FINAL
Site Inspection Report
Army Aviation Support Facility
Concord, New Hampshire

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

August 2023

Prepared for:

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

UNCLASSIFIED

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	Degrees Celsius
°F	Degrees Fahrenheit
%	Percent
µg/kg	Microgram(s) per kilogram
AASF	Army Aviation Support Facility
AECOM	AECOM Technical Services, Inc.
AFFF	Aqueous Film Forming Foam
AGQS	Ambient Groundwater Quality Standards
amsl	Above mean sea level
ANG	Air National Guard
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
DA	Department of the Army
DoD	Department of Defense
DOT	Department of Transportation
DPT	Direct-push technology
DQI	Data quality indicator
DQO	Data quality objective
DUA	Data Usability Assessment
EA	EA Engineering, Science, and Technology, Inc., PBC
EDR	Environmental Data Resources, Inc.
EIS	Extraction internal standards
ELAP	Environmental Laboratory Accreditation Program
EM	Engineer Manual
EB	Equipment Blank
FB	Field blank
FedEx	Federal Express
ft	Foot (feet)
HDPE	High-density polyethylene
HFPO-DA	Hexafluoropropylene oxide dimer acid
HQ	Hazard Quotient
GAC	Granular activated carbon

GPR	Ground-penetrating radar
GPS	Global positioning system
IDW	Investigation-derived waste
ITRC	Interstate Technology Regulatory Council
LC/MS/MS	Liquid chromatography tandem mass spectrometry
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
LOQ	Limit of quantification
MCL	Maximum Contaminant Level
MIL-SPEC	military specification
MS	Matrix spike
MSD	Matrix spike duplicate
NELAP	National Environmental Laboratory Accreditation Program
NGB	National Guard Bureau
ng/L	Nanogram(s) per liter
NHDES	New Hampshire Department of Environmental Services
NH HB	New Hampshire House Bill
No.	Number
OSD	Office of the Secretary of Defense
OWS	Oil-water separator
PA	preliminary assessment
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PID	photoionization detector
ppt	Parts per trillion
PVC	polyvinyl chloride
QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
QSM	Quality Systems Manual
RI	Remedial investigation
RPD	Relative percent difference
SI	Site Inspection

SL	Screening level
SMR	State Military Reservation
TOC	Total organic carbon
TPP	Technical Project Planning
UCMR 3	Third Unregulated Contaminant Monitoring Rule
UFP	Uniform Federal Policy
USACE	US Army Corps of Engineers
USEPA	US Environmental Protection Agency
Wood	Wood Environment & Infrastructure Solutions, Inc.
WSP	WSP USA Environment & Infrastructure Inc.

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 regarding Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program (Assistant Secretary of Defense, 2022) from the Office of the Secretary of Defense (OSD) dated 6 July 2022. The six compounds listed in the OSD memorandum include perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorobutanesulfonic acid (PFBS), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), and hexafluoropropylene oxide dimer acid (HFPO-DA)[1]. These compounds are collectively referred to as "relevant compounds" throughout the document, and the applicable Screening Levels (SLs) are provided below in **Table ES-1**.

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

The Facility, operated by the New Hampshire ARNG (NHARNG), encompasses approximately 26 acres in Concord, New Hampshire. The AASF is located at 26 Regional Drive in Concord, Merrimack County, New Hampshire. The Facility is near the southeastern city limits, east of Interstate 93 and south of Interstate 393. The area surrounding the AASF includes residential and commercial properties to the north, the Concord Municipal Airport to the south, commercial and light industrial properties to the east, and additional portions of the Concord Municipal Airport and the NHARNG State Military Reservation (SMR) to the west. Conservation/Public Lands are located approximately 0.45 miles to the southeast, adjoining the Soucook River. Operations at the AASF include aviation training and maintenance, modification, and repair of rotary-winged aircraft.

The PA identified three AOIs for investigation during the SI phase. SI sampling results from the three AOIs were compared to OSD SLs. **Table ES-2** summarizes the SI results for each AOI. Based on the results of this SI, further evaluation under CERCLA is warranted in a Remedial Investigation (RI) for AOI 1, AOI 2, and AOI 3.

[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] (0-2 feet bgs)	Industrial / Commercial Composite Worker (Soil) (µg/kg)[1] (2-15 feet 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 Screening Levels in Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.
2. Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the CSM developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of MIL-SPEC AFFF and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

Abbreviations:
µg/kg = microgram(s) per kilogram
bgs = below ground surface
ng/L = nanogram(s) per liter

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	Fire Suppression System Releases	●	●	●	Proceed to RI
2	System Testing Area	◐	●	●	Proceed to RI
3	Infiltration Gallery	◐	●	●	Proceed to RI

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

1. INTRODUCTION

1.1 PROJECT AUTHORIZATION

The Army National Guard (ARNG) G-9 is the lead agency in performing Preliminary Assessments (PAs) and Site Inspections (SIs) 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 regarding Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program (Assistant Secretary of Defense, 2022) from the Office of the Secretary of Defense (OSD) dated 6 July 2022. The six compounds listed in the OSD memorandum are 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)[1]. The ARNG performed this SI at the Army Aviation Support Facility (AASF) in Concord, New Hampshire. The AASF is also referred to as the "Facility" throughout this report.

The SI project elements were performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (U.S. Environmental Protection Agency [EPA] 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 U.S. Department of Army (DA) requirements and guidance for field investigations.

1.2 SITE INSPECTION PURPOSE

A PA was performed at the AASF (AECOM Technical Services, Inc. [AECOM] 2019) that identified three Areas of Interest (AOIs) where PFAS-containing materials may have been used, stored, disposed, or released historically. The objective of the SI is to identify whether there has been a release to the environment from the AOIs identified in the PA and determine whether further investigation is warranted, a removal action is required to address immediate threats, or no further action is required based on screening levels (SLs) for the relevant compounds.

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

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2. FACILITY BACKGROUND

2.1 FACILITY LOCATION AND DESCRIPTION

The AASF is located at 26 Regional Drive in Concord, Merrimack County, New Hampshire (**Figure 2-1**). The Facility is near the southeastern city limits, east of Interstate 93 and south of Interstate 393. The approximate center of the property is located at geographic coordinates 43°12'33.50"N; 71°30'8.21”W at 346 feet (ft) above mean sea level (amsl).

According to the PA (AECOM 2019), the NHARNG, by and through the Office of the Adjutant General, entered into a lease with the city of Concord in 2002 for the use and occupancy of 26 acres of land adjacent to the Concord Municipal Airport for 50 years. Prior to this time, the property was an undeveloped section of the Concord Municipal Airport. The current AASF building was constructed in 2004, and in 2004, the NHARNG moved AASF operations to the newly constructed AASF from the previous Building K location at the State Military Reservation (SMR). The AASF building occupies 98,900 square feet and consists of administrative offices, a hangar for the storage and maintenance of helicopters, a building for the maintenance and storage of fueling trucks, a jet fuel storage and filling area, and a hangar apron connected to the Concord Municipal Airport airfield (Tighe & Bond 2018; AECOM 2019). Construction of a new Readiness Center addition to the AASF building began in 2021. Construction is ongoing as of November 2022.

Operations at the AASF include aviation training and maintenance, modification, and repair of rotary-winged aircraft. The AASF is closed to the public, with a 6-foot chain-link fence surrounding the Facility. Access to the Facility is through a locked gate that requires an electronic security badge (AECOM 2019).

2.2 FACILITY ENVIRONMENTAL SETTING

The AASF is located within the Merrimack Valley in southern New Hampshire, within the Eastern New England Upland Physiographic Province of the Appalachian Highlands. The New England Upland consists of a maturely dissected plateau with narrow valleys, and the entire area was greatly modified by glaciation. The city of Concord developed along the Merrimack River and lies fully within the Merrimack River watershed (AECOM 2019). The city of Concord has a population of approximately 43,000 people, according to the US Census (US Census 2018; AECOM 2019).

The topography of the Facility and in the surrounding area is relatively flat. The topographic high of the Facility (approximately 345 ft amsl) is located west of the Main Hangar, on a hill constructed for aircraft landing practice. Much of the Facility is paved with either asphalt or concrete, with unpaved grassy areas along the boundaries of the Facility.

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

2.2.1 Geology

Regional geology consists of unconsolidated glacial material overlying igneous and metamorphic rocks. The unconsolidated material was deposited during the Wisconsin stage of glaciation, of the Pleistocene Epoch during the Quaternary Period. The weight of the ice caused differential depressions of the land surface during the Pleistocene Epoch. The southeastward flow of glacial ice scoured the rock surface, and as the ice melted, it deposited a thick blanket of glacial till in many areas. Meltwater streams deposited a variety of ice-contact sands and gravels upon portions of the till sheet (USAEHA 1993; AECOM 2019). Geologic features in the vicinity of the Facility are shown on **Figure 2-3**.

Bedrock in the vicinity consists predominantly of moderately fractured, medium-grained, two-mica granite of the Concord Granite Formation. Additional nearby formations (Lower Rangley, Upper Rangley, and Perry Mountain Formations) consist of metasedimentary phyllite, schist, and quartzite. The bedrock surface generally slopes downward from west to east (GZA GeoEnvironmental, Inc. 2010; AECOM 2019).

The unconsolidated material, which is mainly ground moraine, was originally subglacial till that was left scattered over the ground after the ice melted. A ground moraine consists of scattered boulders, combined with cobbles, gravel, pebbles, sand, silt, and clay, with some areas of ice-contact stratified drift. This stratified drift was derived from englacial and subglacial meltwater streams that also carried gravel, sand, silt, and clay. The shallowest layer is an approximately 25- to 50-foot-thick lacustrine deposit consisting of very dense, thinly interbedded silt, silt and clay, and fine sand. This stratum is overlain by an approximately 50- to 60-foot-thick section of glacial till consisting of very dense, fine to medium sand with clayey silt and gravel. Lacustrine sediments similar to those underlying the glacial till overlie the glacial till with thicknesses ranging from about 15 to 40 ft. Outwash deposits consisting predominantly of fine sand top the overburden stratigraphy with a thickness ranging from about 50 to 85 ft (GZA GeoEnvironmental, Inc. 2010; AECOM 2019).

During the SI, borings were advanced between 5 and 48 ft bgs. The soil was classified as well graded sand with varying levels of fines and cobbles overlying primarily poorly graded sand with increasing levels of silt with depth as the dominant lithology of the unconsolidated sediments below the AASF. Orange banding was observed between 5 and 48 ft bgs. Samples for grain size analyses were collected at the three AOIs at locations AOI01-04, AOI02-02, and AOI03-02. The results indicate that the soil samples are comprised primarily of sand (64.7% to 85.5%) and silt (11.0% to 26.1%). These results and facility observations are consistent with the reported depositional environment of the region. Boring logs are presented in **Appendix E** and grain size results are presented in **Appendix F**.

2.2.2 Hydrogeology

Based on investigations at the Electropac Worldwide Inc. site (former Vishay Sprague site), located immediately north, and hydraulically upgradient of the AASF, groundwater in the vicinity is between 30 and 50 ft below ground surface (bgs) and flows to the west/southwest in the overburden toward the Merrimack River, which is located approximately 1 mile

west/southwest of the Facility (GZA GeoEnvironmental, Inc. 2018; AECOM 2019). Groundwater features in the vicinity of the Facility are shown on **Figure 2-3**.

The overburden hydrogeology in the area generally consists of a dual hydrogeologic unit system separated by the glacial till stratum. The upper unit consists of the saturated lacustrine and/or outwash deposits overlying glacial till, whereas the lower unit consists of the lacustrine deposits underlying the glacial till. Hydraulic communication between the upper and lower units is likely, with the glacial till forming only a partial aquitard. The upper overburden unit is unconfined, with the resultant groundwater surface at a pressure equal to atmospheric. The lower unit is partially confined by the glacial till, with the resultant groundwater surface at a pressure greater than atmospheric. Groundwater elevations within the upper unit are typically observed to be about 10 to 15 ft higher than those of the lower unit, indicating a loss in total head through the glacial till aquitard and a vertically downward component of groundwater flow (GZA GeoEnvironmental, Inc. 2010; AECOM 2019).

The Environmental Data Resources, Inc. (EDR) Radius Map report did not identify any public supply wells at the AASF or within a 1-mile radius (EDR 2019; AECOM 2019). A domestic well and commercial well are present 0.5 miles and 0.75 miles east of the AASF, respectively. Locations of the wells identified in the PA are shown on **Figure 2-3**.

The AASF is serviced by municipal water from the city of Concord. Third Unregulated Contaminant Monitoring Rule (UCMR 3) data were reviewed as part of the PA. PFAS were non-detect for the Concord Water Department treatment plant, which is located 4.3 miles northwest of the Facility on the west side of the Merrimack River (USEPA 2017; AECOM 2019). The primary water source for the Concord community is Penacook Lake, located 4.5 miles northwest of the Facility near the Concord Water Department treatment plant. During dry periods, the lake is supplemented with water from Contoocook River Pump Station, which is located further northwest of Penacook Lake. Additionally, a groundwater well field adjacent to the Soucook River in Pembroke is maintained as an emergency water source (City of Concord 2019; AECOM 2019). The Pembroke well field is approximately 1.2 miles southeast of the Facility, on the opposite side of the Soucook River.

Depths to water measured in June 2022 during the SI ranged from 28 to 46 ft bgs. Groundwater elevations indicate that local groundwater flow is generally to the southwest; however, localized groundwater mounding was observed at AOI01-03, likely due to the proximity of the infiltration gallery. Groundwater elevation contours from the SI are presented on **Figure 2-5** and indicate the groundwater flow direction at the AASF is primarily to the southwest.

2.2.3 Hydrology

The AASF is located within the central portion of the Merrimack River watershed, which stretches from central New Hampshire into Northeastern Massachusetts. The nearest major surface water bodies are the Merrimack River, located approximately 1 mile to the west/southwest of the Facility, and the Soucook River, located approximately 0.6 miles to the south/southeast. The Merrimack River is popular for recreational use, including boating, canoeing, rowing, and fishing (New Hampshire Department of Environmental Services [NHDES] 2017; AECOM 2019). Based on the depth of the Merrimack River (5 to 40 ft or more;

Concord Monitor 2013; AECOM 2019) and the depth to groundwater in the area (approximately 30 to 50 ft bgs), it is possible that groundwater to surface water discharge may occur at points along the river downgradient of the site. No wetlands exist within the vicinity of the Facility (AECOM 2019). Surface water features in the vicinity of the Facility are shown on **Figure 2-4**.

Stormwater at the Facility is collected from the parking lots, the main apron, and landscaped areas around the buildings and is discharged into a stormwater pre-treatment system, followed by a three-tiered underground infiltration gallery before infiltration to groundwater. The stormwater treatment system is located on the west side of the hangar apron. Stormwater from the roof of the AASF building is discharged to a separate infiltration gallery located in the northeast corner of the property (Tighe & Bond 2018; AECOM 2019).

2.2.4 Climate

The Facility lies within the humid continental climate zone, which is characterized by long, cold, snowy winters, very warm (and at times humid) summers, and relatively brief autumns and springs. The monthly daily average temperature ranges from a high of 31 degrees Fahrenheit (°F) in January to 82°F in July. In winter, successive storms deliver light to moderate snowfall amounts, contributing to the relatively reliable snow cover. Summer can bring stretches of humid conditions as well as thunderstorms, and there is an annual average of 12 days of 90°F highs. Average annual precipitation is approximately 41 inches (US Climate Data 2019; AECOM 2019).

2.2.5 Current and Future Land Use

The AASF property is zoned “industrial” by the city of Concord. The Facility is fenced with restricted access. Much of the Facility is paved with either asphalt or concrete, with unpaved grassy areas along the boundaries of the Facility. West of the Main Hangar, there is a hill constructed for sloped landing training for the UH-60 (Blackhawk). The AASF is responsible for various training activities and aircraft maintenance with an active ARNG lease until 2052. Activities and land use within the Facility are not expected to change.

The area surrounding the AASF includes residential and commercial properties to the north, the Concord Municipal Airport to the south, commercial and light industrial properties to the east, and additional portions of the Concord Municipal Airport and the SMR to the west. Conservation/Public Lands are located approximately 0.45 miles to the southeast, adjoining the Soucook River. No additional mapped priority resources are located within a half-mile radius (Tighe & Bond 2018; AECOM 2019). Future land use of the surrounding area is anticipated to remain the same.

2.2.6 Sensitive Habitat and Threatened/Endangered Species

A wildlife survey has not occurred at the Facility, however, NHARNG is tracking locations of rare plants at the AASF. According to Facility personnel, the Grasshopper Sparrow, a State-threatened grassland bird, is often sighted in the vicinity of the AASF Facility. According to Facility personnel, the Karner Blue Butterfly is also known to exist on airport property and is monitored and managed by the New Hampshire Fish and Game Department.

The following species are listed as federally endangered, threatened, proposed, and/or candidate species in Merrimack County, New Hampshire (US Fish and Wildlife Services, 2022):

Insects: Karner Blue Butterfly *Lycaeides melissa samuelis* (endangered); Monarch Butterfly *Danaus plexippus* (candidate)

Mammals: Northern Long-eared Bat *Myotis septentrionalis* (threatened)

Flowering Plants: Northeastern Bulrush *Scirpus ancistrochaetus* Small Whorled Pogonia *Isotria medeoloides*

2.3 HISTORY OF PFAS USE

The PA identified three AOIs where aqueous film-forming foam (AFFF) may have been used, stored, disposed, or released historically at the Concord AASF: fire suppression system releases, system testing area, and the infiltration gallery. There was one additional documented release of AFFF after the PA was finalized. Approximately 100 gallons of a mixture of AFFF and water was discharged near the loading dock in June 2021; however, a new AOI was not designated for this release since the AFFF was contained within the bounds of AOI 2. A description of each AOI is presented in **Section 3**.

