DRAFT FINAL
Site Inspection Report
Army Aviation Support Facility
Santa Fe, New Mexico

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

February 2023

Prepared for

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

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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
amsl	Above mean sea level
AOI	Area of Interest
ARNG	Army National Guard
ASTM	ASTM International
bgs	Below ground surface
btoc	Below top of casing
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
City	City of Santa Fe
CSM	Conceptual site model
DoD	Department of Defense
DPT	Direct-push technology
DQO	Data quality objective
DUA	Data Usability Assessment
EA	EA Engineering, Science, and Technology, Inc., PBC
ELAP	Environmental Laboratory Accreditation Program
EM	Engineer Manual
EB	Equipment blank
FB	Field blank
FD	Field duplicate
FedEx	Federal Express
ft	Foot (feet)
GPS	Global Positioning System
HDPE	High-density polyethylene
HFPO-DA	Hexafluoropropylene oxide dimer acid
ID	Identification
IDW	Investigation-derived waste
ITRC	Interstate Technology Regulatory Council

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

J	Estimated concentration
J+	Estimated concentration, biased high
LC/MS/MS	Liquid chromatography with tandem mass spectrometry
mg/kg	Milligram(s) per kilogram
MS	Matrix spike
MSD	Matrix spike duplicate
NA	Not applicable
ng/L	Nanogram(s) per liter
NMARNG	New Mexico Army National Guard
NMED	New Mexico Environment Department
NMOSE	New Mexico Office of the Engineer
No.	Number
OSD	Office of the Secretary of Defense
P&A	Plugged and abandoned
PA	Preliminary Assessment
PFAS	Per- and polyfluoroalkyl substances
PFBS	Perfluorobutanesulfonic acid
PFHxS	Perfluorohexanesulfonic acid
PFNA	Perfluorononanoic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PID	Photoionization detector
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
QSM	Quality Systems Manual
RI	Remedial Investigation
SAF	Santa Fe Airport
SI	Site Inspection
SL	Screening level
TOC	Total organic carbon
TPP	Technical Project Planning
UFP	Uniform Federal Policy
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

WWTP	Wastewater Treatment Plan

EXECUTIVE SUMMARY

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

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

The Facility, operated by the New Mexico ARNG (NMARNG), encompasses approximately 22 acres in Santa Fe, New Mexico, approximately 10 miles southwest of downtown. The original Facility was constructed in 1979 in the northwest corner of the Santa Fe Regional Airport. The Facility was renovated with a new, larger AASF building in 2012. The AASF and surrounding area consists of piedmont slopes underlain by late Cenozoic basin-filling deposits, or the Santa Fe marls. Basin-fill aquifers of the Santa Fe Group are the principal groundwater resource for the cities of Santa Fe, Española, and six Pueblo nations (AECOM Technical Services, Inc. 2020).

The PA identified one AOI for investigation during the SI phase. SI sampling results from the AOI were compared to OSD SLs. **Table ES-2** summarizes the SI results for the AOI. Based on the results of this SI and following the CERCLA process, a remedial investigation (RI) is warranted for AOI 1. Note that based on historical aerial photographs, application of biosolids extended into the current Santa Fe AASF lease area; biosolid land application extended to the north end of the current AASF building prior to the 2012 renovations of the facility. This area was therefore designated for further evaluation during the SI planning phases.

[1] Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI, as screening values were established after SI planning and execution. However, ARNG will add HFPO-DA to the list of constituents sampled during the next phase of CERCLA, if warranted.

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

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

Notes:
1. Assistant Secretary of Defense. 2022. Risk-Based Screening Levels in Groundwater and Soil using U.S. Environmental Protection Agency's Regional SL Calculator. Hazard Quotient = 0.1. May 2022.
2. Screening values for HFPO-DA were established after SI planning and execution and thus not included as an analyte. Future CERCLA phases will include HFPO-DA if warranted.

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

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324 **Table ES-2. Summary of Site Inspection Findings and Recommendations**

Area	Potential Release Area	Soil	Groundwater-On-site	Groundwater – Facility Boundary	Future Action
AOI 1	Former Firetruck Bay and Tri-Max™ Hand Truck Storage Area	●	●	○	Proceed to RI
Historical WWTP Biosolid Application Area	Historical WWTP Biosolid Application	●	◑	○	Further Evaluation

Notes:
1. This area will be assessed during the RI to determine if the contamination present poses a detrimental impact on human health for personnel at the facility or the environment.

WWTP = Wastewater Treatment Plan

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1. INTRODUCTION

1.1 PROJECT AUTHORIZATION

The Army National Guard (ARNG) G-9 is the lead agency in performing Preliminary Assessments (PAs) and Site Inspections (SIs) at ARNG facilities nationwide based on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) with a focus on six compounds presented in the memorandum from the Office of the Secretary of Defense (OSD) dated 6 July 2022 (Assistant Secretary of Defense 2022). The six compounds listed in the OSD memorandum will be referred to as "relevant compounds" throughout this document and include perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorobutanesulfonic acid (PFBS), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), and hexafluoropropylene oxide-dimer acid (HFPO-DA)[2] at ARNG facilities nationwide. The ARNG performed this SI at the Army Aviation Support Facility (AASF) in Santa Fe, New Mexico. The Santa Fe AASF will be 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 [USEPA] 1980), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations Part 300) (USEPA 1994), and in compliance with Army requirements and guidance for field investigations.

1.2 SITE INSPECTION PURPOSE

A PA was performed at the Facility (AECOM Technical Services, Inc. [AECOM] 2020) that identified one Area of Interest (AOI) where PFAS-containing materials were used, stored, and/or disposed, or areas where known or suspected releases to the environment occurred. The objective of the SI is to identify whether there has been a release to the environment from the AOI identified in the PA and determine whether further investigation is warranted, a removal action is required to address immediate threats, or no further action is required based on screening levels (SLs) for the relevant compounds. During the SI planning phase and review of the historical aerial photographs, it was noted that application of biosolids extended on to the current Santa Fe AASF lease area to the north end of the current AASF building prior to the 2012 renovations of the Facility. This area was therefore designated for further evaluation under this SI.

[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, as screening values were established after SI planning and execution. However, ARNG will add HFPO-DA to the list of constituents sampled during the next phase of CERCLA, if warranted.

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2. SITE BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

The Santa Fe AASF is located within the incorporated limits of and approximately 10 miles southwest of downtown Santa Fe, New Mexico. The 22-acre Facility is located on the northwest corner of the Santa Fe Regional Airport (SAF) and is leased to the New Mexico Army National Guard (NMARNG) by the City of Santa Fe (City). The land was acquired in 1976, and the original Facility was constructed in 1979. The original facility consisted of an AASF building and hangar and a small parking apron for helicopters. In 2012, the Facility was completely renovated with a new, larger AASF building constructed adjacent to the former AASF building, and the former AASF building converted to the Santa Fe Readiness Center (AECOM 2020).

The properties immediately surrounding the AASF are also owned by the City, with the Santa Fe Wastewater Treatment Plant (WWTP) to the north, and the Santa Fe Regional Airport immediately to the west, south, and east (**Figure 2-1**) (AECOM 2020).

2.2 FACILITY ENVIRONMENTAL SETTING

The AASF is at an elevation of approximately 6,330 feet (ft) above mean sea level (amsl). The Facility is covered by the U.S. Geological Survey Turquoise Hill 7.5-minute quadrangle topographic map. The geographic coordinates for the center of the Facility are 106°18'31.454"W; 35°37'27.146"N. The Facility is developed with two large buildings, three small structures, and a helicopter parking apron. One building, built in 1979 and renovated in 2012, is the former AASF and the current administration headquarters for the Santa Fe Readiness Center. The second building is the current AASF, which is comprised of a 75,000-square-foot (ft^2) hangar/ administration building. A 16,400- ft^2 storage building; a guard house; fuel storage area; and 455,000 ft^2 of concrete airfield paving also exist on the property (AECOM 2020). Topography of the area is displayed in **Figure 2-2**. The regional geology and groundwater features are shown on **Figure 2-3**. The regional surface water features and drainage basins are shown on **Figure 2-4**. Groundwater elevations and contours, if applicable, are presented on **Figures 2-5** and **2-6**.

2.2.1 Geology

The City of Santa Fe, New Mexico, is located on the east border of the Rio Grande trough, in the Española Basin, within the Rio Grande Rift. The basin formed during 25 million years of plate tectonic stress pulling the land apart and causing a vast expanse of land to subside. When these basins formed, large amounts of sediment filled the basin from the ancient flow of the Rio Grande and from volcanic eruptions. These sediments, which fill the basin, make up an aquifer system that contains the primary source of water for most residents who live in the basin (AECOM 2020).

The Española basin in north-central New Mexico comprises the central portion of the Rio Grande rift, which formed in response to rifting as early as Oligocene epoch. There are four main physiographic units associated with the Santa Fe area: a complex of metamorphic and igneous rocks from the Pre-Cambrian encompassing the Sangre de Cristo mountains in the eastern area; sedimentary and volcanic rocks Neogene to Quaternary in age in the southwest; basalt flows of

Quaternary in the western Mesa; and basin fill sediments of the Santa Fe group in the intervening piedmont (AECOM 2020).

Most of the area consists of piedmont slopes underlain by late Cenozoic basin-filling deposits called the Santa Fe marls. These marls are composed of silty sandstones, sand, and gravel approximately 300 ft thick. This layer lies overtop of a bedrock floor that is made up of sedimentary and igneous rocks (AECOM 2020).

Soils encountered during the SI were dominated by well-graded sand with interbedded gravel, silt, and clay. Samples for grain size analyses were collected at two locations, AOI101-01 and AOI01-02, and analyzed via ASTM International (ASTM) Method D-422. The results indicate that the soil samples are comprised primarily of sand (30.5 to 50.3 percent [%]) and silt (57.3 to 41.3%). These results and field observations are consistent with the reported depositional environment of the region. pH in soil samples ranged from 8.7 to 8.9. Total organic carbon (TOC) concentrations ranged from 2,400 to 4,600 milligrams per kilogram (mg/kg).

