Final
Site Inspection Report
Camp Dawson
Kingwood, West Virginia

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

October 2023

Prepared for:

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

UNCLASSIFIED

This page intentionally left blank

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

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
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
DLA	Department of Logistics Agency
DoD	Department of Defense
DPT	Direct-push technology
DQO	Data quality objective
DRMO	Defense Reutilization and Marketing Office
DUA	Data Usability Assessment
EA	EA Engineering, Science, and Technology, Inc., PBC
EB	Equipment blank
EIS	Extraction internal standard
ELAP	Environmental Laboratory Accreditation Program
EM	Engineer Manual
FedEx	Federal Express
ft	Foot (feet)
gal	Gallon(s)
HDPE	High-density polyethylene
HFPO-DA	Hexafluoropropylene oxide dimer acid
ID	Identification
IDW	Investigation-derived waste
in.	Inch(es)
ITRC	Interstate Technology Regulatory Council

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

LC/MS/MS	Liquid chromatography tandem mass spectrometry
mg/kg	Microgram(s) per kilogram
MS	Matrix spike
MSD	Matrix spike duplicate
ND	Non-detect
ng/L	Nanogram(s) per liter
No.	Number
OSD	Office of the Secretary of Defense
PA	Preliminary Assessment
PFAS	Per- and polyfluoroalkyl substances
PFBS	Perfluorobutanesulfonic acid
PFHxS	Perfluorohexanesulfonic acid
PFNA	Perfluorononanoic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PID	Photoionization detector
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
QSM	Quality Systems Manual
RI	Remedial investigation
SI	Site inspection
SL	Screening level
TOC	Total organic carbon
TPP	Technical Project Planning
UFP	Uniform Federal Policy
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
WVARNG	West Virginia Army National Guard
WTP	Water Treatment Plant
ZCC	Zone of Critical Concern

This page intentionally left blank

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), and 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 seven Areas of Interest (AOIs) where PFAS-containing materials may have been used, stored, disposed, or released historically (see **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 is required based on a comparison of SI results to SLs for the relevant compounds. This SI was completed at the Camp Dawson Facility in Kingwood, West Virginia, and determined further evaluation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is warranted for AOIs 1, 2, 3, 4, 5, and 7. Camp Dawson is also referred to as the "Facility" throughout this document.

Camp Dawson, operated by the West Virginia ARNG (WVARNG), encompasses over 4,100 acres in Kingwood, West Virginia, within Preston County. The Facility is composed of multiple distinct tracts and is utilized as a year-round tactical training facility for the WVARNG, various other state National Guard units, the Reserve Officers Training Corps, and other active reserve units. Camp Dawson lies on the western edge of the Briery Mountains and the Cheat River runs directly through the Camp Dawson Training Site, with Camp Dawson Proper to the southeast and the Volkstone Tract to the northwest (AECOM Technical Services, Inc. 2020).

The PA identified seven AOIs for investigation during the SI phase. 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, 2, 3, 4, 5, and 7.

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

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

Analyte[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 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.

µg/kg = Microgram(s) per kilogram
ng/L = Nanogram(s) per liter
bgs = below ground surface
ft = 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	Wash Pad Fire Training Area	●	●	◐	Proceed to RI
2	Stalls 17/16	◐	●	◐	Proceed to RI
3	Former Manganese Plant	◐	●	◐	Proceed to RI
4	Army Airfield	◐	●	●	Proceed to RI
5	Flightline Parking Pad	○	●	◐	Proceed to RI
6	Fuel Farm Shed	◐	◐	◐	No Further Action
7	Vance Building	○	●	◐	Proceed to RI

Legend:
● = Detected; exceedance of SLs
◐ = Detected; no exceedance of SLs
○ = Not detected

1. INTRODUCTION

1.1 PROJECT AUTHORIZATION

The Army National Guard (ARNG) G-9 is the lead agency in performing Preliminary Assessments (PAs) and Site Inspections (SIs) 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 Camp Dawson in Kingwood, West Virginia. Camp Dawson 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 Camp Dawson (AECOM Technical Services, Inc. [AECOM] 2020) that identified seven Areas of Interest (AOIs) where PFAS-containing materials were used, stored, disposed, or released historically. The objective of the SI is to identify whether there has been a release to the environment from the AOIs identified in the PA and determine whether further investigation is warranted, a removal action is required to address immediate threats, or no further action is required based on screening levels (SLs) for the relevant compounds.

[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.

This page intentionally left blank

2. FACILITY BACKGROUND

2.1 FACILITY LOCATION AND DESCRIPTION

The Camp Dawson Army Training Site is in Kingwood, West Virginia, within Preston County, near the Pennsylvania and Maryland borders (**Figure 2-1**). Camp Dawson was established in 1908 as a 196-acre training facility and was utilized for the training of military troops until the start of World War I in 1917. Training activities ceased at Camp Dawson until 1928, when it was re-established as a training site for the West Virginia State Militia. Regular training occurred at Camp Dawson until the beginning of World War II in 1939. At this time, the West Virginia government leased the camp for use as a prisoner of war facility (AECOM 2020).

Since its establishment in 1908, Camp Dawson has acquired additional parcels of land, totaling over 4,100 acres. Camp Dawson consists of multiple distinct tracts. Based on interviews and the Visual Site Inspection, only Camp Dawson Proper and Volkstone Tracts were assessed during this PA. The Facility became a permanent, year-round, training facility for the West Virginia ARNG (WVARNG) and other state National Guard units, U.S. Army, U.S. Marine Corps, U.S. Navy, the Reserve Officers Training Corps, and active reserve units associated with the military in 1985. In 1989, the WVARNG was granted a deed from the State of West Virginia for the permanent use and occupancy of Camp Dawson (AECOM 2020).

Sometime in the 1960s, Camp Dawson constructed an airfield on the right-descending bank just south of the main base, which replaced the original Dawson Army Airfield that was constructed on the left-descending bank of the Cheat River, across from the Camp Dawson base. Historical ownership and use documents were not available for this PA. It is unknown what potential, public, private, or Department of Defense (DoD) agencies used this airfield, or whether PFAS-related activities occurred prior to WVARNG taking ownership in 1989 (AECOM 2020).

Camp Dawson is located amid the rugged Allegheny Mountain range, making it an ideal site for mountain area training. The nearby Mountaineer Challenge Academy provides guidance and military training to at-risk youth. Apart from Camp Dawson, the nearby Mountaineer Challenge Academy, and the Preston Country Club Golf Course, the area around the Facility is largely remote, with few settlements and developments. The Facility is near the City of Kingwood, which has a population of 2,951 residents (AECOM 2020).

2.2 FACILITY ENVIRONMENTAL SETTING

Camp Dawson lies on the western edge of the Briery Mountains, with elevations averaging around 1,880 feet (ft) (**Figure 2-2**). Previously, over 1,150 acres of this mountainous area consisted of the former Briery Mountain Wildlife Management Area, which was established as part of Camp Dawson, owned by the West Virginia State Armory Board. In 2011, a live firing range area was established, which forced the closure of this area (AECOM 2020).

The Volkstone Tract, across the Cheat River, contains a former manganese plant that has been abandoned since 1985. The Volkstone Tract is owned by the Baltimore Army Corps of Engineers, and WVARNG has an indefinite lease on the property. The Volkstone Tract is generally overgrown with wildlife; however, occasional training activities occur at this location.

The remaining areas surrounding Camp Dawson are mostly mountainous, densely forested areas. While Camp Dawson does not currently have recreational facilities, nearby areas surrounding the City of Kingwood and the Cheat River are popular recreational areas for fishing, swimming, whitewater kayaking, and rafting (AECOM 2020).

The following sections include information on geology, hydrogeology, hydrology, climate, and current and future land use. The regional geology and 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 **Figures 2-5 through 2-8**.

2.2.1 Geology

West Virginia is located within the Appalachian Ridge and Valley, with the Facility located within the Appalachian Plateau province. The underlying bedrock consists of sedimentary rock from the Pennsylvanian and Mississippian eras of the Paleozoic. The rock strata include layers of sandstone, shale, bituminous coal beds, and limestone. During the Pennsylvania Era, non-marine sandstone, shale, and coal were deposited in the near-shore environment from sediments derived from mountains (AECOM 2020).

The formation of the Appalachian Mountains changed the landscape with the folding and thrust faulting in the eastern part of the state, which made erosion the primary geological process during the Permian Period. The present mountains of the Appalachian Plateau are ones that were formed from uplift and erosion that occurred 30 to 50 million years ago. The fold geometry varies across the Appalachian Plateau, Valley and Ridge Province, Blue Ridge Mountains, and Piedmont. Chemical and physical erosion of the mountains contributed to sediment in the streams (AECOM 2020).

Preston County is located in the eastern third of West Virginia, bordering Pennsylvania and Maryland. Preston County is situated in the Allegheny Mountain Section, a sub province in the northeast part of the Appalachian Plateau Province. The Facility is located west of the Allegheny Front, the eastern boundary of the Appalachian Plateau. The nearest ridge is Chestnut Ridge Anticline, located west of the facility. Chestnut Ridge Anticline is a symmetrical anticline that is responsible for Chestnut Ridge, a significant topographical feature (AECOM 2020).

Soils primarily composed of fat clays of medium to high plasticity with varying amounts of silt and sand were the dominant lithology encountered during the SI field events. Boring completion depths ranged between 8.5 to 33 ft below ground surface (bgs). Grain size analysis was performed on sample AOI03-01 and analyzed via American Society for Testing and Materials (ASTM) Method D-422. Results indicated soil comprised of 50.1 percent (%) clay, 32.3% silt, 17.6% sand, and 0% gravel; however, layers of gravel were observed between 8-12 ft bgs when in proximity to the Airfield (AOI 4). Results are consistent with the reported depositional environment of the region.

2.2.2 Hydrogeology

Groundwater at Camp Dawson generally flows to the north/northwest within Camp Dawson proper, and to the southeast within the Volkstone Tract, towards the Cheat River (**Figure 2-3,**

and Figures 2-5 through **2-8**). According to the U. S. Geological Survey (USGS), depth to groundwater at Camp Dawson is generally shallow, with groundwater levels at the facility reported at around 20 ft bgs. The Facility is located in the Cheat River watershed, and surrounded by Buffalo Run, a tributary of the Cheat River. The Cheat River watershed covers five counties and reaches small parts of Pennsylvania and Maryland. In total, the Cheat River drains 1,422 square miles and consists of five major forks that function as cold-water fisheries. The Cheat River originates in the Monongahela National Forest. The Cheat River discharges into the Monongahela River at Point Marion in Pennsylvania. The area is dominated by forest and has limited urban and residential areas. The nearby towns of Parsons, Rowlesburg, Kingwood, and Albright obtain drinking water from the Cheat River (AECOM 2020). A source water protection area has been established within the Cheat River watershed that covers two types of delineation. The watershed delineation area covers approximately 1,002 square miles, while the Zone of Critical Concern (ZCC) covers approximately 6,376 acres; Camp Dawson is covered under both watershed protection delineation areas. The runway at Camp Dawson extends into the ZCC, but the other identified AOIs at Camp Dawson are located outside the ZCC (AECOM 2020).

There are no private residential drinking wells located in or around the vicinity of Camp Dawson. The City of Kingwood, including Camp Dawson, obtains drinking water from the Kingwood Water Treatment Plant (WTP). The Kingwood WTP is located on a small parcel of land owned by the City of Kingwood within the southern portion of the Volkstone Tract. The WTP has a surface water intake along the Cheat River, upgradient of Morgan Run and Camp Dawson (**Figure 2-4;** AECOM 2020).

The Kingwood WTP also treats wastewater from the City of Kingwood, including Camp Dawson. Effluent from wastewater treatment is released into Morgan Run, a tributary of the Cheat River. It is possible for stormwater and groundwater to enter the sewer system through leaks and cracked pipes, which have historically caused backups at the plant during high rain events, inevitably discharging minimally treated sewage into the Cheat River (AECOM 2020).

Groundwater data collected during the SI shows a north to northwest flow direction, towards the Cheat River. Depths to groundwater observed during drilling ranged between 2.20 to 14.10 ft below top of casing (btoc) in the Volkstone Tract area (AOI 3), and between 3.35 to 27.69 ft btoc at Camp Dawson proper.

2.2.3 Hydrology

The City of Kingwood relies heavily on the Cheat River, a 78-mile tributary of the Monongahela River which, via the Ohio River, is a part of the Mississippi Watershed. The Cheat River begins in Job, West Virginia and flows north towards Morgantown, with hundreds of tributaries spanning the distance of the river. The Cheat River runs directly through the Camp Dawson Training Site, with Camp Dawson Proper to the southeast and the Volkstone Tract to the northwest (**Figure 2-4**) (AECOM 2020).

The Cheat River is primarily threatened by acid mine drainage from abandoned or defunct mines in Kingwood and surrounding areas. Abandoned mine lands release acidic and metal-containing water into the watershed, which threaten wildlife and contaminate drinking water. Stream beds

are additionally affected by deforestation and agriculture. Flash floods from extreme precipitation is common in the area surrounding Camp Dawson, leading to altered stream channels through erosion and deposition (AECOM 2020).

As confirmed by groundwater data and surface water flow paths observed during the SI, surface water and groundwater flows to the Cheat River and are carried downgradient through residential and recreational areas.

2.2.4 Climate

The climate in West Virginia consists of warm, humid summers and cold winters. Morgantown, a city close to Camp Dawson, has an average temperature of 52.25 degrees Fahrenheit (°F), and an average annual precipitation of 43.15 inches (in.). Seasonally, temperatures vary from summer highs of 83°F to winter lows of 21°F (AECOM 2020).

2.2.5 Current and Future Land Use

The Facility is a current year-round tactical training facility for the WVARNG, various other state National Guard units, the Reserve Officers Training Corps, and active reserve units. Camp Dawson is also home to the Integrated Section Operations Training Facility and National Center for Homeland Defense. Due to its size, location, and breadth of available trainings and exercises, the Facility is expected to continue to be a main base for various training exercises to National Guard and reserve personnel throughout the state of West Virginia and beyond (AECOM 2020).

2.2.6 Sensitive Habitat and Threatened/Endangered Species

The following species are listed as federally endangered, threatened, proposed, and/or candidate species in Preston County, West Virginia (U.S. Fish and Wildlife Services, 2022):

- Snails: Flat-spired Three-toothed Snail (*Triodopsis platysayoides*) – Federally Threatened
- Insects: Monarch Butterfly (*Danaus plexippus*) – Federal Candidate
- Mammal: Indiana Bat (*Myotis sodalis*) – Federally Endangered; Northern Long-eared Bat (*Myotis septentrionalis*) – Federally Threatened; Virginia Big-eared Bat (*Corynorhinus townsendii virginianus*) – Federally Endangered.

2.3 HISTORY OF PFAS USE

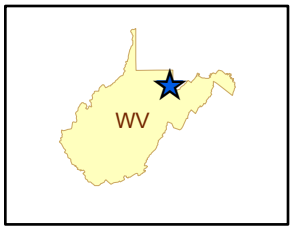
Seven AOIs were identified in the PA where aqueous film-forming foam (AFFF) may have been used, stored, disposed, or released historically at Camp Dawson (AECOM, 2020). AFFF may have historically been released at the facility during a one-time fire training event in the wash rack area as early as 2002 or 2003. Additional AFFF releases may also have occurred from incidental spills from storage in a firetruck or in building or from suspected use along the flight line. Additionally, the use of PFAS-laden materials is suspected at the Former Manganese Plant (located within the Volkstone Tract). The potential release areas were grouped into seven AOIs

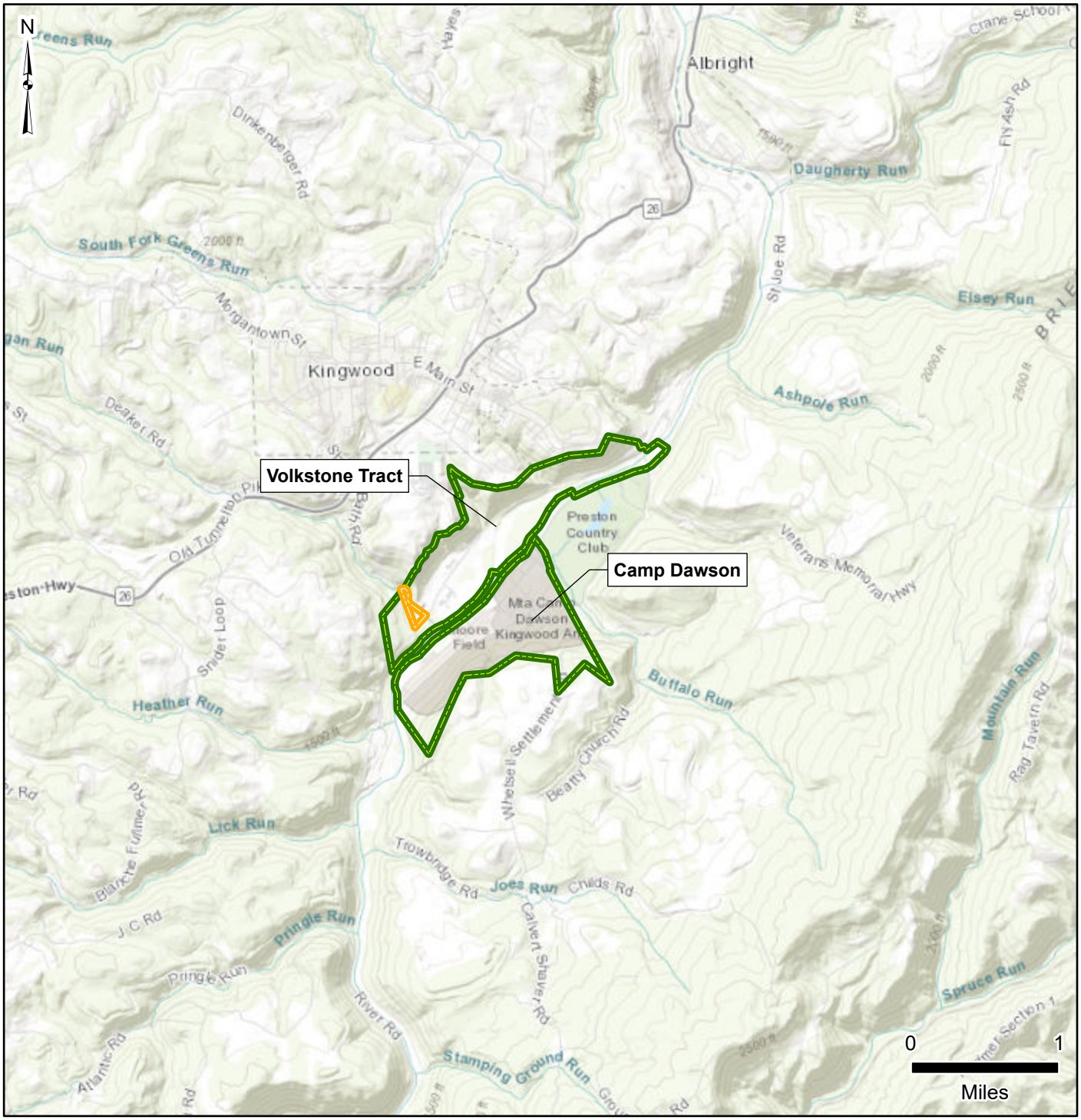
based on preliminary data and presumed groundwater flow directions. A description of each AOI is presented in **Section 3**.

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 2-1
Facility Location





Facility Data

- Facility Boundary
- Kingwood Water Treatment Plant Approximate Parcel Boundary

Data Sources:
ESRI 2020
AECOM 2020

Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 2-1 Site Location

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

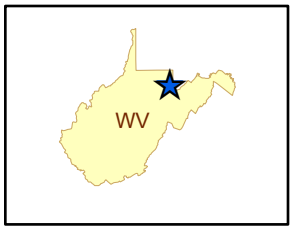
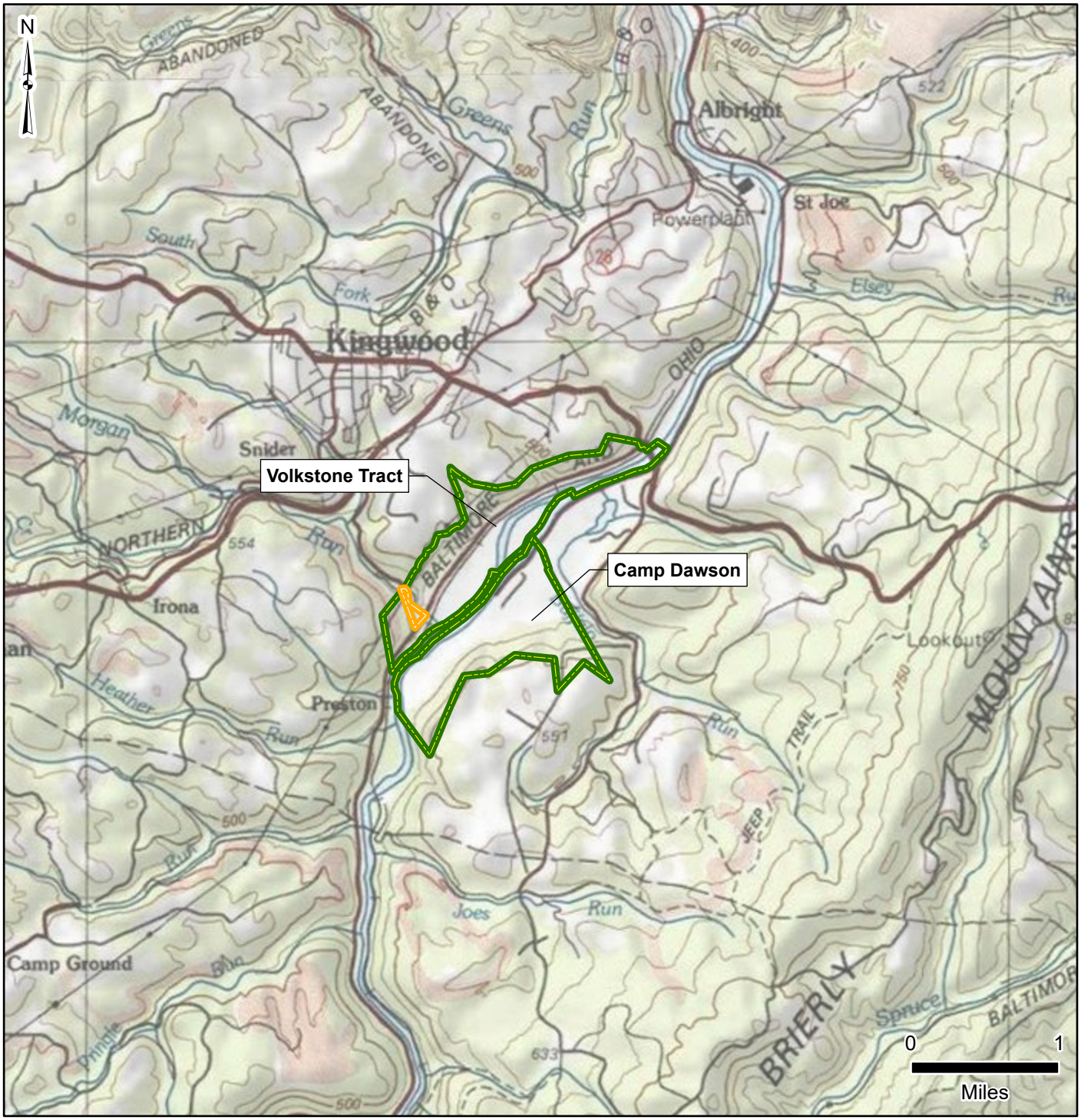


Figure 2-2
Topography



Path: G:\Federal\Nationwide\PFAS\MAES_6342503831\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 2-2 Topography

Facility Data

- Facility Boundary
- Kingwood Water Treatment Plant Approximate Parcel Boundary
- Contour interval = 50ft

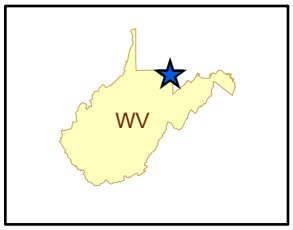
Data Sources:
ESRI 2020
AECOM 2020

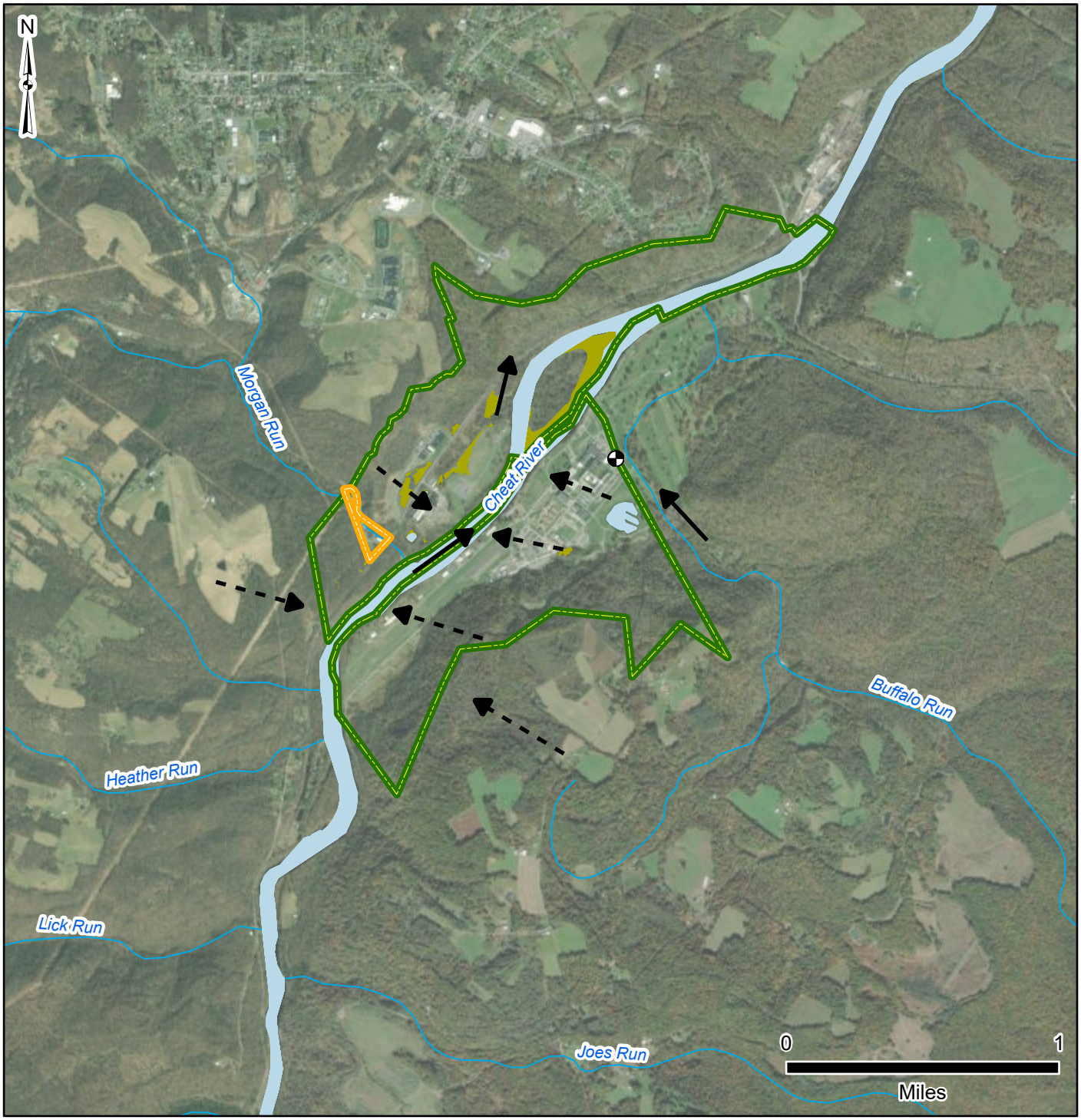
Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 2-3
Groundwater Features





Facility Data
- Facility Boundary
- Kingwood Water Treatment Plant Approximate Parcel Boundary

Well Type
- Monitoring Well

Hydrology/Hydrogeology
- General Flow
- Minor Flow
- Perennial Creek/Stream
- Waterbody
- Wetland

Data Sources:
ESRI 2020
AECOM 2020

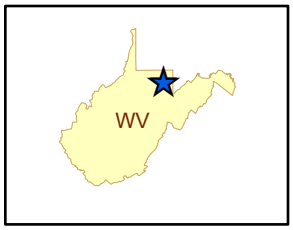
Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

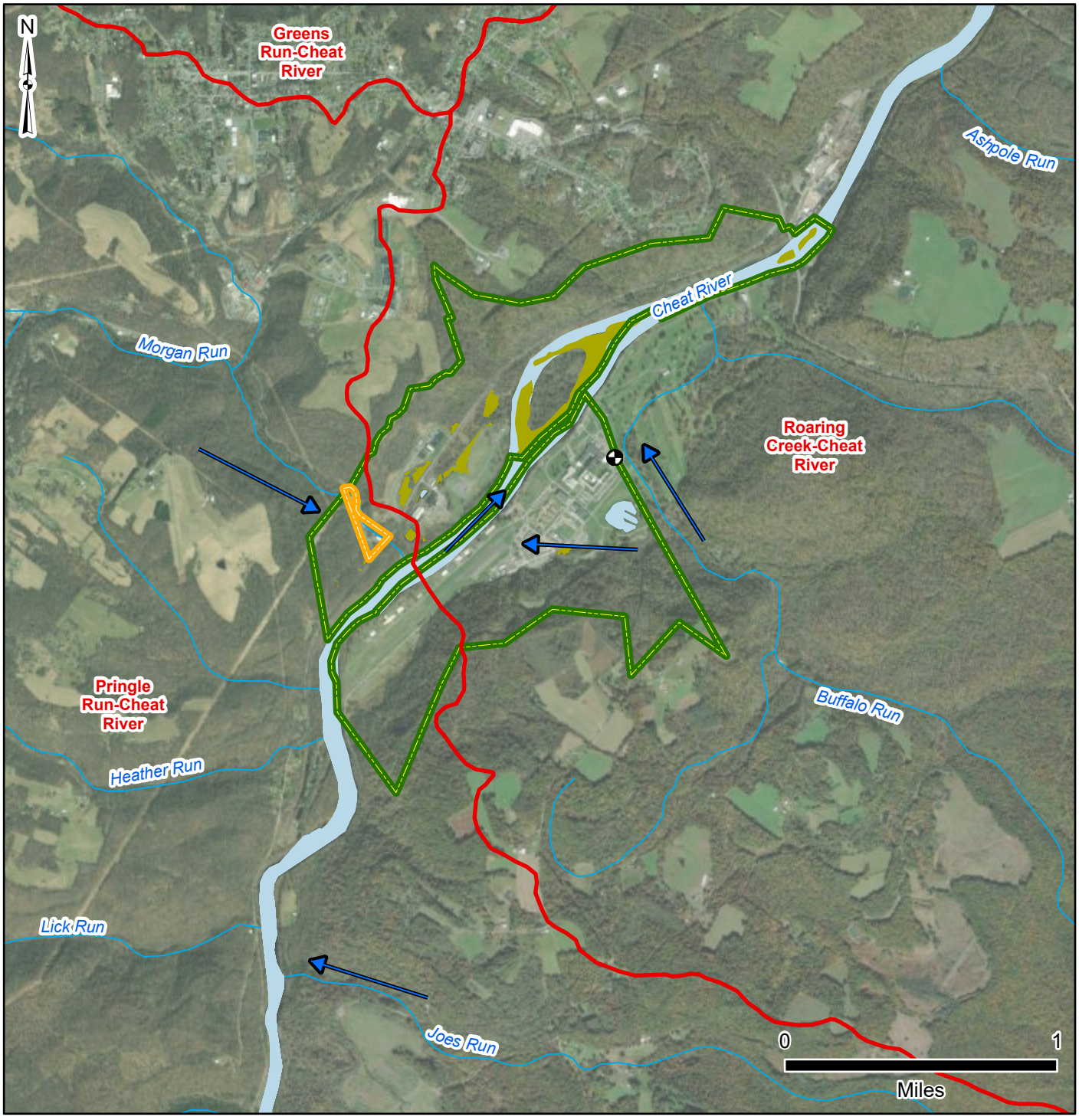
Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 2-3 Groundwater Features

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 2-4
Surface Water Features





Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 2-4 Surface Water Features

Facility Data
- Facility Boundary
- Kingwood Water Treatment Plant Approximate Parcel Boundary

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

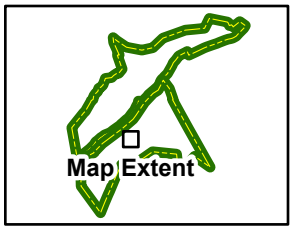
Data Sources:
ESRI 2020
AECOM 2020

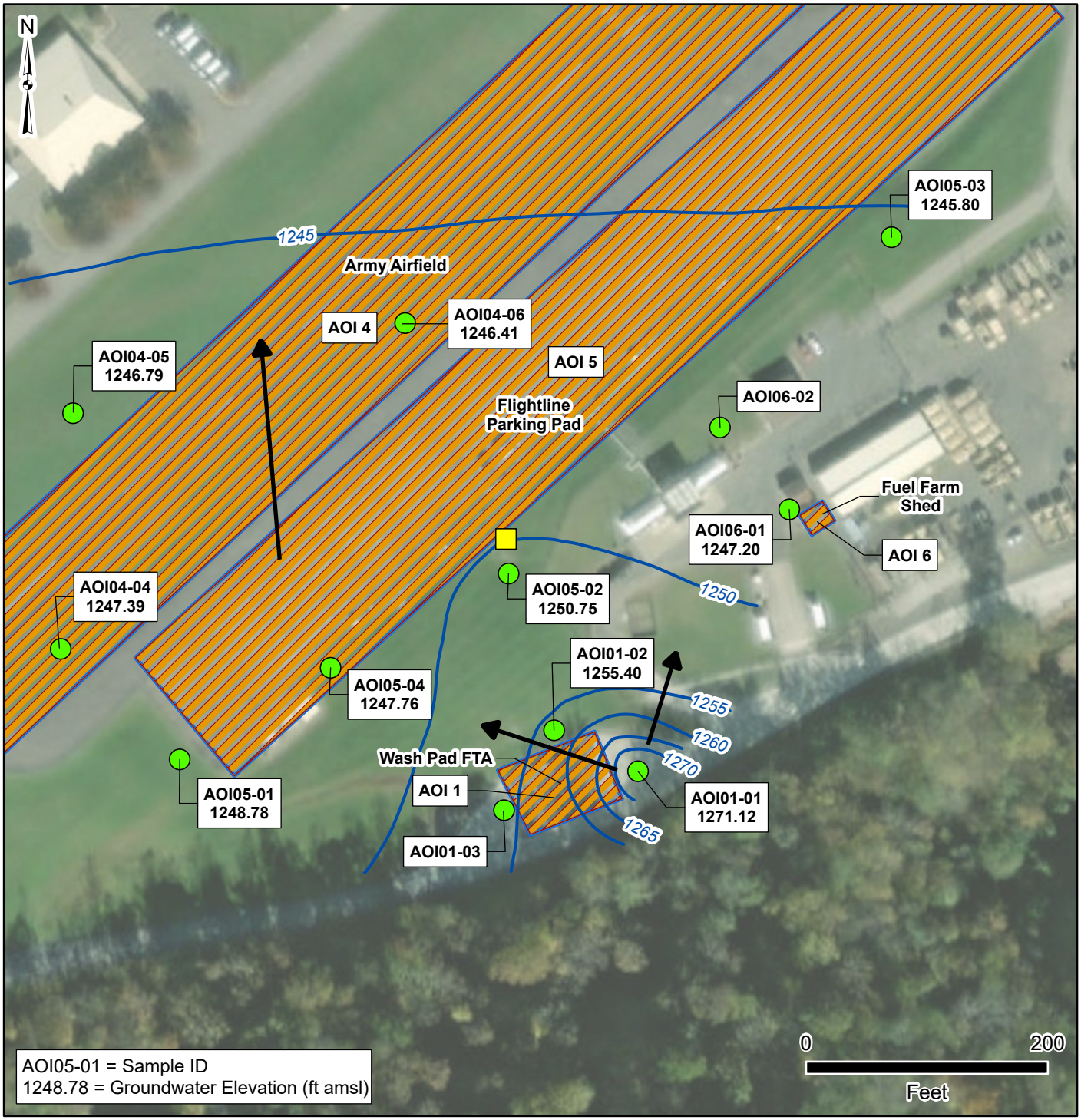
Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 2-5
Groundwater Elevations (AOI 1, 4, 5, 6)





Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release
- Oil Water Seperator

Sample Locations
- Sample Location

Hydrology/Hydrogeology
- Groundwater Flow Direction
- Groundwater Elevation Contour (5 foot interval)

ft amsl = feet above mean sea level

Data Sources:
ESRI 2020
AECOM 2020

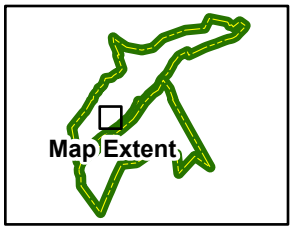
Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