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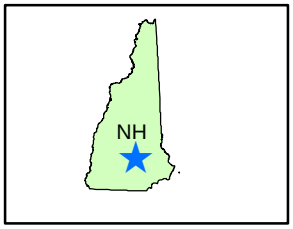
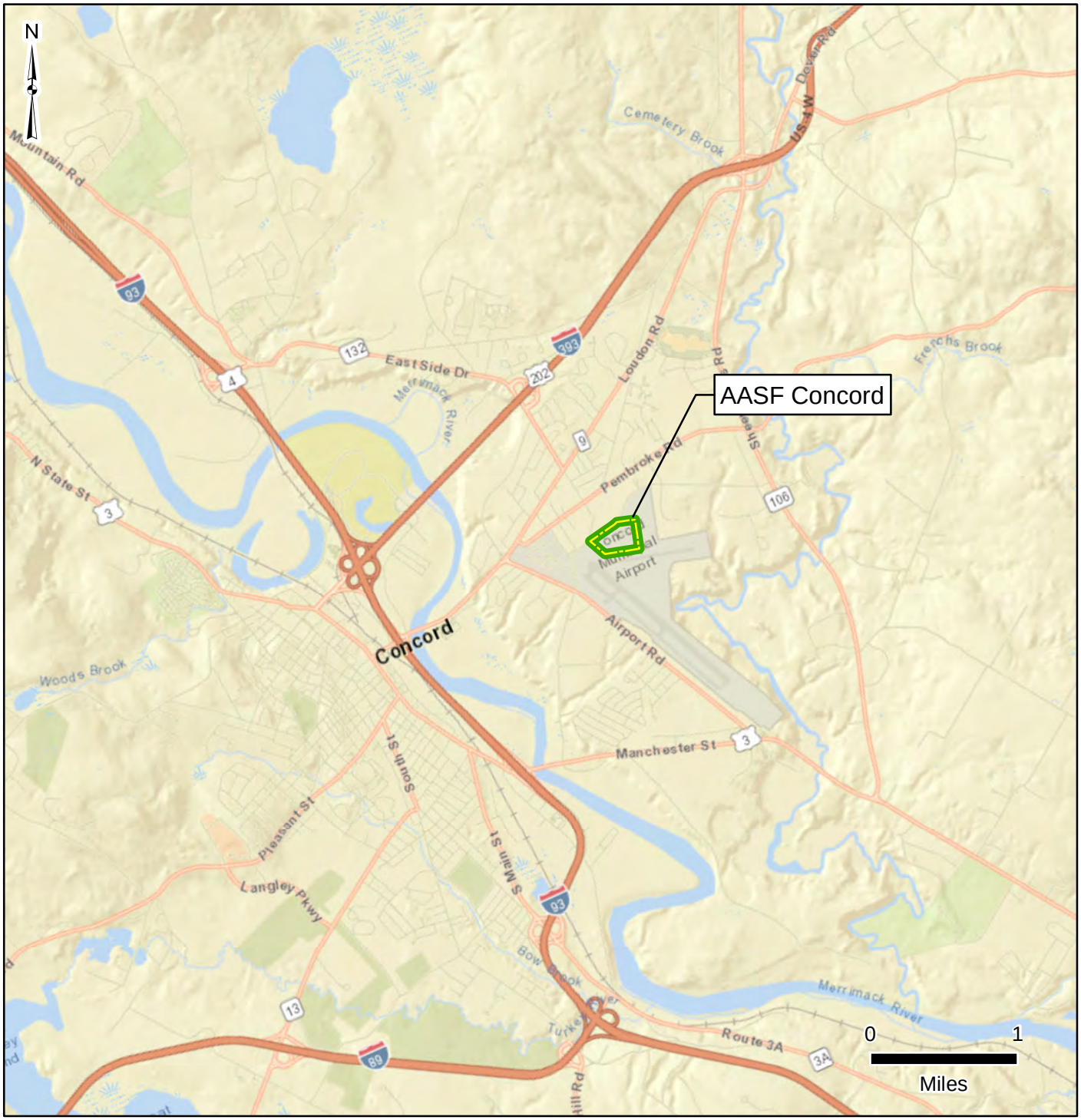
Army National Guard Site Inspections
Site Inspection Report
Army Aviation Support Facility (AASF)
Concord, New Hampshire

Figure 2-1
Facility Location





Facility Data

Facility Boundary

Data Sources:
ESRI 2020
AECOM 2019

Date:.....October 2022
Prepared By:.....WSP
Prepared For:.....USACE

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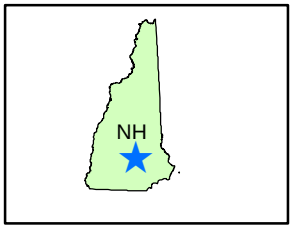
Site Inspection Report
Army Aviation Support Facility (AASF)
Concord, New Hampshire

Figure 2-2
Facility Topography



Facility Data

Facility Boundary

Data Sources:
ESRI 2020
AECOM 2019

Note:
Contour elevation recorded in ft. asml.

Date:.....October 2022
Prepared By:.....WSP
Prepared For:.....USACE

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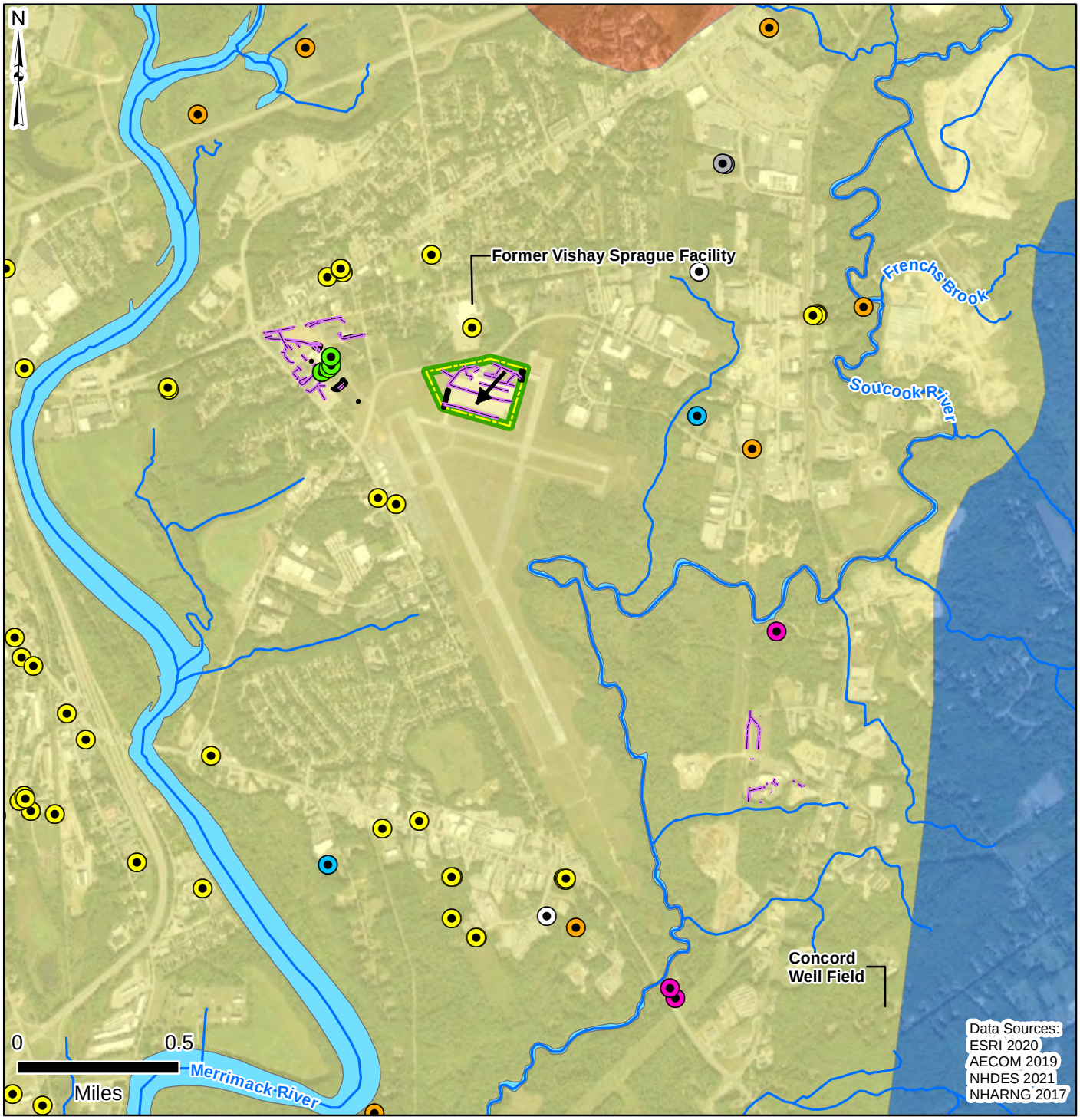
Army Aviation Support Facility (AASF)
Concord, New Hampshire

Figure 2-3
Groundwater Features



Facility Data
- Storm Sewer
- Retention Basin
- Facility Boundary

Hydrology/ Hydrogeology
- Groundwater Flow Direction
- River/Stream
- Water Body
- Wetland

Geology
- Concord Granite
- Lower Rangley Formation
- Perry Mountain Formation

Wells
- Geothermal Well
- Public Water Supply Well
- Abandoned Well
- Commercial Well
- Other/Unknown Well
- Test/Exploration
- Domestic Well
- Domestic Drinking Water Well
- Monitoring Well

Date:.....October 2022
Prepared By:.....WSP
Prepared For:....USACE

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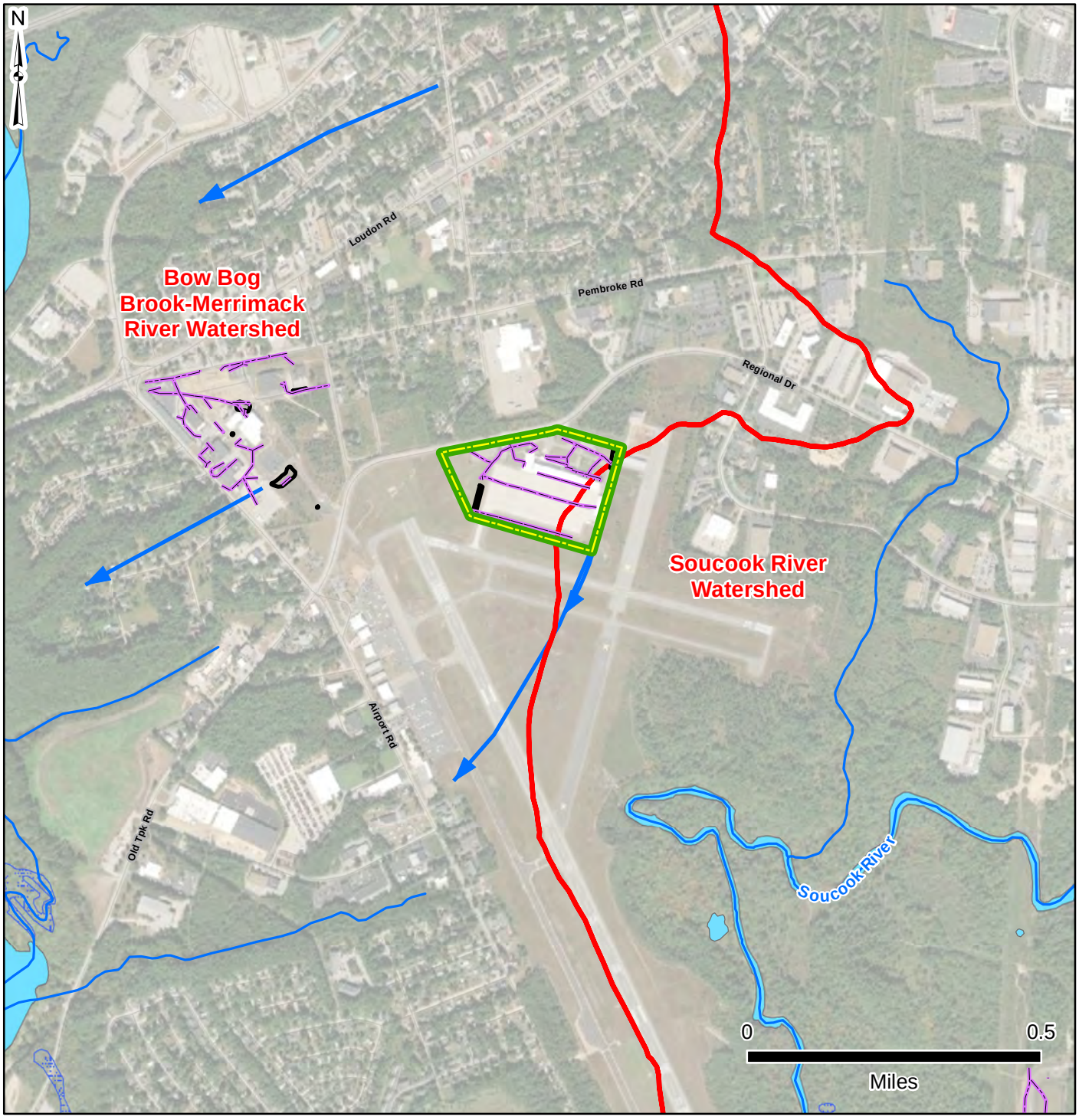
Concord, New Hampshire

Figure 2-4
Surface Water Features



Facility Data
- Facility Boundary
- Storm Sewer
- Retention Basin

Hydrology/Hydrogeology
- Watershed
- Surface Water Flow Direction
- River/Stream
- Wetland
- Water Body

Data Sources:
ESRI 2020
AECOM 2019

Date:.....October 2022
Prepared By:.....WSP
Prepared For:.....USACE

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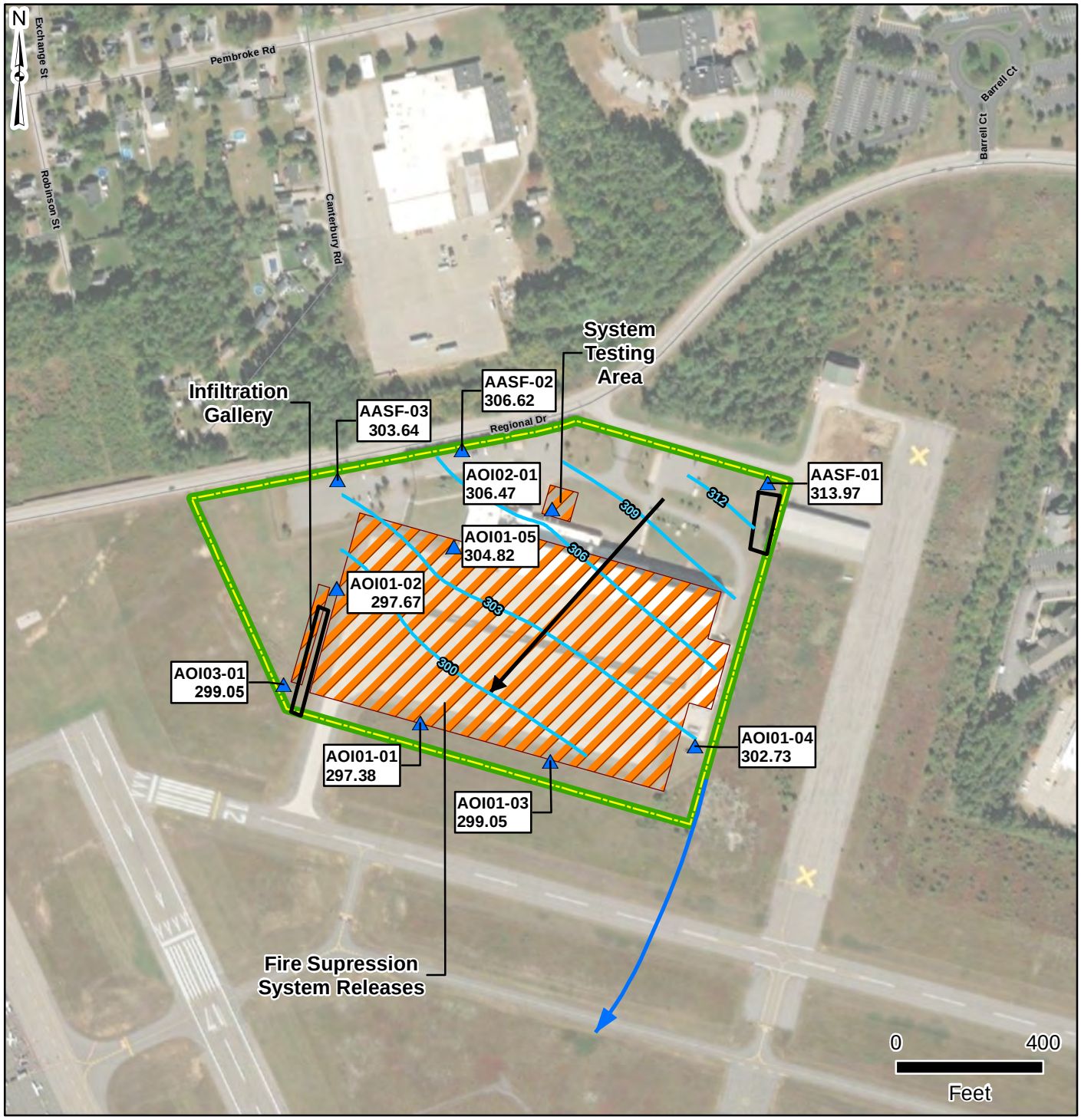
Army Aviation Support Facility (AASF)
Concord, New Hampshire

Figure 2-5
Groundwater Elevations
May 2022



Facility Data
- Retention Basin
- Facility Boundary

Sample Type
- Temporary Monitoring Well

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction
- Groundwater Elevation Contour (3-foot interval)

Note: Sample location AOI03-01 was not used for groundwater elevation contours.

Data Sources:
ESRI 2020
AECOM 2019
NHDES 2021
NHARNG 2017

Date:.....October 2022
Prepared By:.....WSP
Prepared For:....USACE

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3. SUMMARY OF AREAS OF INTEREST

The PA evaluated areas where PFAS-containing materials may have been used, stored, disposed, or released historically. Based on the PA findings, four potential release areas were identified at the AASF and grouped into three AOIs identified as: AOI 1 Fire Suppression System Releases, AOI 2 System Testing Area, and AOI 3 Infiltration Gallery. The AOIs are shown on **Figure 3-1**.

3.1 AOI 1 – FIRE SUPPRESSION SYSTEM RELEASES

AOI 1 consists of the Fire Suppression System Releases. Construction on the current AASF hangar building was completed in 2004, after which operations moved from the SMR. The AASF comprises administrative offices, the AASF Main Hangar, and the Fuel Truck Storage Building. At the time of the PA, the Main Hangar and the Fuel Truck Storage Building were equipped with fire suppression systems charged with AFFF. The fire suppression system in the Main Hangar, which includes a 900-gallon tank of Ansulite 3 % AFFF, is housed in a room on the north side of the building near the loading dock. The fire suppression system in the Fuel Truck Storage Building, which includes a 200-gallon tank of Ansulite 3% AFFF, is housed in a room in the central portion of the west side of the building. The geographic coordinates of the Main Hangar are 43°12'33.50"N; 71°30'8.21”W, and the geographic coordinates of the Fuel Truck Storage Building are 43°12'30.6"N; 71°30'04.3"W.