2.2.2 Hydrogeology

Primary aquifers in the Española Basin are contained within the Tertiary-Quaternary Santa Fe Group. Basin-fill aquifers of the Santa Fe Group are the principal groundwater resource for the cities of Santa Fe, Española, and six Pueblo nations. The Santa Fe Group thickens to the west and north, ranging from approximately 250 ft thick south of the City to greater than 10,000 ft beneath the Pajarito Plateau west of Española. The Ancha Formation is a locally important shallow aquifer that is present in the vicinity of the Facility (Johnson et al 2016). The Ancha Formation is comprised of alluvial deposits associated with the ancestral Santa Fe River and the alluvial slope deposits originating from the southwestern Sangre de Cristo Mountains. The Tesuque Formation lies beneath the Ancha Formation and is in hydraulic communication with aquifers within the overlying Ancha and Puye Formations. The highly heterogeneous and complex nature of the Tesuque aquifer reflects its depositional environment of coalescing alluvial fans, a heterogeneity that is compounded by discontinuities created by faulting. The Santa Fe Group aquifers are in hydraulic communication with Precambrian rocks along the eastern margin of the basin where most of the recharge occurs. Paleozoic limestones underlying the basin-fill aquifers, fractured Tertiary intrusive rocks, and Tertiary volcanics of the Jemez volcanic field also locally produce water. Recharge within the basin is assumed to occur primarily from the higher elevations with little or no recharge from the lower elevations because of high evapotranspiration and low precipitation (AECOM 2020).

Regional groundwater studies indicate that the Facility is near a groundwater divide and that groundwater may travel southwest toward the Santa Fe River or south toward Arroyo Hondo/Cienega Creek (Johnson et al 2016). Based on the SI, regional groundwater flows south-southwest at the Facility. Numerous wells are located south and southwest of the Facility. The nearest domestic well is located approximately 1 mile southwest of the Facility. A municipal well located at the Santa Fe Airport is located a 0.5 mile southeast of the Facility (New Mexico Office of the Engineer [NMOSE] 2022). These and other wells identified during the PA are displayed on **Figure 2-3**.

The City's drinking water comes from a nearly even split between groundwater from the Buckman and City Well Fields, and surface water from the Santa Fe and Rio Grande rivers. The City well fields are located within or northeast of Santa Fe (AECOM 2020), which are hydrologically upgradient of the Facility.

During the SI, perched groundwater was observed on the west side of the Facility at depths of 110–111 ft below ground surface (bgs). Groundwater flow direction of the perched groundwater could not be calculated since it was encountered in only two drilling locations (**Figure 2-5**). Depth to regional groundwater was observed at 176–185 ft bgs, which is consistent with observations made at Santa Fe WWTP monitoring wells located east of the Facility (New Mexico Environment Department [NMED] Ground Water Quality Bureau 2011). Measurements made during the SI indicate that regional groundwater flows south-southwest with a gradient of 0.001 ft/ft (**Figure 2-6**).

2.2.3 Hydrology

The Facility's topography is relatively flat. It straddles two watersheds with the northern portion within the Headwaters Santa Fe River Watershed and the southern portion within the Outlet Santa Fe River Watershed. The surface water flow direction is generally to the southwest on both sides of the watershed divide. The Santa Fe River cuts through undeveloped land approximately 0.5 miles north of the Facility (AECOM 2020). Water features near the Facility are shown in **Figure 2-4.**

Consistent with regional surface water flow directions, historical imagery indicates that stormwater flowed to the southwest from the historical helicopter parking apron and other paved areas. Stormwater also appears to have accumulated on either side of the taxiway historically. There are two stormwater retention basins that currently receive water from the tarmac. A stormwater detention pond north of the Readiness Center currently receives runoff and has an outflow that is directed north. Historical imagery suggests that those areas were constructed during the 2012 facility renovations and did not previously receive runoff. Current and historical areas that receive or appear to have received stormwater runoff are displayed in **Figure 2-4**.

The City of Santa Fe's surface water comes from the Santa Fe River and San Juan-Chama Project water via the Rio Grande, both of which are treated through conventional and advanced treatment processes to meet current permit regulations. The City of Santa Fe has a license to store up to 3,985-acre ft (combined) of Santa Fe River water in McClure and Nichols Reservoirs. Both municipal drinking water supply reservoirs are located east of Santa Fe (AECOM 2020).

2.2.4 Climate

Santa Fe is located in north central New Mexico at an elevation of approximately 7,000 ft amsl. January is the coldest month, with an average temperature of 30.5 degrees Fahrenheit (ºF), while July is the hottest month, with an average temperature of 70.1ºF. Santa Fe receives an average of 14.2 inches of precipitation annually, with 5.85 inches falling during summer months. The City receives an annual snowfall amount of 23 inches per year (AECOM 2020).

2.2.5 Current and Future Land Use

Presently, Santa Fe AASF resides on SAF property. The Facility is comprised of one hangar, multiple administrative buildings, a paved parking area, a fueling station, and a small, paved parking area. The current land use is listed as I-1 Light Industrial. Future land use is not anticipated to change (AECOM 2020). The Facility is fenced and has restricted access. Land directly to the north and east of the Facility is currently a WWTP biosolid application area owned by the City of Santa Fe.

2.2.6 Critical Habitat and Threatened/Endangered Species

A wildlife survey has not occurred at the Facility, and the Facility does not have any significant areas of habitat. The following species have not been identified at the Facility but may be present in the surrounding area.

The following species are listed as federally endangered, threatened, proposed, and/or candidate species in Santa Fe County, New Mexico (U.S. Fish and Wildlife Service 2022):

- Birds: Mexican Spotted Owl, *Strix occidentalis lucida* (Threatened); Southwestern Willow Flycatcher, *Empidonax traillii extimus* (Endangered); and Yellow-billed Cuckoo, *Coccyzus americanus* (Threatened)
- Fishes: Rio Grande Cutthroat Trout, *Oncorhynchus clarkii virginalis* (Candidate); and Rio Grande Silvery Minnow, *Hybognathus amarus* (Endangered)
- Insects: Monarch Butterfly, *Danaus plexippus* (Candidate)
- Amphibians: Jemez Mountains Salamander, *Plethodon neomexicanus* (Endangered)
- Mammal: New Mexico Meadow Jumping Mouse, *Zapas hudsonius luteus* (Endangered).

2.3 HISTORY OF PFAS USE

Two potential PFAS release areas were identified at the Facility during the PA (AECOM 2020). The areas include the former AASF building and former Tri-Max™ 70/30 hand-truck storage area, which consists of the flight line and paved parking apron. These two potential source areas are in close proximity to one another and have co-mingling stormwater runoff. As a result, these areas were combined and together comprise AOI 1.

Personnel interviews confirmed that a firetruck parked within the former AASF building stored aqueous film-forming foam (AFFF). Personnel indicate that it was never used because no one at the Facility was qualified to use it; however, there is a possibility that the firetruck stored inside the former AASF Facility may have leaked AFFF or may have had its AFFF tank flushed out during maintenance. There are no records or recollection of the AFFF stored on this firetruck being used or spilled.

Prior to the 2012 facility renovation, Tri-Max™ 70/30 hand trucks were stored in various places around the flight line and paved parking apron and constitute a potential PFAS source within AOI 1. The hand trucks were regularly serviced. Service for Tri-Max™ 70/30 hand trucks may include nozzle checks that can result in an AFFF discharge. According to personnel, the Tri-Max™ hand trucks were only used for 4 to 5 years in the mid-2000s and were turned in because they were too expensive to maintain. There is no recollection or record of any training conducted with these units or nozzle testing performed. A description of AOI 1 and its potential release areas are presented in **Section 3**.

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Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

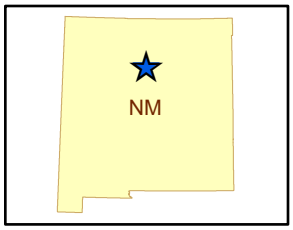
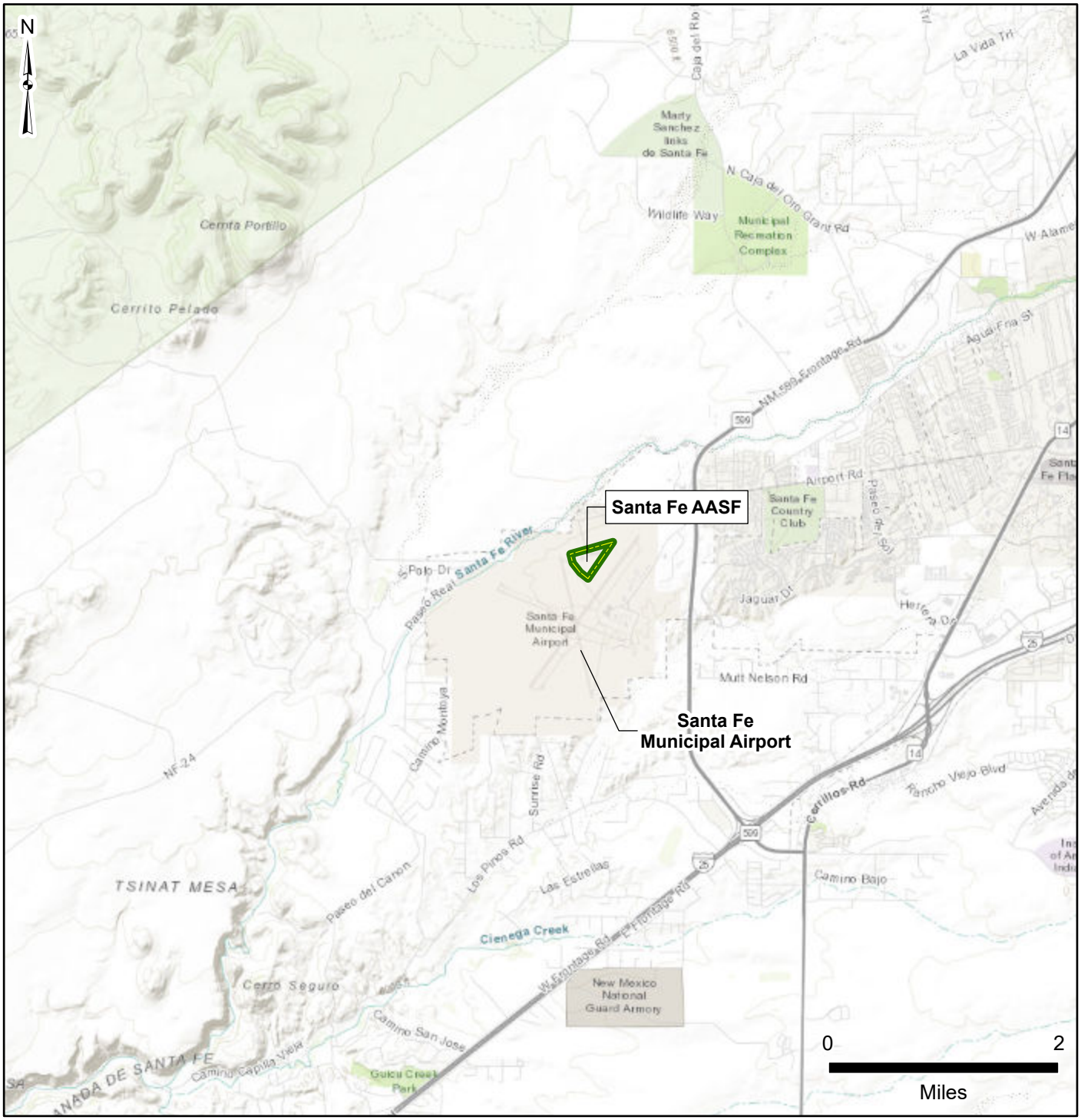


