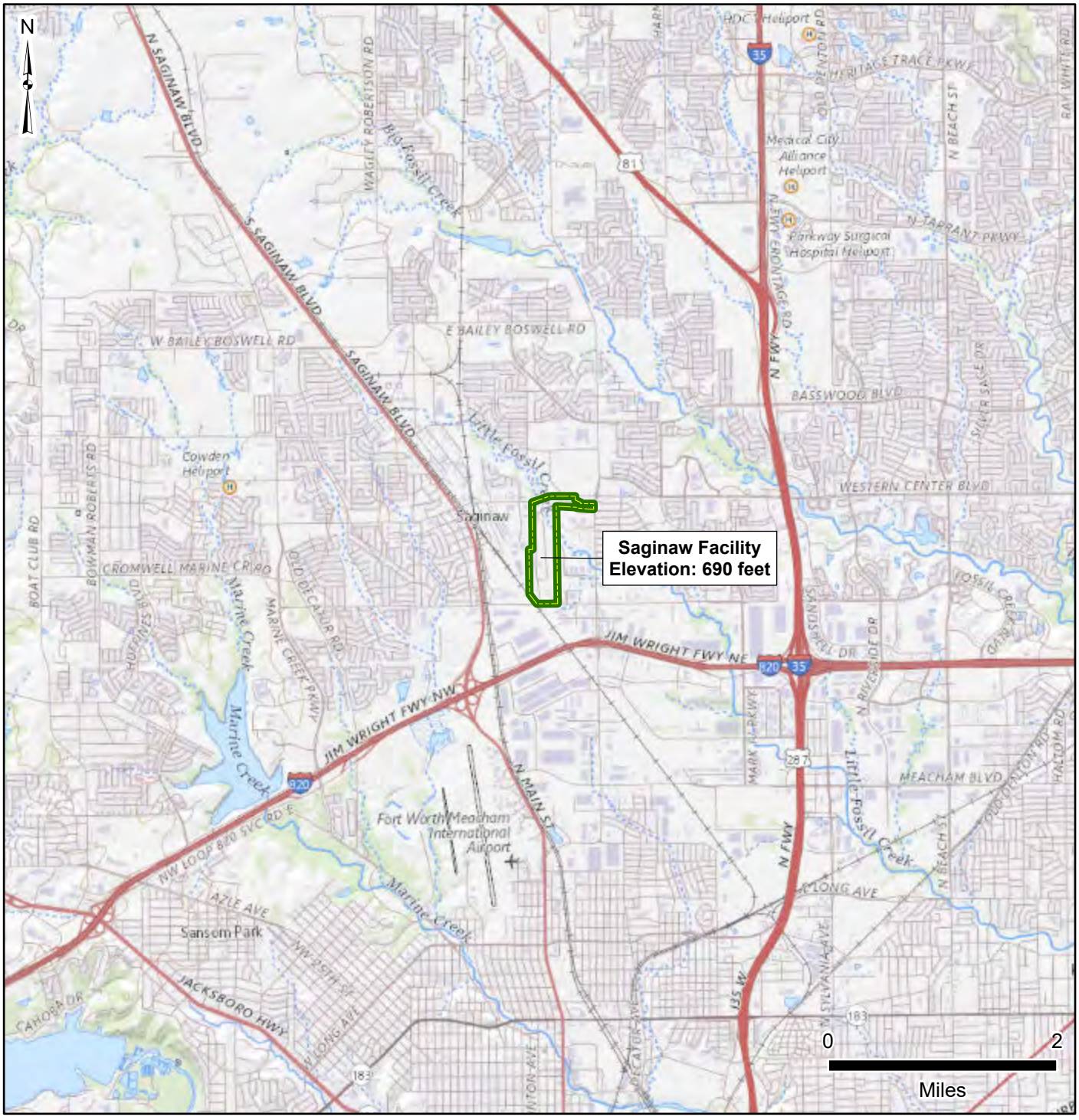

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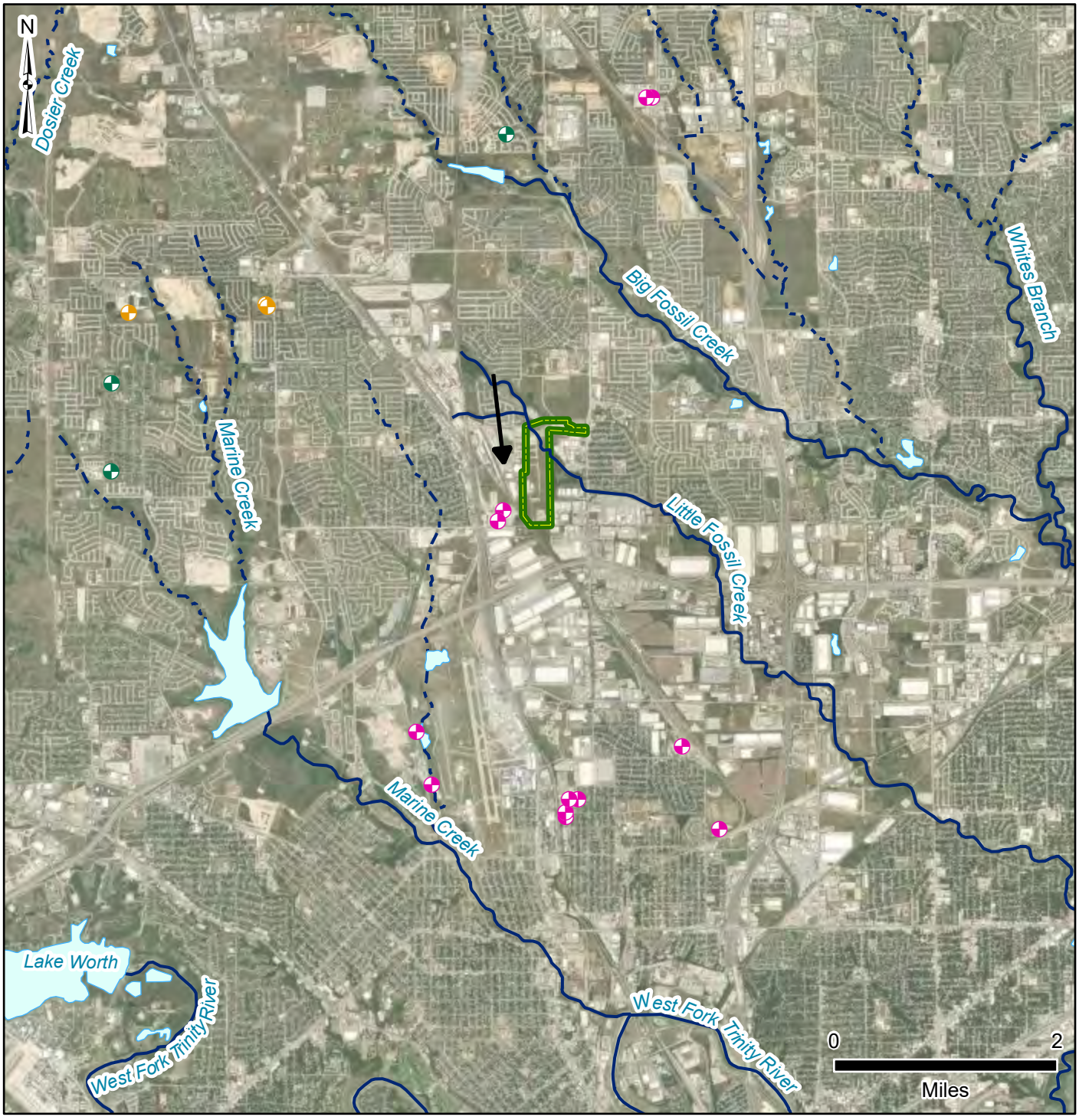
Figure 2-3
Groundwater Features



Facility Data
- Facility Boundary

Well Type
- Domestic
- Industrial
- Irrigation

Hydrology/Hydrogeology
- Inferred Groundwater Flow Direction
- Perennial Creek/Stream
- Intermittent Creek/Stream
- Waterbody

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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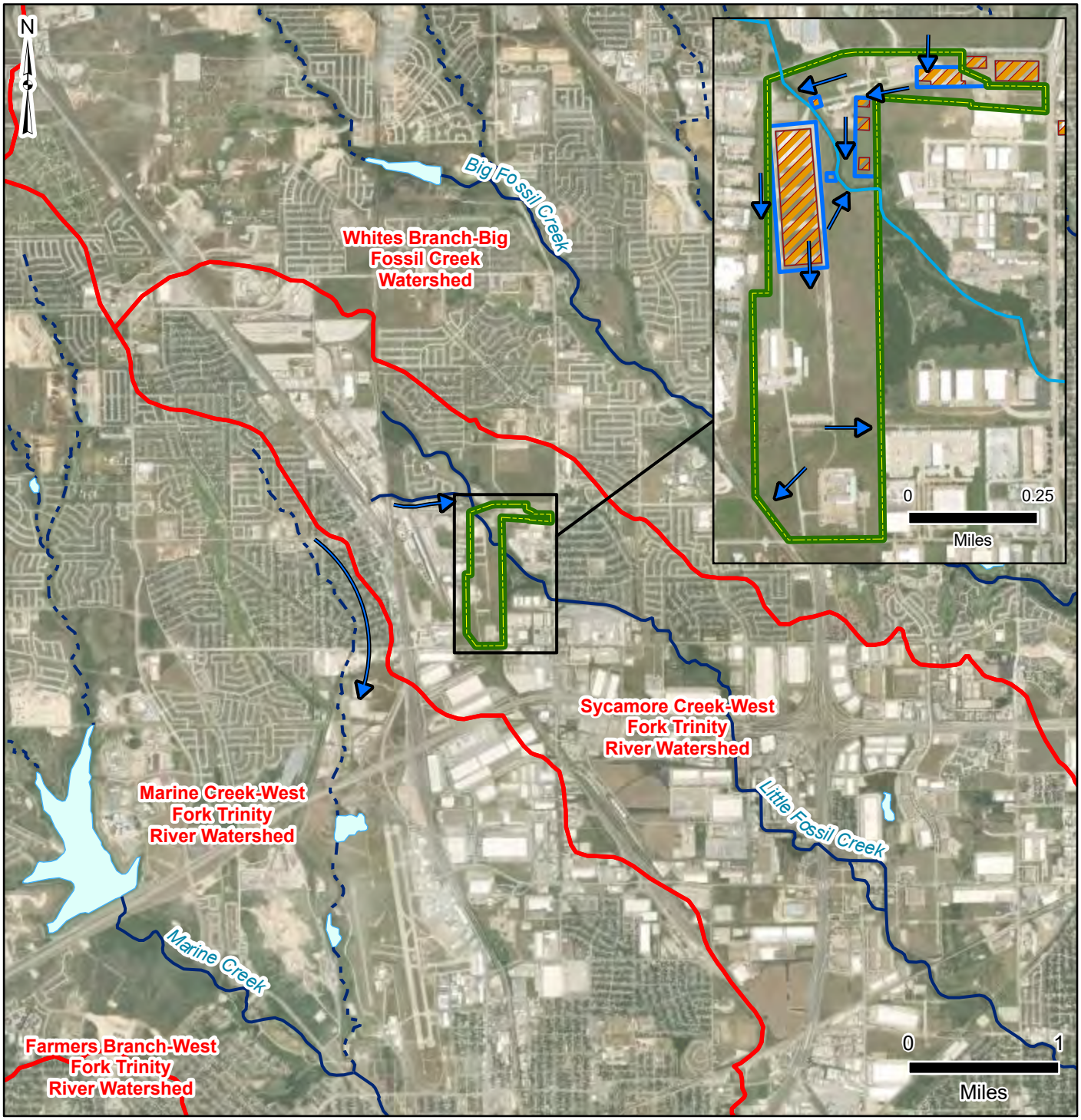
Figure 2-4
Surface Water Features



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Perennial Creek/Stream
- Intermittent Creek/Stream
- Waterbody
- Watershed Boundary

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
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Projection:.....WGS 84 UTM 14N

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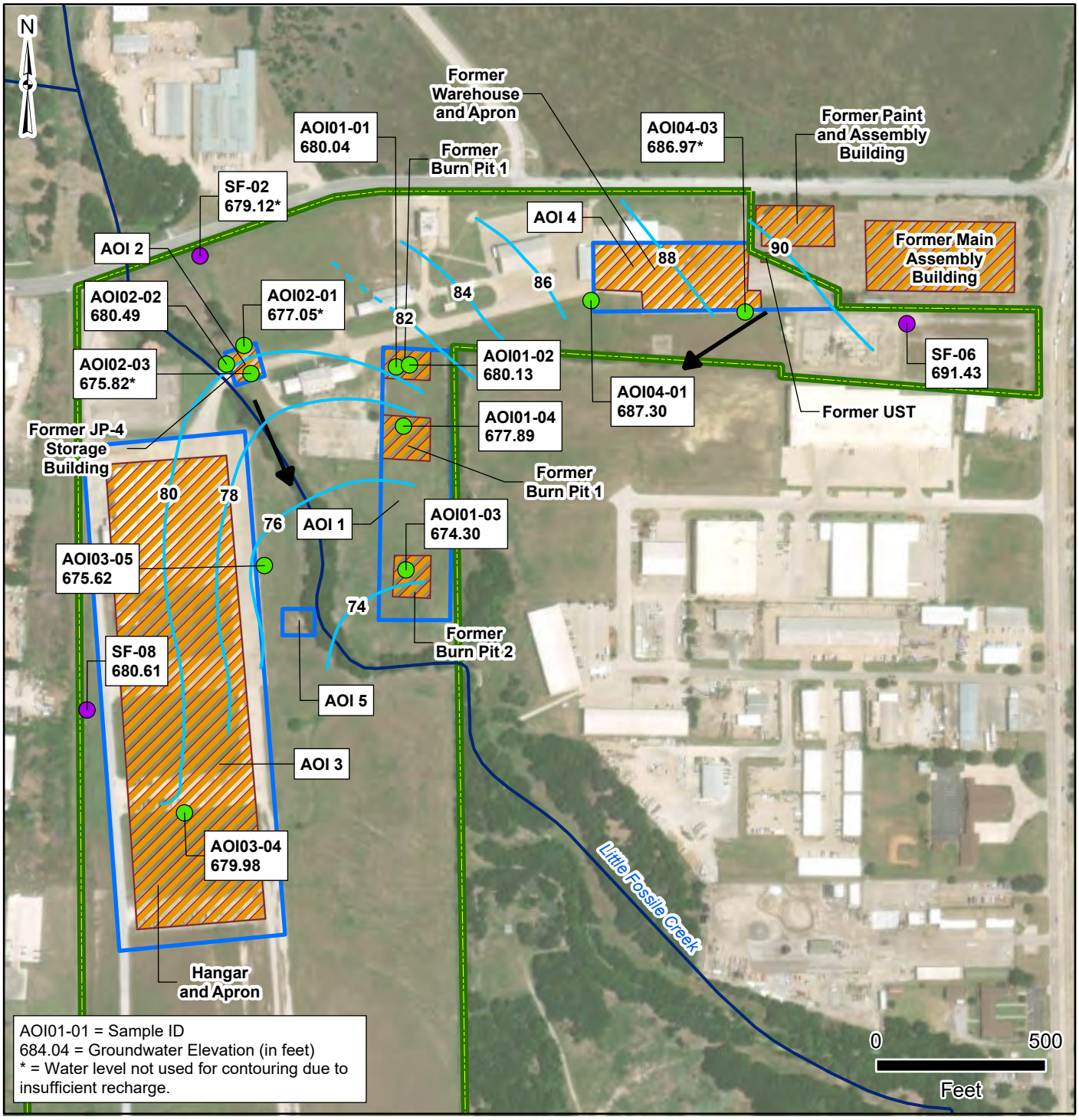
Figure 2-5
Groundwater Elevations



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

SampleLocations
- Soil Boring
- Boundary Soil Boring and Temporary Well

Hydrology/Hydrogeology
- Groundwater Flow Direction
- Little Fossil Creek
- Groundwater Elevation Contour Interval = 2 feet
- Dashed where Inferred

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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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, six potential release areas were identified at Saginaw Facility, with a seventh area identified during the SI field event; the areas were then grouped into five AOIs. The potential release areas are shown on **Figure 3-1** and described below.

3.1 AOI 1 – Former Burn Pits

Two Former Burn Pits are located in the area between Little Fossil Creek and the eastern Facility fence-line. The Former Burn Pits are located on a portion of land acquired by the TXARNG in 1996. Based on aerial imagery, the Former Burn Pits are visible as early as 1957. By 1963, the Former Burn Pits appeared significantly filled in, and in 1975, the Former Burn Pits area was filled in and graded; therefore, the Former Burn Pits were presumably closed between 1963 and 1975, and in use when Bell Helicopter-Textron was operating the Facility.

DoD contractors used the Former Burn Pits to burn paper and construction wastes, which may have also included petroleum and halogenated hydrocarbons, lacquers, varnish, metals, paint, inks, dyes, pesticides, polychlorinated biphenyls (PCBs), adhesives, epoxy, dioxins, and furans. Based on investigations and sampling events conducted by ARNG and TXARNG at the Former Burn Pits between the years 2002 and 2018, the site's groundwater bearing unit is contaminated with volatile organic compounds (VOCs), including 1,1-dichloroethene and trichloroethene. The Response Action Plan for the site contaminants selected a remedy of In Situ Redox Manipulation with Permeable Reactive Barriers, and the plan was subsequently approved by the TCEQ on 28 September 2017. Both Former Burn Pits are currently grassed over and landscaped with multiple monitoring wells located on and surrounding them. Monitoring wells also extend to the vacant, off-facility property to the east.

The nature of how fires were extinguished and what exact materials were disposed of during the burning activities are unknown, since the usage of the Former Burn Pits predated TXARNG's occupation of the site in 1996. Bell Helicopter-Textron was the DoD contractor leasing the Facility during the period of interest; however, little is known about their activities at the Former Burn Pits. Because the Former Burn Pits were used to dispose of various materials, the procedure may have been to allow all contents to burn completely without using any extinguishers. However, if a burn were to become uncontrolled, it is also likely that fire extinguishing methods were close at hand and may have been used. Due to the uncertainty about the nature and history of activities at the Former Burn Pits, the Former Burn Pits are considered potential PFAS-release areas (AECOM 2022). Further uncertainties exist concerning the exact location of Burn Pit 1. The previous CERCLA investigations from 2004 to 2015, such as Corrigan (2004) and Terracon (2015), have noted the location to be slightly north of the positioning determined during the PA investigation (**Figure 3-1**). As such, each location determined during the PA and the previous CERCLA investigations are considered potential PFAS release areas for this SI.

3.2 AOI 2 – Former JP-4 Storage Building

The Former JP-4 Fuel Storage Building is located northwest of the Former Burn Pits. Based on aerial imagery, the Former JP-4 Fuel Storage Building is visible as early as 1968 and as late as 1990. Bell Helicopter-Textron was the DoD contractor leasing the Facility during the period of interest; however, little is known about their activities at the Former JP-4 Fuel Storage Building. Petroleum, oil, and lubricants (JP-4) were stored underground in an undetermined number of tanks; the total capacity of the tanks was 71,000 gallons (gal). No documentation was found to determine if the USTs remain. Due to the former storage of fuel at this location, it is possible that AFFF or other PFAS-containing materials were stored or used at the Former JP-4 Fuel Storage Building for fire suppression purposes. As a result, the Former JP-4 Fuel Storage Building is considered a potential PFAS- release area (AECOM 2022).

3.3 AOI 3 – Hangar and Apron

The Hangar and Apron are located on the western portion of the Facility, between the fence-line and Little Fossil Creek. The Hangar, also referred to as the Final Assembly Hangar, is currently used to prepare equipment for rigging and contains a fire suppression system that is currently and has always been charged with water only. The fire suppression system is currently out of service, according to a sign observed during the visual site inspection (VSI). Also observed within the Hangar were 10 dry chemical (non-AFFF) extinguishers. (AECOM 2022).

Prior to the TXARNG occupation of the Facility in 1991, Bell Helicopter-Textron used the Hangar and Apron for their own operations. Helicopters are known to have been parked at Aprons located directly east and south of the Hangar, as seen in historical aerial imagery. The Hangar and Apron were constructed sometime between 1963 and 1968, and the eastern edge of the Apron was built over a former runway that ran north-south. Due to the storage of aircraft at the Hangar and Apron, it is possible that AFFF or other PFAS-containing materials were stored or used at the Hangar and Apron for fire suppression purposes in case of aircraft incidents, or other uses. As a result, the Hangar and Apron are conservatively considered a potential PFAS release area (AECOM 2022).

3.4 AOI 4 – Former Warehouse, Apron, and Former UST

The Former Warehouse, Apron, and former UST are located in the northern portion of the Facility, west of South Blue Mound Road. Based on historical aerial imagery, the Former Warehouse and Apron area was used by Bell Helicopter-Textron from approximately 1950 to 1989, and the Apron contained parking for helicopters. According to Google Earth imagery, the Former Warehouse was demolished sometime in the period between November 2018 and October 2019. It is possible that AFFF or other PFAS-containing materials were stored at the Former Warehouse and on the Apron for fire suppression purposes due to the historical presence of nearby aircraft. A former UST, also referred to as the Underground Diesel Fuel Pit, was located southwest of the Former Paint and Assembly Building on the northern portion of the Facility. The former UST was used by Bell Helicopter-Textron for their aviation-related operations. It is unknown how long the former UST was in use or when it was removed. The former UST originally contained JP-4 before being converted to a diesel fuel tank with a capacity of 23,000 gal. During diesel storage operations, a leak was detected, and the tank was

opened and repaired. A leak test conducted after repairs in 1980 found the tank to be in operational condition, and no subsequent leak test for this tank occurred. Due to the storage of fuel at this location, it is possible that AFFF or other PFAS-containing materials were stored or used at the former UST for fire suppression purposes. It is also possible that AFFF could have been used for the cleanup of fuel spills, since AFFF is a known surfactant. As a result, the Former Warehouse, Apron, and former UST are considered a potential PFAS release area (AECOM 2022).

3.5 AOI 5 – Helicopter Tie-Down Area

AOI 5 is the Helicopter Tie-Down area located roughly 300 ft east of the center of AOI 3, on the west bank of Little Fossil Creek. Not much is known about this location; it was identified during the SI field event after a Saginaw Facility maintenance worker mentioned the location to field staff as a previous area that Bell-Helicopter Textron reportedly used as a tie-down area for helicopters. Activities performed at this location may have included engine testing, maintenance, and repairs of helicopters. It is possible that AFFF or other PFAS-containing materials were stored and/or used in this area for fire suppression purposes. As a result, the Helicopter Tie-Down Area is conservatively considered a potential PFAS release area.

3.6 ADJACENT SOURCES

Five potential off-facility sources of PFAS, adjacent to Saginaw Facility, were identified during the PA and are described below. An additional two locations (the Fort Worth Meacham International Airport and the Har-Conn Aerospace facility) were also identified during the PA; however, due to their downgradient location and distance (approximately 2–2.5miles away) in relation to the Saginaw Facility, as well as the groundwater flow direction, these two potential off-site sources have been removed from further consideration. The adjacent potential sources are shown on **Figure 3-1** and described in the following section for informational purposes only and these areas were not investigated as part of this SI.

3.6.1 Former Main Assembly Building

The Former Main Assembly Building, once a part of the Saginaw Facility prior to ARNG taking over the lease, was used by Bell Helicopter-Textron from approximately 1950–1983. It is now located on the property directly on the other side of the Facility Boundary fence in the northeastern portion of the Facility. The Former Main Assembly Building was demolished after 1991, when the TXARNG lease was established, and has never been under the control of TXARNG. According to the land survey included in the PA report, the property is currently occupied by Icon Texas Development, LLC.

During mobilization periods, up to 50 helicopters were produced per month at the Former Main Assembly Building. Additional processes at the Former Main Assembly Building included limited-scale Plexiglas® forming, plaster molding, tooling, and painting operations. Although it is unknown what fire-suppression systems existed at the Former Main Assembly Building, there is potential for AFFF or other PFAS-containing materials to have been stored or used at the Former Main Assembly Building. As a result of this and due to locally varying groundwater flow

paths, the Former Main Assembly Building is considered a potential PFAS release area (AECOM 2022).

3.6.2 Former Paint and Assembly Building

The Former Paint and Assembly Building is located roughly 20 ft northwest of the Former Main Assembly Building on the property directly on the other side of the Facility Boundary fence in the northwestern portion of the Facility and was used by Bell Helicopter-Textron predominantly from 1954 to 1975. The Former Paint and Assembly Building was demolished around 1992 and the area where the Former Paint and Assembly Building existed is not within the boundaries of the current TXARNG facility. According to the land survey included in PA report, the property is currently occupied by Icon Texas Development, LLC. The Former Paint and Assembly Building contained an Alodine wash rack, where Alodine solution was brushed on helicopters and rinsed off with water. Due to the maintenance of aircraft at the Former Paint and Assembly Building, there is potential for AFFF or other PFAS-containing materials to have been stored or used at this location. As a result of this and due to locally varying groundwater flow paths, the Former Paint and Assembly Building is considered a potential PFAS release area (AECOM 2022).

3.6.3 Blue Mound Fire Department

The Blue Mound Fire Department is located at 301 South Blue Mound Road, Fort Worth, Texas, less than 1 mile east of and presumed to be cross-gradient to Saginaw Facility. An off-facility VSI was not conducted at the fire department, and it is unknown if any fire training activities or AFFF releases have occurred there. The Blue Mound Fire Department is conservatively considered a potential PFAS-release area due to the common storage and/or usage of AFFF at fire stations and locally varying groundwater flow (AECOM 2022).

3.6.4 Saginaw Fire Department

The Saginaw Fire Department has a fire station located at 400 South Saginaw Boulevard, Saginaw, Texas, less than 1 mile west of and cross-gradient to Saginaw Facility. An off-facility VSI was not conducted at the fire department, and it is unknown if any fire training activities or AFFF releases have occurred there. The Saginaw Fire Department is conservatively considered a potential PFAS-release area due to the common storage and/or usage of AFFF at fire stations and locally varying groundwater flow (AECOM 2022).

3.6.5 Zips Car Wash

Zips Car Wash is located at 100 East McLeroy Boulevard, Saginaw, Texas, cross-gradient to and less than 1 mile west of Saginaw Facility. The car wash business advertises using eco-friendly soaps and waxes, and their wash water is treated and not discharged into storm drains. Although no off-facility VSI was conducted, Zips Car Wash is conservatively considered a potential PFAS-release area due to car wash businesses commonly using car wash solutions/products containing PFAS and the locally varying groundwater flow (AECOM 2022).

Army National Guard Site Inspections
Site Inspection Report
Saginaw Facility, Texas

Figure 3-1
Areas of Interest

Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology

- Surface Water Flow Direction
- Groundwater Flow Direction
- Perennial Creek/Stream

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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4. PROJECT DATA QUALITY OBJECTIVES

As identified during the data quality objective (DQO) process and outlined in the SI Uniform Federal Policy (UFP) Quality Assurance Project Plan (QAPP) Addendum (EA Engineering, Science, and Technology, Inc., PBC [EA] 2023a), 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 NFA 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 may recommend AOIs for RI if site-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 for the SI include the following:

- The PA Report for Saginaw Facility (AECOM 2022)
- Final DD for *Solid Waste Registration Number 82136, Texas Army National Guard, Former Burn Pit Area* (JESCO 2018*)*
-
- Analytical data from groundwater and soil samples collected as part of this SI in accordance with the SI UFP-QAPP Addendum (EA 2023a)
- 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 horizontally by the property limits of the Facility (**Figure 2-1**). The vertical boundary of the study is from the top of all existing structures and the ground and water surface down to the top of the aquiclude, which is the top of the competent limestone bedrock. 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). Temporal boundaries were limited to the earliest available time field resources were available to complete the study.

4.4 ANALYTICAL APPROACH

Samples were analyzed by Eurofins Lancaster Laboratories Environmental, LLC, accredited under the DoD Environmental Laboratory Accreditation Program (ELAP); Accreditation No. 1.01). PFAS data underwent 100% Stage 2B validation in accordance with the DoD General Data Validation Guidelines (2019a) and DoD Data Validation Guidelines Module 3: Data

Validation Procedure of Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual (QSM) Table B-15 (2020).

Data were compared to applicable SLs within this document and decision rules as defined in the SI UFP-QAPP Addendum (EA 2023a).

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, 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 UFP-QAPP Addendum (EA 2023a).

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 was implemented in accordance with the following approved documents:

- *Final PA Report, Saginaw Facility, Saginaw, Texas,* dated May 2022 (AECOM 2022)
- *Final Programmatic UPF-QAPP, SIs for PFAS Impacted Sites, ARNG Installations, Nationwide,* dated December 2020 (EA 2020a)
- *Final SI UFP-QAPP Addendum, Saginaw Facility, Saginaw, Texas,* dated July 2023 (EA 2023a)
- *Final Programmatic Accident Prevention Plan, Revision 1,* dated November 2020 (EA 2020b)
- *Final Accident Prevention Plan/Site Safety and Health Plan Addendum, Saginaw Facility, Saginaw, Texas,* dated July 2023 (EA 2023b).

The SI field activities were conducted from 17 to 27 July 2023 and consisted of direct-push technology (DPT)/hollow stem auger (HSA) and hand auger borings, soil sample collection, temporary monitoring well installation, and grab groundwater sample collection. Two preparatory facility visits without intrusive work were also conducted on 6 June 2023 (source water sampling) and 17 July 2023 (utility location). Field activities were conducted in accordance with the SI UFP-QAPP Addendum (EA 2023a), except as noted in **Section 5.8**.

The following samples were collected during the SI and analyzed for a subset of 24 PFAS via liquid chromatography/tandem mass spectrometry (LC/MS/MS) compliant with QSM Version 5.3 Table B-15 to fulfill the project DQOs:

- Seventy-One (71) soil samples from seventeen (17) primary locations, six (6) secondary surface soil-only locations, and eleven (11) boundary locations
- Fourteen (14) grab groundwater samples from 18 temporary well locations (4 locations did not produce groundwater)
- Twenty-Seven (27) quality assurance/quality control 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 medium. 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,** and land survey data is provided in **Appendix B3**. 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 of these activities are presented below.

5.1.1 Technical Project Planning

The U.S. Army Corps of Engineers (USACE) TPP Process, Engineers Manual (EM) 200-1-2 (Department of the Army 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 14 December 2021, prior to SI field activities with stakeholders. The combined TPP Meeting 1 and 2 was conducted in general accordance with EM 200-1-2. The stakeholders for this SI include ARNG G-9, TXARNG, USACE, and the TCEQ 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 UFP-QAPP Addendum (EA 2023a).

A TPP Meeting 3 was held on 1 December 2023 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

EA contracted Ground Penetrating Radar Systems (GPRS) Inc., a private utility location service, to perform utility clearance at the Facility. Utility clearance was performed at each of the proposed boring locations on 12 July 2023 with input from the EA field team. General locating services and ground-penetrating radar were used to complete the clearance. Location AOI02-01 was offset approximately 20 ft west-northwest due to an overhead powerline, and location AOI02-02 was offset west approximately 15 ft due to the presence of an underground sewer line. Locations SF-08, SF-09, and SF-10 were each offset approximately 10 ft north due to the concrete drainage grates located at each location. Hand auger clearance to a full 5 ft bgs for the boring locations was unsuccessful and resulted in a deviation from the UFP-QAPP as outlined in **Section 5.8**.

5.1.3 Source Water and PFAS Sampling Equipment Acceptability

The potable water source used for decontamination of drilling equipment was sampled prior to the start of field activities. A sample from a potable water source was collected on 8 June 2023, prior to mobilization, and analyzed for PFAS by LC/MS/MS compliant with QSM 5.3 Table B-15. The spigot on USPFO Building #49 was sampled using PFAS-free hose tubing. The results indicated that the potable water source contained low levels of PFAS, with all relevant

compound concentrations below the SLs. However, because PFOA and PFOS relevant compounds were detected at a concentration greater than one-fifth of their respective SLs of 6 and 4 nanograms per liter (ng/L), the water was deemed unacceptable for unfiltered use in the initial decontamination rinse. Based on this, the water was filtered through a 5-gal granular activated carbon (GAC) pail before use. A final rinse procedure using laboratory certified PFAS-free water was performed. Further discussion is provided in the DUA (**Appendix A**). Analytical results for this filtered sample can be found in **Appendix F**.

Materials that were used within the sampling zone were confirmed as acceptable for use in the PFAS sampling environment. The checklist of acceptable materials for use in the PFAS sampling environment was provided in the Standard Operating Procedures appendix to the Programmatic UFP-QAPP (EA 2020a).

5.2 SOIL BORINGS AND SOIL SAMPLING

Each boring was pre-cleared by EA's drilling subcontractor, Sunbelt, using a hand auger to verify utility clearance in the shallow subsurface where utilities would typically be encountered (except as noted in **Section 5.8**). Soil samples collected from depths shallower than 5 ft bgs were collected using the hand auger. The hand auger was decontaminated between each boring to ensure no cross-contamination occurred between samples. All soil sample locations are shown on **Figures 5-1 through 5-5** and described in the subsequent section.