Both fire suppression systems (in the Main Hangar and the Fuel Truck Storage Building) were originally charged with Aer-O-Lite 3% AFFF in 2005. The system in the Main Hangar was tested once after initial installation. In 2008, AASF personnel discovered the AFFF in both fire suppression systems did not meet military specifications, and the Aer-O-Lite 3% AFFF was subsequently removed and replaced with Ansulite 3% AFFF. Twelve 55-gallon drums of Aer-O-Lite 3% AFFF were removed from the site and donated to local Fire Departments. Prior to transfer, the drums were stored in the hangar Hazardous Materials storage room. The system was not tested again after the change to Ansulite 3%. Interviewed personnel indicated that a contractor manages system inspections, and the interviewees were not familiar with the frequency of inspections.

Two releases of AFFF from the fire suppression systems at the AASF have occurred. The first release of AFFF happened on February 4 and 5, 2005. The incident occurred when the AASF was hit by lightning during a storm, and stray voltage triggered the fire suppression systems. It was estimated that less than 10 gallons of Aer-O-Lite 3% AFFF was released from the Main Hangar (on February 4, 2005) and approximately 3.4 gallons was released from the Fuel Truck Storage Building (on February 5, 2005). After the release, the doors of the Main Hangar and Fuel Truck Storage Building were opened, and the foam was washed out of the buildings and onto the apron, from there it was either washed into the drain at the center of the apron or onto the grass surrounding the apron. Interviewees also noted foam on the grass on the west side of the building, near the AASF offices. Foam washed into the drain at the center of the apron would drain west to an underground basin, then into an underground storm water treatment system, and then an underground infiltration gallery. The infiltration gallery is located approximately at geographic coordinates 43°12'33.1"N; 71°30'19.2"W (National Guard Bureau [NGB], 2002a; NGB, 2002b).

Some foam may have also been rinsed down the trench drains in the hangar bay and wash rack. Foam and wastewater washed into the trench drains would have been contained and treated by the onsite wastewater management system. Wastewater would have drained into an onsite oil-water separator (OWS), from where the residual water would have entered a holding tank that fed into a membrane ultra-filtration system. After passing through the filtration system, the wastewater would have then been held in onsite wastewater holding tanks. The concentrate from the membrane filtration system, the residual from the OWS, and the wastewater in the holding tanks were removed by a contracted disposal facility. No foam or wastewater in the OWS and holding tanks were discharged to the municipal sanitary sewer system.

The second release occurred in January 2019, when a fire suppression system pipe in the AASF Main Hangar wash rack froze and burst. During this release, the foam extended from the wall to about half the width (to the center drain) and half the length of the 8,745-square foot wash rack. The exact quantity of Ansulite 3% AFFF released was unknown. The foam was contained inside the wash bay and was rinsed down the center trench drain by AASF personnel, after which it would have been contained in the current AASF wastewater holding tanks and removed by a contracted disposal facility, as described above (AECOM 2019).

3.2 AOI 2 – SYSTEM TESTING AREA

AOI 2 is the System Testing Area. According to AASF personnel, the company that installed the fire suppression system in the Main Hangar tested the system once in 2005, after the initial installation, to ensure proper mixing of AFFF and water flow and pressure. Testing was conducted outside the north side of the building by the loading dock, and the mixture was discharged to the grass at approximate geographic coordinates 43°12'35.2"N; 71°30'09.9"W. At the time, the system was charged with Aer-O-Lite 3% AFFF. The quantity of AFFF released was unknown (AECOM 2019).

A second release occurred on June 15, 2021, when AFFF was released to concrete and a grassy area on the east side of the loading dock. Emergency Response Actions were immediately implemented, and Clean Harbors was mobilized to remove the AFFF.

3.3 AOI 3 – INFILTRATION GALLERY

AOI 3 is the Infiltration Gallery. According to engineering drawings, the infiltration gallery is located 4 ft bgs (NGB 2002c; AECOM 2019). As described above, after the first release of AFFF from the fire suppression systems occurred on the weekend of February 4 to 5, 2005, the doors of the Main Hangar and Fuel Truck Storage Building were opened, and the foam was washed out of the buildings and onto the apron, from where it was either washed into the drain at the center of the apron or onto the grass surrounding the apron. Interviewees also noted foam on the grass on the west side of the building, near the AASF offices. Foam washed into the drain at the center of the apron would drain west to an underground basin, then into an underground storm water treatment system, and then an underground infiltration gallery. The infiltration gallery is located approximately at geographic coordinates 43°12'33.1"N; 71°30'19.2"W (National Guard Bureau [NGB], 2002a; NGB, 2002b).

Some foam may have also been rinsed down the trench drains in the hangar bay and wash rack. Foam and wastewater washed into the trench drains would have been contained and treated by the onsite wastewater management system. Wastewater would have drained into an onsite OWS from where the residual water would have entered a holding tank that fed into a membrane ultra-filtration system. After passing through the filtration system, the wastewater would have then been held in onsite wastewater holding tanks. The concentrate from the membrane filtration system, the residual from the OWS, and the wastewater in the holding tanks were removed by a contracted disposal Facility. No foam or wastewater in the holding tanks or the OWS were discharged to the municipal sanitary sewer system.

After the second release of AFFF from the fire suppression systems occurred in January 2019, the foam was contained inside the wash bay and was rinsed down the center trench drain by AASF personnel, after which it would have been contained in the current AASF wastewater holding tanks (AECOM 2019).

3.4 ADJACENT SOURCES

Two potential off-Facility sources of PFAS are adjacent to the Facility and are not under the control of the NHARNG. A description of each off-Facility source is presented below and shown on **Figure 3-1**.

3.4.1 The Electropac Worldwide Inc. (former Vishay Sprague Facility)

The Electropac Worldwide Inc. site (former Vishay Sprague site), located immediately north, and hydraulically upgradient of the AASF. This Facility is included on the NHDES PFAS Sampling Map as a site with a positive PFAS detection; however, the type and concentrations of PFAS were not identified.

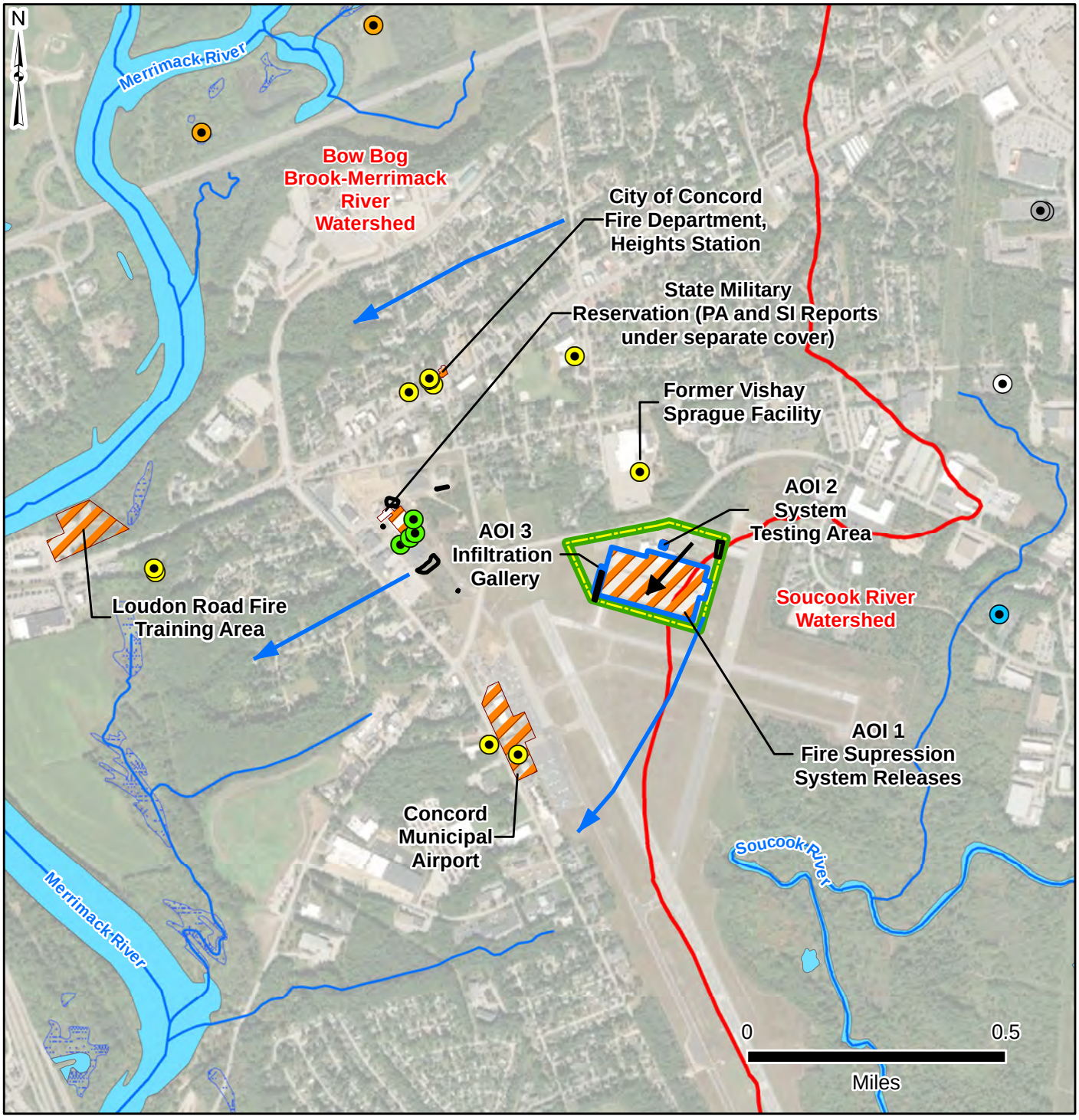
3.4.2 The Richard M. Flynn Fire Academy

The Richard M. Flynn Fire Academy, also known as the New Hampshire Fire Academy, is located 1.3 miles due east of the AASF. Class B foam has been used on the Fire Academy site through approximately 175 training courses dating back to 1994. In June and August 2018, environmental samples were collected at the Academy at the request of NHDES. PFOS was detected in groundwater at concentrations ranging from 190 parts per trillion (ppt) to 18,000 ppt and PFOA was detected at concentrations ranging from 120 ppt to 2,200 ppt, with a maximum total of 20,200 ppt for combined PFOA/PFOS. Elevated concentrations of PFAS compounds were also detected in soil samples and adjacent surface water samples from the Soucook River; however, at the time there were no standards for PFAS in soil or surface water in New Hampshire (Nobis Group 2018; AECOM 2019). It should be noted that although there were no standards for PFAS in soil or surface water in New Hampshire in 2018, the New Hampshire Legislature signed New Hampshire House Bill (NH HB) 1264 into law establishing Maximum Contaminant Levels (MCLs) and Ambient Groundwater Quality Standards (AGQS) for PFOA (12 nanograms per liter (ng/L), PFOS (15 ng/L), PFHxS (18 ng/L), and PFNA (11 ng/L) in July of 2020.

The types and quantities of AFFF used or stored at the academy currently or historically are not known. However, because the Fire Academy has confirmed releases of PFAS and is located hydraulically up- or cross-gradient from the AASF, it is considered an adjacent off-Facility source of PFAS (AECOM 2019).

Army National Guard Site Inspections
Site Inspection Report
Army Aviation Support Facility (AASF)
Concord, New Hampshire

Figure 3-1
Areas of Interest



Facility Data
- Area of Interest (AOI)
- Potential PFAS Release
- Facility Boundary
- Retention Basin

Hydrology/Hydrogeology
- Groundwater Flow Direction
- Surface Water Flow Direction
- Wetland
- Watershed
- River/Stream
- Water Body

Wells
- Monitoring Well
- Geothermal Well
- Abandoned Well
- Commercial Well
- Domestic Well
- Domestic Drinking Water Well
- Other/Unknown Well
- Test/Exploration

Data Sources:
ESRI 2020
AECOM 2019

Date:.....October 2022
Prepared By:.....WSP
Prepared For:.....USACE

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4. PROJECT DATA QUALITY OBJECTIVES

As identified during the Data Quality Objective (DQO) process and outlined in the SI Uniform Federal Policy (UFP)-Quality Assurance Project Plan (QAPP) Addendum (EA/Wood 2022), 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 the presence or absence of relevant compounds at each of the sampled AOIs.

4.1 PROBLEM STATEMENT

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

4.2 INFORMATION INPUTS

Primary information inputs for the SI include the following:

- The PA Report for the AASF (AECOM 2019);
- Analytical data from groundwater and soil samples collected as part of this SI in accordance with the site-specific UFP –QAPP Addendum (EA/Wood 2022); and
- Field data collected during the SI, including groundwater elevation and water quality parameters measured at the time of sampling.

4.3 STUDY BOUNDARIES

The scope of the SI was bounded horizontally by the property limits of the Facility (**Figures 2-1 and 2-2**). The scope of the SI was bounded vertically by the depth of temporary monitoring wells installed within groundwater, where encountered (maximum depth of 48 feet bgs). 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, accredited under the Department of Defense (DoD) Environmental Laboratory Accreditation Program (DoD ELAP; Accreditation Number 1.01) and the National Environmental Laboratory Accreditation Program (NELAP; Certificate Number 021). Data were compared to applicable SLs within this document and decision rules as defined in the UFP-QAPP Addendum (EA/Wood 2022).

4.5 DATA USABILITY ASSESSMENT

The Data Usability Assessment (DUA), which is provided in **Appendix A**, is an evaluation at the conclusion of data collection activities that uses the results of both data verification and validation in the context of the overall project decisions or objectives. Using both quantitative and qualitative methods, the assessment determines whether project execution and the resulting data have met installation specific DQOs. Both sampling and analytical activities are considered to assess whether the collected data are of the right type, quality, and quantity to support the decision-making (DoD 2019a, DoD 2019b, USEPA 2017).

Based on the DUA, the environmental data collected during the SI were found to be acceptable and usable for this SI evaluation with the qualifications documented in the DUA and its associated data validation reports. These data are of sufficient quality to meet the objectives and requirements of the UFP-QAPP (EA, 2020).

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 Preliminary Assessment Report, Army Aviation Support Facility, New Hampshire,* dated November 2019 (AECOM 2019)

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

- *Final Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Addendum, Army Aviation Support Facility, New Hampshire* dated May 2022 (EA/Wood 2022)

- *Final Programmatic Accident Prevention Plan, Revision 1,* dated November 2021 (EA 2021)

- *Final Accident Prevention Plan/Site Safety and Health Plan, Army Aviation Support Facility, New Hampshire,* dated October 2021 (EA/Wood 2021).

The SI field activities were conducted from 24 May to 13 June 2022 and consisted of utility clearance, direct push technology (DPT) boring and 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/Wood 2022), except as noted in **Section 5.9**.

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

- Twenty-eight (28) soil samples from 10 boring locations;
- Ten (10) grab groundwater samples from 10 temporary well locations;
- Twenty-one (21) quality assurance (QA)/quality control (QC) samples.

Figure 5-1 provides the sample locations for all media across the Facility. **Table 5-1** presents the list of samples collected for each 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**, land survey data are provided in **Appendix B3**, and investigation-derived waste (IDW) placement locations are provided in **Appendix B4**. Additionally, a photographic log of field activities is provided in **Appendix C**.

5.1 PRE-INVESTIGATION ACTIVITIES

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

5.1.1 Technical Project Planning

The USACE TPP Process, Engineers Manual (EM) 200-1-2 (Department of the Army 2016a) 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 22 April 2022, prior to SI field activities. The combined TPP Meeting 1 and 2 was conducted in general accordance with EM 200-1-2. The stakeholders for this SI included ARNG, USACE, NHARNG, NHDES, and representatives familiar with the Facility, the regulations, and the community. Stakeholders were provided the opportunity to make comments on the technical sampling approach and methods at the combined TPP Meeting 1 and 2. The outcome of the combined TPP Meeting 1 and 2 was memorialized in the UFP-QAPP Addendum (EA/Wood 2022).

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

5.1.2 Utility Clearance

WSP USA Environment & Infrastructure Inc. (WSP), previously doing business as Wood Environment & Infrastructure Solutions, Inc., contacted the Utility Notification Center to notify them of intrusive work at the Facility. WSP contracted Advanced Technologies Utility Locating Corp., a private utility location service, to perform utility clearance at the Facility. Utility clearance was performed at each of the proposed boring locations on 24 May 2022 with input from the WSP field team. General locating services and ground-penetrating radar (GPR) were used to complete the clearance. Additionally, the first 5 feet of each boring were pre-cleared by WSP's drilling subcontractor, Parratt Wolff, Inc., using a hand auger to verify utility clearance in shallow subsurface where utilities would typically be encountered.

5.1.3 Source Water and PFAS Sampling Equipment Acceptability

The potable water source used for decontamination of drilling equipment was confirmed to meet acceptability criteria, as defined in the UFP-QAPP Addendum, prior to the start of field activities. A sample from a potable water source at the AASF, was collected on 6 May 2022, prior to mobilization, and analyzed for PFAS by LC/MS/MS compliant with QSM 5.3 Table B-15 (DoD, 2020). The results of the sample of the potable water source used for decontamination

of drilling equipment during the SI are provided in **Appendix F**. A discussion of the results is presented in the DUA (**Appendix A**).

Materials that were used within the sampling zone were confirmed as acceptable for use in the 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 (PQAPP) (EA 2020).

5.2 HAND AUGER SOIL SAMPLING

Soil samples were collected from two locations, AOI2-02 and AOI2-03, for chemical analysis from 0 to 2 ft bgs and 3 to 5 ft bgs using a hand auger. All soil sample locations are shown on **Figure 5-1**. The hand auger locations were selected based on the AOI information provided in the PA (AECOM 2019) and as agreed upon by stakeholders during the TPP and review of the UFP-QAPP Addendum (EA 2021a). Non-dedicated sampling equipment (i.e., hand auger) was decontaminated between sampling locations.