Figure 2-1
Facility Location



Facility Data

Facility Boundary

Data Sources:
ESRI 2020
AECOM 2020

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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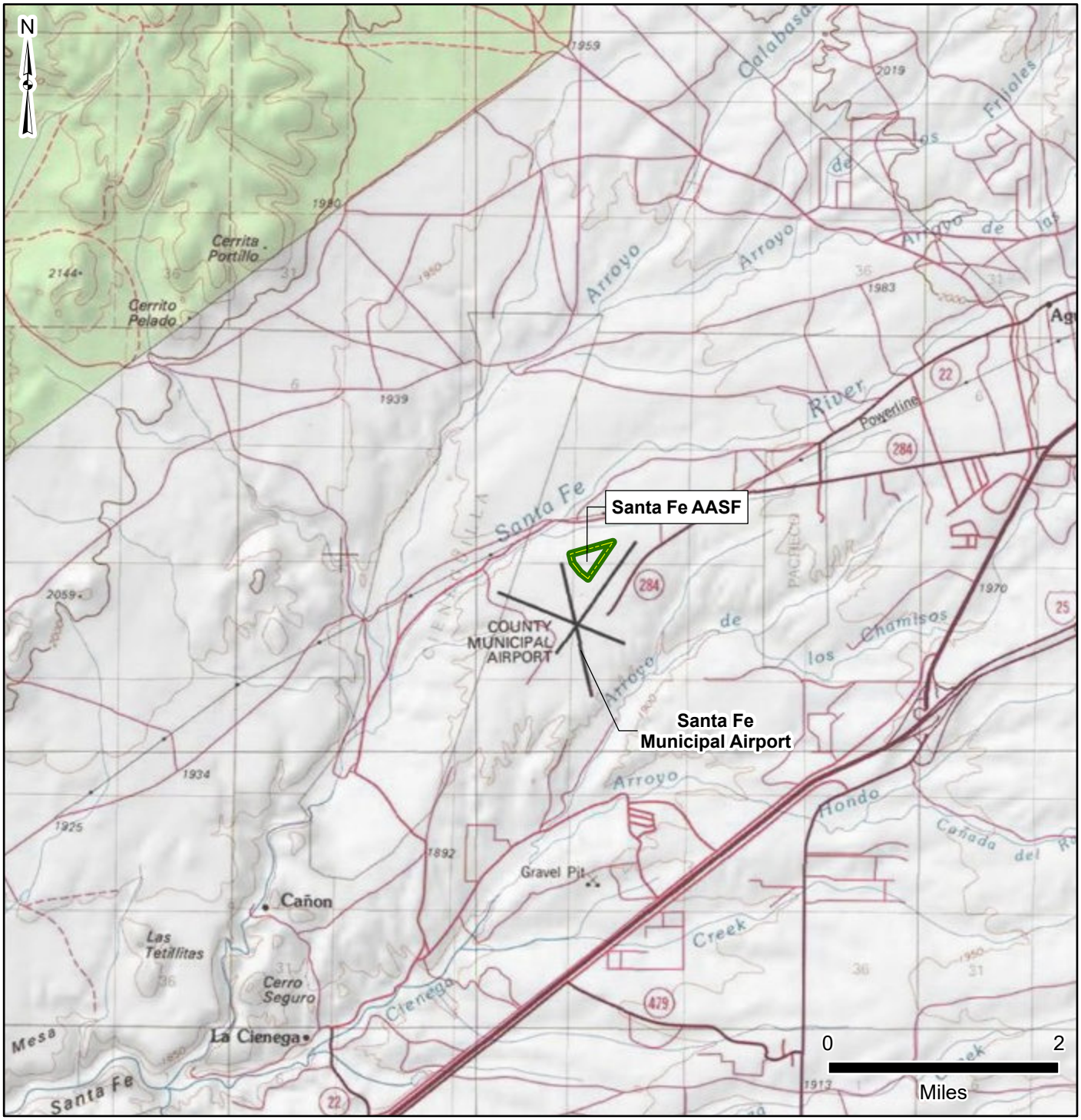
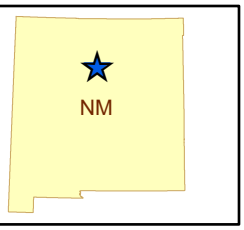
Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Figure 2-2
Facility Topography





Facility Data

Facility Boundary

Data Sources:
ESRI 2020
AECOM 2020

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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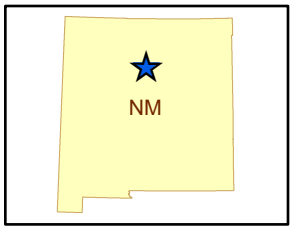
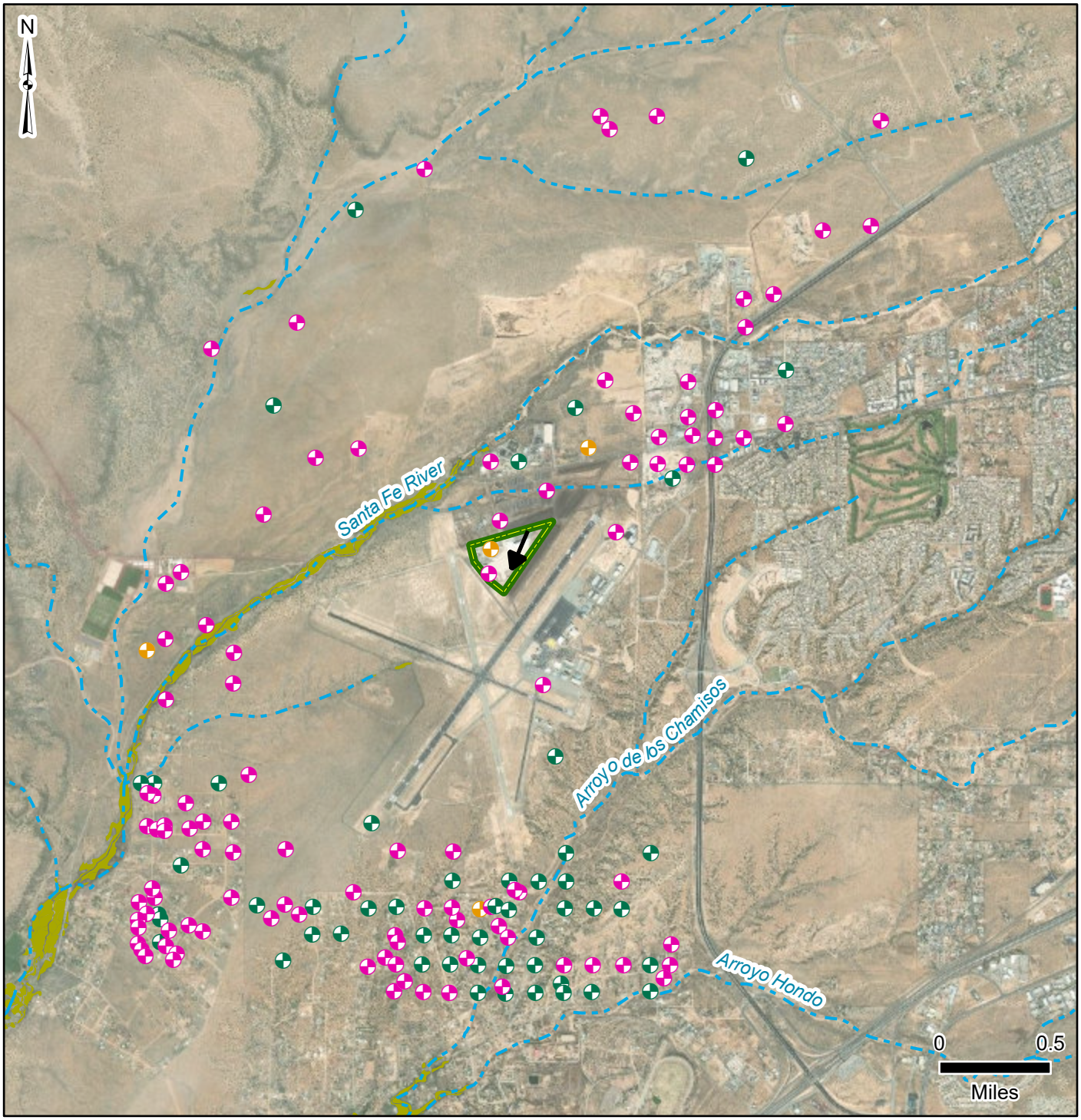
Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Figure 2-3
Groundwater Features





Facility Data
- Facility Boundary

Well Type
- Domestic Well
- Irrigation Well
- Unknown/Other Well

Hydrology/Hydrogeology
- Groundwater Flow Direction (Deep Water-Bearing Zone)
- Perennial Creek/Stream
- Intermittent Creek/Stream
- Wetlands