Beyond 5 ft depth, soil samples were collected via DPT drilling method in accordance with the SI UFP-QAPP Addendum (EA 2023a). Soil cores were collected using the dual-tube core sampler (DT22) system, which collects 4-foot soil cores in a thin PVC, PFAS-free liner that allows for continuous soil logging. For locations SF-10, SF-11, AOI03-01, AOI03-02, AOI03-03, AOI03-06, AOI03-07, AOI04-02, and AOI04-03, limestone bedrock refusal was encountered less than 5ft bgs via DPT. The drill rig then switched over to HSA drilling to confirm the presence of limestone bedrock refusal and to ensure no interbedded wet zones existed (down to 15ft bgs, or when drilling was no longer capable). Off-sets were performed at AOI03-02 (10ft east), AOI03-07 (10ft east), and SF-10 (5ft east-southeast) due to limestone being encountered under 2ft bgs.

Three discrete soil samples were collected for chemical analysis from each soil boring (except for shallow borings as noted in **Section 5.8**); one sample at the surface (0 to 2 ft bgs) and two subsurface soil samples. One subsurface soil sample was collected approximately 1 ft above the groundwater table, and one collected at the mid-point between the surface and the groundwater table (not to exceed 15 ft bgs). Groundwater was encountered at depths ranging from 5.24 to 15.06 ft btoc during drilling. Total boring completion depths, to accommodate temporary well installation, ranged from 6 to 20 ft bgs.

Soil sample locations are shown on **Figures 5-1 through 5-5**, and boring sample depths are provided in **Table 5-1**. The soil boring locations were selected based on the AOI information provided in the PA (AECOM 2022) and as agreed upon by stakeholders during the TPP and review of the SI UFP-QAPP Addendum (EA 2023a). Several boring locations were adjusted within a 20-ft offset for various reasons including drill rig access, utility avoidance, and drill equipment refusal.

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

Each sample was collected into a laboratory-supplied PFAS-free high-density polyethylene (HDPE) bottle and labeled using a PFAS-free marker or pen. Samples were packaged on ice and transported via Federal Express (FedEx) under standard chain-of-custody (CoC) procedures to the laboratory and analyzed for PFAS (LC/MS/MS compliant with QSM Version 5.3 Table B-15), total organic carbon (TOC) (USEPA Method 9060A), pH (USEPA Method 9045D), and grain size (ASTM International D422) in accordance with the SI UFP-QAPP Addendum (EA 2023a).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. Matrix spike (MS)/matrix spike 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, one equipment blank (EB) was collected per day 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 after sampling and surveying in accordance with the SI UFP-QAPP Addendum (EA 2023a). After removal of the casings, boreholes were abandoned using bentonite chips. 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 with a Geoprobe using DPT drilling methods. After the borehole was advanced to the desired depth, a temporary well was constructed with a 5 or 10-ft section of 1-in. Schedule 40 polyvinyl chloride (PVC) screen with sufficient casing to reach the ground surface (as noted in **Section 5.8**). New PVC pipe and screen were used at each location to avoid cross contamination between locations. The screen intervals for the temporary wells are provided in **Table 5-2**.

In some wells, groundwater samples were collected after 48 to 72 hours following well installation to allow sufficient time for groundwater to infiltrate and recharge the temporary well intervals. However most wells were sampled immediately after being installed to avoid not being able to collect a sample due to the low well recharge rates. A peristaltic pump was used with PFAS-free HDPE tubing to collect each sample. Each sample was collected in laboratory-supplied PFAS-free HDPE bottles and labeled using a PFAS-free marker or pen. 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., turbidity, 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 (except as noted in **Section 5.8**). Samples were packaged on ice and transported via FedEx under standard CoC procedures to the laboratory and analyzed for PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 in accordance with the SI UFP-QAPP Addendum (EA 2023a).

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. Two field blanks were collected in accordance with the SI UFP-QAPP Addendum (EA 2023a). 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 UFP-QAPP Addendum (EA 2023a) by removing the PVC, backfilling the hole with 3/8-in. bentonite chips and hydrating gently. Upon completion of well abandonment, the ground surface at each location was patched to match existing surrounding conditions.

5.4 SYNOPTIC WATER LEVEL MEASUREMENTS

Groundwater levels were used to monitor sitewide groundwater elevations and assess groundwater flow. Synoptic water level elevation measurements were collected from the newly installed temporary monitoring wells (**Figure 2-5**), taken from the survey mark on the northern side of the well casing. Groundwater elevation data is provided in **Table 5-3**.

Due to slow recharge rates, some of the water levels do not appear to have fully recovered prior to water level measurement. These locations are labeled with asterisks on **Figure 2-5**.

5.5 SURVEYING

The northern side of each new temporary well casing was surveyed using a GEOMAX Zoom 90 Robotic (accuracy of 0.01 ft) total station by EA's Texas licensed professional surveyor subcontractor, RLG (except as noted in **Section 5.8**). Positions were collected in the applicable datum as referenced in the survey report. Surveying data were collected on 26 July 2023 and are provided in **Appendix B3**.

5.6 INVESTIGATION-DERIVED WASTE

As of the date of this report, the disposal of PFAS investigation-derived waste (IDW) is not regulated federally. PFAS IDW generated during the SI was managed in accordance with the SI UFP-QAPP Addendum (EA 2023a).

All solid (i.e., soil cuttings) and liquid (i.e., purge water, development water, and decontamination fluids) IDW were contained in labeled, 55-gallon steel drums (one soil, one

water), temporarily staged at an approved location in a TXARNG equipment storage area and subsequently removed from the site, and disposed of in a Resource Conservation and Recovery Act Subtitle C landfill. Specifics on the disposal of solid and liquid IDW will be summarized in a separate IDW disposal report.

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

5.7 LABORATORY ANALYTICAL METHODS

Samples were analyzed for PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 at Eurofins Lancaster Laboratories Environmental, LLC, in Lancaster, Pennsylvania, a DoD ELAP- and National Environmental Laboratory Accreditation Program-certified laboratory.

Soil samples were also analyzed for TOC using USEPA Method 9060A, pH by USEPA Method 9045D, and grain size by ASTM International D422.

5.8 DEVIATIONS FROM SITE INVESTIGATION UFP-QAPP ADDENDUM

Deviations from the UFP-QAPP Addendum occurred based on field conditions. These deviations were discussed between EA, ARNG G-9, and USACE. Deviations from the SI UFP-QAPP Addendum (EA 2023a) are noted below:

- Due to shallow bedrock/challenging lithology and/or refusal encountered between 0–5ft bgs across the site, the majority of borings were not able to be cleared via hand auger to the full 5 ft bgs.

- With concurrence from ARNG G-9, the majority of temporary well locations were sampled prior to purging and collecting measurements first via low flow sampling, due to slow infiltration rates, poor recharge, and low water column volume. Low-flow purging and collection of groundwater parameters occurred after sampling, with 8 of 14 wells providing between 1–3 measurements (at 5min intervals per measurement) before running dry and 6 of 14 wells had 0 measurements collected.

- With concurrence from ARNG G-9 and due to the lithology, tight formations, and no saturated zones and only moist zones observed in borings during the field event, 11 of 18 temporary wells had 10 ft of screen installed instead of the UFP-QAPP Addendum approved 5 ft of screen. Location SF-08 had a 15-ft screen installed to ensure adequate groundwater recharge.

- During surveying, location AOI03-04 was inadvertently plugged and abandoned by Sunbelt prior to RLG surveying the top of casing information. The ground elevation data was still surveyed and was able to be used for contouring purposes.

- During SI field activities at Saginaw Facility, a site worker identified a formerly used helicopter tie down area used by Bell-Helicopter Textron that had not been identified in the preliminary assessment. It was decided with the concurrence of ARNG G9 that the area would be designated as AOI 5 and that surface soil samples would be collected to determine whether relevant compounds were present in the surface soil. Temporary wells were not installed, groundwater samples were not collected, and subsurface soil samples were not collected. The decision not to install temporary wells and collect groundwater and subsurface soil samples at AOI 5 was based on several reasons. 1) Because the AOI was identified after mobilization, additional supplies and materials would be needed in order to install additional temporary wells and collect additional samples and it was unclear whether it was logistically possible. 2) Due to the nature of activities expected at a helicopter tie down, it was determined that it if relevant compounds had been released, these would most likely be present in surface soil and that the absence of relevant compound detections in surface soil would provide evidence that a release had not occurred. 3) Due to the presence of artifacts from past operations, the tie down location was clearly defined, which allowed for a more focused sample location configuration with a high degree of confidence. 4) Moreover, the surface soil samples were placed in a higher density configuration than at other AOIs in order to enhance representativeness to actual conditions with regards to the presence/absence of relevant compounds throughout the relatively small footprint.

- Because the laboratory told EA that they perform shaker tests in the laboratory, the specific shaker test bottle ware was not delivered. ARNG G9 directed that shaker tests would be performed during the field event, so unused groundwater sampling bottle ware was used to perform the redundant shaker tests. Any positive shaker test results would have been noted on the chain of custodies; however none were noted.

Table 5-1. Samples by Medium
Saginaw Facility, Saginaw, Texas
Site Inspection Report

Sample Identification	Sample Collection Date	Sample Depth (ft bgs)	PFAS[1]	TOC[2]	pH[3]	Grain Size[4]	Comments
Soil Samples							
AOI01-01-SB-[0-2]	7/19/2023	0-2	X				MS/MSD sample collected
AOI01-01-SB-[4-5]	7/19/2023	4-5	X				
AOI01-01-SB-[10-11]	7/19/2023	10-11	X				
AOI01-02-SB-[0-2]	7/19/2023	0-2	X				
AOI01-02-SB-[4-5]	7/19/2023	4-5	X				
AOI01-02-SB-[8-9]	7/19/2023	8-9	X				
AOI01-02-SB-[12-13]	7/19/2023	12-13	X				
AOI01-03-SB-[0-2]	7/19/2023	0-2	X				
AOI01-03-SB-[5-6]	7/19/2023	5-6	X	X	X	X	
AOI01-03-SB-[11-12]	7/19/2023	11-12	X				
AOI01-04-SB-[0-2]	7/19/2023	0-2	X				
AOI01-04-SB-[5-6]	7/19/2023	5-6	X				
AOI01-04-SB-[10-11]	7/19/2023	10-11	X				
AOI02-01-SB-[0-2]	7/19/2023	0-2	X				
AOI02-01-SB-[7-8]	7/19/2023	7-8	X				
AOI02-01-SB-[15-16]	7/19/2023	15-16	X				
AOI02-02-SB-[0-2]	7/19/2023	0-2	X				
AOI02-02-SB-[10-11]	7/19/2023	10-11	X	X	X		
AOI02-02-SB-[13-14]	7/19/2023	13-14	X				
AOI02-02-SB-[19-20]	7/19/2023	19-20	X				
AOI02-03-SB-[0-2]	7/19/2023	0-2	X				
AOI02-03-SB-[6-7]	7/19/2023	6-7	X				
AOI02-03-SB-[11-12]	7/19/2023	11-12	X				
AOI03-01-SB-[0-2]	7/24/2023	0-2	X				
AOI03-02-SB-[0-2]	7/20/2023	0-2	X				
AOI03-03-SB-[0-2]	7/21/2023	0-2	X				
AOI03-04-SB-[0-2]	7/21/2023	0-2	X				MS/MSD sample collected
AOI03-04-SB-[8-9]	7/21/2023	8-9	X				
AOI03-04-SB-[13-14]	7/21/2023	13-14	X				
AOI03-05-SB-[0-2]	7/20/2023	0-2	X				MS/MSD sample collected
AOI03-05-SB-[5-6]	7/20/2023	5-6	X				
AOI03-05-SB-[15-16]	7/20/2023	15-16	X				
AOI03-06-SB-[0-2]	7/21/2023	0-2	X				
AOI03-07-SB-[0-2]	7/24/2023	0-2	X				
AOI04-01-SB-[0-2]	7/18/2023	0-2	X	X	X		
AOI04-01-SB-[5-6]	7/18/2023	5-6	X			X	
AOI04-02-SB-[0-2]	7/18/2023	0-2	X				
AOI04-02-SB-[5.5-6.5]	7/18/2023	5.5-6.5	X				
AOI04-03-SB-[0-2]	7/18/2023	0-2	X				
AOI04-03-SB-[6-7]	7/18/2023	6-7	X				
AOI05-01-SB-[0-2]	7/24/2023	0-2	X				
AOI05-02-SB-[0-2]	7/24/2023	0-2	X				
AOI05-03-SB-[0-2]	7/24/2023	0-2	X				
AOI05-04-SB-[0-2]	7/24/2023	0-2	X				
AOI05-05-SB-[0-2]	7/24/2023	0-2	X				
AOI05-06-SB-[0-2]	7/24/2023	0-2	X				
SF-01-SB-[0-2]	7/20/2023	0-2	X				
SF-01-SB-[9-10]	7/20/2023	9-10	X				

Table 5-1. Samples by Medium
Saginaw Facility, Saginaw, Texas
Site Inspection Report

Sample Identification	Sample Collection Date	Sample Depth (ft bgs)	PFAS[1]	TOC[2]	pH[3]	Grain Size[4]	Comments
SF-02-SB-[0-2]	7/20/2023	0-2	X				MS/MSD sample collected
SF-02-SB-[6-7]	7/20/2023	6-7	X				
SF-02-SB-[13-14]	7/20/2023	13-14	X				
SF-03-SB-[0-2]	7/20/2023	0-2	X				
SF-04-SB-[0-2]	7/18/2023	0-2	X				
SF-04-SB-[5-6]	7/18/2023	5-6	X				
SF-05-SB-[0-2]	7/18/2023	0-2	X				
SF-05-SB-[5-6]	7/18/2023	5-6	X				
SF-05-SB-[9-10]	7/18/2023	9-10	X				
SF-06-SB-[0-2]	7/18/2023	0-2	X				
SF-06-SB-[5-6]	7/18/2023	5-6	X				
SF-06-SB-[10-11]	7/18/2023	10-11	X				
SF-07-SB-[0-2]	7/21/2023	0-2	X				
SF-07-SB-[8-9]	7/21/2023	8-9	X				
SF-07-SB-[15-16]	7/21/2023	15-16	X				
SF-08-SB-[0-2]	7/24/2023	0-2	X				
SF-08-SB-[5-6]	7/24/2023	5-6	X				
SF-08-SB-[8-9]	7/24/2023	8-9	X				
SF-09-SB-[0-2]	7/24/2023	0-2	X				
SF-09-SB-[7-8]	7/24/2023	7-8	X				
SF-10-SB-[0-2]	7/24/2023	0-2	X				
SF-11-SB-[0-2]	7/24/2023	0-2	X				
DUP-01	7/18/2023	0-2	X				Field Duplicate of AOI04-01-SB-[0-2]
DUP-02	7/18/2023	0-2	X				Field Duplicate of SF-04-SB-[0-2]
DUP-03	7/19/2023	8-9	X				Field Duplicate of AOI01-02-SB-[8-9]
DUP-04	7/20/2023	0-2	X				Field Duplicate of SF-03-SB-[0-2]
DUP-05	7/20/2023	15-16	X				Field Duplicate of SF-07-SB-[15-16]
DUP-06	7/21/2023	0-2	X				Field Duplicate of AOI03-03-SB-[0-2]
DUP-07	7/24/2023	5-6	X				Field Duplicate of SF-08-SB-[5-6]
DUP-08	7/24/2023	7-8	X				Field Duplicate of SF-09-SB-[7-8]
Groundwater Samples							
AOI01-01-GW	7/26/2023	--	X				
AOI01-02-GW	7/26/2023	--	X				
AOI01-03-GW	7/26/2023	--	X				
AOI01-04-GW	7/26/2023	--	X				
AOI02-01-GW	7/25/2023	--	X				
AOI02-02-GW	7/25/2023	--	X				MS/MSD Collected
AOI02-03-GW	7/26/2023	--	X				
AOI03-04-GW	7/25/2023	--	X				
AOI03-05-GW	7/25/2023	--	X				
AOI04-01-GW	7/25/2023	--	X				

Table 5-1. Samples by Medium
Saginaw Facility, Saginaw, Texas
Site Inspection Report

Sample Identification	Sample Collection Date	Sample Depth (ft bgs)	PFAS[1]	TOC[2]	pH[3]	Grain Size[4]	Comments
AOI04-03-GW	7/25/2023	--	X				
SF-02-GW	7/25/2023	--	X				
SF-06-GW	7/26/2023	--	X				Limited sample collection due to poor recharge
SF-08-GW	7/25/2023	--	X				
DUP-01	7/25/2023	--	X				Field duplicate of AOI03-04-GW
DUP-02	7/25/2023	--	X				Field duplicate of AOI04-03-GW
Source-Post-GAC	7/26/2023	--	X				5-gal GAC filtered sample
Blank Samples							
FB01-07252023	7/25/2023	--	X				Field Blank
FB02-07262023	7/26/2023	--	X				Field Blank
EB01-07182023	7/18/2023	--	X				Equipment Blank
EB02-07192023	7/19/2023	--	X				Equipment Blank
EB05-07202023	7/20/2023	--	X				Equipment Blank
EB08-07122023	7/27/2023	--	X				Equipment Blank
EB09-07242023	7/24/2023	--	X				Equipment Blank

Notes:
1 = PFAS analysis LC/MS/MS compliant with QSM 5.3 Table B-15 (Standard Preparation)
2 = TOC analysis by USEPA Method 9060A
3 = pH analysis by USEPA Method 904D
4 = Grain size analysis by ASTM D422

Table 5-2. Soil Boring Depths and Temporary Well Screen Intervals
Saginaw Facility, Saginaw, Texas
Site Inspection Report

AOI	Boring ID	Soil Boring Depth (ft bgs)	Temporary Well Screen Interval (ft bgs)
1	AOI01-01	12	7-12
	AOI01-02	13	3-13
	AOI01-03	16	6-16
	AOI01-04	14	4-14
2	AOI02-01	17	7-17
	AOI02-02	20	10-20
	AOI02-03	16	6-16
3	AOI03-01	10	Refusal encountered
	AOI03-02	3	Refusal encountered
	AOI03-03	15	Refusal encountered
	AOI03-04	16	6-16
	AOI03-05	16	6-16
	AOI03-06	9	4-9
	AOI03-07	3.5	Refusal encountered
4	AOI04-01	6	1-6
	AOI04-02	15	5-15
	AOI04-03	13	3-13
5	AOI05-01	2	Surface soil sample only location
	AOI05-02	2	Surface soil sample only location
	AOI05-03	2	Surface soil sample only location
	AOI05-04	2	Surface soil sample only location
	AOI05-05	2	Surface soil sample only location
	AOI05-06	2	Surface soil sample only location
Facility Boundary	SF-01	11	Refusal encountered
	SF-02	15	5-15
	SF-03	4	Refusal encountered
	SF-04	7	Refusal encountered
	SF-05	12	7-12
	SF-06	12	7-12
	SF-07	16	6-16
	SF-08	15	0-15
	SF-09	15	Refusal encountered
	SF-10	2	Refusal encountered
	SF-11	15	Refusal encountered

Table 5-3. Groundwater Elevation
Saginaw Facility, Saginaw, Texas
Site Inspection Report

Temporary Well ID	Top of Casing Elevation (ft amsl)	Depth to Water (ft btoc)	Depth To Water (ft bgs)	Groundwater Elevation (ft amsl)	Ground Surface Elevation (ft amsl)
AOI01-01	690.08	10.04	8.87	680.04	688.91
AOI01-02	689.52	9.39	9.1	680.13	689.23
AOI01-03	684.44	10.14	9.85	674.30	684.15
AOI01-04	686.64	8.75	8.5	677.89	686.39
AOI02-01	682.25	15.20	14.85	677.05	691.90
AOI02-02	691.37	10.88	10.7	680.49	691.19
AOI02-03	690.88	15.06	14.86	675.82	690.68
AOI03-04	691.11	11.13	11.12	679.98	691.10
AOI03-05	690.58	14.97	14.57	675.62	690.19
AOI04-01	692.54	5.24	5.0	687.30	692.30
AOI04-03	696.98	10.01	10.55	686.97	697.52
SF-02	690.46	11.33	10.9	679.12	680.02
SF-06	703.30	11.87	11.1	691.43	702.53
SF-08	694.07	13.46	13.1	680.61	693.71

Notes:
amsl = Above mean sea level

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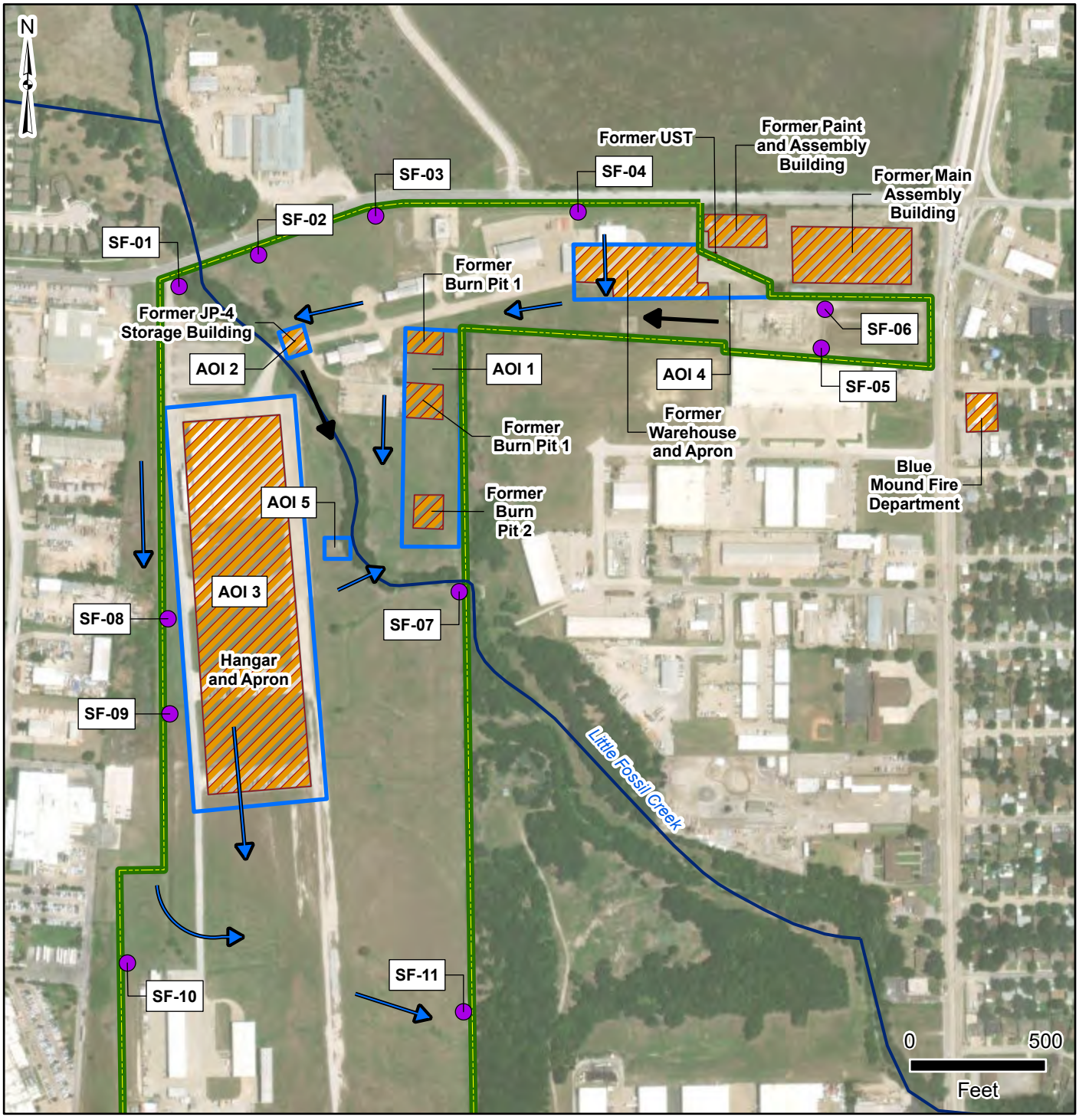
Saginaw Facility, Texas

Figure 5-1
Facility Boundary Sample Locations



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Sample Locations
- Boundary Soil Boring and Temporary Well

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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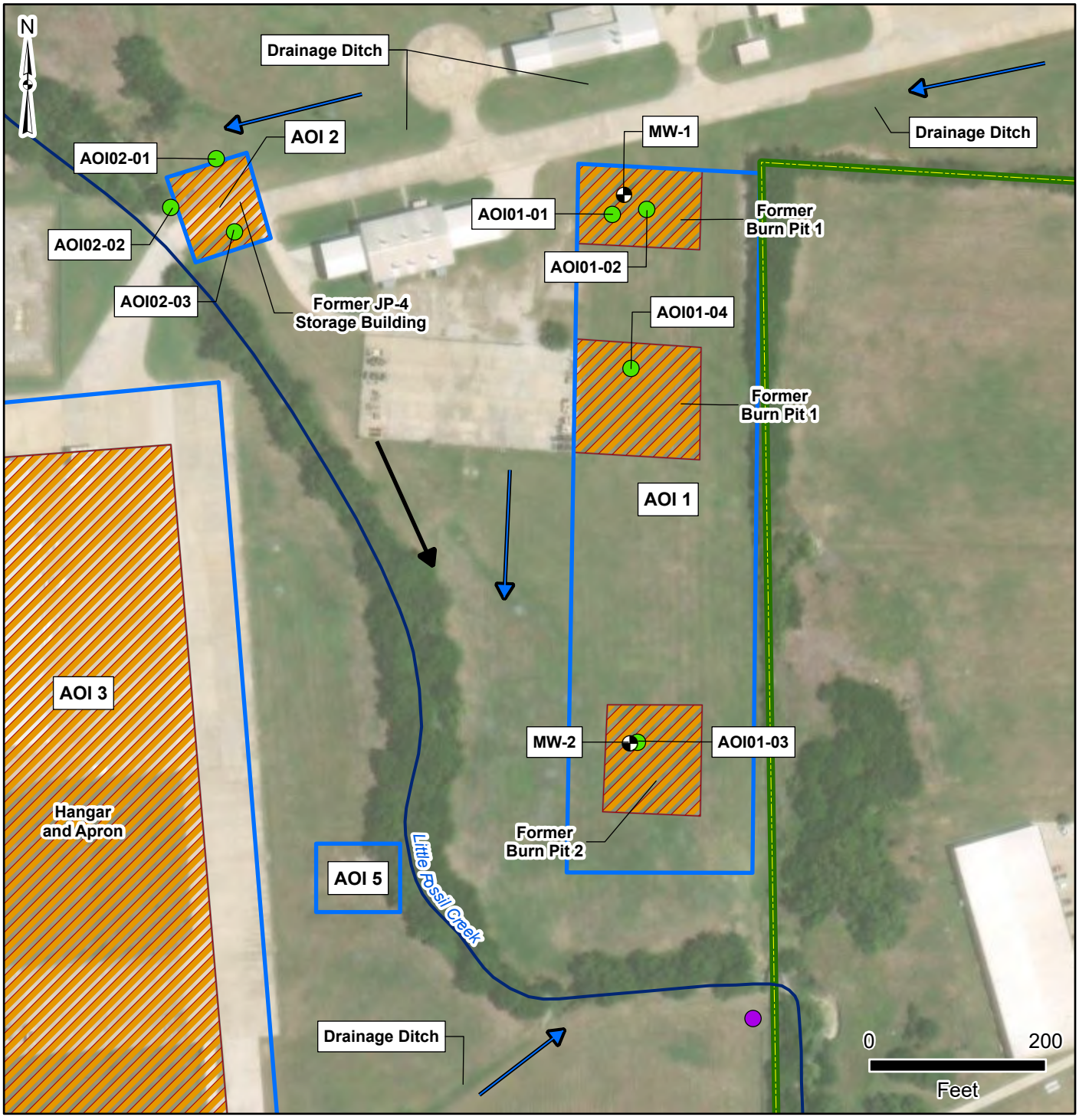
Army National Guard Site Inspections
Site Inspection Report
Saginaw Facility, Texas

Map Extent

Figure 5-2
AOI 1 and AOI 2 Site Inspection Sample Locations



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Sample Locations
- Soil Boring
- Boundary Soil Boring and Temporary Well
- Pre-Existing Monitoring Well

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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Army National Guard Site Inspections
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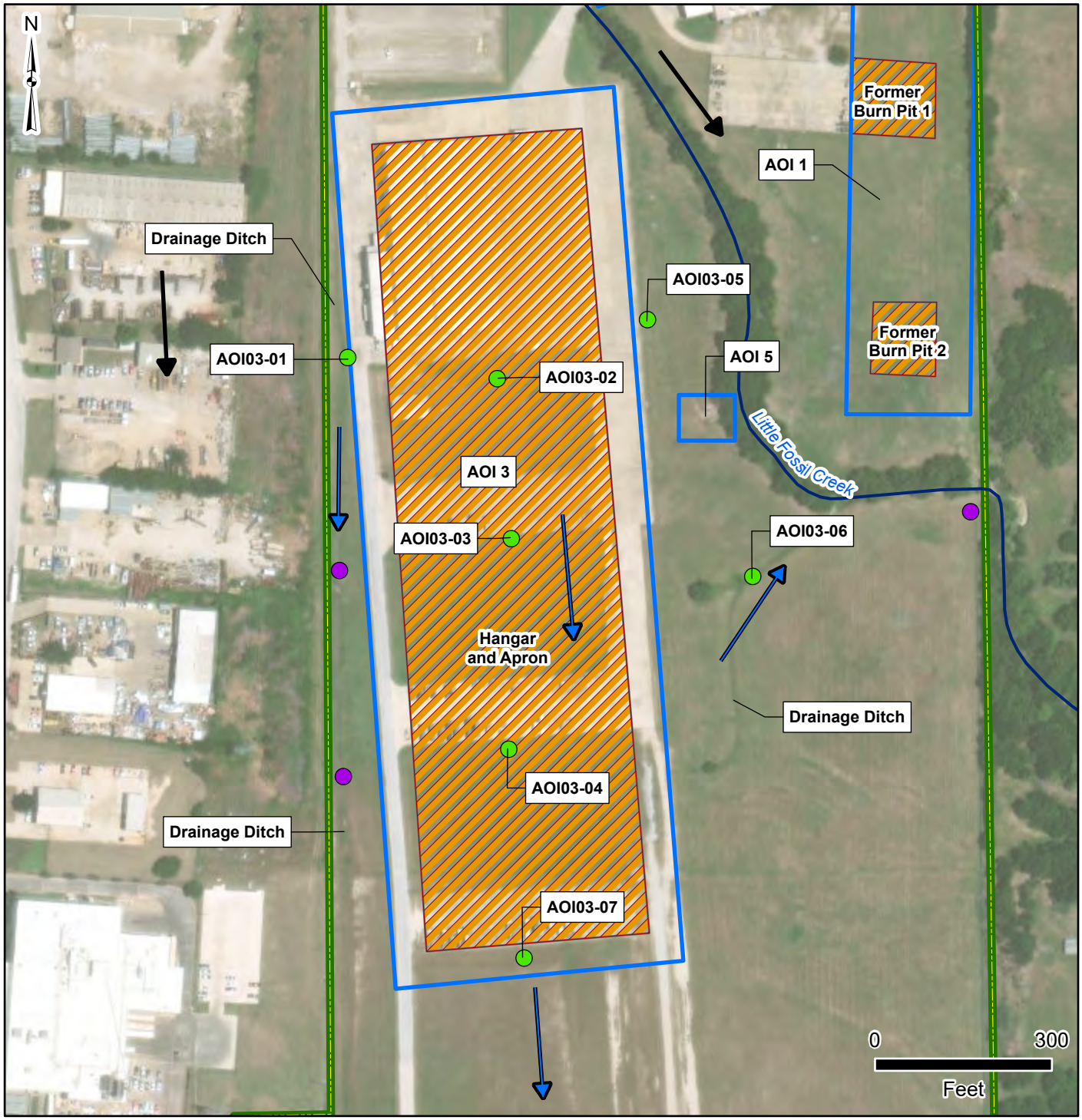
Saginaw Facility, Texas

Figure 5-3
AOI 3 Site Inspection Sample Locations



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Sample Locations
- Soil Boring
- Boundary Soil Boring and Temporary Well