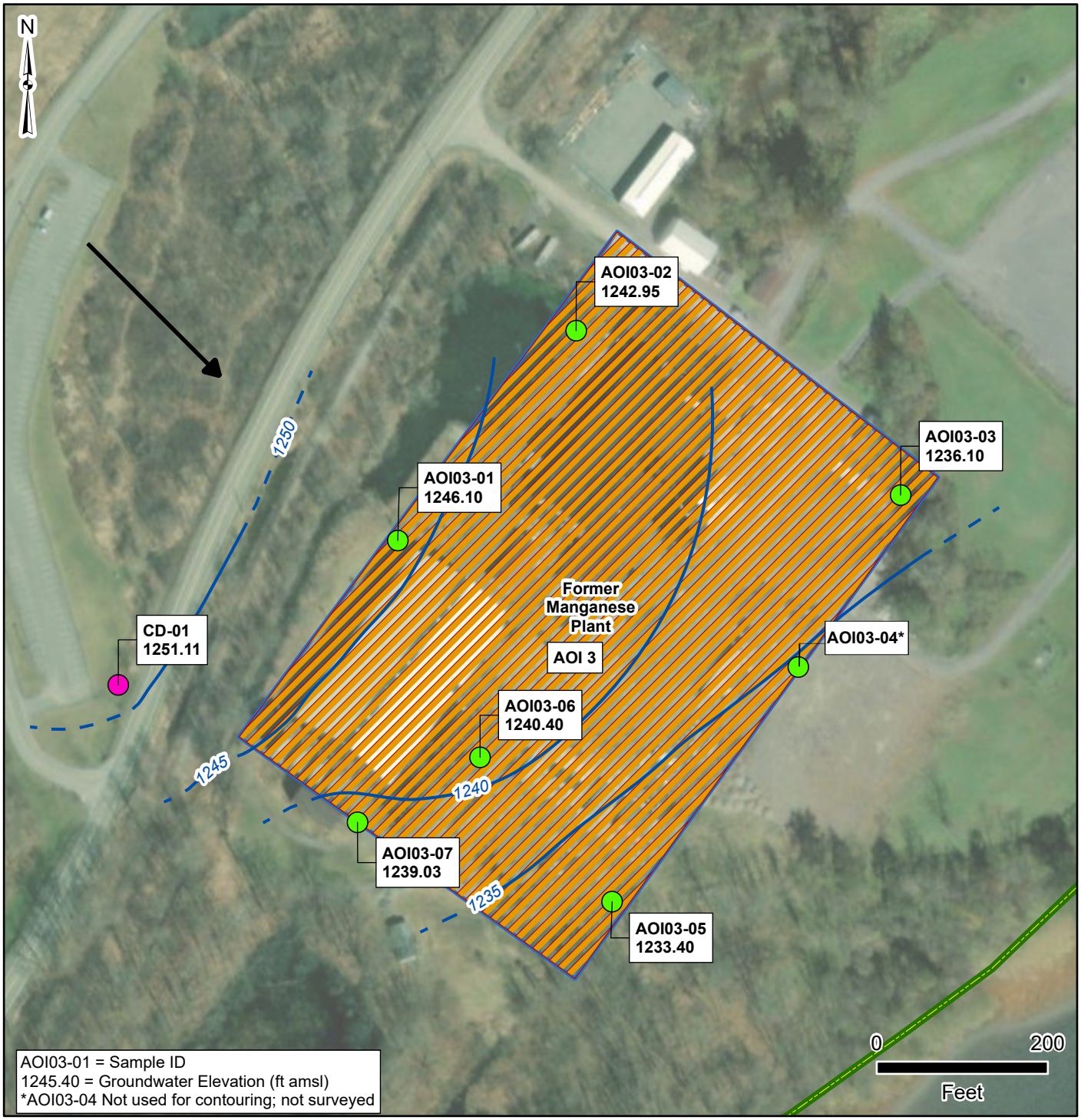
Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 2-5 Groundwater Elevations AOI 1,4,5,6

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 2-6
Groundwater Elevations (AOI 3)





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

Sample Locations
- Sample Location
- Boundary Well

Hydrology/Hydrogeology
- Groundwater Flow Direction
- Groundwater Elevation Contour (5 foot interval)
- Inferred Groundwater Elevation Contour (5 foot interval)

ft amsl = feet above mean sea level

Data Sources:
ESRI 2020
AECOM 2020

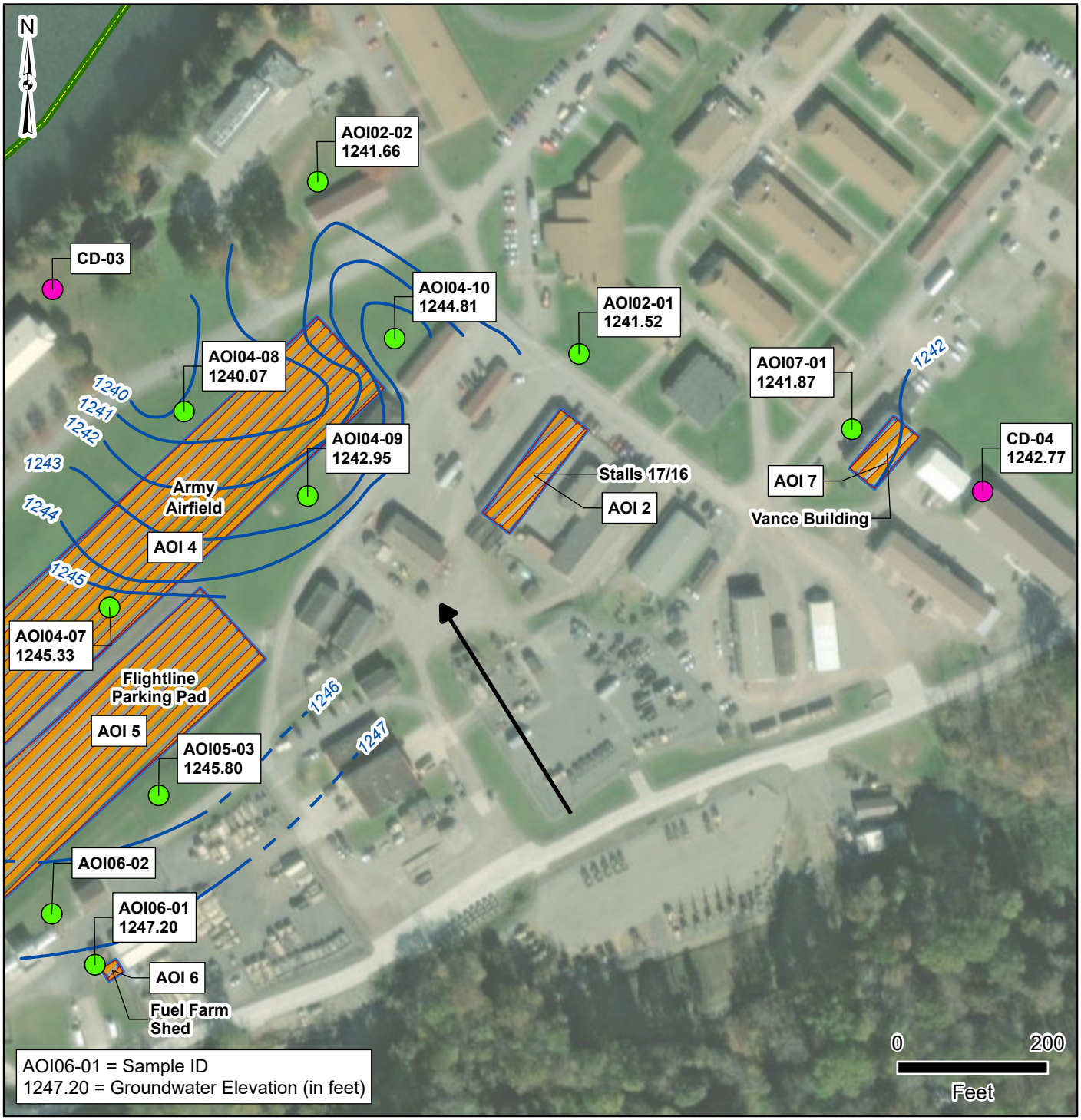
Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 2-6 Groundwater Elevations AOI 3

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 2-7
Groundwater Elevations (AOI's 2, 4, 5, 6, 7)



Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 2-7 Groundwater Elevations AOI 2,4,5,6,7

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

Sample Locations
- Sample Location
- Boundary Well

Hydrology/Hydrogeology
- Groundwater Flow Direction
- Groundwater Elevation Contour (1 foot interval)
- Inferred Groundwater Elevation Contour (1 foot interval)

ft amsl = feet above mean sea level

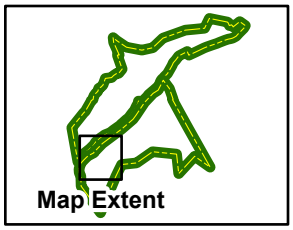
Data Sources:
ESRI 2020
AECOM 2020

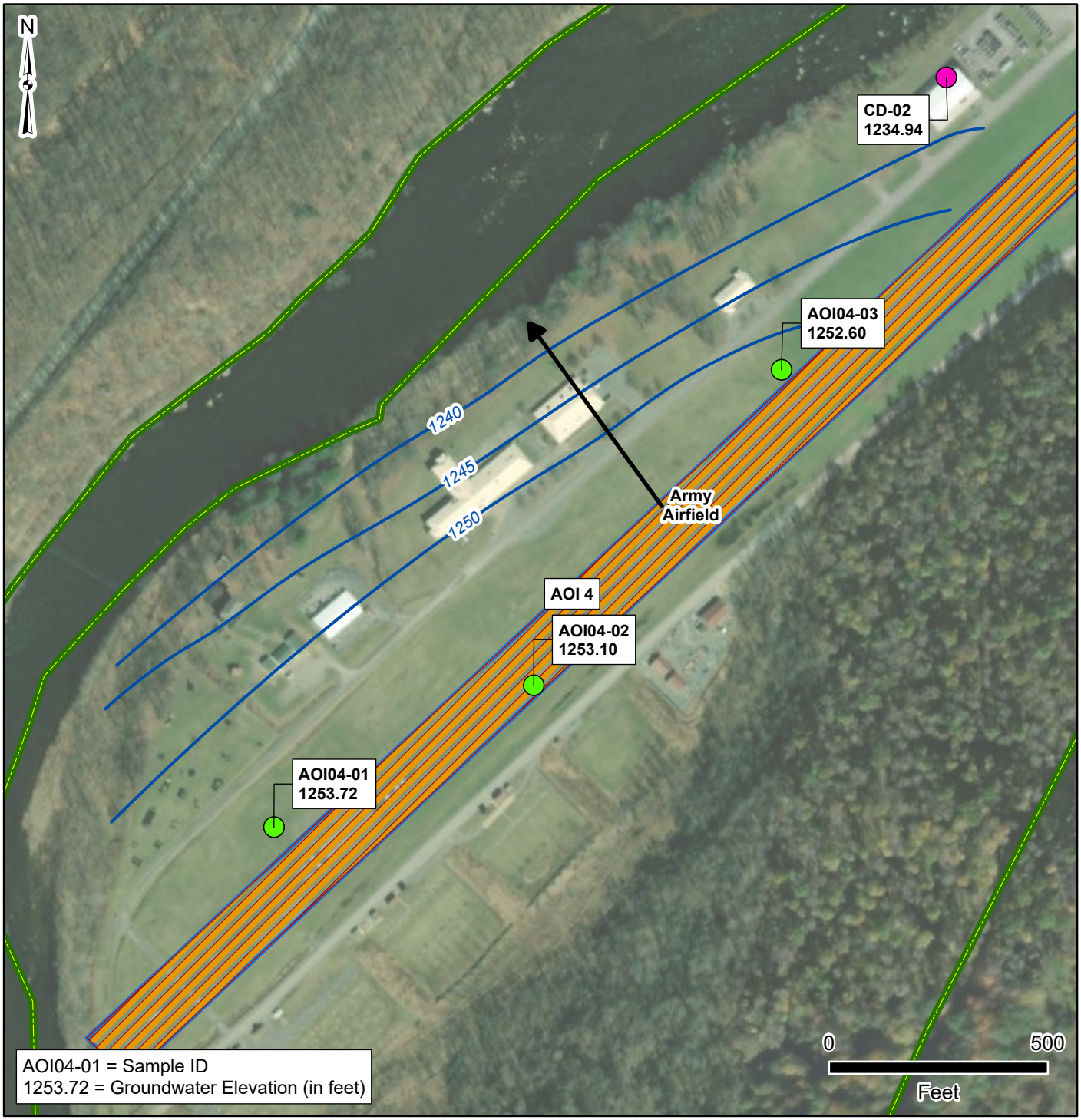
Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 2-8
Groundwater Elevations (AOI 4)





Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 2-8 Groundwater Elevations AOI 4

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

Sample Locations
- Sample Location
- Boundary Well

Hydrology/Hydrogeology
- Groundwater Flow Direction
- Groundwater Elevation Contour (5 foot interval)

ft amsl = feet above mean sea level

Data Sources:
ESRI 2020
AECOM 2020

Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

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, seven potential release areas were identified at Camp Dawson and grouped into seven AOIs. The potential release areas are shown on **Figure 3-1** and described below.

3.1 AOI 1 – WASH PAD FIRE TRAINING AREA

AOI 1 consists of the concrete wash pad located just south of the aircraft parking area. In approximately 2002 or 2003, Camp Dawson personnel along with the Wheeling and Parkersburg 2/104th Aviation Unit conducted a controlled barrel burn. The one-time training lasted approximately 4 hours and included pilots and aviation personnel. The barrels were set on fire directly on top of the concrete wash pad, approximately 100 yards southwest of the aircraft parking area and the Flightline, near the oil water separator. Interviewees estimated approximately between 30 and 60 gallons (gal) of Tri- Max ™ 30, three percent (%) concentrated AFFF was used for this training exercise. The wash pad has several grated drains which lead to a concrete pit. This concrete pit then transfers residual to an oil water separator that discharges to the nearby Cheat River. During the training exercise, there was no containment of the AFFF, leaving the potential for releases outside of the concrete wash pad. The wash pad is surrounded by a permeable grassy area. Surface water and groundwater in this area flow north, towards the adjacent Cheat River (AECOM 2020).

The Defense Reutilization and Marketing Office (DRMO), through the direction of the U.S. Property and Fiscal Office, was contacted to initiate disposal of the empty Tri-Max ™ 30 tanks used in the training. The empty Tri-Max ™ 30 tanks were stored on-site until disposal in 2014; however, the exact storage location is unknown. Between the time of the training and the time of the Tri-Max ™ 30 disposal, no additional Tri-Max ™ 30 tanks were brought on-site or used for training activities. No Tri-Max™ 30 tanks are currently located at Camp Dawson (AECOM 2020).

3.2 AOI 2 – STALLS 17/16

AOI 2 consists of Stalls 17/16 of Building 403, located just east of the northern end of the Flightline and slightly southwest of the Vance Building. In approximately 2014, a firetruck was given to Camp Dawson from the Air National Guard 130th Air Wing Division of Charleston, West Virginia. The firetruck arrived at Camp Dawson filled with AFFF of an unknown concentration. The firetruck was later emptied into containers of various sizes at an unknown time/location and the containers were stored in Stalls 17/16 of Building 403. The capacity of the AFFF holding tank on the firetruck was estimated to be 50 gal.

Following containerization and storage in Stalls 17/16 of Building 403, which is not climate controlled and does not contain floor drains, the Defense Logistics Agency (DLA) Dispositional Service was contacted to initiate disposal, which occurred in June 2017. However, the exact location of where this transfer took place is unknown. Whether unintended spills or releases occurred during storage or before the transfer of these containers to DLA is also unknown.

According to manifest records received from Camp Dawson personnel, the following containers, which included AFFF from the firetruck as well as waste AFFF from other unknown sources, were located in the stalls inside of Building 403 prior to their disposal in June 2017 (AECOM 2020):

- One 55-gal plastic drum
- One 20-gal plastic drum
- Twenty 5-gal plastic buckets
- One 55-gal metal drum within a 95-gal plastic over-pack dissipate.

The containers listed above held concentrated AFFF in a designated staging area on top of Wooden pallets within the Stalls 17/16 inside Building 403. Although the exact volume of AFFF disposed of from these containers is not known, it was documented that 1,086 pounds of AFFF material was removed and disposed of by the DLA Dispositional Service. The AFFF was sent to a disposal facility in Calvert City, Kentucky. It is unknown how long this AFFF was stored in Stalls 17/16 before disposal (AECOM 2020).

3.3 AOI 3 – FORMER MANGANESE PLANT

AOI 3 consists of the Former Manganese Plant located directly across from the Cheat River, approximately 1,000 ft west of the Flightline, in an area known as the Volkstone Tract of Camp Dawson. The previous smelting plant is located downstream less than 100 yards northeast of the surface water intake at the Cheat River, which supplies drinking water to Camp Dawson and the City of Kingwood. This plant was active from 1960 until 1985 and was responsible for smelting and processing heavy metals, including manganese and copper. (AECOM 2020).

AFFF fire suppression systems or extinguishers are commonly found in smelting and metal plating operations to quickly suppress potential metal fires. However, a visual inspection of the former manganese plant did not indicate a fire suppression system was present. It is unknown whether an AFFF fire suppression system or portable fire extinguishers with AFFF were present at the Facility during its operation is unknown (AECOM 2020)

3.4 AOI 4 – ARMY AIRFIELD

AOI 4 consists of the Army Airfield, which runs from the far west boundary of the Facility and ends adjacent to Stalls 17/16. The airfield was built sometime in the 1960s and still hosts a variety of DoD entities, including the WVARNG, U.S. Army, U.S. Marine Corps, U.S. Navy, and other state National Guard units. While interviewee knowledge and visual observation did not indicate the current or past presence of PFAS-containing materials, airfields, runways, air strips, ramp areas, and aircraft parking areas often have portable or mobile AFFF-containing fire extinguishers or tanks throughout the airfield area for emergency response purposes. While limited information was available on the use/history of this airfield, it is likely that AFFF or other PFAS-containing chemicals were used or stored along the U.S. Army airfield during its operational history (AECOM 2020).

3.5 AOI 5 – FLIGHTLINE PARKING PAD

AOI 5 is the Flightline Parking Pad located adjacent to and immediately east of the Army Airfield. During follow-up interviews, it was discovered that former fire training activities occurred at Camp Dawson near the Flightline Parking Pad. Interviewees recall barrel burns, similar to the burn described at the Wash Pad above, occurring near the Flightline Parking Pad, near where aircraft are usually parked. Barrels containing fuel were ignited and extinguished using AFFF. Following the training, the foam was left to dry on the concrete, pavement, and surrounding grassy areas near the Flightline Parking Pad. However, the exact location of the fire training activities is unknown. Additionally, the timeframe of these fire training activities, how often these trainings occurred, and the quantity of AFFF used during these fire training activities are unknown (AECOM 2020).

3.6 AOI 6 – FUEL FARM SHED

AOI 6 is the Fuel Farm Shed located slightly southeast of the center of the Flightline Parking Pad. In 2016, WVARNG personnel discovered four to five full, unopened, 5-gal buckets of concentrated AFFF located within the Fuel Farm Shed. The concentration of AFFF in these buckets and the duration of their storage in the Fuel Farm Shed are unknown. Whether previous storage or releases of AFFF occurred at this location or whether unintended spills or releases occurred during storage of these buckets is unknown (AECOM 2020).

While no spills or releases were reported to have occurred from the Fuel Farm Shed, the long term and undocumented storage of AFFF at this non-climate-controlled location leaves the potential for unintended spills or releases. No floor drains exist within the Fuel Farm Shed; however, the entire wooden shed sits on top of metal support beams that are surrounded by grassy areas.

3.7 AOI 7 – VANCE BUILDING

AOI 7 is the Vance Building located roughly 400 ft east from Stalls 17/16 on the eastern side of the Facility. A firetruck arrived at Camp Dawson in 2014 from the West Virginia Air National Guard. The firetruck was filled with approximately 50 gal of AFFF; however, the concentration of AFFF inside the truck upon arrival is unknown. The firetruck was stored in the Vance Building (also known as the Post-Fire Department Building and Building 441) throughout its duration at Camp Dawson. According to interviews, the firetruck was estimated to be on-site anywhere from 18 months to 3 years; however, exact dates of storage are unknown. Interviewees confirmed the firetruck was never mobilized because personnel were not trained on how to operate the truck. Whether unintended spills or releases occurred from this firetruck during storage is unknown (AECOM 2020).

3.8 ADJACENT SOURCES

During the PA, one potential off-facility source of PFAS was identified adjacent to the Facility and not under the control of the WVARNG. The adjacent potential source is shown on **Figure 3-1** and described in the following section for informational purposes only and this area was not investigated as part of this SI.

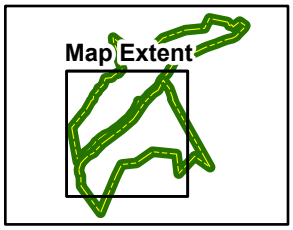
3.8.1 Kingwood Water Treatment Plant

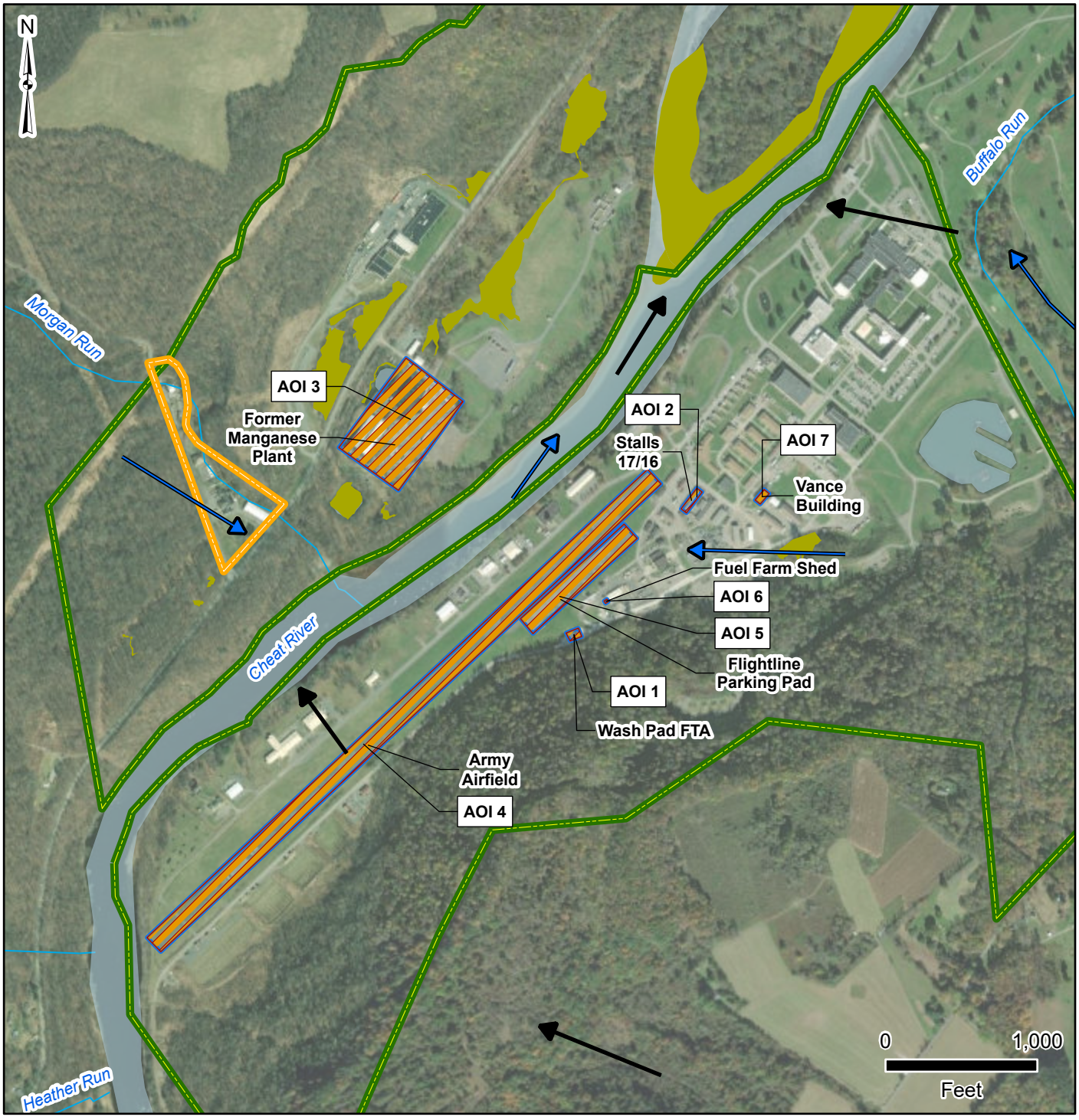
The Kingwood WTP is located within the southern portion of the Camp Dawson Volkstone Tract on a small parcel of land owned by the City of Kingwood. Because the WTP is owned and operated by the City of Kingwood, it is considered a potential adjacent source of PFAS. The WTP provides drinking water for the City of Kingwood, including Camp Dawson, and also treats the City's wastewater. For drinking water treatment, the WTP has a surface water intake along the Cheat River, upgradient of Morgan Run. Effluent from wastewater treatment is released into Morgan Run, which subsequently discharges into the Cheat River downgradient of the intake (AECOM 2020).

Wastewater treatment facilities are not usually considered primary potential release areas of PFAS, but sludges and liquids treated at wastewater treatment plants may create a secondary source of contamination if they receive PFAS-impacted waste from other release areas, personal care products, and other household waste. PFAS releases that may have occurred within the City of Kingwood could have resulted in the migration of PFAS in water to the Kingwood WTP. Sludge generated at wastewater treatment facilities is typically removed and disposed of at an off-site location; the location of sludge disposal for the Kingwood WTP is unknown. Due to the potential for PFAS releases to have occurred elsewhere in the City of Kingwood sanitary sewer system, the WTP is considered a potential adjacent, off-facility PFAS release area (AECOM 2020).

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 3-1
Areas of Interest





Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 3-1 Areas of Interest

Facility Data
- Facility Boundary
- Kingwood Water Treatment Plant Approximate Parcel Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Inferred Groundwater Flow Direction
- Waterbody
- Perennial Creek/Stream
- Wetland

Data Sources:
ESRI 2020
AECOM 2020

Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

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] 2022a), the objective of the SI is to identify whether there has been a release to the environment at the AOIs identified in the PA. For each AOI, ARNG determines if further investigation is warranted, a removal action is required to address immediate threats, or whether no further action is warranted. This SI evaluated groundwater and soil for presence or absence of relevant compounds at each of the sampled AOIs.

4.1 PROBLEM STATEMENT

ARNG may recommend AOIs for remedial investigation (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 Camp Dawson (AECOM 2020)
- Analytical data from groundwater and soil samples collected as part of this SI in accordance with the UFP-QAPP Addendum (EA 2022a)
- 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**). 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 2022a).

4.5 DATA USABILITY ASSESSMENT

The Data Usability Assessment (DUA), which is provided in **Appendix A**, is an evaluation at the conclusion of data collection activities that uses the results of both data verification and validation in the context of the overall project decisions or objectives. Using both quantitative and qualitative methods, the assessment determines whether project execution and the resulting data have met installation-specific DQOs. Both sampling and analytical activities are considered to assess whether the collected data are of the right type, quality, and quantity to support the decision-making (DoD 2019a, 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 UFP-QAPP Addendum (EA 2022a).

5. SITE INSPECTION ACTIVITIES

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

- *Final PA Report, Camp Dawson, Kingwood, West Virginia,* dated May 2020 (AECOM 2020)
- *Final Programmatic UPF-QAPP, SIs for PFAS Impacted Sites, ARNG Installations, Nationwide,* dated December 2020 (EA 2020a)
- *Final SI UFP-QAPP Addendum, Camp Dawson, Kingwood, West Virginia,* dated March 2022 (EA 2022a)
- *Final Programmatic APP, Revision 1,* dated November 2020 (EA 2020b)
- *Final APP/Site Safety and Health Plan Addendum, Camp Dawson, Kingwood, West Virginia,* dated October 2021 (EA 2021).

The SI field activities were conducted from 31 August to 16 September 2022 and consisted of direct push technology (DPT) and hand auger borings and soil sample collection, temporary monitoring well installation and grab groundwater sample collection. Two preparatory facility visits without intrusive work were also conducted on 16 November 2021 (source water sampling) and 16 to 17 August 2022 (utility location). Field activities were conducted in accordance with the UFP-QAPP Addendum (EA 2022a), 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:

- Ninety-eight (98) soil samples from thirty-three (33) primary locations
- Twenty-eight (28) grab groundwater samples from 28 temporary well locations
- Forty-One (41) quality assurance/quality control samples.

Figures 5-1 through 5-4 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 19 November 2021, prior to SI field activities. Meeting minutes are provided in **Appendix D**. The combined TPP Meeting 1 and 2 was conducted in general accordance with EM 200-1-2. The stakeholders for this SI include ARNG, USACE, and West Virginia Department of Environmental Protection 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 is provided in the UFP-QAPP Addendum (EA 2022a).

Note: A TPP Meeting (no. 3) will be held to discuss the results of the SI. Meeting minutes for TPP 3 will be included in Appendix D of this report. Future TPP meetings will provide an opportunity to discuss the results and findings, and future actions, where warranted.

5.1.2 Utility Clearance

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 between 16 and 17 August 2022 with input from the EA field team. General locating services and ground-penetrating radar were used to complete the clearance. The location AOI03-03 was offset approximately 20 ft northwest due to the presence of an obstruction in the original location. Hand auger clearance to a full 5 ft bgs for the remaining 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 16 November 2021, prior to mobilization, and analyzed for PFAS by LC/MS/MS compliant with QSM 5.3 Table B-15. The spigot on Building 414 was sampled using PFAS-free hose tubing. The results indicated that the potable water source contained trace levels of PFAS, with all relevant compound concentrations below the SLs. PFOA was the only relevant compound detected at an estimated concentration less than one-tenth of the SL of 6 nanograms per liter (ng/L). Based on these low-level detections, the water was deemed acceptable for use in decontamination. Further discussion is provided in the DUA (**Appendix A**). Analytical results for this 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, Enviroprobe, using a hand auger to verify utility clearance in the shallow subsurface where utilities would typically be encountered (see **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 5-4** and described in the subsequent section. Non-dedicated sampling equipment (i.e., hand auger) was decontaminated between sampling locations.

Beyond 5 ft depth, soil samples were collected via DPT drilling method in accordance with the UFP-QAPP Addendum (EA 2022a). Soil cores were collected using the MC5 single-tube core sampler system, which collects 5-foot MacroCores in a thin PVC, PFAS-free liner that allows for continuous soil logging.

Three discrete soil samples were collected for chemical analysis from each soil boring (except 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). Depths to groundwater observed during drilling ranged between 2.20 to 14.10 ft btoc in the Volkstone Tract area (AOI 3), and between 3.35 to 27.69 ft btoc at Camp Dawson proper.

Soil sample locations are shown on **Figures 5-1 through 5-4**, 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 2020) and as agreed upon by stakeholders during the TPP and review of the UFP-QAPP Addendum (EA 2022a). Several boring locations were adjusted within a 50-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 HDPE bottle and labeled using a PFAS-free marker or pen. Samples were packaged on ice and transported via FedEx under standard CoC procedures to the laboratory and analyzed for PFAS (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 UFP-QAPP Addendum (EA 2022a).

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 UFP-QAPP Addendum (EA 2022a). 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 of a 5-ft section of 1-in. Schedule 40 polyvinyl chloride (PVC) screen with sufficient casing to reach the ground surface. 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**.

Groundwater samples were collected after a period of time following well installation to allow groundwater to infiltrate and recharge the temporary well intervals, using a peristaltic or bladder pump, depending on depth to groundwater, with PFAS-free HDPE tubing. 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., 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 in a separate container. 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 UFP-QAPP Addendum (EA 2022a).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. MS/MSDs were collected at a rate of 5% and analyzed for the same parameters as the accompanying samples. Two field blanks were collected in accordance with the UFP-QAPP Addendum (EA 2022a). In instances when non-dedicated sampling equipment was used, such as a bladder pump, one EB was collected a day and analyzed for the same

parameters as the groundwater samples. A temperature blank was placed in each cooler to ensure that samples were preserved at or below 6°C during shipment.

Following well surveying (described below in **Section 5.5**), temporary wells were abandoned in accordance with the SI QAPP Addendum (AECOM, 2021a) by removing the PVC and backfilling the hole with 3/8" bentonite chips. Upon completion of well abandonment, the ground surface at each location was patched to match existing surrounding conditions.

5.4 SYNOPTIC WATER LEVEL MEASUREMENTS

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 (**Figures 2-5** through **2-8**), taken from the survey mark on the northern side of the well casing. Groundwater elevation data is provided in **Table 5-3**.

5.5 SURVEYING

The northern side of each new temporary well casing was surveyed using a GEOMAX Zoom 90 Robotic total station by EA's West Virginia licensed professional surveyor subcontractor, Bell Land Surveying. Positions were collected in the applicable datum as referenced in the survey report. Surveying data were collected between 14 and 16 September 2022 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 is considered non-hazardous waste and was managed in accordance with the UFP-QAPP Addendum (EA 2022a).

Soil IDW (i.e., soil cuttings) and liquid IDW (i.e., purge water) generated during the SI activities were containerized in four properly labeled 55-gal drums (two soil, two water) and staged in an approved location at Building 402, which were subsequently moved inside Building 407 upon completion of field work and are being held until they are disposed of. The solid and liquid IDW will be sampled and disposed of via a Resource Conservation and Recovery Act Subtitle C landfill. Specifics on the disposal of solid and liquid IDW will be addressed in an IDW Technical Memorandum.

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 UFP-QAPP Addendum are noted below:

- Due to shallow bedrock and/or refusal encountered between 0-5ft bgs across the site, the majority of borings were not cleared via hand auger to the full 5 ft bgs but went to at least the frost line between 3-4ft bgs.

- Groundwater and refusal/bedrock was encountered at variable depths across the Facility. As such, the third sample outlined in the UFP-QAPP Addendum (EA 2022a) was not collected from boring location AOI04-10, due to unanticipated shallow depths to bedrock (less than 10 ft bgs).

- Additionally, on the second day of drilling activities, after encountering shallow bedrock and no saturated soils, a call was held with WVARNG, ARNG G9, and USACE to determine how to proceed if similar subsurface conditions were continually observed during the remainder of the investigation. Based on the call, it was determined a well would be installed if similar conditions were encountered and no further offsets would occur (if it were determined the refusal was shallow bedrock). Several wells were installed in this manner and five of the temporary wells ran dry and did not recharge enough to allow for a sample to be collected (CD-03, AOI01-03, AOI03-04, AOI04-05, and AOI06-02).