Each sample was collected into a laboratory-supplied PFAS-free high-density polyethylene (HDPE) bottle and labeled using a PFAS-free marker or pen. Samples were packaged on ice and transported via Federal Express (FedEx) under standard chain-of-custody (COC) procedures to the laboratory and analyzed for PFAS (LC/MS/MS compliant with QSM Version 5.3 Table B-15) in accordance with the UFP-QAPP Addendum. QC samples and analysis were performed as described in the UFP-QAPP Addendum (EA/Wood 2022).

5.3 SOIL BORINGS AND SOIL SAMPLING

Soil samples were collected via DPT drilling methods in accordance with Standard Operating Procedure 047 *Direct-Push Technology Sampling* (EA/Wood 2022*).* A Geoprobe® 7822DT dual-tube sampling system was used to collect continuous soil cores to the target depth. A hand auger was used to collect soil from the top 5 ft of the boring in compliance with utility clearance procedures. The soil boring locations are shown on **Figure 5-1**, and boring sample depths are provided in **Table 5-1**. Several boring locations were adjusted within a 50-feet offset for reasons including drill rig access, utility avoidance and bias toward sampling within observed drainage features.

Three discrete soil samples were collected for chemical analysis from each soil boring: one sample at the surface (0 to 2 ft bgs) and two subsurface soil samples. One subsurface soil sample was collected approximately 1 ft above the groundwater table, and one collected at the mid-point between the surface and the groundwater table (not to exceed 15 ft bgs). Groundwater was encountered at depths ranging from 28 to 46 ft bgs during drilling. Total boring completion depths, to accommodate temporary well installation, ranged from 36 to 48 ft bgs.

During the drilling, the soil cores were continuously logged for lithological descriptions by a field geologist using the Unified Soil Classification System. 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 Unified Soil Classification System 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) (EPA Method 9060A), pH (EPA Method 9045D), and grain size (ASTM Method D-422) in accordance with the UFP-QAPP Addendum (EA/Wood 2022).

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 for use in confirming 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/Wood 2022). After removal of the casings, boreholes were abandoned using bentonite chips.

5.4 TEMPORARY WELL INSTALLATION AND GROUNDWATER GRAB SAMPLING

Temporary wells were installed using a GeoProbe® DT7822 dual-tube sampling system. Once the borehole was advanced to the desired depth, a temporary well was constructed of a 5-ft section of 1-inch Schedule 40 poly-vinyl 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 screen intervals. After the recharge period, groundwater samples were collected using a bladder pump with PFAS-free HDPE tubing. The temporary wells were purged at a rate determined in the field to reduce turbidity and draw down prior to sampling. Water quality parameters (e.g., temperature, specific conductance, pH, dissolved oxygen, and oxidation-reduction potential) were measured using a water quality meter and recorded on the field sampling form (**Appendix B2**) before each grab sample was collected in a separate container. Additionally, a subsample of each groundwater sample was collected in a separate container, and a shaker test was completed to identify if there were any foaming. No foaming was noted in any of the groundwater samples.

Each sample was collected in laboratory-supplied PFAS-free HDPE bottles and labeled using a PFAS-free marker or pen. Samples were packaged on ice and transported via FedEx under standard COC procedures to the laboratory and analyzed for PFAS by LC/MS/MS compliant

with QSM Version 5.3 Table B-15 in accordance with the UFP-QAPP Addendum (EA/Wood 2022).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. MS/MSDs were collected at a rate of 5% and analyzed for the same parameters as the accompanying samples. One FB was collected in accordance with the UFP-QAPP Addendum (EA 2022). 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 for use in confirming that samples were preserved at or below 6°C during shipment.

Following well surveying (described below in **Section 5.6**), temporary wells were abandoned in accordance with the SI UFP-QAPP Addendum (EA/Wood, 2022) by removing the PVC and backfilling the hole with bentonite chips.

5.5 SYNOPTIC WATER LEVEL MEASUREMENTS

Synoptic water level elevation measurements were collected from the newly installed temporary monitoring wells prior to sampling. Water level measurements were taken from the survey mark on the northern side of the well casing. Groundwater elevation data is provided in **Table 5-3**. A groundwater flow contour map is provided as **Figure 2-5**.

5.6 SURVEYING

The northern side of each new temporary well casing was surveyed following guidelines provided in the SOPs provided in the SI QAPP Addendum (EA/Wood 2022). Positions were collected in the applicable Universal Transverse Mercator zone projection with World Geodetic System 1984 datum (horizontal) and North American Vertical Datum 1988 (vertical). Surveying data were collected on 9 June 2022 and are provided in **Appendix B3**.

5.7 INVESTIGATION-DERIVED WASTE

As of the date of this report, the disposal of PFAS IDW is not regulated federally. IDW generated during the SI is considered non-hazardous waste and was managed in accordance with the UFP-QAPP Addendum (EA/Wood 2022).

Soil IDW (i.e., soil cuttings) generated during the SI activities were returned to the borehole from which they originated. The soil IDW was not sampled and assumes the characteristics of the associated soil samples collected from that source location.

Liquid IDW generated during SI activities (purge water, decontamination fluids) were treated using granular activated carbon (GAC) and contained in two labeled, 55-gallon Department of Transportation (DOT)-approved steel drums and left onsite as directed by Facility personnel. The liquid IDW was sampled following the SI fieldwork and is awaiting disposal.

Geographic coordinates were collected using a Global positioning system (GPS) around each location where IDW was placed. The IDW placement locations are displayed on the figure in **Appendix B6**.

Other solids such as spent personal protective equipment, plastic sheeting, tubing, rope, unused monitoring well construction materials, and other environmental media generated during the field activities were disposed of off-site as municipal waste.

5.8 LABORATORY ANALYTICAL METHODS

Samples were analyzed by LC/MS/MS, compliant with QSM Version 5.3 Table B-15, at Eurofins in Lancaster, Pennsylvania, a DoD ELAP and NELAP-certified laboratory.

Soil samples were also analyzed for TOC using EPA Method 9060A, pH by EPA Method 9045D, and grain size using ASTM Method D-422.

5.9 Deviations from SI UFP-QAPP Addendum

Deviations from the UFP-QAPP Addendum occurred based on conditions encountered during field activities. These deviations were discussed between EA, ARNG, and USACE. The deviations from the UFP-QAPP Addendum are noted below:

- Multiple sample locations were moved into grassy areas to avoid disturbing the rare plants and paved/concrete areas that are located at the AASF as directed by NHARNG. Some of these changes placed the sample locations within the historic release locations.

- Borings were advanced via DPT instead of Hollow Stem Auger (HSA) drilling methods at all locations designated for soil and groundwater sample collection. An HSA was deployed to the AASF, but soil conditions did not warrant the use of HSA drilling methods.

Table 5-1. Site Inspection Samples by Medium
Army Aviation Support Facility, Concord, New Hampshire
Site Inspection Report

Sample Identification	Sample Collection Date	Sample Depth (ft bgs)	PFAS (LC/MS/MS compliant with QSM 5.3 Table B-15)	TOC (EPA Method 9060A)	pH (EPA Method 9045D)	Grain Size (ASTM D422)	Comments
Soil Samples							
AOI01-01-SB-(0-2)	5/31/22	0-2	X				
AOI01-01-SB-(13-15)	5/31/22	13-15	X				
AOI01-01-SB-(43-45)	6/1/22	43-45	X				
AOI01-02-SB-(0-2)	5/25/22	0-2	X				MS/MSD Collected; Parent Sample of (AASF)DUP01
AOI01-02-SB-(13-15)	5/25/22	13-15	X				
AOI01-02-SB-(38-40)	5/25/22	38-40	X				
AOI01-03-SB-(0-2)	5/31/22	0-2	X				
AOI01-03-SB-(13-15)	5/31/22	13-15	X				
AOI01-03-SB-(37-39)	5/31/22	37-39	X				
AOI01-04-SB-(0-2)	5/26/22	0-2	X	X	X	X	MS/MSD Collected; Parent Sample of (AASF)DUP02
AOI01-04-SB-(13-15)	5/26/22	13-15	X				
AOI01-04-SB-(36-38)	5/26/22	36-38	X				
AOI01-05-SB-(0-2)	5/25/22	0-2	X				
AOI01-05-SB-(13-15)	5/25/22	13-15	X				
AOI01-05-SB-(33-35)	5/25/22	33-35	X				
AOI02-01-SB-(0-2)	5/26/22	0-2	X				
AOI02-01-SB-(13-15)	5/26/22	13-15	X				
AOI02-01-SB-(33-35)	5/26/22	33-35	X				
AOI02-02-SB-(0-2)	5/25/22	0-2	X	X	X	X	
AOI02-02-SB-(2-5)	5/25/22	2-5	X				
AOI02-03-SB-(0-2)	5/25/22	0-2	X				
AOI02-03-SB-(2-5)	5/25/22	2-5	X				
AOI03-01-SB-(0-2)	6/1/22	0-2	X				
AOI03-01-SB-(13-15)	6/1/22	13-15	X				
AOI03-01-SB-(35-37)	6/1/22	35-37	X				
AOI03-02-SB-(0-2)	6/1/22	0-2	X				
AOI03-02-SB-(13-15)	6/1/22	13-15	X				
AOI03-02-SB-(35-37)	6/1/22	35-37	X				Parent Sample of (AASF)DUP03
(AASF)DUP01	5/25/22	-	X				
(AASF)DUP02	5/28/22	-	X				
(AASF)DUP03	6/1/22	-	X				
Groundwater Samples							
AOI01-01-GW-(46)	6/7/22	46	X				
AOI01-02-GW-(45)	6/6/22	45	X				Parent Sample of (AASF)DUP04
AOI01-03-GW-(45)	6/7/22	45	X				
AOI01-04-GW-(41)	6/7/22	41	X				

AOI01-05-GW-(42)	6/6/22	42	X				
AOI02-01-GW-(38)	6/3/22	38	X				
AOI03-01-GW-(41)	6/7/22	41	X				
AASF-01-GW-(34)	6/3/22	34	X				
AASF-02-GW-(42)	6/6/22	42	X				MS/MSD Collected
AASF-03-GW-(44)	6/3/22	44	X				
(AASF)DUP04	6/6/22	-	X				
Blank Samples							
(AASF)EB-01	5/25/22	-	X				Equipment Blank Collected from Sampling Spoon
(AASF)FB-01	5/25/22	-	X				
(AASF)EB-02	5/25/22	-	X				Equipment Blank Collected from Trowel
(AASF)FB-02	5/26/22	-	X				
(AASF)EB-03	5/26/22	-	X				Equipment Blank Collected from Sampling Spoon
(AASF)FB-03	5/27/22	-	X				
(AASF)EB-04	5/27/22	-	X				Equipment Blank Collected from Sampling Spoon
(AASF)FB-04	5/31/22	-	X				
(AASF)EB-05	5/31/22	-	X				Equipment Blank Collected from Trowel
(AASF)FB-05	6/1/22	-	X				
(AASF)EB-06	6/1/22	-	X				Equipment Blank Collected from Trowel
(AASF)FB-06	6/3/22	-	X				
(AASF)EB-07	6/3/22	-	X				Equipment Blank Collected from Bladder Pump
(AASF)FB-07	6/6/22	-	X				
(AASF)EB-08	6/6/22	-	X				Equipment Blank Collected from Bladder Pump
(AASF)FB-08	6/7/22	-	X				
(AASF)EB-09	6/7/22	-	X				Equipment Blank Collected from Bladder Pump

Notes:
AASF = Army Aviation Support Facility
ASTM = American Society for Testing and Materials
bgs = below ground surface
EB = equipment blank
FD = field duplicate
FB = field blank
LC/MS/MS = Liquid Chromatography Mass Spectrometry
MS/MSD = matrix spike/ matrix spike duplicate
QSM = Quality Systems Manual
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

Table 5-2. Soil Boring Depths and Temporary Well Screen Intervals
Army Aviation Support Facility, Concord, New Hampshire
Site Inspection Report

Area of Interest	Boring Location	Soil Boring Depth (ft bgs)	Temporary Well Screen Interval (ft bgs)
1	AOI01-01	48.0	43-48
	AOI01-02	47.5	42.5-47.5
	AOI01-03	48.0	43-48
	AOI01-04	43.7	38.7-43.7
	AOI01-05	40.0	35-40
2	AOI02-01	40.0	35-40
	AOI02-02	5.0	NA
	AOI02-03	5.0	NA
3	AOI03-01	44.0	39-44
	AOI03-02	44.0	NA
Facility Boundary	AASF-01	36.0	31-36
	AASF-02	44.0	39-44
	AASF-03	48.0	43-48

Notes:
[1] Temporary well screen set above total depth to capture groundwater interface
AASF = Army Aviation Support Facility
bgs = below ground surface
ft = feet
NA = not applicable

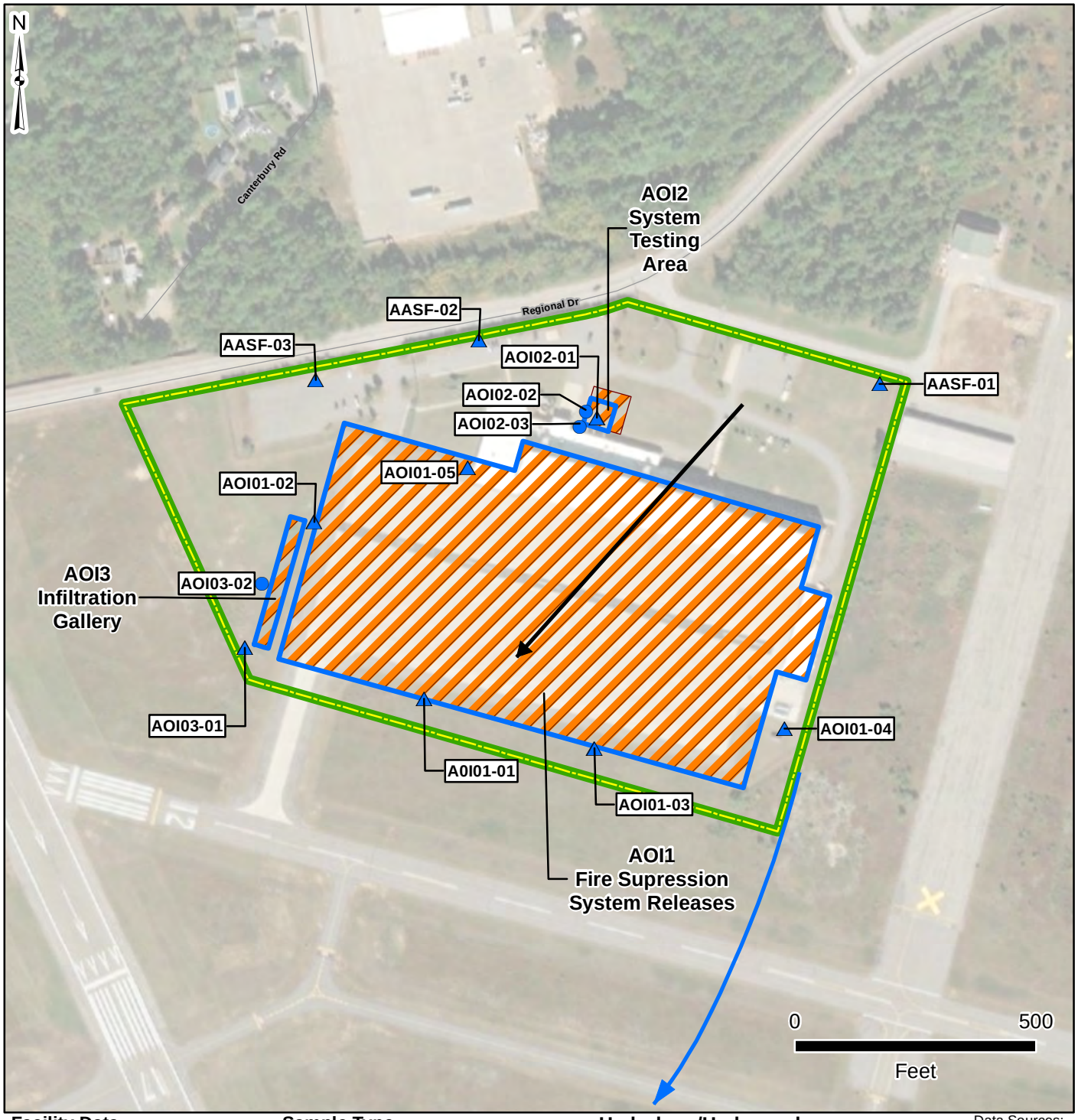
Table 5-3. Groundwater Elevation
Army Aviation Support Facility, Concord, New Hampshire
Site Inspection Report

Monitoring Well ID	Top of Casing Elevation (ft NAVD88)	Depth to Water (ft btoc)	Groundwater Elevation (ft NAVD 88)
AOI01-01	341.38	44.00	297.38
AOI01-02	343.13	45.46	297.67
AOI01-03	341.54	42.49	299.05
AOI01-04	343.48	40.75	302.73
AOI01-05	346.30	41.48	304.82
AOI02-01	344.06	37.59	306.47
AOI03-01	342.39	41.32	301.07
AASF-01	343.46	29.49	313.97
AASF-02	344.64	38.02	306.62
AASF-03	342.94	39.30	303.64

Notes:
[1] Temporary well screen set above total depth to capture groundwater interface
AASF = Army Aviation Support Facility
btoc = below top of casing
ft = feet
NAVD88 = North American Vertical Datum 1988

Army National Guard Site Inspections
Site Inspection Report
Army Aviation Support Facility (AASF)
Concord, New Hampshire

Figure 5-1
Site Inspection Sample Locations



Facility Data
- Area of Interest (AOI)
- Facility Boundary

Sample Type
- Temporary Monitoring Well
- Soil Boring

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

Data Sources:
ESRI 2020
AECOM 2019

Date:.....October 2022
Prepared By:.....WSP
Prepared For:.....USACE

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6. SITE INSPECTION RESULTS

This section presents the analytical results of the SI. The SLs used in this evaluation are presented in **Section 6.1**. A discussion of the results for each AOI is provided in **Sections 6.3 through 6.6**. **Tables 6-2** through **6-6** present results in soil or groundwater for the relevant compounds. Tables that contain all results are provided in **Appendix F**, and the laboratory reports are provided in **Appendix G**.