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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Army National Guard Site Inspections
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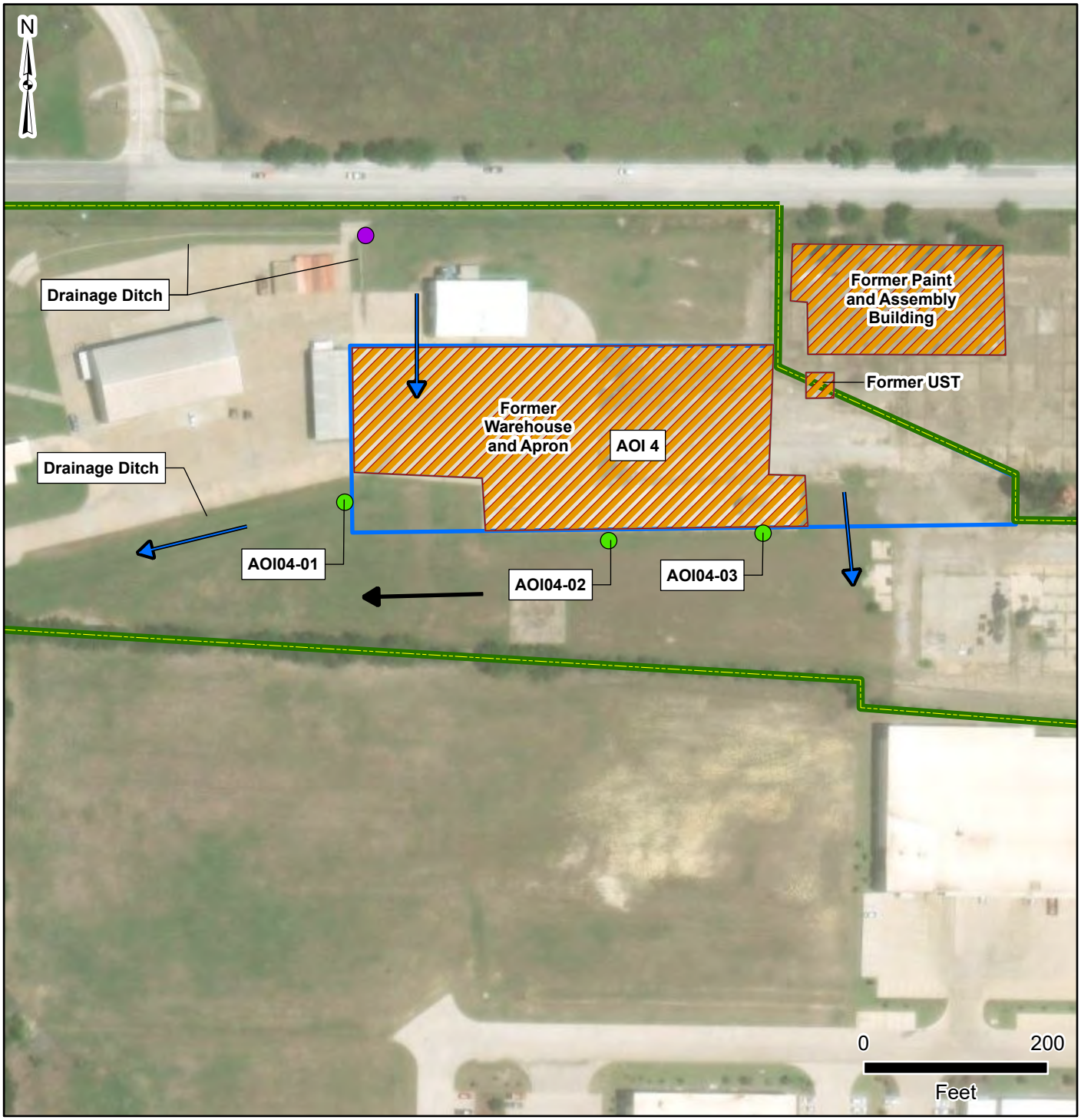
Saginaw Facility, Texas

Figure 5-4
AOI 4 Site Inspection Sample Locations



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Sample Locations
- Soil Boring
- Boundary Soil Boring and Temporary Well

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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Army National Guard Site Inspections
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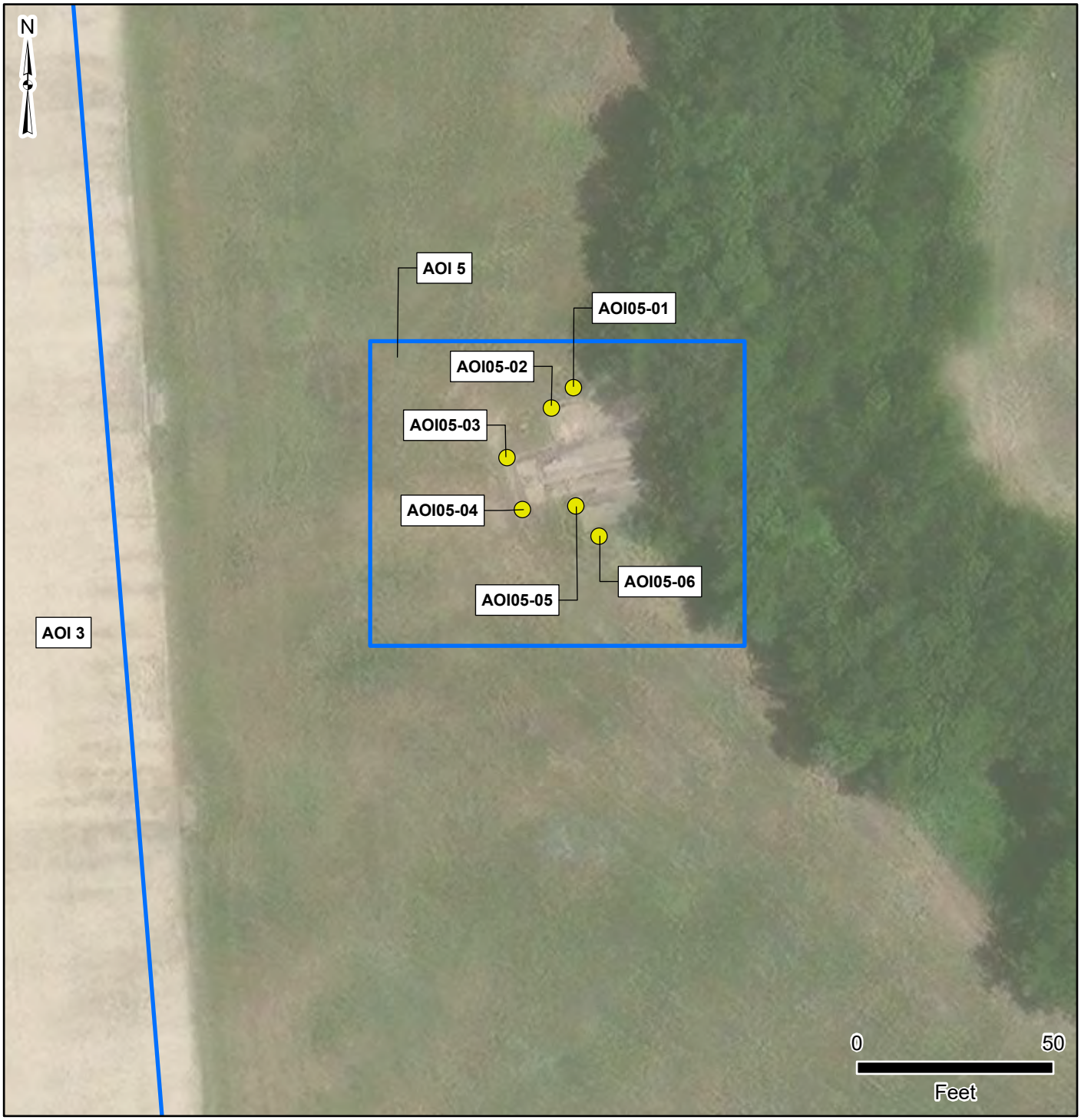
Figure 5-5
AOI 5 Site Inspection Sample Locations



Facility Data

- Facility Boundary
- Area of Interest

Sample Locations

- Surface Soil Hand Auger Sample

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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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** in **Table 6-1**. A discussion of the results for the AOIs and boundary areas is provided in **Sections 6.3 through 6.9**. **Tables 6-2 through 6-5** present results for 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**.

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

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

Notes:
1. Assistant Secretary of Defense. July 2022. Risk-Based SLs in Groundwater and Soil using USEPA's Regional Screening Level Calculator. Hazard Quotient=0.1. May 2022.
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 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 ft bgs) and the industrial/commercial worker scenario is applied to shallow subsurface soil results (2 to 15 ft bgs). The SLs are not applied to deep subsurface soil results (greater than 15 ft bgs) because 15 ft is the anticipated limit of construction activities. [3]

[3] It is noted that due to the groundwater depth, some deep subsurface soil samples were actually collected above 15 ft bgs. Based on the sampling depth being less than 15 ft bgs the industrial/commercial worker scenario and associated SLs is applied to these samples as well.

6.2 SOIL PHYSICOCHEMICAL ANALYSES

To provide basic soil parameter information, soil samples were analyzed for grain size, TOC, and pH, which are important for evaluating transport through the soil medium. **Appendix F** contains the results of the grain size, 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 PFAS partitioning mechanisms include hydrophobic and lipophobic effects, electrostatic interactions, and interfacial behaviors. At relevant environmental pH values, certain PFAS are present as organic anions; and are therefore, relatively mobile in groundwater (Xiao et al. 2015) but tend to associate with the organic carbon fraction that may be present in soil or sediment (Higgins and Luthy 2006; Guelfo and Higgins 2013). When sufficient organic carbon is present, organic carbon normalized distribution coefficients (K_{oc} values) can help in evaluating transport potential, though other geochemical factors (e.g., pH and presence of polyvalent cations) may also affect PFAS sorption to solid phases (ITRC 2018).

Soil pH and TOC were analyzed in soil samples AOI01-03-SB-[5-6] and AOI02-02-SB-[10-11], AOI03-07-SB-[0-2], and AOI04-01-SB-[0-2]. Results indicated pH ranging from 7.6 to 8.8, and TOC results ranging from non-detect , to 21 milligrams per kilogram. The grain size analysis conducted on sample AOI01-03-SB-[5-6] and AOI04-01-SB-[5-6] consisted of approximately 45.5–52% clay, 4.5–10.2% sand, 32.1–50% silt, and 0.0–5.7% gravel, respectively. This result corresponds to a soil texture of clay loam.

6.3 AOI 1

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 1, which includes the Former Burn Pits. The soil and groundwater results are summarized on **Tables 6-2 through 6-5** and presented on **Figures 6-1 through 6-7**.

6.3.1 AOI 1– Soil Analytical Results

Tables 6-2 through 6-4 summarize the detected compounds in soil. **Figures 6-1 through 6-5** present the ranges of detections in soil.

Soil was sampled in four boring locations associated with the potential release areas at AOI 1. Soil was sampled from three intervals at all locations, with an additional interval collected at AOI01-02 due to multiple moist to wet zones encountered in the borings; this additional sample has been categorized as a shallow subsurface soil sample. Samples were collected from surface soil (0 to 2 ft bgs), shallow subsurface soil (4 to 9 ft bgs), and deep subsurface soil (10 to 13 ft bgs).

Two locations, AOI01-02 and AOI01-03, had detections of relevant compounds in surface soil (0 to 2 ft bgs). PFOS was detected at a concentration of 36 micrograms per kilogram (µg/kg) at AOI01-03, which exceeds the SL of 13µg/kg, and 0.29 µg/kg at AOI01-02, which was below the SL. PFOA was detected at concentrations of 0.24 J (estimated) at AOI01-02 and 7.3 µg/kg at AOI01-03, below the SL of 19 µg/kg. PFHxS was detected at a concentration of 0.63 µg/kg at

AOI01-03, below the SL of 130 µg/kg. No relevant compounds were detected in AOI01-01 and AOI01-04.

Three of the five relevant PFAS compounds (PFOA, PFOS, and PFHxS) were detected in shallow subsurface soil (4–9 ft bgs) below their respective SLs of 250 µg/kg, 160 µg/kg, and 1,600 µg/kg. PFOA was detected at a single location (AOI01-03) at a concentration of 3.2 µg/kg. PFOS was detected at concentrations ranging from 0.29 µg/kg (AOI01-04) to 0.97 µg/kg (AOI01-01). PFHxS concentrations ranged from 0.20 (AOI01-01) to 0.46 (AOI01-04).

There was a single detection of PFOS in the deep subsurface sample at AOI01-04, with a concentration of 0.25 J µg/kg, below the 160 µg/kg SL. There were no detections of PFOA, PFNA, PFBS, or PFHxS in deep subsurface soil at AOI 1.

6.3.2 AOI 1 – Groundwater Analytical Results

Table 6-5 summarizes the detected compounds in groundwater. **Figures 6-6 and 6-7** present the ranges of detections in groundwater.

Groundwater was collected from four temporary wells installed in AOI 1. All five PFAS relevant compounds (PFBS, PFHxS, PFNA, PFOS, and PFOA), were detected in each temporary well, with exceedances of SLs for PFOA, PFOS, and PFHxS at each temporary well location.

- PFOA was detected in concentrations ranging from a low of 15 to a high of 1000 ng/L at AOI01-01 and AOI01-03, respectively, above the associated SL (6.0 ng/L).

- PFOS was detected in excess of the SL (4 ng/L) with concentrations ranging from a low of 130 to a high of 360 ng/L at AOI01-01 and AOI01-03, respectively.

- PFHxS was detected in exceedance of the SL (39 ng/L) with concentrations ranging from a low of 86 to a high of 340 ng/L at AOI01-02 and AOI01-01, respectively.

PFBS was detected at concentrations ranging from a low of 5.8 to a high of 16 ng/L at locations AOI01-02 and AOI01-03, respectively, below the SL (601 ng/L). PFNA was detected below the SL (6 ng/L), with concentrations ranging from a low of 1.6 to a high of 2.4 ng/L at AOI01-01 and AOI01-04, respectively.

6.3.3 AOI 1 – Conclusions

Three of the five relevant compounds were detected in soil at AOI 1. PFOA and PFHxS were detected below their respective SLs, and PFOS exceeded the SL at one location. In groundwater, detected concentrations exceeded the respective SLs for PFHxS, PFOS, and PFOA in all temporary well locations, while PFBS and PFNA were detected below respective SLs. Based on the exceedances of the SLs in soil and groundwater, further evaluation at AOI 1 is warranted.

6.4 AOI 2

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 2, which includes the Former JP-4 Storage Building. The soil and groundwater results are summarized on **Tables 6-2 through 6-5**. Soil and groundwater results are presented on **Figures 6-1 through 6-7**.

A petroleum odor and soil staining was noted at the 15 to 16 ft bgs interval at boring AOI02-01. A photoionization detector reading (PID) was collected at the same 15 to 16 ft bgs interval; the result was 233.7 parts per million (ppm).

6.4.1 AOI 2 – Soil Analytical Results

Tables 6-2 through 6-4 summarize the detected compounds in soil. **Figures 6-1 through 6-5** present the ranges of detections in soil.

Soil was sampled in three boring locations associated with the potential release areas at AOI 2. Soil was sampled from three intervals at each location. Samples were collected from surface soil (0 to 2 ft bgs), shallow subsurface soil (6 to 14 ft bgs), and deep subsurface soil (11 to 20 ft bgs).

The only detection of relevant compounds in surface soil occurred at boring AOI02-03. PFOS was detected at a concentration of 19 µg/kg, exceeding the SL. PFHxS was detected at an estimated concentration of 0.50 J µg/kg, below the SL. There were no detections PFOA, PFNA, or PFBS in surface soils samples from AOI 2.

PFOA, PFOS, and PFHxS were detected in shallow subsurface soil below their respective SLs at AOI02-03 at concentrations of 4.1 µg/kg, 0.46 J µg/kg, and 18 µg/kg, respectively. There were no detections PFNA or PFBS in shallow subsurface soil at AOI 2.

There were no detections of any relevant compounds in deep subsurface soils at AOI 2.

6.4.2 AOI 2 – Groundwater Analytical Results

Table 6-5 summarizes the groundwater results. **Figures 6-6** and **6-7** present the ranges of detections in groundwater.

Groundwater samples were collected from three temporary wells at AOI 2 during the SI. All five relevant compounds were detected in groundwater.

- PFOS exceeded the SL in all three sample locations in AOI 2, with concentrations ranging from 6.1 ng/L in AOI02-01, to 18 ng/L in AOI02-03.

All other detections were below respective SLs. PFOA concentrations ranged from 2.9 ng/L in AOI02-02 to 5.3 ng/L in AOI02-03. PFNA was detected in AOI02-01 and AOI02-03, with concentrations of 0.77 J ng/L and 0.64 J ng/L, respectively. PFHxS concentrations ranged from 3.5 to 24 ng/L in AOI02-01 and AOI02-03, respectively, and PFBS concentrations ranged from 7.7 to 11 ng/L in AOI02-02 and AOI02-03, respectively.

6.4.3 AOI 2 – Conclusions

PFOS was detected above the SL in surface soil at AOI 2. PFOS was detected in groundwater at concentrations above the SL in all temporary wells at AOI 2, while PFBS, PFHxS, PFNA, and PFOA were detected in groundwater at concentrations below their respective SLs. Based on the exceedances of the SLs in soil and groundwater, further evaluation at AOI 2 is warranted.

6.5 AOI 3

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 3, which is the hangar and apron. The soil and groundwater results are summarized on **Tables 6-2 through 6-5**. Soil and groundwater results are presented on **Figures 6-8 through 6-14.**

6.5.1 AOI 3 – Soil Analytical Results

Tables 6-2 through 6-4 summarize the detected compounds in soil. **Figures 6-8 through 6-12** present the ranges of detections in soil.

Soil was sampled at seven locations associated with potential release areas at AOI 3, as well as three boundary locations (SF-07, SF-08, and SF-09) located to the west (SF-08 and SF-09) and east (SF-07) of AOI 3. Samples were collected from surface soil (0 to 2 ft bgs), shallow subsurface soil (5 to 9 ft bgs), and deep subsurface (8 to 16 ft bgs). Due to refusal encountered less than 5 ft bgs, soil was sampled from three intervals at AOI03-04, AOI03-05, SF-07, and SF-08, two intervals at SF-09, and only one interval (surficial soil 0–2 ft bgs) from AOI03-01 through AOI03-03, and AOI03-06.

Four of the five relevant compounds (PFOA, PFOS, PFNA, and PFHxS) were detected in surface soil at AOI-03. PFOA, PFOS, and PFNA were detected in the two west boundary locations, SF-08 and SF-09, while no relevant compounds were detected in the east boundary sample (SF-07). Only one relevant compound (PFOS) exceeded the SL at either AOI 3 or the boundary locations; PFOS was detected in AOI03-02 at a concentration of 37 µg/kg. All other detections of relevant compounds were below respective SLs. PFOS (excluding AOI03-02) ranged from 0.25 J µg/kg in the AOI03-03 duplicate, to 2.2 µg/kg at AOI03-06. PFOA concentrations ranged from 0.10 J µg/kg in the AOI03-03 duplicate to 1.8 µg/kg at AOI03-02. PFNA concentrations ranged from 0.29 J µg/kg in the AOI03-03 duplicate to 2.3 µg/kg at AOI03-02. PFHxS was detected in surface soil at AOI 3 at concentrations ranging from 0.55 J µg/kg at AOI03-06 to 1.1 µg/kg at AOI03-02.

There were no detections of PFAS relevant compounds in shallow subsurface soil at AOI 3. PFOA and PFHxS were detected at boundary location SF-07 at 0.066 J µg/kg and 0.12 J µg/kg (respectively), below respective SLs. PFNA, PFBS, and PFHxS were not detected.

There were no detections of PFAS relevant compounds in deep subsurface soil at AOI 3. Only PFOA and PFHxS were detected in boundary location SF-07 with concentrations of 0.14 J µg/kg and 0.42 J µg/kg for PFOA and PFHxS, respectively.

6.5.2 AOI 3 – Groundwater Analytical Results

Figures 6-13 and 6-14 present the ranges of detections in groundwater. **Table 6-5** summarizes the groundwater results.

Groundwater was collected from two of the three temporary well locations installed at AOI 3; temporary well AOI03-06 never recharged with water and a sample was not collected. Additionally, groundwater was collected from one boundary well (SF-08) installed approximately 250 ft downgradient of AOI 3, on the western-central boundary.

All five PFAS-relevant compounds (PFOA, PFOS, PFNA, PFHxS, and PFBS) were detected in groundwater in both sampled locations at AOI 3 (AOI03-04 and AOI03-05 and the duplicate sample of AOI03-04) as well as in the downgradient SF-08 boundary sample.

- PFOS exceeded the SL at all three locations, with concentrations ranging from 8.4 ng/L in SF-08 to 12 ng/L in both AOI03-04 (and the duplicate) and AOI03-05.

- PFOA exceeded the SL with a concentration of 12 ng/L in both AOI03-05 and AOI03-04 (and its duplicate)

- PFNA exceeded the SL in AOI03-05 with a concentration of 6.6 ng/L.

PFOA was detected below the SL in SF-08 at a concentration of 4.7 ng/L. PFNA was detected below the SL at concentrations ranging from 0.97 J to 1.1 J ng/L in SF-08 and the AOI03-04 (1.0 in AOI03-04 duplicate), respectively. PFHxS was detected below the SL with concentrations ranging from 1.67 J ng/L in SF-08 to 11 ng/L in AOI03-05. PFBS was detected below the SL with concentrations ranging from 2.9 to 14 J ng/L in SF-08 and AOI03-04, respectively.

6.5.3 AOI 3 – Conclusions

PFOS exceeded the SL in surface soil at one location at AOI 3. PFOA, PFNA, PFHxS, and PFBS were detected below their respective SLs in surface soils at AOI 3 and the three boundary locations associated with AOI 3. Groundwater results indicated that PFOS and PFOA exceeded the SLs at one or more locations in AOI 3 and the boundary locations. PFBS, PFHxS, and PFNA were detected in groundwater at concentrations below their respective SLs in AOI 3 and the boundary locations. Based on the exceedances of the SLs in soil and groundwater further evaluation at AOI 3 is warranted.

6.6 AOI 4

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 4, which includes the Former Warehouse, Apron, and former UST. In addition to the AOI 4 results, this section also presents the results for soil and groundwater samples collected from boundary locations SF-04, which is located approximately 300 ft upgradient of the eastern edge

of AOI 4. The soil and groundwater results are summarized on **Tables 6-2 through 6-5** and presented on **Figures 6-15 through 6-21**.

6.6.1 AOI 4 – Soil Analytical Results

Tables 6-2 through 6-4 summarize the detected compounds in soil. **Figures 6-15 through 6-19** present the ranges of detections in soil.

Soil was sampled at three locations associated with potential release areas at AOI 4 and one location directly upgradient of the AOI (SF-04). Soil was sampled from two intervals at each location; due to shallow refusal encountered less than 8 ft bgs, a third interval sample was not collected. Samples were collected from surface soil (0 to 2 ft bgs), and shallow subsurface soil (5 to 7 ft bgs).

No PFAS relevant compounds were detected in surface soil in the boundary sample. PFOA and PFOS were detected in surface soil below their respective SLs at two AOI 4 locations, AOI04-01 and AOI04-03. PFOA concentrations ranged from 0.34 µg/kg in AOI04-03 to 1.4 µg/kg in AOI4-01. PFOS concentrations ranged from 0.37 µg/kg in AOI04-03 to 1.6 µg/kg in AOI04-1. PFHxS was detected in one location, AOI04-01, at a concentration of 0.28 J µg/kg, below the SL. PFNA and PFBS were not detected in surface soil.

There were no detections of relevant compounds in the shallow subsurface soil in AOI 4 or the upgradient boundary location.

6.6.2 AOI 4 – Groundwater Analytical Results

Figures 6-20 and 6-21 present the ranges of detections in groundwater. **Table 6-5** summarizes the groundwater results.

Groundwater was sampled from two of the three temporary well locations installed at AOI 4. No temporary well was installed at the upgradient boundary location SF-04 due to shallow refusal prior to reaching groundwater. At location AOI04-02, the temporary well never recharged with water; therefore, no sample could be collected. Location AOI04-01 was sampled on 25 and 26 July 2023 in order to fill a complete bottle set due to low production.

Five PFAS relevant compounds (PFOA, PFOS, PFNA, PFHxS, and PFBS) were detected in AOI04-01 and AOI04-03, with the AOI04-03 duplicate having detections of four of the five relevant compounds (PFOA, PFOS, PFHxS, and PFBS).

- PFOA exceeded the SL in AOI04-01 with a concentration of 26 J+ ng/L

- PFOS exceeded the SL in AOI04-01 and AOI04-03 (and its duplicate) with concentrations of 38 J+ ng/L and 4.4 ng/L (4.6 ng/L in duplicate), respectively.

AOI04-03 and its duplicate had detections of PFOA below the SL with concentrations of 5.1 ng/L and 5.3 ng/L, respectively. PFNA was detected below the SL (6 ng/L) in AOI04-01 (5.6

ng/L) and AOI04-03 (0.59 ng/L; non detect in duplicate). PFHxS was detected below the SL (39 ng/L) at AOI 4 with concentrations of 17 ng/L (AOI04-01) and 2.2 ng/L (AOI04-03; 2.3 ng/L in duplicate). PFBS was detected below the SL (601 ng/L) in AOI04-01 and AOI04-03, with concentrations of 8.3 ng/L and 2.2 ng/L (2.3 ng/L in duplicate), respectively.

6.6.3 AOI 4 – Conclusions

None of the relevant compounds were detected above the SLs in soil at AOI 4 or the upgradient boundary location. Groundwater results indicated five relevant compounds were detected in groundwater in AOI 4, with exceedances of SLs for both PFOA and PFOS. No groundwater was collected from the upgradient boundary location. Based on the exceedances of the SLs in groundwater, further evaluation at AOI 4 is warranted.

6.7 AOI 5

This section presents the analytical results for soil in comparison to SLs for AOI 5, the Helicopter Tie Down Area. The soil results are summarized in **Table 6-2** and presented on **Figures 6-22 and 6-23**. AOI 5 was identified during the SI field event as a potential PFAS-release area. Surface soil (0 to 2 ft bgs) samples were collected as directed by ARNG G-9. No shallow or deep subsurface soil or groundwater samples were collected.

6.7.1 AOI 5 – Soil Analytics

Table 6-2 summarizes the detected compounds in soil. **Figures 6-22 and 6-23** present the ranges of detections in soil.

Three of the five relevant compounds (PFOA, PFOS, and PFNA) were detected in soil a AOI 5, all below their respective SLs. PFOA was detected in all soil samples at AOI 5, except sample AOI05-04, at concentrations ranging from 0.066 J to 0.35 µg/kg at AOI05-03 and AOI05-06, respectively. PFOS was detected in all AOI 5 samples with concentrations ranging from 0.14 J µg/kg (AOI05-04) to 1.4 µg/kg (AOI05-01 and AOI05-06). PFNA was detected in all AOI 5 samples at concentrations ranging from 0.039 J µg/kg (AOI05-04) to 0.23 J µg/kg (AOI05-01). There were no detections of PFBS or PFHxS in AOI 5 soil.

No shallow or deep subsurface samples were collected at AOI 5.

6.7.2 AOI 5 – Groundwater Analytics

No temporary wells were installed at AOI 5, and no groundwater samples were collected.

6.7.3 AOI 5 – Conclusion

Three of the five relevant compounds were detected in surface soil at AOI 5 below their respective SLs. No shallow or deep subsurface soil or groundwater samples were collected. Based on the results of the SI, no further action is warranted at AOI 5.

6.8 FACILITY BOUNDARY

This section presents the analytical results for soil and groundwater in comparison to SLs for the Facility Boundary locations, which includes upgradient and downgradient locations to the four AOIs. The soil and groundwater results are summarized on **Tables 6-2 through 6-5** and presented on **Figures 6-24 through 6-30**.

6.8.1 Facility Boundary – Soil Analytical Results

Tables 6-2 through 6-4 summarize the detected compounds in soil. **Figures 6-24 through 6-28** present the ranges of detections in soil.

Soil was sampled at 11 locations associated with the Facility Boundary; locations SF-01 through SF-03 (northern boundary) are upgradient to AOIs 1 through 3; SF-04 (northern boundary) and SF-05 and 06 (northeastern boundary) are all upgradient to AOI 4; SF-07 (east of AOI 3 center) is downgradient to AOIs 1 through 3; SF-8 and 09 are downgradient to AOI 3 (western boundary); SF-10 and 11 are downgradient of AOIs 1-4 on the southwestern and southeastern boundaries, respectively. Surface soil samples were collected at all eleven boundary locations. Due to shallow refusal encountered at many locations, shallow and deep subsurface samples were only collected at six locations. Samples were collected from surface soil (0 to 2 ft bgs), shallow subsurface (5 to 9 ft bgs), and deep subsurface soil (8 to 16 ft bgs).

Boundary locations SF-04 through SF-07 had no detections of PFAS relevant compounds in surface soil. All detections were below their respective SLs. PFOA was detected in eight surface soil samples with concentrations ranging from 0.08 J µg/kg to 0.42 µg/kg in SF-01 and SF-08, respectively. PFOS was detected at five sample locations with concentrations ranging from 0.12 µg/kg (SF-10) to 2.9 µg/kg (SF-11). PFNA was detected at six sample locations with concentrations ranging from 0.044 J µg/kg (SF-11) to 0.16 J µg/kg (SF-09). PFHxS was detected at one location, SF-11, at a concentration of 0.093 J µg/kg. There were no detections of PFBS in surface soil.

Only one location, SF-07, had detections of two PFAS relevant compounds (PFOA and PFOS) in shallow subsurface soil below the SLs. PFOA and PFOS were detected at concentrations of 0.066 J µg/kg and 0.12 J µg/kg, respectively. There were no detections of PFNA, PFHxS, or PFBS in shallow subsurface soil.

Two locations, SF-01 and SF-07 (and its duplicate), had detections of PFOS and PFHxS in one or both locations, below their respective SLs. PFOS was detected in SF-01 and SF-07 (and duplicate) at concentrations of 0.16 J µg/kg and 0.14 J µg/kg (0.16 J µg/kg in the SF-07 duplicate), respectively. PFHxS was detected at SF-07 at a concentration of 0.042 J µg/kg. There were no detections of PFOA, PFBS, or PFNA in deep subsurface soil.

6.8.2 Facility Boundary – Groundwater Analytical Results

Table 6-5 summarizes the groundwater results. **Figures 6-29 and 6-30** present the ranges of detections in groundwater.

The rationale for each of the Facility boundary samples is to collect samples to characterize ground water entering or exiting the Facility. Upgradient detections and exceedances could indicate a potential offsite source is impacting groundwater at the Facility, while downgradient detections and exceedances could be used to help characterize an AOI or determine if PFAS contamination is potentially being transported offsite through groundwater.

SF-01 through SF-04 were located to intercept ground water entering the Facility from the north. SF-8 through SF-10 were located to intercept groundwater most likely entering the Facility from the west Facility boundary; however, it is possible that surface water from within the Facility could be conveyed off the Facility by the stormwater management system structure located along the west Facility boundary. SF-07 and SF-11 were located to intercept groundwater exiting the Facility to the south or east. SF-05 and SF-06 were located to help evaluate potential unknown sources from historical activities in the area and from the adjacent property. However, due to shallow refusal prior to encountering groundwater, a groundwater sample could not be collected at SF-05.

Groundwater was sampled from three of the four temporary well locations installed around the Facility Boundary. Location SF-05 did not produce enough water for a groundwater sample to be collected. 11 temporary wells were planned for installation along the Facility boundary, but, a hard and competent limestone aquiclude was encountered before reaching a water bearing unit at six of the proposed locations.

All five relevant compounds were detected at locations SF-02 and SF-08, while four of the five relevant compounds (PFOA, PFOS, PFHxS, and PFBS) were detected at SF-06. PFOS was the only relevant compound which exceeded the SL in all three locations.

- PFOS concentrations detected were 5.3 ng/L, 4.4 ng/L, and 8.4 ng/L for SF-02, SF-06, and SF-08, respectively.

All other detections were below their respective SLs. PFOA concentrations ranged from 1.4 J ng/L to 4.7 ng/L in SF-02 and SF-08, respectively. PFNA was detected in SF-02 and SF-08 at concentrations of 0.78 J ng/L and 0.97 J ng/L, respectively. PFHxS concentrations ranged from 1.6 J ng/L (SF-08) to 3.4 J ng/L (SF-06), and PFBS concentrations ranged from 1.8 J ng/L (SF-06) to 12 ng/L (SF-02).

6.8.3 Facility Boundary – Conclusions

PFOA, PFOS, PFNA, and PFHxS were detected below their respective SLs in soil at the Facility Boundary. Groundwater results indicated five relevant compounds were detected in groundwater at the facility boundary, with exceedances of the PFOA SL in all three temporary well locations. It should be noted that the exceedances and detections of relevant compounds in the upgradient boundary locations could potentially indicate off-Facility PFAS sources impacting groundwater within the Facility. Based on the exceedances of the SLs in groundwater, further evaluation of the boundary area is warranted.