Table 5-1. Site Inspection Samples by Medium
Camp Dawson, Kingwood, West Virginia
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]	9/8/2022	0-2	X	X	X		
AOI01-01-SB-[7-9]	9/8/2022	7-9	X				
AOI01-01-SB-[15-17]	9/8/2022	15-17	X				
AOI01-02-SB-[0-2]	9/8/2022	0-2	X				MS/MSD sample collected
AOI01-02-SB-[12-14]	9/8/2022	12-14	X				
AOI01-02-SB-[24-26]	9/8/2022	24-26	X				
AOI01-03-SB-[0-2]	9/7/2022	0-2	X				
AOI01-03-SB-[12-14]	9/7/2022	12-14	X				
AOI01-03-SB-[24-26]	9/7/2022	24-26	X				
AOI02-01-SB-[0-2]	9/9/2022	0-2	X	X	X		
AOI02-01-SB-[4-6]	9/9/2022	4-6	X				
AOI02-01-SB-[7-9]	9/9/2022	7-9	X				
AOI02-02-SB-[0-2]	9/9/2022	0-2	X				
AOI02-02-SB-[3-5]	9/9/2022	3-5	X				
AOI02-02-SB-[7-9]	9/9/2022	7-9	X				
AOI03-01-SB-[0-2]	9/2/2022	0-2	X				
AOI03-01-SB-[pH/TOC]]	9/2/2022	0-2		X	X	X	
AOI03-01-SB-[5-7]	9/2/2022	5-7	X				
AOI03-01-SB-[11-13]	9/2/2022	11-13	X				
AOI03-02-SB-[0-2]	9/2/2022	0-2	X				
AOI03-02-SB-[5-7]	9/2/2022	5-7	X				
AOI03-02-SB-[13-15]	9/2/2022	13-15	X				
AOI03-03-SB-[0-2]	9/1/2022	3-4	X				
AOI03-03-SB-[4-6]	9/1/2022	4-6	X				
AOI03-03-SB-[8-10]	91/2022	8-10	X				
AOI03-04-SB-[0-2]	9/1/2022	0-2	X				
AOI03-04-SB-[5-7]	9/1/2022	5-7	X				
AOI03-04-SB-[10-12]	9/1/2022	10-12	X				
AOI03-05-SB-[0-2]	9/1/2022	0-2	X				
AOI03-05-SB-[4-6]	9/1/2022	4-6	X				
AOI03-05-SB-[9-11]	9/1/2022	9-11	X				
AOI03-06-SB-[0-2]	9/1/2022	0-2	X				
AOI03-06-SB-[3-5]	9/1/2022	3-5	X				
AOI03-06-SB-[5-7]	9/1/2022	5-7	X				
AOI03-07-SB-[0-2]	9/1/2022	0-2	X				
AOI03-07-SB-[6-8]	9/1/2022	6-8	X				
AOI03-07-SB-[13-15]	9/1/2022	13-15	X				
AOI04-01-SB-[0-2]	9/6/2022	0-2	X				
AOI04-01-SB-[4-6]	9/6/2022	4-6	X				
AOI04-01-SB-[9-11]	9/6/2022	9-11	X				
AOI04-02-SB-[0-2]	9/6/2022	0-2	X				MS/MSD sample collected
AOI04-02-SB-[4-6]	9/6/2022	4-6	X				
AOI04-02-SB-[9-11]	9/6/2022	9-11	X				
AOI04-03-SB-[0-2]	9/6/2022	0-2	X				
AOI04-03-SB-[4-6]	9/6/2022	4-6	X				
AOI04-03-SB-[8-10]	9/6/2022	8-10	X				
AOI04-04-SB-[0-2]	9/7/2022	0-2	X				
AOI04-04-SB-[3-5]	9/7/2022	3-5	X				

Table 5-1. Site Inspection Samples by Medium
Camp Dawson, Kingwood, West Virginia
Site Inspection Report

Sample Identification	Sample Collection Date	Sample Depth (ft bgs)	PFAS[1]	TOC[2]	pH[3]	Grain Size[4]	Comments
AOI04-04-SB-[6-8]	9/7/2022	6-8	X				
AOI04-05-SB-[0-2]	9/6/2022	0-2	X				
AOI04-05-SB-[4-6]	9/6/2022	4-6	X				
AOI04-05-SB-[8-10]	9/6/2022	8-10	X				
AOI04-06-SB-[0-2]	9/7/2022	0-2	X				
AOI04-06-SB-[4-6]	9/7/2022	4-6	X				
AOI04-06-SB-[8-10]	9/7/2022	8-10	X				
AOI04-07-SB-[0-2]	9/7/2022	0-2	X	X	X		
AOI04-07-SB-[4-6]	9/7/2022	4-6	X				
AOI04-07-SB-[9-11]	9/7/2022	9-11	X				
AOI04-08-SB-[0-2]	9/6/2022	0-2	X				MS/MSD sample collected
AOI04-08-SB-[4-6]	9/6/2022	4-6	X				
AOI04-08-SB-[8-10]	9/6/2022	8-10	X				
AOI04-09-SB-[0-2]	9/7/2022	0-2	X				MS/MSD sample collected
AOI04-09-SB-[4-6]	9/7/2022	4-6	X				
AOI04-09-SB-[8-10]	9/7/2022	8-10	X				
AOI04-10-SB-[0-2]	9/6/2022	0-2	X				
AOI04-10-SB-[5-7]	9/6/2022	5-7	X				
AOI05-01-SB-[0-2]	9/7/2022	0-2	X				
AOI05-01-SB-[3-5]	9/7/2022	3-5	X				
AOI05-01-SB-[6-8]	9/7/2022	6-8	X				
AOI05-02-SB-[0-2]	9/7/2022	0-2	X				MS/MSD sample collected
AOI05-02-SB-[3-5]	9/7/2022	3-5	X				
AOI05-02-SB-[6-8]	9/7/2022	6-8	X				
AOI05-03-SB-[0-2]	9/7/2022	0-2	X	X	X		
AOI05-03-SB-[4-6]	9/7/2022	4-6	X				
AOI05-03-SB-[8-10]	9/7/2022	8-10	X				
AOI05-04-SB-[0-2]	9/7/2022	0-2	X				
AOI05-04-SB-[3-5]	9/7/2022	3-5	X				
AOI05-04-SB-[6-8]	9/7/2022	6-8	X				
AOI06-01-SB-[0-2]	9/8/2022	0-2	X				
AOI06-01-SB-[12-14]	9/8/2022	12-14	X	X	X		
AOI06-01-SB-[24-26]	9/8/2022	24-26	X				
AOI06-02-SB-[0-2]	9/8/2022	0-2	X				
AOI06-02-SB-[10-12]	9/8/2022	10-12	X				
AOI06-02-SB-[20-22]	9/8/2022	20-22	X				
AOI07-01-SB-[0-2]	9/8/2022	0-2	X				
AOI07-01-SB-[5-7]	9/8/2022	5-7	X	X	X		
AOI07-01-SB-[12-14]	9/8/2022	12-14	X				
CD-01-SB-[0-2]	9/2/2022	0-2	X				
CD-01-SB-[3-5]	9/2/2022	3-5	X				
CD-01-SB-[8-10]	9/2/2022	8-10	X				
CD-02-SB-[0-2]	8/31/2022	0-2	X				
CD-02-SB-[8-10]	8/31/2022	8-10	X				
CD-02-SB-[16-18]	8/31/2022	16-18	X				
CD-03-SB-[0-2]	8/31/2022	0-2	X				
CD-03-SB-[6-8]	8/31/2022	6-8	X				
CD-03-SB-[12-14]	8/31/2022	12-14	X				
CD-04-SB-[0-2]	9/8/2022	0-2	X				

Table 5-1. Site Inspection Samples by Medium
Camp Dawson, Kingwood, West Virginia
Site Inspection Report

Sample Identification	Sample Collection Date	Sample Depth (ft bgs)	PFAS[1]	TOC[2]	pH[3]	Grain Size[4]	Comments
CD-04-SB-[5-7]	9/8/2022	5-7	X				
CD-04-SB-[11-13]	9/8/2022	11-13	X				
DUP1-20220902	9/2/2022	5-7	X				Field Duplicate of AOI03-01-SB-[5-7]
DUP2-20220902	9/2/2022	3-5	X				Field Duplicate of CD-01-SB-[3-5]
DUP3-20220906	9/6/2022	0-2	X				Field Duplicate of AOI04-01-SB-[0-2]
DUP4-20220906	9/6/2022	0-2	X				Field Duplicate of AOI04-03-SB-[0-2]
DUP5-20220906	9/6/2022	0-2	X				Field Duplicate of AOI04-05-SB-[0-2]
DUP6-20220907	9/7/2022	0-2	X				Field Duplicate of AOI04-06-SB-[0-2]
DUP7-20220907	9/7/2022	0-2	X				Field Duplicate of AOI04-04-SB-[0-2]
DUP8-20220907	9/7/2022	0-2	X				Field Duplicate of AOI01-03-SB-[0-2]
DUP9-20220908	9/8/2022	0-2	X				Field Duplicate of AOI06-06-SB-[0-2]
DUP10-20220908	9/8/2022	0-2	X				Field Duplicate of AOI07-01-SB-[0-2]
Groundwater Samples							
AOI01-01-GW	9/13/2022	--	X				
AOI01-02-GW	9/15/2022	--	X				
AOI01-03-GW	--	--	--				**Insufficient recharge for sample collection**
AOI02-01-GW	9/12/2022	--	X				
AOI02-02-GW	9/15/2022	--	X				
AOI03-01-GW	9/7/2022	--	X				
AOI03-02-GW	9/7/2022	--	X				
AOI03-03-GW	9/6/2022	--	X				
AOI03-04-GW	--	--	--				**Insufficient recharge for sample collection**
AOI03-05-GW	9/12/2022	--	X				
AOI03-06-GW	9/12/2022	--	X				
AOI03-07-GW	9/8/2022	--	X				
AOI04-01-GW	9/13/2022	--	X				
AOI04-02-GW	9/14/2022	--	X				
AOI04-03-GW	9/13/2022	--	X				
AOI04-04-GW	9/13/2022	--	X				
AOI04-05-GW	--	--	--				**Insufficient recharge for sample collection**
AOI04-06-GW	9/16/2022	--	X				
AOI04-07-GW	9/16/2022	--	X				
AOI04-08-GW	9/16/2022	--	X				
AOI04-09-GW	9/16/2022	--	X				
AOI04-10-GW	9/16/2022	--	X				
AOI05-01-GW	9/16/2022	--	X				

Table 5-1. Site Inspection Samples by Medium
Camp Dawson, Kingwood, West Virginia
Site Inspection Report

Sample Identification	Sample Collection Date	Sample Depth (ft bgs)	PFAS[1]	TOC[2]	pH[3]	Grain Size[4]	Comments
AOI05-02-GW	9/15/2022	--	X				
AOI05-03-GW	9/16/2022	--	X				
AOI05-04-GW	9/16/2022	--	X				
AOI06-01-GW	9/15/2022	--	X				
AOI06-02-GW	--	--	--				**Insufficient recharge for sample collection**
AOI07-01-GW	9/14/2022	--	X				
CD-01-GW	9/12/2022	--	X				
CD-02-GW	9/2/2022	--	X				
CD-03-GW	--	--	--				**Insufficient recharge for sample collection**
CD-04-GW	9/14/2022	--	X				
DUP1-GW	9/7/2022	--	X				Field duplicate of AOI03-02-GW
DUP-GW	9/13/2022	--	X				Field duplicate of AOI01-01-GW
DUP3-GW	9/13/2022	--	X				Field duplicate of AOI04-03-GW
DUP4-GW	9/15/2022	--	X				Field duplicate of AOI05-02-GW
Blank Samples							
CD-FB-01	9/2/2022	--	X				Field Blank
CD-FB-04	9/6/2022	--	X				Field Blank
CD-FB-05	9/7/2022	--	X				Field Blank
CD-FB-06	9/8/2022	--	X				Field Blank
CD-FB-07	9/9/2022	--	X				Field Blank
CD-FB-08	9/12/2022	--	X				Field Blank
CD-FB-09	9/13/2022	--	X				Field Blank
CD-FB-10	9/14/2022	--	X				Field Blank
CD-FB-11	9/15/2022	--	X				Field Blank
CD-FB-12	9/16/2022	--	X				Field Blank
CD-EB-01	8/31/2022	--	X				Equipment Blank
CD-EB-02	9/1/2022	--	X				Equipment Blank
CD-EB-03	9/2/2022	--	X				Equipment Blank
CD-EB-04	9/6/2022	--	X				Equipment Blank
CD-EB-05	9/7/2022	--	X				Equipment Blank
CD-EB-06	9/8/2022	--	X				Equipment Blank
CD-EB-07	9/9/2022	--	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 International D422
ft = foot (feet)
bgs = below ground surface

Table 5-2. Soil Boring Depths and Temporary Well Screen Intervals
Camp Dawson, Kingwood, West Virginia
Site Inspection Report

AOI	Boring ID	Soil Boring Depth (ft bgs)	Temporary Well Screen Interval (ft bgs)
1	AOI01-01	23	18-23
	AOI01-02	30	25-30
	AOI01-03	31.5	26.5-31.5
2	AOI02-01	12	7-12
	AOI02-02	15	10-15
3	AOI03-01	20	15-20
	AOI03-02	20	15-20
	AOI03-03	15	10-15
	AOI03-04	17	12-17
	AOI03-05	16	11-16
	AOI03-06	12	7-12
	AOI03-07	20	15-20
4	AOI04-01	20	15-20
	AOI04-02	15	10-15
	AOI04-03	15	10-15
	AOI04-04	14.5	9.5-14.5
	AOI04-05	14	9-14
	AOI04-06	13	8-13
	AOI04-07	13.5	8.5-13.5
	AOI04-08	20	15-20
	AOI04-09	15	10-15
	AOI04-10	8.5	3.5-8.5
5	AOI05-01	15	10-15
	AOI05-02	15	10-15
	AOI05-03	17	12-17
	AOI05-04	15	10-15
6	AOI06-01	33	28-33
	AOI06-02	25	20-25
7	AOI07-01	15	10-15
Facility Boundary	CD-01	20	15-20
	CD-02	20	15-20
	CD-03	14	10-14
	CD-04	20	15-20

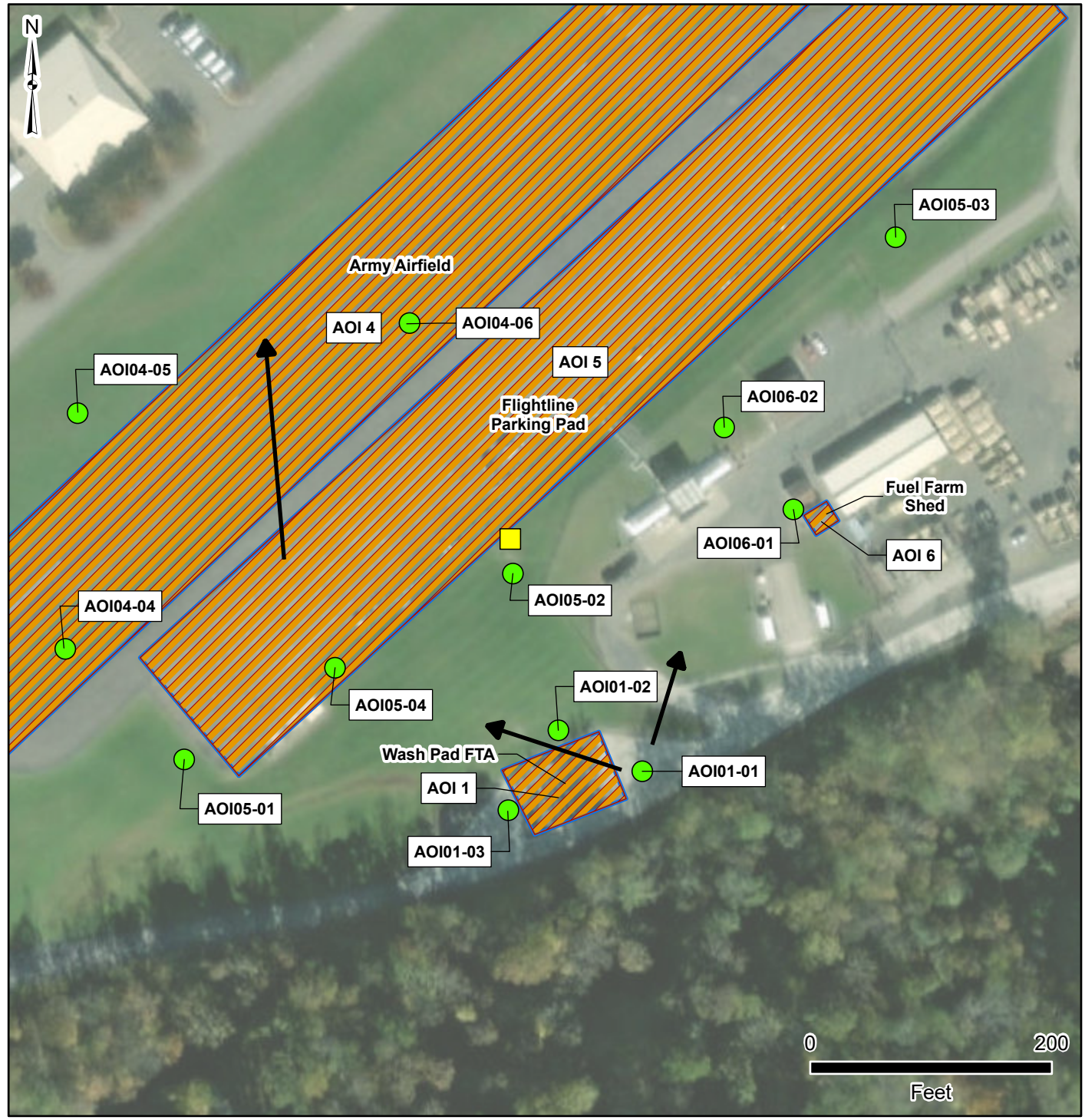
Table 5-3. Groundwater Elevation
Camp Dawson, Kingwood, West Virginia
Site Inspection Report

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	1280.53	9.41	8.28	1271.12	1279.40
AOI01-02	1279.43	24.03	23.40	1255.40	1278.80
AOI01-03	1278.22	*	*	*	1277.30
AOI02-01	1251.41	9.89	9.38	1241.52	1250.90
AOI02-02	1250.84	9.18	8.34	1241.66	1250.00
AOI03-01	1248.84	2.20	1.66	1246.10	1248.30
AOI03-02	1249.20	5.85	5.45	1242.95	1248.80
AOI03-03	1247.92	11.70	11.58	1236.10	1247.80
AOI03-04	**	*	*	*	**
AOI03-05	1248.24	14.10	13.36	1233.40	1247.50
AOI03-06	1249.09	8.20	7.71	1240.40	1248.60
AOI03-07	1249.23	9.27	8.34	1239.03	1248.30
AOI04-01	1260.35	6.18	5.73	1253.72	1259.90
AOI04-02	1260.26	6.6	6.04	1253.10	1259.70
AOI04-03	1258.96	5.4	4.44	1252.60	1258.00
AOI04-04	1257.18	8.41	7.03	1247.39	1255.80
AOI04-05	1255.09	8.3	8.31	1246.79*	1255.10
AOI04-06	1257.12	10.71	9.09	1246.41	1255.50
AOI04-07	1256.41	10.07	9.06	1245.33	1255.40
AOI04-08	1253.67	13.60	12.83	1240.07	1252.90
AOI04-09	1252.07	9.45	9.78	1242.95	1252.40
AOI04-10	1249.79	4.98	4.19	1244.81	1249.00
AOI05-01	1258.76	9.32	8.66	1248.78	1258.10
AOI05-02	1258.99	7.65	7.06	1250.75	1258.40
AOI05-03	1258.84	13.20	13.36	1245.80	1259.00
AOI05-04	1258.61	10.85	10.64	1247.76	1258.40
AOI06-01	1274.89	27.69	26.90	1247.20	1274.10
AOI06-02	1271.30	*		*	1271.60
AOI07-01	1253.47	11.60	11.63	1241.87	1253.50
CD-01	1254.46	3.35	3.29	1251.11	1254.40
CD-02	1251.74	13.80	13.26	1237.94	1251.20
CD-03	1251.32	*		*	1250.70
CD-04	1254.42	11.65	11.23	1242.77	1254.00

Notes:
amsl = Above mean sea level
btoc = Below top of casing
** = Well was not surveyed
* = Well had insufficient recharge for sample collection and/or DTW measurement;

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 5-1
Site Inspection Sample Locations (AOI 1, 4, 5, 6)



Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 5-1 Site Inspection Sample Locations AOI 1,4,5,6

Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release
- Oil Water Seperator

Sample Locations
- Sample Location

Hydrology/Hydrogeology
- Groundwater Flow Direction

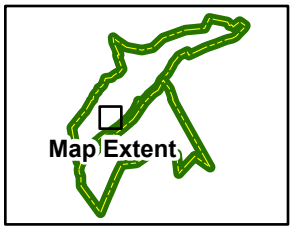
Data Sources:
ESRI 2020
AECOM 2020

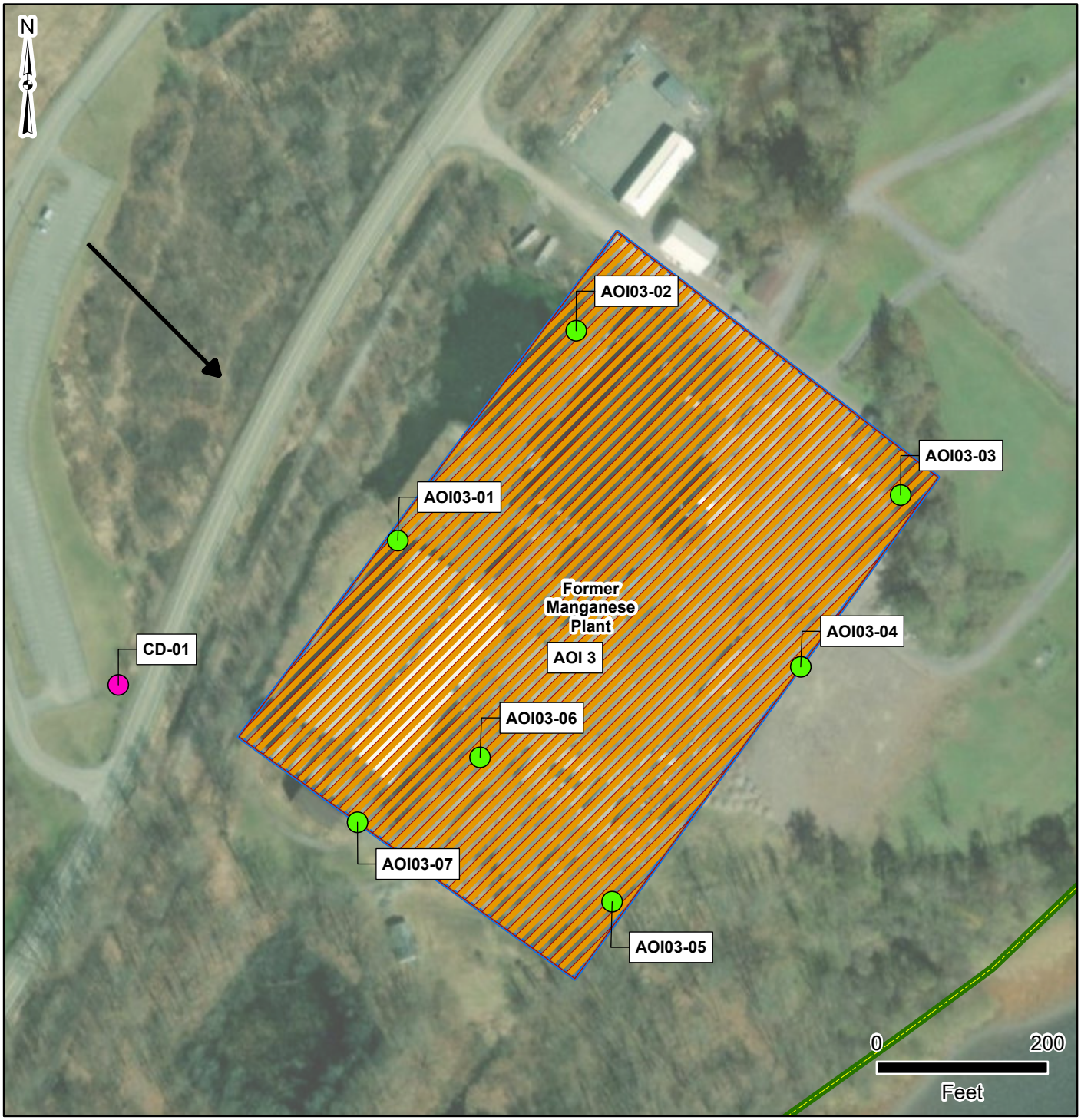
Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 5-2
Site Inspection Sample Locations (AOI 3)





Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 5-2 Site Inspection Sample Locations AOI 3

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

Sample Locations
- Sample Location
- Boundary Well

Hydrology/Hydrogeology
- Groundwater Flow Direction

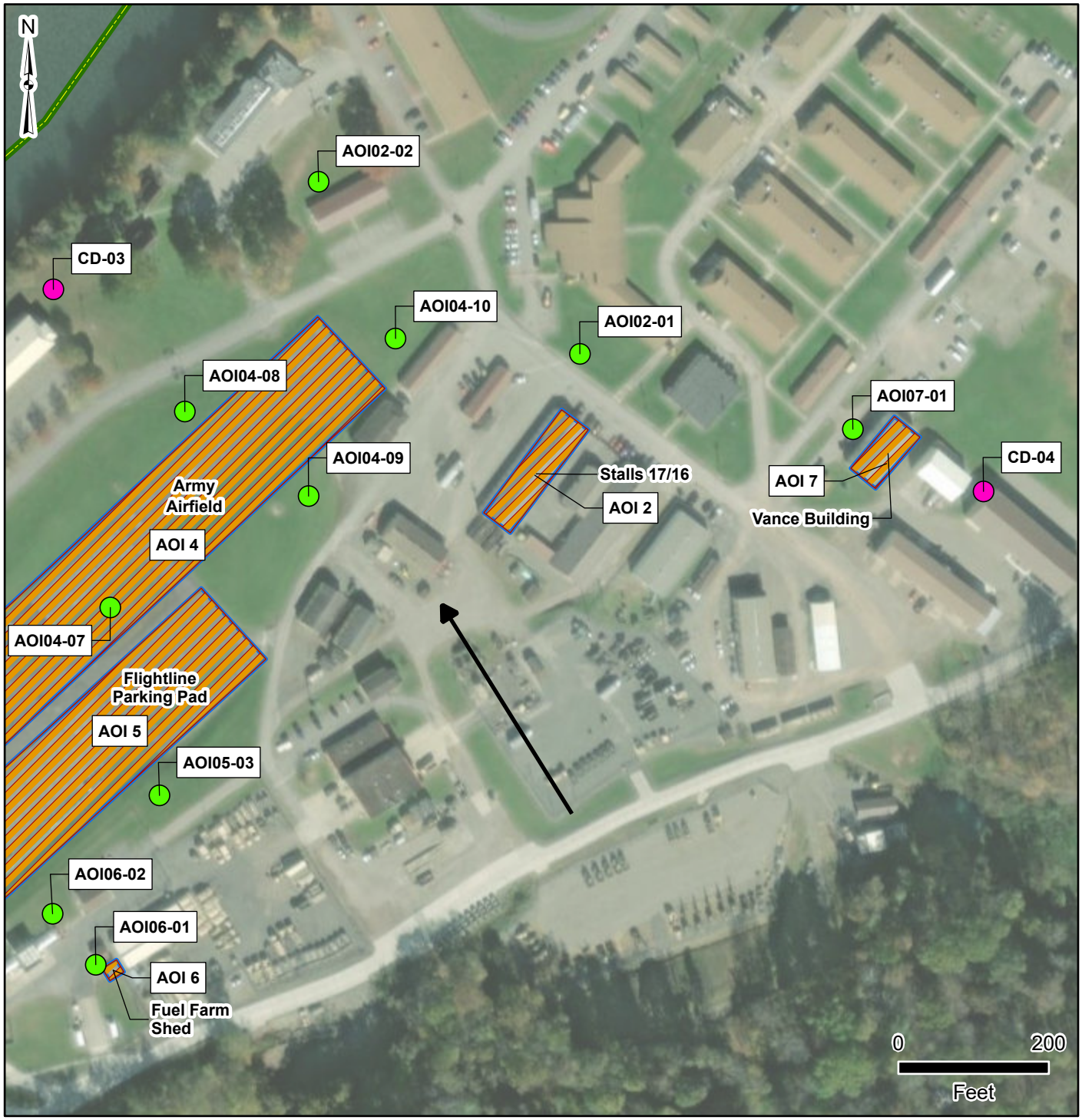
Data Sources:
ESRI 2020
AECOM 2020

Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 5-3
Site Inspection Sample Locations (AOI's 2, 4, 5, 6, 7)



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

Sample Locations
- Sample Location
- Boundary Well

Hydrology/Hydrogeology
- Groundwater Flow Direction

Data Sources:
ESRI 2020
AECOM 2020

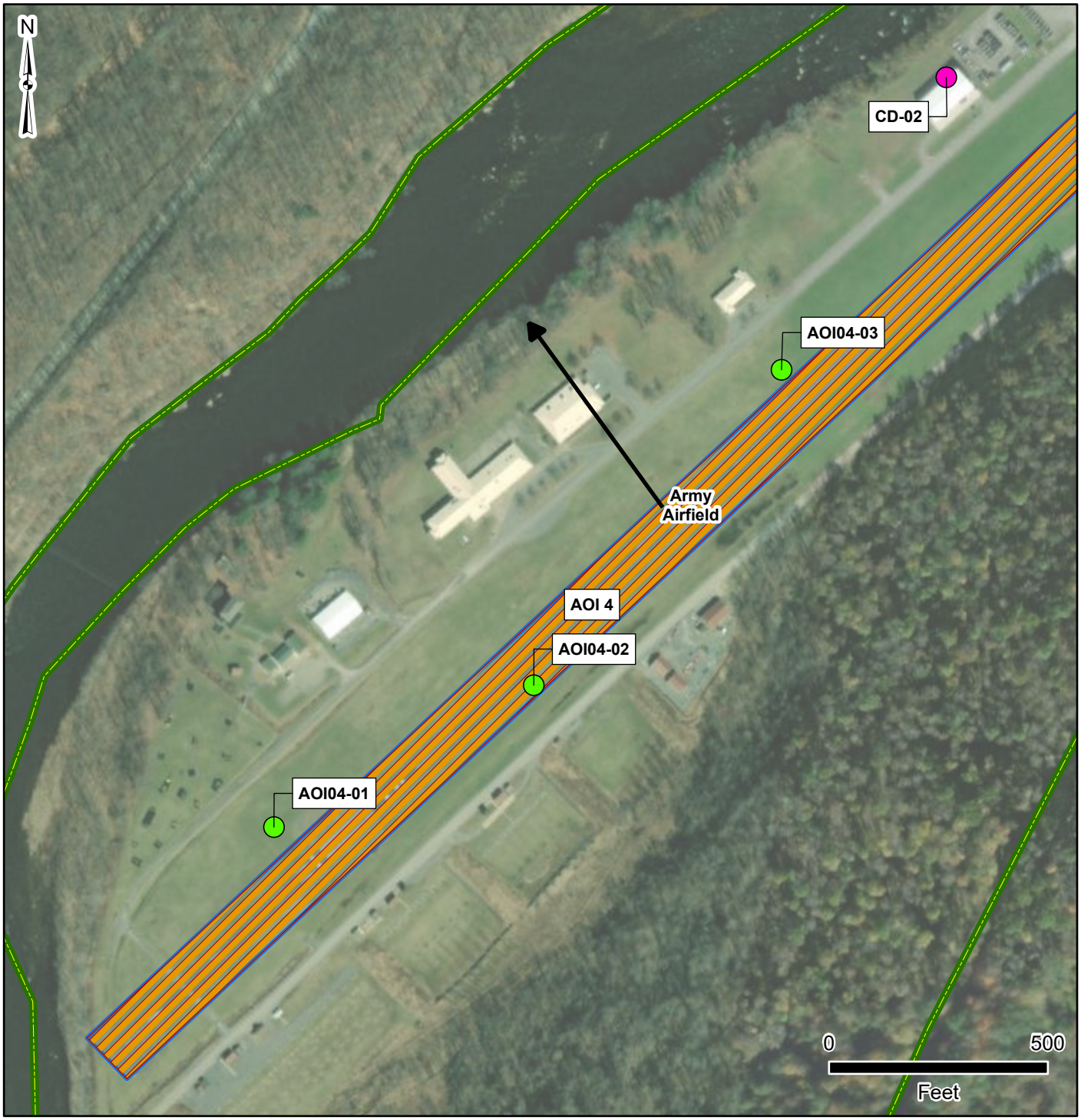
Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 5-3 Site Inspection Sample Locations AOI 2,4,5,6,7

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 5-4
Site Inspection Sample Locations (AOI 4)



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

Sample Locations
- Sample Location
- Boundary Well

Hydrology/Hydrogeology
- Groundwater Flow Direction

Data Sources:
ESRI 2020
AECOM 2020

Date:..... October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx\Figure 5-4 Site Inspection Sample Locations AOI 4

This page intentionally left blank

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** below.

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 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

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

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.

6.2 SOIL PHYSICOCHEMICAL ANALYSES

To provide basic soil parameter information, soil samples were analyzed for grainsize, TOC, and pH, which are important for evaluating transport through the soil medium. **Appendix F** contains the results of the grainsize, 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 AOI01-01-SB-[0-2] and AOI02-01-SB-[0-2], AOI03-01-SB-PH/TOC, AOI04-07-SB-[0-2], AOI05-03-SB-[0-2], AOI06-01-SB-[12-14], and AOI07-01-SB-[5-7]. Results were similar, with pH ranging from 6.0 to 7.4, and TOC results ranging from non-detect (ND), to 8000 milligrams per kilogram (mg/kg). The grain size analysis conducted on sample AOI03-01-SB-GS consisted of approximately 50.1% clay, 17.6% sand, 32.3% silt, and 0.0% gravel. 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 Wash Pad FTA. 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 three boring locations associated with the potential release areas at AOI 1. Soil was sampled from three intervals at all locations, with an additional sample collected at AOI01-01 and analyzed for pH and TOC. Samples were collected from surface soil (0 to 2 ft bgs), shallow subsurface soil (7 to 14 ft bgs), and deep subsurface soil (15 to 26 ft bgs).

Only location AOI01-01 had detections of relevant compounds (PFNA, PFOA, PFHxS, and PFOS) in surface soil (0 to 2 ft bgs). PFBS was not detected. PFOS was detected at a concentration of 15 µg/kg, which exceeds the SL of 13µg/kg. Detections of PFNA (0.21 [J estimated]), PFOA (0.29 [J estimated]), and PFHxS (2.0 µg/kg) were below their respective SLs of 19 µg/kg, 19 µg/kg, and 130 µg/kg, respectively.

There were no detections of relevant compounds in any shallow subsurface sample.

AOI01-02 had the only detection of relevant compounds in deep subsurface soil. PFOA was detected at an estimated concentration of 0.29 µg/kg (J).

6.3.2 AOI 1 – Groundwater Analytical Results

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

Groundwater was collected from two of three temporary wells installed. Location AOI01-03 ran dry and no sample was collected. The two sampled locations, as well as the duplicate sample for AOI01-01, had detections of PFBS, PFHxS, PFNA, PFOS, and PFOA, with exceedances for PFOS, PFHxS, and PFOA.

PFOS was detected at AOI01-01 at a concentration of 4.0 ng/L, which equals the associated SL (4.0 ng/L). PFOS was detected in exceedance of the SL at locations AOI01-02 and the duplicate sample for AOI01-01 at concentrations of 21 ng/L and 4.8 ng/L, respectively. PFBS was detected at concentrations of 3.7, 3.8, and 21 ng/L at locations AOI01-01, AOI01-01 duplicate, and AOI01-02, respectively. Both of these detections were below the associated SL of 601 ng/L. PFHxS was detected at concentrations of 19 ng/L, 20 ng/L, and 49 ng/L at location AOI01-01, in the duplicate sample (AOI01-01), and at location AOI01-02, respectively. The detection at AOI01-02 exceeded the associated SL of 39 ng/L. PFNA was detected below the SL (6 ng/L) in the duplicate sample for AOI01-01 with an estimated concentration of 0.47 J ng/L.

6.3.3 AOI 1 – Conclusions

Four of the five relevant compounds were detected in soil at AOI 1. PFNA, PFOA, and PFHxS were detected below their respective SLs, and PFOS exceeded the SL. In groundwater, detected concentrations exceeded the respective SLs for PFHxS, PFOS, and PFOA. 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 Stalls 17/16. The soil and groundwater results are summarized on **Tables 6-2 through 6-5**. Soil and groundwater results are presented on **Figures 6-15 through 6-21**.

6.4.1 AOI 2 – 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 in two boring locations associated with the potential release areas at AOI 2. Soil was sampled from three intervals at locations AOI02-01 and AOI02-02, with an additional sample collected at AOI02-01 and analyzed for pH and TOC. Samples were collected from surface soil (0 to 2 ft bgs), shallow subsurface soil (3 to 6 ft bgs), and deep subsurface soil (7 to 9 ft bgs).

The only detection of relevant compounds occurred in the surface sample at boring AOI02-01, at concentrations below the SLs. PFOA was detected at a concentration of 0.84 µg/kg, below the SL of 19 µg/kg. PFOS was detected at an estimated concentration of 0.25 J µg/kg, below the SL of 13 µg/kg. There were no other detections of relevant compounds in the shallow subsurface or deep subsurface soils samples from AOI 2.

6.4.2 AOI 2 – Groundwater Analytical Results

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

Groundwater samples were collected from two temporary wells at AOI 2 during the SI. All five relevant compounds were detected in groundwater. PFOA concentrations ranged from 3.9 ng/L in AOI02-02, below the SL of 6 ng/L, to 20 ng/L in AOI02-01, which exceeds the SL. Each of the four other relevant compounds were detected in one or more samples at concentrations below their respective SLs. PFBS concentrations ranged from 0.59 J to 2.7 ng/L, below the SL of 601 ng/L. PFHxS concentrations ranged from ND to 3.3 ng/L, below the SL of 39 ng/L. PFNA concentrations ranged from ND to 0.67 J ng/L, below the SL of 6 ng/L. PFOS concentrations ranged from ND to 1.3 J ng/L, below the SL of 4 ng/L.

6.4.3 AOI 2 – Conclusions

None of the relevant compounds were detected in soil above their respective SLs. PFOA was detected in groundwater at concentrations above the SL and PFBS, PFHxS, PFNA, and PFOS were detected in groundwater at concentrations below their respective SLs. Based on the exceedance of an SL in 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 includes the Former Manganese Plant. 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 release areas at AOI 3, as well as one boundary location (CD-01) approximately 250 ft upgradient of AOI 3. Soil was sampled from three intervals at each location, with an additional sample taken at AOI03-01 and analyzed for pH, TOC, and grain size. Samples were collected from surface soil (0 to 2 ft bgs), shallow subsurface soil (3 to 8 ft bgs), and deep subsurface (8 to 15 ft bgs). It should be noted that at location AOI3-06, shallow groundwater was encountered at 7ft bgs; thus, the deep interval for this location was 5 to 7 ft bgs.

Two relevant compounds were detected in surface soil at AOI 3. PFOS was detected at AOI03-03 at an estimated concentration of 0.23 J µg/kg, below the SL of 13 µg/kg. PFOA was detected in AOI03-05 at an estimated concentration of 0.23 J µg/kg below the SL of 19 µg/kg. No other relevant compounds were detected.

There was one detection of PFOA in shallow subsurface soil at AOI3-05 at an estimated concentration of 0.56 J µg/kg, which is below the associated SL of 250 µg/kg. There were no other detections of relevant compounds in shallow subsurface soil.

There were no detections of relevant compounds at any location in deep subsurface soil at AOI 3 or upgradient of the AOI (CD-01).

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 six of the seven temporary well locations at the AOI; temporary well AOI03-04 ran dry and a sample was not able to be collected. Additionally, groundwater was collected from one boundary well (CD-01) installed approximately 250 ft upgradient of the AOI. Relevant compounds were detected in groundwater in all sampled locations at AOI 3. PFOA was detected in all locations ranging from an estimated concentration of 0.83 J ng/L in AOI03-02 (duplicate sample) to 35 ng/L in AOI03-05, which was the only PFOA exceedance above the 6 ng/L SL. PFOS was detected at concentrations ranging from 1 to 7.3 ng/L. However, only the concentrations detected at locations AOI03-03 (7.3 ng/L) and AOI03-05 (4.1 ng/L) exceeded the associated SL of 4.0 ng/L.PFNA was detected below the SL of 6 ng/L in three locations with concentrations ranging from 0.48 J to 2.9 ng/L. PFHxS was detected below the SL of 39 ng/L with estimated concentrations of 0.63 J ng/L detected in the duplicate AOI03-02 sample and 0.81 J ng/L detected in AOI03-05. PFBS was detected below the SL of 601 ng/L in three wells, with values ranging from 0.40 J to 1.1 J ng/L. PFOA was detected at a concentration of 3.3 ng/L at CD-01, well below the SL of 6 ng/L.

6.5.3 AOI 3 – Conclusions

None of the relevant compounds were detected in soil above their respective SLs. Groundwater results indicated that PFOS and PFOA exceeded the SLs at one or more locations and PFBS, PFHxS, and PFNA were detected in groundwater at concentrations below their respective SLs. Based on the exceedances of the SLs in 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 Army Airfield. In addition to the AOI 4 results, this section also presents the results for soil and groundwater samples collected from boundary locations CD-02 and CD-03, which are located approximately 300 ft downgradient of AOI 4's central and northern portions, respectively. The soil and groundwater results are summarized on **Tables 6-2 through 6-5** and presented on **Figures 6-1 through 6-7** as well as **Figures 6-15 through 6-28**.

6.6.1 AOI 4 – Soil Analytical Results

Tables 6-2 through 6-4 summarize the detected compounds in soil. **Figures 6-1 through 6-5** and **Figures 6-15 through 6-19** and **Figures 6-22 through 6-**26 present the ranges of detections in soil.