6.1 SCREENING LEVELS

The DoD has adopted a policy to retain facilities in the CERCLA process based on risk-based SLs for soil and groundwater, as described in a memorandum from the OSD dated 6 July 2022 (Assistant Secretary of Defense 2022). The ARNG program under which this SI was performed follows this DoD policy. Should the maximum concentration for sampled media exceed the SLs established in the OSD memorandum, the AOI will proceed to the next phase under CERCLA. The SLs established in the OSD memorandum apply to the five compounds presented on **Table 6-1**.

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

Analyte[2]	Residential (Soil) (µg/kg)[1] 0-2 ft bgs	Industrial / Commercial Composite Worker (Soil) (µg /kg)[1] 2-15 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 Screening Levels in Groundwater and Soil using U.S. Environmental Protection Agency's (EPA's) Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.
2. Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the CSM developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of 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.

Abbreviations:
µg/kg = microgram(s) per kilogram
bgs = below ground surface
ft = feet
ng/L = nanogram(s) per liter

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 (>15 ft bgs) because 15 ft bgs is the anticipated limit of construction activities.

6.2 SOIL PHYSICOCHEMICAL ANALYSES

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

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

6.3 AOI 1

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 1: Fire Suppression System Releases. The soil and groundwater results are summarized in **Table 6-2** through **Table 6-5**. Soil and groundwater results are presented on **Figures 6-1** through **Figure 6-7**.

6.3.1 AOI 1 Soil Analytical Results

Soil samples were collected from five boring locations associated with AOI 1 during the SI. **Figure 6-1** through **Figure 6-5** present the ranges of detections in soil. **Tables 6-2** through **Table 6-4** summarize the soil results.

Surface soil (0 to 2 ft bgs) was sampled from boring locations AOI01-01 through AOI01-05, with duplicate soil samples collected at AOI01-02 and AOI01-04. Soil was also sampled from shallow subsurface soil (13 to 15 ft bgs) and deep subsurface soil intervals (33 to 45 ft bgs) from boring locations AOI01-01 through AOI01-05.

PFOS was detected in surface soil at concentrations exceeding its SL. PFOA was detected in surface soil at concentrations below its SL. PFOS was detected in surface soil at two of the five

locations at concentrations of 0.21 J and 15 J µg/kg and exceeded at one location (AOI01-03). PFOA was detected in two of the five locations at concentrations at concentrations of 0.34 J and 0.35 J µg/kg. PFBS, PFHxS, and PFNA were not detected in any of the surface soil samples.

PFOS was detected in shallow subsurface soil at concentrations below its SL. PFOS was detected in one of the five locations at a concentration of 0.53 J µg/kg. PFBS, PFHxS, PFOA, and PFNA were not detected in any of the shallow subsurface soil samples.

PFOS was detected in deep subsurface soil in one of the five locations at a concentration of 0.22 J µg/kg. PFBS, PFHxS, PFOA, and PFNA were not detected in the deep subsurface soil samples.

6.3.2 AOI 1 Groundwater Analytical Results

Groundwater samples were collected from five temporary wells associated with AOI 1 during the SI. **Figure 6-6** and **Figure 6-7** present the ranges of detections in groundwater. **Table 6-5** summarizes the groundwater results.

Groundwater was sampled from temporary monitoring well locations AOI01-01 through AOI01-05. PFNA and PFOA were detected at concentrations exceeding their respective SLs. PFBS, PFHxS, and PFOS were detected at concentrations below their respective SLs. PFNA was detected at one of the five locations (AOI01-03) at a concentration of 14 ng/L, which exceeded its SL. PFOA was detected in three of the five locations at concentrations ranging from 0.88 J to 100 J+ ng/L and exceeded at one location (AOI01-03). PFBS was detected in two of the five locations at concentrations ranging from 0.44 J to 0.65 J ng/L. PFHxS was detected in one of the five locations at a concentrations of 0.66 J ng/L. PFOS was not detected in any of the groundwater samples associated with AOI 1.

Groundwater samples were also collected from three temporary wells associated with Facility boundary during the SI, AASF-01, AASF-02, and AASF-03. Based on the synoptic groundwater elevations collected during the SI, AASF-01 is located upgradient of AOI 1, AOI-2, and AOI 3. AASF-02 and AASF-03 are located cross-gradient of AOI 1. PFOA was detected in groundwater at all three locations ranging in concentration from 0.97 J to 13 ng/L and exceeded the SL at one location (AASF-01). PFBS was detected at one of three locations at a concentration of 1.3 J ng/L. PFHxS was detected at one of three locations at a concentration of 3.7 ng/L. PFNA was detected at two of three locations ranging in concentrations from 0.55 J ng/L to 0.98 J ng/L. PFOS was not detected.

6.3.3 Conclusions

Based on the results of the SI, PFOS was detected in surface soil above its SL. PFNA and PFOA were detected in groundwater at concentrations above their respective SLs. Based on the exceedances of the SLs in soil and groundwater, further evaluation at AOI 1 is warranted. The detections in the wells located upgradient and cross-gradient of AOI 1, indicate that there is potential that an off-Facility source may be impacting the groundwater.

6.4 AOI 2

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 2: System Testing Area. The soil and groundwater results are summarized in **Table 6-2** through **Table 6-5**. Soil and groundwater results are presented on **Figures 6-1** through **Figure 6-7**.

6.4.1 AOI 2 Soil Analytical Results

Soil samples were collected from three boring locations associated with AOI 2 during the SI. **Figure 6-1** through **Figure 6-5** present the ranges of detections in soil. **Tables 6-2** through **Table 6-4** summarize the soil results.

Surface soil (0 to 2 ft bgs) was sampled from boring locations AOI02-01 through AOI02-03. Soil was also sampled from shallow subsurface soil (2 to 15 ft bgs) from boring locations AOI02-01 through AOI02-03 and a deep subsurface soil interval (33 to 35 ft bgs) from boring location AOI02-01.

PFNA and PFOA were detected in surface soil at concentrations below their respective SLs. PFNA was detected in all three locations at concentrations ranging from 0.38 J+ to 2.4 J+ µg/kg. PFOA was detected in all three locations at concentrations ranging from 2.0 J+ to 6.4 J+ µg/kg. PFBS, PFHxS, and PFOS were not detected in the surface soil samples.

PFNA and PFOA were detected in shallow subsurface soil at concentrations below their respective SLs. PFNA was detected in two of the three locations at concentrations ranging from 0.61 J to 6.2 µg/kg. PFOA was detected in all three locations at concentrations ranging from 0.63 to 1.9 µg/kg. PFBS, PFHxS, and PFOS were not detected in the shallow subsurface soil samples.

PFBS, PFHxS, PFOA, PFOS, and PFNA were not detected in the deep subsurface soil sample.

6.4.2 AOI 2 Groundwater Analytical Results

Groundwater samples were collected from one temporary well associated with AOI 2 during the SI. **Figure 6-6** and **Figure 6-7** present the ranges of detections in groundwater. **Table 6-5** summarizes the groundwater results.

Groundwater was sampled from temporary monitoring well location AOI02-01. PFOA exceeded its SL with a concentration of 25 ng/L. PFBS was detected below its SL at a concentration of 0.53 J ng/L, PFHxS was detected below its SL at a concentration of 1.5 J ng/L. PFNA was detected below its SL at a concentration of 1.9 ng/L. PFOS was not detected in groundwater.

6.4.3 Conclusions

PFOA was detected in groundwater at a concentration above its SL. PFNA and PFOA were detected in soil below their respective SLs. Based on the exceedances of the SLs 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: Infiltration Gallery. The soil and groundwater results are summarized in **Table 6-2** through **Table 6-5**. Soil and groundwater results are presented on **Figures 6-1** through **Figure 6-7**.

6.5.1 AOI 3 Soil Analytical Results

Soil samples were collected from two boring locations associated with AOI 3 during the SI. **Figure 6-1** through **Figure 6-5** present the ranges of detections in soil. **Tables 6-2** through **Table 6-5** summarize the soil results.

Surface soil (0 to 2 ft bgs) was sampled from boring locations AOI03-01 and AOI03-02, with a duplicate surface soil sample collected at AOI03-02. Soil was also sampled from shallow subsurface soil (13 to 15 ft bgs) and deep subsurface soil intervals (35 to 37 ft bgs) from boring locations AOI03-01 and AOI03-02.

PFOA and PFOS were detected in surface soil at concentrations below their respective SLs. PFOA was detected in one of the two locations with a concentration of 0.52 J+ µg/kg (0.45 J+ in the duplicate sample). PFOS was detected in one of the two locations with a concentration of 0.36 J+ µg/kg (0.32 J in the duplicate sample). PFBS, PFHxS, and PFNA were not detected in either of the surface soil samples.

PFBS, PFHxS, PFOA, PFOS, and PFNA were not detected in either of the shallow subsurface soil samples.

PFBS, PFHxS, PFOA, PFOS, and PFNA were not detected in either of the deep subsurface soil samples.

6.5.2 AOI 3 Groundwater Analytical Results

Groundwater samples were collected from one temporary well associated with AOI 3 during the SI. **Figure 6-6** and **Figure 6-7** present the ranges of detections in groundwater. **Table 6-5** summarizes the groundwater results.

Groundwater was sampled from temporary monitoring well location AOI03-01. PFNA and PFOA were detected at concentrations exceeding their respective SLs. PFNA exceeded its SL with a concentration of 7.1 ng/L. PFOA exceeded its SL with a concentration of 6.1 ng/L. PFOS was detected below its SL at a concentration of 0.6 J ng/L. PFBS and PFHxS were not detected in the groundwater sample.

6.5.3 Conclusions

Based on the results of the SI, PFNA and PFOA were detected in groundwater at concentrations above their respective SLs. PFOA and PFOS were detected in soil below their SL. Based on the exceedances of the SLs in groundwater, further evaluation at AOI 3 is warranted.

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

Area of Interest		AOI01													
Location ID		AOI01-01		AOI01-02		AOI01-02-Duplicate		AOI01-03		AOI01-04		AOI01-04-Duplicate		AOI01-05	
Sample ID		AOI01-01-SB-(0-2)		AOI01-02-SB-(0-2)		(AASF) DUP01		AOI01-03-SB-(0-2)		AOI01-04-SB-(0-2)		(AASF) DUP02		AOI01-05-SB-(0-2)	
Sample Date		5/31/2022		5/25/2022		5/25/2022		5/31/2022		5/26/2022		5/26/2022		5/25/2022	
Depth		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft	
Analyte	**OSD Screening Level [1]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)															
PFBS	1900	ND	U	ND	U	ND	U	ND	UJ	ND	U	ND	U	ND	U
PFHxS	130	ND	U	ND	U	ND	U	ND	UJ	ND	U	ND	U	ND	U
PFNA	19	ND	U	ND	U	ND	U	ND	UJ	ND	U	ND	U	ND	U
PFOA	19	0.35	J	ND	U	ND	U	ND	UJ	ND	U	ND	U	0.34	J
PFOS	13	0.21	J	ND	U	ND	U	15	J	ND	U	ND	U	ND	U

Notes

Gray Fill — Detected concentration exceeded OSD Screening Levels

References

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

Chemical Abbreviations

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

Interpreted Qualifiers

J = Estimated concentration.
J+ = The result is an estimated quantity, but the result may be biased high.
U = The analyte was not detected at a level greater than or equal to the adjusted DL.
UJ = The analyte was not detected and was reported as less than the limit of detection. However, the associated numerical value is approximate.

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
DUP	duplicate
HQ	Hazard Quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
ND	analyte not detected above the LOD (LOD values are presented in Appendix F)
ng/L	nanogram(s) per liter
OSD	Office of the Secretary of the Defense
QSM	Quality Systems Manual
PFAS	per- and polyfluoroalkyl substances
SB	soil boring
USEPA	United States Environmental Protection Agency
Qual	interpreted qualifier

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

Area of Interest		AOI02						AOI03					
Location ID		AOI02-01		AOI02-02		AOI02-03		AOI03-01		AOI03-02		AOI03-02-Duplicate	
Sample ID		AOI02-01-SB-(0-2)		AOI02-02-SB-(0-2)		AOI02-03-SB-(0-2)		AOI03-01-SB-(0-2)		AOI03-02-SB-(0-2)		(AASF)DUP03	
Sample Date		5/26/2022		5/25/2022		5/25/2022		6/1/2022		6/1/2022		6/1/2022	
Depth		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft	
Analyte	**OSD Screening Level [1]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)													
PFBS	1900	ND	U	ND	U	ND	U	ND	UJ	ND	U	ND	U
PFHxS	130	ND	U	ND	U	ND	U	ND	UJ	ND	U	ND	U
PFNA	19	2.4	J+	2.2		0.38	J+	ND	UJ	ND	UJ	ND	UJ
PFOA	19	6.4	J+	3.8		2.0	J+	ND	UJ	0.52	J+	0.45	J+
PFOS	13	ND	U	ND	U	ND	U	ND	UJ	0.36	J	0.32	J

Notes

Gray Fill — Detected concentration exceeded OSD Screening Levels

Chemical Abbreviations

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

References

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

Interpreted Qualifiers

J = Estimated concentration.
J+ = The result is an estimated quantity, but the result may be biased high.
U = The analyte was not detected at a level greater than or equal to the adjusted DL.
UJ = The analyte was not detected and was reported as less than the limit of detection. However, the associated numerical value is approximate.

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
DUP	duplicate
HQ	Hazard Quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
ND	analyte not detected above the LOD (LOD values are presented in Appendix F)
ng/L	nanogram(s) per liter
OSD	Office of the Secretary of the Defense
QSM	Quality Systems Manual
PFAS	per- and polyfluoroalkyl substances
SB	soil boring
USEPA	United States Environmental Protection Agency
Qual	interpreted qualifier

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

Area of Interest		AOI01									
Location ID		AOI01-01		AOI01-02		AOI01-03		AOI01-04		AOI01-05	
Sample ID		AOI01-01-SB-(13-15)		AOI01-02-SB-(13-15)		AOI01-03-SB-(13-15)		AOI01-04-SB-(13-15)		AOI01-05-SB-(13-15)	
Sample Date		5/31/2022		5/25/2022		5/31/2022		5/26/2022		5/25/2022	
Depth		13 - 15 ft		13 - 15 ft		13 - 15 ft		13 - 15 ft		13 - 15 ft	
Analyte	**OSD Screening Level [1]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)											
PFBS	25000	ND	U	ND	U	ND	U	ND	U	ND	U
PFHxS	1600	ND	U	ND	U	ND	U	ND	U	ND	U
PFNA	250	ND	UJ	ND	U	ND	U	ND	U	ND	U
PFOA	250	ND	UJ	ND	U	ND	U	ND	U	ND	U
PFOS	160	ND	U	ND	U	0.53	J	ND	U	ND	U

Notes

Gray Fill — Detected concentration exceeded OSD Screening Levels

References

1. Assistant Secretary of Defense, July 2022. *Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. May 2022.* The screening levels for soil are based on Industrial/Commercial Composite Worker scenario for direct ingestion of contaminated soil.

Chemical Abbreviations

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

Interpreted Qualifiers

J = The result is an estimated quantity.
U = The analyte was not detected at a level greater than or equal to the adjusted DL.
UJ = The analyte was not detected and was reported as less than the limit of detection. However, the associated numerical value is approximate.

Acronyms and Abbreviations

µg/kg	microgram(s) per kilogram
AASF	Army Aviation Support Facility
AOI	Area of Interest
DUP	duplicate
HQ	Hazard Quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
ND	analyte not detected above the LOD (LOD values are presented in Appendix F)
OSD	Office of the Secretary of the Defense
QSM	Quality Systems Manual
PFAS	per- and polyfluoroalkyl substances
SB	soil boring
USEPA	United States Environmental Protection Agency
Qual	interpreted qualifier

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

	Area of Interest	AOI02						AOI03			
	Location ID	AOI02-01		AOI02-02		AOI02-03		AOI03-01		AOI03-02	
	Sample ID	AOI02-01-SB-(13-15)		AOI02-02-SB-(2-5)		AOI02-03-SB-(2-5)		AOI03-01-SB-(13-15)		AOI03-02-SB-(13-15)	
	Sample Date	5/26/2022		5/25/2022		5/25/2022		6/1/2022		6/1/2022	
	Depth	13 - 15 ft		2 - 5 ft		2 - 5 ft		13 - 15 ft		13 - 15 ft	
Analyte	**OSD Screening Level [1]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)											
PFBS	25000	ND	U	ND	U	ND	U	ND	U	ND	U
PFHxS	1600	ND	U	ND	U	ND	U	ND	U	ND	U
PFNA	250	ND	U	0.61	J	6.2		ND	U	ND	U
PFOA	250	0.63		1.9		1.4		ND	U	ND	U
PFOS	160	ND	U	ND	U	ND	U	ND	U	ND	U

Notes

Gray Fill — Detected concentration exceeded OSD Screening Levels

References

1. Assistant Secretary of Defense, July 2022. *Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. May 2022.* The screening levels for soil are based on Industrial/Commercial Composite Worker scenario for direct ingestion of contaminated soil.

Chemical Abbreviations

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

Interpreted Qualifiers

J = The result is an estimated quantity.
U = The analyte was not detected at a level greater than or equal to the adjusted DL.
UJ = The analyte was not detected and was reported as less than the limit of detection. However, the associated numerical value is approximate.

Acronyms and Abbreviations

µg/kg	microgram(s) per kilogram
AASF	Army Aviation Support Facility
AOI	Area of Interest
DUP	duplicate
HQ	Hazard Quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
ND	analyte not detected above the LOD (LOD values are presented in Appendix F)
OSD	Office of the Secretary of the Defense
QSM	Quality Systems Manual
PFAS	per- and polyfluoroalkyl substances
SB	soil boring
USEPA	United States Environmental Protection Agency
Qual	interpreted qualifier

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

Area of Interest	AOI01										AOI02		AOI03			
Location ID	AOI01-01		AOI01-02		AOI01-03		AOI01-04		AOI01-05		AOI02-01		AOI03-01		AOI03-02	
Sample Name	AOI01-01-SB-(43-45)		AOI01-02-SB-(38-40)		AOI01-03-SB-(37-39)		AOI01-04-SB-(36-38)		AOI01-05-SB-(33-35)		AOI02-01-SB-(33-35)		AOI03-01-SB-(35-37)		AOI03-02-SB-(35-37)	
Sample Date	5/31/2022		5/25/2022		5/31/2022		5/26/2022		5/25/2022		5/26/2022		6/1/2022		6/1/2022	
Depth	43 - 45 ft		38 - 40 ft		37 - 39 ft		36 - 38 ft		33 - 35 ft		33 - 35 ft		35 - 37 ft		35 - 37 ft	
Analyte	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Soil, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																
PFBS	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PFHxS	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PFNA	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PFOA	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PFOS	ND	U	ND	U	0.22	J	ND	U	ND	U	ND	U	ND	U	ND	U

Notes

Gray Fill

References

1. Assistant Secretary of Defense, July 2022. *Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. May 2022.* The screening levels for soil are based on Industrial/Commercial Composite Worker scenario for direct ingestion of contaminated soil.