Data Sources:
ESRI 2020
AECOM 2020

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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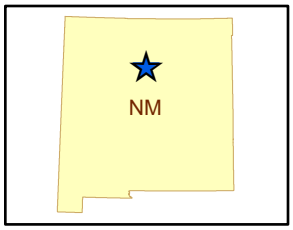
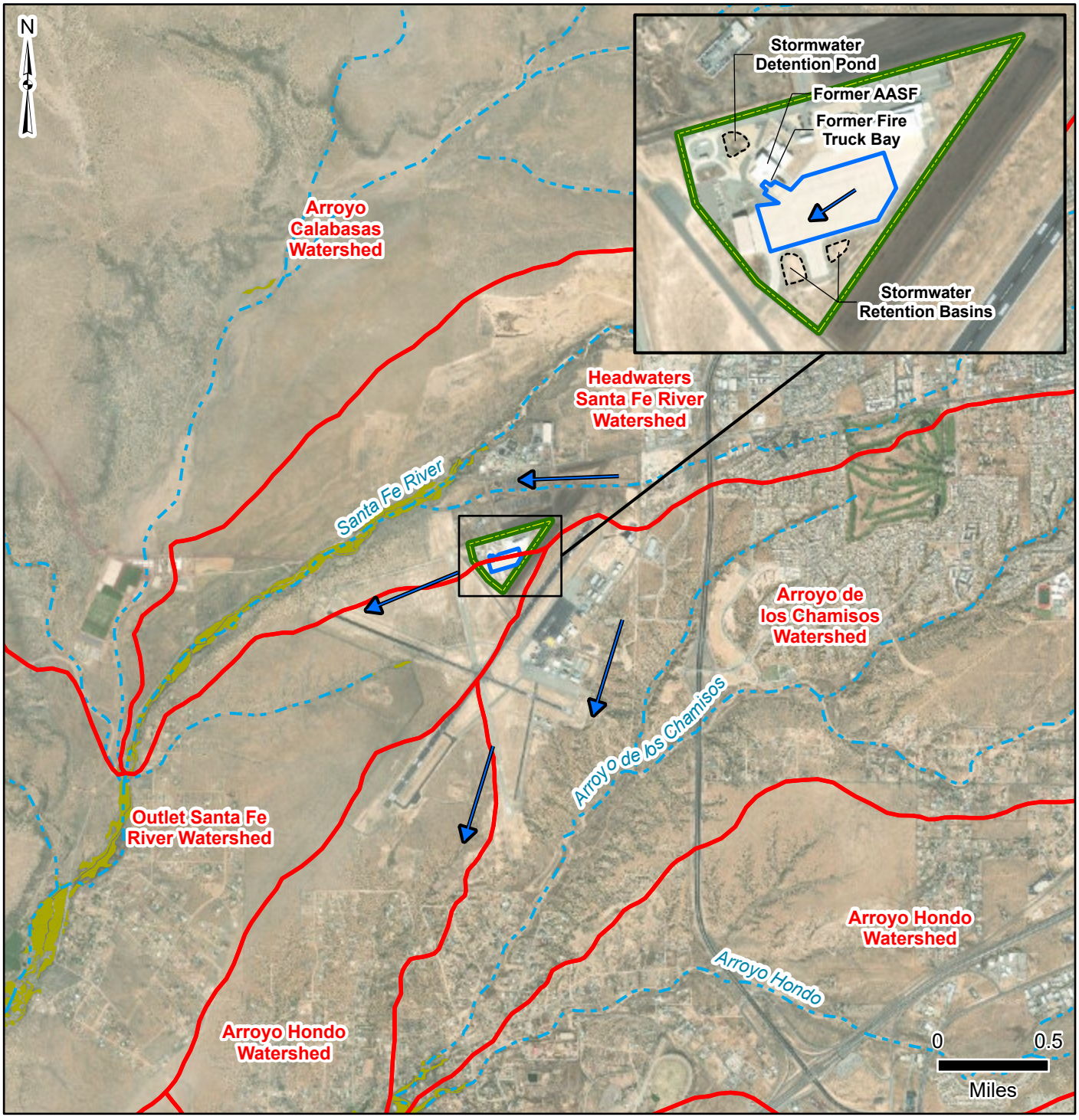
Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Figure 2-4
Surface Water Features





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Facility Data
- Facility Boundary
- Area of Interest

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

Data Sources:
ESRI 2020
AECOM 2020

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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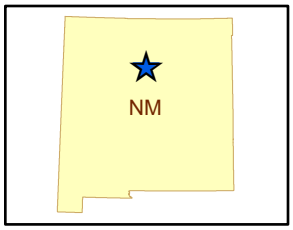
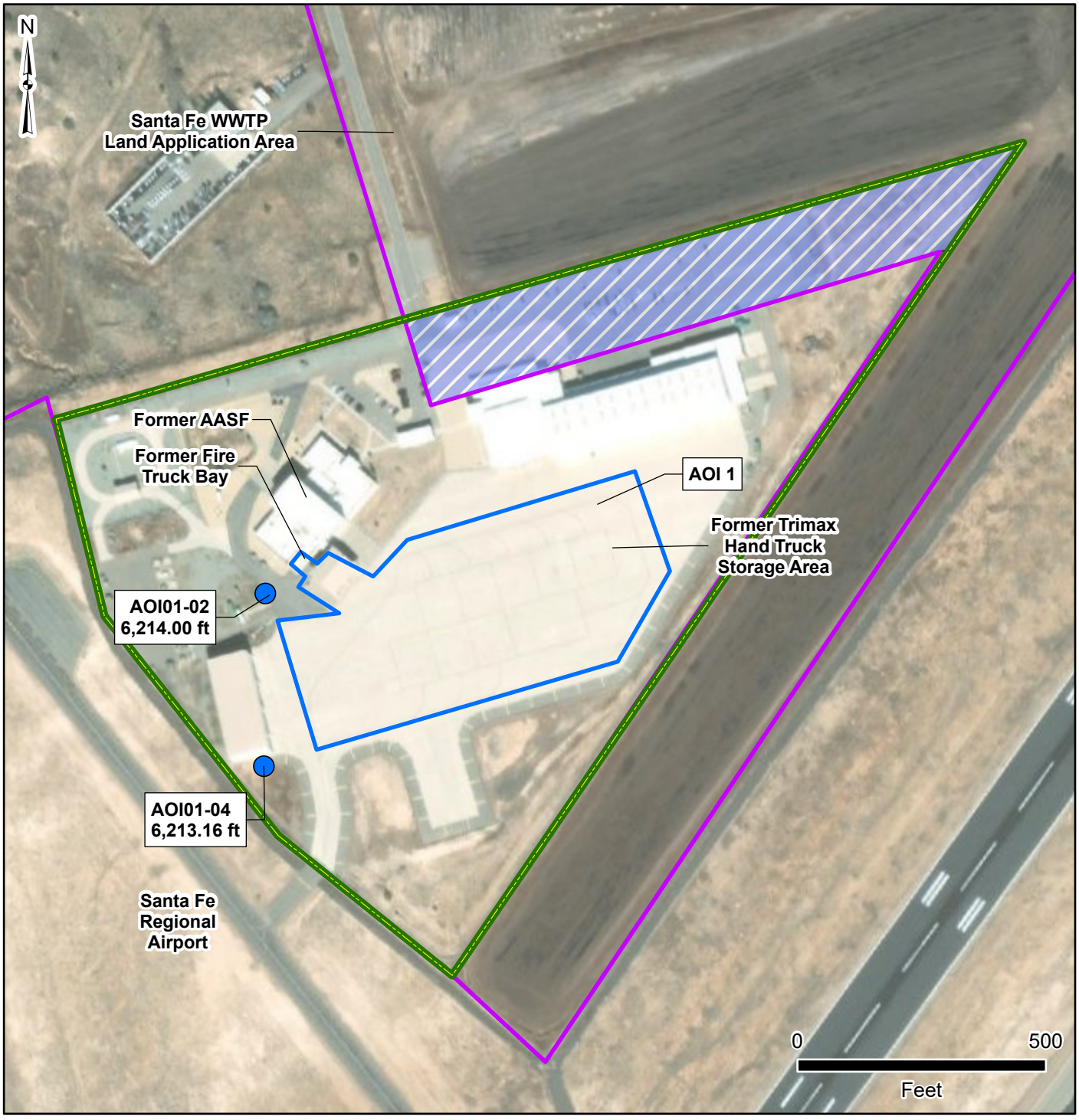
Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Figure 2-5
Groundwater Elevations, Perched (June 2022)





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Facility Data

- Facility Boundary
- Area of Interest
- Adjacent Potential Source Areas
- Historical WWTP Biosolid Area

Sample Locations

- Sonic Soil Boring/Monitoring Well

Note:
Groundwater elevation is provided in feet above mean sea level.

Data Sources:
ESRI 2022
AECOM 2020

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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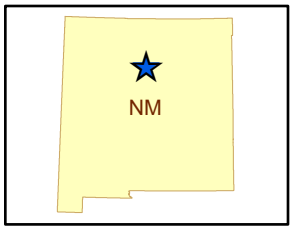
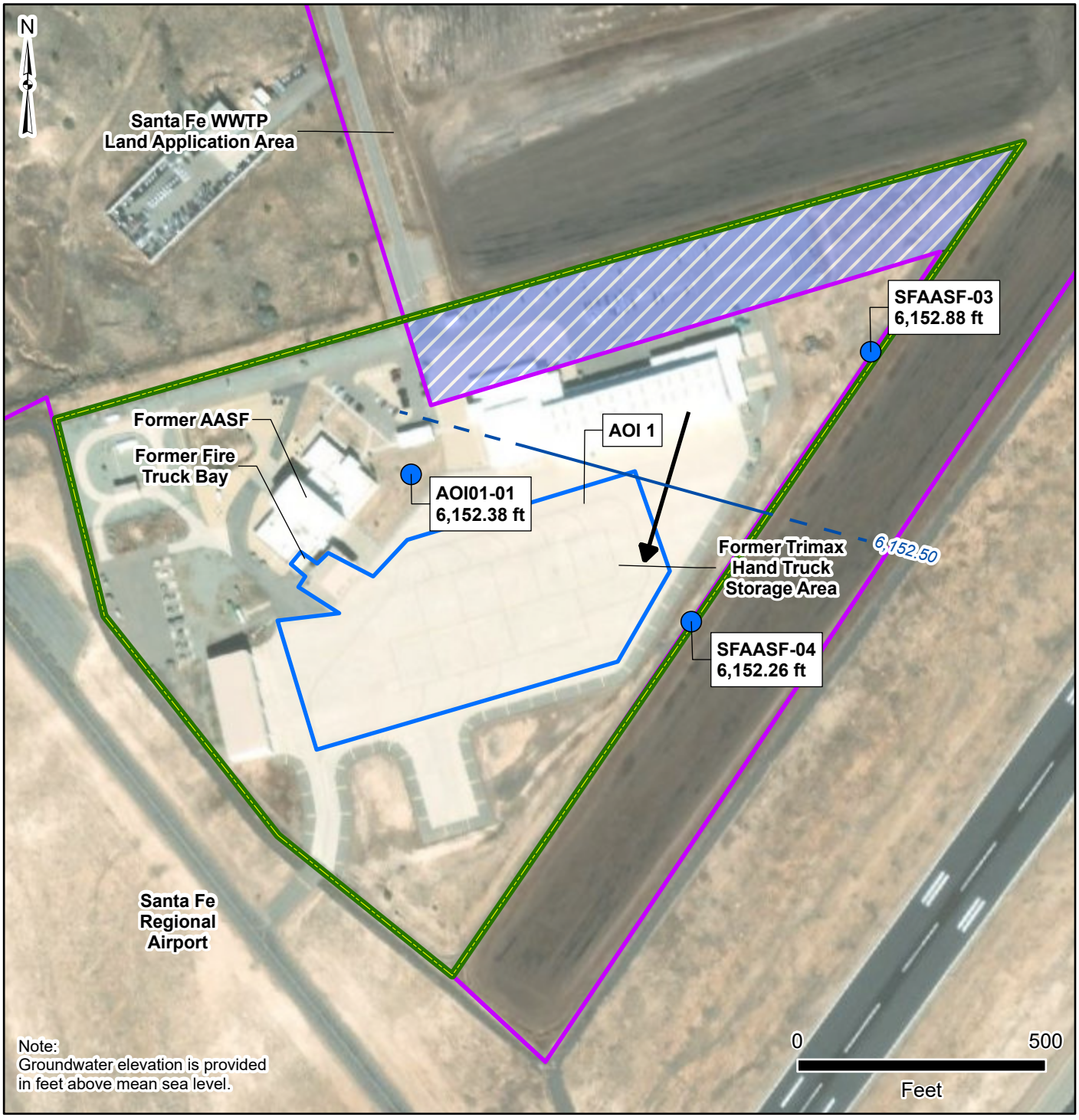
Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Figure 2-6
Groundwater Elevations, Regional (June 2022)