Soil was sampled at 10 locations associated with release areas at AOI 4 and two locations directly downgradient of the AOI (CD-02 and CD-03). Soil was sampled from three intervals at each location, except for AOI04-10 where shallow refusal was hit under 8 ft bgs and only two soil samples were collected. An additional sample was taken at AOI04-07 and analyzed for pH and TOC. Samples were collected from surface soil (0 to 2 ft bgs), shallow subsurface soil (4 to 7 ft bgs), and deep subsurface soil (6 to 10 ft bgs).

Relevant compounds were detected in surface soil at two AOI locations and one of the downgradient locations below associated SLs. PFOA was detected in the AOI04-06 duplicate sample, AOI04-08, and CD-02 with estimated concentrations of 0.42 J µg/kg, 0.31 J µg/kg, and 0.38 J µg/kg, respectively, which are below the SL of 19 µg/kg. PFOS was detected in the CD-02 surface sample at a concentration of 0.83 µg/kg, below the SL of 13 µg/kg. No other relevant compounds were detected in surface soil at AOI 4. There were no detections of relevant compounds in the shallow subsurface and deep subsurface soil intervals in AOI 4.

6.6.2 AOI 4 – Groundwater Analytical Results

Figures 6-6 and 6-7, **Figures 6-20 and 6-21, and Figures 6-27 and 28** present the ranges of detections in groundwater. **Table 6-5** summarizes the groundwater results.

Groundwater was sampled from 9 of the 10 temporary well locations at the AOI and one of the two downgradient wells. At two locations (AOI04-05 and CD-03), the wells ran dry and samples were not collected. All five relevant compounds were detected in one sample, AOI04-07. One or more relevant compounds were detected in all samples at AOI 4.

Detections of PFOA ranged from 1.4 J ng/L in AOI04-06 to 7.9 ng/L in AOI04-07. Only the detection of PFOA in AOI04-07 exceeded the associated SL of 6.0 ng/L. PFOS concentrations ranged from 0.74 J (AOI04-10) to 8.2 ng/L in CD-02. Only the detection of PFOS in CD-02 (8.2 ng/L) exceeded the SL of 4 ng/L. PFNA was detected below the SL of 6 ng/L in a single well, AOI04-07, with an estimated concentration of 1.2 J ng/L. PFHxS was detected below the SL of 39 ng/L in four AOI locations and one downgradient location (CD-02) with concentrations ranging from 0.65 J to 2 ng/L in AOI04-10 and AOI04-09, respectively. PFBS was detected below the SL of 601 ng/L in five AOI wells and one downgradient well (CD-02) with concentrations ranging from 0.59 J to 2.1 ng/L in AOI04-08 and AOI04-07, respectively.

6.6.3 AOI 4 – Conclusions

None of the relevant compounds were detected above the SLs in soil at AOI 4. Groundwater results indicated one or more of the five relevant compounds were detected at every groundwater sample location in AOI 4, and five relevant compounds were detected in AOI04-07. A single exceedance of PFOA occurred at AOI04-7 with a concentration of 7.9 ng/L, above the SL of 6

ng/L. Additionally, a detection of PFOS (8.2 ng/L) in CD-02 (downgradient well) exceeded the associated SL of 4 ng/L. 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 and groundwater in comparison to SLs for AOI 5, which includes the Flightline Parking Pad. The soil and groundwater results are summarized on **Tables 6-2 through 6-5** and presented on **Figures 6-1 through 6-7** as well as **Figures 6-15 through 6-21**.

6.7.1 AOI 5 – Soil Analytical Results

Tables 6-2 through 6-4 summarize the detected compounds in soil. **Figures 6-1 through 6-5** and **Figures 6-15 through 6-19** present the ranges of detections in soil.

Soil was sampled at four locations associated with release areas at AOI 5. Samples were collected from three intervals at each location, with an additional sample taken at AOI05-03 and analyzed for pH and TOC. Samples were collected from surface soil (0 to 2 ft bgs), shallow subsurface (3 to 6 ft bgs), and deep subsurface soil (6 to 10 ft bgs).

There were no detections of relevant compounds in the surface, shallow subsurface, or deep subsurface soil intervals in AOI 5.

6.7.2 AOI 5 – Groundwater Analytical Results

Figures 6-6 and 6-7 and **Figures 6-20 and 21** present the ranges of detections in groundwater. **Table 6-5** summarizes the groundwater results.

Groundwater was sampled from four temporary well locations at AOI 5. Five relevant compounds were detected at two locations above and below SLs, with one or more relevant compounds being detected in every temporary well at AOI 5.

PFOA was detected in all temporary well locations with concentrations ranging from 1.5 J to 6.7 ng/L in AOI05-02 dup and AOI05-03, respectively. Only the detected concentration of PFOA at AOI05-03 exceeded the associated SL of 6 ng/L. PFOS was detected in two locations, AOI05-03 and AOI05-02 with concentrations of 2.1 ng/L and 8.1 ng/L, respectively. The detected concentration of PFOS at AOI05-02 exceeded the SL of 4 ng/L. An exceedance for PFOS was also detected in the duplicate sample for AOI05-02 with a concentration of 8.7 ng/L. PFNA was detected in two locations, AOI05-02 (and its' duplicate sample) and AOI05-03, with estimated concentrations of 0.48 J and 0.57 J ng/L, respectively. All detections of PFNA were below the 6 ng/L SL. PFHxS was detected in all locations (and the duplicate sample for AOI05-02) below the 39 ng/L SL, with concentrations ranging from 3.9 to 17 ng/L. PFBS was detected in all locations (and the duplicate sample for AOI05-02) below the 601 ng/L SL, with concentrations ranging from 0.96 J to 5.9 ng/L.

6.7.3 AOI 5 – Conclusions

No relevant compounds were detected in any interval of soil at AOI 5. Groundwater results indicated one or more of the five relevant compounds detected in samples at AOI 5, above and below respective SLs. An exceedance for PFOA was detected in AOI05-03, with a concentration of 6.7 ng/L, above the 6 ng/L SL. PFOS was detected above the 4 ng/L SL in AOI5-02 and its' duplicate sample with concentrations of 8.1 and 8.7 ng/L, respectively. Based on the exceedances of the SLs in groundwater further evaluation at AOI 5 is warranted.

6.8 AOI 6

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 6, which includes the Fuel Farm Shed. The soil and groundwater results are summarized on **Tables 6-2 through 6-5** and presented on **Figures 6-1 through 6-7** as well as **Figures 6-15 through 6-21**.

6.8.1 AOI 6 – Soil Analytical Results

Tables 6-2 through 6-4 summarize the detected compounds in soil. **Figures 6-1 through 6-5** and **Figures 6-15 through 6-19** present the ranges of detections in soil.

Soil was sampled at two locations within the release areas at AOI 6. Samples were collected from three intervals at each location, with an additional sample collected at AOI06-01 and analyzed for pH and TOC. Soil samples were collected from surface soil (0 to 2 ft bgs), shallow subsurface soil (10 to 14 ft bgs), and deep subsurface soil (20 to 26 ft bgs).

Relevant compounds were detected below SLs in surface soil at one location, AOI06-02 and its' associated duplicate. PFOA was detected below the 19 µg/kg SL at an estimated concentration of 0.27 J µg/kg in the duplicate sample, but not the parent sample. PFOS was detected in both samples with estimated concentrations of 0.34 J (duplicate) and 0.64 J µg/kg (AOI06-02), below the SL of 13 µg/kg. PFHxS was detected below the SL of 130 µg/kg at concentrations of 0.95 (duplicate) and 0.69 J µg/kg (AOI06-02). PFNA and PFBS were not detected.

There were no other detections of relevant compounds in the shallow subsurface and deep subsurface soil intervals at AOI 6.

6.8.2 Groundwater Analytical Results

Figures 6-6 and 6-7 and **Figures 6-20 and 21** present the ranges of detections in groundwater. **Table 6-5** summarizes the groundwater results.

Groundwater was collected from one of two temporary wells installed at AOI 6; temporary well location AOI06-02 ran dry and a groundwater sample was not collected. Relevant compounds were detected in AOI06-01 below their respective SLs. PFOA was detected at an estimated concentration of 0.72 J ng/L; PFHxS was detected at an estimated concentration of 1.1 J ng/L; and PFBS was detected at an estimated concentration of 0.82 J ng/L, below the SLs

of 6 ng/L, 39 ng/L, and 601 ng/L, respectively. There were no other detections of relevant compounds in groundwater at AOI 6.

6.8.3 AOI 6 – Conclusions

No relevant compounds were detected above SLs for any interval of soil at AOI 6. PFOA, PFOS, and PFHxS were detected in surface soil well below their respective SLs at one location. Results indicated no relevant compounds were detected above SLs for the groundwater sample collected. PFOA, PFHxS, and PFBS were detected at concentrations well below their respective SLs for groundwater. Based on the results of this SI, and the lack of exceedances for soil and groundwater, further evaluation at AOI 6 is not warranted.

6.9 AOI 7

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 7, which includes the Vance Building. The soil and groundwater results are summarized on **Tables 6-2 through 6-5** and presented on **Figures 6-15 through 6-21.**

6.9.1 AOI 7 – 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 from one location at AOI 7 and one location (CD-04) approximately 75 ft east and upgradient of AOI 7. Samples were collected from three intervals, with an additional sample collected and analyzed for pH and TOC. Sample intervals included surface soil (0 to 2 ft bgs), shallow subsurface soil (5 to 7 ft bgs), and deep subsurface soil (12 to 14 ft bgs).

There were no detections of relevant compounds in the surface soil interval at AOI 7. PFOA was detected at an estimated concentration of 0.42 J µg/kg in surface soil at CD-04, below the SL of 19 µg/kg.

There were no detections of relevant compounds in the shallow subsurface and deep subsurface soil intervals at AOI 7 and CD-04.

6.9.2 AOI 7 – Groundwater Analytical Results

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

Groundwater was collected from one temporary well location at AOI 7 and one upgradient boundary well (CD-4). In the AOI well, five relevant compounds were detected, with four of the five compounds (PFOS, PFNA, PFHxS, and PFBS) detected below their respective SLs. PFOA was detected at a concentration of 43 ng/L, above the 6 ng/L SL. PFOS, PFNA, PFHxS, and PFBS were found at estimated concentrations of 1.7 J+, 0.71 J, 1.5 J, and 1.9 ng/L, respectively, below their respective SLs of 4 ng/L, 6 ng/L, 39 ng/L, and 601 ng/L. PFBS was detected in CD-04 at a concentration of 0.68 ng/L, which is below the associated SL of 601 ng/L.

6.9.3 AOI 7 – Conclusions

No relevant compounds were detected for any interval of soil at AOI 7. Groundwater results showed five relevant compounds detected at AOI 7, with a single exceedance for PFOA, which had a concentration of 49 ng/L, above the SL of 6 ng/L. Based on the exceedances of an SL in groundwater, further evaluation at AOI 7 is warranted.

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

Location ID		AOI01-01		AOI01-02		AOI01-03		AOI01-03		AOI02-01		AOI02-02		AOI03-01	
Sample Name		AOI01-01-SB-0-2		AOI01-02-SB-0-2		AOI01-03-SB-0-2		DUP8		AOI02-01-SB-0-2		AOI02-02-SB-0-2		AOI03-01-SB-0-2	
Parent Sample ID								AOI01-03-SB-0-2							
Sample Date		9/8/2022		9/8/2022		9/7/2022		9/8/2022		9/9/2022		9/9/2022		9/2/2022	
Sample Depth (ft bgs)		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**
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
Perfluorohexanesulfonic acid (PFHxS)	130	2		ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	19	0.21	J	ND	U	ND	U	ND	U	ND	U	ND	UJ	ND	U
Perfluorooctanesulfonic acid (PFOS)	13	15		ND	U	ND	U	ND	U	0.25	J	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	19	0.29	J	ND	U	ND	U	ND	U	0.84		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 Limit of Detection (LOD). Associated numerical value is approximate.

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.
ft bgs = Feet below ground surface.
µg/kg = Microgram(s) per kilogram.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

Location ID		AOI03-02		AOI03-03		AOI03-04		AOI03-05		AOI03-06		AOI03-07		AOI04-01		AOI04-01	
Sample Name		AOI03-02-SB-0-2		AOI03-03-SB-0-2		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		DUP3	
Parent Sample ID																AOI04-01-SB-02	
Sample Date		9/2/2022		9/1/2022		9/1/2022		9/1/2022		9/1/2022		9/1/2022		9/6/2022		9/8/2022	
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	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	13	ND	U	0.23	J	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	19	ND	U	ND	U	ND	U	0.23	J	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 Limit of Detection (LOD). Associated numerical value is approximate.

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.
ft bgs = Feet below ground surface.
µg/kg = Microgram(s) per kilogram.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

	Location ID	AOI04-02		AOI04-03		AOI04-03		AOI04-04		AOI04-04		AOI04-05		AOI04-05		AOI04-06	
	Sample Name	AOI04-02-SB-0-2		AOI04-03-SB-0-2		DUP4		AOI04-04-SB-0-2		DUP7		AOI04-05-SB-0-2		DUP5		AOI04-06-SB-0-2	
	Parent Sample ID					AOI04-03-SB-0-2				AOI04-04-SB-0-2				AOI04-05-SB-0-2			
	Sample Date	9/6/2022		9/6/2022		9/8/2022		9/7/2022		9/8/2022		9/6/2022		9/8/2022		9/7/2022	
	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	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	13	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	19	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).
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD). Associated numerical value is approximate.

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.
ft bgs = Feet below ground surface.
µg/kg = Microgram(s) per kilogram.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

Location ID		AOI04-06		AOI04-07		AOI04-08		AOI04-09		AOI04-10		AOI05-01		AOI05-02		AOI05-03		AOI05-04	
Sample Name		DUP6		AOI04-07-SB-0-2		AOI04-08-SB-0-2		AOI04-09-SB-0-2		AOI04-10-SB-0-2		AOI05-01-SB-0-2		AOI05-02-SB-0-2		AOI05-03-SB-0-2		AOI05-04-SB-0-2	
Parent Sample ID		AOI04-06-SB-0-2																	
Sample Date		9/8/2022		9/7/2022		9/6/2022		9/7/2022		9/6/2022		9/7/2022		9/7/2022		9/7/2022		9/7/2022	
Sample Depth (ft bgs)		0-2		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**	**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	ND	U
Perfluorohexanesulfonic acid (PFHxS)	130	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	19	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	13	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	19	0.42	J	ND	U	0.31	J	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 Limit of Detection (LOD). Associated numerical value is approximate.

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.
ft bgs = Feet below ground surface.
µg/kg = Microgram(s) per kilogram.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

	Location ID	AOI06-01		AOI06-02		AOI06-02		AOI07-01		AOI07-01		CD-01		CD-02		CD-03		CD-04	
	Sample Name	AOI06-01-SB-0-2		AOI06-02-SB-0-2		DUP9		AOI07-01-SB-0-2		DUP10		CD-01-SB-0-2		CD-02-SB-0-2		CD-03-SB-0-2		CD-04-SB-0-2	
	Parent Sample ID					AOI06-02-SB-0-2				AOI07-01-SB-0-2									
	Sample Date	9/8/2022		9/8/2022		9/8/2022		9/8/2022		9/8/2022		9/2/2022		8/31/2022		8/31/2022		9/8/2022	
	Sample Depth (ft bgs)	0-2		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**	**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	UJ	ND	U
Perfluorohexanesulfonic acid (PFHxS)	130	ND	U	0.69	J	0.95		ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	19	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	13	ND	U	0.64	J	0.34	J	ND	U	ND	U	ND	U	0.83		ND	U	ND	U
Perfluorooctanoic acid (PFOA)	19	ND	U	ND	U	0.27	J	ND	U	ND	U	ND	U	0.38	J	ND	U	0.42	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).
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD). Associated numerical value is approximate.

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.
ft bgs = Feet below ground surface.
µg/kg = Microgram(s) per kilogram.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

Location ID		AOI01-01		AOI01-02		AOI01-03		AOI02-01		AOI02-01		AOI02-02		AOI02-02	
Sample Name		AOI01-01-SB-7-9		AOI01-02-SB-12-14		AOI01-03-SB-12-14		AOI02-01-SB-4-6		AOI02-01-SB-7-9		AOI02-02-SB-3-5		AOI02-02-SB-7-9	
Parent Sample ID															
Sample Date		9/8/2022		9/8/2022		9/7/2022		9/9/2022		9/9/2022		9/9/2022		9/9/2022	
Sample Depth (ft bgs)		7-9		12-14		12-14		4-6		7-9		3-5		7-9	
Analyte	**Screening Level[1,2]**	**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
Perfluorohexanesulfonic acid (PFHxS)	1600	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
Perfluorooctanesulfonic acid (PFOS)	160	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	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 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 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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

Location ID		AOI03-01		AOI03-01		AOI03-01		AOI03-02		AOI03-02		AOI03-03		AOI03-03	
Sample Name		AOI03-01-SB-5-7		DUP1		AOI03-01-SB-11-13		AOI03-02-SB-5-7		AOI03-02-SB-13-15		AOI03-03-SB-4-6		AOI03-03-SB-8-10	
Parent Sample ID				AOI03-01-SB-5-7											
Sample Date		9/2/2022		9/2/2022		9/2/2022		9/2/2022		9/2/2022		9/1/2022		9/1/2022	
Sample Depth (ft bgs)		5-7		5-7		11-13		5-7		13-15		4-6		8-10	
Analyte	**Screening Level[1,2]**	**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
Perfluorohexanesulfonic acid (PFHxS)	1600	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
Perfluorooctanesulfonic acid (PFOS)	160	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	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 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 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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

Location ID		AOI03-04		AOI03-04		AOI03-05		AOI03-05		AOI03-06		AOI03-06		AOI03-07	
Sample Name		AOI03-04-SB-5-7		AOI03-04-SB-10-12		AOI03-05-SB-4-6		AOI03-05-SB-9-11		AOI03-06-SB-3-5		AOI03-06-SB-5-7		AOI03-07-SB-6-8	
Parent Sample ID															
Sample Date		9/1/2022		9/1/2022		9/1/2022		9/1/2022		9/1/2022		9/1/2022		9/1/2022	
Sample Depth (ft bgs)		5-7		10-12		4-6		9-11		3-5		5-7		6-8	
Analyte	**Screening Level[1,2]**	**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
Perfluorohexanesulfonic acid (PFHxS)	1600	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
Perfluorooctanesulfonic acid (PFOS)	160	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	ND	U	ND	U	0.56	J	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 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 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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

Location ID		AOI03-07		AOI04-01		AOI04-01		AOI04-02		AOI04-02		AOI04-03		AOI04-03	
Sample Name		AOI03-07-SB-13-15		AOI04-01-SB-4-6		AOI04-01-SB-9-11		AOI04-02-SB-4-6		AOI04-02-SB-9-11		AOI04-03-SB-4-6		AOI04-03-SB-8-10	
Parent Sample ID															
Sample Date		9/1/2022		9/6/2022		9/6/2022		9/6/2022		9/6/2022		9/6/2022		9/6/2022	
Sample Depth (ft bgs)		13-15		4-6		9-11		4-6		9-11		4-6		8-10	
Analyte	**Screening Level[1,2]**	**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
Perfluorohexanesulfonic acid (PFHxS)	1600	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
Perfluorooctanesulfonic acid (PFOS)	160	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	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 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 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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

	Location ID	AOI04-04		AOI04-04		AOI04-05		AOI04-05		AOI04-06		AOI04-06		AOI04-07	
	Sample Name	AOI04-04-SB-3-5		AOI04-04-SB-6-8		AOI04-05-SB-4-6		AOI04-05-SB-8-10		AOI04-06-SB-4-6		AOI04-06-SB-8-10		AOI04-07-SB-4-6	
	Parent Sample ID														
	Sample Date	9/7/2022		9/7/2022		9/6/2022		9/6/2022		9/7/2022		9/7/2022		9/7/2022	
	Sample Depth (ft bgs)	3-5		6-8		4-6		8-10		4-6		8-10		4-6	
Analyte	**Screening Level[1,2]**	**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
Perfluorohexanesulfonic acid (PFHxS)	1600	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
Perfluorooctanesulfonic acid (PFOS)	160	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	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 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 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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

Location ID		AOI04-07		AOI04-08		AOI04-08		AOI04-09		AOI04-09		AOI04-10		AOI05-01	
Sample Name		AOI04-07-SB-9-11		AOI04-08-SB-4-6		AOI04-08-SB-8-10		AOI04-09-SB-4-6		AOI04-09-SB-8-10		AOI04-10-SB-5-7		AOI05-01-SB-3-5	
Parent Sample ID															
Sample Date		9/7/2022		9/6/2022		9/6/2022		9/7/2022		9/7/2022		9/6/2022		9/7/2022	
Sample Depth (ft bgs)		9-11		4-6		8-10		4-6		8-10		5-7		3-5	
Analyte	**Screening Level[1,2]**	**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
Perfluorohexanesulfonic acid (PFHxS)	1600	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
Perfluorooctanesulfonic acid (PFOS)	160	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	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 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 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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

	Location ID	AOI05-01		AOI05-02		AOI05-02		AOI05-03		AOI05-03		AOI05-04	
	Sample Name	AOI05-01-SB-6-8		AOI05-02-SB-3-5		AOI05-02-SB-6-8		AOI05-03-SB-4-6		AOI05-03-SB-8-10		AOI05-04-SB-3-5	
	Parent Sample ID												
	Sample Date	9/7/2022		9/7/2022		9/7/2022		9/7/2022		9/7/2022		9/7/2022	
	Sample Depth (ft bgs)	6-8		3-5		6-8		4-6		8-10		3-5	
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)	25000	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	1600	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
Perfluorooctanesulfonic acid (PFOS)	160	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	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 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 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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

	Location ID	AOI05-04		AOI06-01		AOI06-02		AOI07-01		AOI07-01		CD-01		CD-01	
	Sample Name	AOI05-04-SB-6-8		AOI06-01-SB-12-14		AOI06-02-SB-10-12		AOI07-01-SB-5-7		AOI07-01-SB-12-14		CD-01-SB-3-5		DUP2	
	Parent Sample ID													CD-01-SB-3-5	
	Sample Date	9/7/2022		9/8/2022		9/8/2022		9/8/2022		9/8/2022		9/2/2022		9/2/2022	
	Sample Depth (ft bgs)	6-8		12-14		10-12		5-7		12-14		3-5		3-5	
Analyte	**Screening Level[1,2]**	**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
Perfluorohexanesulfonic acid (PFHxS)	1600	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
Perfluorooctanesulfonic acid (PFOS)	160	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	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 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 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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

	Location ID	CD-01		CD-02		CD-03		CD-03		CD-04		CD-04	
	Sample Name	CD-01-SB-8-10		CD-02-SB-8-10		CD-03-SB-6-8		CD-03-SB-12-14		CD-04-SB-5-7		CD-04-SB-11-13	
	Parent Sample ID												
	Sample Date	9/2/2022		8/31/2022		8/31/2022		8/31/2022		9/8/2022		9/8/2022	
	Sample Depth (ft bgs)	8-10		8-10		6-8		12-14		5-7		11-13	
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)	25000	ND	U	ND	U	ND	UJ	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	1600	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	250	ND	U	ND	U	ND	UJ	ND	UJ	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	160	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	ND	U	ND	U	ND	UJ	ND	UJ	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 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 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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

Location ID	AOI01-01		AOI01-02		AOI01-03		AOI06-01		AOI06-02		CD-02	
Sample Name	AOI01-01-SB-15-17		AOI01-02-SB-24-26		AOI01-03-SB-24-26		AOI06-01-SB-24-26		AOI06-02-SB-20-22		CD-02-SB-16-18	
Parent Sample ID												
Sample Date	9/8/2022		9/8/2022		9/7/2022		9/8/2022		9/8/2022		8/31/2022	
Sample Depth (ft bgs)	15-17		24-26		24-26		24-26		20-22		16-18	
Analyte	**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
Perfluorohexanesulfonic acid (PFHxS)	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
Perfluorooctanesulfonic acid (PFOS)	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	ND	U	0.29	J	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 Limit of Detection (LOD). Associated numerical value is approximate.
µg/kg = Microgram(s) per kilogram.
ft bgs = Feet below ground surface.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

Location ID		AOI01-01		AOI01-01		AOI01-02		AOI02-01		AOI02-02		AOI03-01		AOI03-02		AOI03-02	
Sample Name		AOI01-01-GW		DUP-GW		AOI01-02-GW		AOI02-01-GW		AOI02-02-GW		AOI03-01-GW		AOI03-02-GW		DUP1-GW	
Parent Sample ID				AOI01-01-GW												AOI03-02-GW	
Sample Date		9/13/2022		9/13/2022		9/15/2022		9/12/2022		9/15/2022		9/7/2022		9/7/2022		9/7/2022	
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	3.7		3.8		21		2.7		0.59	J	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	39	19		20		49		3.3		ND	U	ND	U	ND	U	0.63	J
Perfluorononanoic acid (PFNA)	6	ND	U	0.47	J	ND	U	0.67	J	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	4	4		4.8		21	J	1.3	J	ND	U	ND	U	ND	U	1	J
Perfluorooctanoic acid (PFOA)	6	4		4		12		20		3.9		1.5	J	0.99	J	0.83	J

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).
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD). Associated numerical value is
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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

Location ID		AOI03-03		AOI03-05		AOI03-06		AOI03-07		AOI04-01		AOI04-02		AOI04-03		AOI04-03	
Sample Name		AOI03-03-GW		AOI03-05-GW		AOI03-06-GW		AOI03-07-GW		AOI04-01-GW		AOI04-02-GW		AOI04-03-GW		DUP3-GW	
Parent Sample ID																AOI04-03-GW	
Sample Date		9/6/2022		9/12/2022		9/12/2022		9/8/2022		9/13/2022		9/14/2022		9/13/2022		9/13/2022	
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	1.1	J	1	J	0.86	J	0.4	J	1.4	J	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	39	ND	U	0.81	J	ND	U	ND	U	2		ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	6	0.48	J	2.9		1.7		ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	4	7.3		4.1		3.5		ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	6	3.2		35		3.9		2.2		3.4		4.7		2.2		2.4	

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).
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD). Associated numerical value is
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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

Location ID		AOI04-04		AOI04-06		AOI04-07		AOI04-08		AOI04-09		AOI04-10		AOI05-01		AOI05-02	
Sample Name		AOI04-04-GW		AOI04-06-GW		AOI04-07-GW		AOI04-08-GW		AOI04-09-GW		AOI04-10-GW		AOI05-01-GW		AOI05-02-GW	
Parent Sample ID																	
Sample Date		9/13/2022		9/16/2022		9/16/2022		9/16/2022		9/16/2022		9/16/2022		9/16/2022		9/15/2022	
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	ND	U	ND	U	2.1		0.59	J	1.9		1.6	J	1.8		1.6	
Perfluorohexanesulfonic acid (PFHxS)	39	ND	U	ND	U	0.76	J	ND	U	2		0.65	J	7.3		8.1	
Perfluorononanoic acid (PFNA)	6	ND	U	ND	U	1.2	J	ND	U	ND	U	ND	U	ND	U	0.48	J
Perfluorooctanesulfonic acid (PFOS)	4	ND	U	ND	U	2		ND	U	1.6	J	0.74	J	ND	U	8.1	
Perfluorooctanoic acid (PFOA)	6	1.9		1.4	J	7.9		3.4		2.9		5.2		3.2		1.6	

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).
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD). Associated numerical value is
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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

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

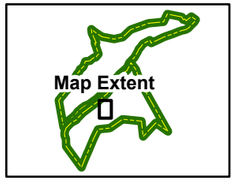
Location ID		AOI05-02		AOI05-03		AOI05-04		AOI06-01		AOI07-01		CD-01		CD-02		CD-04	
Sample Name		DUP4-GW		AOI05-03-GW		AOI05-04-GW		AOI06-01-GW		AOI07-01-GW		CD-01-GW		CD-02-GW		CD-04-GW	
Parent Sample ID		AOI05-02-GW															
Sample Date		9/15/2022		9/16/2022		9/16/2022		9/15/2022		9/14/2022		9/12/2022		9/2/2022		9/14/2022	
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	2		5.9		0.96	J	0.82	J	1.9		ND	U	0.98	J	0.68	J
Perfluorohexanesulfonic acid (PFHxS)	39	8.4		17		3.9		1.1	J	1.5	J	ND	U	0.94	J	ND	U
Perfluorononanoic acid (PFNA)	6	0.42	J	0.57	J	ND	U	ND	U	0.71	J	ND	U	ND	U	ND	UJ
Perfluorooctanesulfonic acid (PFOS)	4	8.7		2.1		ND	U	ND	U	1.7	J+	ND	U	8.2		ND	UJ
Perfluorooctanoic acid (PFOA)	6	1.5	J	6.7		1.7	J	0.72	J	43		3.3		2.9		ND	U

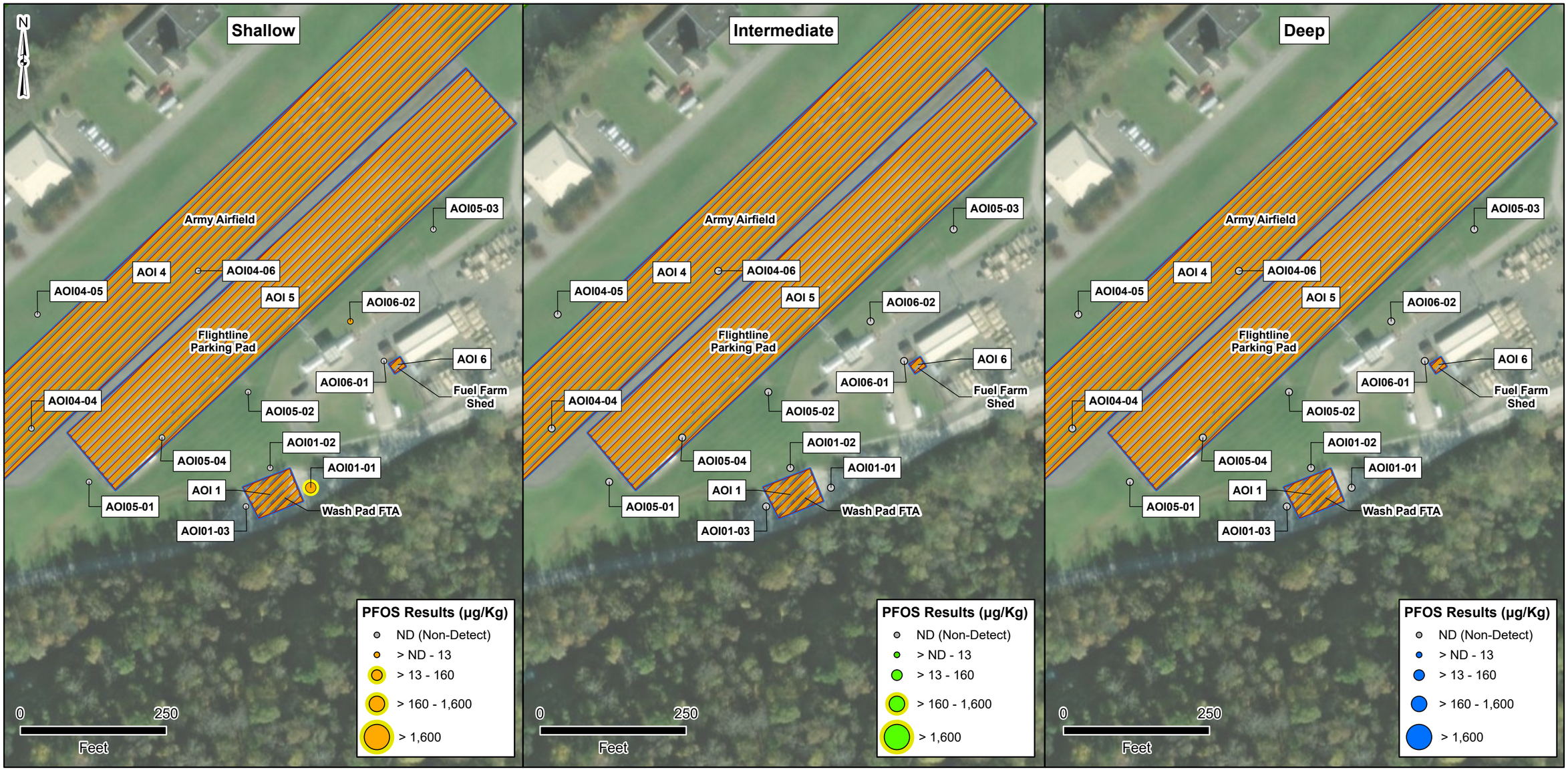
Notes.
J = Estimated concentration.
J+ = Estimated concentration, biased high.
U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD). Associated numerical value is
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.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.
AOI = Area of Interest
LCS/MS/MS = liquid chromatography/tandem mass spectrometry
Dup = duplicate
QSM = quality systems manual

1477 *This page intentionally left blank*

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-1
AOI's 1, 4, 5 and 6
PFOS Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

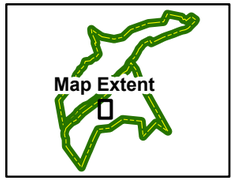
Data Sources:
ESRI 2022
AECOM 2019

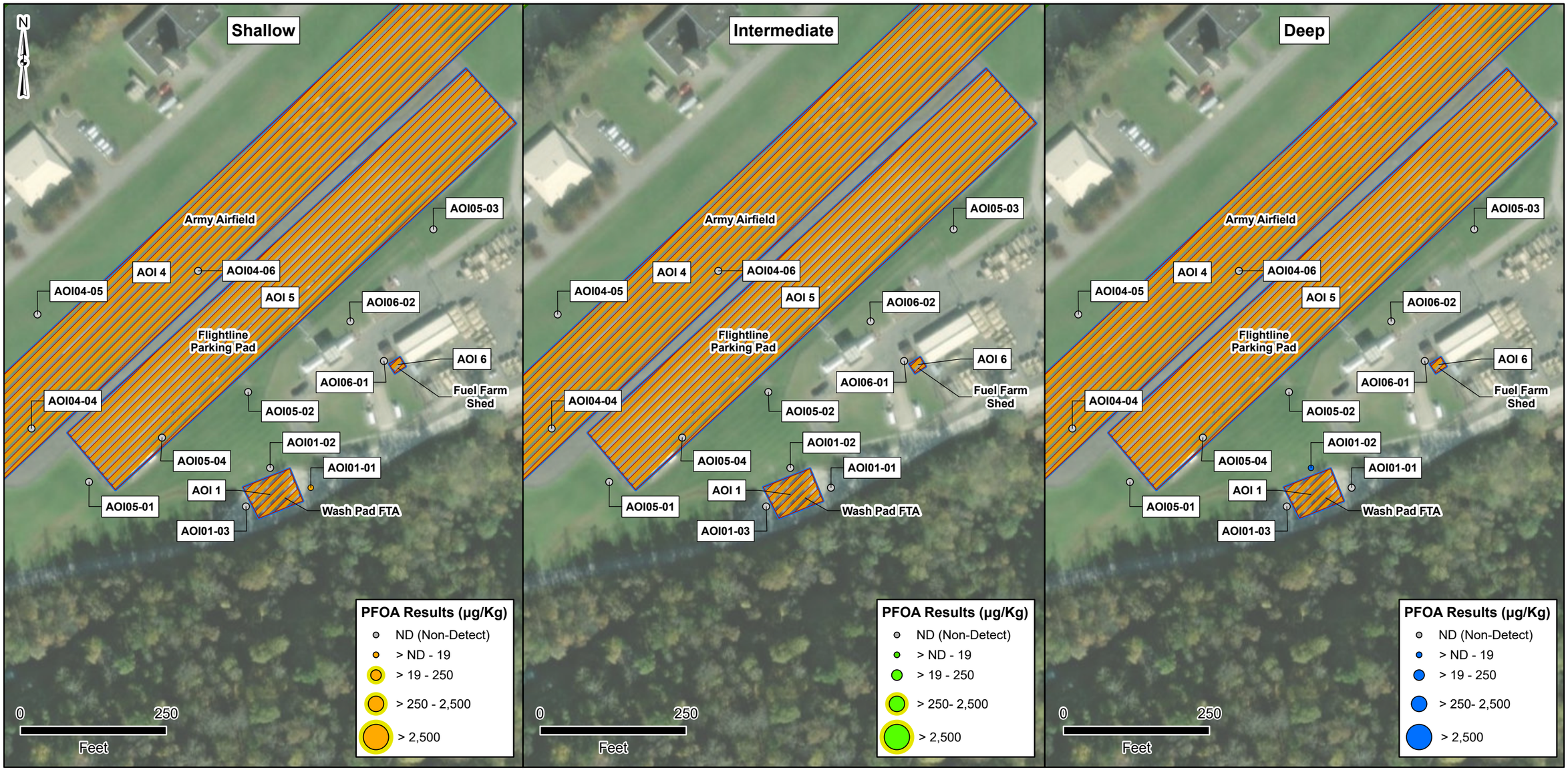
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-2
AOI's 1, 4, 5 and 6
PFOA Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