Chemical Abbreviations

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

Interpreted Qualifiers

J = The result is an estimated quantity.
U = The analyte was not detected at a level greater than or equal to the adjusted DL.
UJ = The analyte was not detected and was reported as less than the limit of detection. However, the associated numerical value is approximate.

Acronyms and Abbreviations

µg/kg	microgram(s) per kilogram
AASF	Army Aviation Support Facility
AOI	Area of Interest
DUP	duplicate
HQ	Hazard Quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
ND	analyte not detected above the LOD (LOD values are presented in Appendix F)
OSD	Office of the Secretary of the Defense
QSM	Quality Systems Manual
PFAS	per- and polyfluoroalkyl substances
SB	soil boring
USEPA	United States Environmental Protection Agency
Qual	interpreted qualifier

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Table 6-5
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Groundwater
Site Inspection Report
Concord AASF

	Area of Interest	AOI01											
	Location ID	AOI01-01		AOI01-02		AOI01-02-Duplicate		AOI01-03		AOI01-04		AOI01-05	
	Sample ID	AOI01-01-GW-(46)		AOI01-02-GW-(45)		(AASF)DUP04		AOI01-03-GW-(45)		AOI01-04-GW-(41)		AOI01-05-GW-(42)	
	Sample Date	6/7/2022		6/6/2022		6/6/2022		6/7/2022		6/7/2022		6/6/2022	
Analyte	**OSD Screening Level [1]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Water, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)													
PFBS	601	0.65	J	ND	U	ND	U	0.44	J	ND	U	ND	U
PFHxS	39	ND	U	ND	U	ND	U	ND	U	ND	U	0.66	J
PFNA	6	ND	U	ND	U	ND	U	14		ND	U	ND	U
PFOA	6	1.5	J	ND	U	ND	U	100	J+	ND	U	0.88	J
PFOS	4	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U

Notes

Gray Fill — Detected concentration exceeded OSD Screening Levels

References

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

Chemical Abbreviations

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

Interpreted Qualifiers

J = Estimated concentration.
J+ = The result is an estimated quantity, but the result may be biased high.
U = The analyte was not detected at a level greater than or equal to the adjusted DL.
UJ = The analyte was not detected at a level greater than or equal to the adjusted DL.
However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
DUP	duplicate
HQ	Hazard Quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
ND	analyte not detected above the LOD (LOD values are presented in Appendix F)
ng/L	nanogram(s) per liter
OSD	Office of the Secretary of the Defense
QSM	Quality Systems Manual
PFAS	per- and polyfluoroalkyl substances
SB	soil boring
USEPA	United States Environmental Protection Agency
Qual	interpreted qualifier

Table 6-5
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Groundwater
Site Inspection Report
Concord AASF

	Area of Interest	AOI02		AOI03		AASF					
	Location ID	AOI02-01		AOI03-01		AASF-01		AASF-02		AASF-03	
	Sample ID	AOI02-01-GW-(38)		AOI03-01-GW-(41)		AASF-01-GW-(34)		AASF-02-GW-(42)		AASF-03-GW-(44)	
	Sample Date	6/7/2022		6/7/2022		6/3/2022		6/6/2022		6/3/2022	
Analyte	**OSD Screening Level [1]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Water, PFAS by LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)											
PFBS	601	0.53	J	ND	U	ND	U	ND	U	1.3	J
PFHxS	39	1.5	J	ND	U	ND	U	ND	U	3.7	
PFNA	6	1.9		7.1		0.98	J	0.55	J	ND	U
PFOA	6	25		6.1		13		1.8		0.97	J
PFOS	4	ND	U	0.6	J	ND	U	ND	U	ND	U

Notes

Gray Fill — Detected concentration exceeded OSD Screening Levels

References

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

Chemical Abbreviations

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

Interpreted Qualifiers

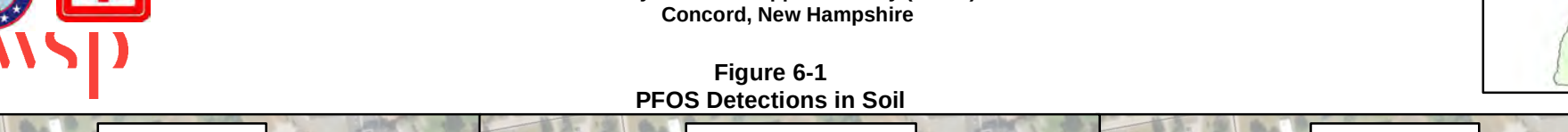
J = Estimated concentration.
J+ = The result is an estimated quantity, but the result may be biased high.
U = The analyte was not detected at a level greater than or equal to the adjusted DL.
UJ = The analyte was not detected at a level greater than or equal to the adjusted DL.
However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

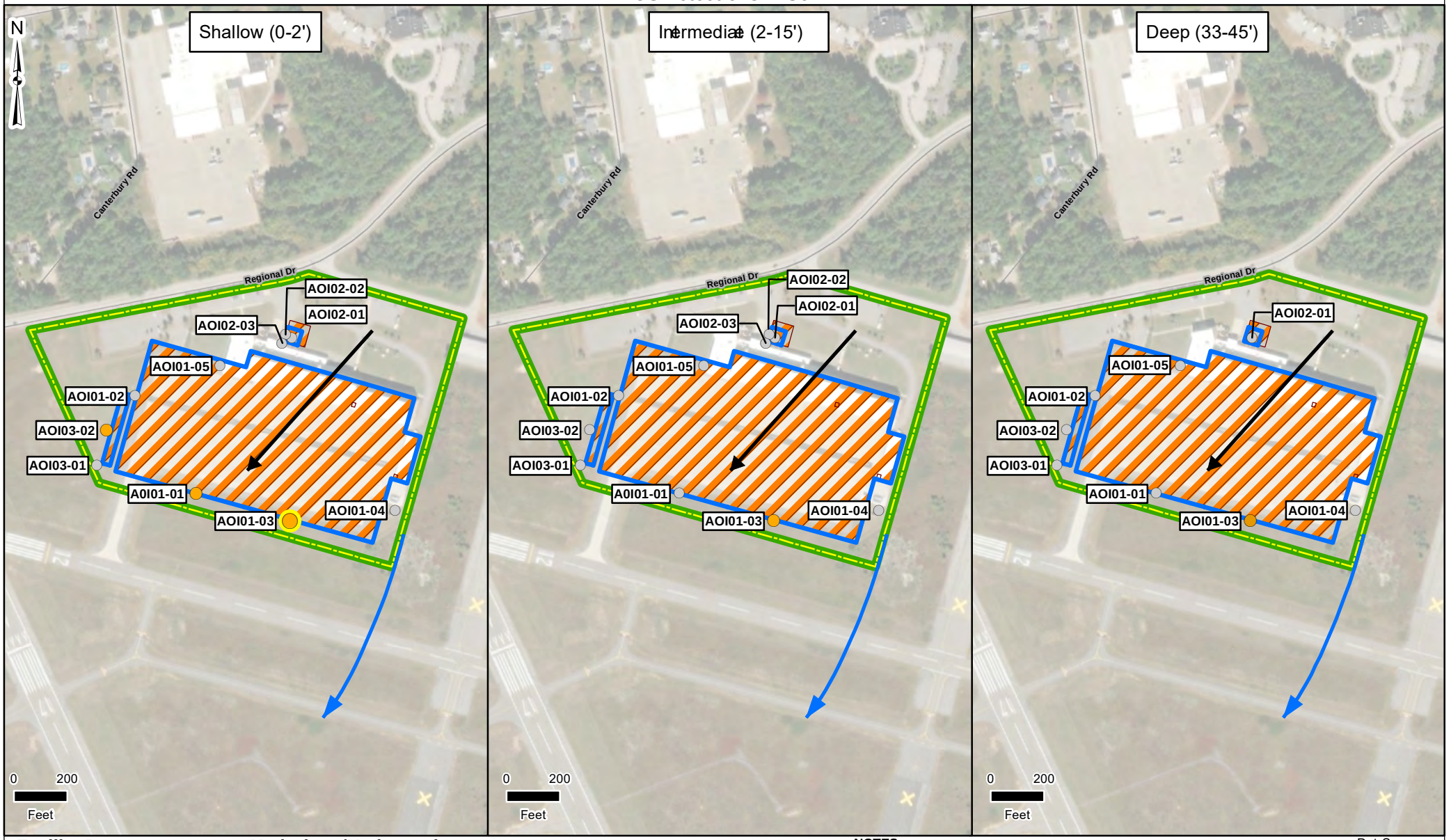
Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
DUP	duplicate
HQ	Hazard Quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
LOQ	limit of quantitation
ND	analyte not detected above the LOD (LOD values are presented in Appendix F)
ng/L	nanogram(s) per liter
OSD	Office of the Secretary of the Defense
QSM	Quality Systems Manual
PFAS	per- and polyfluoroalkyl substances
SB	soil boring
USEPA	United States Environmental Protection Agency
Qual	interpreted qualifier

Army National Guard Site Inspections
Site Inspection Report
Army Aviation Support Facility (AASF)
Concord, New Hampshire

Figure 6-1
PFOS Detections in Soil





Facility Data
- Area of Interest (AOI)
- Potential PFAS Release
- Facility Boundary

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

PFOS Results (µg/kg)
- ND (Non-Detect)
- >ND - 13
- >13 -160
- >160 - 1,600
- >1,600

NOTES:
PFAS = Per- and Polyfluoroalkyl Substances
PFOS = perfluorooctanesulfonic acid
ND = Non-Detect
(µg/Kg) = Microgram(s) per Kilogram
Exceedances of The Office of the Secretary of Defense (OSD) Screening Level (SL) are depicted with a yellow halo.

Data Sources:
ESRI 2020
AECOM 2020

Date:.....October 2022
Prepared By:.....WSP
Prepared For:.....USACE

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Army National Guard Site Inspections
Site Inspection Report
Army Aviation Support Facility (AASF)
Concord, New Hampshire

Figure 6-2
PFOA Detections in Soil

Facility Data
- Area of Interest (AOI)
- Potential PFAS Release
- Facility Boundary

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

PFOA Results (µg/kg)
- ND (Non-Detect)
- >ND - 16
- >16 - 250
- >250 - 2,500
- >2,500

NOTES:
PFAS = Per- and Polyfluoroalkyl Substances
PFOA = perfluorooctanoic acid
ND = Non-Detect
(µg/Kg) = Microgram(s) per Kilogram
Exceedances of The Office of the Secretary of Defense (OSD) Screening Level (SL) are depicted with a yellow halo.

Data Sources:
ESRI 2020
AECOM 2020

Date:.....October 2022
Prepared By:.....WSP
Prepared For:.....USACE

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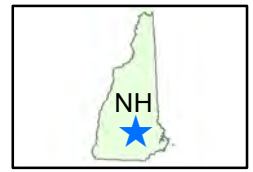
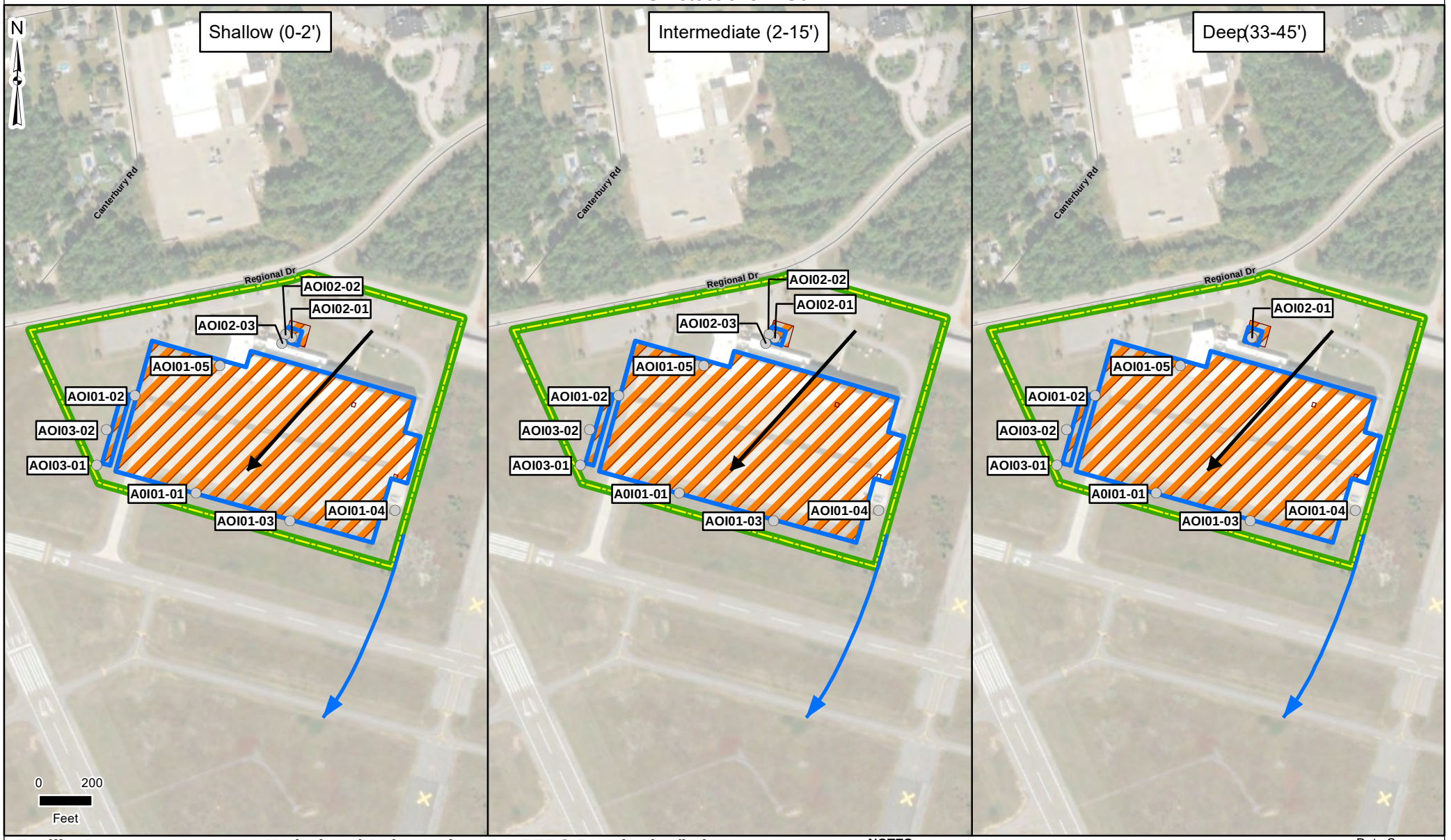
Site Inspection Report
Army Aviation Support Facility (AASF)
Concord, New Hampshire

Figure 6-3
PFBS Detections in Soil





Facility Data
- Area of Interest (AOI)
- Potential PFAS Release
- Facility Boundary

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

PFBS Results (µg/kg)
- ND (Non-Detect)
- >ND - 10
- >10 - 1,600
- >1,600 - 25,000
- >25,000

NOTES:
PFAS = Per- and Polyfluoroalkyl Substances
PFBS = perfluorobutanesulfonic acid
ND = Non-Detect
(µg/Kg) = Microgram(s) per Kilogram
Exceedances of The Office of the Secretary of Defense (OSD) Screening Level (SL) are depicted with a yellow halo.

Data Sources:
ESRI 2020
AECOM 2020

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Prepared For:.....USACE

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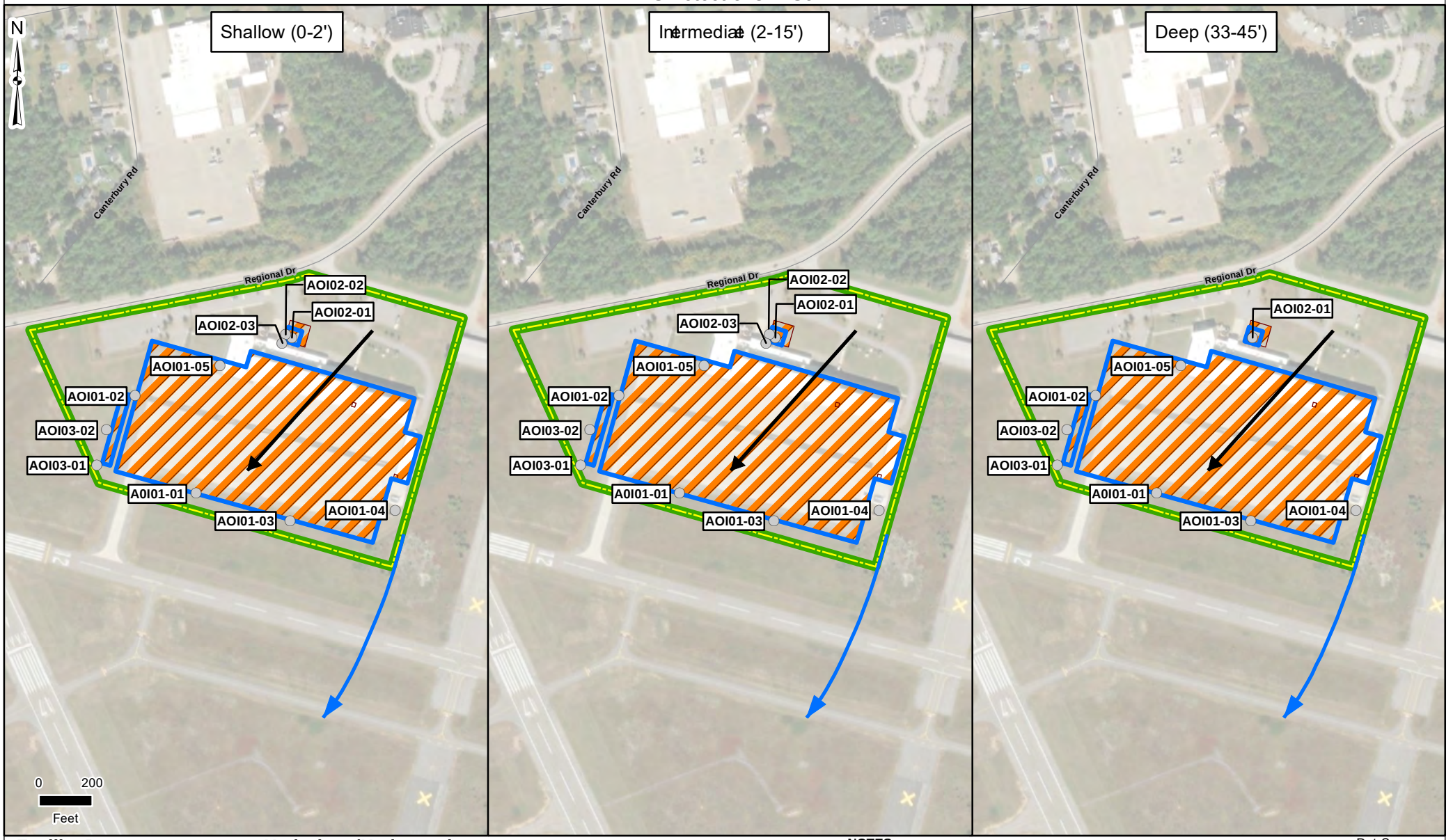
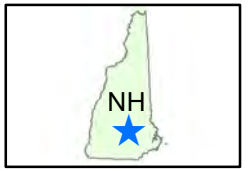
Site Inspection Report
Army Aviation Support Facility (AASF)
Concord, New Hampshire

Figure 6-4
PFHxS Detections in Soil





Facility Data
- Area of Interest (AOI)
- Potential PFAS Release
- Facility Boundary

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

PFHxS Results (µg/kg)
- ND (Non-Detect)
- >ND - 13
- >13 -160
- >160 - 1,600
- >1,600

NOTES:
PFAS = Per- and Polyfluoroalkyl Substances
PFHxS = perfluorohexanesulfonic acid
ND = Non-Detect
(µg /Kg) = Microgram(s) per Kilogram
Exceedances of The Office of the Secretary of Defense (OSD) Screening Level (SL) are depicted with a yellow halo.