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

	Location ID	AOI01-01		AOI01-02		AOI01-03		AOI01-04		AOI02-01		AOI02-02		AOI02-03		AOI03-01	
	Sample Name	AOI01-01-SB-0-2		AOI01-02-SB-0-2		AOI01-03-SB-0-2		AOI01-04-SB-0-2		AOI02-01-SB-0-2		AOI02-02-SB-0-2		AOI02-03-SB-0-2		AOI03-01-SB-0-2	
	Parent Sample ID																
	Sample Date	7/19/2023		7/19/2023		7/19/2023		7/19/2023		7/19/2023		7/20/2023		7/19/2023		7/24/2023	
	Sample Depth (ft bgs)	0-2		0-2		0-2		0-2		0-2		0-2		0-2		0-2	
Analyte	**Screening Level[1,2]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
Perfluorobutanesulfonic acid (PFBS)	1900	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	130	ND	U	ND	U	0.63	J	ND	U	ND	U	ND	U	0.5	J	ND	U
Perfluorononanoic acid (PFNA)	19	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	0.089	J
Perfluorooctanesulfonic acid (PFOS)	13	ND	U	0.29	J	36		ND	U	ND	U	ND	U	19		0.43	
Perfluorooctanoic acid (PFOA)	19	ND	U	0.24	J	7.3		ND	U	ND	U	ND	U	ND	U	ND	U

Notes.

J = Estimated concentration.

U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).

1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.

2. The Screening Levels for soil are based on a residential scenario for direct ingestion of contaminated soil.

Values exceeding the Screening Level are shaded gray.

µg/kg = Microgram(s) per kilogram.

ft bgs = Feet below ground surface.

Qual = Qualifier.

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

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

	Location ID	AOI03-02		AOI03-03		AOI03-03		AOI03-04		AOI03-05		AOI03-06		AOI03-07		AOI04-01	
	Sample Name	AOI03-02-SB-0-2		AOI03-03-SB-0-2		DUP-06		AOI03-04-SB-0-2		AOI03-05-SB-0-2		AOI03-06-SB-0-2		AOI03-07-SB-0-2		AOI04-01-SB-0-2	
	Parent Sample ID					AOI03-03-SB-0-2											
	Sample Date	7/20/2023		7/21/2023		7/21/2023		7/20/2023		7/20/2023		7/21/2023		7/24/2023		7/18/2023	
	Sample Depth (ft bgs)	0-2		0-2		0-2		0-2		0-2		0-2		0-2		0-2	
Analyte	**Screening Level[1,2]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
Perfluorobutanesulfonic acid (PFBS)	1900	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	130	1.1		ND	U	ND	U	ND	U	ND	U	0.055	J	0.068	J	0.38	J
Perfluorononanoic acid (PFNA)	19	2.3		0.045	J	0.029	J	ND	U	ND	U	0.22		0.13	J	ND	U
Perfluorooctanesulfonic acid (PFOS)	13	37		0.32	J	0.25	J	ND	U	ND	U	2.2		2		1.6	
Perfluorooctanoic acid (PFOA)	19	1.8		0.11	J	0.1	J	ND	U	ND	U	0.49		0.47		1.4	

Notes.

J = Estimated concentration.

U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).

1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.

2. The Screening Levels for soil are based on a residential scenario for direct ingestion of contaminated soil.

Values exceeding the Screening Level are shaded gray.

µg/kg = Microgram(s) per kilogram.

ft bgs = Feet below ground surface.

Qual = Qualifier.

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

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

	Location ID	AOI04-01		AOI04-02		AOI04-03		AOI05-01		AOI05-02		AOI05-03		AOI05-04		AOI05-05	
	Sample Name	DUP-01		AOI04-02-SB-0-2		AOI04-03-SB-0-2		AOI05-01-SS-0-2		AOI05-02-SS-0-2		AOI05-03-SS-0-2		AOI05-04-SS-0-2		AOI05-05-SS-0-2	
	Parent Sample ID	AOI04-01-SB-0-2															
	Sample Date	7/18/2023		7/18/2023		7/18/2023		7/24/2023		7/24/2023		7/24/2023		7/24/2023		7/24/2023	
	Sample Depth (ft bgs)	0-2		0-2		0-2		0-2		0-2		0-2		0-2		0-2	
Analyte	**Screening Level[1,2]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
Perfluorobutanesulfonic acid (PFBS)	1900	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	130	0.28	J	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	19	ND	U	ND	U	ND	U	0.23		0.093	J	0.078	J	0.039	J	0.1	J
Perfluorooctanesulfonic acid (PFOS)	13	1.3		ND	U	0.37	J	1.4		0.54		0.36		0.14	J	0.67	
Perfluorooctanoic acid (PFOA)	19	1.3		ND	U	0.34	J	0.32		0.13	J	0.066	J	ND	U	0.14	J

Notes.

J = Estimated concentration.

U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).

1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.

2. The Screening Levels for soil are based on a residential scenario for direct ingestion of contaminated soil.

Values exceeding the Screening Level are shaded gray.

µg/kg = Microgram(s) per kilogram.

ft bgs = Feet below ground surface.

Qual = Qualifier.

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

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

	Location ID	AOI05-06		SF-01		SF-02		SF-03		SF-03		SF-04		SF-04		SF-05	
	Sample Name	AOI05-06-SS-0-2		SF-01-SB-0-2		SF-02-SB-0-2		SF-03-SB-0-2		DUP-04		SF-04-SB-0-2		DUP-02		SF-05-SB-0-2	
	Parent Sample ID									SF-03-SB-0-2				SF-04-SB-0-2			
	Sample Date	7/24/2023		7/20/2023		7/20/2023		7/20/2023		7/20/2023		7/18/2023		7/18/2023		7/18/2023	
	Sample Depth (ft bgs)	0-2		0-2		0-2		0-2		0-2		0-2		0-2		0-2	
Analyte	**Screening Level[1,2]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
Perfluorobutanesulfonic acid (PFBS)	1900	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	130	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	19	0.19		ND	U	0.082	J	0.079	J	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	13	1.4		ND	U	ND	U	1		0.64		ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	19	0.35		0.08	J	0.26	J	0.36		0.22	J	ND	U	ND	U	ND	U

Notes.

J = Estimated concentration.

U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).

1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.

2. The Screening Levels for soil are based on a residential scenario for direct ingestion of contaminated soil.

Values exceeding the Screening Level are shaded gray.

µg/kg = Microgram(s) per kilogram.

ft bgs = Feet below ground surface.

Qual = Qualifier.

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

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

	Location ID	SF-06		SF-07		SF-08		SF-09		SF-10		SF-11	
	Sample Name	SF-06-SB-0-2		SF-07-SB-0-2		SF-08-SB-0-2		SF-09-SB-0-2		SF-10-SB-0-2		SF-11-SB-0-2	
	Parent Sample ID												
	Sample Date	7/18/2023		7/21/2023		7/24/2023		7/24/2023		7/24/2023		7/24/2023	
	Sample Depth (ft bgs)	0-2		0-2		0-2		0-2		0-2		0-2	
Analyte	**Screening Level[1,2]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)													
Perfluorobutanesulfonic acid (PFBS)	1900	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	130	ND	U	ND	U	ND	U	ND	U	ND	U	0.093	J
Perfluorononanoic acid (PFNA)	19	ND	U	ND	U	0.064	J	0.16	J	0.048	J	0.044	J
Perfluorooctanesulfonic acid (PFOS)	13	ND	U	ND	U	1.4		0.8		0.12	J	2.9	
Perfluorooctanoic acid (PFOA)	19	ND	U	ND	U	0.42		0.17	J	0.21	J	0.32	

Notes.

J = Estimated concentration.

U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).

1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.

2. The Screening Levels for soil are based on a residential scenario for direct ingestion of contaminated soil.

Values exceeding the Screening Level are shaded gray.

µg/kg = Microgram(s) per kilogram.

ft bgs = Feet below ground surface.

Qual = Qualifier.

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

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

	Location ID	AOI01-01		AOI01-02		AOI01-02		AOI01-02		AOI01-03		AOI01-04		AOI02-01		AOI02-02	
	Sample Name	AOI01-01-SB-4-5		AOI01-02-SB-4-5		AOI01-02-SB-8-9		DUP-03		AOI01-03-SB-5-6		AOI01-04-SB-5-6		AOI02-01-SB-7-8		AOI02-02-SB-13-14	
	Parent Sample ID							AOI01-02-SB-8-9									
	Sample Date	7/19/2023		7/19/2023		7/19/2023		7/19/2023		7/19/2023		7/19/2023		7/19/2023		7/20/2023	
	Sample Depth (ft bgs)	4-5		4-5		8-9		8-9		5-6		5-6		7-8		13-14	
Analyte	**Screening Level[1,2]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
Perfluorobutanesulfonic acid (PFBS)	25000	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	1600	0.2	J	ND	U	ND	U	0.3	J	0.32	J	0.46	J	ND	U	ND	U
Perfluorononanoic acid (PFNA)	250	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	160	0.97		ND	U	ND	U	ND	U	0.87		0.29	J	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	ND	U	ND	U	ND	U	ND	U	3.2		ND	U	ND	U	ND	U

Notes.

J = Estimated concentration.

U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).

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

1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.

2. The Screening Levels for soil are based on incidental ingestion of soil in a industrial/commercial worker scenario.

Values exceeding the Screening Level are shaded gray.

µg/kg = Microgram(s) per kilogram.

ft bgs = Feet below ground surface.

Qual = Qualifier.

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

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

	Location ID	AOI02-03		AOI03-04		AOI03-05		AOI04-01		AOI04-02		AOI04-03		SF-01		SF-02	
	Sample Name	AOI02-03-SB-6-7		AOI03-04-SB-8-9		AOI03-05-SB-5-6		AOI04-01-SB-5-6		AOI04-02-SB-5.5-6.5		AOI04-03-SB-6-7		SF-01-SB-5-6		SF-02-SB-6-7	
	Parent Sample ID																
	Sample Date	7/19/2023		7/21/2023		7/20/2023		7/18/2023		7/18/2023		7/18/2023		7/20/2023		7/20/2023	
	Sample Depth (ft bgs)	6-7		8-9		5-6		5-6		5.5-6.5		6-7		5-6		6-7	
Analyte	**Screening Level[1,2]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
Perfluorobutanesulfonic acid (PFBS)	25000	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	1600	18		ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	250	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	160	0.46	J	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	4.1		ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U

Notes.

J = Estimated concentration.

U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).

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

1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.

2. The Screening Levels for soil are based on incidental ingestion of soil in a industrial/commercial worker scenario.

Values exceeding the Screening Level are shaded gray.

µg/kg = Microgram(s) per kilogram.

ft bgs = Feet below ground surface.

Qual = Qualifier.

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

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

	Location ID	SF-04		SF-05		SF-06		SF-07		SF-08		SF-08		SF-09		SF-09	
	Sample Name	SF-04-SB-5-6		SF-05-SB-5-6		SF-06-SB-5-6		SF-07-SB-8-9		SF-08-SB-5-6		DUP-07		SF-09-SB-7-8		DUP-08	
	Parent Sample ID											SF-08-SB-5-6				SF-09-SB-7-8	
	Sample Date	7/18/2023		7/18/2023		7/18/2023		7/21/2023		7/24/2023		7/24/2023		7/24/2023		7/24/2023	
	Sample Depth (ft bgs)	5-6		5-6		5-6		8-9		5-6		5-6		7-8		7-8	
Analyte	**Screening Level[1,2]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
Perfluorobutanesulfonic acid (PFBS)	25000	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	UJ	ND	U
Perfluorohexanesulfonic acid (PFHxS)	1600	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	UJ	ND	U
Perfluorononanoic acid (PFNA)	250	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	UJ	ND	U
Perfluorooctanesulfonic acid (PFOS)	160	ND	U	ND	U	ND	U	0.12	J	ND	U	ND	U	ND	UJ	ND	U
Perfluorooctanoic acid (PFOA)	250	ND	U	ND	U	ND	U	0.066	J	ND	U	ND	U	ND	UJ	ND	U

Notes.

J = Estimated concentration.

U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).

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

1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.

2. The Screening Levels for soil are based on incidental ingestion of soil in a industrial/commercial worker scenario.

Values exceeding the Screening Level are shaded gray.

µg/kg = Microgram(s) per kilogram.

ft bgs = Feet below ground surface.

Qual = Qualifier.

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

Insert Table 6-3. Page 2 of 3

Table 6-4. PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Deep Subsurface Soil, Site Inspection Report, SF

Location ID	AOI01-01		AOI01-02		AOI01-03		AOI01-04		AOI02-01		AOI02-02		AOI02-03		AOI03-04	
Sample Name	AOI01-01-SB-10-11		AOI01-02-SB-12-13		AOI01-03-SB-11-12		AOI01-04-SB-10-11		AOI02-01-SB-15-16		AOI02-02-SB-19-20		AOI02-03-SB-11-12		AOI03-04-SB-13-14	
Parent Sample ID																
Sample Date	7/19/2023		7/19/2023		7/19/2023		7/19/2023		7/19/2023		7/20/2023		7/19/2023		7/21/2023	
Sample Depth (ft bgs)	10-11		12-13		11-12		10-11		15-16		19-20		11-12		13-14	
Analyte	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																
Perfluorobutanesulfonic acid (PFBS)	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	ND	U	ND	U	ND	U	0.25	J	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U

Notes.
J = Estimated concentration.
U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
µg/kg = Microgram(s) per kilogram.
ft bgs = Feet below ground surface.
Qual = Qualifier.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).

Table 6-4. PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Deep Subsurface Soil, Site Inspection Report, SF

Location ID	AOI03-05		SF-01		SF-02		SF-05		SF-06		SF-07		SF-07		SF-08	
Sample Name	AOI03-05-SB-15-16		SF-01-SB-9-10		SF-02-SB-13-14		SF-05-SB-9-10		SF-06-SB-10-11		SF-07-SB-15-16		DUP-05		SF-08-SB-8-9	
Parent Sample ID													SF-07-SB-15-16			
Sample Date	7/20/2023		7/20/2023		7/20/2023		7/18/2023		7/18/2023		7/21/2023		7/20/2023		7/24/2023	
Sample Depth (ft bgs)	15-16		9-10		13-14		9-10		10-11		15-16		15-16		8-9	
Analyte	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																
Perfluorobutanesulfonic acid (PFBS)	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	ND	U	ND	U	ND	U	ND	U	ND	U	0.042	J	ND	U	ND	U
Perfluorononanoic acid (PFNA)	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	ND	U	0.16	J	ND	U	ND	U	ND	U	0.14	J	0.16	J	ND	U

Notes.
J = Estimated concentration.
U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
µg/kg = Microgram(s) per kilogram.
ft bgs = Feet below ground surface.
Qual = Qualifier.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).

Table 6-5. PFOA, PFOS, PFNA, and PFHxS Results in Groundwater, Site Inspection Report, SF

	Location ID	AOI01-01		AOI01-02		AOI01-03		AOI01-04		AOI02-01		AOI02-02		AOI02-03		AOI03-04	
	Sample Name	AOI01-01-GW		AOI01-02-GW		AOI01-03-GW		AOI01-04-GW		AOI02-01-GW		AOI02-02-GW		AOI02-03-GW		AOI03-04-GW	
	Parent Sample ID																
	Sample Date	7/26/2023		7/26/2023		7/26/2023		7/26/2023		7/25/2023		7/25/2023		7/26/2023		7/25/2023	
Analyte	**Screening Level[1]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (ng/L)																	
Perfluorobutanesulfonic acid (PFBS)	601	15		5.8		16		7.2		9.1		7.7		11		14	
Perfluorohexanesulfonic acid (PFHxS)	39	340		86		220		140		3.5		7.6		24		4.9	
Perfluorononanoic acid (PFNA)	6	1.6	J	2.2		2.3		2.4		0.77	J	ND	U	0.64	J	1.1	J
Perfluorooctanesulfonic acid (PFOS)	4	130		140		360		230		6.1		17		18		12	
Perfluorooctanoic acid (PFOA)	6	15		18		1000		19		4.1		2.9		5.3		12	

Notes.
J = Estimated concentration.
J+ = Estimated concentration, biased high.
U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.
Values exceeding the Screening Level are shaded gray.
ng/L = Nanogram(s) per liter.
Qual = Qualifier.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).

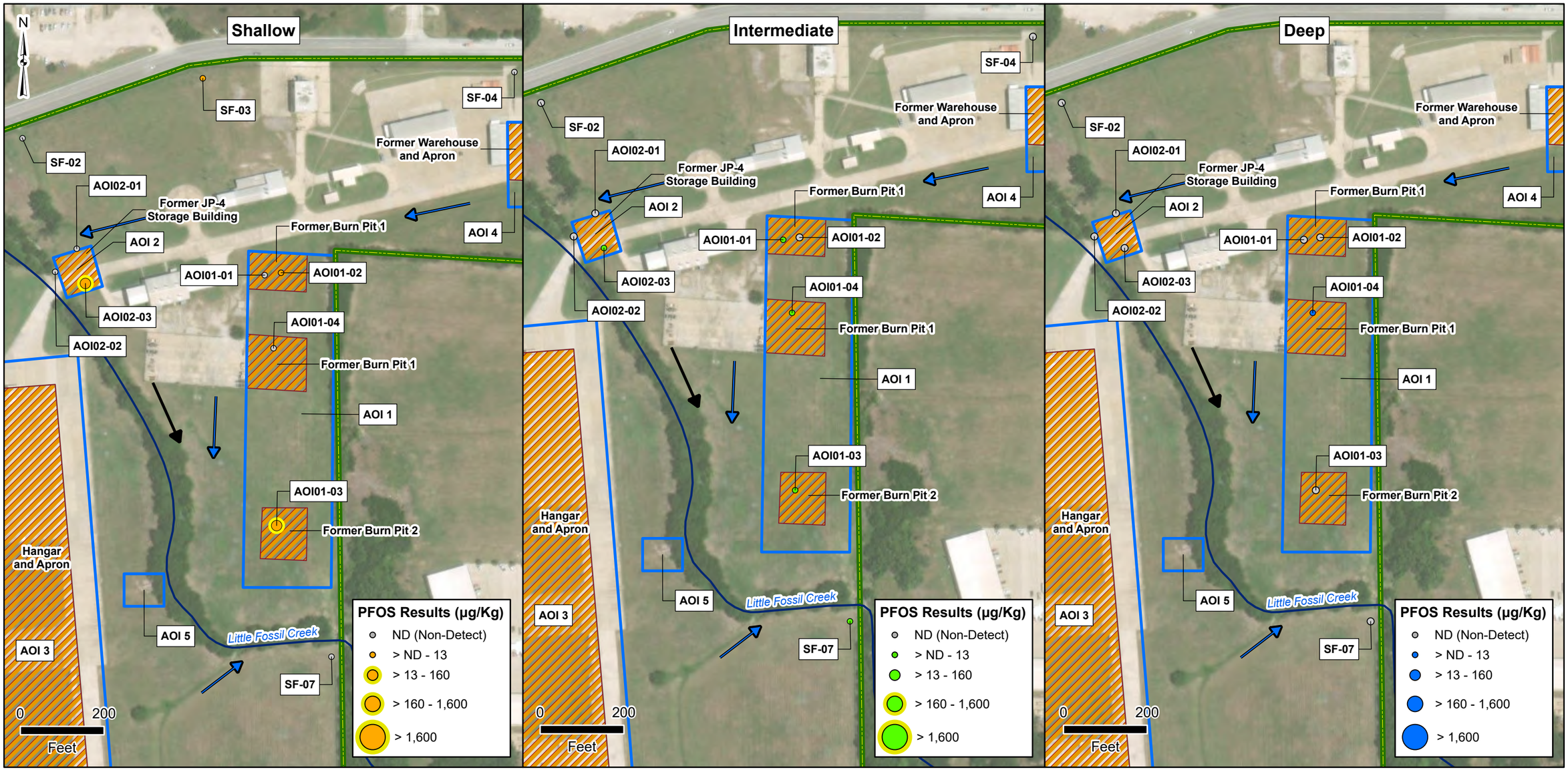
Table 6-5. PFOA, PFOS, PFNA, and PFHxS Results in Groundwater, Site Inspection Report, SF

	Location ID	AOI03-04		AOI03-05		AOI04-01		AOI04-03		AOI04-03		SF-02		SF-06		SF-08	
	Sample Name	DUP-01-GW		AOI03-05-GW		AOI04-01-GW		AOI04-03-GW		DUP-02-GW		SF-02-GW		SF-06-GW		SF-08-GW	
	Parent Sample ID	AOI03-04-GW								AOI04-03-GW							
	Sample Date	7/25/2023		7/25/2023		7/25/2023		7/25/2023		7/25/2023		7/25/2023		7/26/2023		7/25/2023	
Analyte	**Screening Level[1]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (ng/L)																	
Perfluorobutanesulfonic acid (PFBS)	601	13		7.2		8.3	J+	2.1		2.3		12		1.8	J	2.9	
Perfluorohexanesulfonic acid (PFHxS)	39	4.3		11		17	J+	2.2		2.3		2.9		3.4	J	1.6	J
Perfluorononanoic acid (PFNA)	6	1	J	6.6		5.6	J+	0.59	J	ND	U	0.78	J	ND	U	0.97	J
Perfluorooctanesulfonic acid (PFOS)	4	12		12		38	J+	4.4		4.6		5.3		4.4		8.4	
Perfluorooctanoic acid (PFOA)	6	12		12		26	J+	5.1		5.3		1.4	J	2.5	J	4.7	

Notes.
J = Estimated concentration.
J+ = Estimated concentration, biased high.
U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.
Values exceeding the Screening Level are shaded gray.
ng/L = Nanogram(s) per liter.
Qual = Qualifier.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).

Army National Guard Site Inspections
Site Inspection Report
Saginaw Facility, Texas

Figure 6-1
AOI 1 and AOI 2
PFOS Detections in Soil



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 6-14 ft bgs

Deep = 11-20 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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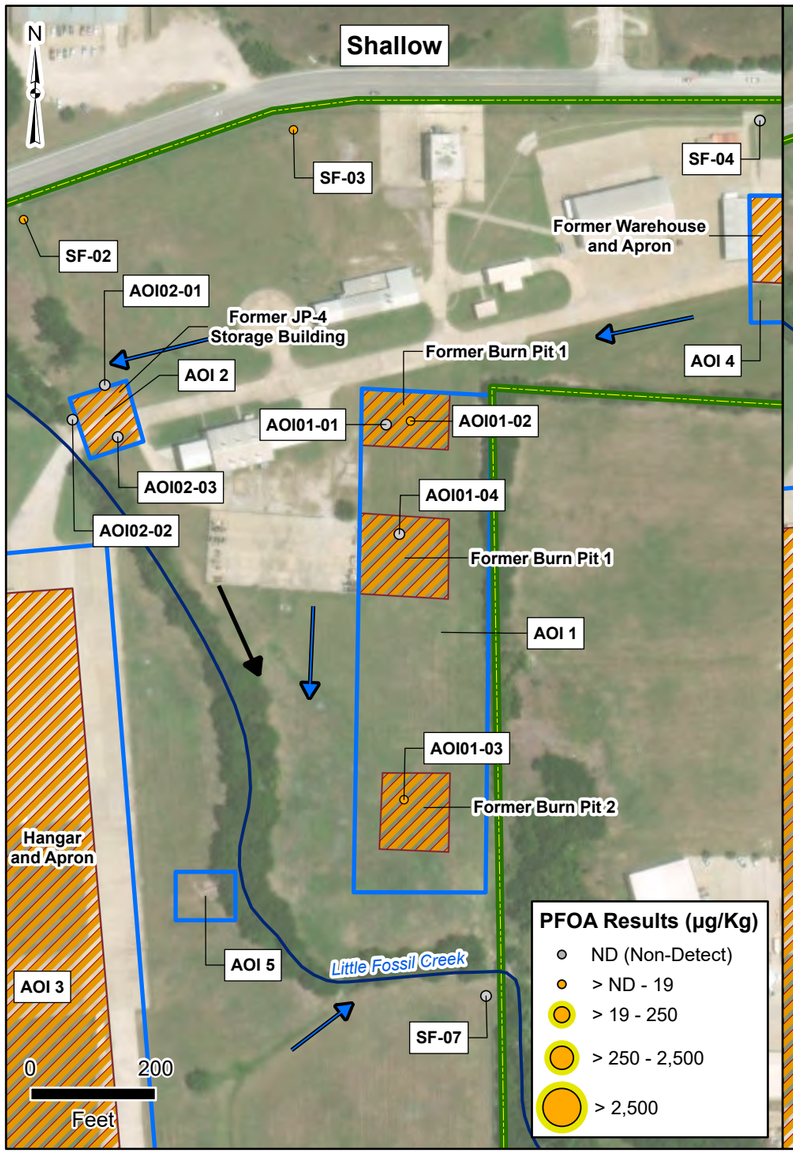
Army National Guard Site Inspections
Site Inspection Report
Saginaw Facility, Texas

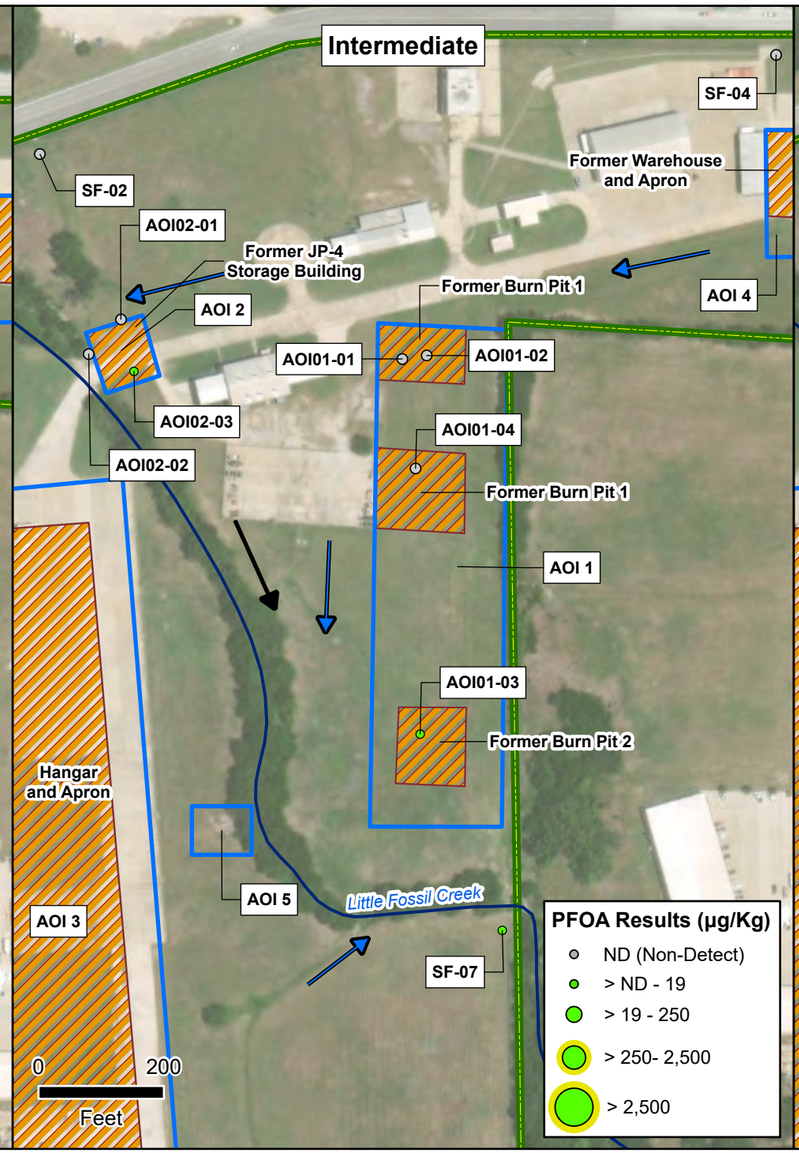
Figure 6-2
AOI 1 and AOI 2
PFOA Detections in Soil

Map Extent

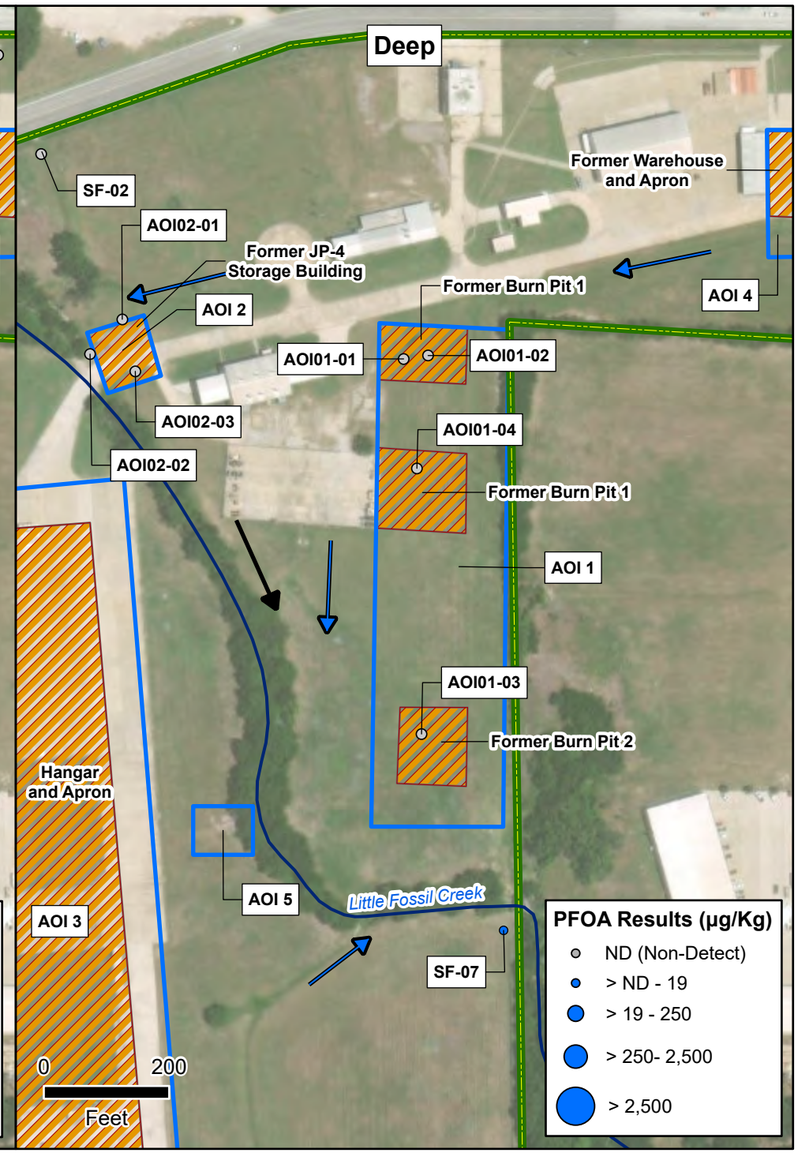
Shallow



Intermediate



Deep



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 6-14 ft bgs

Deep = 11-20 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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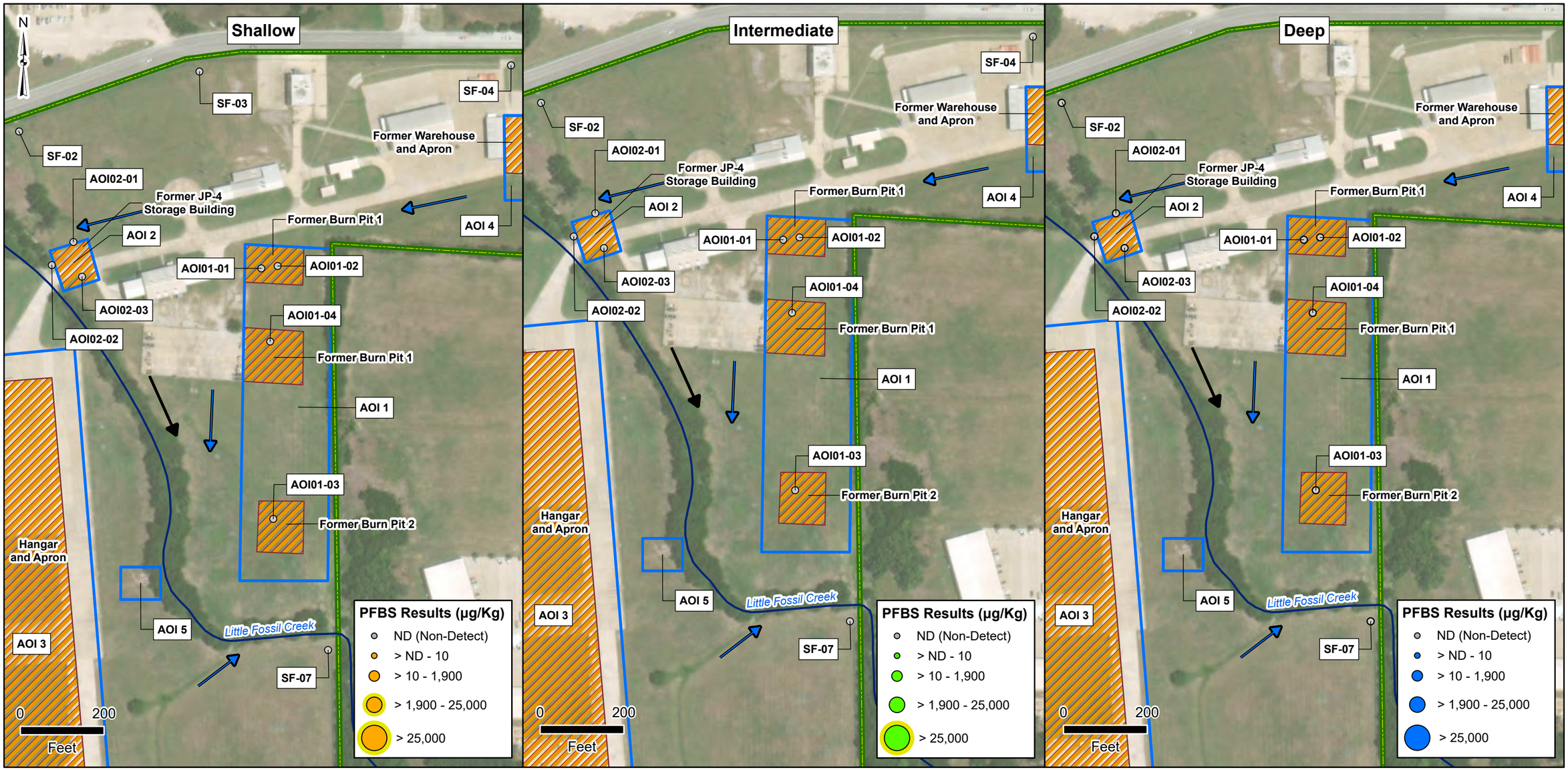
Site Inspection Report
Saginaw Facility, Texas