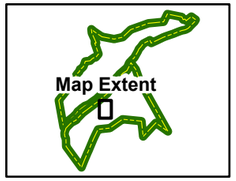
Data Sources:
ESRI 2022
AECOM 2019

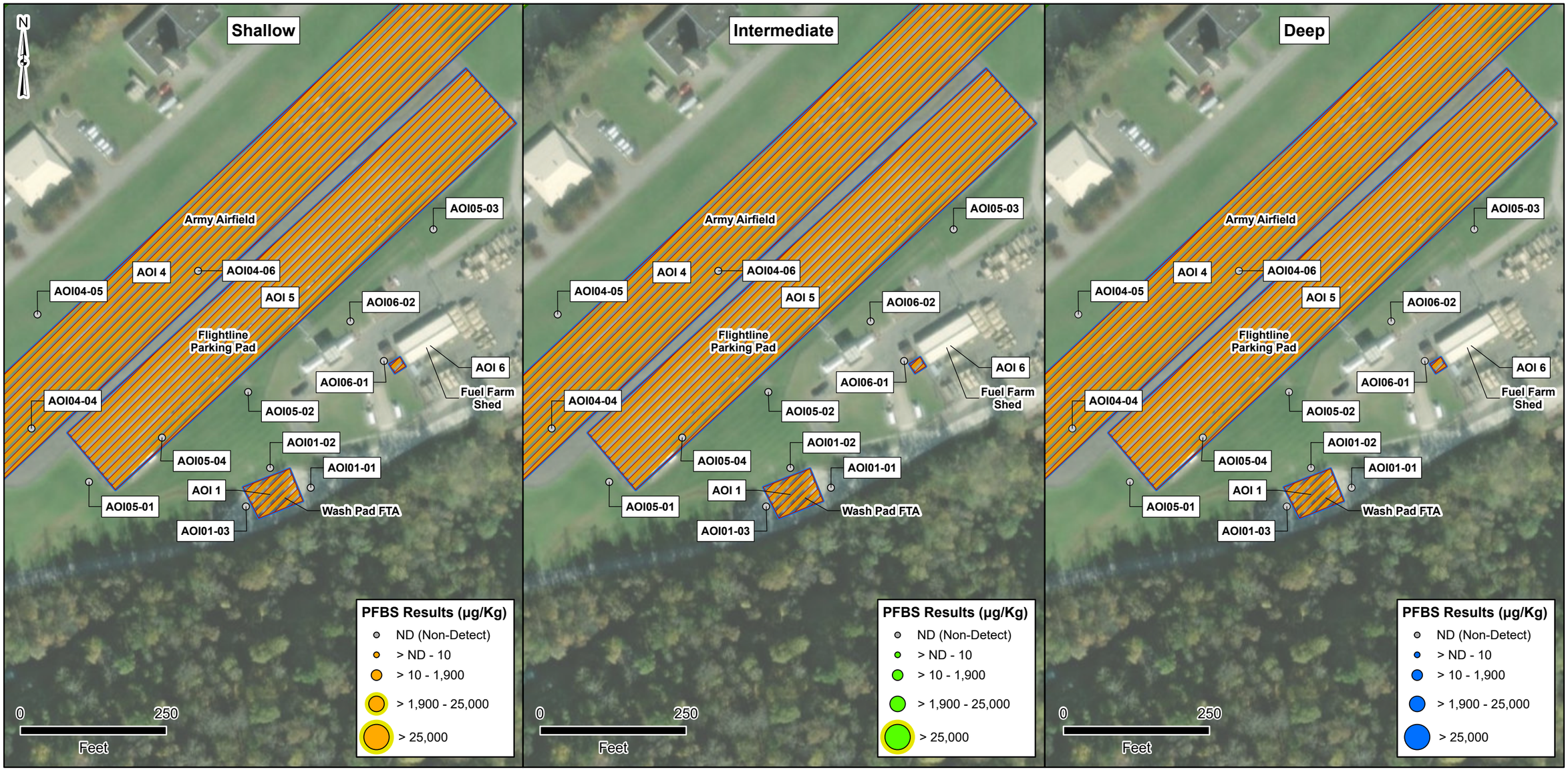
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-3
AOI's 1, 4, 5 and 6
PFBS Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

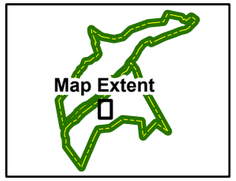
Data Sources:
ESRI 2022
AECOM 2019

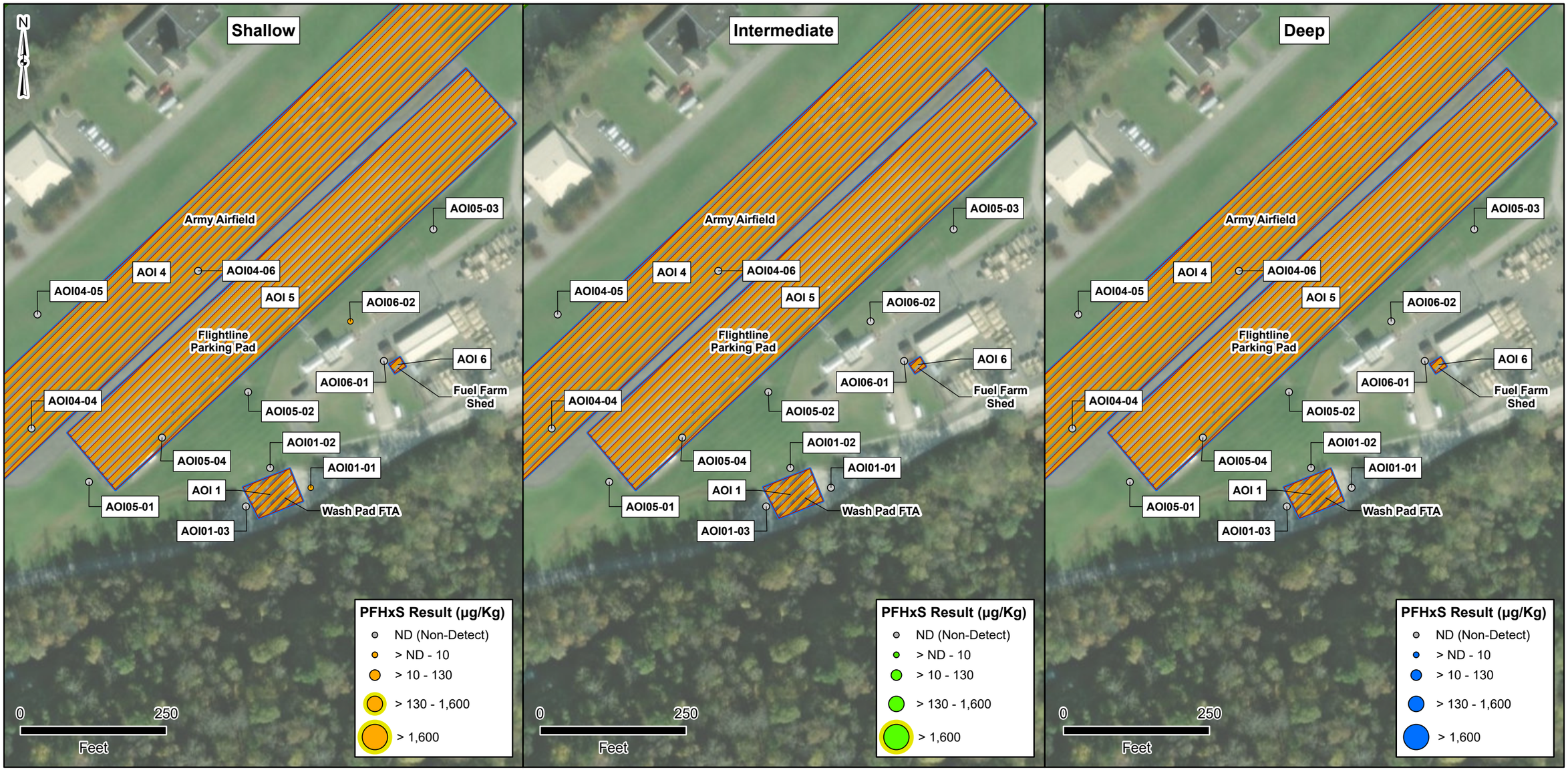
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-4
AOI's 1, 4, 5 and 6
PFHxS Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

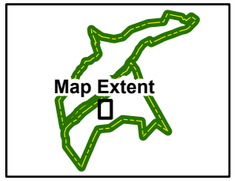
Data Sources:
ESRI 2022
AECOM 2019

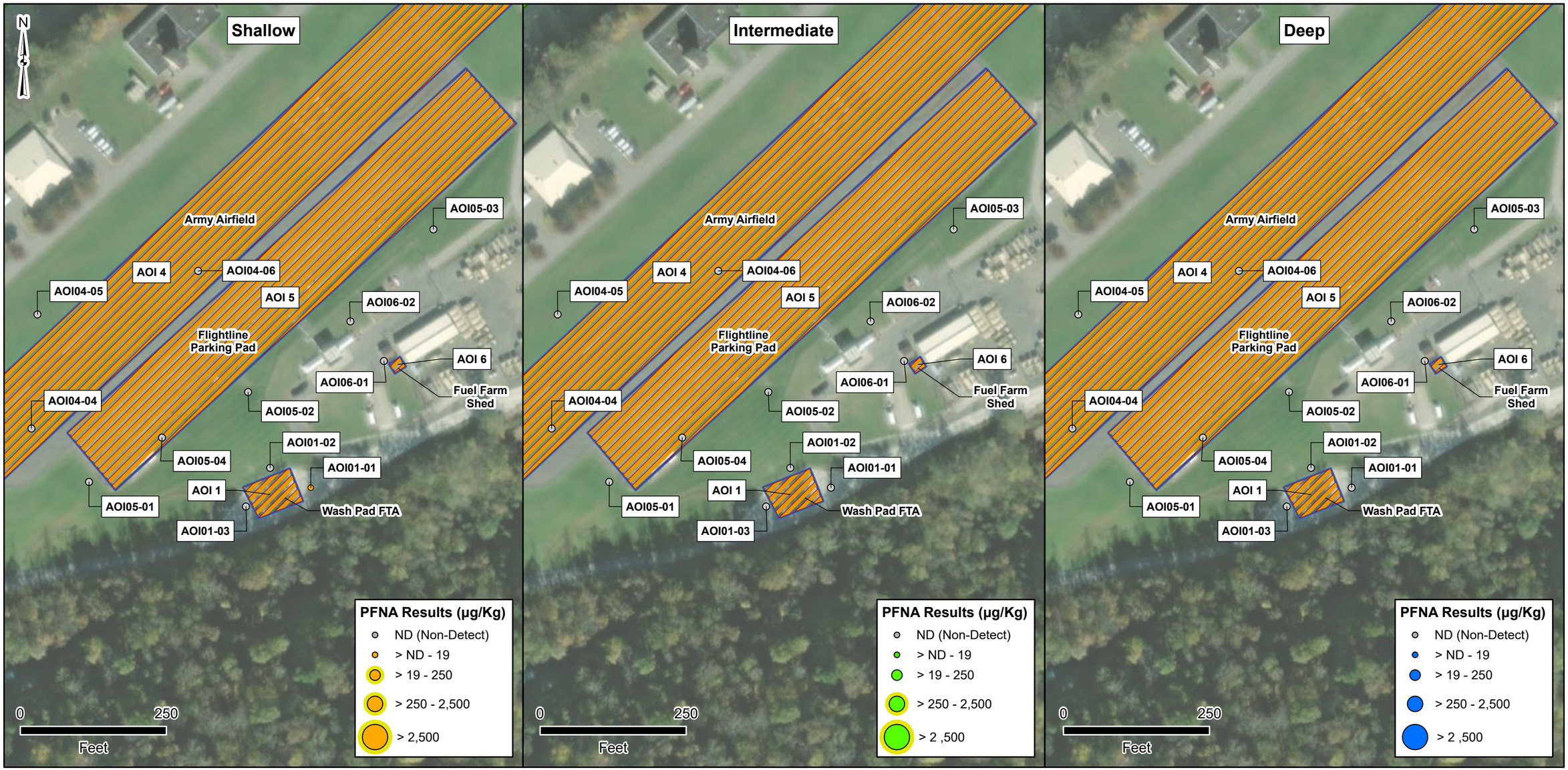
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-5
AOI 1, 4, 5 and 6
PFNA Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-6
PFOA, PFOS and PFBS Detections in Groundwater (AOI's 1, 4, 5 and 6)

Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-7
PFHxS and PFNA Detections in Groundwater (AOI's 1, 4, 5 and 6)

Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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

Data Sources:
ESRI 2020
AECOM 2020

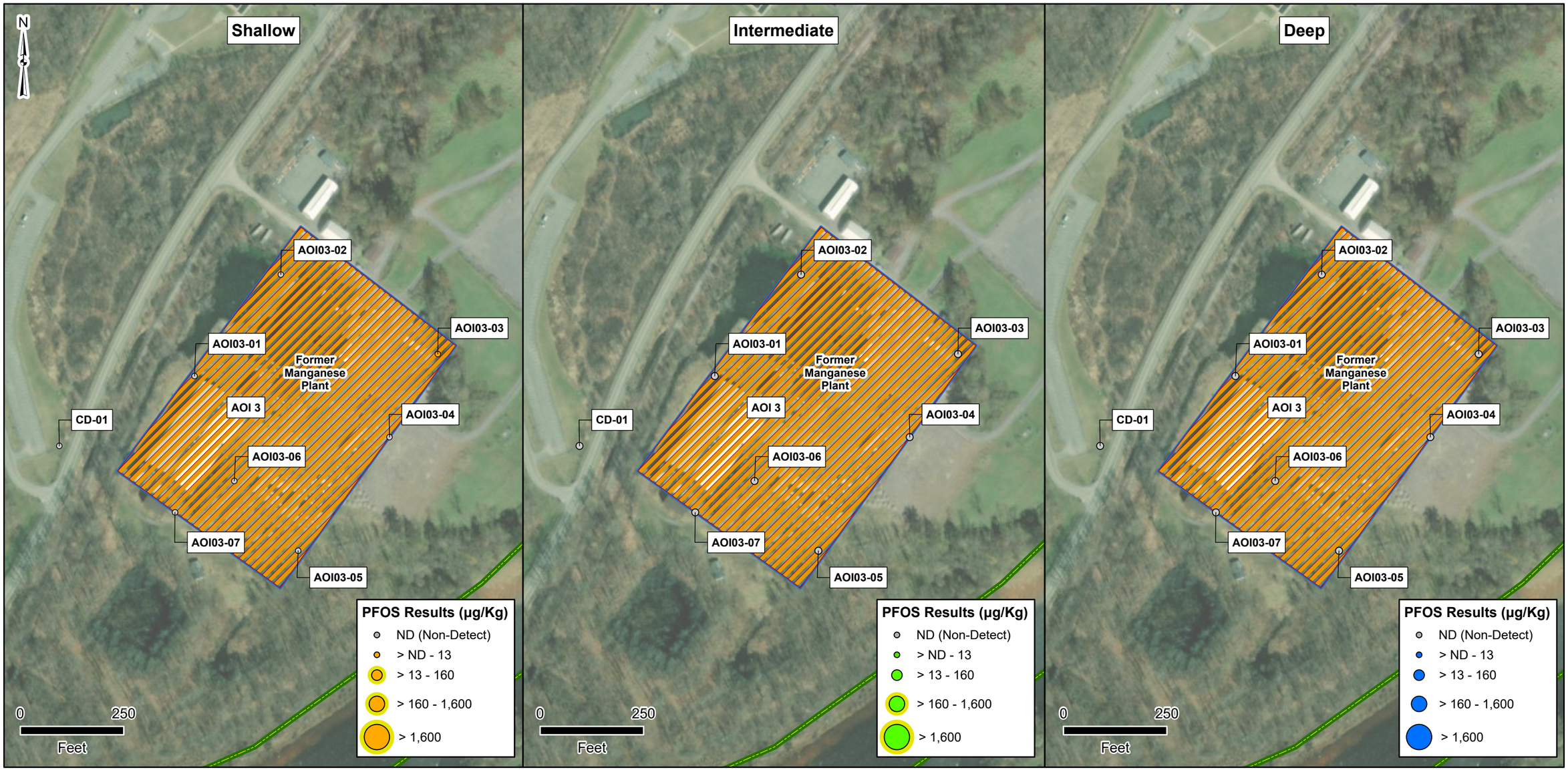
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

Path: G:\Federal\Nationwide\PFAS\WAE5_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-8
AOI 3
PFOS Detections in Soil



Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

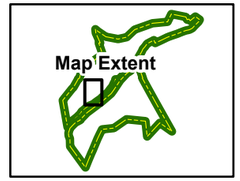
Data Sources:
ESRI 2022
AECOM 2019

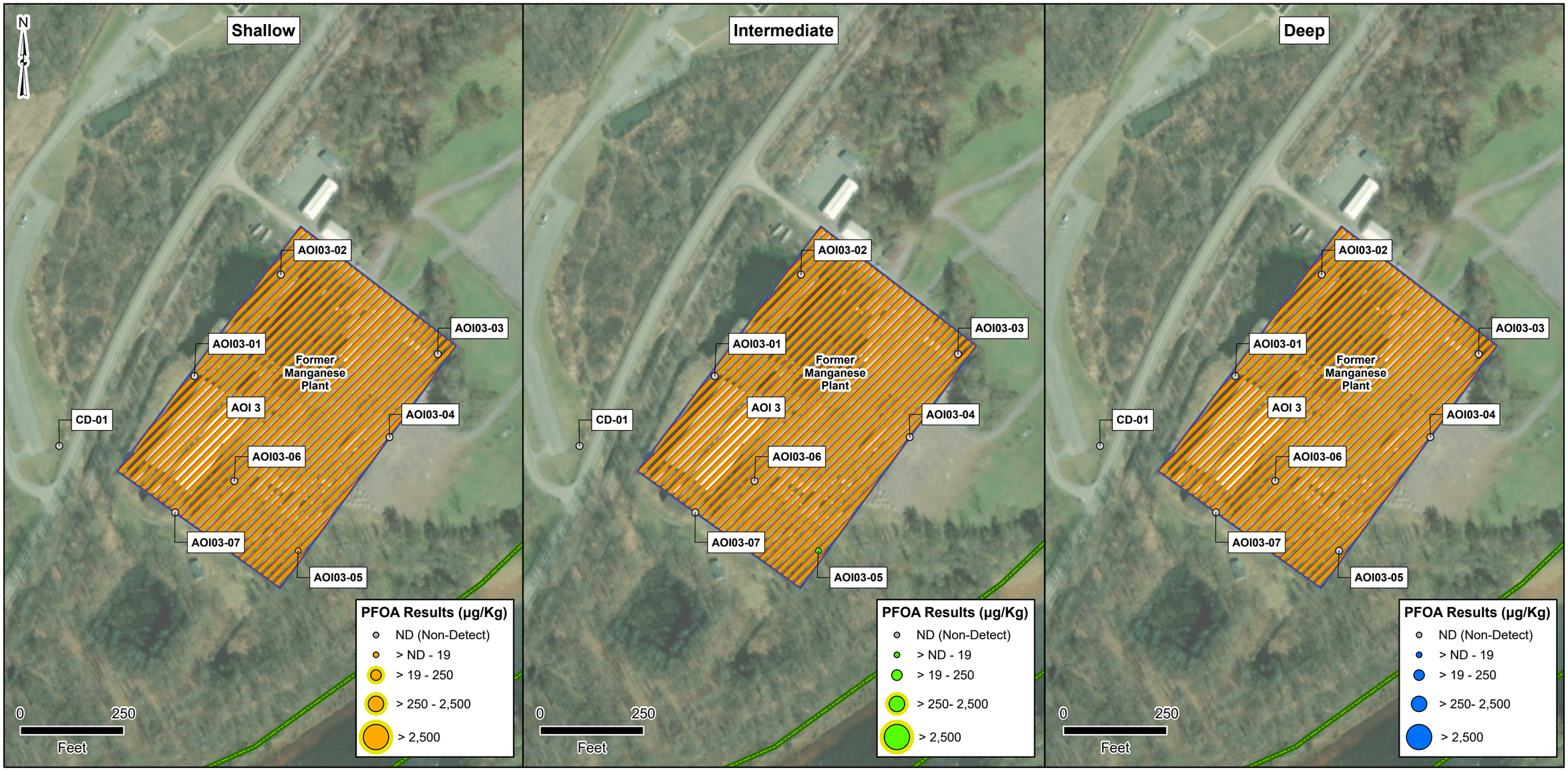
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-9
AOI 3
PFOA Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

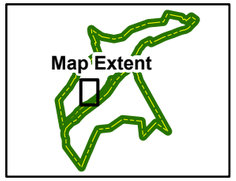
Data Sources:
ESRI 2022
AECOM 2019

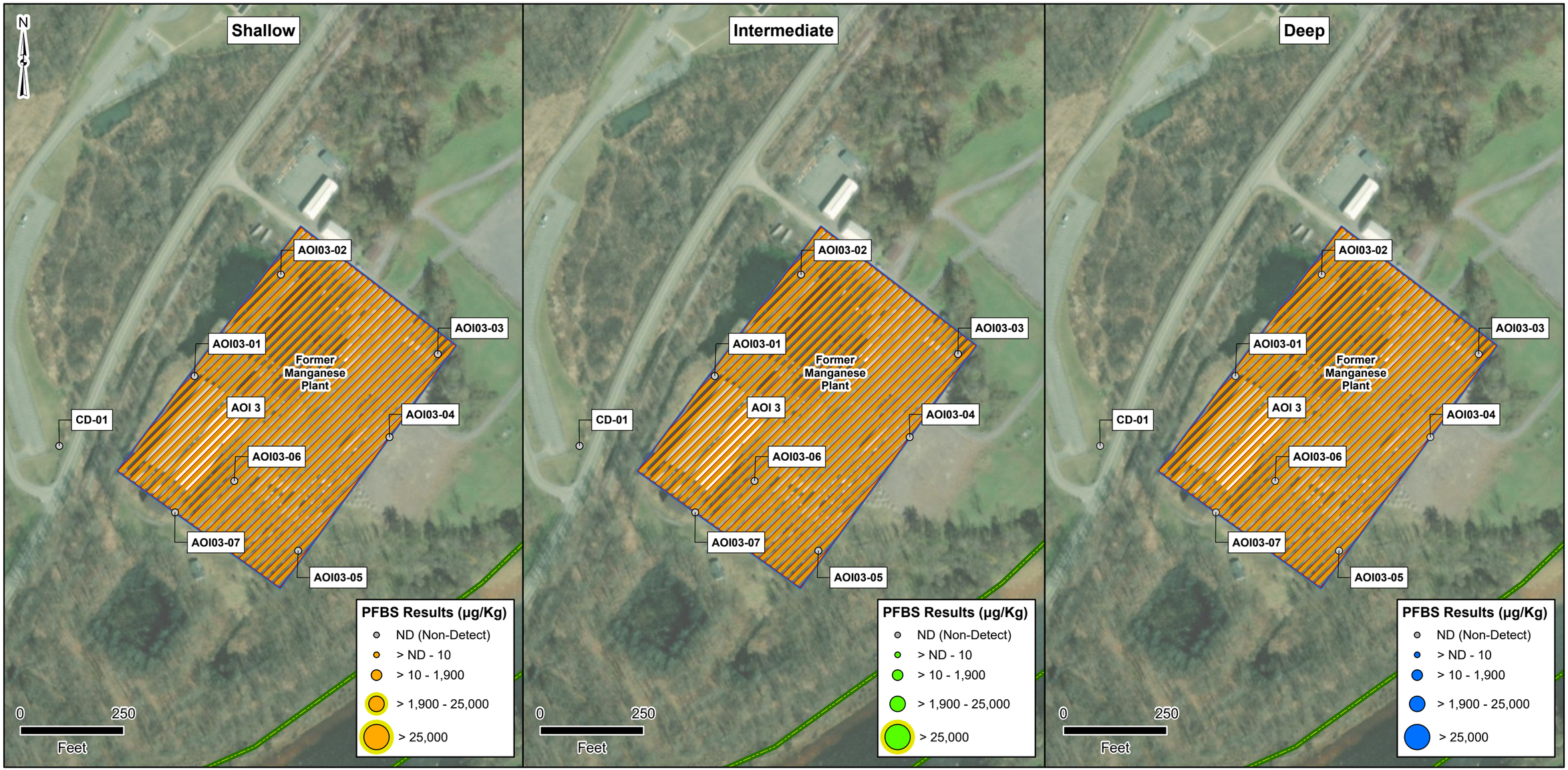
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-10
AOI 3
PFBS Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

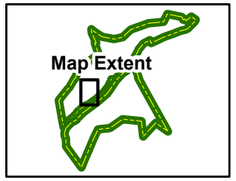
Data Sources:
ESRI 2022
AECOM 2019

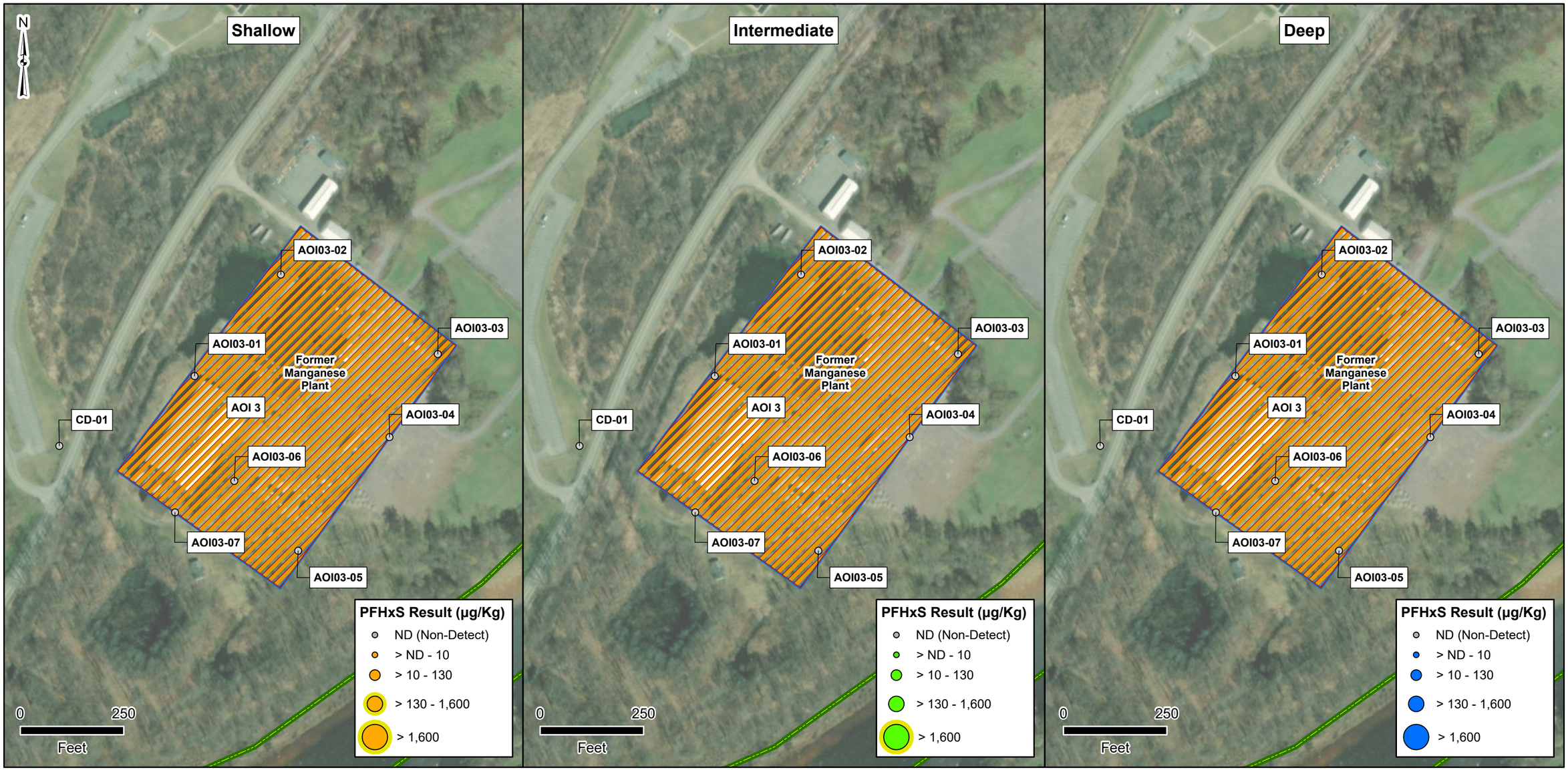
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-11
AOI 3
PFHxS Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

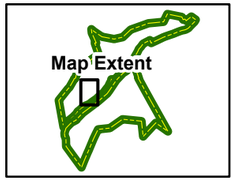
Data Sources:
ESRI 2022
AECOM 2019

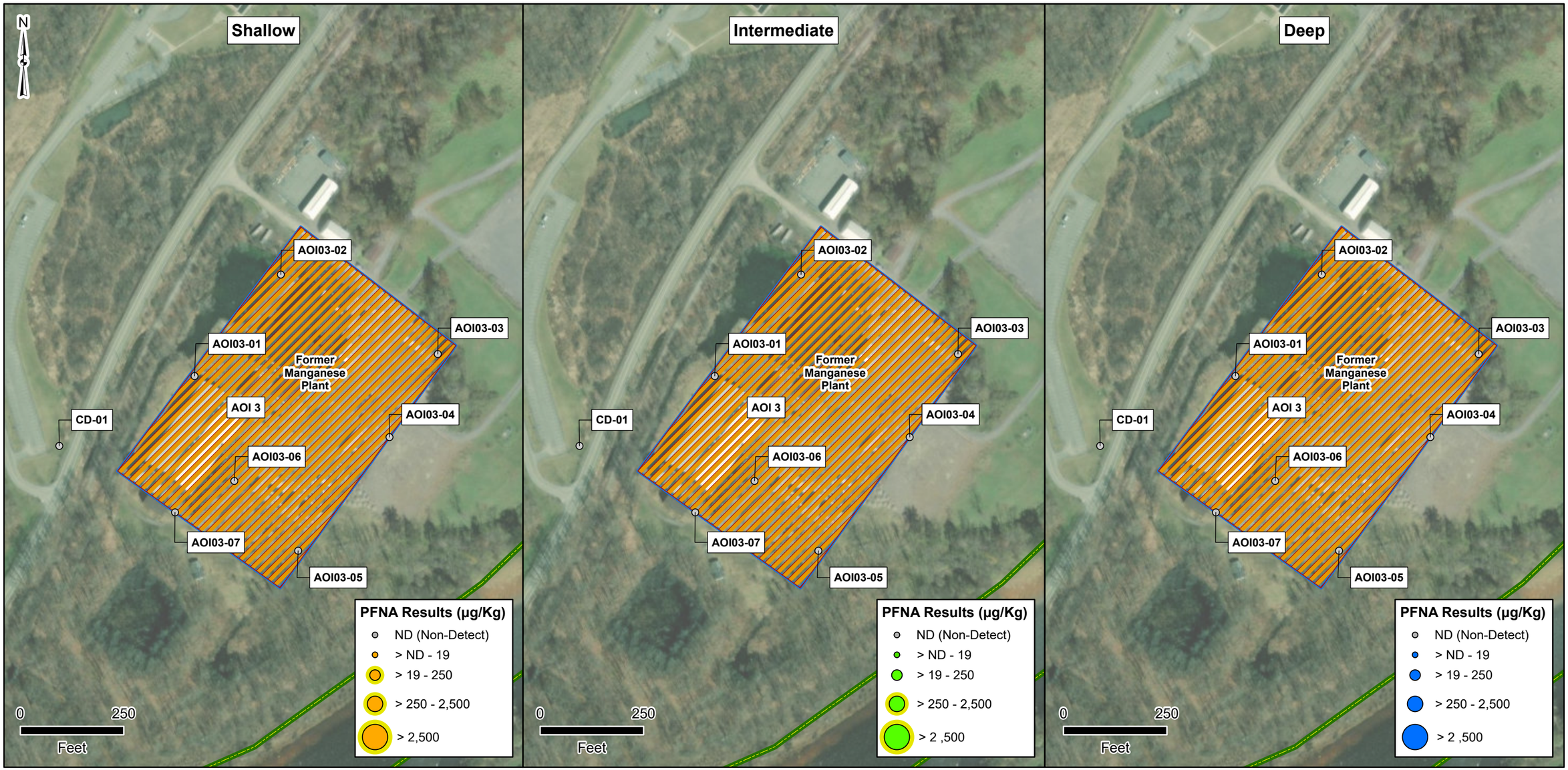
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-12
AOI 3
PFNA Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

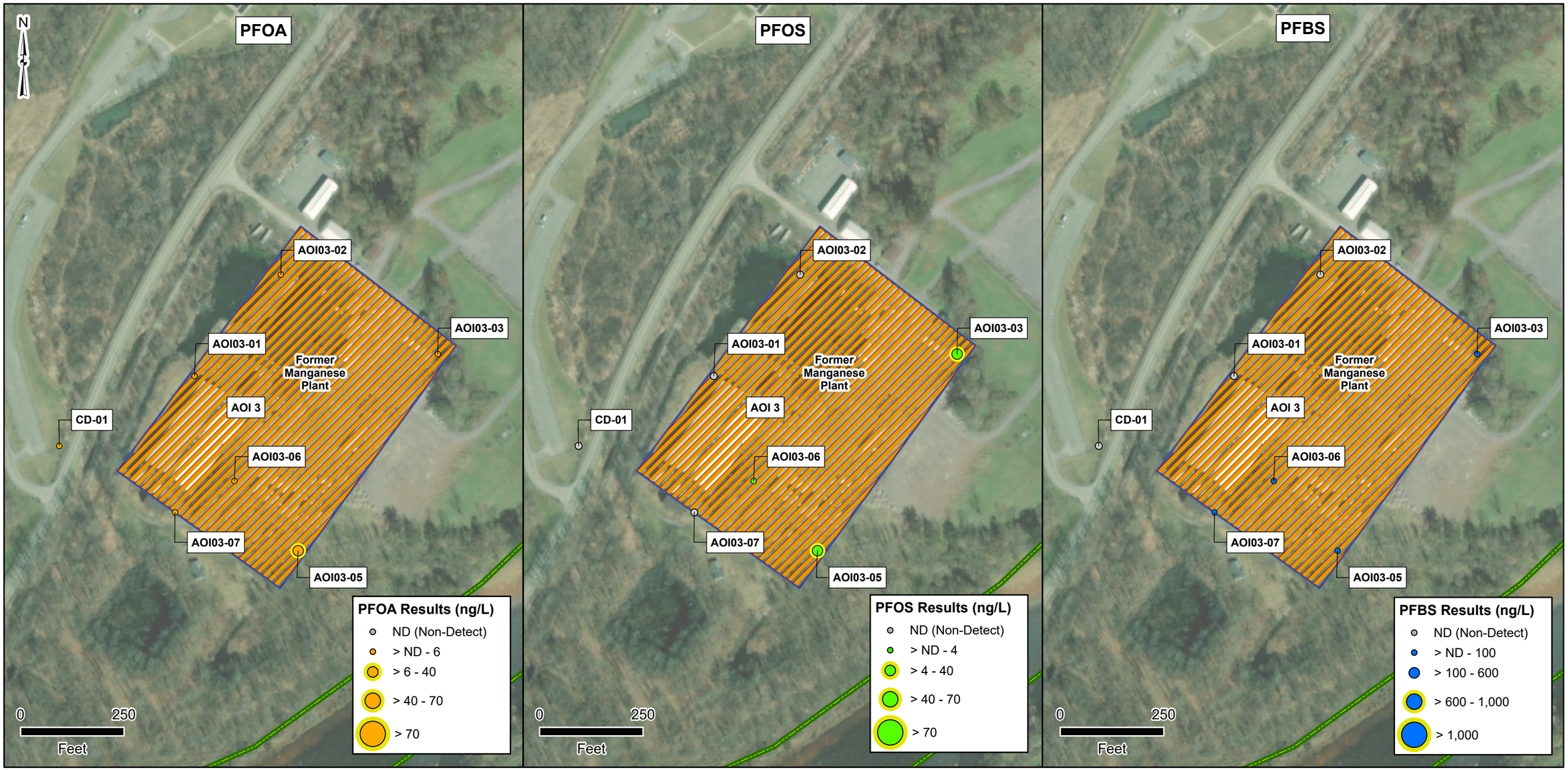
Data Sources:
ESRI 2022
AECOM 2019

Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-13
PFOA, PFOS and PFBS Detections in Groundwater (AOI 3)



Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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