Data Sources:
ESRI 2020
AECOM 2020

Date:.....October 2022
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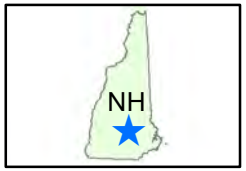
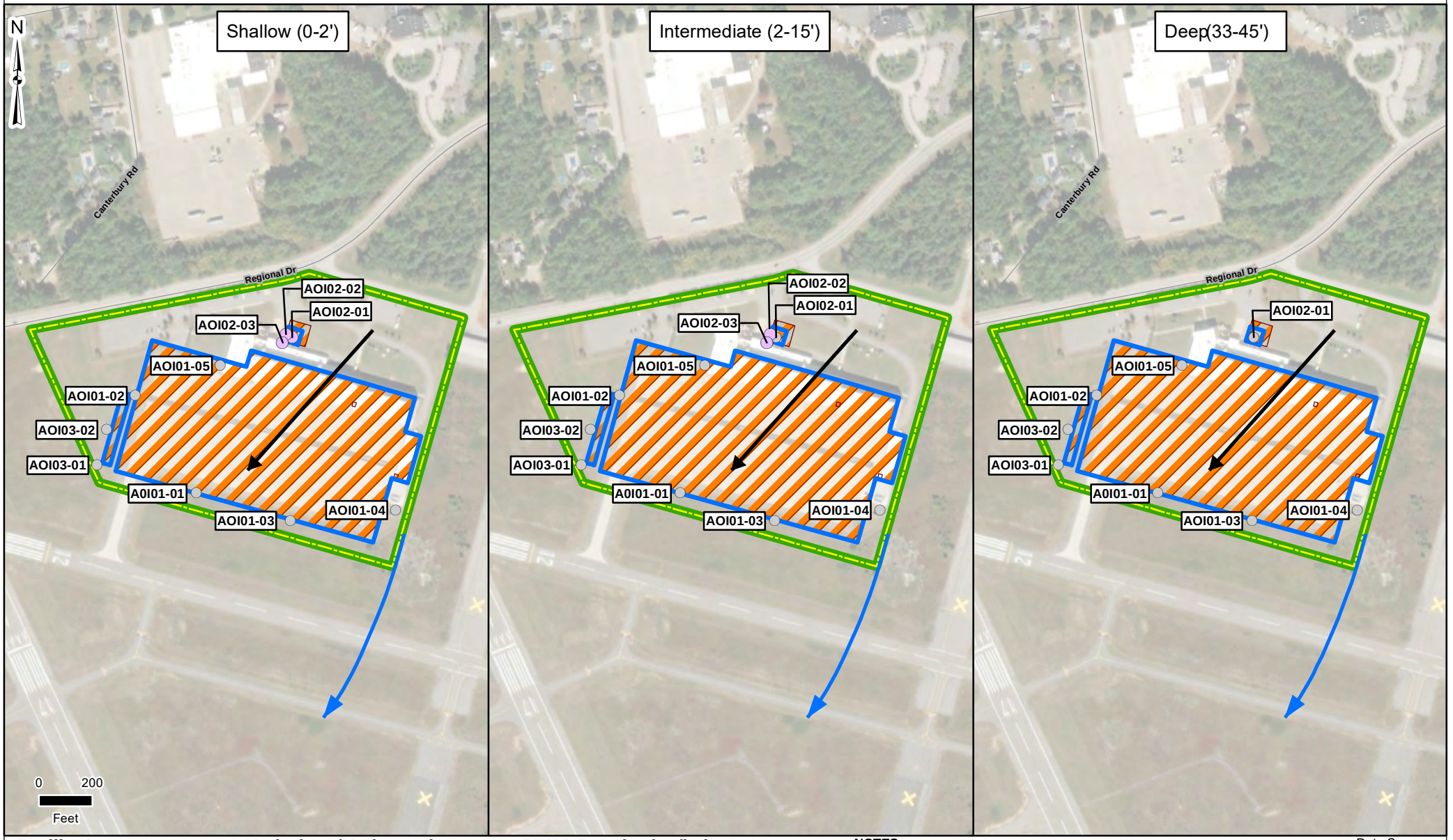
Site Inspection Report
Army Aviation Support Facility (AASF)
Concord, New Hampshire

Figure 6-5
PFNA Detections in Soil





Facility Data
- Area of Interest (AOI)
- Potential PFAS Release
- Facility Boundary

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

PFNA Results (µg/kg)
- ND (Non-Detect)
- >ND - 16
- >16 - 250
- >250 - 2,500
- >2,500

NOTES:
PFAS = Per- and Polyfluoroalkyl Substances
PFNA = perfluorononanoic acid
ND = Non-Detect
(µg/Kg) = Microgram(s) per Kilogram
Exceedances of The Office of the Secretary of Defense (OSD) Screening Level (SL) are depicted with a yellow halo.

Data Sources:
ESRI 2020
AECOM 2020

Date:.....October 2022
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Army National Guard Site Inspections
Site Inspection Report
Army Aviation Support Facility (AASF)
Concord, New Hampshire

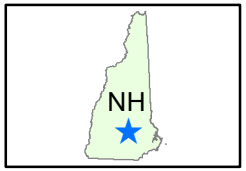

Figure 6-6
PFOS, PFOA, and PFBS Detections in Groundwater

Facility Data
- Area of Interest (AOI)
- Potential PFAS Release
- Facility Boundary

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

NOTES:
PFAS = Per- and Polyfluoroalkyl Substances
PFOS = perfluorooctanesulfonic acid
PFOA = perfluorooctanoic acid
PFBS = perfluorobutanesulfonic acid
ND = Non-Detect
ng/L = nanogram(s) per liter
Exceedances of The Office of the Secretary of Defense (OSD) Screening Level (SL) are depicted with a yellow halo.

Data Sources:
ESRI 2020
AECOM 2020

Date:.....October 2022
Prepared By:.....WSP
Prepared For:.....USACE

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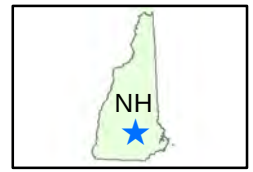
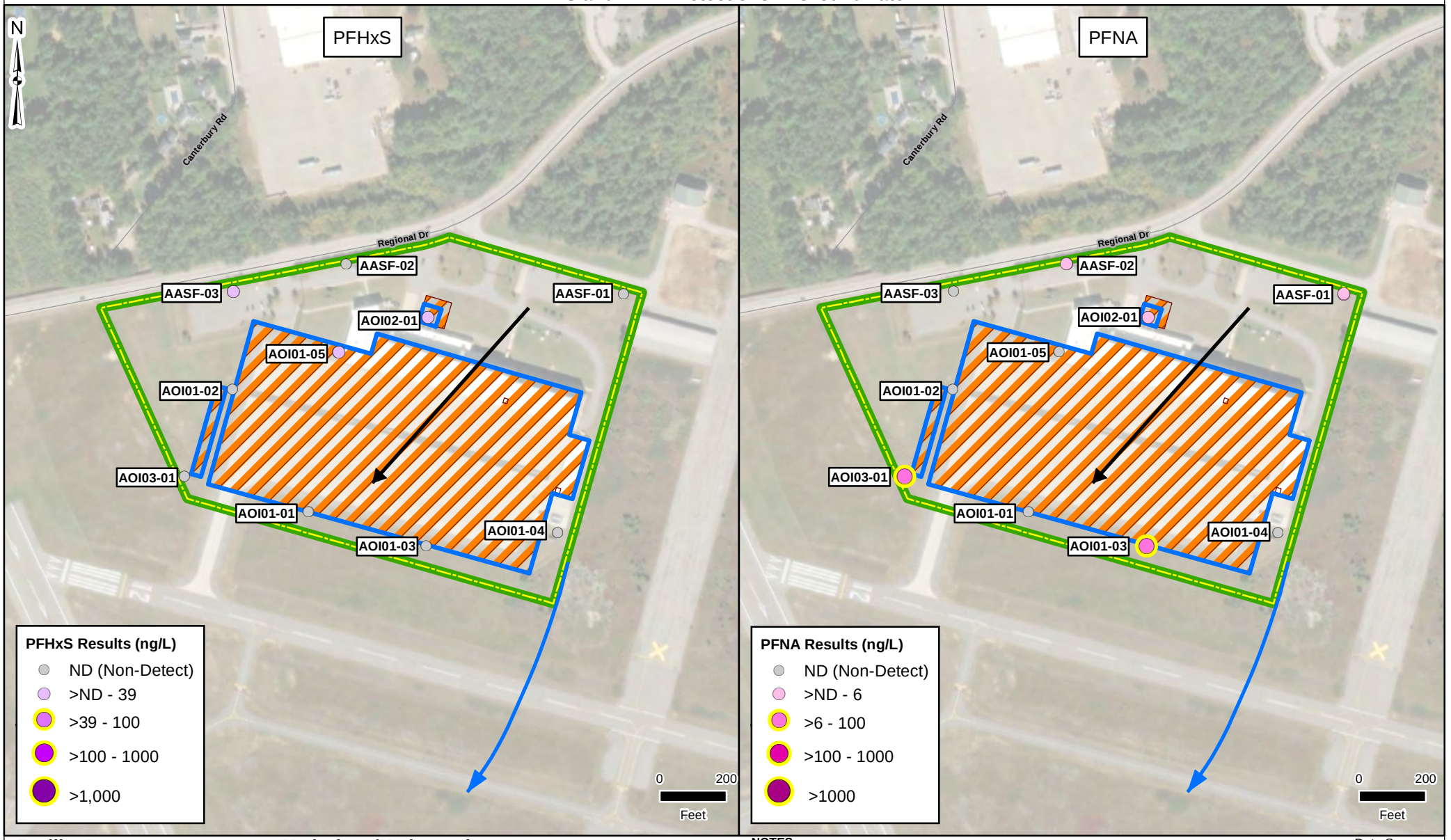
Army National Guard Site Inspections
Site Inspection Report
Army Aviation Support Facility (AASF)
Concord, New Hampshire

Figure 6-7
PFHxS and PFNA Detections in Groundwater





Facility Data
- Area of Interest (AOI)
- Potential PFAS Release
- Facility Boundary

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

NOTES:
PFAS = Per-and Polyfluoroalkyl Substances
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
ND = Non-Detect
ng/L = nanogram(s) per liter
Exceedances of The Office of the Secretary of Defense (OSD) Screening Level (SL) are depicted with a yellow halo.

Data Sources:
ESRI 2020
AECOM 2020

Date:.....October 2022
Prepared By:.....WSP
Prepared For:.....USACE

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7. EXPOSURE PATHWAYS

The Conceptual Site Model (CSM) for each AOI, revised based on the SI findings, is presented on **Figure 7-1** through **Figure 7-3**. Please note that while the CSM discussion assists in determining if a receptor may be impacted, the decision to move from SI to RI or interim action is determined based upon exceedances of the SLs for the relevant compounds and whether the release is more than likely attributable to the DoD. A CSM presents the current understanding of the Facility conditions with respect to known and suspected sources, potential transport mechanisms and migration pathways, and potentially exposed human receptors. A human exposure pathway is considered potentially complete when the following conditions are present:

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

If any of these elements are missing, the pathway is incomplete. The CSM figures use an empty circle symbol to represent an incomplete exposure pathway. Areas with 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 the relevant compounds above the SLs. Areas with an identified potentially complete pathway and a complete pathway 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 EPA guidance for risk screening (EPA 2001). Receptors at the Facility include site workers (e.g., Facility staff and visiting soldiers) and construction workers, and outside the Facility boundary includes recreational users and residents.

7.1 SOIL EXPOSURE PATHWAY

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

7.1.1 AOI 1

AOI 1 includes the Fire Suppression System Releases. Both the Main Hangar and the Fuel Truck Storage Building at AASF are equipped with AFFF fire suppression systems. Two releases have

occurred since the Facility was opened. In 2005, a lightning strike triggered the release of the suppression systems in both the Main Hangar and Fuel Truck Storage Building. It was estimated that less than 10 gallons of Aer-O-Lite 3% AFFF were released from the AASF Main Hangar and that approximately 3.4 gallons were released from the Fuel Truck Storage Building. The second release occurred in the Main Hangar in January 2019, when a fire suppression system pipe froze and burst in the wash rack. The foam was contained inside the wash bay and was rinsed down the center trench drain. The foam and wastewater from the trench drain were contained and treated by the onsite wastewater management system. Residual water was removed and disposed of by a contracted disposal Facility (AECOM 2019).

PFOS was detected in surface soil at AOI 1 above its SL. Site workers and construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for facility workers and construction workers are potentially complete. PFOS was detected in subsurface soil at AOI 1 below its SL. Construction workers could contact constituents in subsurface soil via incidental ingestion and inhalation of dust; therefore, the subsurface soil exposure pathway for construction workers is potentially complete.

The CSM for AOI 1 is presented on **Figure 7-1**.

7.1.2 AOI 2

AOI 2 is the System Testing Area. According to AASF personnel, the fire suppression system in the Main Hangar was tested once in 2005, after the initial installation, to ensure proper mixing of AFFF and water flow and pressure. Testing was conducted outside the north side of the building by the loading dock, and the mixture was discharged to the grass. The system was charged with Aer-O- Lite 3% AFFF, but the quantity of AFFF released is unknown. Additionally, a second release occurred on June 15, 2021, when AFFF was released to a grassy area on the east side of the loading dock. Emergency Response Actions were immediately implemented, and Clean Harbors was mobilized to remove the AFFF (AECOM 2019).

PFNA and PFOA were detected in surface soil at AOI 2 at concentrations below their respective SLs. Facility workers and construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for facility workers and construction workers are potentially complete. PFNA and PFOA were detected in subsurface soil at AOI 2. Construction workers could contact constituents in subsurface soil via incidental ingestion and inhalation of dust; therefore, the subsurface soil exposure pathway for construction workers is potentially complete.

The CSM is presented in **Figure 7-2**.

7.1.3 AOI 3

AOI 3 is the Infiltration Gallery. The stormwater system and infiltration gallery were installed circa 2004, when the new AASF was constructed. Stormwater runoff from the main apron is collected in a drain at the center of the apron and discharged into a stormwater pre-treatment system, followed by a three-tiered underground infiltration gallery. According to engineering

drawings, the infiltration gallery is located 4 ft bgs (NGB 2002c; AECOM 2019). According to interviews with NHARNG personnel, foam from the 2005 fire suppression system releases in the Main Hangar and the Fuel Truck Storage Building was washed into the drain and surrounding grass.

PFOA and PFOS were detected in surface soil at AOI 3 at concentrations below their respective SLs. Facility workers and construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for facility workers and construction workers are potentially complete. PFBS, PFHxS, PFOA, PFOS, and PFNA were not detected in subsurface soil at AOI 3; therefore, the subsurface soil exposure pathway for construction workers is incomplete.

The CSM is presented in **Figure 7-3**.

7.2 GROUNDWATER EXPOSURE PATHWAY

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

7.2.1 AOI 1

PFNA and PFOA were detected above their respective SLs in groundwater samples collected at AOI 1. Depths to water measured at AASF in June 2022 during the SI ranged from 28 to 46 ft bgs. Due to the depth of groundwater at the site, the groundwater ingestion exposure pathway for construction workers is considered incomplete.

Potable water at the AASF is provided by public water distribution lines; therefore, the pathway for ingestion of shallow groundwater by site workers is incomplete. A domestic well and commercial well are present 0.5 miles and 0.75 miles east of the AASF respectively (EDR 2019; AECOM 2019). Based on groundwater flow direction to the south/southwest, these two wells are not considered downgradient from the AASF. Relevant compounds were detected above their respective SLs in groundwater at the downgradient boundary of the facility; therefore, the pathway for ingestion of shallow groundwater by off-Facility residents is potentially complete.

The Merrimack River is located approximately 0.8 miles to the west/southwest (downgradient), and the Soucook River is located approximately 0.6 miles to the south/southeast (cross gradient). It is not known if there is offsite groundwater discharge to surface water bodies (the Soucook River, Merrimack River, or their tributaries). Based on the depth to groundwater and the depth of the Merrimack River (5 to 40 ft bgs), groundwater interaction with the river may be possible downgradient of the Facility (GZA GeoEnvironmental, Inc. 2018; AECOM 2019). Therefore, the ingestion exposure pathway for offsite surface water and sediment is considered potentially complete for recreational users. Human consumption of fish potentially affected by PFAS from the river is also possible.