Figure 6-3
AOI 1 and AOI 2
PFBS Detections in Soil



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 6-14 ft bgs

Deep = 11-20 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

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Prepared For:.....USACE
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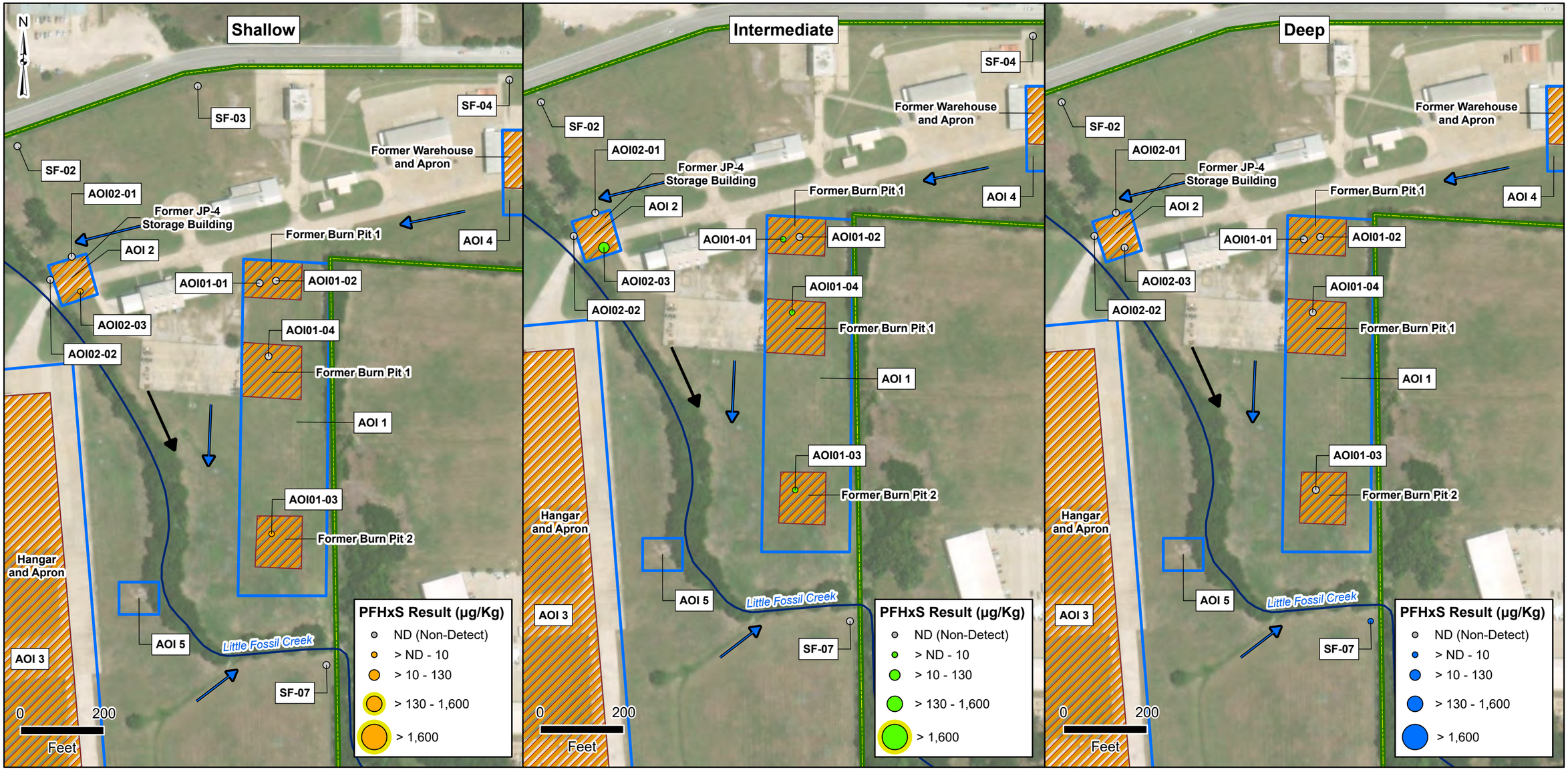
Figure 6-4
AOI 1 and AOI 2
PFHxS Detections in Soil



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 6-14 ft bgs

Deep = 11-20 ft bgs

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

Data Sources:
ESRI 2022
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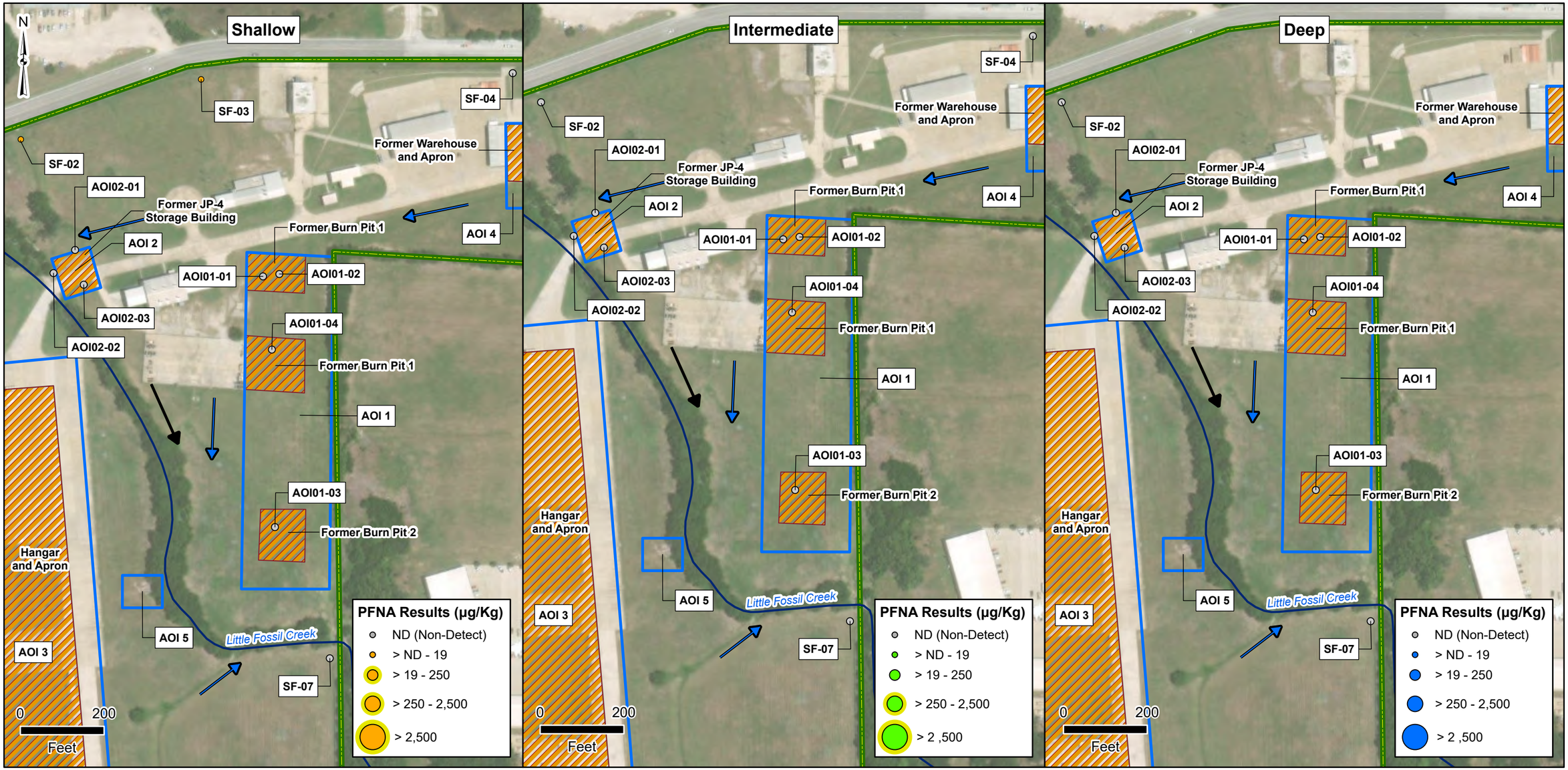
Saginaw Facility, Texas

Figure 6-5
AOI 1 and AOI 2
PFNA Detections in Soil



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
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Army National Guard Site Inspections
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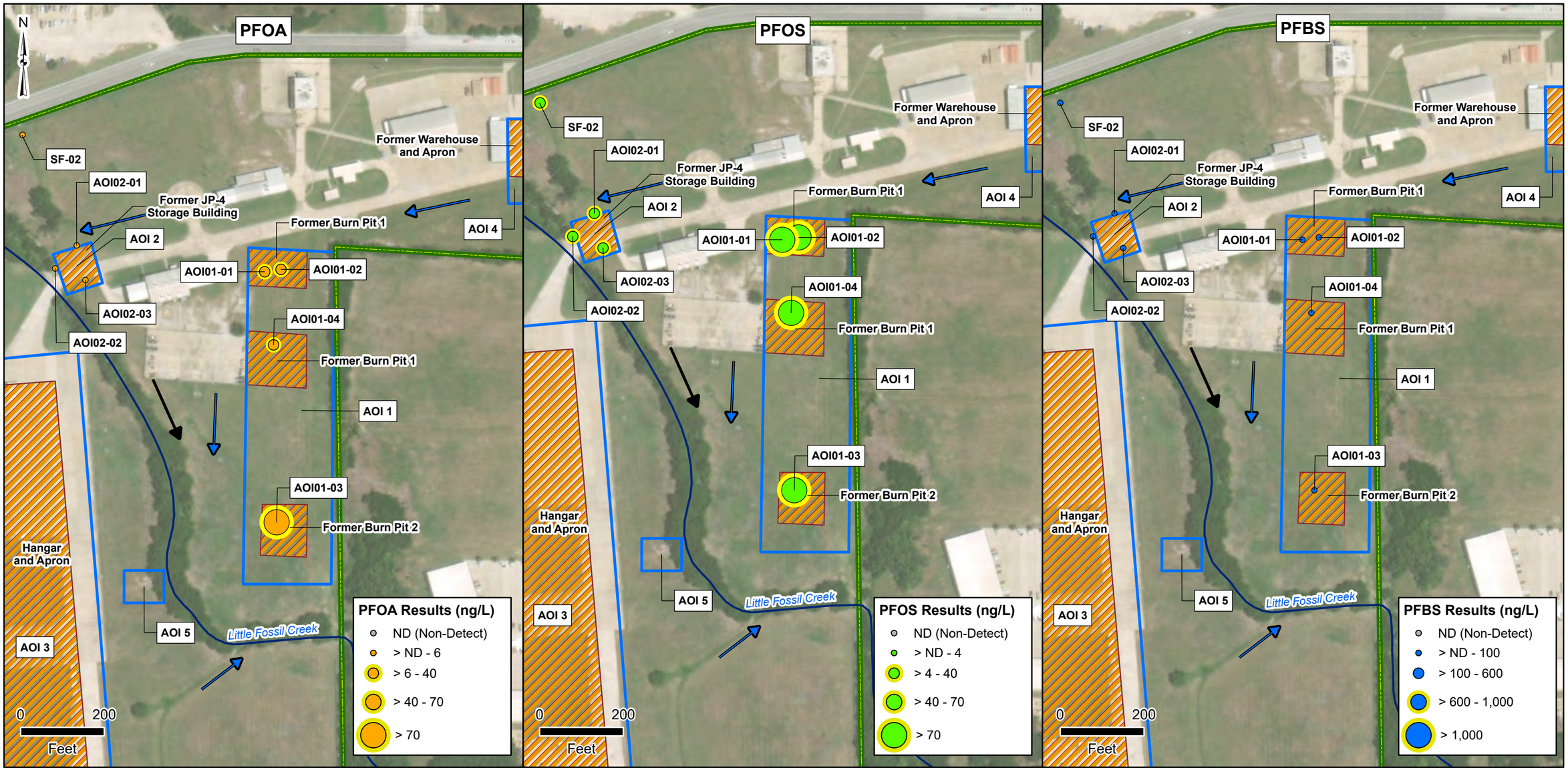
Saginaw Facility, Texas

Figure 6-6
AOI 1 and AOI 2
PFOA, PFOS and PFBS Detections in Groundwater

Map Extent



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Note:
PFOA = Perfluorooctanesulfonic acid
PFOS = Perfluorooctanoic acid
PFBS = Perfluorobutanesulfonic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2022
AECOM 2019

Date:.....November 2023
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Prepared For:.....USACE
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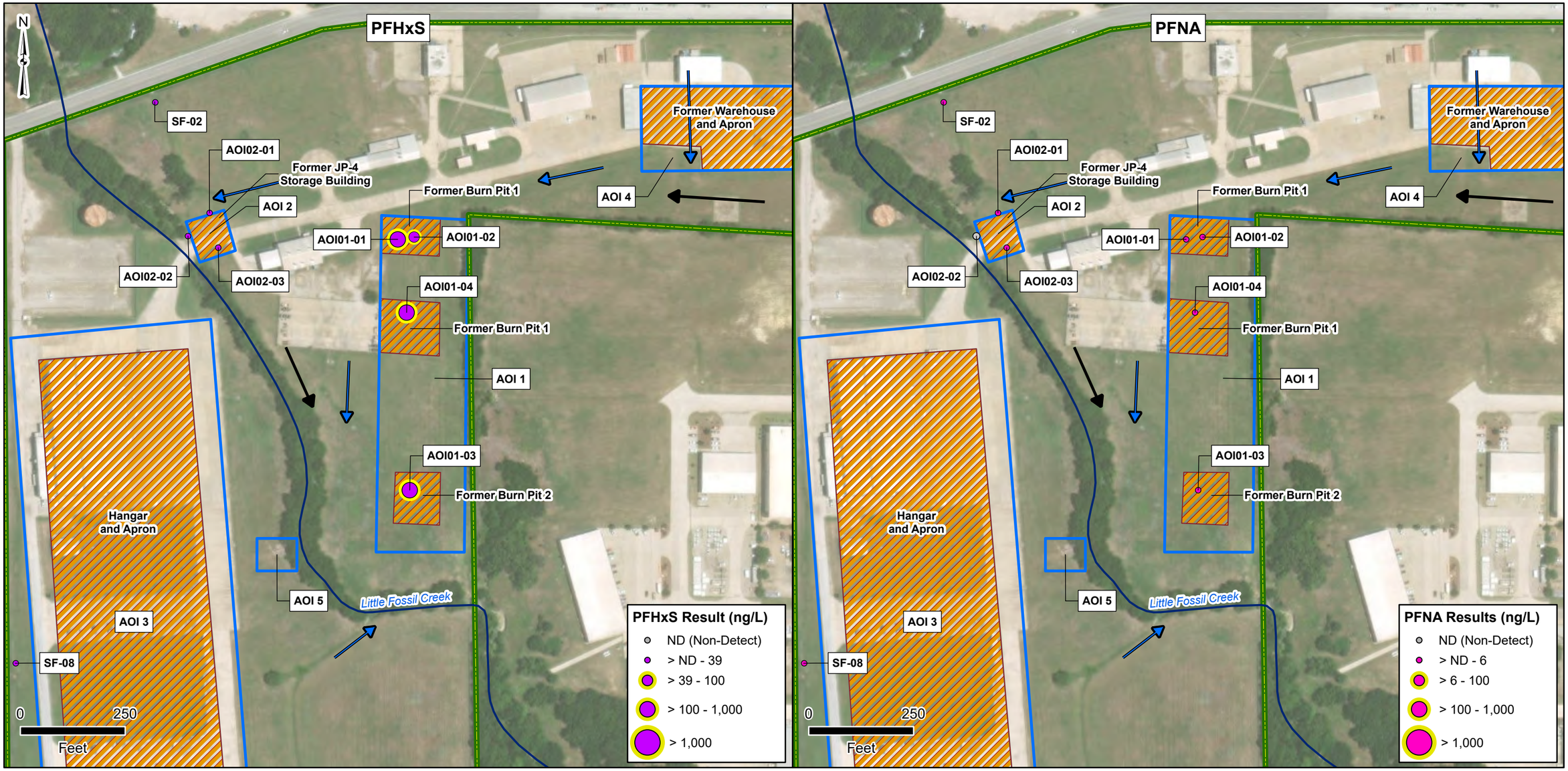
Army National Guard Site Inspections
Site Inspection Report
Saginaw Facility, Texas

Figure 6-7
AOI 1 and AOI 2
PFHxS and PFNA Detections in Groundwater



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Notes:
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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Figure 6-8
AOI 3
PFOS Detections in Soil

Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-9 ft bgs

Deep = 8-16 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

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Prepared For:.....USACE
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Figure 6-9
AOI 3
PFOA Detections in Soil

Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-9 ft bgs

Deep = 8-16 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

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Prepared By:.....EA
Prepared For:.....USACE
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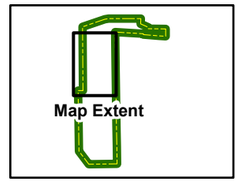
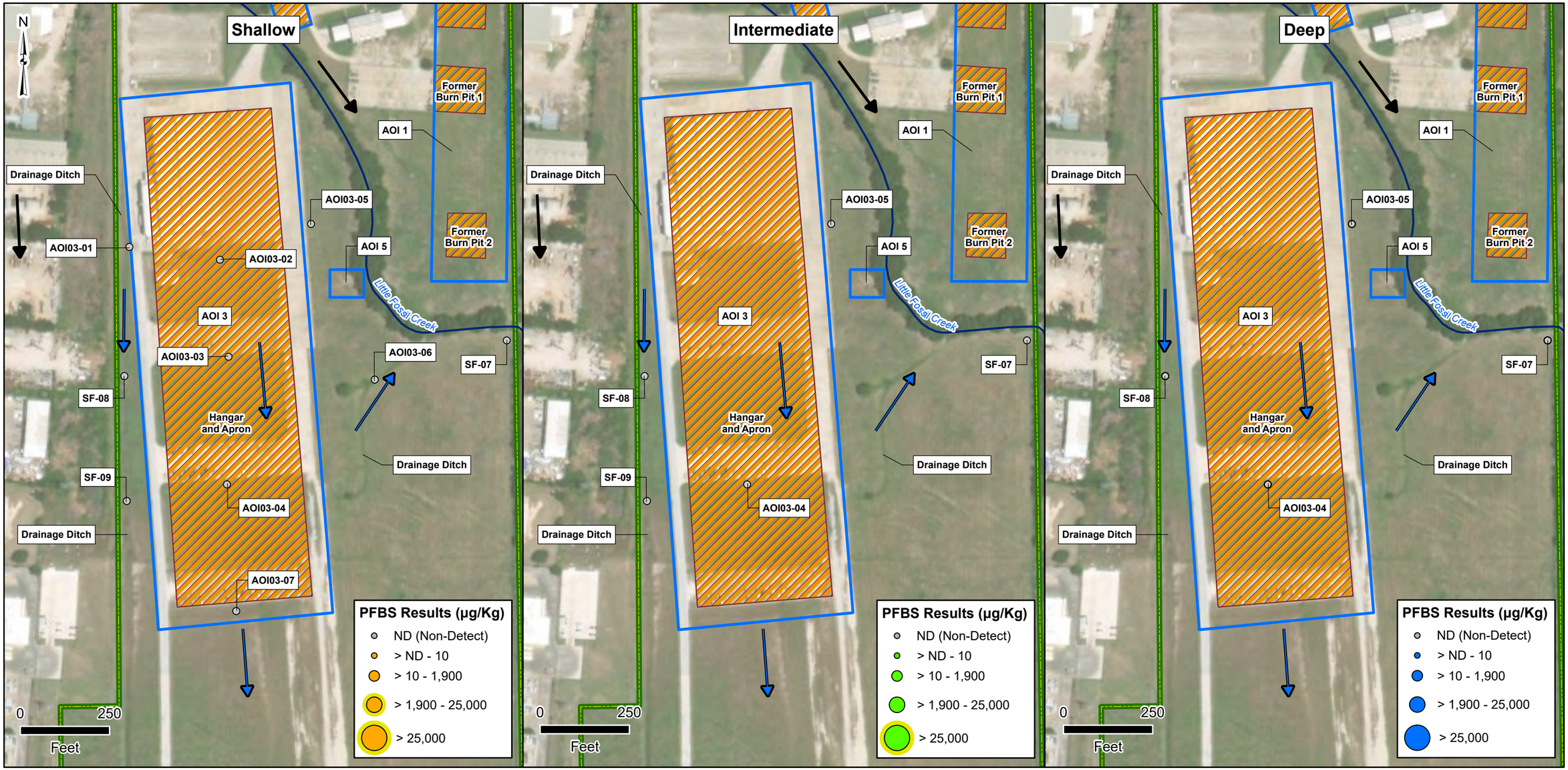
Figure 6-10
AOI 3
PFBS Detections in Soil





Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-9 ft bgs

Deep = 8-16 ft bgs

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

Data Sources:
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AECOM 2019

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Prepared For:.....USACE
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Army National Guard Site Inspections
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Figure 6-11
AOI 3
PFHxS Detections in Soil

Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-9 ft bgs

Deep = 8-16 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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Figure 6-12
AOI 3
PFNA Detections in Soil

Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-9 ft bgs

Deep = 8-16 ft bgs

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

Data Sources:
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Prepared For:.....USACE
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Army National Guard Site Inspections
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Figure 6-13
AOI 3
PFOA, PFOS and PFBS Detections in Groundwater

Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Note:
PFOA = Perfluorooctanesulfonic acid
PFOS = Perfluorooctanoic acid
PFBS = Perfluorobutanesulfonic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
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AECOM 2019

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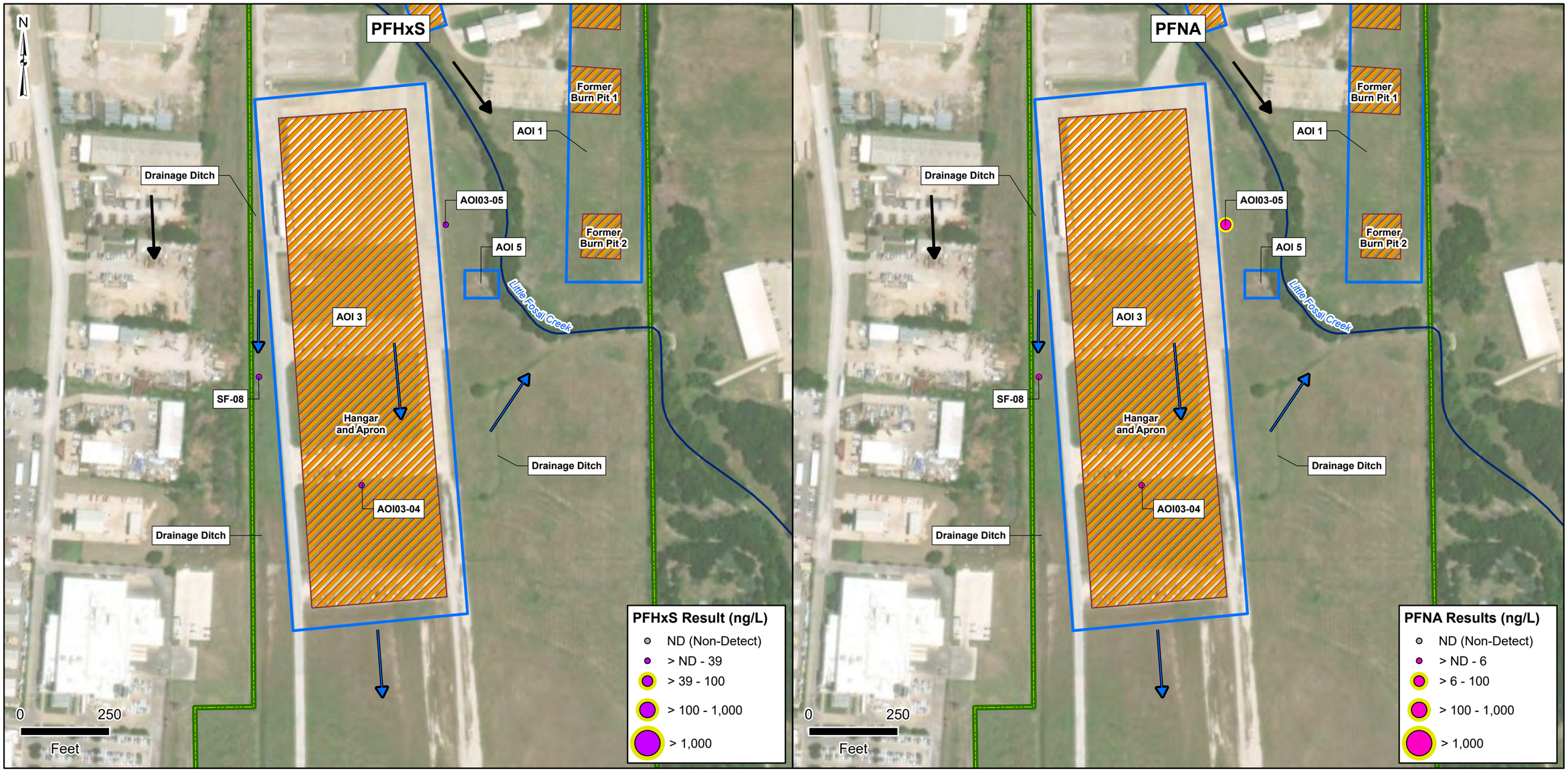
Figure 6-14
AOI 3
PFHxS and PFNA Detections in Groundwater



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Notes:
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
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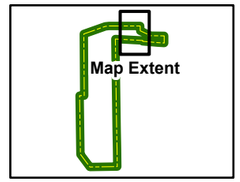
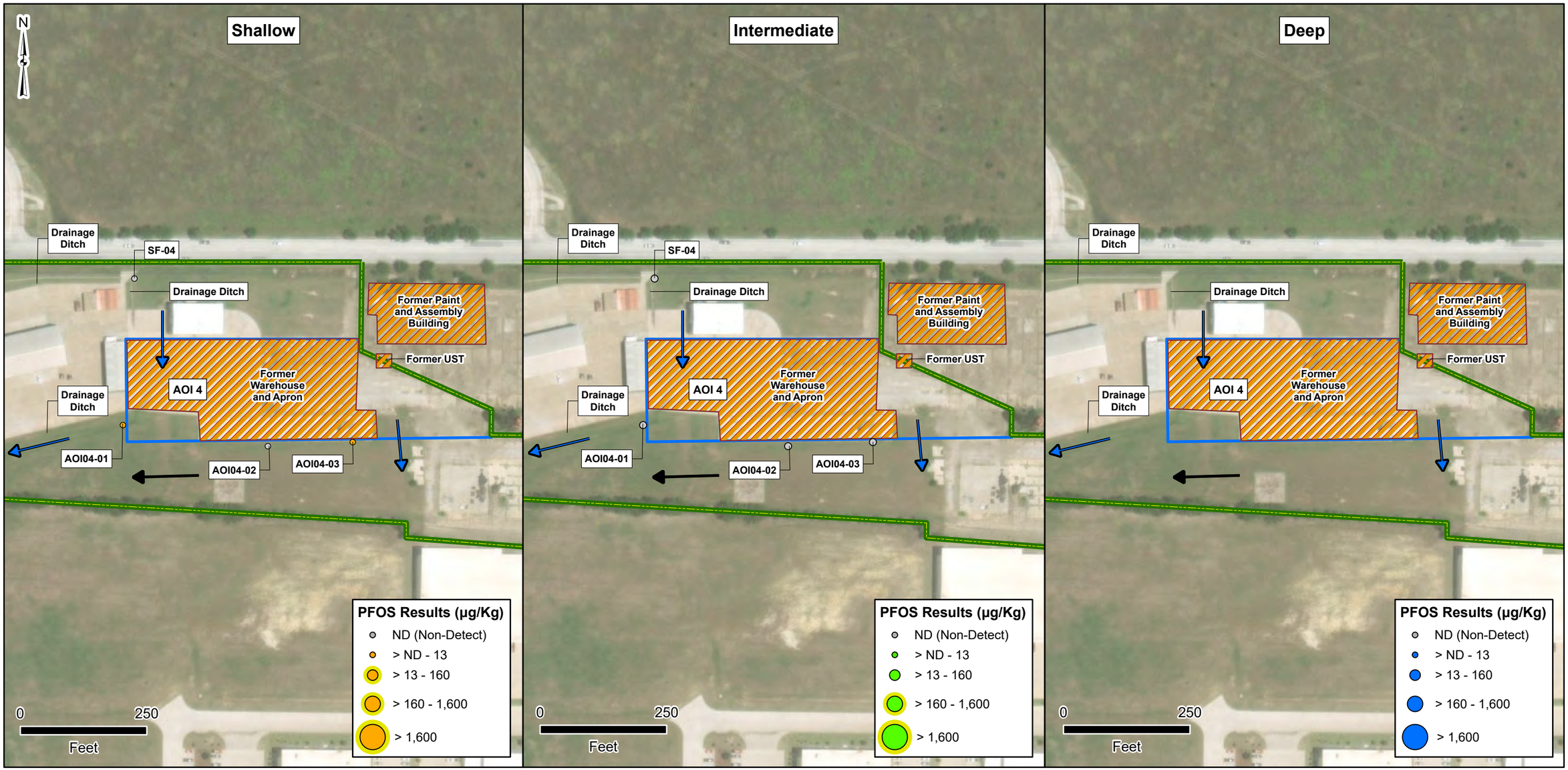
Saginaw Facility, Texas

Figure 6-15
AOI 4
PFOS Detections in Soil





Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-7 ft bgs

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

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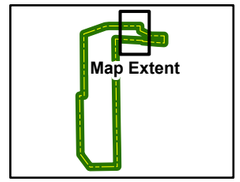
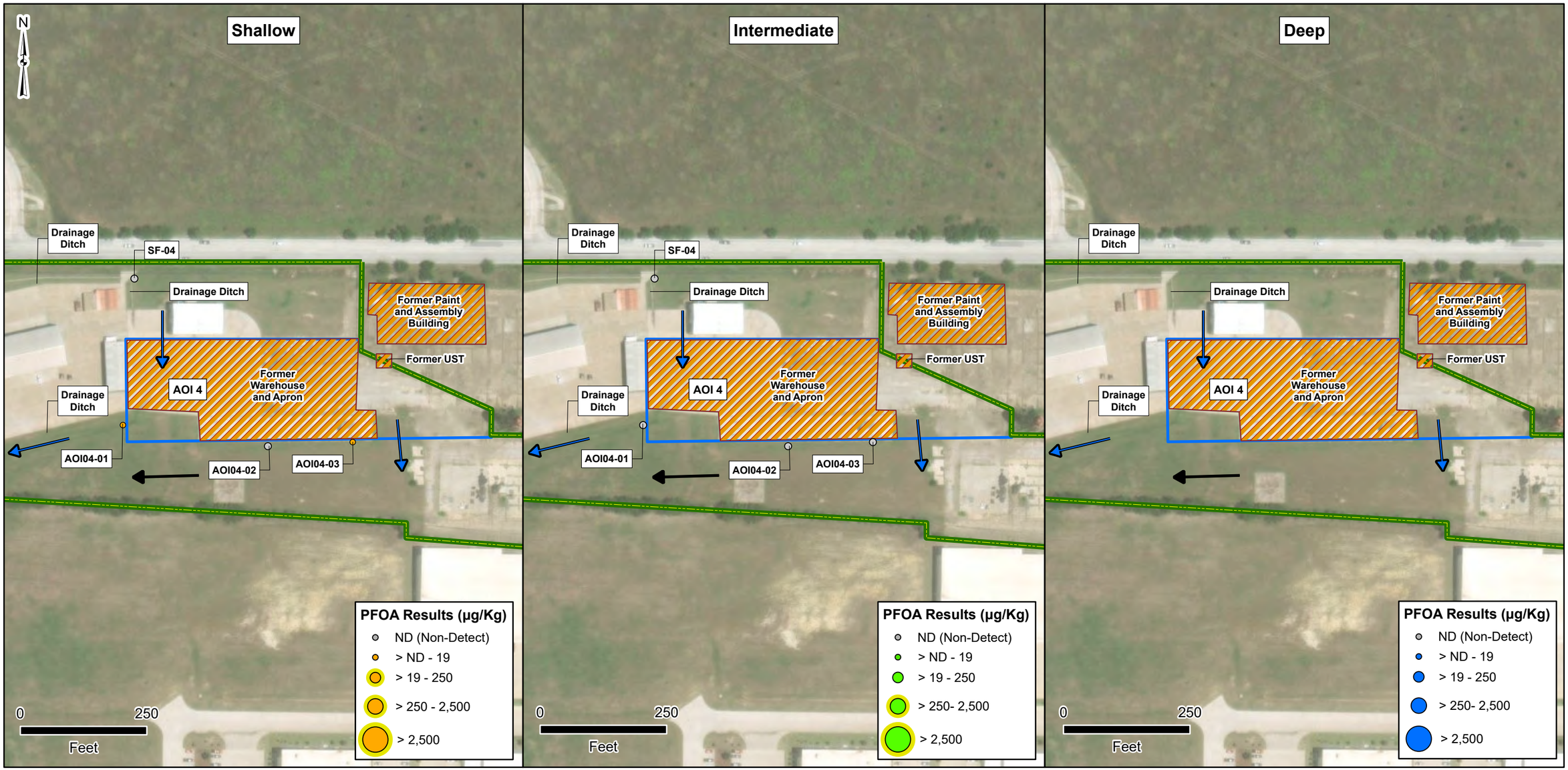
Figure 6-16
AOI 4
PFOA Detections in Soil





Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-7 ft bgs

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

Data Sources:
ESRI 2022
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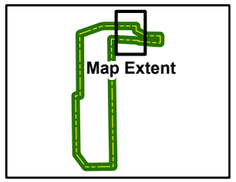
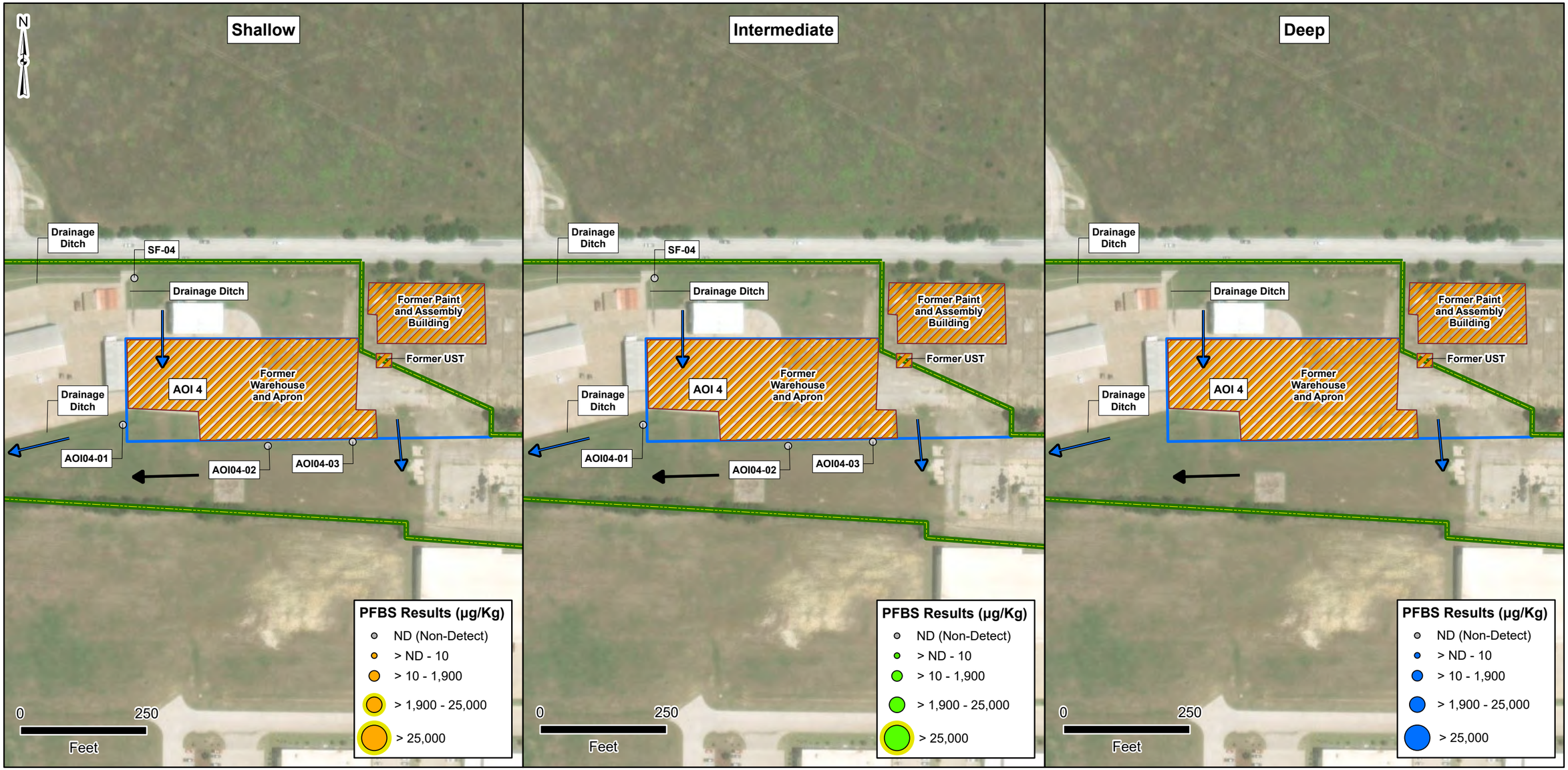
Figure 6-17
AOI 4
PFBS Detections in Soil





Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-7 ft bgs

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

Data Sources:
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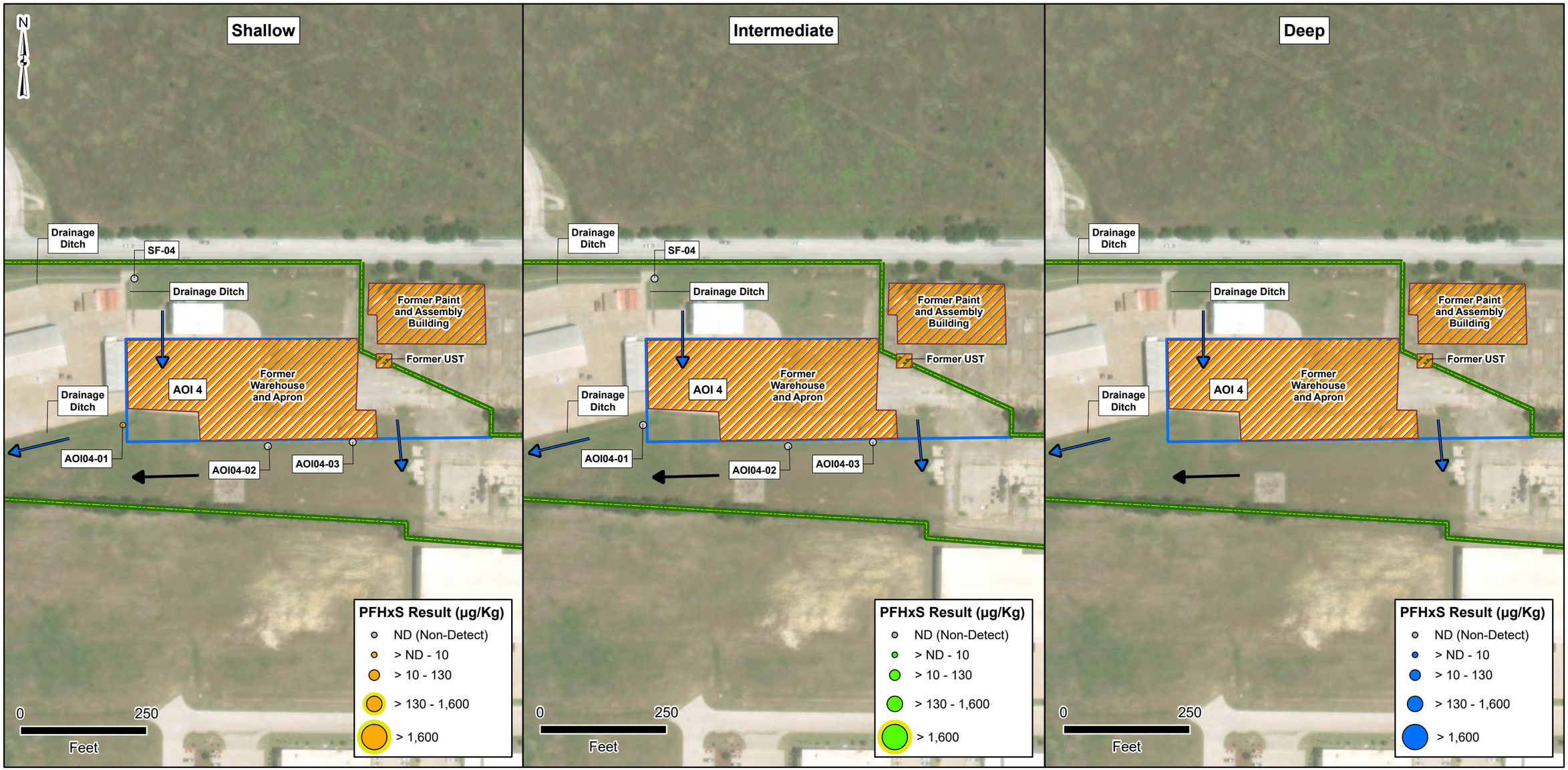
Figure 6-18
AOI 4
PFHxS Detections in Soil



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-7 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

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Prepared For:.....USACE
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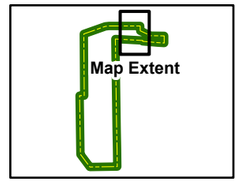
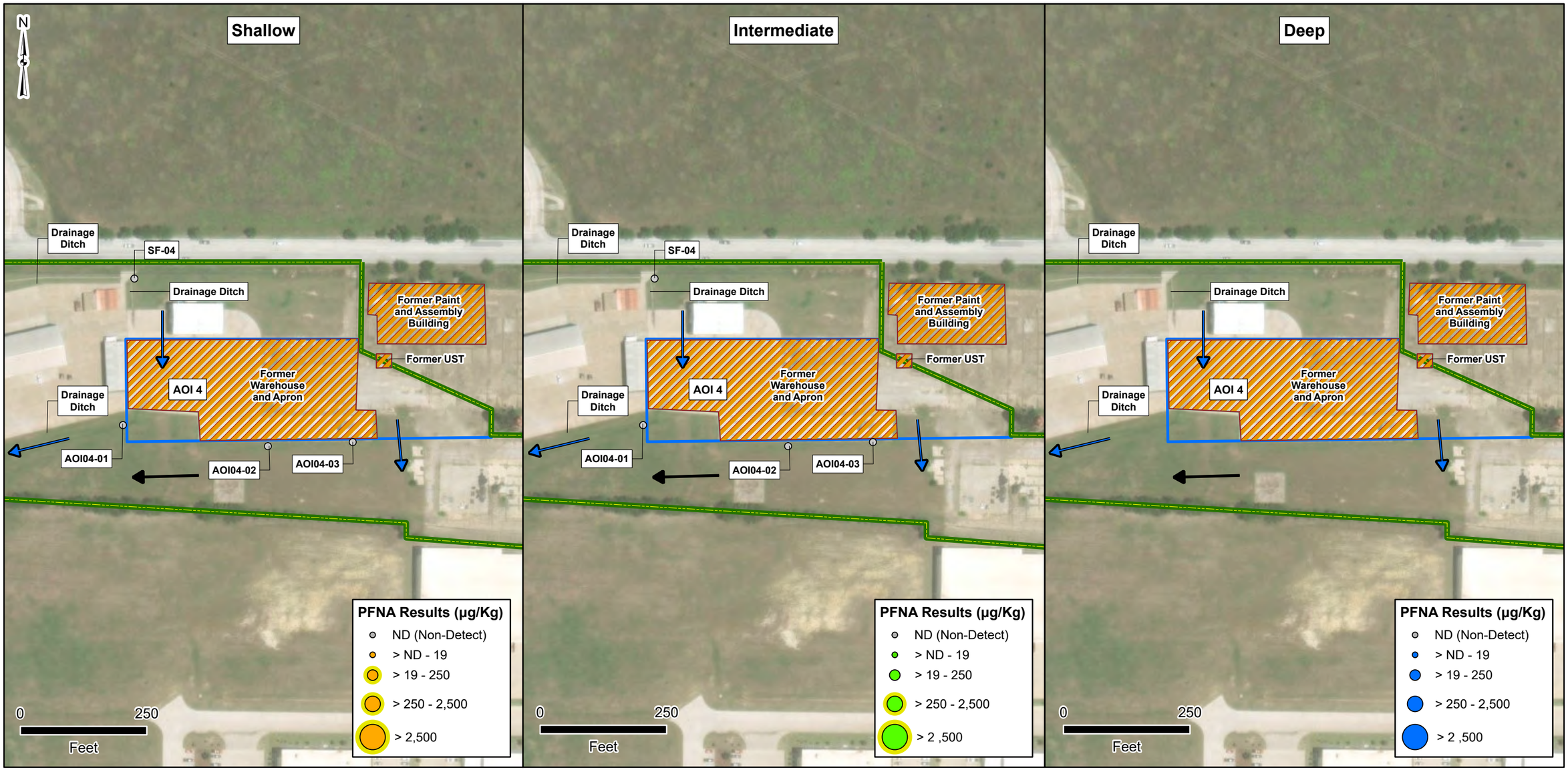
Figure 6-19
AOI 4
PFNA Detections in Soil





Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-7 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

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Army National Guard Site Inspections
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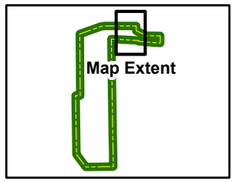
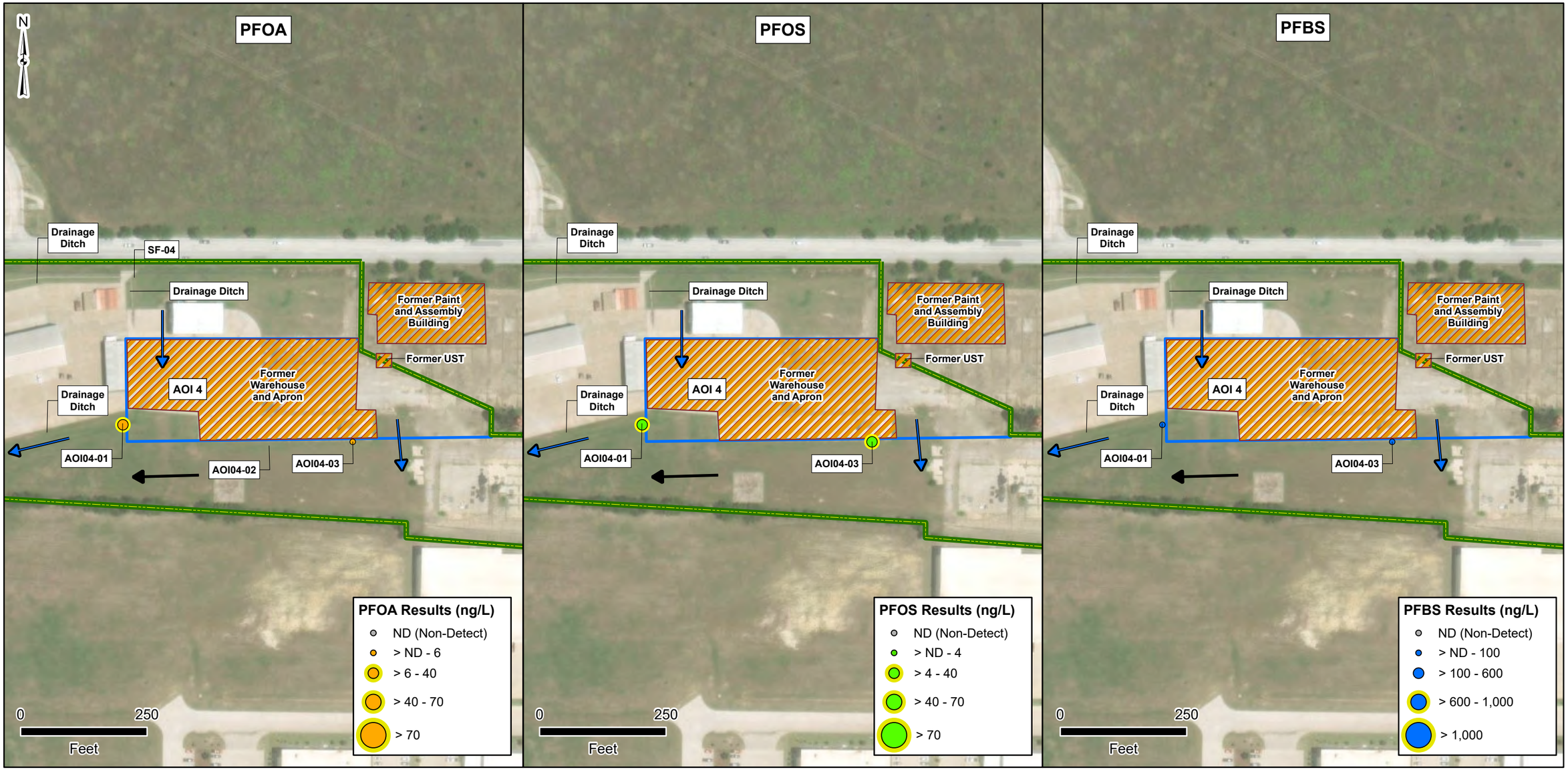
Saginaw Facility, Texas

Figure 6-20
AOI 4
PFOA, PFOS and PFBS Detections in Groundwater





Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction

Note:
PFOA = Perfluorooctanesulfonic acid
PFOS = Perfluorooctanoic acid
PFBS = Perfluorobutanesulfonic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2022
AECOM 2019

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
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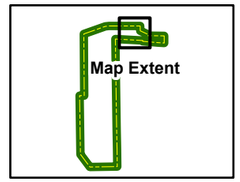
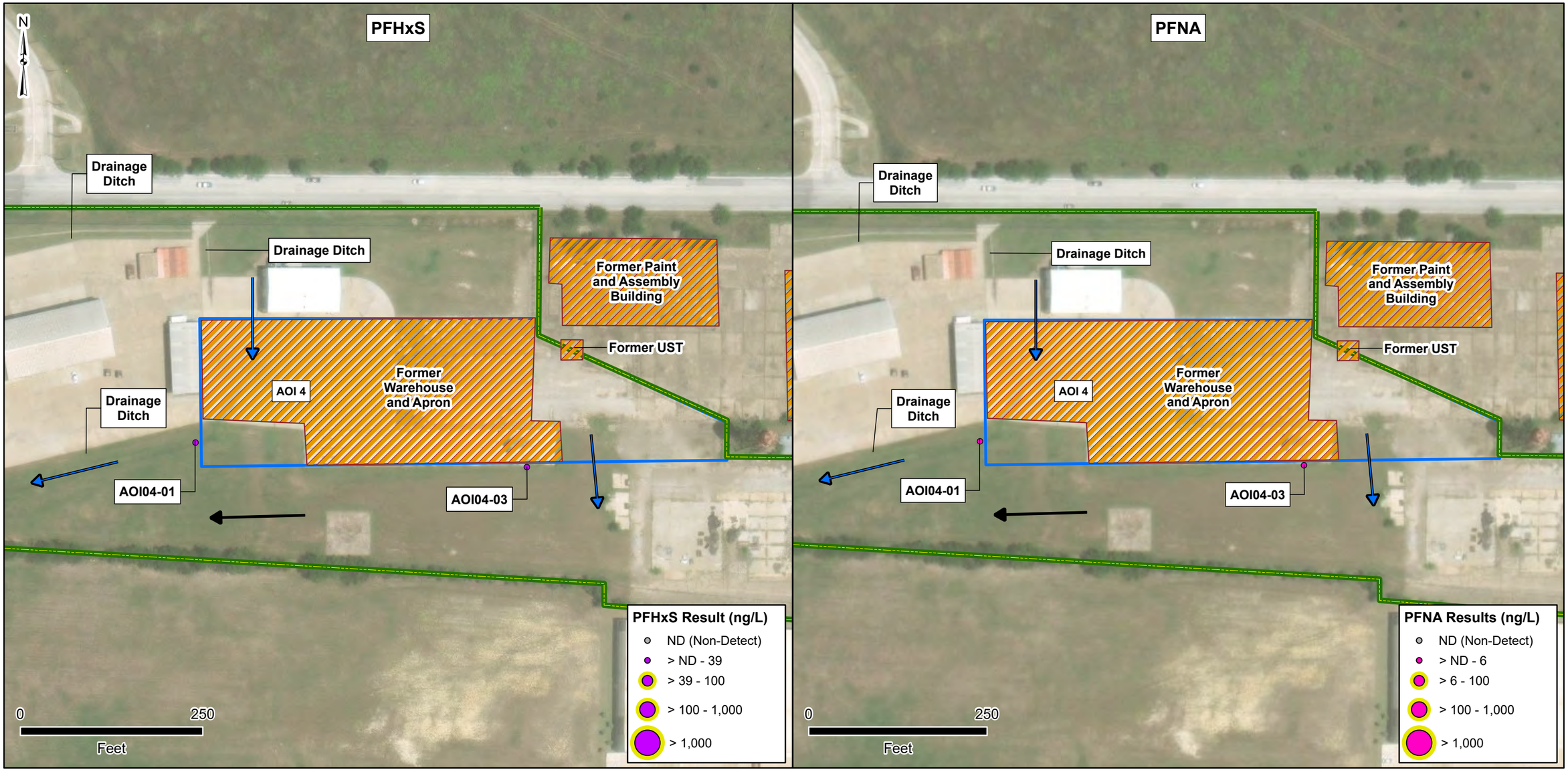
Saginaw Facility, Texas

Figure 6-21
AOI 4
PFHxS and PFNA Detections in Groundwater





Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction

Notes:
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
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Army National Guard Site Inspections
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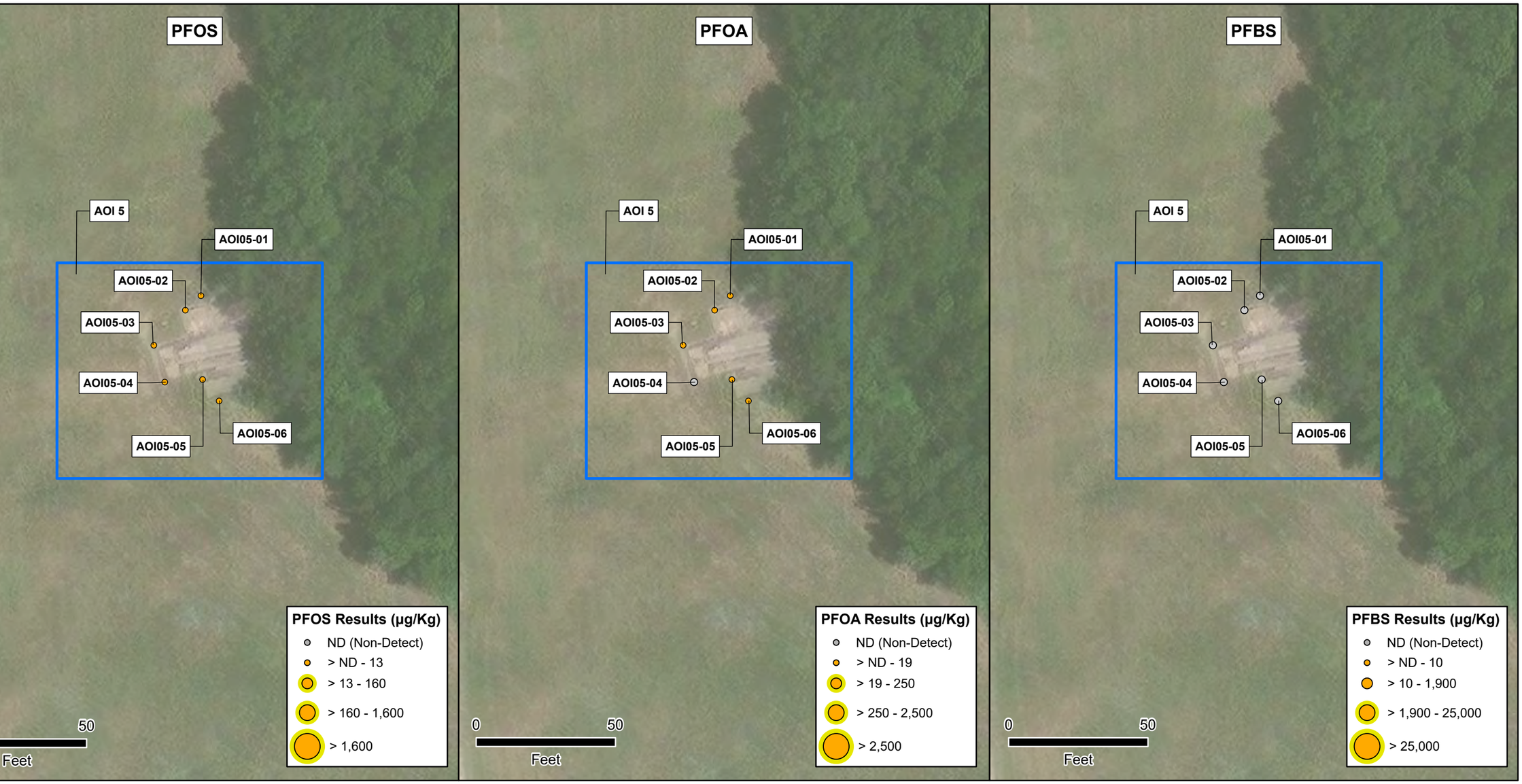
Saginaw Facility, Texas

Figure 6-22
AOI 5
PFOS, PFOA, and PFBS Detections in Soil



Facility Data
- Facility Boundary
- Area of Interest

* Surface soil samples 0-2 feet below ground surface (ft bgs)

Notes:
PFOS = Perfluorooctanesulfonic acid
PFOA = Perfluorooctanoic acid
PFBS = Perfluorobutanesulfonic acid
Exceedances of the OSD SL are depicted with a yellow halo. Depth intervals shown represent respective sampling position within a given soil boring location.

Data Sources:
ESRI 2022
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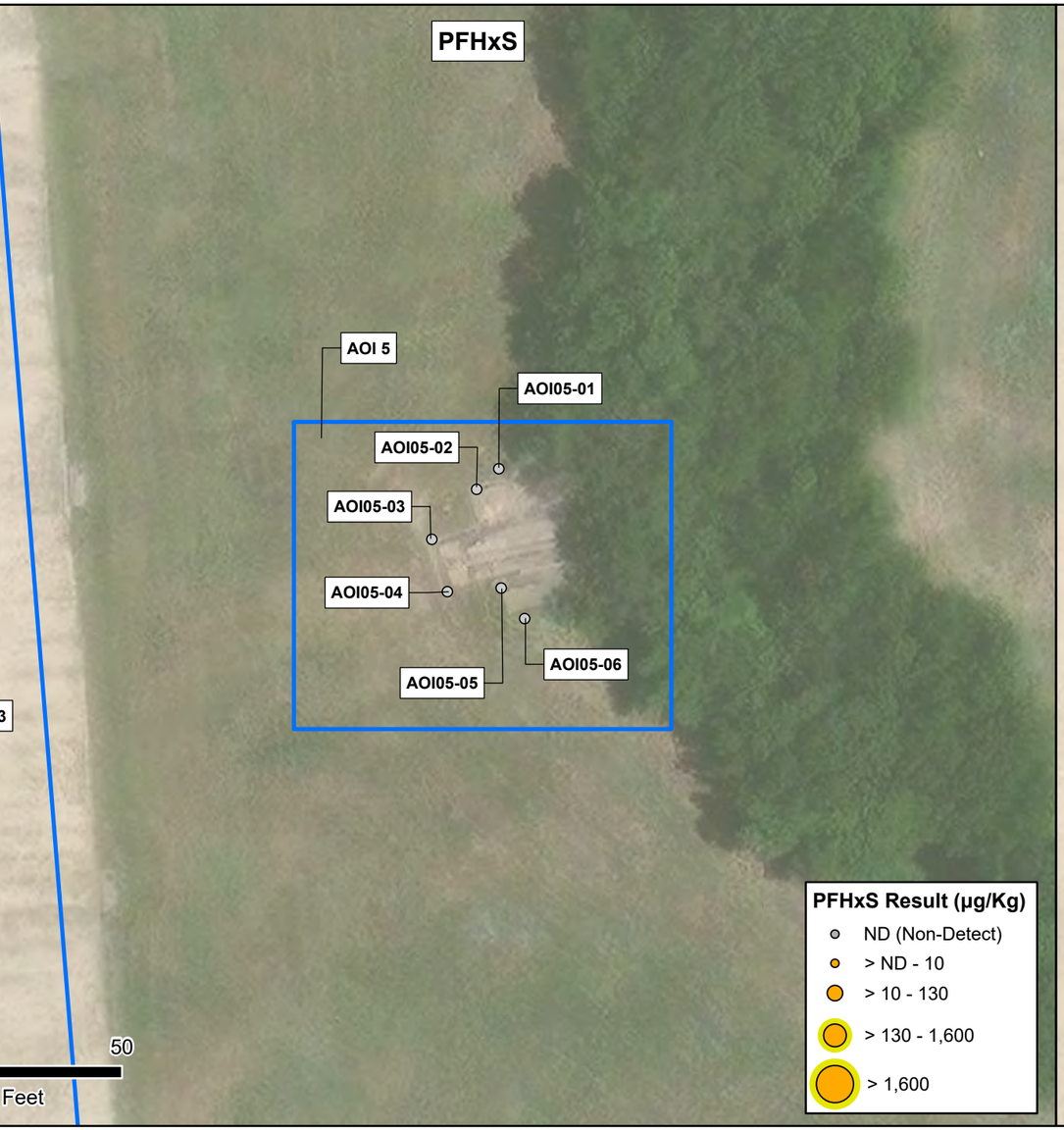
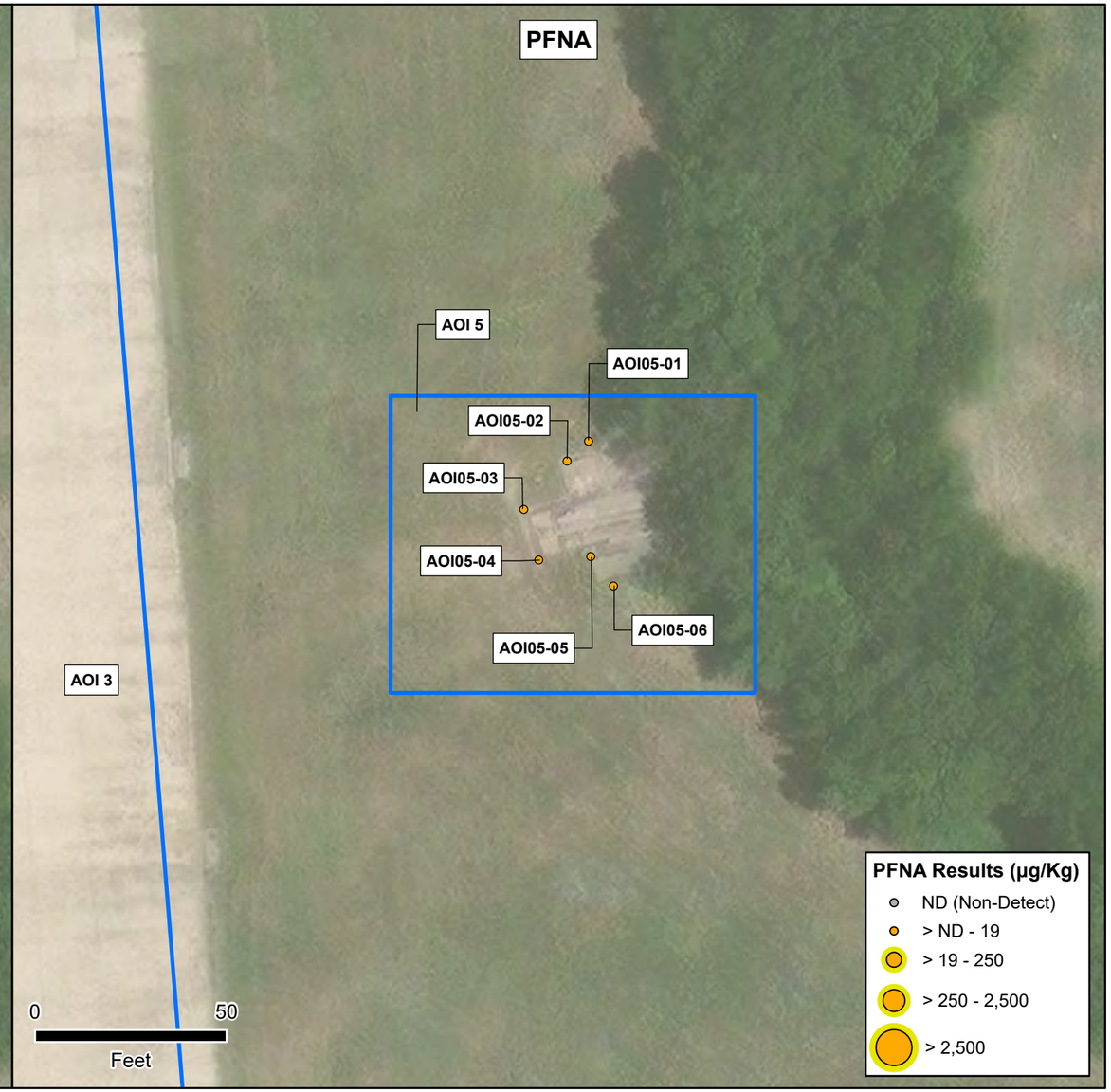
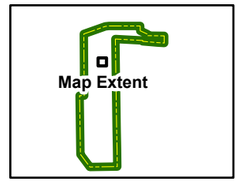
Saginaw Facility, Texas

Figure 6-23
AOI 5
PFHxS and PFNA Detections in Soil







Facility Data

Facility Boundary

Area of Interest

* Surface soil samples 0-2 feet below ground surface (ft bgs)

Notes:
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
Exceedances of the OSD SL are depicted with a yellow halo. Depth intervals shown represent respective sampling position within a given soil boring location.