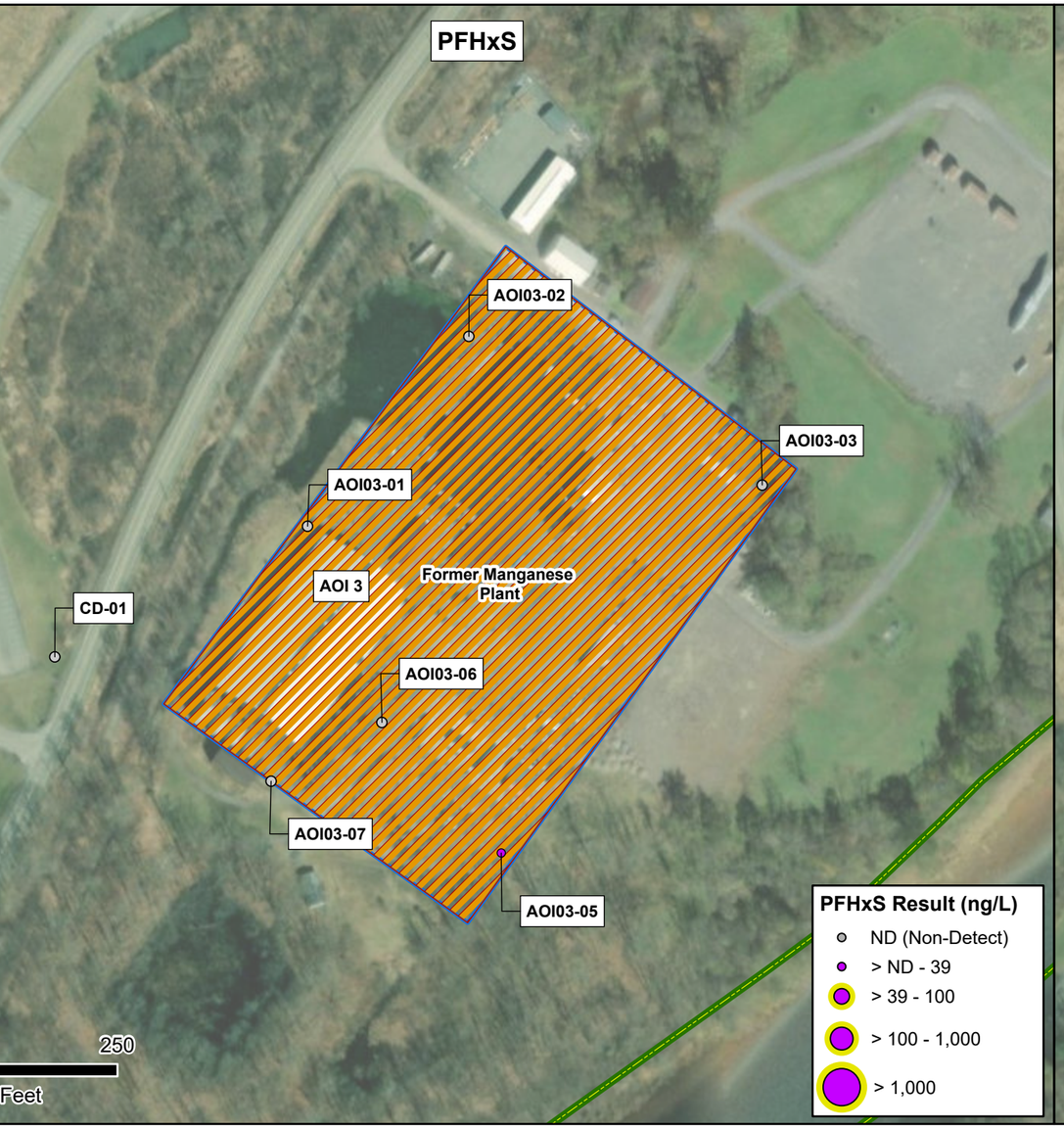
Data Sources:
ESRI 2022
AECOM 2019

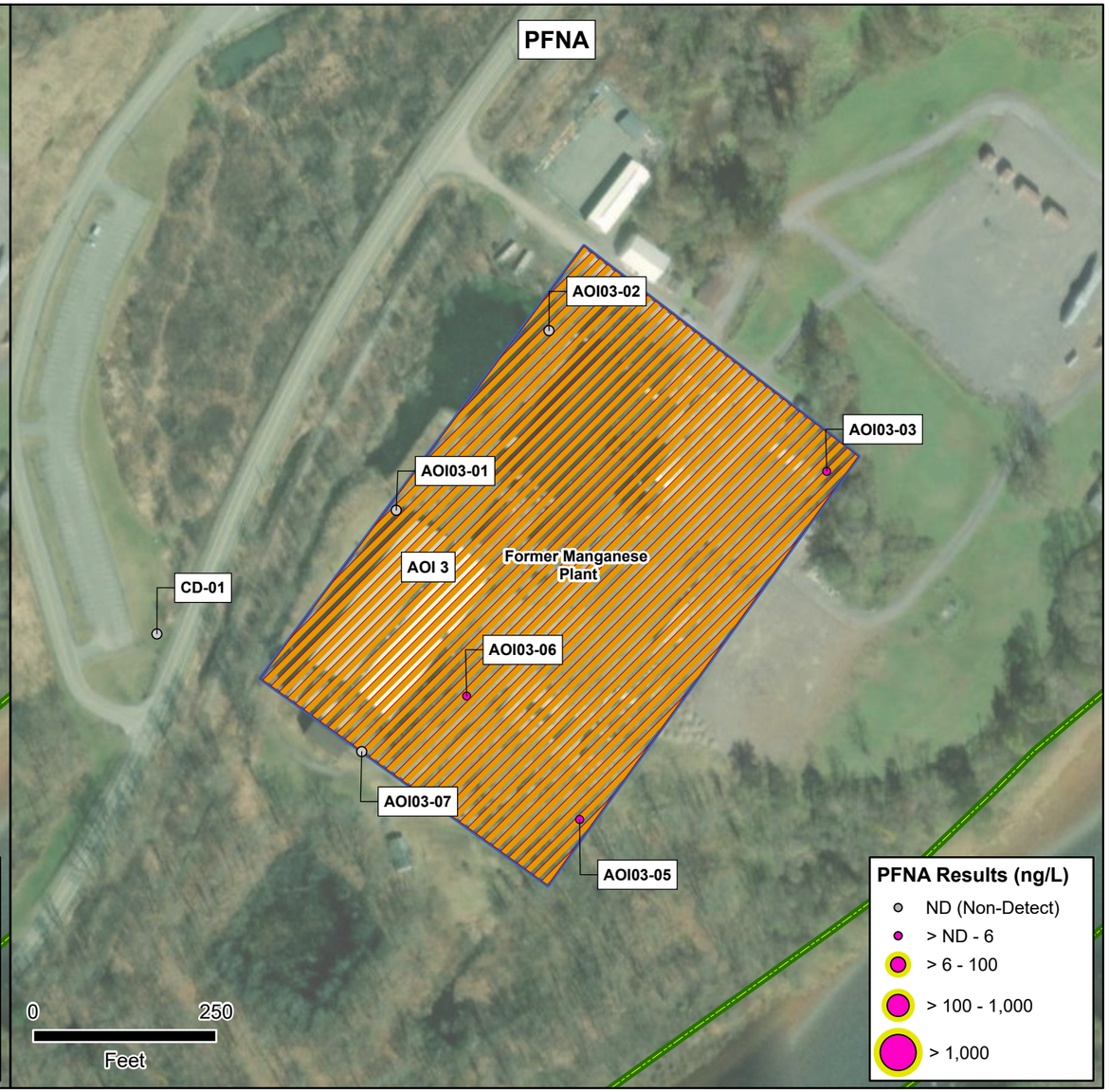
Date:.....February 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

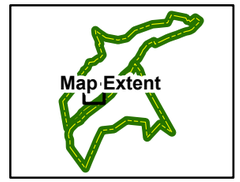
This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

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







Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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

Data Sources:
ESRI 2020
AECOM 2020

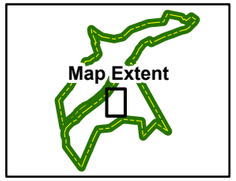
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

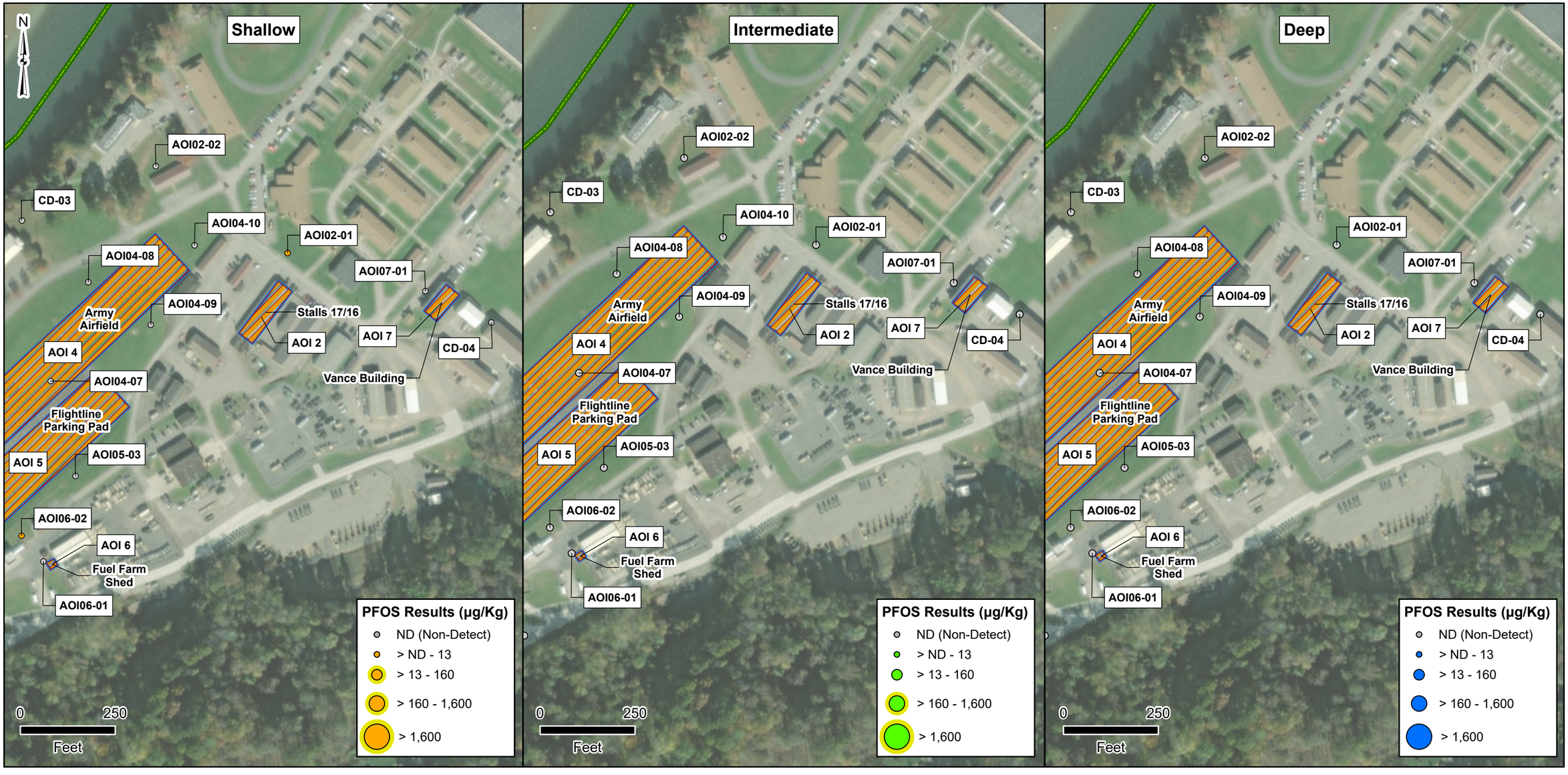
Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\CampDawson\CampDawsonSI.aprx

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-15
AOI's 2, 4, 5, 6 and 7
PFOS Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

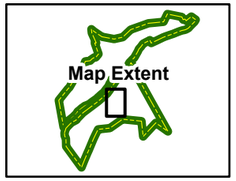
Data Sources:
ESRI 2022
AECOM 2019

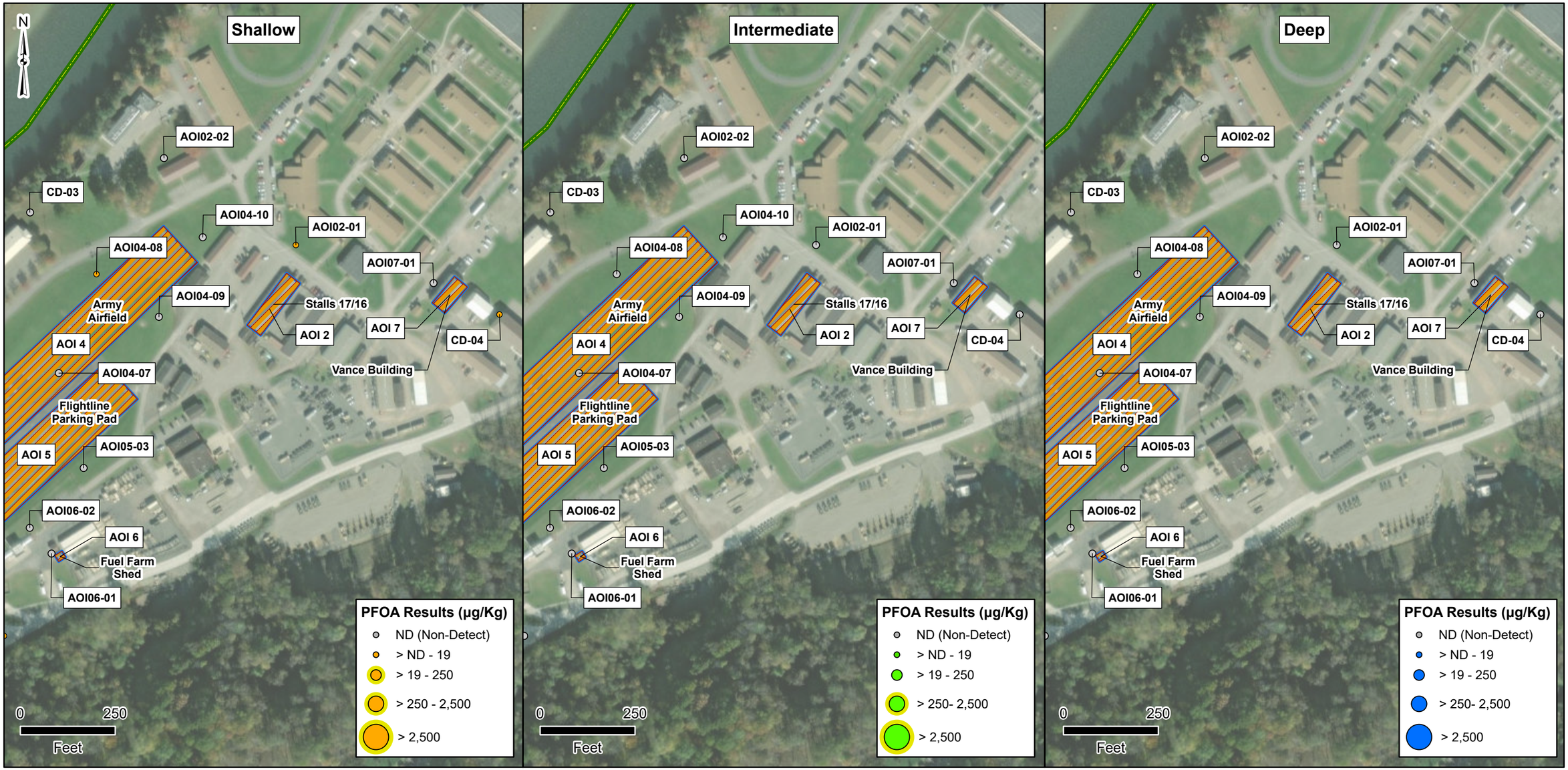
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-16
AOI's 2, 4, 5, 6 and 7
PFOA Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

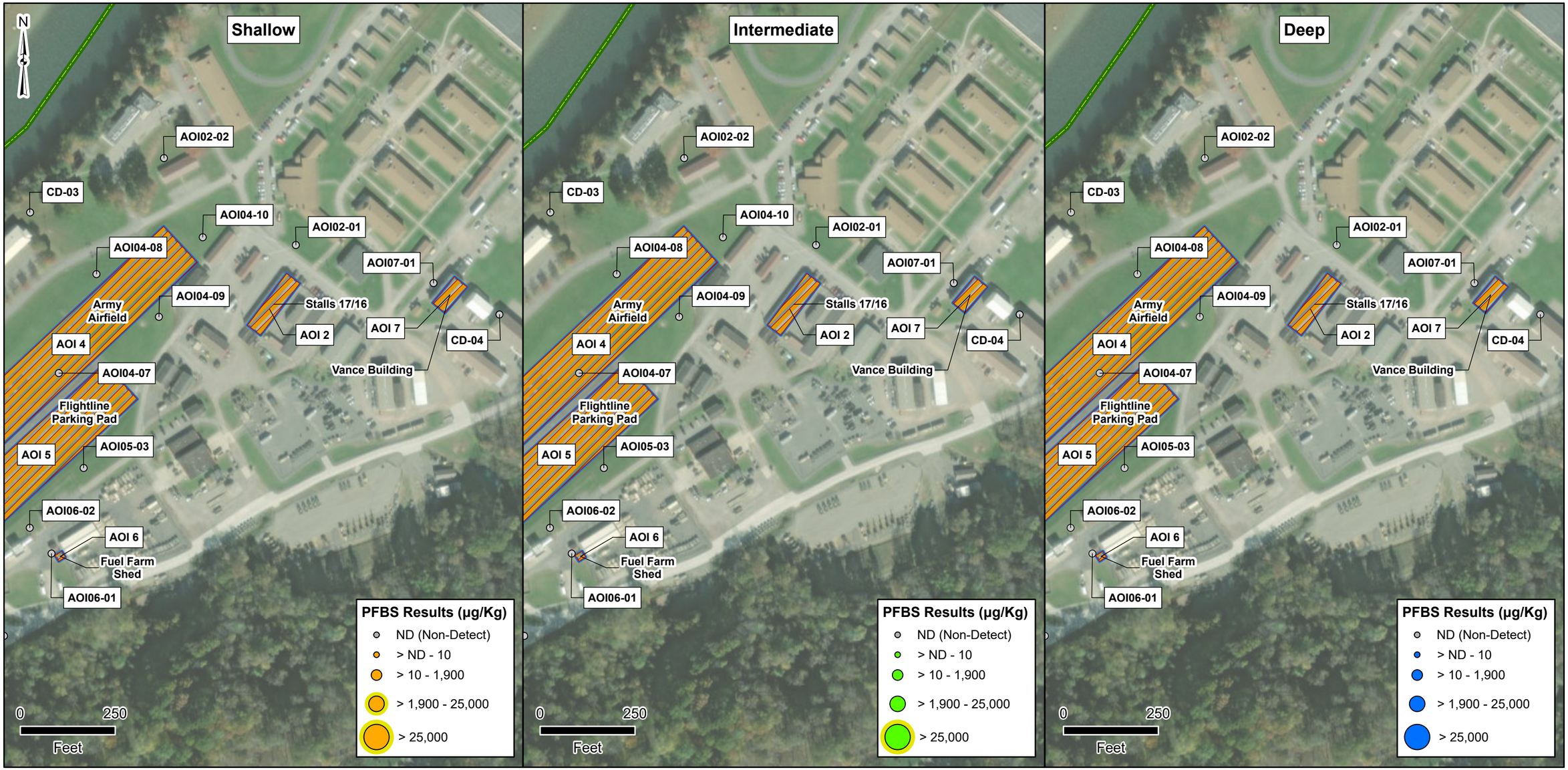
Data Sources:
ESRI 2022
AECOM 2019

Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-17
AOI's 2, 4, 5, 6 and 7
PFBS Detections in Soil



Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

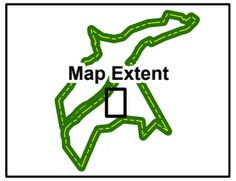
Data Sources:
ESRI 2022
AECOM 2019

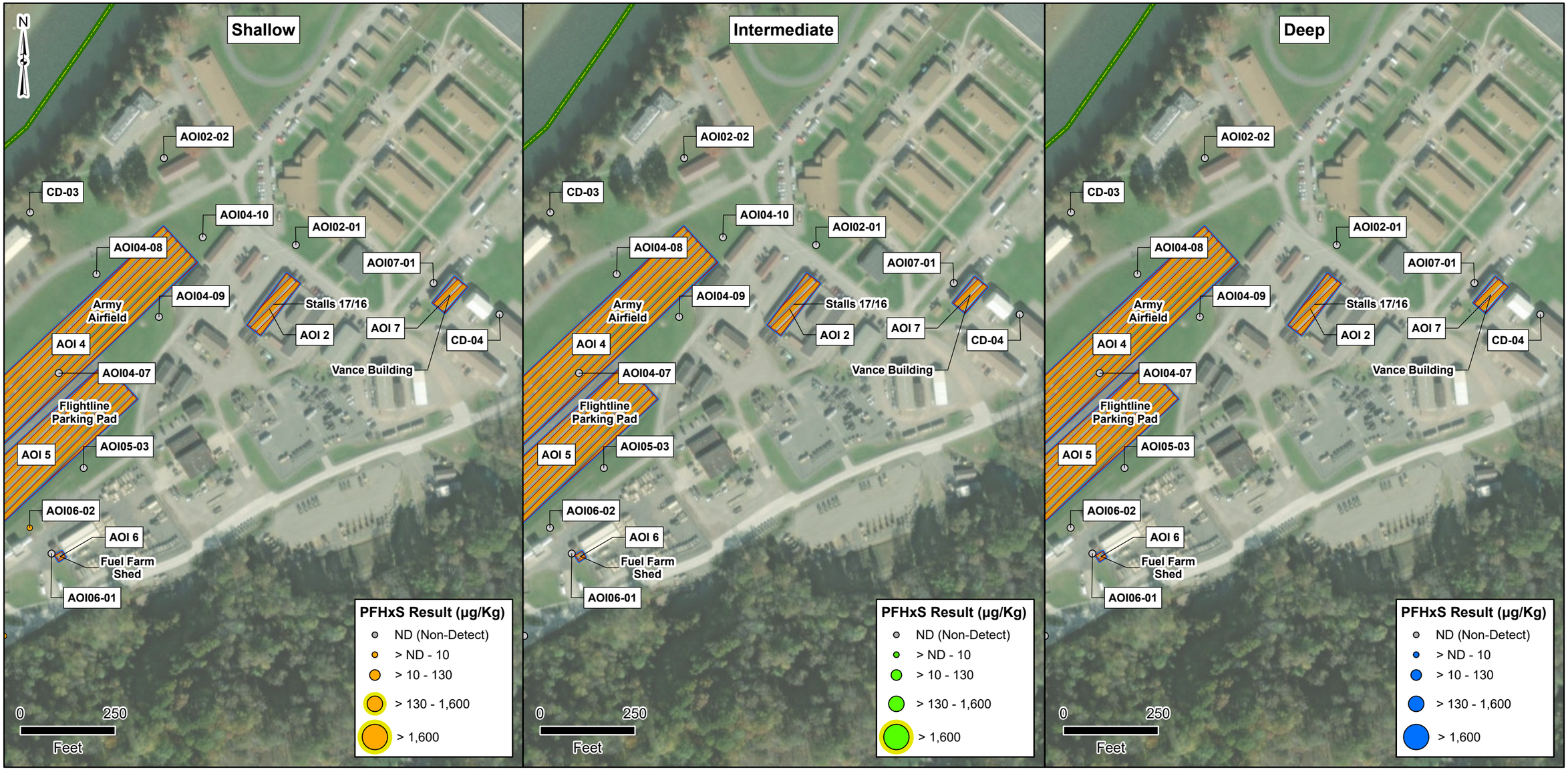
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-18
AOI's 2, 4, 5, 6 and 7
PFHxS Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

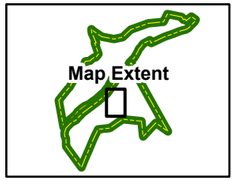
Data Sources:
ESRI 2022
AECOM 2019

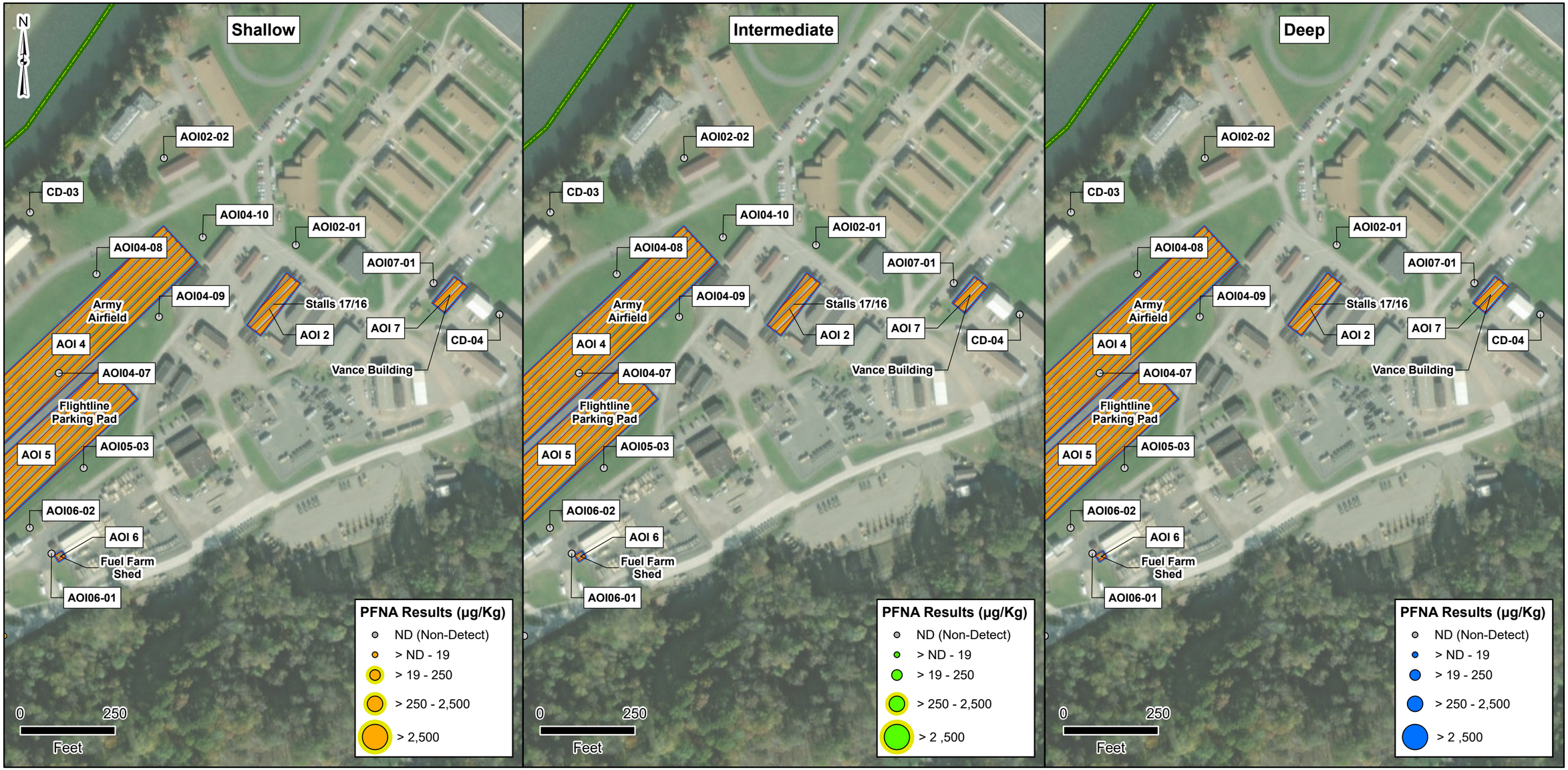
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-19
AOI's 2, 4, 5, 6 and 7
PFNA Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

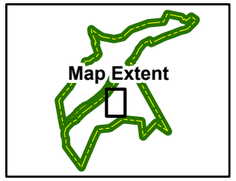
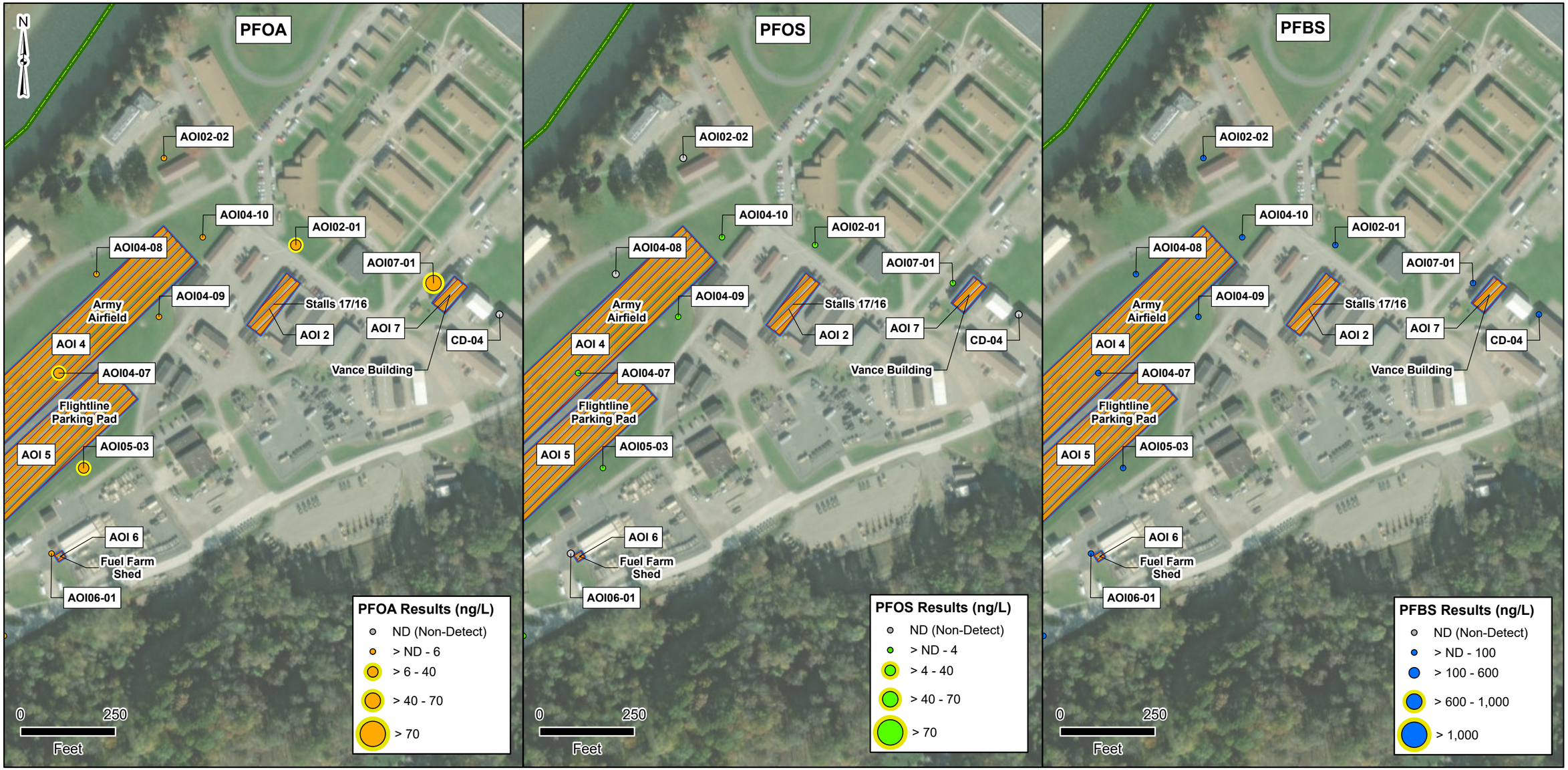


Figure 6-20
PFOA, PFOS and PFBS Detections in Groundwater (AOI's 2, 4, 5, 6, and 7)



Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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

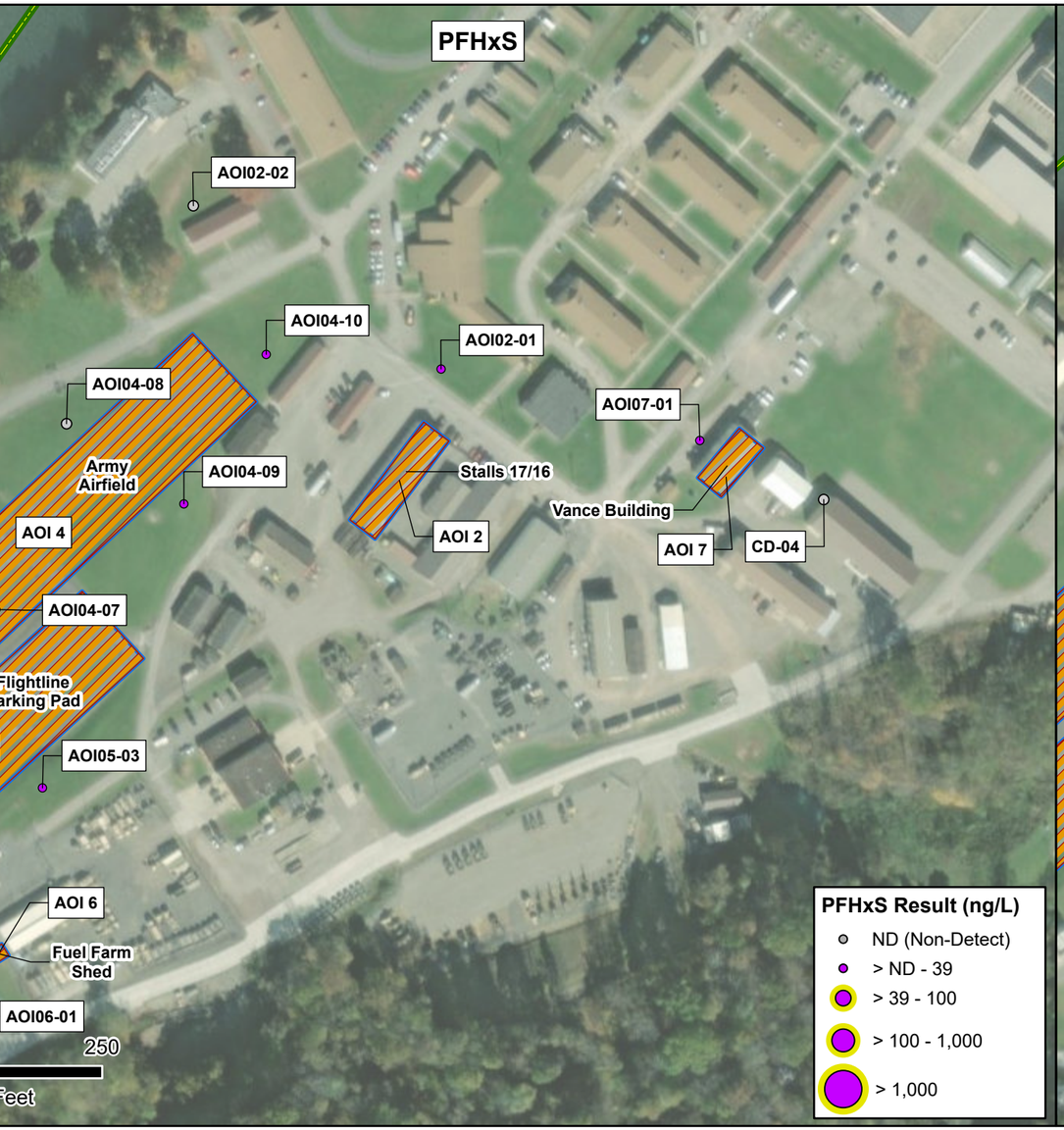
Data Sources:
ESRI 2022
AECOM 2019

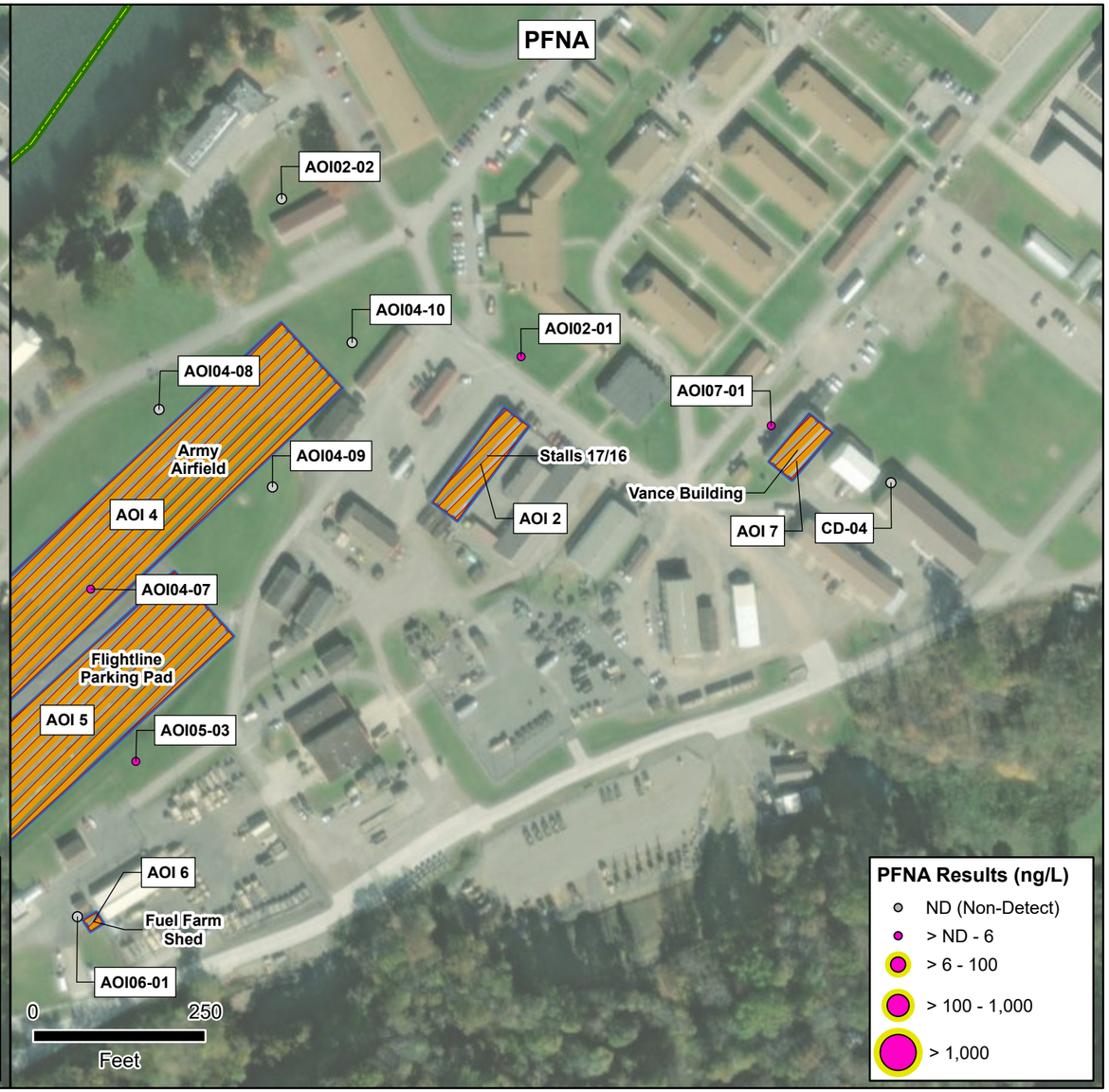
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

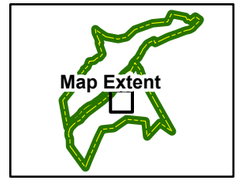
This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-21
PFHxS and PFNA Detections in Groundwater (AOI's 2, 4, 5, 6 and 7)







Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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

Data Sources:
ESRI 2020
AECOM 2020

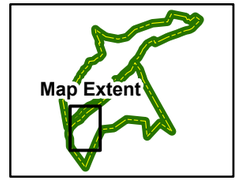
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