The CSM for AOI 1 is presented on **Figure 7-1**.

7.2.2 AOI 2

PFOA was detected above their SL in the groundwater sample collected at AOI 2. Depths to water measured at AASF in June 2022 during the SI ranged from 28 to 46 ft bgs. Due to the depth of groundwater at the site, the groundwater ingestion exposure pathway for construction workers is considered incomplete.

Potable water at the AASF is provided by public water distribution lines; therefore, the pathway for ingestion of shallow groundwater by site workers is incomplete. A domestic well and commercial well are present 0.5 miles and 0.75 miles east of the AASF respectively (EDR 2019; AECOM 2019). Based on groundwater flow direction to the south/southwest, these two wells are not considered downgradient from the AASF. Relevant compounds were detected above their respective SLs in groundwater at the downgradient boundary of the facility; therefore, the pathway for ingestion of shallow groundwater by off-Facility residents is potentially complete. The Merrimack River is located approximately 0.8 miles to the west/southwest (downgradient), and the Soucook River is located approximately 0.6 miles to the south/southeast (cross gradient). It is not known if there is offsite groundwater discharge to surface water bodies (the Soucook River, Merrimack River, or their tributaries). Based on the depth to groundwater and the depth of the Merrimack River (5 to 40 ft bgs), groundwater interaction with the river may be possible downgradient of the site (GZA GeoEnvironmental, Inc. 2018; AECOM 2019). Therefore, the ingestion exposure pathway for offsite surface water and sediment is considered potentially complete for recreational users. Human consumption of fish potentially affected by PFAS from the river is also possible.

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

7.2.3 AOI 3

PFNA and PFOA were detected above their respective SLs in groundwater samples collected at AOI 3. Depths to water measured at AASF in June 2022 during the SI ranged from 28 to 46 ft bgs. Due to the depth of groundwater at the site, the groundwater ingestion exposure pathway for construction workers is considered incomplete.

Potable water at the AASF is provided by public water distribution lines; therefore, the pathway for ingestion of shallow groundwater by site workers is incomplete. A domestic well and commercial well are present 0.5 miles and 0.75 miles east of the AASF respectively (EDR 2019; AECOM 2019). Based on groundwater flow direction to the south/southwest, these two wells are not considered downgradient from the AASF. Relevant compounds were detected above their respective SLs in groundwater at the downgradient boundary of the facility; therefore, the pathway for ingestion of shallow groundwater by off-Facility residents is potentially complete.

The Merrimack River is located approximately 0.8 miles to the west/southwest (downgradient), and the Soucook River is located approximately 0.6 miles to the south/southeast (cross gradient). It is not known if there is offsite groundwater discharge to surface water bodies (the Soucook River, Merrimack River, or their tributaries). Based on the depth to groundwater and the depth of the Merrimack River (5 to 40 ft bgs), groundwater interaction with the river may be possible downgradient of the site (GZA GeoEnvironmental, Inc. 2018; AECOM 2019). Therefore, the

ingestion exposure pathway for offsite surface water and sediment is considered potentially complete for recreational users. Human consumption of fish potentially affected by PFAS from the river is also possible.

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

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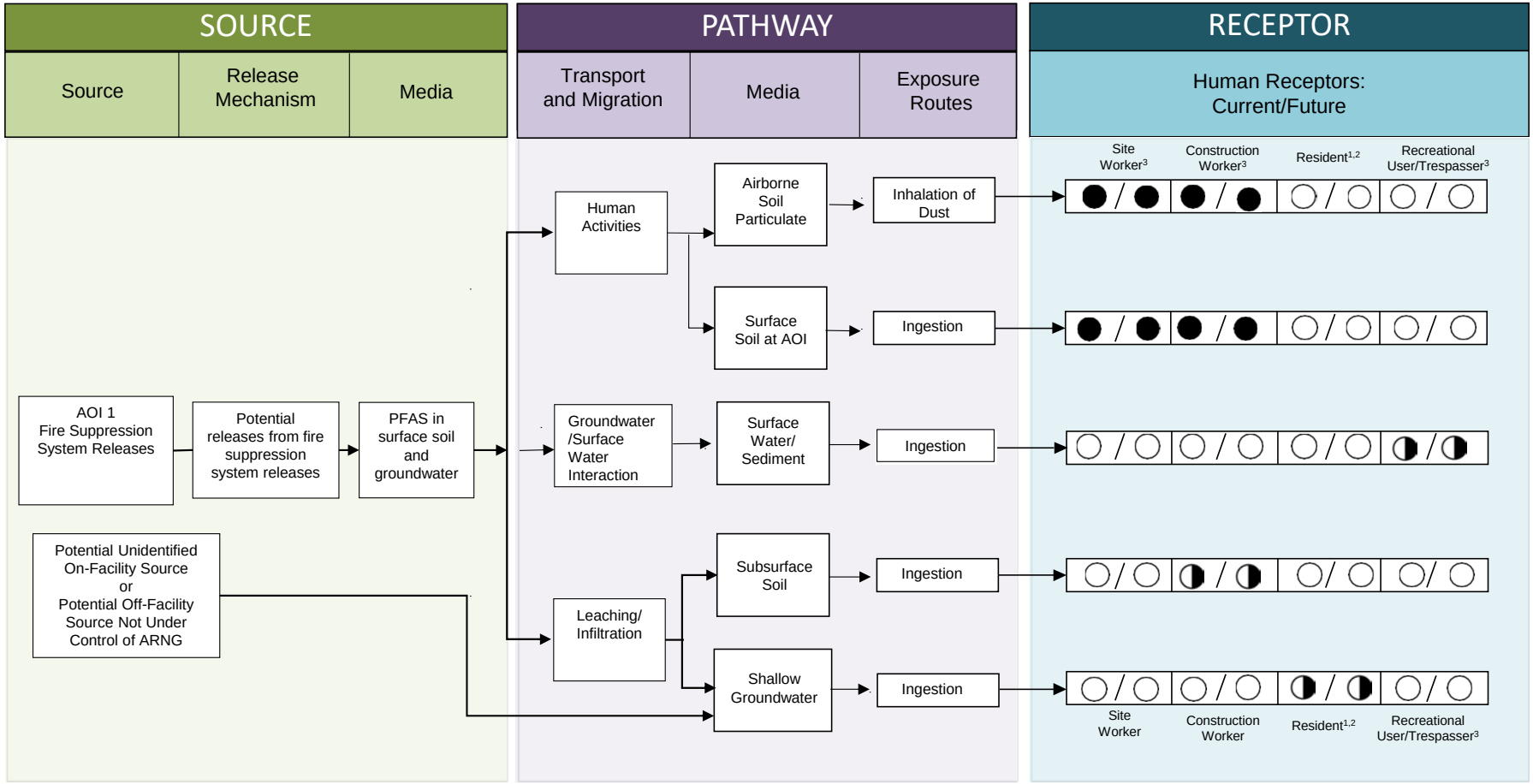

LEGEND

- Flow Chart Continues
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

Notes:

1. The resident refers to off-site receptors
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Dermal contact exposure pathway is incomplete for PFAS

Figure 7-1
Conceptual Site Model, AOI 1
AASF

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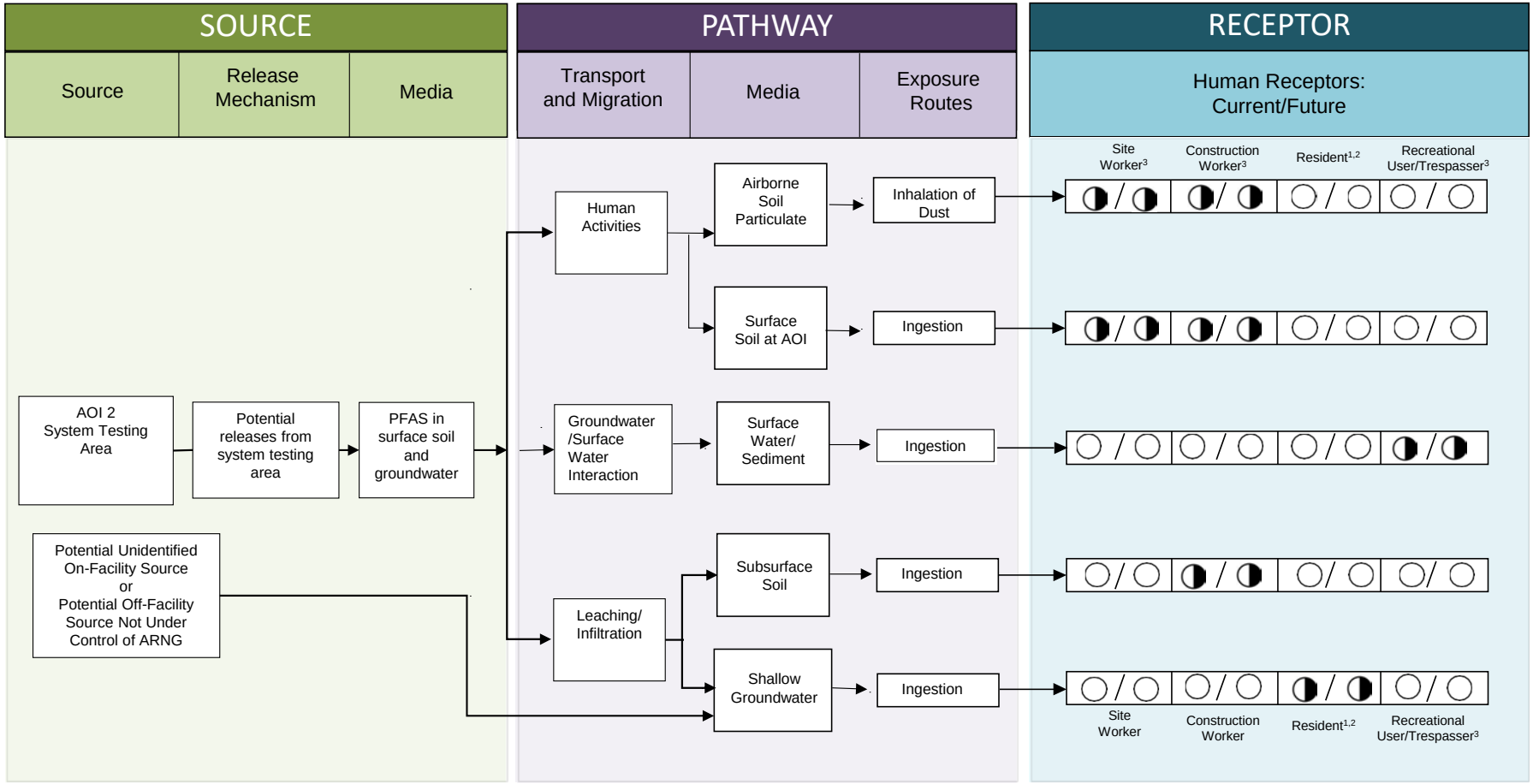

LEGEND

- Flow Chart Continues
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

Notes:

1. The resident refers to off-site receptors
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Dermal contact exposure pathway is incomplete for PFAS

Figure 7-2
Conceptual Site Model, AOI 2
AASF

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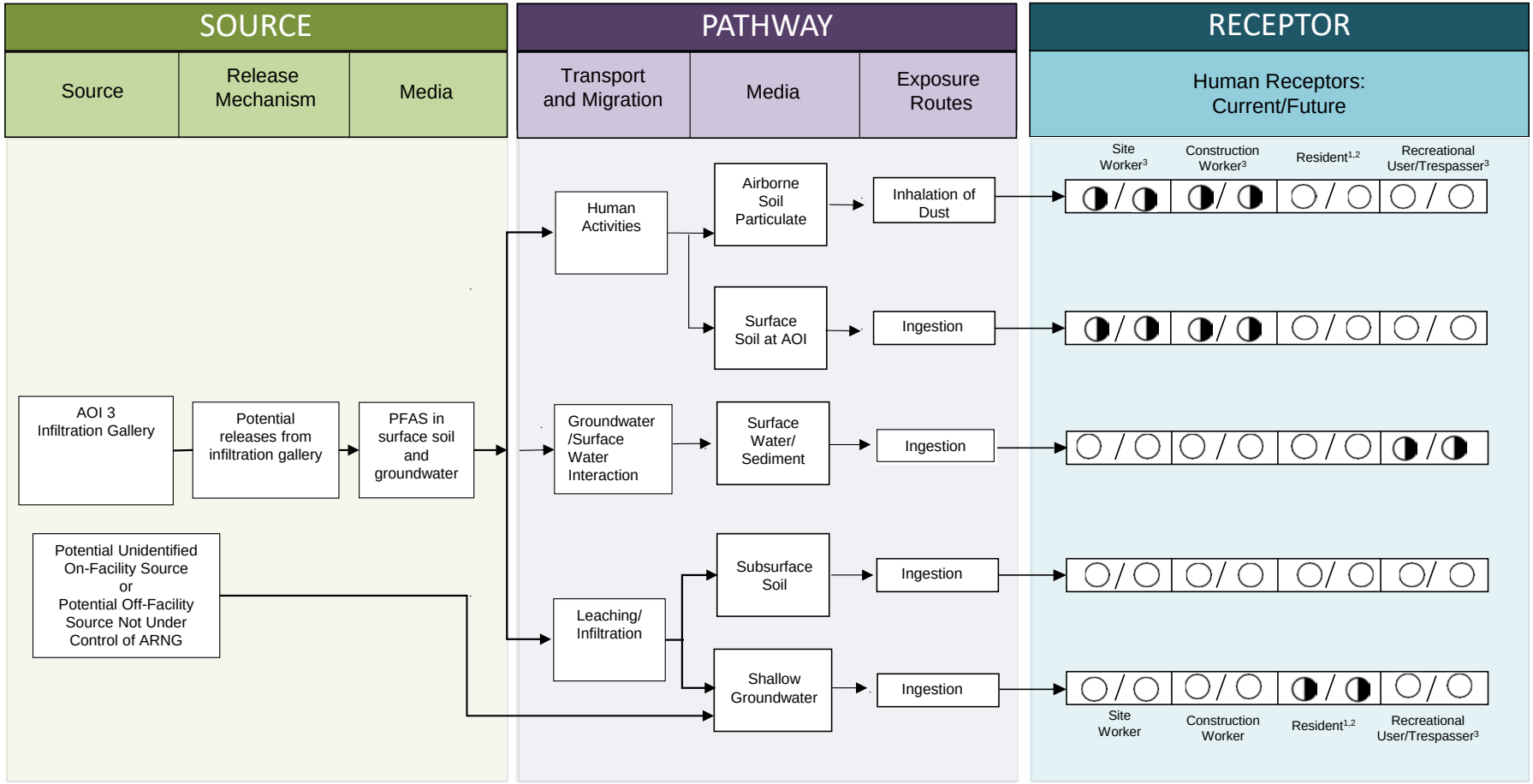

LEGEND

- Flow Chart Continues
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

Notes:

1. The resident refers to off-site receptors
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Dermal contact exposure pathway is incomplete for PFAS

Figure 7-3
Conceptual Site Model, AOI 3
AASF

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8. SUMMARY AND OUTCOME

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

8.1 SI ACTIVITIES

The SI field activities at the Facility were conducted from 24 May to 13 June 2022. The SI field activities included soil and groundwater sampling. Field activities were conducted in accordance with the UFP-QAPP Addendum (Wood/EA 2022), except as previously noted in **Section 5.9**.

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

- Twenty-eight (28) soil samples from 10 boring locations;
- Ten (10) grab groundwater samples from 10 temporary well locations;
- Twenty-one (21) QA/QC samples.

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

8.2 OUTCOME

Based on the results of this SI, further evaluation under CERCLA in the form of a RI is warranted for AOI 1, AOI 2, and AOI 3. Based on the CSMs developed and revised based on the SI findings, there is potential for exposure to receptors from AOI 1, AOI 2, and AOI 3 from sources on the Facility resulting from historical DoD activities. There is also a potential that an off-Facility source may be impacting the groundwater.

Sample chemical analytical concentrations collected during the SI were compared against the project SLs in soil and groundwater, as described in **Table 6-1**. The following bullets summarize the SI results relative to the SLs:

At AOI 1:

- PFNA and PFOA were detected in groundwater at concentrations above their respective SLs with maximum concentrations of 14 and 100 J+ ng/L, respectively, at AOI01-03. Other relevant compounds were detected below their respective SLs in groundwater samples from AOI 1.

- PFOS was detected in surface soil above the SL, with a maximum concentration of 15 J µg/kg at AOI01-03. Other relevant compounds were also detected below their respective SLs in soil samples from AOI 1.
- Based on the results of the SI, further evaluation of AOI 1 is warranted in the RI.

At AOI 2:

- PFOA was detected in groundwater at concentrations above the SL with maximum concentration of 25 ng/L at AOI02-01. Other relevant compounds were also detected below their respective SLs in the groundwater sample from AOI 2.
- Relevant compounds were detected in soil in the AOI 2 source area at concentrations below SLs.
- Based on the results of the SI, further evaluation of AOI 2 is warranted in the RI.

At AOI 3:

- PFNA and PFOA were detected in groundwater at concentrations above their respective SLs with maximum concentrations of 7.1 and 6.1 ng/L, respectively, at AOI03-01. PFOS was also detected below its SL in the groundwater sample from AOI 3.
- PFOA and PFOS were detected in soil in the AOI 3 source area at concentrations below SLs.
- Based on the results of the SI, further evaluation of AOI 3 is warranted in the RI.

At the Facility Boundary:

- PFOA was detected at a concentration above the SL in groundwater on the upgradient Facility boundary in sample AASF-01, which suggests potential contributions from an off-Facility source. Samples AASF-02 and AASF-03 had concentrations of relevant compounds below the SLs and were also located cross gradient on the upgradient Facility boundary.

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

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

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

AOI	Potential Release Area	Soil – Source Area	Groundwater – Source Area	Groundwater – Facility Boundary	Future Action
1	Fire Suppression System Releases	●	●	●	Proceed to RI
2	System Testing Area	◐	●	●	Proceed to RI
3	Infiltration Gallery	◐	●	●	Proceed to RI

Legend:

● = Detected; exceedance of screening levels

◐ = Detected; no exceedance of screening levels

○ = Not detected

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