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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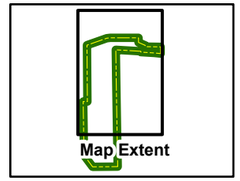
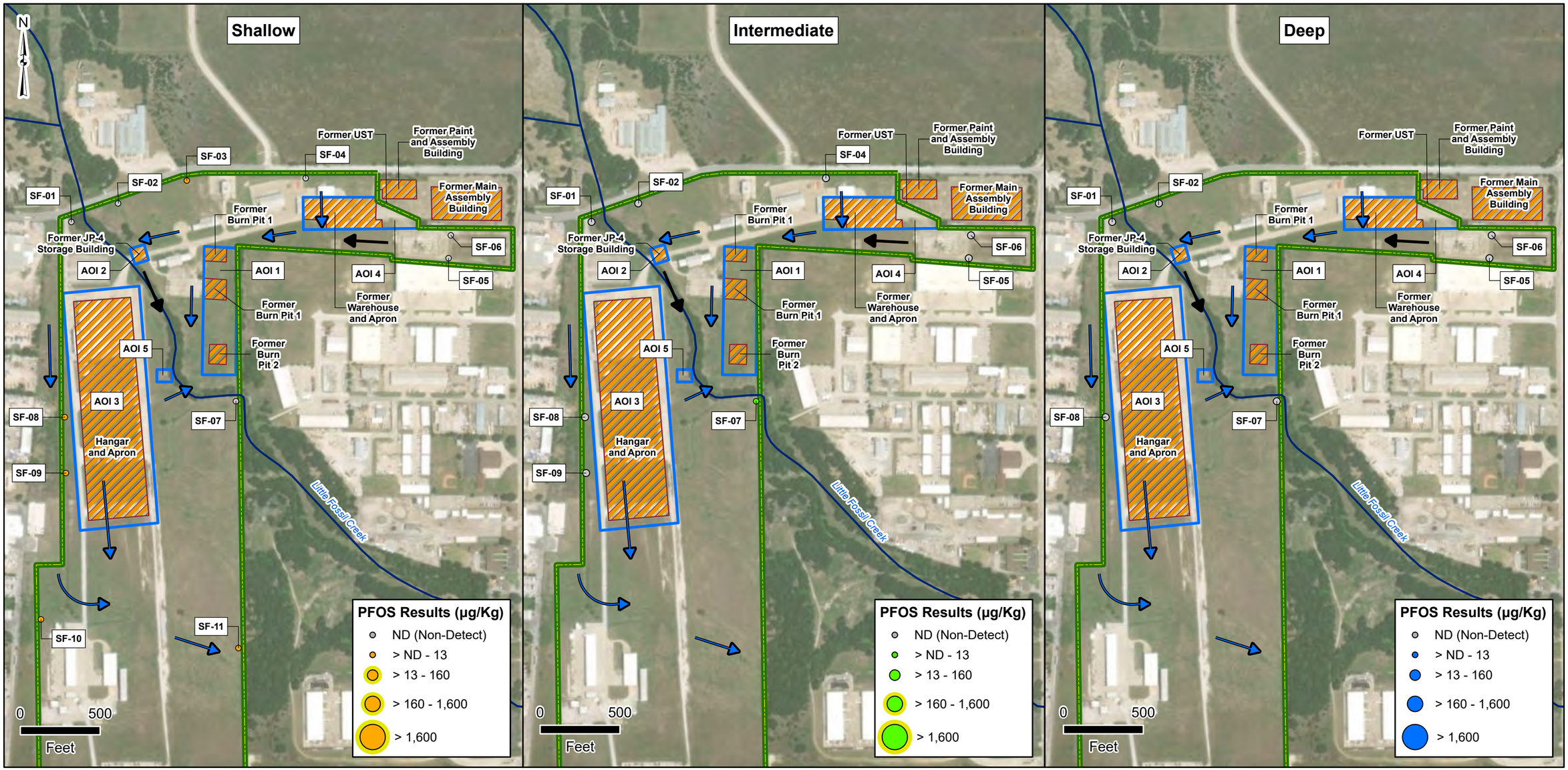
Army National Guard Site Inspections
Site Inspection Report
Saginaw Facility, Texas

Figure 6-24
Facility Boundary Samples
PFOS Detections in Soil





Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-9 ft bgs

Deep = 8-16 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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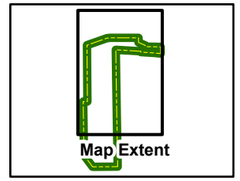
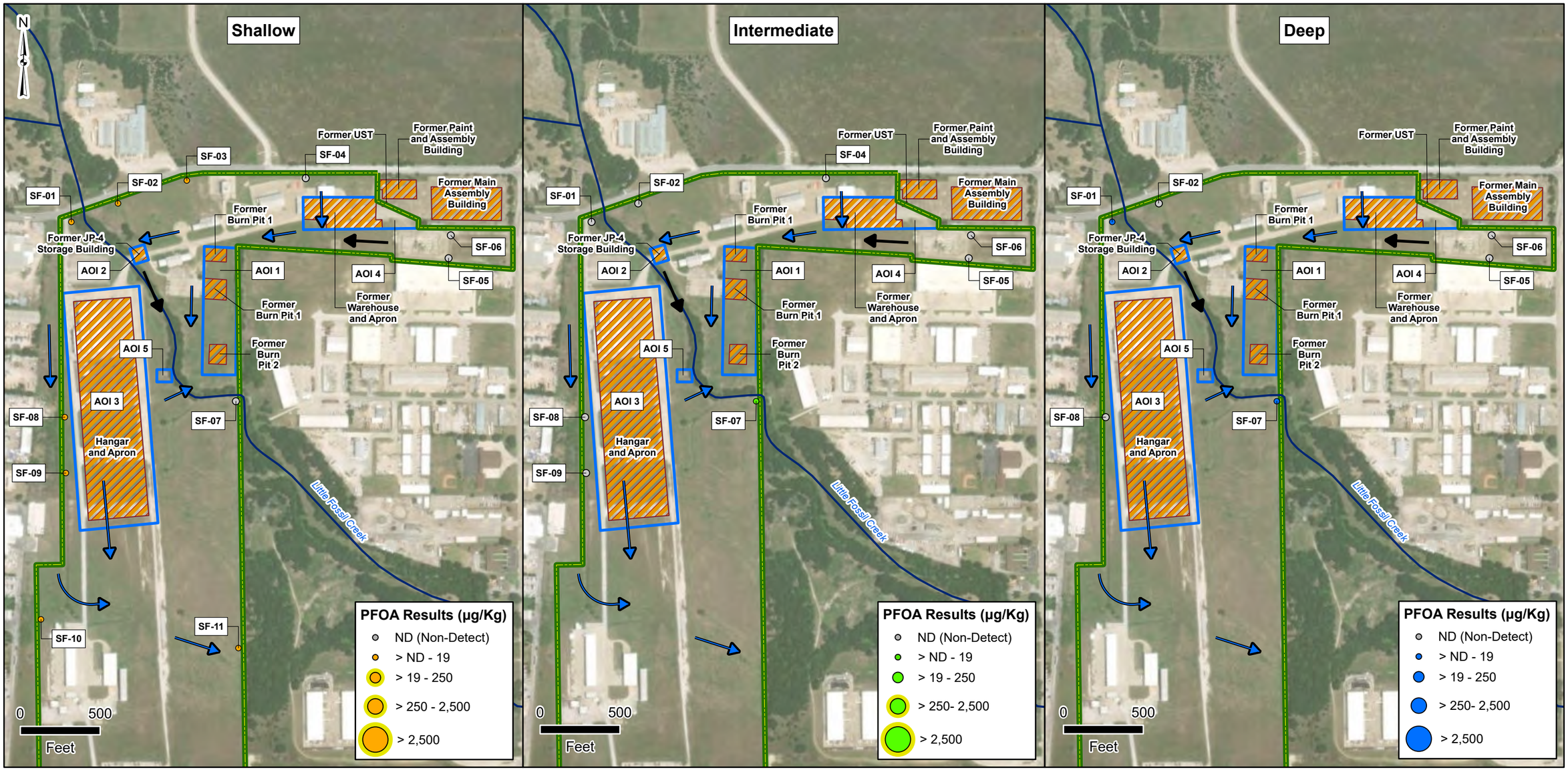
Army National Guard Site Inspections
Site Inspection Report
Saginaw Facility, Texas

Figure 6-25
Facility Boundary Samples
PFOA Detections in Soil





Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-9 ft bgs

Deep = 8-16 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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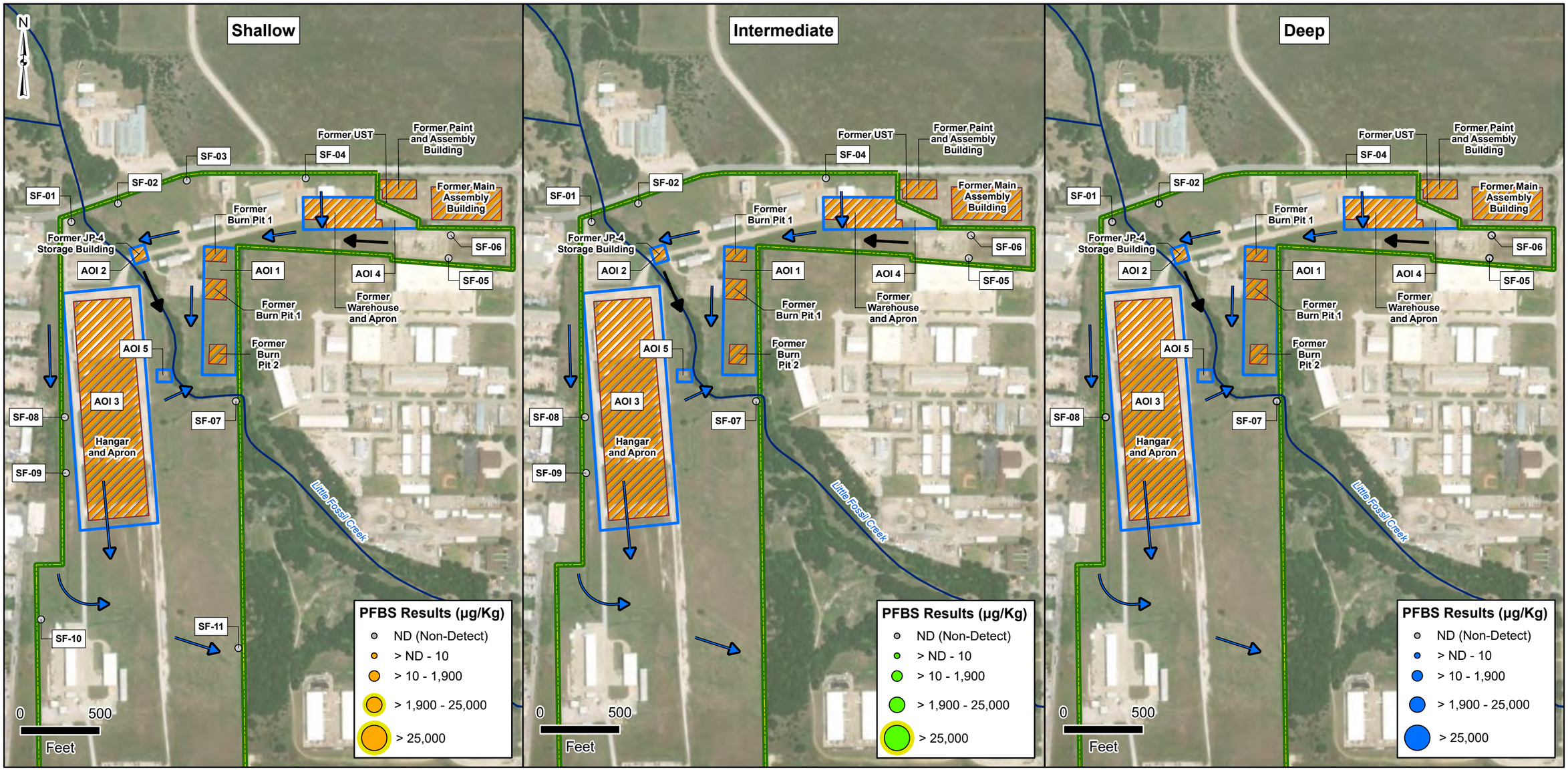
Army National Guard Site Inspections
Site Inspection Report
Saginaw Facility, Texas

Figure 6-26
Facility Boundary Samples
PFBS Detections in Soil



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-9 ft bgs

Deep = 8-16 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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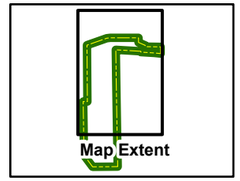
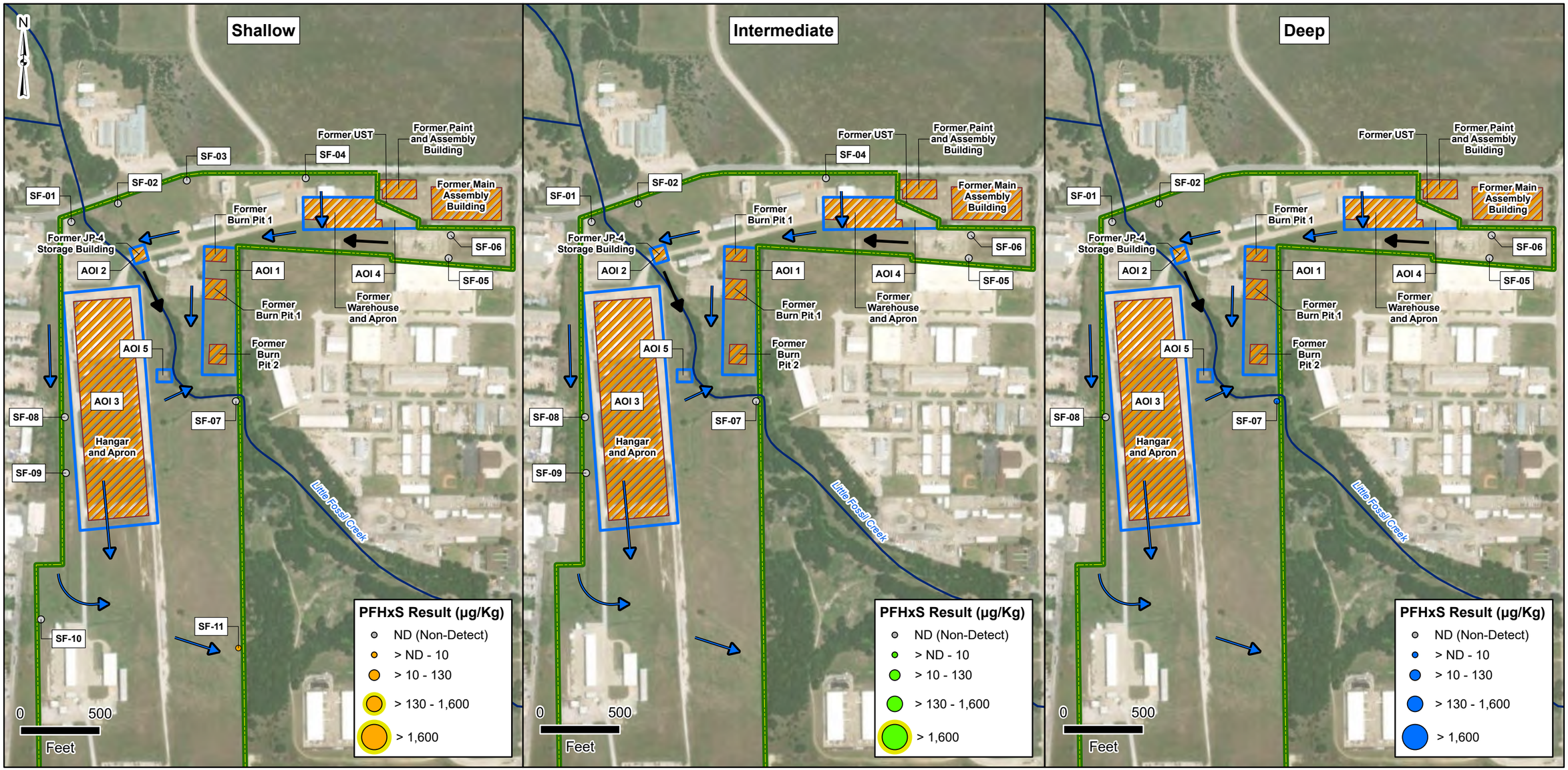
Army National Guard Site Inspections
Site Inspection Report
Saginaw Facility, Texas

Figure 6-27
Facility Boundary Samples
PFHxS Detections in Soil





Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-9 ft bgs

Deep = 8-16 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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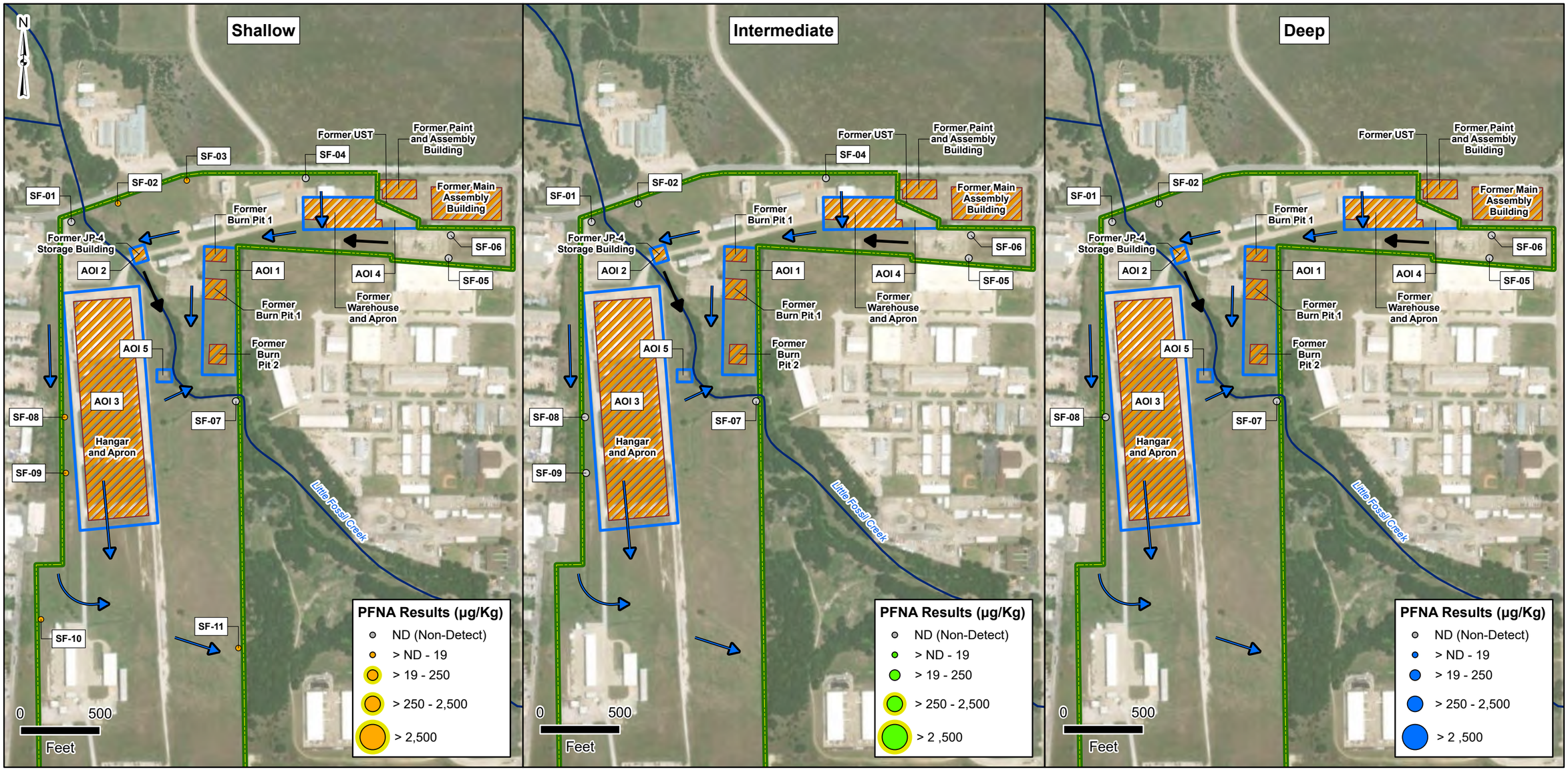
Army National Guard Site Inspections
Site Inspection Report
Saginaw Facility, Texas

Figure 6-28
Facility Boundary Samples
PFNA Detections in Soil



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Shallow = 0-2 feet below ground surface (ft bgs)

Intermediate = 5-9 ft bgs

Deep = 8-16 ft bgs

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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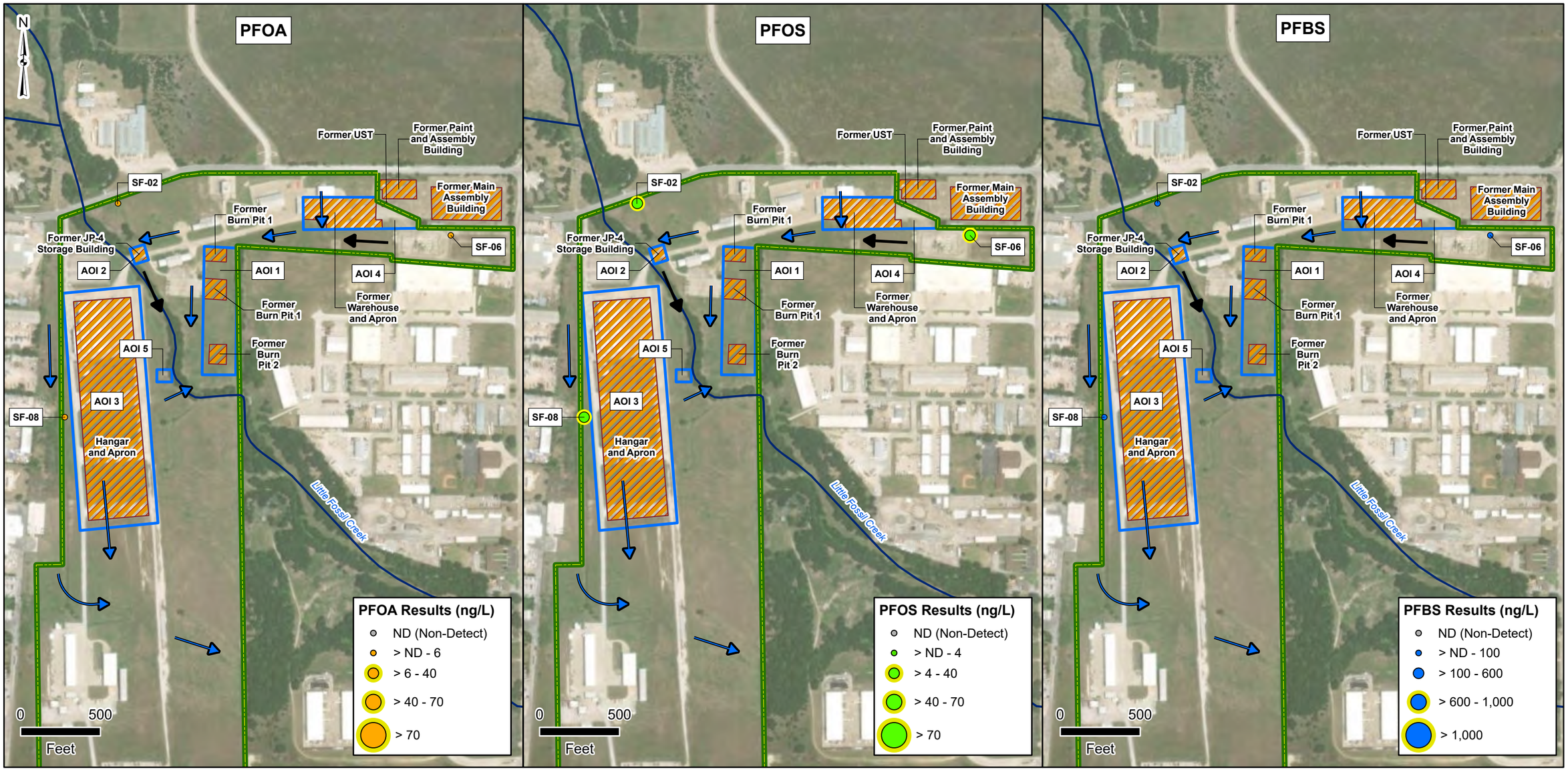
Army National Guard Site Inspections
Site Inspection Report
Saginaw Facility, Texas

Figure 6-29
Facility Boundary Samples
PFOA, PFOS and PFBS Detections in Groundwater



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Note:
PFOA = Perfluorooctanesulfonic acid
PFOS = Perfluorooctanoic acid
PFBS = Perfluorobutanesulfonic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2022
AECOM 2019

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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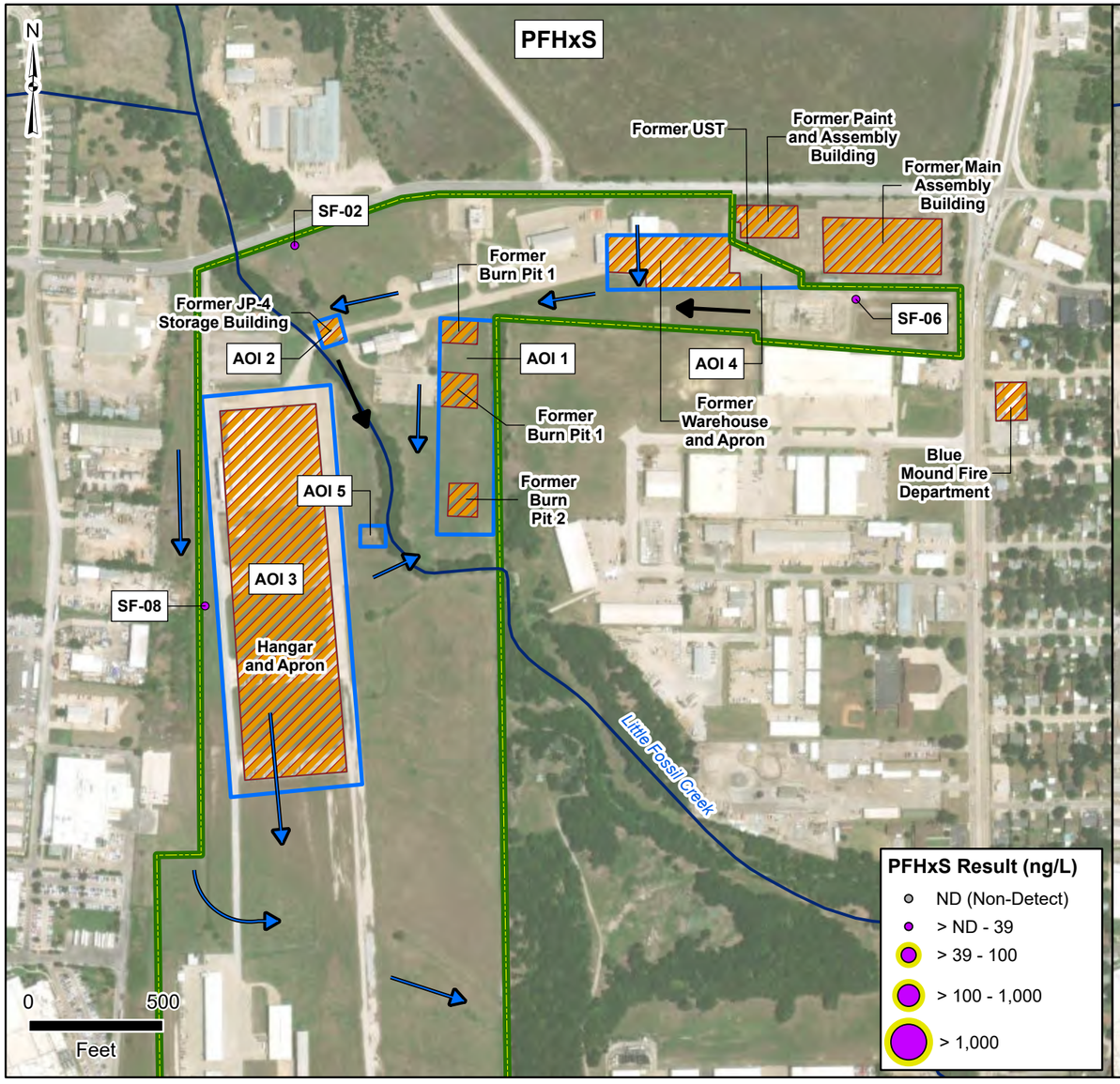
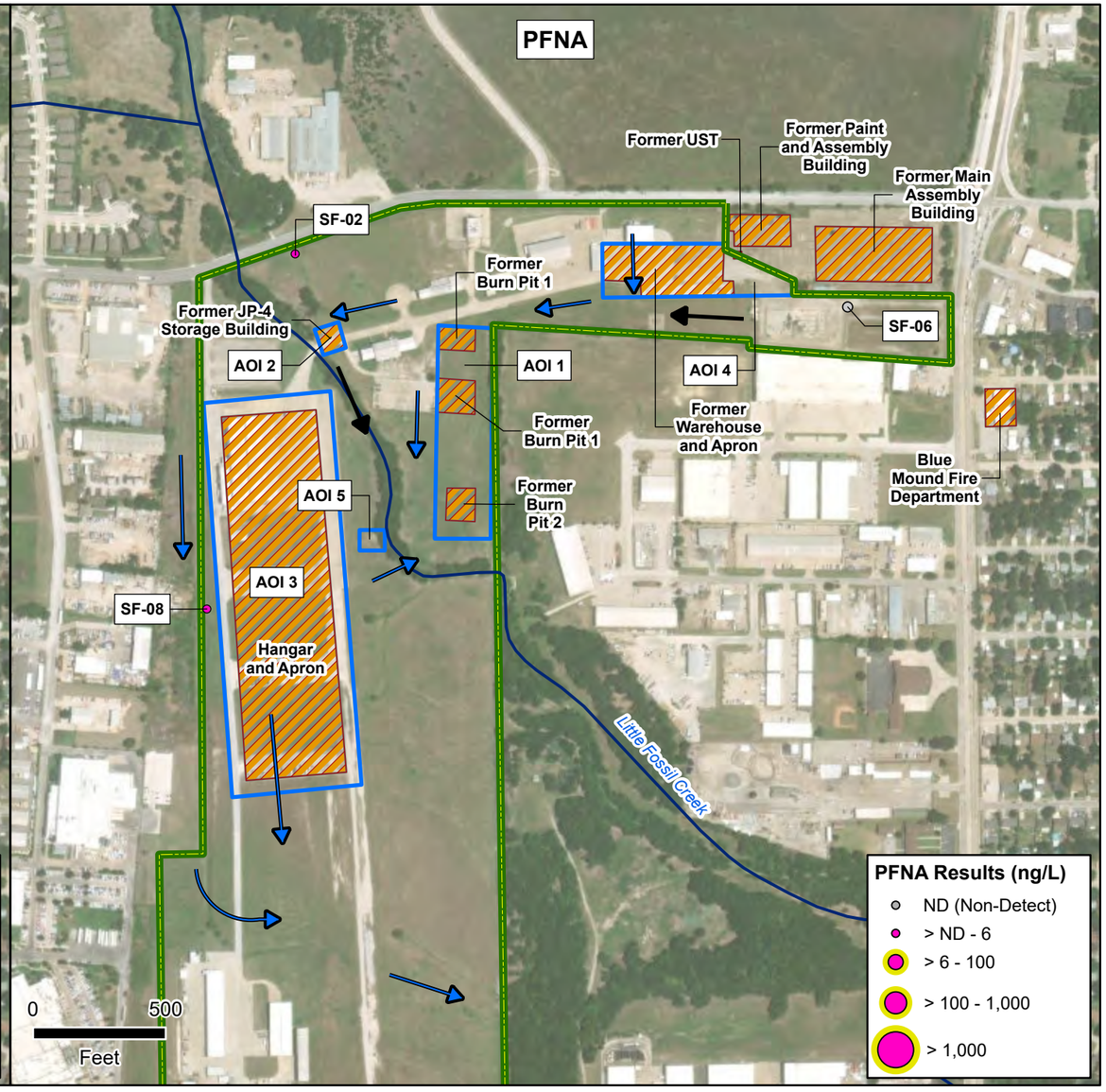
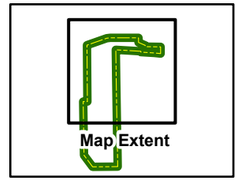
Army National Guard Site Inspections
Site Inspection Report
Saginaw Facility, Texas

Figure 6-30
Facility Boundary Samples
PFHxS and PFNA Detections in Groundwater







Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Little Fossil Creek

Notes:
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2020
AECOM 2020

Date:.....November 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 14N

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7. EXPOSURE PATHWAYS

The CSM for the AOIs, revised based on the SI findings, are presented on **Figures 7-1 through 7-4**. Please note that while the CSM discussions assist 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
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 no identified complete pathway generally warrant NFA. 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., staff and visiting soldiers), construction workers, trespassers (though unlikely due to restricted access), off-facility recreational users and residents.