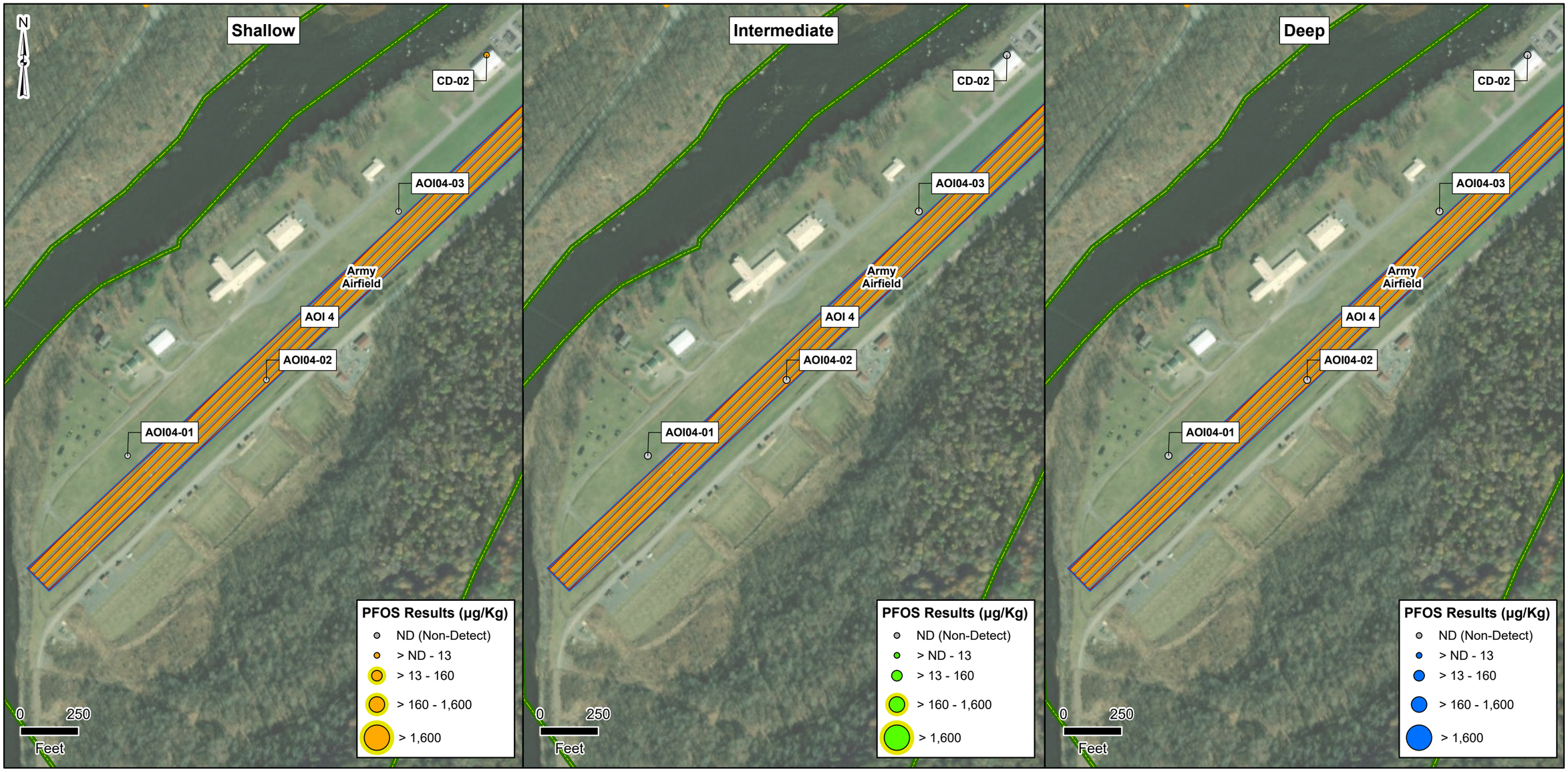
Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SI\Report\CampDawson\CampDawsonSI.aprx

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-22
AOI 4
PFOS Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

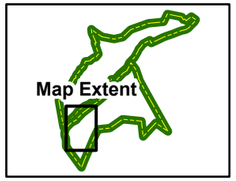
Data Sources:
ESRI 2022
AECOM 2019

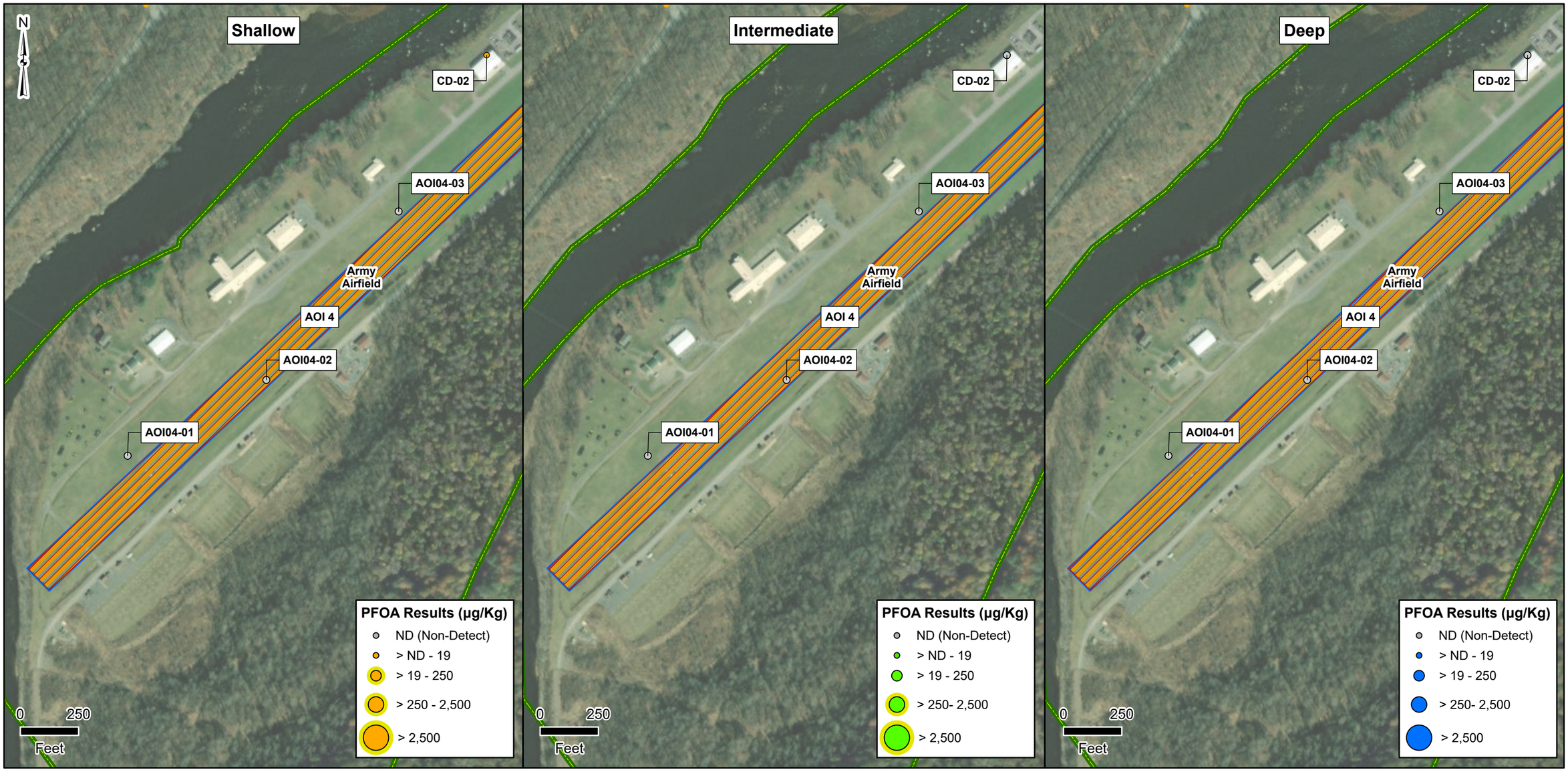
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-23
AOI 4
PFOA Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

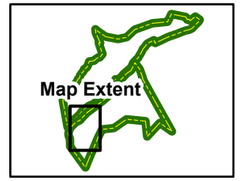
Data Sources:
ESRI 2022
AECOM 2019

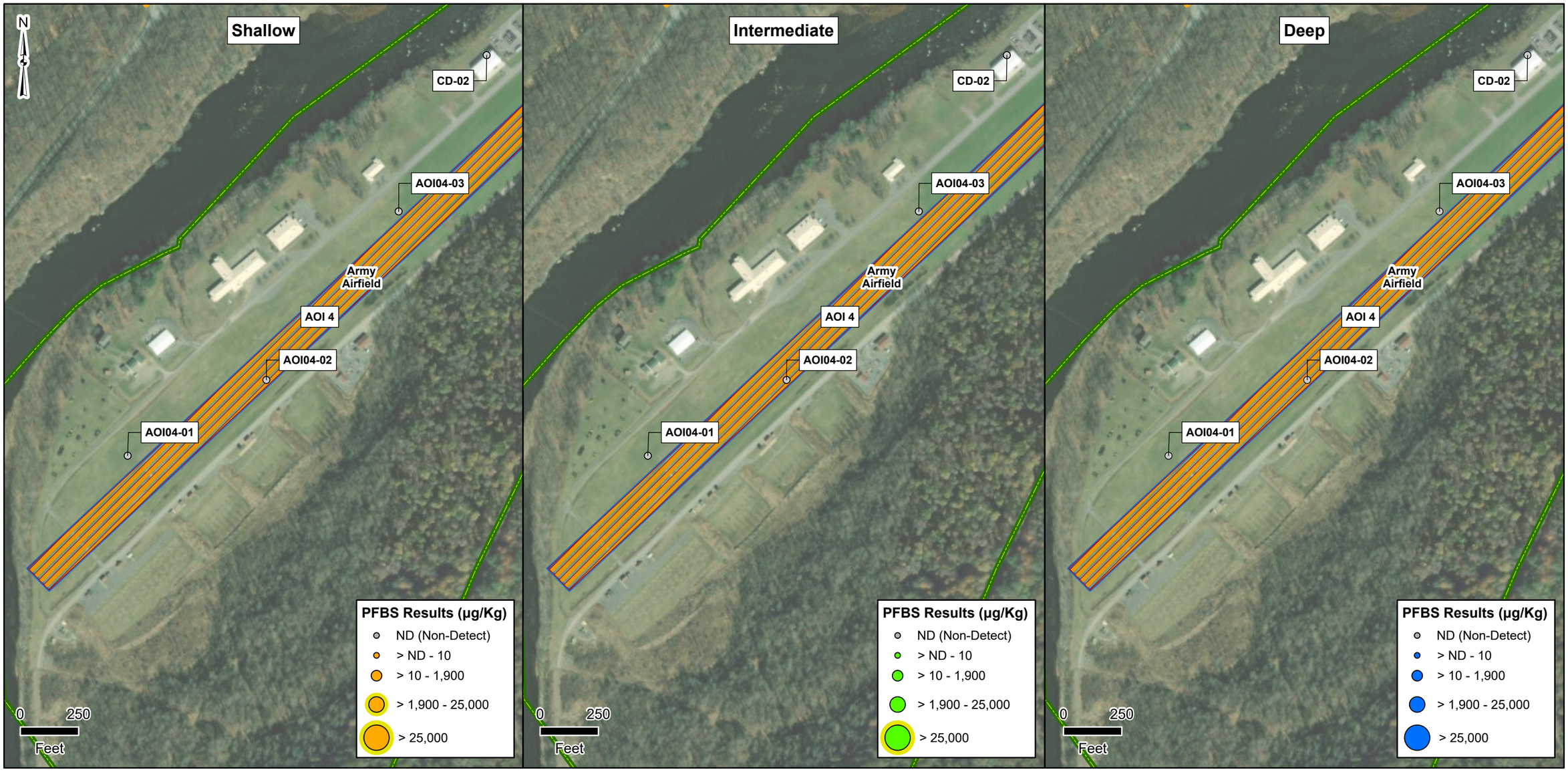
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-24
AOI 4
PFBS Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

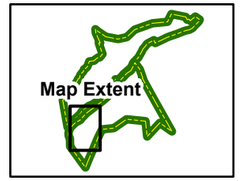
Data Sources:
ESRI 2022
AECOM 2019

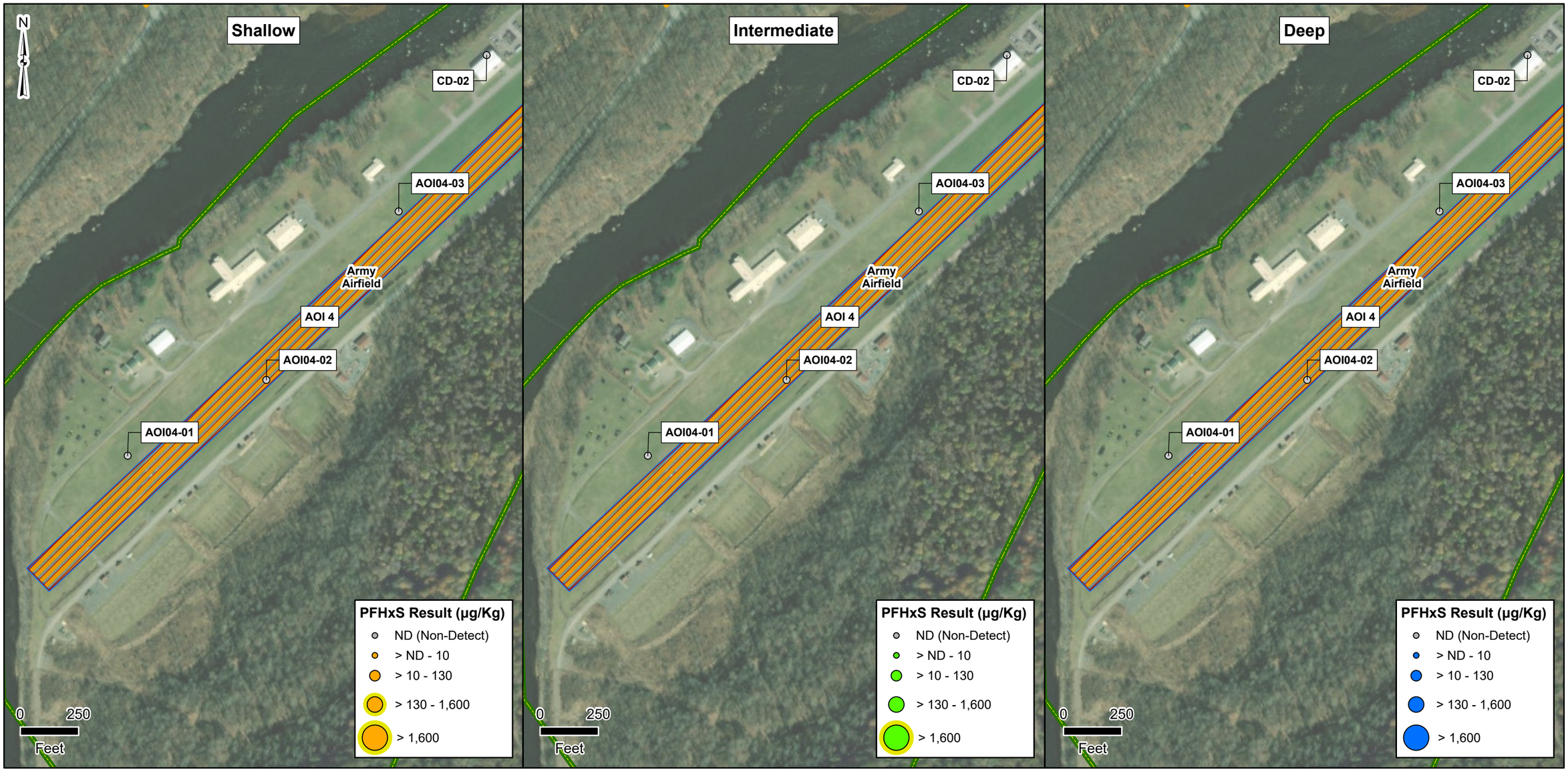
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-25
AOI 4
PFHxS Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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.

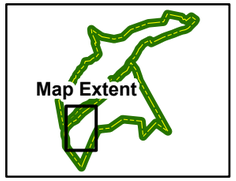
Data Sources:
ESRI 2022
AECOM 2019

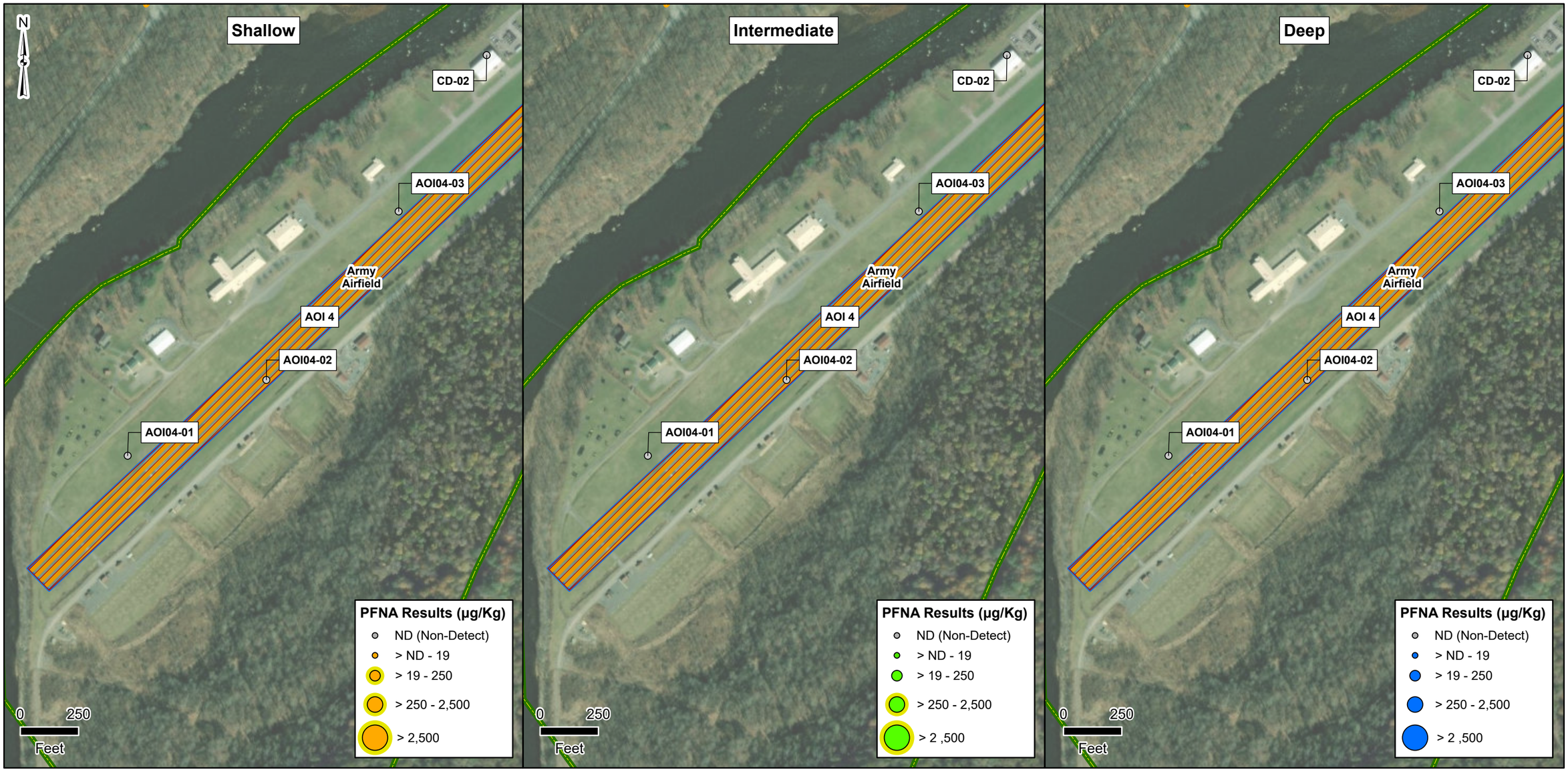
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-26
AOI 4
PFNA Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

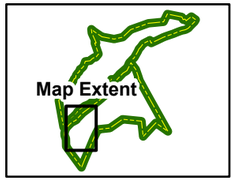
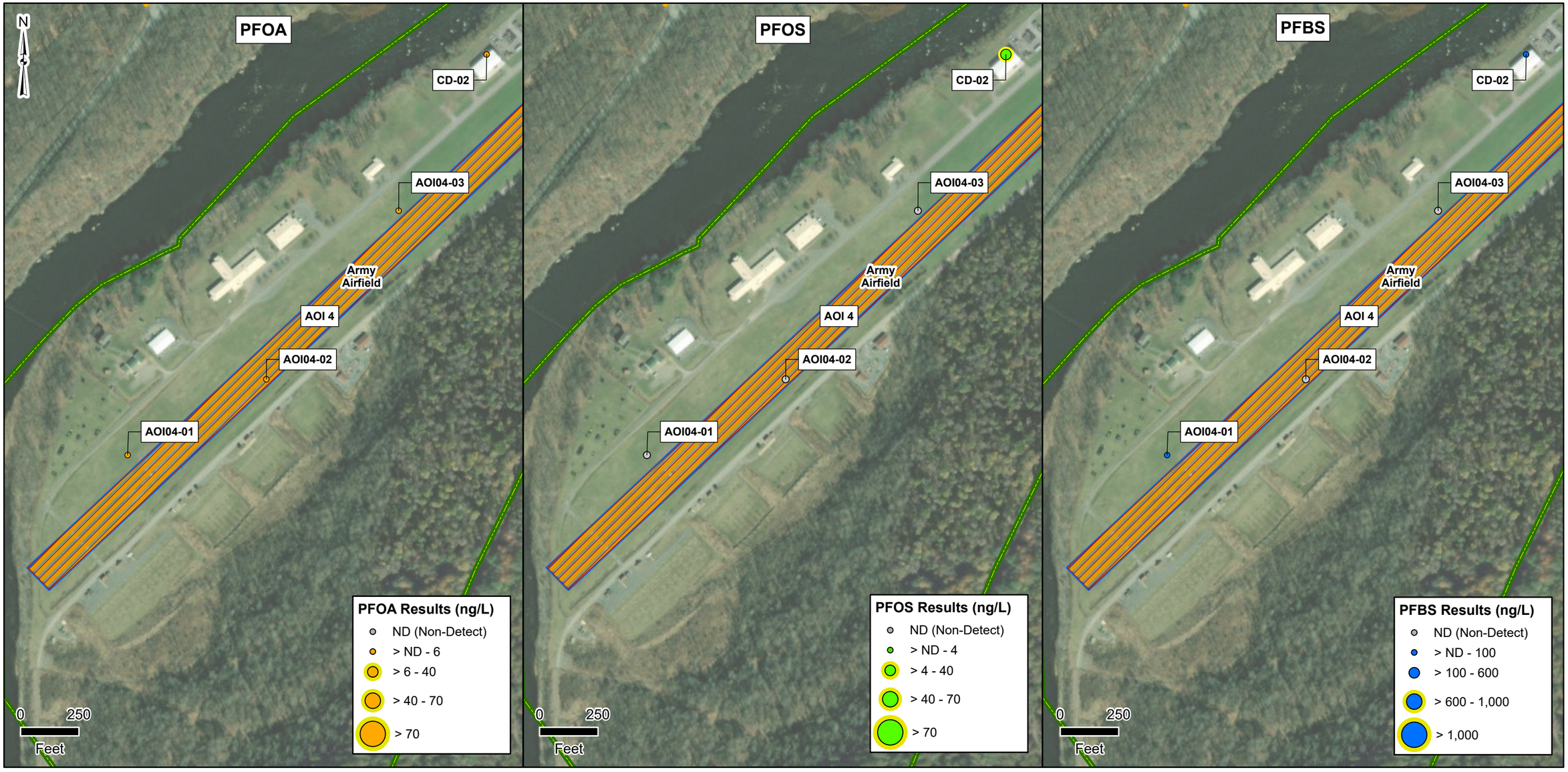


Figure 6-27
PFOA, PFOS and PFBS Detections in Groundwater (AOI 4)



Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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

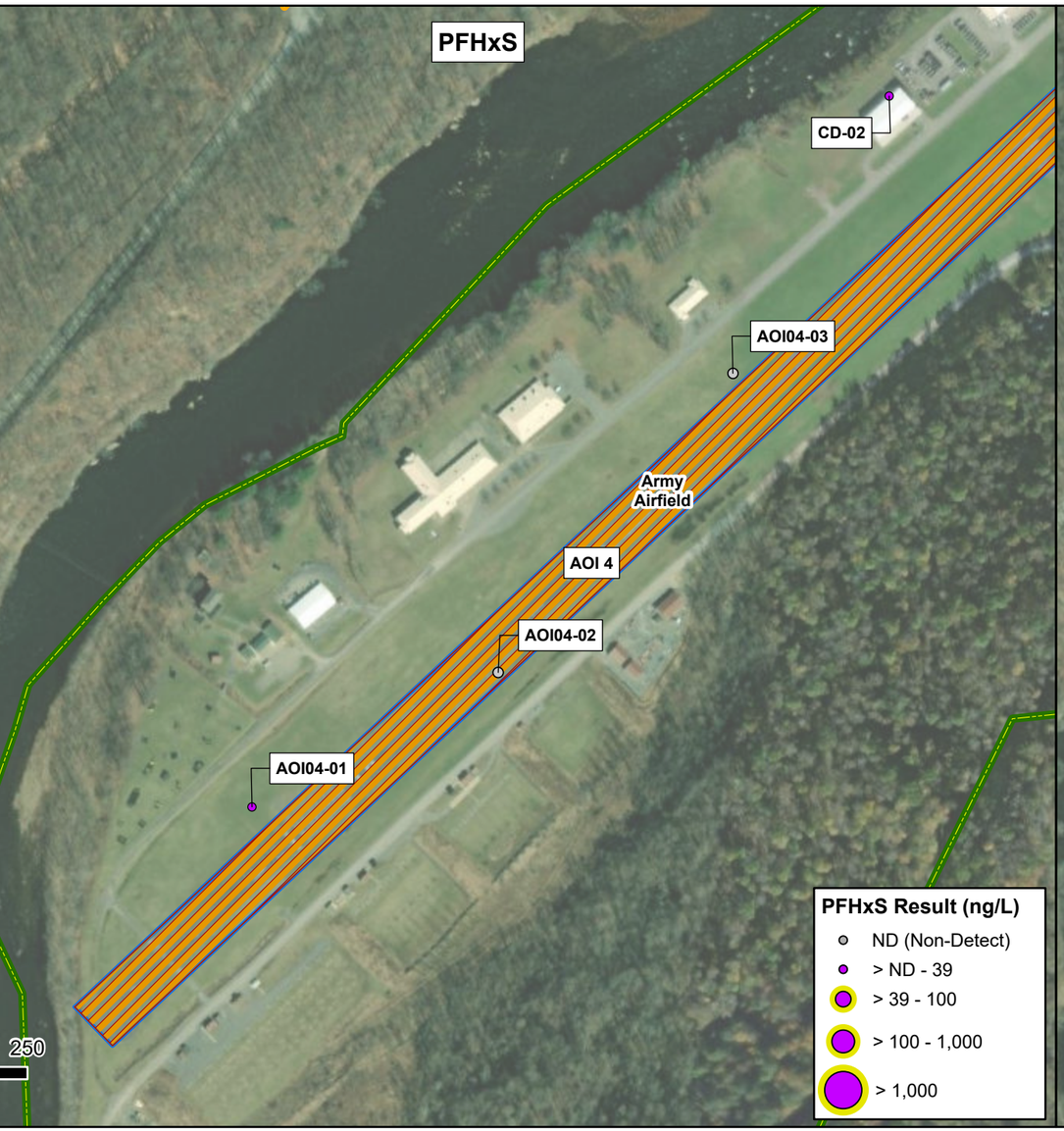
Data Sources:
ESRI 2022
AECOM 2019

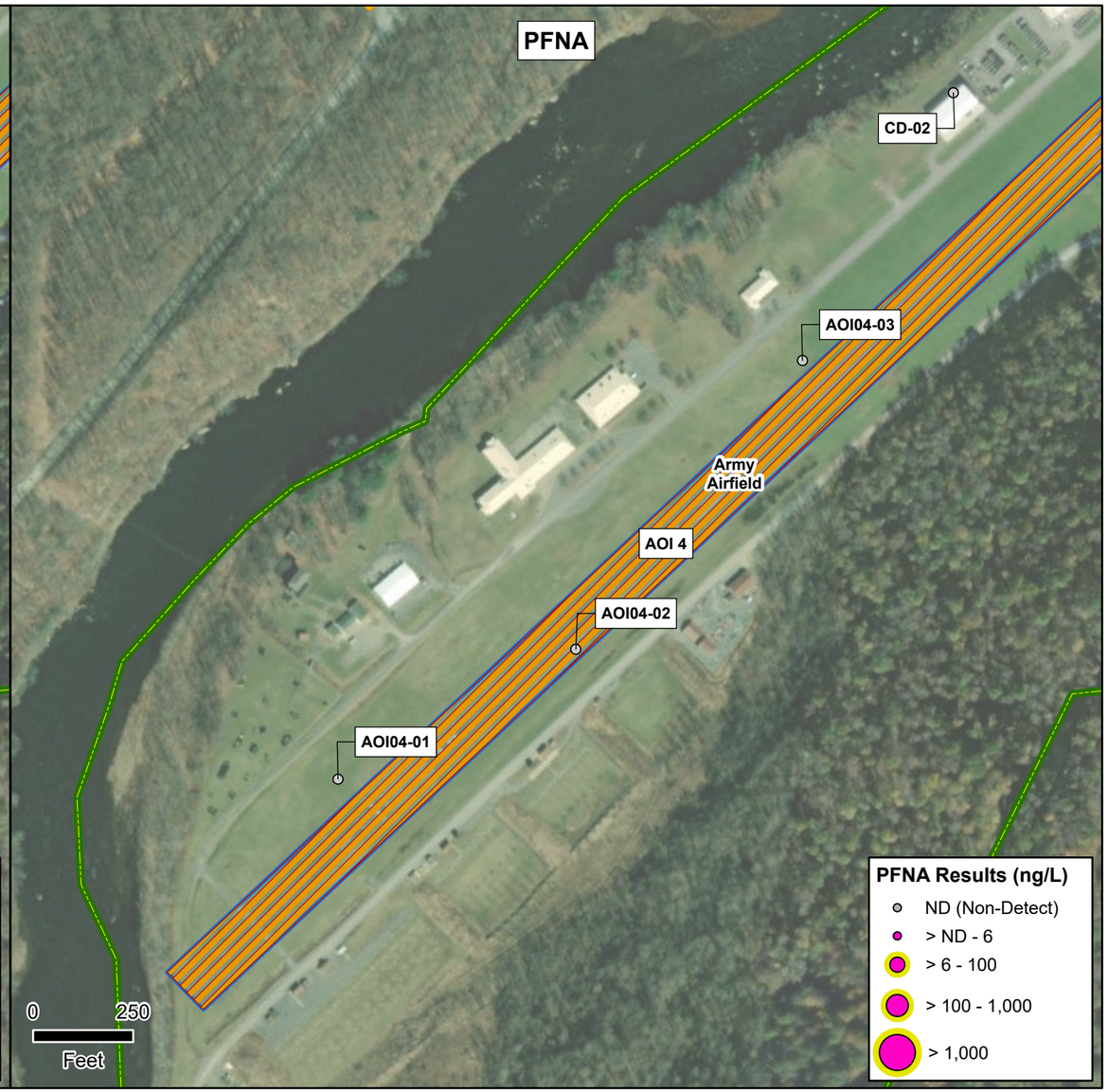
Date:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

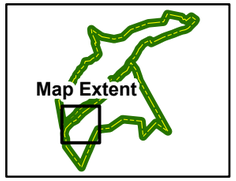
This page intentionally left blank

Army National Guard Site Inspections
Site Inspection Report
Camp Dawson, West Virginia

Figure 6-28
PFHxS and PFNA Detections in Groundwater (AOI 4)







Path: G:\Federal\Nationwide\PFAS\MAE5_634250383\PROJECTS\SIReport\CampDawson\CampDawson5i.aprx

Facility Data

- Facility Boundary
- Area of Interest
- Potential PFAS Release

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:.....October 2023
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 17N

This page intentionally left blank

7. EXPOSURE PATHWAYS

The conceptual site models (CSM) for the AOIs, revised based on the SI findings, are presented on **Figure 7-1** through **Figure 7-7**. Please note that while the CSM discussions assists in determining if a receptor may be impacted, the decision to move from SI to RI or interim action is determined based upon exceedances of the SLs for the relevant compounds and whether the release is more than likely attributable to the DoD. A CSM presents the current understanding of the site conditions with respect to known and suspected sources, potential transport mechanisms and migration pathways, and potentially exposed human receptors. A human exposure pathway is considered potentially complete when the following conditions are present:

1. Contaminant source
2. Environmental fate and transport
3. Exposure point
4. Exposure route
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 no further action. However, the pathway is considered potentially complete if the relevant compounds are detected, in which case the CSM figure uses a half-filled circle symbol to represent a potentially complete exposure pathway. Additionally, a completely filled circle symbol is used to indicate when a potentially complete exposure pathway has detections of relevant compounds above the SLs. Areas with an identified potentially complete pathway that have detections of the relevant compounds above the SLs may warrant further investigation. Although the CSMs indicate whether potentially complete exposure pathways may exist, the recommendation for future study in a RI or no action at this time is based on the comparison of the SI analytical results for the relevant compounds to the SLs.

In general, the potential routes of exposure to the relevant compounds are ingestion and inhalation. Human exposure via the dermal contact pathway may occur, and current risk practice suggests it is an insignificant pathway compared to ingestion; however, exposure data for dermal pathways are sparse and continue to be the subject of toxicological study. The receptors evaluated are consistent with those listed in USEPA guidance for risk screening (USEPA 2001). Receptors at the Facility include site workers (e.g., 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 7) based on the aforementioned criteria. AOIs 1, 2, 3, 4, 5, 6, and 7 are the Wash Pad FTA, Stalls 17/16, Former Manganese Plant, Army Airfield, Flightline Parking Pad, Fuel Farm Shed, and Vance Building, respectively. AOIs 1, 2, 4, 5, 6, and 7 will be treated separately with individual CSM figures and soil exposure discussions. CSM. AOI 3 will also be considered a singular CSM based on its remote location across the river from all other AOIs.

7.1.1 AOI 1

Controlled barrel burns occurred sometime between 2002 and 2003 at AOI 1, releasing 60 or more gallons of an unknown concentration of AFFF onto the Wash Pad FTA and surrounding grassy areas.

PFOA, PFNA, and PFHxS were detected in surface soils associated with AOI 1 at concentrations below their respective SLs. PFOS was detected at a concentration above the SL. 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 was a single detection for PFOA in the deep subsurface sample at AOI01-02, approximately 26 ft below grade. However, future construction worker exposure is evaluated between 0-15ft bgs. Therefore, the exposure pathways for subsurface soil are considered incomplete for the construction worker. The CSM is presented in **Figure 7-1**.

7.1.2 AOI 2

AOI 2 is the Stalls 17/16, located just east of the northern end of the Flightline parking pad and slightly southwest of the Vance Building (AOI 7). In 2014, a firetruck arrived carrying roughly 50 gals of AFFF of an unknown concentration. The truck was emptied at an unknown location, moved to the Vance Building, and the waste AFFF was stored in Stalls 17/16. Further, base personnel interviewed, along with manifest records, listed one 55-gal drum, one 20-gal plastic drum, twenty 5-gal buckets, and one 55-gal metal drum as holding concentrated AFFF on wooden pallets within Stalls 17/16.

PFOA and PFOS were detected in surface soil at AOI 2 at concentrations below their respective SLs. 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 detections of the relevant compounds in subsurface soil at AOI 2. Therefore, the exposure pathways for subsurface soil are considered incomplete for the construction worker. The CSM is presented in **Figure 7-2**.

7.1.3 AOI 3

Directly across the Cheat River and west of the Army Airfield, the remnants of the Former Manganese Plant are located in what is now known as the Volkstone Tract of Camp Dawson. The previous smelting plant is located downstream of the surface water intake for the Cheat River, which supplies drinking water to Camp Dawson and the City of Kingwood. No known documentation exists concerning AFFF usage or the type of fire suppression systems used in the plant.

PFOA and PFOS were detected in surface soils at AOI 3 at concentrations below their respective SLs. Trespassers, site workers, and 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 was a single detection of PFOA below the SL in shallow subsurface between 4 and 6 ft bgs. There were no deep subsurface detections in soil. Future construction workers could contact constituents in shallow subsurface soil through ground disturbing activities. Therefore, the exposure pathways for subsurface soil are considered potentially complete for construction workers. The CSM is presented in **Figure 7-3.**

7.1.4 AOI 4

AOI 4 is the Army Airfield where, although not documented, AFFF may have been stored or used due to the nature of airfields and flightlines historically providing mobile or portable AFFF fire extinguishers and tanks for emergency fire purposes.

PFOA was detected in surface soils at AOI 4 at concentrations below the SL. 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 detections of the relevant compounds in subsurface soil at AOI 4. Therefore, the exposure pathways for subsurface soil are incomplete for the future construction worker. The CSM is presented in **Figure 7-4**

7.1.5 AOI 5

AOI 5 is the Flightline Parking Pad located adjacent to and immediately east of the Army Airfield. During follow-up interviews with Camp Dawson personnel, it was discovered that former fire training activities occurred near the Flightline Parking Pad. Personnel recalled barrel burns, similar to the burn described at the Wash Pad FTA, occurring near the Flightline Parking Pad. The exact location, quantity of AFFF used, and extent of the fire training activities is unknown, as is the timeframe.

There were no detections of relevant compounds in any interval of soil at AOI 5. Therefore, the exposure pathways for both surface and subsurface soil for all receptors are considered incomplete. The CSM is presented in **Figure 7-5.**

7.1.6 AOI 6

In 2016, WVARNG personnel discovered four to five full and unopened 5-gal buckets of concentrated AFFF within the Fuel Farm Shed, located north of the Wash Pad FTA and east from the center of the Flightline Parking Pad. Concentration of the AFFF as well as the storage duration within the Fuel Farm Shed is unknown. Further, it is unknown whether any undocumented spillage or releases of AFFF occurred at this location.