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Facility Data
- Facility Boundary
- Area of Interest
- Adjacent Potential Source Areas
- Historical WWTP Biosolid Area

Sample Locations
- Sonic Soil Boring/Monitoring Well

Hydrology/Hydrogeology
- Groundwater Flow Direction
- Groundwater Elevation Deep Water Contour Interval
- Dashed where Inferred

Data Sources:
ESRI 2022
AECOM 2020

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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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, one potential release area was identified at the Santa Fe AASF: AOI 1 Former Firetruck Bay and Tri-Max™ Hand Truck Storage Area. Additionally, there are off-facility potential source areas as detailed in **Section 3.2**. The potential source areas are shown on **Figure 3-1** and described in subsequent sections.

3.1 AOI 1 – FORMER FIRETRUCK BAY AND TRI-MAX™ HAND TRUCK STORAGE AREA

AOI 1 consists of the Santa Fe AASF Former Firetruck Bay and Tri-Max™ Hand Truck Storage Area. Each of these areas is described below and shown on **Figure 3-1**.

3.1.1 Former Firetruck Bay

The former AASF building, which is now the current Santa Fe Readiness Center, is located on the western portion of the Facility and historically housed a single firetruck within a bay. The firetruck was stored in this bay for an unknown length of time, but it was sold in 2005 to the Santa Fe Fire Department. Personnel interviews confirmed that the firetruck stored AFFF foam, but it was never used because no personnel at the Facility were qualified to use it. There are no records or recollection of the use or release of the AFFF stored on the firetruck; however, there is a possibility that the firetruck stored may have leaked AFFF or had its AFFF tank flushed out during maintenance.

The building was renovated in 2012 and received a new roof, exterior wall openings and finishes, interior walls, floor finishes, ceilings, and lighting. Mechanical, electrical, plumbing, fire protection, telecommunication, and security systems were replaced as well. There is no floor drain in the remodeled bay and no evidence one was previously present. The current Santa Fe Readiness Center building does not currently house any materials containing AFFF (AECOM 2020).

3.1.2 Former Tri-Max™ Hand Truck Storage Area

The flight line and paved parking apron currently stretch across the majority of the Facility and are directly adjacent to both the current and former AASF buildings. The area was expanded and repaved in 2012 during the construction and renovation of the Facility. Prior to the 2012 renovation, Tri-Max™ 70/30 hand trucks were stored in various places around the flight line and parking apron and were regularly serviced. Service for Tri-Max™ 70/30 hand trucks may include nozzle checks that can result in an AFFF discharge. According to personnel, the Tri-Max™ hand trucks were only used for 4 to 5 years in the mid-2000s and their use was discontinued because they were too expensive to maintain. There is no recollection or record of any training conducted with these units or nozzle testing performed. Interviewees were unsure about when or where, specifically, the Tri-Max™ units were turned in, but they no longer exist at the Facility and have since been replaced with fire extinguishers that do not contain PFAS (AECOM 2020).

3.2 ADJACENT AND HISTORICAL POTENTIAL SOURCES

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

3.2.1 Santa Fe Regional Airport

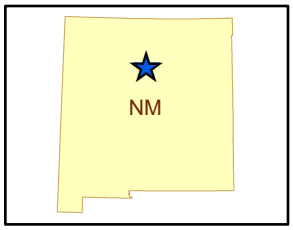
The SAF is a public airport that opened in 1941 and covers 2,128 acres. The SAF has three active asphalt runways. Interviews with NMARNG facility staff and a historical records search provided little information regarding use of AFFF at SAF; however, the records search detailed two emergency incidents that happened on or near the runway on 27 November 2018, and on 8 April 2019. According to a local news source, the first crash occurred when a single-engine Mooney M20 crashed just short of the runway and burst into flames. The second crash happened several months later, when a two-seater aircraft crashed and burst into flames at the airport on a secondary runway just south of the AASF Facility (AECOM 2020). Fire Station 10 supports the Santa Fe Airport with a crash rescue fire truck (City of Santa Fe 2022), which is presumably AFFF-enabled. As a result, the entirety of the airport is considered a potential AFFF release area. The Santa Fe Regional Airport is located upstream of surface water flow and cross-gradient to groundwater flow at the time of gauging.

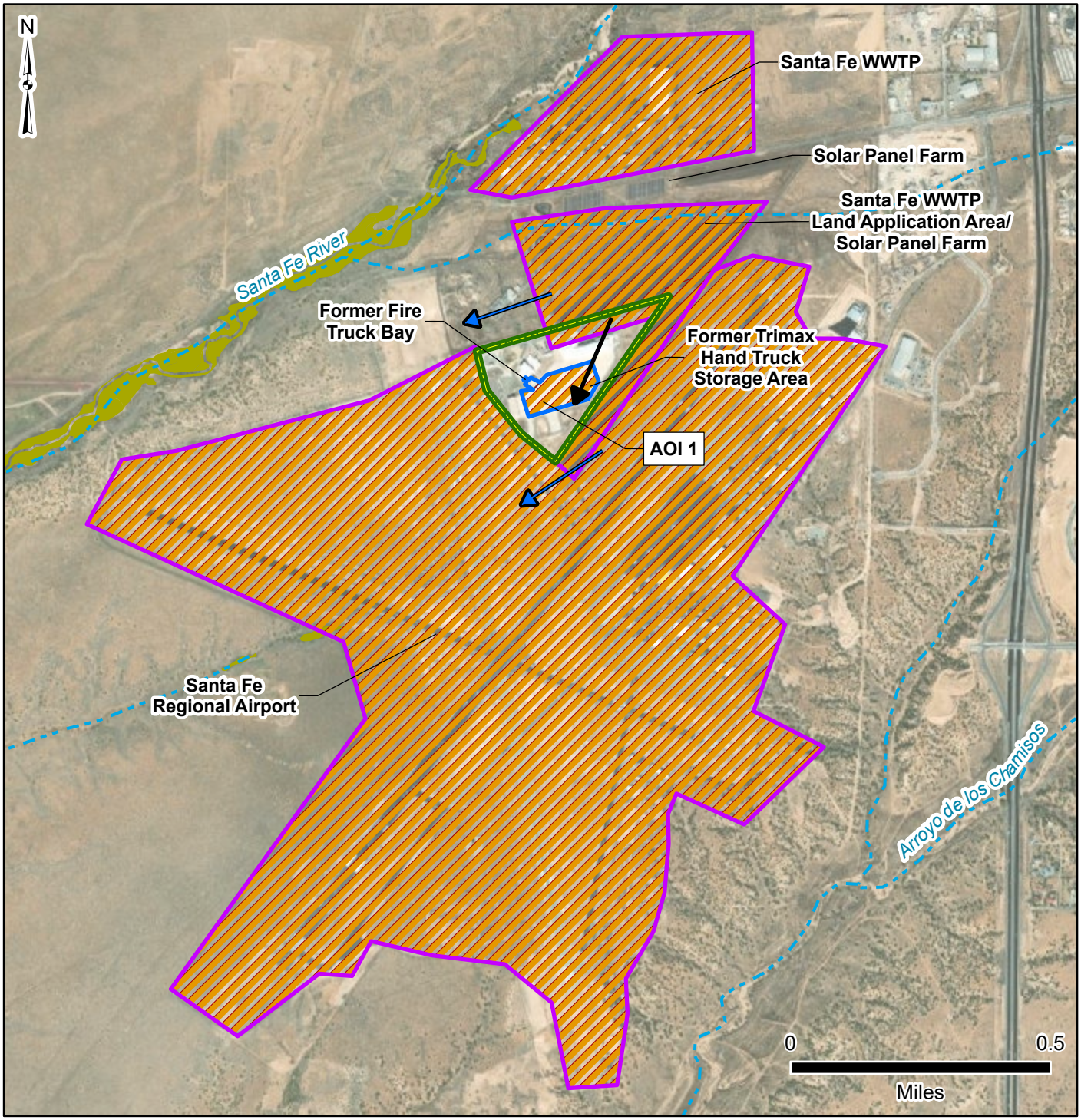
3.2.2 Santa Fe WWTP, Associated Land Application Areas, and Solar Panel Farm

The Santa Fe WWTP is located north of the Santa Fe AASF. Areas to the north and east of the Santa Fe AASF are currently used for land application of biosolids. Within the Santa Fe WWTP Land Application area is a solar panel farm, which is also a potential source of PFAS due to the use of fluoropolymers in the construction of solar panels. Based on historical aerial photographs, application of biosolids extended into the current Santa Fe AASF lease area; biosolid land application extended to the north end of the current AASF building prior to the 2012 renovations of the Facility (**Figure 3-1**). Although WWTPs are not usually primary potential release areas of PFAS, sludges and liquids from areas of potential release that are treated at WWTPs can create a secondary source of contamination.

Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Figure 3-1
Areas of Interest





Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SI Report\SantaFe\SantaFeSIReport.aprx

Facility Data
- Facility Boundary
- Area of Interest
- Adjacent Potential Source Areas
- Potential PFAS Release

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction (Regional)
- Intermittent Creek/Stream
- Wetlands

Data Sources:
ESRI 2020
AECOM 2020

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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4. PROJECT DATA QUALITY OBJECTIVES

As identified during the data quality objective (DQO) process and outlined in the SI Uniform Federal Policy- (UFP) Quality Assurance Project Plan (QAPP) Addendum (EA Engineering, Science, and Technology, Inc., PBC [EA] 2021a), the objective of the SI is to identify whether there has been a release to the environment at the AOI identified in the PA. For each AOI, ARNG determines if further investigation is warranted, a removal action is required to address immediate threats, or whether no further action is warranted. This SI evaluated groundwater and soil for presence or absence of relevant compounds at the sampled AOI.

4.1 PROBLEM STATEMENT

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

4.2 INFORMATION INPUTS

Primary information inputs for the SI include the following:

- The PA Report for the Santa Fe AASF (AECOM 2020)
- Analytical data collected during other environmental sampling efforts at each ARNG facility
- Groundwater and soil sample data collected as part of this SI in accordance with the site-specific UFP-QAPP Addendum (EA 2021a)
- Field data collected including groundwater elevation and water quality parameters measured at the time of sampling.

4.3 STUDY BOUNDARIES

The scope of the SI was bounded horizontally by the property limits of the Facility (**Figure 2-2**). Off-facility sampling was not included in the scope of this SI. If future off-facility sampling is required, the proper stakeholders will be notified, and necessary rights of entry will be obtained by ARNG with property owner(s). The scope of the SI was vertically bounded as follows: groundwater (110–185 ft bgs), soil from hand-auger borings (0–2 ft bgs), soil from direct-push technology (DPT) borings (15 ft bgs), and soil from sonic drilling borings (197 ft bgs). Temporal boundaries were limited to the earliest available time field resources were available to complete the study.

4.4 ANALYTICAL APPROACH

Samples were analyzed in accordance with Department of Defense (DoD) Quality Systems Manual (QSM) Version 5.3 by Eurofins Lancaster Laboratories Environmental, LLC, accredited under the DoD Environmental Laboratory Accreditation Program (ELAP) (DoD ELAP;

Accreditation No. 1.01). PFAS data underwent 100 % Stage 2B validation in accordance with the DoD General Data Validation Guidelines (2019) and DoD Data Validation Guidelines Module 3: Data Validation Procedure of PFAS Analysis by QSM Table B-15 (2020).

Data were compared to applicable SLs and decision rules as defined in the UFP-QAPP Addendum (EA 2021b).

4.5 DATA USABILITY ASSESSMENT

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

Based on the DUA, the environmental data collected during the SI were found to be acceptable and usable for this SI evaluation with the qualifications documented in the DUA and its associated data validation reports. These data are of sufficient quality to meet the objectives and requirements of the UFP-QAPP Addendum (EA 2021b).

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, Santa Fe Army Aviation Support Facility,* dated August 2020 (AECOM 2020)
- *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 2020a)
- *Final Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Addendum, Santa Fe Army Aviation Support Facility, Santa Fe, New Mexico* dated December 2021 (EA 2021b)
- *Final Programmatic Accident Prevention Plan, Revision 1,* dated November 2020 (EA 2020b)
- *Final Accident Prevention Plan/Site Safety and Health Plan Addendum, Santa Fe Army Aviation Support Facility, New Mexico,* dated August 2021 (EA 2021a).

The SI field activities were conducted during two mobilizations. Field activities for the first mobilization were conducted from 7 to 8 February 2022 and consisted of hand augering and surface soil sample collection. The second mobilization was conducted 25 April through 3 June 2022. Field activities included sonic and DPT drilling, collection of soil samples, installation of permanent monitoring wells, groundwater gauging and sampling, and collection of spatial data. Field activities were conducted in accordance with the UFP-QAPP Addendum (EA 2021a), except as noted in **Section 5.8**.

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

- Eighteen (18) surface soil samples collected by hand auger from 16 locations
- Fifteen (15) shallow subsurface samples collected by direct push/sonic drilling from 10 locations
- Eight (8) deep subsurface samples collected from 6 locations by sonic drilling
- Six (6) groundwater samples from 5 groundwater monitoring wells
- Nineteen (19) field blanks

- Twenty-one (21) equipment rinsate samples.

Figure 5-1 provides the sample locations for all media across the Facility. **Figure 5-2** displays the sample locations with historical imagery to show features and Facility layout before the facility renovation. **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**. Field notes are provided in **Appendix B2**. Survey data is presented in **Appendix B3**. Field change request forms 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 U.S. Army Corps of Engineers (USACE) TPP Process, Engineer Manual (EM) 200-1-2 (Department of the Army 2016) defines four phases to project planning: (1) defining the project phase; (2) determining data needs; (3) developing data collection strategies; and (4) finalizing the data collection plan. The process encourages stakeholder involvement in the SI, beginning with defining overall project objectives, including DQOs, and formulating a sampling approach to address the AOIs identified in the PA.

A combined TPP Meeting 1 and 2 was held on 1 October 2021, prior to SI field activities and included a site walk with stakeholders. The combined TPP Meeting 1 and 2 was conducted in general accordance with EM 200-1-2. The stakeholders for this SI include ARNG, NMARNG, USACE, and the NMED, 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 2021b).

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 the results and findings, and future actions, where warranted.

5.1.2 Utility Clearance

EA contracted MT Private Utility Locating Services, LLC, a private utility location service, to perform utility clearance at the Facility. Utility clearance was performed at each of the proposed boring locations on 7 February 2022 with input from the EA field team. It was discovered that incorrect locations received utility clearance for AOI01-02 and AOI01-06. As a result, the corrected locations were surveyed on 27 April 2022. General locating services were used to complete the clearance. Additionally, the first 5 ft of each boring were pre-cleared by EA's

drilling subcontractors 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 sampled prior to the start of field activities and confirmed to be acceptable for this use during the SI. A potable water source sample was collected at the wash rack on 14 October 2021, prior to mobilization, and analyzed for PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15. The results of the decontamination water sample associated with the wash rack spigot source used during the SI are provided in **Appendices F** and **G**. 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 provided as **Appendix B** to the Programmatic UFP-QAPP (EA 2020a).

5.2 SOIL BORINGS AND SOIL SAMPLING

A hand auger was used to collect surface soil samples from 0 to 2 ft bgs. It was also used to collect soil from the top 5 ft of the boring in compliance with utility clearance procedures. For boring locations advanced to a depth greater than 5 ft, soil samples were collected via sonic or DPT drilling methods in accordance with 025 *Standard Operating Procedure for Soil Sampling* (EA 2021b*).* Soil borings associated with monitoring wells were installed with a truck-mounted Boart LS600 full-sized sonic rig. Continuous soil cores were collected to the target depth. For 15-ft borings, a Geoprobe® 7822DT dual-tube sampling system was used.

At hand auger borings, a soil sample was collected from 0 to 2 ft bgs with a total depth of 2 ft bgs. Three discrete soil samples were collected for chemical analysis from all other soil borings: one sample at the surface (0 to 2 ft bgs) and two subsurface soil samples. In 15-ft DPT borings, subsurface soil samples were collected at 6–8 ft bgs and 13–15 ft bgs. In deeper soil borings associated with monitoring wells and drilled with sonic, one subsurface soil sample was collected at the 13–15 ft bgs interval, and one sample was collected approximately 1 ft above the groundwater table. Total depth for soil borings associated with monitoring wells ranged from 110 to 184 ft bgs. Note that subsurface soil samples were not collected at SFAASF-03; concentrations in sub-surface soil are considered to be represented by the samples collected at SFAASF-03-PA due to the close proximity of the two borings.

All soil sample locations are shown on **Figures 5-1** and **5-2** and boring sample depths are provided in **Table 5-1**. The soil boring locations were selected based on the AOI information provided in the PA (AECOM 2020) and as agreed upon by stakeholders during the TPP and review of the UFP-QAPP Addendum (EA 2021b), with several exceptions. Soil boring locations AOI01-06B, AOI01-09, and SFAASF-03-PA are not included in the UFP-QAPP Addendum but are discussed in **Section 5.8**.

During drilling, 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 boring log forms 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. Soil borings SFAASF-03 and AOI01-09 were not logged due to their close proximity (17 ft or less) to soil borings SFAASF-03-PA and AOI01-01, respectively. The boring logs are provided in **Appendix E**.

Boreholes advanced to a maximum depth of 2 ft bgs were filled with bentonite. Boreholes advanced to a maximum depth of 15 ft bgs were backfilled with material removed from the borehole and then bentonite pellets filled the remainder to land surface except for boring AOI01-06B which was filled with bentonite and the cuttings were drummed.

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 procedures to the laboratory and analyzed for PFAS (LC/MS/MS compliant with QSM Version 5.3 Table B-15), TOC (USEPA Method 9060A) and pH (USEPA Method 9045D) in accordance with the UFP-QAPP Addendum (EA 2021b).

Field duplicate (FD) 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. One field blank (FB) was collected per day. A temperature blank was placed in each cooler to ensure that samples were preserved at or below 6 degrees Celsius (°C) during shipment. After removal of the drilling equipment, boreholes were abandoned using bentonite chips. In borings installed on paved surfaces, the borings were abandoned by backfilling with bentonite chips. Borings were installed in unpaved areas to avoid disturbing concrete or asphalt surfaces.

5.3 MONITORING WELL INSTALLATION AND GROUNDWATER GRAB SAMPLING

Monitoring wells were installed using a truck-mounted Boart LS600 full-sized sonic rig. Once the borehole was advanced to the desired depth, a monitoring well was constructed of a 20-ft section of 2-inch Schedule 80 polyvinyl chloride (PVC) screen with sufficient casing to reach the ground surface. The screen intervals for the monitoring wells are provided in **Table 5-2**.

Two wells were installed and subsequently plugged and abandoned due to the lack of water production (AOI01-09) or the presence of grout in the well (SFAASF-03-PA). Upon the completion of SFAASF-03-PA, the well was gauged and found to contain grout. The well was abandoned by filling the PVC pipe with bentonite chips from a depth of 197 to 138.8 ft and adding water to hydrate overnight. The next day the top 5 ft of PVC was removed and a tremie

pipe was inserted to fill the rest of the well/borehole with mixed grout 136 ft to ground surface. After AOI01-09 was completed to the target depth, the well was left overnight to allow any groundwater to accumulate. No groundwater accumulated so the well was abandoned by removing the entire PVC pipe and pumping mixed grout to fill the open borehole to ground surface.