7.1 SOIL EXPOSURE PATHWAY

The SI results for soil were used to determine whether a potentially complete pathway exists between the source and potential receptors at each AOI (AOIs 1 through 5) based on the aforementioned criteria. AOIs 1, 2, 3, 4, and 5 are the Former Burn Pits, the Former JP-4 Storage Building, the Hangar and Apron, the Former Warehouse and Apron and former UST, and the Former Helicopter Tie-Down Area, respectively. Discussion for AOIs 1 and 2 will be combined due to their location proximity, pathways, and data results and have a singular CSM figure. AOIs

3, 4, and 5, although having similar pathways, will be treated individually with separate soil exposure discussions due to the observed differing soil results.

7.1.1 AOIs 1 and 2

AOI 1 comprises the Former Burn Pits, where Bell Helicopter-Textron performed controlled burns with known and unknown materials between 1957 and 1963. The Former JP-4 Storage Building at AOI 2 is roughly 200 ft west-northwest of AOI 1. Little is known concerning the activities; however, Bell Helicopter-Textron stored petroleum products in an undetermined number of USTs.

PFOS was detected in surface soil at concentrations above the SL in both AOI 1 and 2. PFOA and PFHxS were detected in surface soils associated with AOIs 1 and 2 at concentrations below their respective SLs. Upgradient boundary locations SF-01 through SF-03 had detections of PFOA, PFOS, and PFNA below their respective SLs in surface soils. Trespassers, site workers, and future construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust particles. Therefore, the surface soil exposure pathways for these receptors are considered potentially complete. PFOA, PFOS, and PFHxS were detected in subsurface soils in AOIs 1 and 2 between 4–14 ft bgs, below their respective SLs. Ground disturbing activities to these areas could result in future construction worker exposure. Therefore, the exposure pathways for subsurface soil are considered potentially complete for the future construction worker. The CSM is presented in **Figure 7-1**.

7.1.2 AOI 3

AOI 3 is the Hangar and Apron located on the western portion of the Facility, between the fence line and Little Fossil Creek.

PFOS was detected in AOI 3 surface soil at concentrations above the SL. PFOA, PFNA, and PFHxS were detected in surface soil at AOI 3 at concentrations below their respective SLs. Upgradient boundary locations SF-01 through SF-03, and downgradient boundary locations SF-07 through SF-11, had detections of one or more PFAS relevant compounds in surface soils including PFOA, PFOS, and PFNA below their respective SLs. Trespassers, site workers, and future construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust particles. Therefore, the surface soil exposure pathways for these receptors are considered potentially complete. There were no detections of PFAS relevant compounds in subsurface soil at AOI 3 (downgradient boundary location SF-07 had a detection of PFOA and PFOS below respective SLs), however subsurface soil samples could not be collected at AOI03-01 through AOI03-03 where relevant compounds were detected with one detection in excess of the screening level. Therefore, the exposure pathway for subsurface soil is considered potentially complete for the future construction worker. The CSM is presented in **Figure 7-2**.

7.1.3 AOI 4

AOI 4 comprises the Former Warehouse, Apron, and former UST located in the northeastern portion of the Facility.

PFOA, PFOS, PFHxS were detected in surface soils at AOI 4 at concentrations below their respective SLs. Upgradient boundary locations SF-04 through SF-06 had no detections of relevant compounds in surface soils. Trespassers, site workers, and construction workers could contact constituents in AOI 4 surface soil via incidental ingestion and inhalation of dust particles. Therefore, the surface soil exposure pathways for these receptors are considered potentially complete. There were no detections of PFAS relevant compounds in shallow or deep subsurface soils at AOI 4, nor in the upgradient boundary locations. Therefore, the exposure pathways for subsurface soil are considered incomplete for future construction workers. The CSM is presented in **Figure 7-3.**

7.1.4 AOI 5

AOI 5 is the Former Helicopter Tie-Down Area located approximately 300 ft centrally-east of AOI 3.

PFOA, PFOS, and PFNA relevant compounds were detected below their respective SLs at all but one location in surface soils at AOI 5; PFOA was not detected at AOI05-04. Trespassers, site workers, and future construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathways for these receptors are considered potentially complete. There were no shallow or deep subsurface samples collected. Therefore, the exposure pathway for subsurface soil cannot be ruled out, and is conservatively considered potentially complete for future construction workers. The CSM is presented in **Figure 7-4.**

7.2 GROUNDWATER EXPOSURE PATHWAY

The SI results for groundwater were used to determine whether a potentially complete pathway exists between the source and potential receptors based on the aforementioned criteria. AOIs 1 and 2 discussion will be combined due to proximity, similar pathways, and exceedances of relevant compounds, and AOIs 3 and 4 will be separated due to additional surface drainage factors. AOI 5 had no temporary wells installed; and thus, had no groundwater samples collected. AOI 5 will be discussed separately.

7.2.1 AOIs 1 and 2

All five relevant compounds – PFOS, PFOA, PFNA, PFHxS, and PFBS – were detected in groundwater within AOIs 1 and 2. PFOA, PFOS, and PFHxS were detected above their respective SLs at one or more locations in AOIs 1 and 2. Further, groundwater was collected from one boundary location, SF-02, which is upgradient to AOIs 1 and 2. SF-02 had detections of all five relevant compounds, with PFOS detected above the SL, indicating the potential for off-facility contamination.

The Facility receives drinking water from the City of Saginaw (which receives water from the City of Fort Worth, which has surface water intakes upgradient to the Facility from the Eagle Mountain Reservoir). Groundwater is not used for any purpose at Saginaw Facility. There is no residential housing on-site, and no private drinking water wells are known to exist within 4 miles of the Facility. Domestic supply wells exist roughly 4 miles upgradient of the Facility, and

industrial supply wells exist off-site and downgradient to the Facility. Therefore, the exposure pathways for shallow groundwater for resident/trespasser and site worker are considered incomplete. However, due to the exceedance of relevant compounds in shallow groundwater occurrences (depth to water was 15 ft bgs or less) at every AOI, exposure to future construction workers could result via ground disturbing and trenching activities. Therefore, the exposure pathway for future construction workers for shallow groundwater is considered potentially complete.

The CSM for AOIs 1 and 2 are presented on **Figure 7-1.**

7.2.2 AOI 3

All five relevant compounds – PFOS, PFOA, PFNA, PFHxS, and PFBS – were detected in groundwater within AOI 3. PFOA and PFOS were detected above their respective SLs at every sampled AOI 3 location, with PFHxS additionally detected above the SL at one AOI 3 location. Further, groundwater was collected from one boundary location, SF-08, located downgradient to AOI 3 on its western boundary. SF-08 had all five relevant compounds detected, with an exceedance for PFOS. Saginaw Facility workers stated that the western AOI 3 boundary locations, SF-08 through SF-10, are locations where surface water runoff and drainage flowed both on and off-facility, creating the potential for off-facility sources making their way onto the Facility.

The pathways to receptors discussed in **Section 7.2.1** are the same for AOI 3. Therefore, the exposure pathways for shallow groundwater are considered potentially complete for future construction workers and are considered incomplete for resident/trespasser and site worker.

The CSM for AOI 3 is presented on **Figure 7-2**.

7.2.3 AOI 4

All five relevant compounds – PFOS, PFOA, PFNA, PFHxS, and PFBS – were detected in groundwater within AOI 4, with PFOA and PFOS detected above respective SLs. Groundwater was also collected from boundary location SF-06, upgradient to AOI 4. PFOS exceeded the SL in SF-6, with PFOA, PFHxS, and PFBS detected below respective SLs, indicating the potential for off-facility contamination.

The pathways to receptors discussed in **Section 7.2.1** are the same for AOI 4. Therefore, the exposure pathways for shallow groundwater are considered potentially complete for future construction workers and are considered incomplete for resident/trespasser and site worker.

The CSM for AOI 4 is presented on **Figure 7-3**.

7.2.4 AOI 5

Groundwater was not collected at AOI 5 during the SI. However, since PFOA, PFOS, and PFNA were detected in surface soil, these compounds may be present in the groundwater at AOI 5 due to leaching. Therefore, the exposure pathway for future construction workers is conservatively

considered potentially complete, and incomplete for all other receptors for the reasons discussed in 7.2.1. The CSM is presented on **Figure 7-4**.

7.3 SURFACE WATER AND SEDIMENT EXPOSURE PATHWAY

Surface water and sediment were not sampled as part of this SI. Relevant compounds were detected in surface soil in all AOIs. Impacted surface soil may be subject to leaching or surface water transport through the facility's stormwater system, which uses open swales, ditches, and graded areas to direct storm water to Little Fossil Creek at multiple locations on the Facility.

Little Fossil Creek flows through and bisects the Facility before merging with Big Fossil Creek approximately 8 miles downstream from the Facility. Their combined waters enter the West Fork of the Trinity River 0.5 miles later. Both the West Fork of the Trinity River and Big Fossil Creek are used for fishing, swimming, and other recreation.

Boundary locations SF-06 and SF-08, as well as AOI04-01 had exceedances in groundwater at locations that flow directly downgradient off-site. Groundwater contour maps, and the subsequent soil detections in downgradient boundary locations SF-11 and SF-07, corroborate surface flow and potential groundwater discharge to Little Fossil Creek. Based on the presence of relevant compounds in surface soil at all AOIs, and the soluble and mobile nature of PFAS, it is possible that the Ingestion exposure pathway for surface water and sediment is considered potentially complete for site workers and recreational and off-facility residents who use the downgradient water bodies, as well as future construction workers who perform ground disturbing activities within the Little Fossil Creek and/or the Facility drainage features. The CSMs are presented on **Figures 7-1 through 7-4**.

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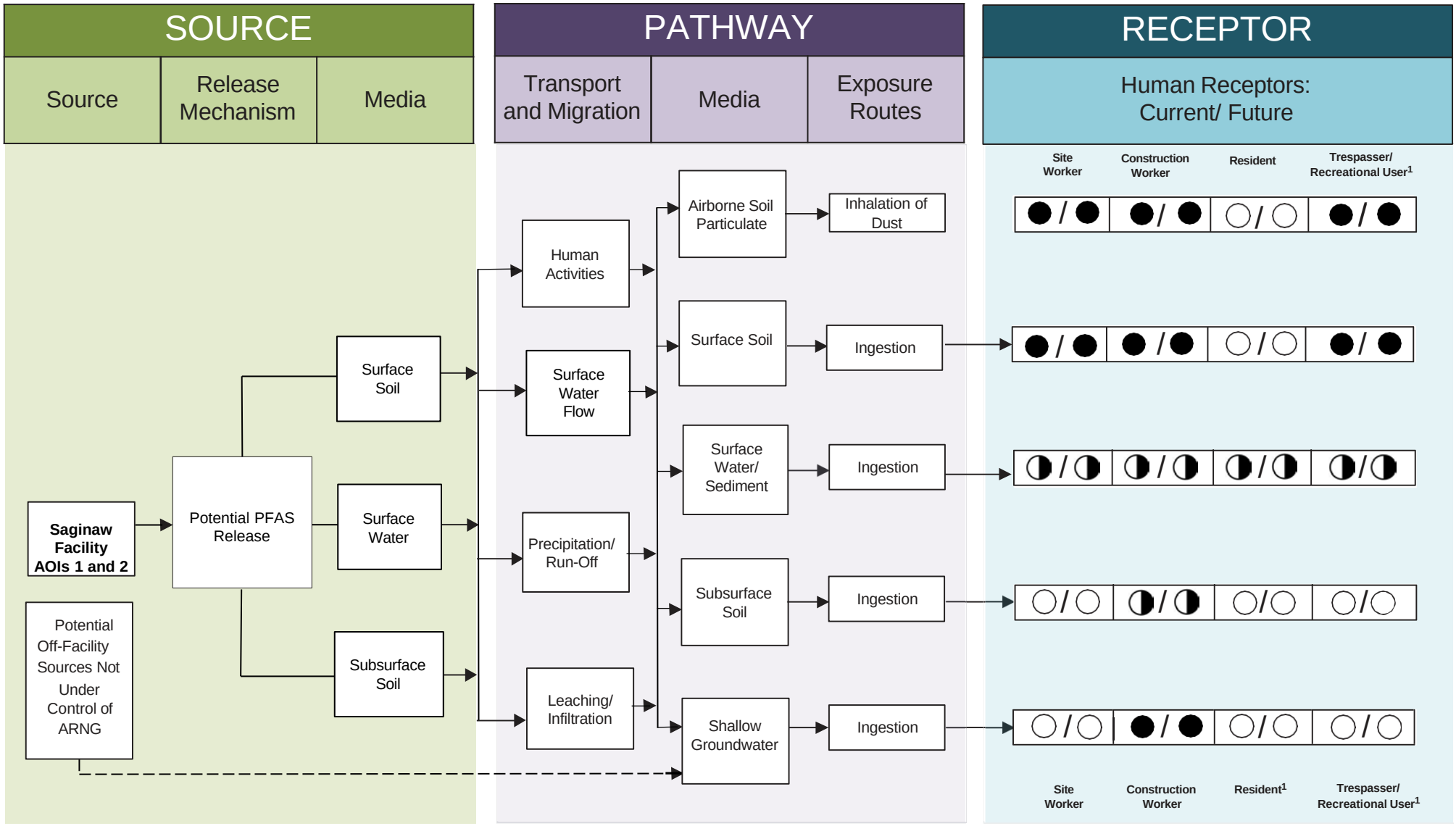

NOTES

1. The resident and recreational users refer to off-site receptors.

LEGEND

- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway with no Exceedances of Screening Levels
- Potentially Complete Pathway with Exceedance of Screening Levels

Figure 7-1
Conceptual Site Model
Saginaw Facility AOIs 1 and 2

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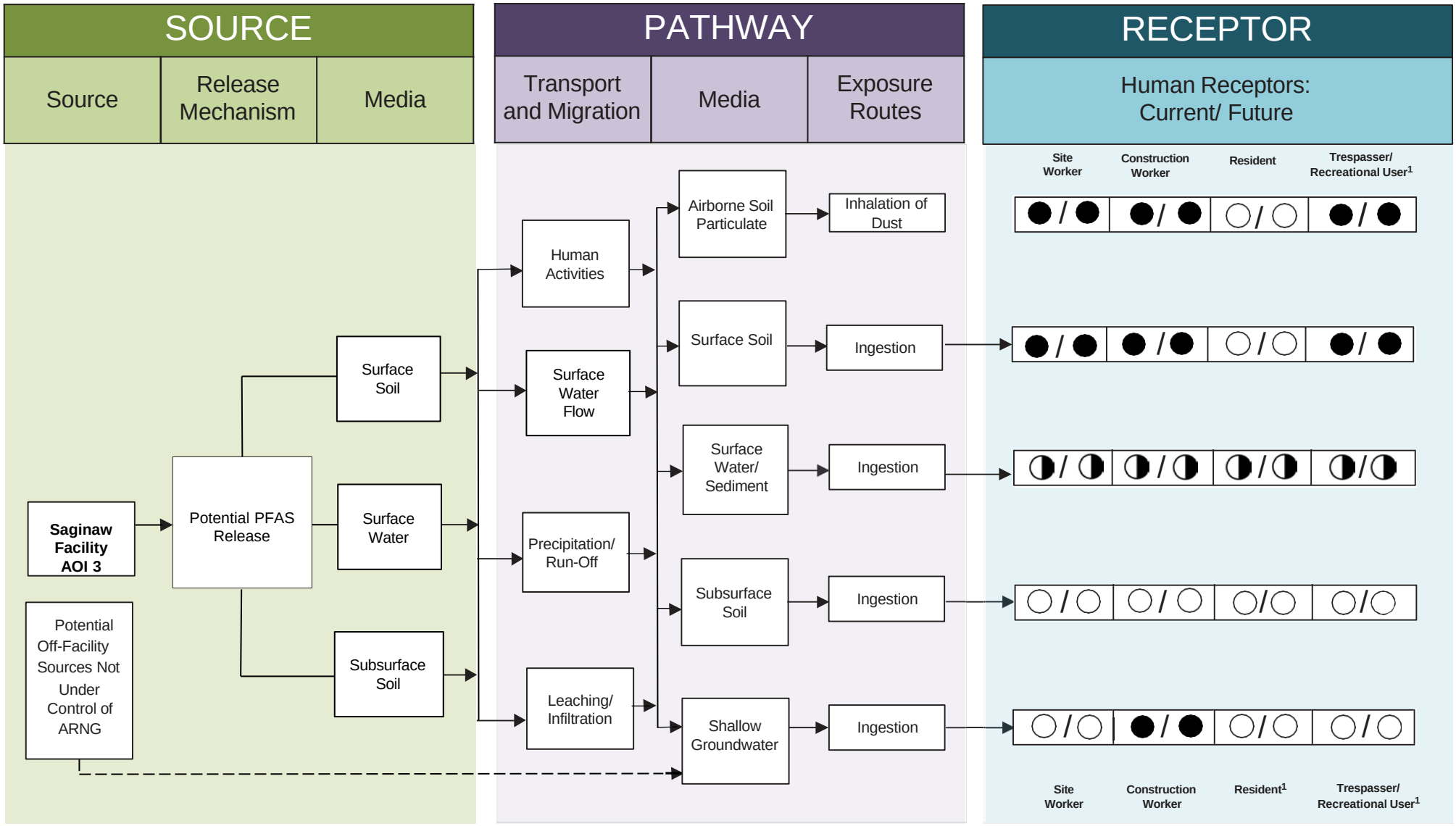

NOTES

1. The resident and recreational users refer to off-site receptors.

LEGEND

- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway with no Exceedances of Screening Levels
- Potentially Complete Pathway with Exceedance of Screening Levels

Figure 7-2
Conceptual Site Model
Saginaw Facility AOI 3

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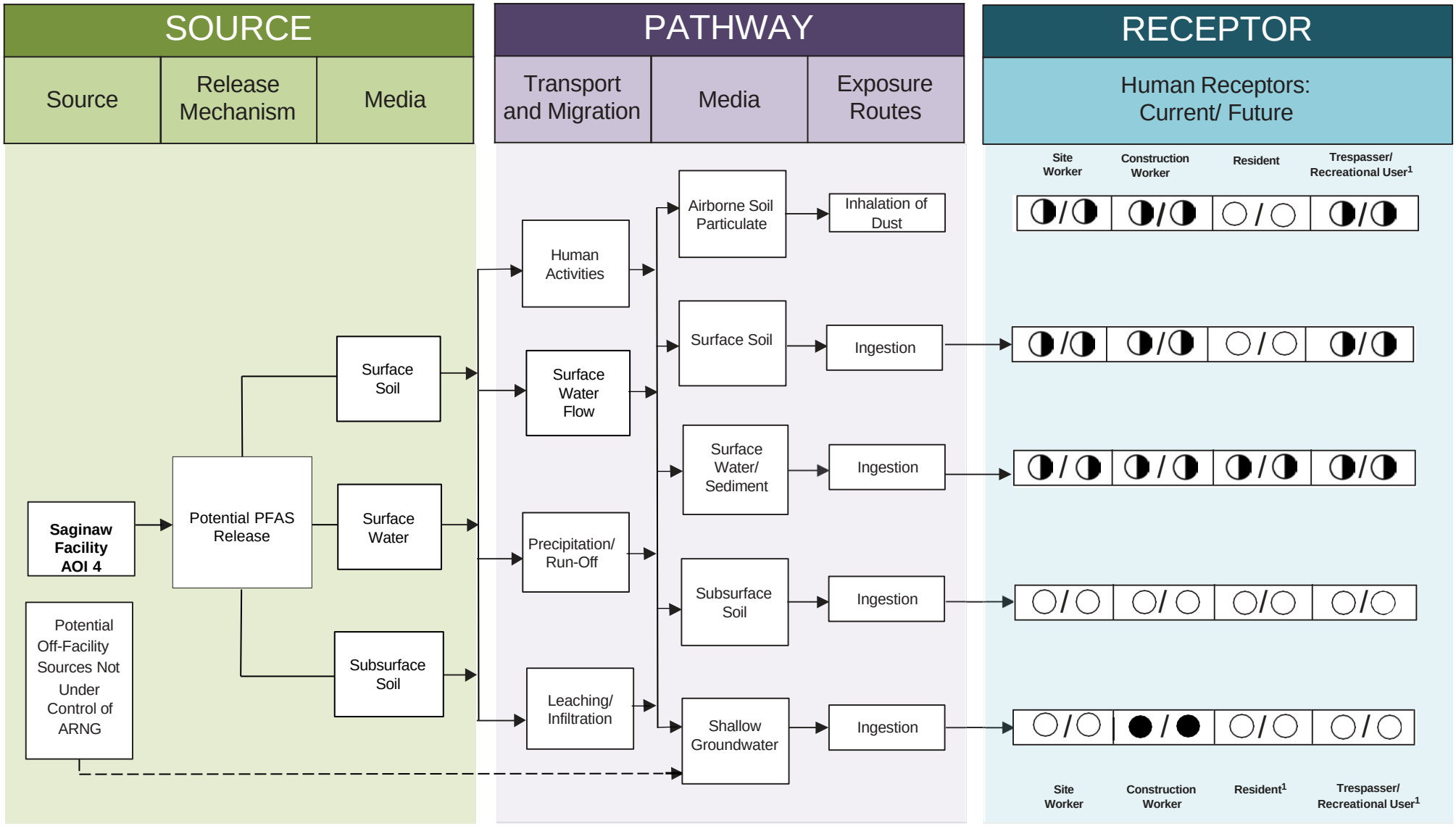

NOTES

1. The resident and recreational users refer to off-site receptors.

LEGEND

- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway with no Exceedances of Screening Levels
- Potentially Complete Pathway with Exceedance of Screening Levels

Figure 7-3
Conceptual Site Model
Saginaw Facility AOI 4

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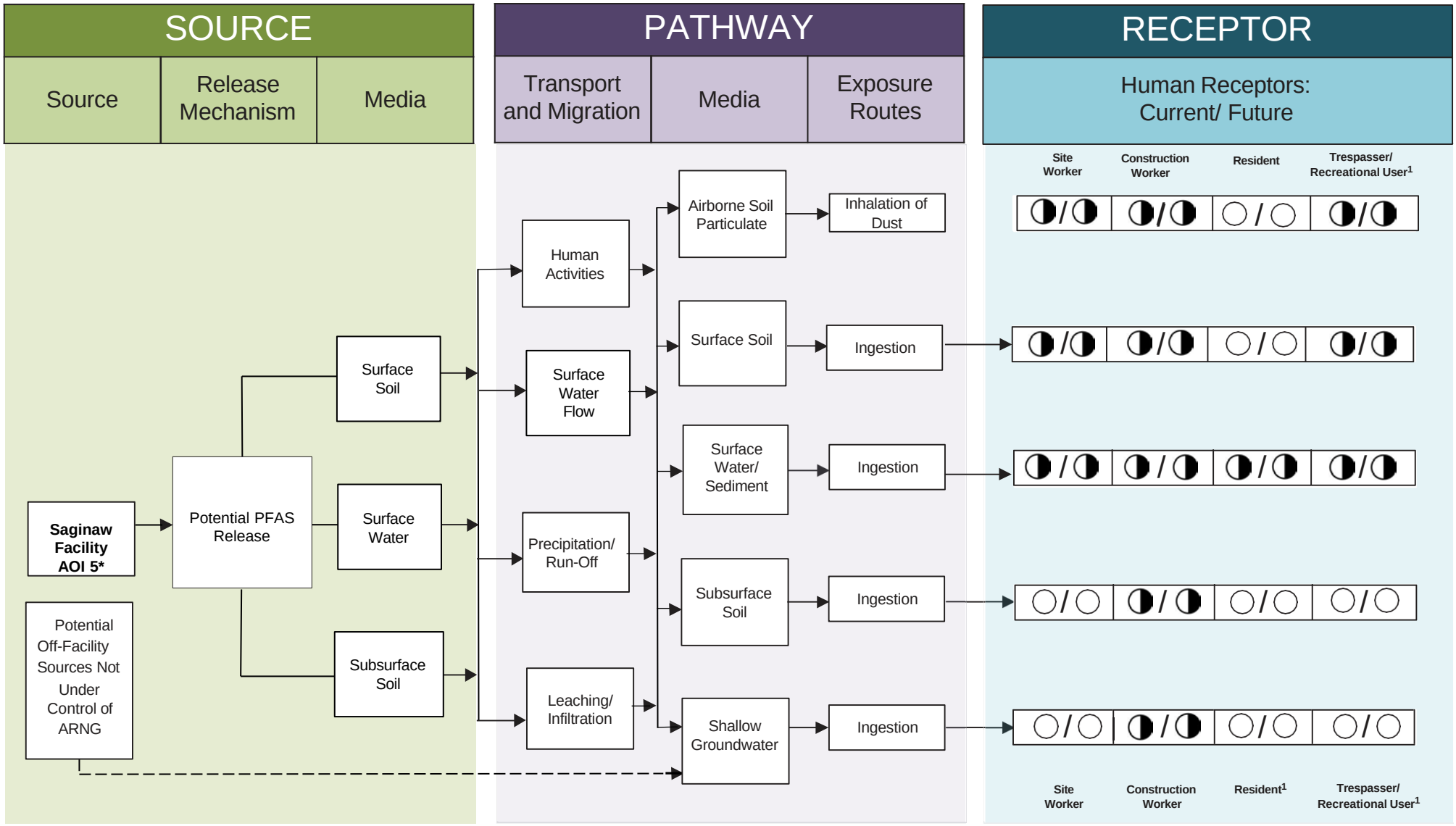

LEGEND

- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway with no Exceedances of Screening Levels
- Potentially Complete Pathway with Exceedance of Screening Levels

NOTES

1. The resident and recreational users refer to off-site receptors.

* No groundwater collected at AOI 5

Figure 7-4
Conceptual Site Model
Saginaw Facility AOI 5

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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 SITE INSPECTION ACTIVITIES

The SI field activities at the Facility were conducted from 17 to 27 July 2023. The SI field activities included soil sample collection, temporary monitoring well installation, grab groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI UFP-QAPP Addendum (EA 2023a), except as previously noted in **Section 5.8**.

To fulfill the project DQOs set forth in the approved SI UFP-QAPP Addendum (EA 2023a), samples were collected and analyzed for a subset of PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 as follows:

- Seventy-One (71) soil samples from seventeen (17) primary locations, six (6) secondary surface soil-only locations, and eleven (11) boundary locations
- Fourteen (14) grab groundwater samples from 18 temporary well locations (4 locations did not produce groundwater)
- Twenty-Seven (27) quality assurance/quality control 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 under CERCLA is warranted in an RI for AOIs 1, 2, 3, and 4. No further action is recommended for AOI 5. Based on the CSMs developed and revised with the SI findings, there is potential for exposure to trespassers, site workers, future construction workers and surface water recreationists from releases of PFAS-containing materials likely the result of historical DOD contractors' activities at the Facility. Sample chemical analytical concentrations collected during this SI were compared against the project SLs in soil and groundwater, as described in **Table 6-1**.

It is further recommended that the RI for PFAS-containing materials and the ongoing, separate action addressing TCE and 1,1-DCE be combined in a single action under CERCLA that

encompasses PFAS, TCE, and 1,1-DCE contamination at the Saginaw Facility. Based on the results of this SI and those of the separate TCE and 1,1-DCE investigation, the contamination is likely comingled. Such a combined effort will ensure adequate protectiveness of human and ecological health and will aid in evaluating restoration approaches.

A summary of the results of the SI data relative to SLs is as follows:

- AOI 1:
  - PFOA, PFOS, and PFHxS were detected in surface soil samples, with PFOA exceeding the SL with a maximum concentration of 36 µg/kg.
  - PFOA, PFOS, and PFHxS were detected in subsurface soil samples below SLs at AOI 1.
  - Five relevant compounds were detected in groundwater within AOI 1 at four locations. PFOA, PFOS, and PFHxS were detected above their respective SLs with maximum concentrations of 1000, 360, and 340 ng/L, respectively.
  - Based on the results of this SI, further evaluation is warranted in a Remedial Investigation.
- AOI 2:
  - PFOA, PFOS, and PFHxS were detected in surface soil at one location within AOI 2. PFOS exceeded the SL with a maximum concentration of 19 µg/kg.
  - PFOA, PFOS, and PFHxS were detected in subsurface soil samples below SLs at AOI 2.
  - Five relevant compounds were detected in groundwater within AOI 2 at one or more locations. PFOS was detected above the SL at every AOI 2 location with a maximum concentration of 18 ng/L.
  - Based on the results of this SI, further evaluation is warranted in a Remedial Investigation.
- AOI 3:
  - PFOA, PFOS, PFNA, and PFHxS were detected in surface soil at AOI 3 in one or more locations. PFOS was detected above the SL at one location with a concentration of 37 µg/kg.
  - No relevant compounds were detected in subsurface soil at AOI 3.

- — Five relevant compounds were detected in groundwater at the two sampled locations within AOI 3. PFOA and PFOS were detected at concentrations above their respective SLs with maximum concentrations of 12 and 12ng/L, respectively, and PFNA was detected above the SL in one location with a concentration of 6.6 ng/L.

- — Based on the results of this SI, further evaluation is warranted in a Remedial Investigation.

- AOI 4:

  - — PFOA, PFOS, and PFHxS were detected in surface soil at AOI 4. No PFAS relevant compounds were detected in subsurface soil. No exceedances above SL criteria were detected.

  - — Five relevant compounds were detected in groundwater within AOI 4 at both sampled locations. Exceedances for PFOS were seen above the SL in both locations (and the duplicate) with a maximum concentration of 38 ng/L, with PFOS exceeding the SL in one location with a concentration of 26 ng/L.

  - — Based on the results of this SI, further evaluation is warranted in a Remedial Investigation.

- AOI 5:

  - — PFOA, PFOS, and PFNA were detected in surface soil at AOI 5. No subsurface samples were collected at AOI 5. No exceedances for any PFAS relevant compound was detected.

  - — No temporary wells were installed at AOI 5; no groundwater samples were collected.

  - — Based on the results of this SI, no further evaluation is warranted at this time.

- Facility Boundary:

  - — PFOA, PFOS, PFNA, and PFHxS were detected in one or more upgradient and downgradient boundary locations in surface soil below respective SLs.

  - — One upgradient location, SF-01, and one downgradient location, SF-07, had a subsurface detection for PFOS, with PFHxS additionally detected in SF-07 below respective SLs.

  - — Five PFAS relevant compounds were detected in groundwater in the upgradient SF-02 and downgradient SF-08 locations, while PFOS, PFOA, PFHxS, and PFBS were detected in upgradient SF-06 location. All sampled upgradient and downgradient boundary locations had exceedances for PFOS above the SL, with a maximum concentration of 8.4 ng/L. Exceedances of PFOS and detections of other relevant

compounds in groundwater in the upgradient boundary locations may indicate a potential offsite source of PFAS that is impacting groundwater at the Facility.
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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	Former Burn Pits	●	●	●	Proceed to RI
2	Former JP-4 Storage Building	●	●	●	Proceed to RI
3	Hangar and Apon	●	●	●	Proceed to RI
4	Former Warehouse, Apron, and Former UST	◐	●	●	Proceed to RI
5	Former Helicopter Tie-Down Area	◐	Not sampled	Not sampled	No Further Action
N/A	Boundary Areas	◐	●	●	Proceed to RI

Legend:
● = Detected; exceedance of SLs
◐ = Detected; no exceedance of SLs
○ = Not detected
N/A = Not applicable
JP-4 = Jet propulsion fuel (Grade 4)
NFA = No Further Action

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