PFOA, PFOS, and PFHxS were detected in concentrations 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. Therefore, the surface soil exposure pathways for these receptors are considered potentially complete. There were no detections of the relevant compounds in subsurface soil at AOI 6. Therefore, the exposure pathways for

subsurface soil are incomplete for the future construction worker. The CSM is presented in **Figure 7-6.**

7.1.7 AOI 7

AOI 7 is the Vance Building located roughly 400ft east from Stalls 17/16 on the eastern side of the Facility. The firetruck given to Camp Dawson in 2014 was stored in the Vance Building anywhere from 18 months to 3 years with an unknown concentration of AFFF. The undocumented storage of AFFF in the firetruck may have resulted in unintended spills and/or leaks of AFFF within or adjacent to the Vance Building. Parking the firetruck outside in the parking bay may have resulted in releases to the surrounding gravel and grassy areas adjacent to the Vance Building.

There were no detections of relevant compounds in any interval of soil at AOI 7. Therefore, the exposure pathways for both surface and subsurface soil for all receptors are considered incomplete. The CSM is presented in **Figure 7-7.**

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. Due to exceedances of respective SLs for relevant compounds in AOIs 1, 2, 3, 4, 5, and 7, as well as having the same affected pathways and receptors, the section for groundwater exposure pathway will be combined into a single discussion. AOI 6, although having detections of relevant compounds in groundwater, no exceedances of SLs occurred, thus, AOI 6 will be discussed separately.

7.2.1 AOIs 1, 2, 3, 4, 5, and 7

Five relevant compounds – PFOS, PFOA, PFNA, PFHxS, and PFBS – were detected in groundwater within AOIs 1, 2, 4, 5, and 7 source areas. Additionally, PFOA, PFOS, and PFHxS were detected at concentrations above their respective SLs in multiple locations.

The Facility receives drinking water from the City of Kingwood, which has surface water intakes just upgradient of Camp Dawson via Morgan Run tributaries. Groundwater is not used for any purpose at Camp Dawson. However, due to the exceedance of relevant compounds in shallow groundwater occurrences (depth to water was 15 ft bgs or less), 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 CSMs are presented on **Figures 7-1, 7-2, 7-3, 7-4, 7-5, and 7-7**.

7.2.2 AOI 6

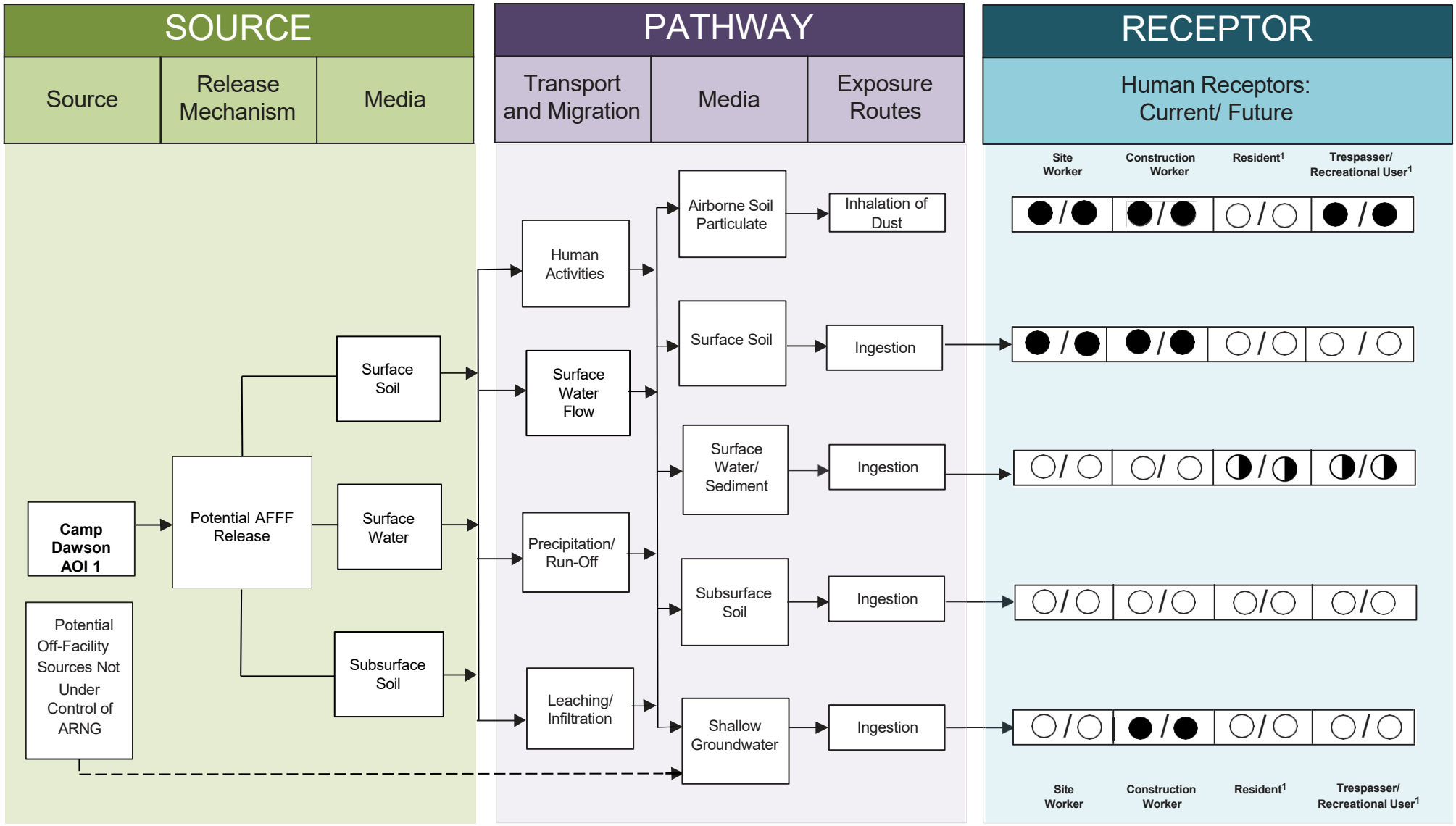
Three relevant compounds – PFOA, PFHxS, and PFBS – were detected in the temporary well associated with source area within the Fuel Farm Shed in Camp Dawson. No relevant compounds were detected in concentrations exceeding their respective SLs.

The Facility receives drinking water from the City of Kingwood, which has surface water intakes just upgradient of Camp Dawson via Morgan Run tributaries. Groundwater is not used for any purpose at Camp Dawson, and there were no exceedances of relevant compounds in groundwater. Therefore, the exposure pathway for future construction workers for shallow groundwater is considered incomplete. The CSM is presented in **Figure 7-6**.

7.3 SURFACE WATER AND SEDIMENT EXPOSURE PATHWAY

Off-facility surface water and sediment were not sampled as part of this SI, as the scope of sampling was limited to the presence or absence of the relevant compounds in soil and groundwater within the facility boundary. No surface water features flow through Camp Dawson, therefore the exposure pathway for surface water and sediment for trespasser, site workers, and future construction workers is considered incomplete. However, the Facility is within close proximity to the Cheat River. Boundary sample CD-02, which had exceedances for PFOS in groundwater and detections of PFOA and PFOS in surface soil below respective SLs, was placed west of AOIs 1, 4, 5, and 6 roughly 50 ft from the eastern bank of the Cheat River to capture potential flow entering/leaving the Cheat River. Groundwater contour maps, and the subsequent detections in CD-04, corroborate surface flow and groundwater discharge to the Cheat River. The Cheat River, as well as tributaries it connects to, continue north downgradient and are high-use bodies of water for fishing, swimming, boating, and are a source for groundwater. Based on the groundwater concentrations, which exceeded SLs at multiple AOIs and at the facility boundary, the ingestion exposure pathway for surface water and sediment is considered potentially complete for recreational and off-facility residents who use the downgradient water bodies. The CSMs are presented on **Figures 7-1 through 7-7**.

This page intentionally left blank



NOTES

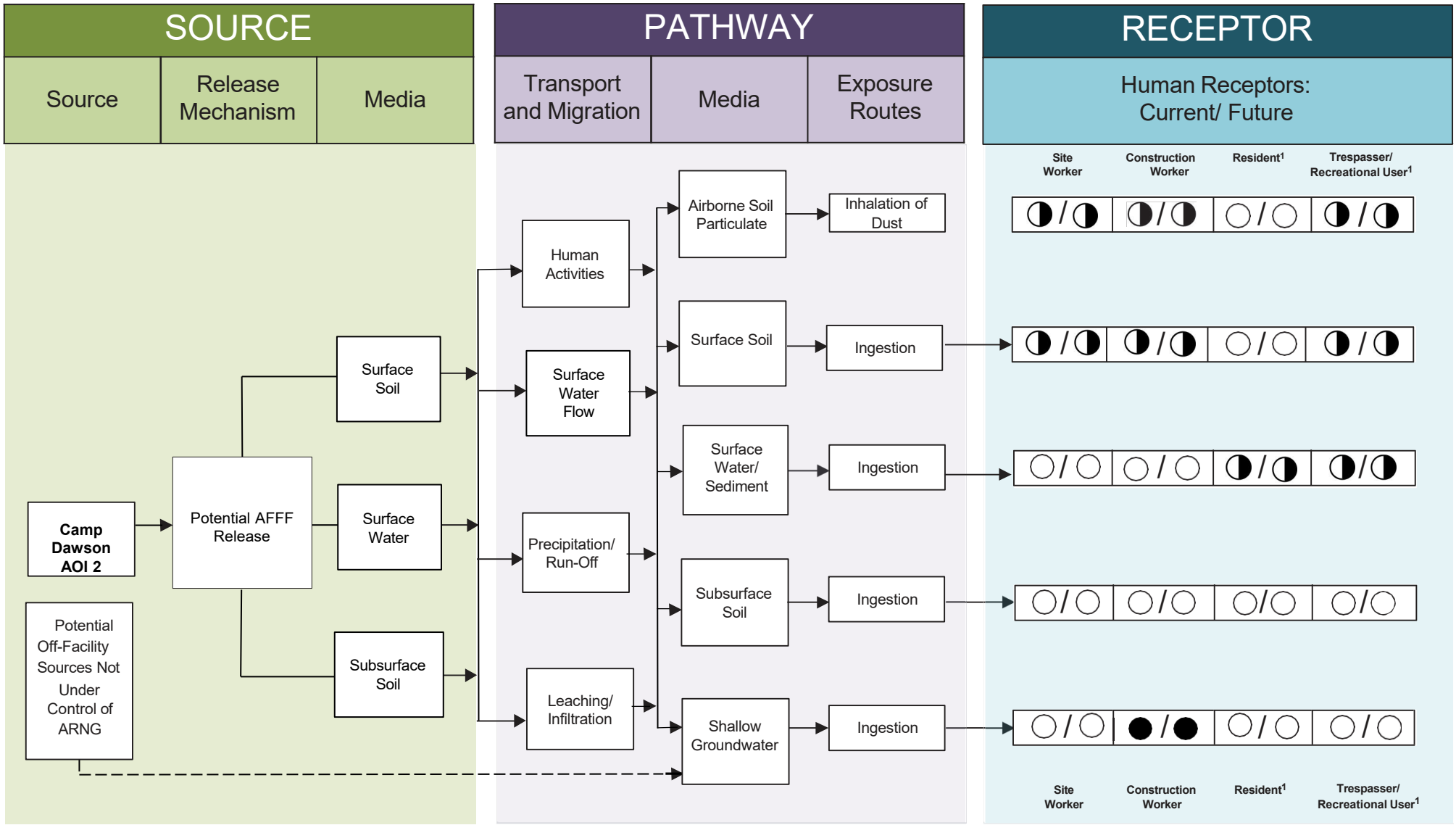
1. The resident and recreational users refer to off-site receptors.

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
Camp Dawson AOI 1

This page intentionally left blank



NOTES

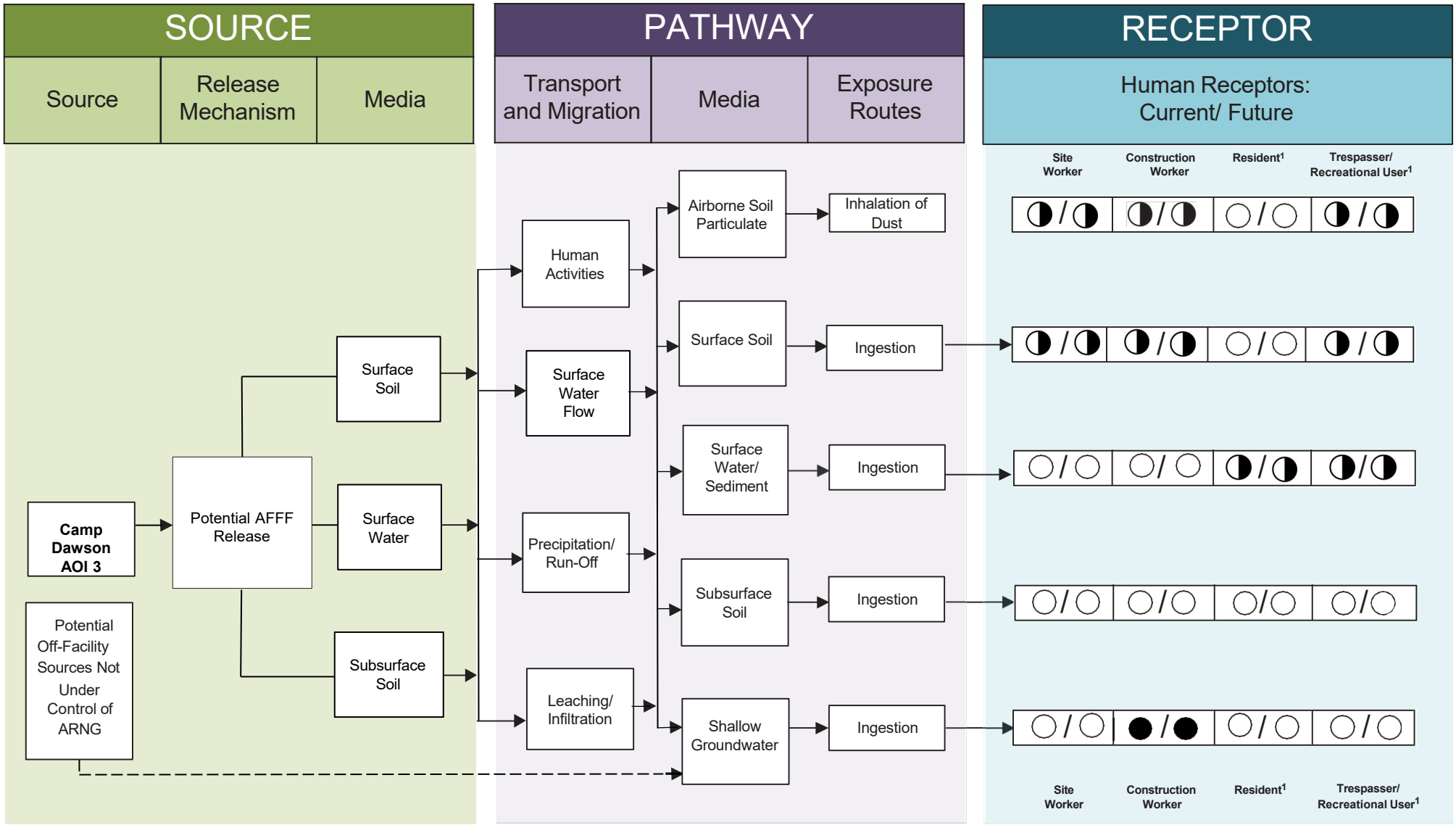
1. The resident and recreational users refer to off-site receptors.

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
Camp Dawson AOI 2

This page intentionally left blank



NOTES

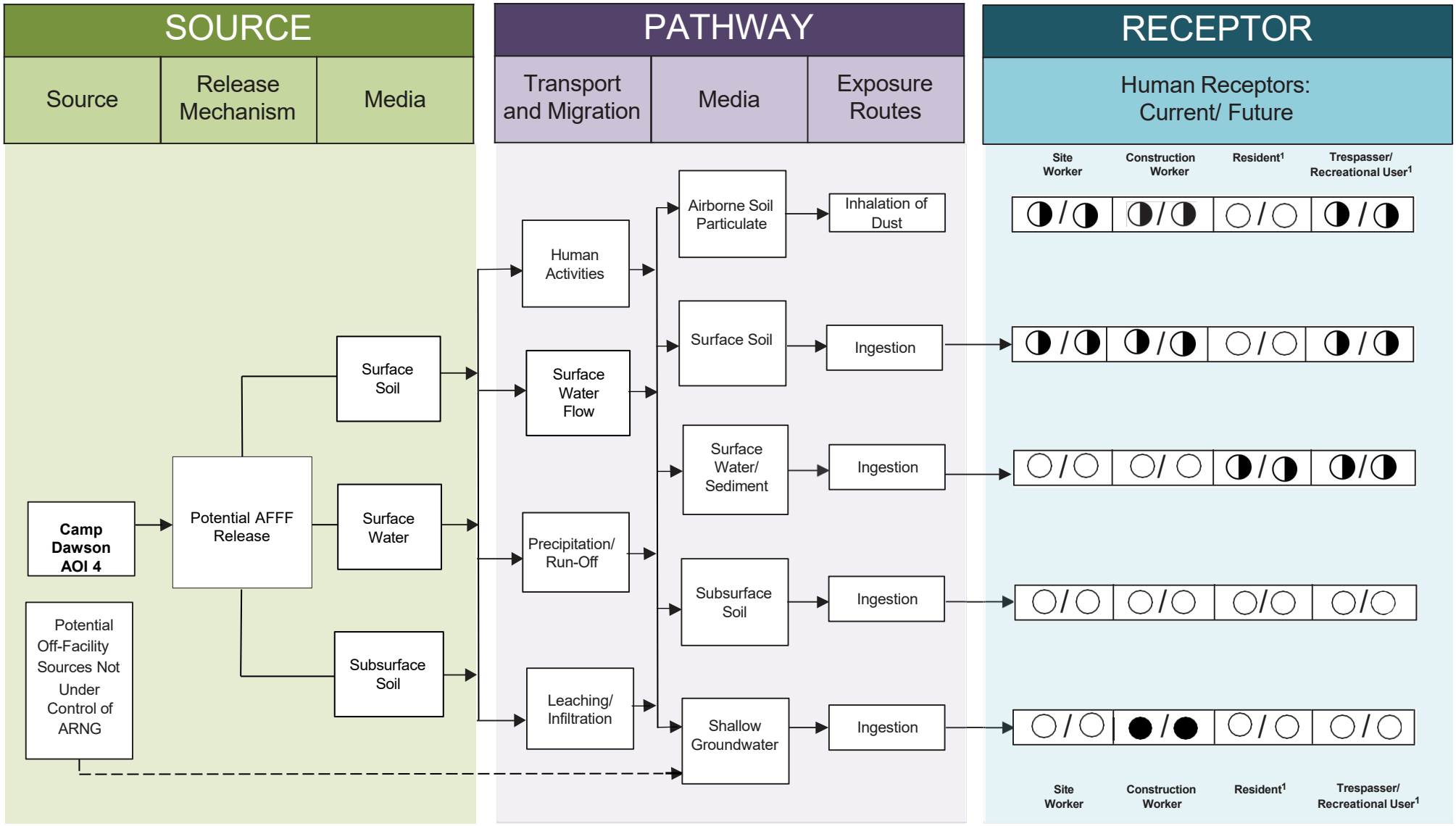
1. The resident and recreational users refer to off-site receptors.

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
Camp Dawson AOI 3

This page intentionally left blank



NOTES

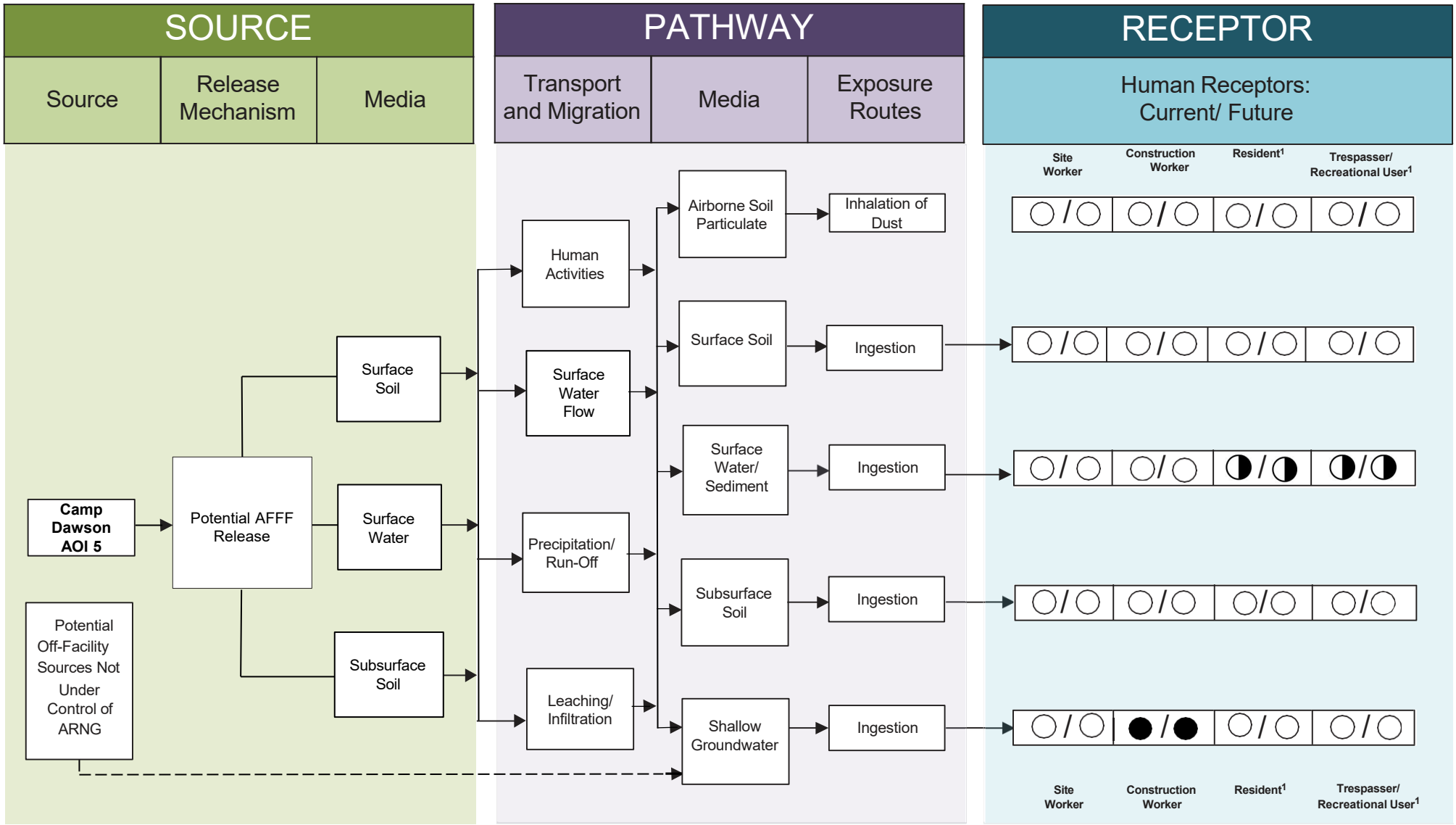
1. The resident and recreational users refer to off-site receptors.

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 7-4
Conceptual Site Model
Camp Dawson AOI 4

This page intentionally left blank



NOTES

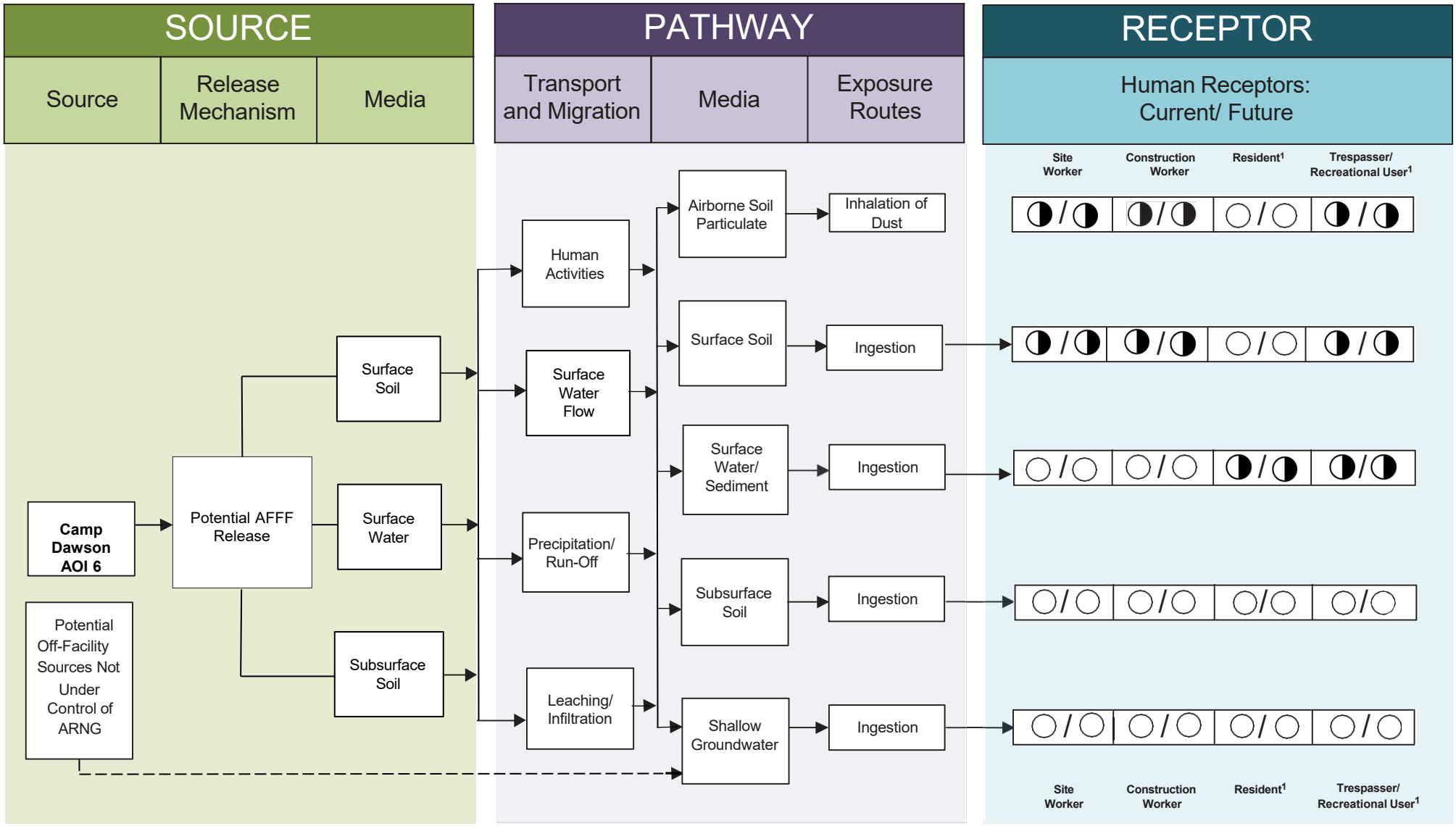
1. The resident and recreational users refer to off-site receptors.

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 7-5
Conceptual Site Model
Camp Dawson AOI 5

This page intentionally left blank



NOTES

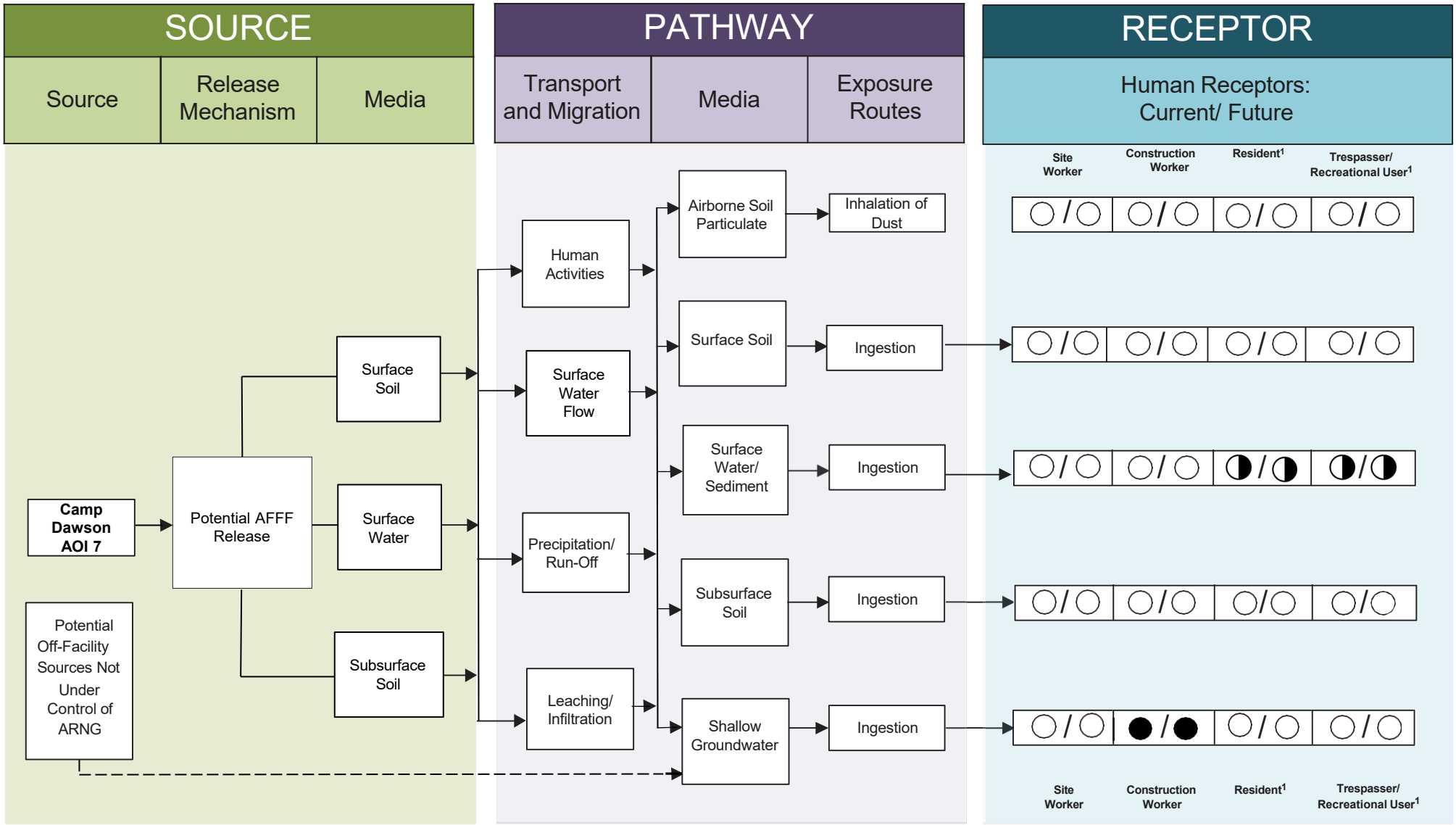
1. The resident and recreational users refer to off-site receptors.

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 7-6
Conceptual Site Model
Camp Dawson AOI 6

This page intentionally left blank



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 7-7
Conceptual Site Model
Camp Dawson AOI 7

This page intentionally left blank

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 31 August to 16 September 2022. 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 UFP-QAPP Addendum (EA 2022a), except as previously noted in **Section 5.8**.

To fulfill the project DQOs set forth in the approved SI UFP-QAPP Addendum (EA 2022a), 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:

- Ninety-Eight (98) soil samples from 29 primary locations and four boundary samples
- Twenty-Eight (28) grab groundwater samples from 33 temporary well locations (5 locations could not produce samples)
- Forty-One (41) 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 RI is warranted for AOIs 1, 2, 3, 4, 5, and 7. 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 recreators from releases during historical DoD 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**.

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

- AOI 1:
  - PFOA, PFAS, PFNA, PFHxS, and PFBS were detected in groundwater samples, with exceedances for PFOA (12 ng/L), PFOS (21 ng/L), and PFHxS (49 ng/L) above their respective SLs. Based on the results of the SI, further evaluation of AOI 1 is warranted in the RI.
  - PFOA, PFOS, PFNA, and PFHxS were detected in surface soil at AOI 1, with an exceedance for PFOS. No relevant compounds were detected in subsurface soil.
- AOI 2:
  - PFOS, PFOA, PFBS, PFNA, and PFHxS were detected in groundwater at AOI 2. PFOA exceeded the SL in groundwater. Based on the results of the SI, further evaluation of AOI 2 is warranted in the RI.
  - PFOA and PFOS were detected in soil at AOI 2 at low concentrations below the SL. There were no other detections for relevant compounds in any interval of soil.
- AOI 3:
  - PFOA, PFOS, PFNA, PFHxS, and PFBS were detected in groundwater at AOI 3. PFOA, and PFOS were detected above their respective SLs. Based on the results of the SI, further evaluation of AOI 3 is warranted in the RI.
  - PFOA and PFOS were detected at concentrations below their respective SLs in surface soil, and a single PFOA detection in a shallow subsurface soil sample.
- AOI 4:
  - PFOA, PFOS, PFNA, PFHxS, and PFBS were detected in groundwater at AOI 4. An exceedance for PFOA was seen at one location above the SL. Based on the results of the SI, further evaluation of AOI 4 is warranted in the RI.
  - PFOA was detected at very low concentrations in two surface soil boring locations, well below the SL. No relevant compounds were detected in subsurface soil.
- AOI 5:
  - PFOA, PFOS, PFNA, PFHxS, and PFBS were detected in groundwater at AOI 5. PFOA and PFOS in groundwater exceeded their respective SLs. Based on the results of the SI, further evaluation of AOI 5 is warranted in the RI.

- There were no detections of relevant compounds in any interval for soil at AOI 5.

- AOI 6:

  - PFOA, PFHxS, and PFBS were detected in groundwater below their respective SLs. Based on the results of the SI, no further evaluation of AOI 6 is warranted.

  - PFOA, PFOS, and PFHxS were detected in surface soil below their respective SLs. No relevant compounds were detected in subsurface soil.

- AOI 7:

  - PFOA, PFOS, PFNA, PFHxS, and PFBS were detected in groundwater at AOI 7. PFOA exceeded the SL in one location. Based on the results of the SI, further evaluation of AOI 7 is warranted in the RI.

  - There were no detections of relevant compounds in any interval for soil at AOI 7.

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 military specification (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	Wash Pad FTA	●	●	◐	Proceed to RI
2	Stalls 17/16	◐	●	◐	Proceed to RI
3	Former Manganese Plant	◐	●	◐	Proceed to RI
4	Army Airfield	◐	●	●	Proceed to RI
5	Flightline Parking Pad	○	●	◐	Proceed to RI
6	Fuel Farm Shed	◐	◐	◐	No Further Action
7	Vance Building	○	●	◐	Proceed to RI

Legend:
● = Detected; exceedance of SLs
◐ = Detected; no exceedance of SLs
○ = Not detected

9. REFERENCES

AECOM Technical Services, Inc. (AECOM). 2020. *Final Preliminary Assessment Report, Camp Dawson, Kingwood, West Virginia*. May.

Assistant Secretary of Defense. 2022. *Investigation Per- and Polyfluoroalkyl Substances within The Department of Defense Cleanup Program*. United States Department of Defense. 6 July.

Department of the Army. 2016. *EM-200-1-2, Environmental Quality, Technical Project Planning Process*. 29 February.

Department of Defense (DoD). 2019a. *General Data Validation Guidelines*. November.

———2019b. *Department of Defense (DoD), Department of Energy (DOE) Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3*. May.

———2020. *Data Validation Guidelines Module 3: Data Validation Procedure for Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-15*. May.

EA, Engineering, Science, and Technology, PBC (EA). 2020a. *Final Programmatic Uniform Federal Policy Quality Assurance Project Plan, Site Inspections for Per- and Polyfluoroalkyl Substances Impacted Sites, ARNG Installations, Nationwide*. December.

———2020b. *Programmatic Accident Prevention Plan, Revision 1*, November 2020.

———2021. *Final Accident Prevention Plan Site Safety and Health Plan, Fixed Wing Army Aviation Training Site, West Virginia Revision 0*, October 2021.

———2022. *Final Site Inspection Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) Camp Dawson, Kingwood, West Virginia, Per- and Polyfluoroalkyl Substances Impacted Sites ARNG Installations, Nationwide*. March.

Guelfo, J.L. and C.P. Higgins. 2013. *Subsurface transport potential of perfluoroalkyl acids and aqueous film-forming foam (AFFF)-impacted sites*. Environmental Science and Technology 47(9):4164-71.

Higgins, C.P., and R.G. Luthy. 2006. *Sorption of perfluorinated surfactants on sediments*. Environmental Science and Technology 40 (23): 7251-7256.

Interstate Technology Regulatory Council (ITRC). 2018. *Environmental Fate and Transport for Per- and Polyfluoroalkyl Substances*. March.

U.S. Environmental Protection Agency (USEPA). 1980. *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*. 11 December.

———. 1994. *National Oil and Hazardous Substances Pollution Contingency Plan (Final Rule).* 40 Code of Federal Regulations Part 300; 59 Federal Register 47384. September.

———. 2001. *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation* Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments). December.

———. 2017. UCMR 3 (2013-2015) Occurrence Data by State. Occurrence Data for the Unregulated Contaminant Monitoring Rule. Accessed 9 July 2019 at https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule. January.

U.S. Fish and Wildlife Service. 2022. *Endangered Species.* http://ecos.fws.gov/ipac/. Accessed 28 October.

Xiao, F., M. F. Simcik, T.R. Halbach, and J.S Gulliver. 2015, *Perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA) in soils and groundwater of a U.S. metropolitan area: Migration and implications for human exposure*. Water Research 72:64-74