Groundwater samples were collected using a PFAS-free Geosub pump and PFAS-free HDPE tubing. Samples were collected at least 1 week after well development. Each sample was collected in laboratory-supplied PFAS-free HDPE bottles and labeled using a PFAS-free marker or pen. The monitoring wells were purged at a rate determined in the field to reduce turbidity and draw down prior to sampling. Water quality parameters (e.g., temperature, specific conductance, pH, dissolved oxygen, and oxidation-reduction potential) were measured using a water quality meter and recorded on the field sampling form (**Appendix B2**) before each grab sample was collected in a separate container. Samples were packaged on ice and transported via FedEx under standard chain-of-custody 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 2021b). Additionally, a separate groundwater sample was collected for the purpose of conducting a field-administered shake test to observe the presence or absence of foam.

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 per day was collected in accordance with the UFP-QAPP Addendum (EA 2021b). A minimum of one EB was collected per day and analyzed for the same parameters as the groundwater samples due to the use of a non-dedicated pump. A temperature blank was placed in each cooler to ensure that samples were preserved at or below 6°C during shipment.

5.4 SYNOPTIC WATER LEVEL MEASUREMENTS

Groundwater levels were measured and used to calculate facility-wide groundwater elevations and assess groundwater flow direction. Synoptic water-level elevation measurements were collected on 3 June 2022 from the groundwater monitoring wells, taken from the survey mark on the northern side of the well casing. Groundwater elevation maps for perched and regional groundwater are provided in **Figures 2-5** and **2-6**, respectively. Groundwater elevation data are provided in **Table 5-3**.

5.5 SURVEYING

The northern side of each new temporary well casing was surveyed using a Trimble R10 real-time kinematic differential Global Positioning System (GPS). Positions are provided in the applicable Universal Transverse Mercator zone projection with North American Datum 1983 (horizontal) and North American Vertical Datum 1988 using Geoid 18 (vertical). Surveying data were collected on 3 June 2022 and are provided in **Appendix B3**.

GPS locations for soil borings and land application of soil cuttings were collected using a Trimble Geo 7x by EA on 19–20 May 2022 and 17 June 2022. Coordinates were differentially

corrected, and point locations meet accuracy objectives outlined in the UFP-QAPP Addendum Worksheet #22 (EA 2021b). Coordinates are presented in **Appendix B3**.

5.6 INVESTIGATION-DERIVED WASTE

As of the date of this report, the disposal of PFAS investigation-derived waste (IDW) is not regulated federally. PFAS IDW generated during the SI is considered non-hazardous waste. The waste was managed according to a set of decision rules approved by ARNG, NMARNG, and NMED and documented in Field Change Request 1. PFAS concentrations from Mobilization 1 were compared to the industrial screening levels published in the Risk Assessment Guidance for Investigations and Remediation, Volume 1 (NMED 2021) for the purpose of directing IDW management for Mobilizations 1 and 2.

Surface soil collected during Mobilization 1 had concentrations below NMED industrial SLs. In accordance with the IDW decision rules outlined in Section 5.8, these cuttings were land applied. All land application areas were recorded with a GPS. **Appendix B3** contains maps displaying land application areas and a table of coordinates.

For Mobilization 2, in accordance with the IDW decision rules outlined in Section 5.8, in cases where PFAS concentrations in surface soil were less than the NMED industrial SLs, cuttings generated during Mobilization 2 from surface to the capillary fringe were land applied. Soil cuttings from Mobilization 2 were drummed in borehole-specific drums if they were sourced from the capillary fringe or below. Soil cuttings from above the capillary fringe were land applied, with the exception of DPT boring location AOI01-06B. Cuttings from AOI01-06B were drummed due to the lack of surface soil analytical results that could be used to characterize the cuttings. All land application areas were recorded with a GPS. **Appendix B3** contains maps displaying land application areas and a table of coordinates.

Liquid IDW (i.e., purge water, development water, and decontamination fluids) generated during the SI activities were drummed. All liquid and solid IDW drums are currently stored at the Facility.

Other solids such as spent personal protective equipment, plastic sheeting, tubing, and unused monitoring well construction materials utilized during the field activities were disposed of as municipal waste.

5.7 LABORATORY ANALYTICAL METHODS

Samples were analyzed by LC/MS/MS compliant with QSM Version 5.3 Table B-15 at Eurofins Lancaster Laboratories Environmental, LLC, in Lancaster, Pennsylvania, a DoD ELAP-certified laboratory. Soil samples were also analyzed for TOC using USEPA Method 9060A and pH by USEPA Method 9045D.

5.8 DEVIATIONS FROM UFP-QAPP ADDENDUM

The following deviations from the UFP-QAPP Addendum occurred based on conditions encountered during the field investigation activities. These deviations were discussed between

EA, ARNG, USACE, NMARNG, and the NMED and are documented in a Field Change Request Form (**Appendix B4)**. Deviations from the UFP-QAPP Addendum are noted below:

- The UFP-QAPP Addendum indicates that non-hazardous waste generated during SI activities would be containerized in 55-gallon drums. Based on discussions with ARNG and with the NMED, surface soil samples from each of the drilling locations were collected during a first mobilization. PFAS concentrations were reviewed and compared to state industrial standards for purposes of IDW management. NMED approved the land application of soil cuttings down to the capillary fringe in borings where surface soil concentrations did not exceed state standards. NMED granted approval via email on January 18, 2022 (J. Rhoderick, email). Areas of land application were recorded with a GPS. Locations are provided in a table and a map in **Appendix B3**. Solid IDW from the capillary fringe down were containerized in drums.

- The UFP-QAPP Addendum states that borings will be advanced with air rotary or sonic drilling; however, DPT was used to install 15-ft borings. The alternate technology was used to reduce the length of the field event, as the DPT rig could install 15-ft boreholes while the sonic rig was installing deeper boreholes.

- The UFP-QAPP Addendum identifies AOI01-01 as a 15-ft soil boring and AOI01-03 as a soil boring/monitoring well location. Due to the results of the surface soil sampling during the first mobilization, the project team decided to convert AOI01-01 a soil boring/monitoring well and AOI01-03 to a 15-ft soil boring.

- Soil boring AOI01-06B was installed as a replacement for soil boring AOI01-06. The location of the 0–2 ft surface soil sample from AOI01-06 was collected from the lowest point in the area rather than from the edge of the pavement, as depicted in the UFP-QAPP Addendum (Figure 17-1). Soil boring AOI01-06B was installed at a location in closer proximity to the former parking apron, which was identified as a possible PFAS source.

- An additional soil boring (AOI01-09) was installed 11 ft northeast of monitoring well AOI01-01, which was screened in regional groundwater. The purpose of the installing AOI01-09 was to characterize the groundwater and capillary fringe of perched groundwater if present. Perched groundwater was not observed during drilling and a monitoring well was not installed at the location.

Additional deviations from the UFP-QAPP not included in the Field Change Request Form (**Appendix B4**) are described below:

- Monitoring wells installed in perched groundwater were constructed with 10 ft of screen rather than 20 ft of screen due to the limited thickness of the water-bearing zone.

- The deep soil sample from AOI01-01 was collected at 181–182 ft bgs, which was the 1-ft interval above observed moisture in soil. Groundwater was later observed at 176 ft bgs. As a result, the deep sample collected from AOI01-01 may represent PFAS concentrations in saturated soil rather than the capillary fringe.

Table 5-1. Samples by Medium
AASF, Santa Fe, New Mexico
Site Inspection Report

Sample Identification	Sample Collection Date	Sample Depth (ft bgs)	PFAS (USEPA Method 537 Modified)	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Grain Size (ASTM D422)	Comments
Soil Samples							
AOI01-01-SB-0-2	2/8/2022	0-2	X				
AOI01-01-SB-13-15	4/25/2022	13-15	X				
AOI01-01-SB-135-136	4/25/2022	135-136				X	
AOI01-01-SB-181-182	4/26/2022	181-182	X				
AOI01-02-SB-0-2	2/8/2022	0-2					
AOI01-02-SB-0-2-D	2/8/2022	0-2	X				FD
AOI01-02-SB-13-15	4/27/2022	13-15	X				
AOI01-02-SB-113-115	4/28/2022	113-115	X				
AOI01-02-SB-113-115-DUP	4/28/2022	113-115	X				FD
AOI01-02-SB-119-120	4/28/2022	119-120				X	
AOI01-03-SB-0-2	2/7/2022	0-2	X	X	X		
AOI01-03-SB-6-8	5/4/2022	6-8	X				
AOI01-03-SB-13-15	5/4/2022	13-15	X				
AOI01-04-SB-0-2	2/7/2022	0-2	X				
AOI01-04-SB-13-15	5/3/2022	13-15	X				
AOI01-04-SB-109-110	5/4/2022	109-110	X				
AOI01-04-SB-109-110- DUP	5/4/2022	109-110	X				FD
AOI01-05-SB-0-2	2/7/2022	0-2	X				
AOI01-05-SB-6-8	5/4/2022	6-8	X				
AOI01-05-SB-13-15	5/4/2022	13-15	X				
AOI01-06-SB-0-2	2/7/2022	0-2	X				
AOI01-06B-SB-0-2	5/4/2022	0-2	X				
AOI01-06B-SB-6-8	5/4/2022	6-8	X				
AOI01-06B-SB-13-15	5/4/2022	13-15	X				
AOI01-07-SB-0-2	2/8/2022	0-2	X				
AOI01-08-SB-0-2	2/8/2022	0-2	X				
AOI01-09-SB-0-2	5/9/2022	0-2	X				
AOI01-09-SB-13-15	5/5/2022	13-15	X				
AOI01-09-SB-111-112	5/6/2022	111-112	X				
SFAASF-01-SB-0-2	2/8/2022	0-2	X				
SFAASF-02-SB-0-2	2/8/2022	0-2	X	X	X		
SFAASF-02-SB-0-2-D	2/8/2022	0-2	X				FD
SFAASF-03-SB-0-2	5/7/2022	0-2	X				
SFAASF-03-PA-SB-0-2	2/7/2022	0-2	X				
SFAASF-03-PA-SB-13-15	5/1/2022	13-15	X				
SFAASF-03-PA-SB-183-184	5/2/2022	183-184	X				
SFAASF-04-SB-0-2	2/7/2022	0-2	X				
SFAASF-04-SB-13-15	4/28/2022	13-15	X				
SFAASF-04-SB-180-181	4/30/2022	180-181	X				

Table 5-1. Samples by Medium
AASF, Santa Fe, New Mexico
Site Inspection Report

Sample Identification	Sample Collection Date	Sample Depth (ft bgs)	PFAS (USEPA Method 537 Modified)	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Grain Size (ASTM D422)	Comments
SFAASF-05-SB-0-2	2/7/2022	0-2	X				
SFAASF-05-SB-6-8	5/4/2022	6-8	X				
SFAASF-05-SB-13-15	5/4/2022	13-15	X				
SFAASF-05-SB-13-15-DUP	5/4/2022	13-15	X				FD
Groundwater Samples							
AOI01-01-GW	5/20/2022	NA	X				
AOI01-02-GW	5/20/2022	NA	X				
AOI01-02-GW-DUP	5/20/2022	NA	X				FD
AOI01-04-GW	5/20/2022	NA	X				
SFAASF-03-GW	5/19/2022	NA	X				
SFAASF-04-GW	5/19/2022	NA	X				
Blank Samples							
SFAASF-EB-01	2/7/2022	NA	X				EB
SFAASF-EB-02	2/8/2022	NA	X				EB
SFAASF-EB-03	4/25/2022	NA	X				EB
SFAASF-EB-04	4/26/2022	NA	X				EB
SFAASF-EB-05	4/26/2022	NA	X				EB
SFAASF-EB-06	4/27/2022	NA	X				EB
SFAASF-EB-07	4/28/2022	NA	X				EB
SFAASF-EB-08	4/28/2022	NA	X				EB
SFAASF-EB-09	4/29/2022	NA	X				EB
SFAASF-EB-10	4/30/2022	NA	X				EB
SFAASF-EB-11	5/1/2022	NA	X				EB
SFAASF-EB-12	5/2/2022	NA	X				EB
SFAASF-EB-13	5/3/2022	NA	X				EB
SFAASF-EB-14	5/4/2022	NA	X				EB
SFAASF-EB-15	5/4/2022	NA	X				EB
SFAASF-EB-16	5/5/2022	NA	X				EB
SFAASF-EB-17	5/6/2022	NA	X				EB
SFAASF-EB-18	5/7/2022	NA	X				EB
SFAASF-EB-19	5/9/2022	NA	X				EB
SFAASF-EB-20	5/19/2022	NA	X				EB
SFAASF-EB-21	5/20/2022	NA	X				EB
SFAASF-FB-01	2/7/2022	NA	X				FB
SFAASF-FB-02	2/8/2022	NA	X				FB
SFAASF-FB-03	4/25/2022	NA	X				FB
SFAASF-FB-04	4/26/2022	NA	X				FB
SFAASF-FB-05	4/27/2022	NA	X				FB
SFAASF-FB-06	4/28/2022	NA	X				FB
SFAASF-FB-07	4/29/2022	NA	X				FB

Table 5-1. Samples by Medium
AASF, Santa Fe, New Mexico
Site Inspection Report

Sample Identification	Sample Collection Date	Sample Depth (ft bgs)	PFAS (USEPA Method 537 Modified)	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Grain Size (ASTM D422)	Comments
SFAASF-FB-08	4/30/2022	NA	X				FB
SFAASF-FB-09	5/1/2022	NA	X				FB
SFAASF-FB-10	5/2/2022	NA	X				FB
SFAASF-FB-11	5/3/2022	NA	X				FB
SFAASF-FB-12	5/4/2022	NA	X				FB
SFAASF-FB-13	5/5/2022	NA	X				FB
SFAASF-FB-14	5/6/2022	NA	X				FB
SFAASF-FB-15	5/7/2022	NA	X				FB
SFAASF-FB-16	5/8/2022	NA	X				FB
SFAASF-FB-17	5/9/2022	NA	X				FB
SFAASF-FB-18	5/19/2022	NA	X				FB
SFAASF-FB-19	5/20/2022	NA	X				FB

Notes:
EB = Equipment blank
FB = Field blank
FD = Field duplicate
NA = Not applicable

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Table 5-2. Soil Boring Depths and Well Screen Intervals
AASF, Santa Fe, New Mexico
Site Inspection Report

Areas of Interest	Boring Location	Soil Boring Depth (ft bgs)	Well Screen Interval (ft bgs)	Current Well Status
1	AOI01-01	192	170-190	Existing
	AOI01-02	119	107-117	Existing
	AOI01-03	15	-	-
	AOI01-04	115	105-115	Existing
	AOI01-05	15	-	-
	AOI01-06	2	-	-
	AOI01-06b	15	-	-
	AOI01-07	2	-	-
	AOI01-08	2	-	-
	AOI01-09	115	110-115	P&A
Historical WWTP Land Application Area	SFAASF-01	2	-	-
	SFAASF-02	2	-	-
Santa Fe AASF Boundary	SFAASF-03	197	175-195	Existing
	SFAASF-03-PA	197	175-195	P&A
	SFAASF-04	193	171-191	Existing
	SFAASF-05	15	-	-

Notes:
P&A = Plugged and abandoned

Table 5-3. Groundwater Elevation

AASF, Santa Fe, New Mexico
Site Inspection Report

Monitoring Well ID	Top of Casing Elevation (ft amsl)	Depth to Water[1] (ft btoc)	Groundwater Elevation (ft amsl)
AOI01-01	6,328.84	176.46	6,152.38
AOI01-02	6,324.96	110.96	6,214.00
AOI01-04	6,323.20	110.04	6,213.16
SFAASF-03	6,337.69	184.81	6,152.88
SFAASF-04	6,332.85	180.59	6,152.26

Notes:
1. Measured on 3 June 2022.
btoc = Below top of casing
ID = Identification

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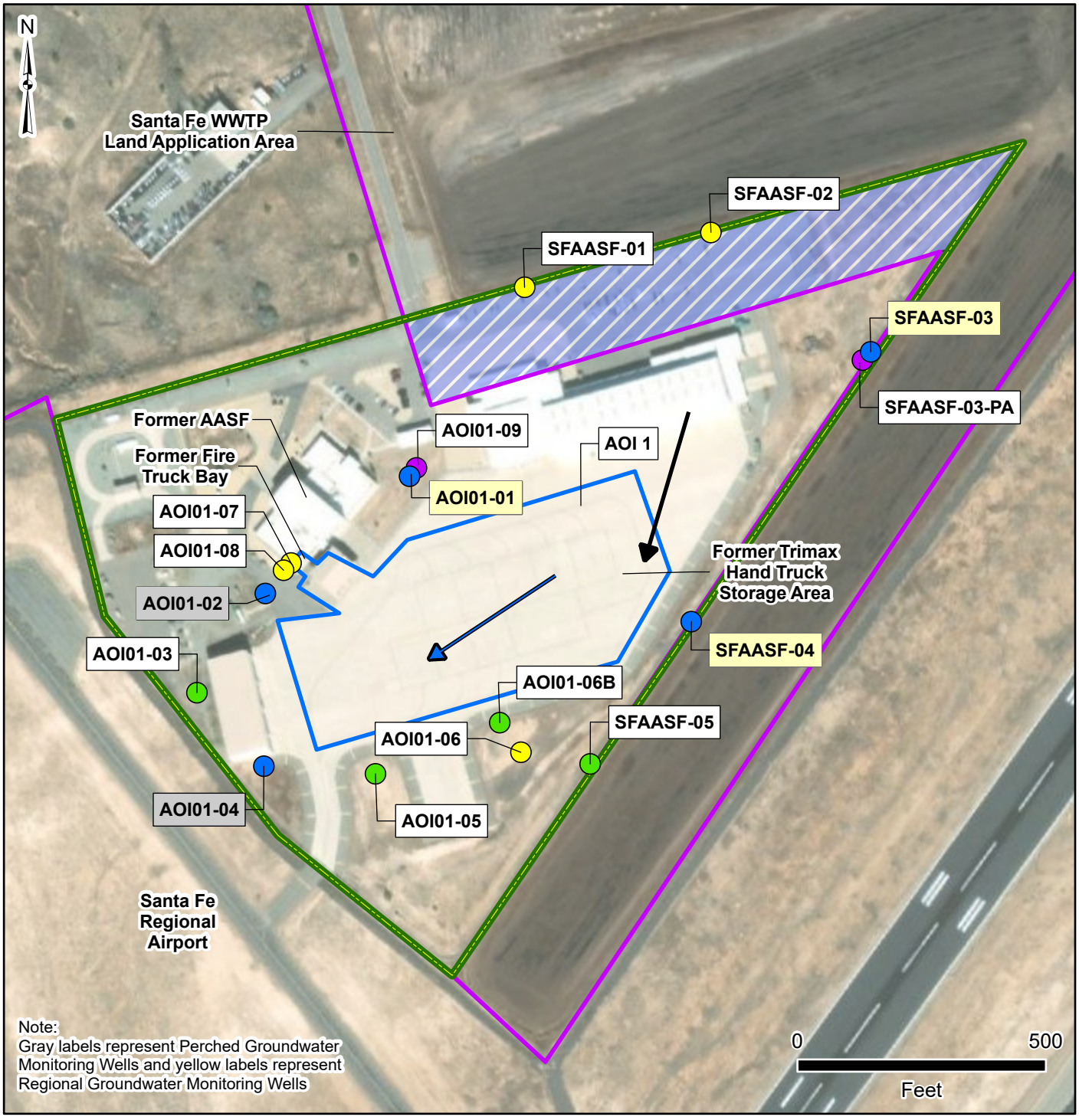
Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

NM

Figure 5-1
Site Inspection Sample Locations



Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\SantaFe\SantaFeSIReport.aprx

Facility Data
- Facility Boundary
- Area of Interest
- Adjacent Potential Source Areas
- Historical WWTP Biosolid Area

Sample Locations
- DPT Soil Boring
- Hand Auger Soil Boring
- Sonic Soil Boring
- Sonic Soil Boring/Monitoring Well

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction (Regional)

Data Sources:
ESRI 2022
AECOM 2020

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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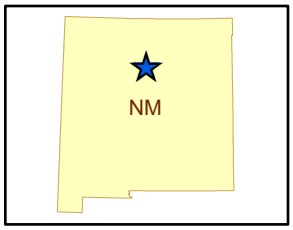
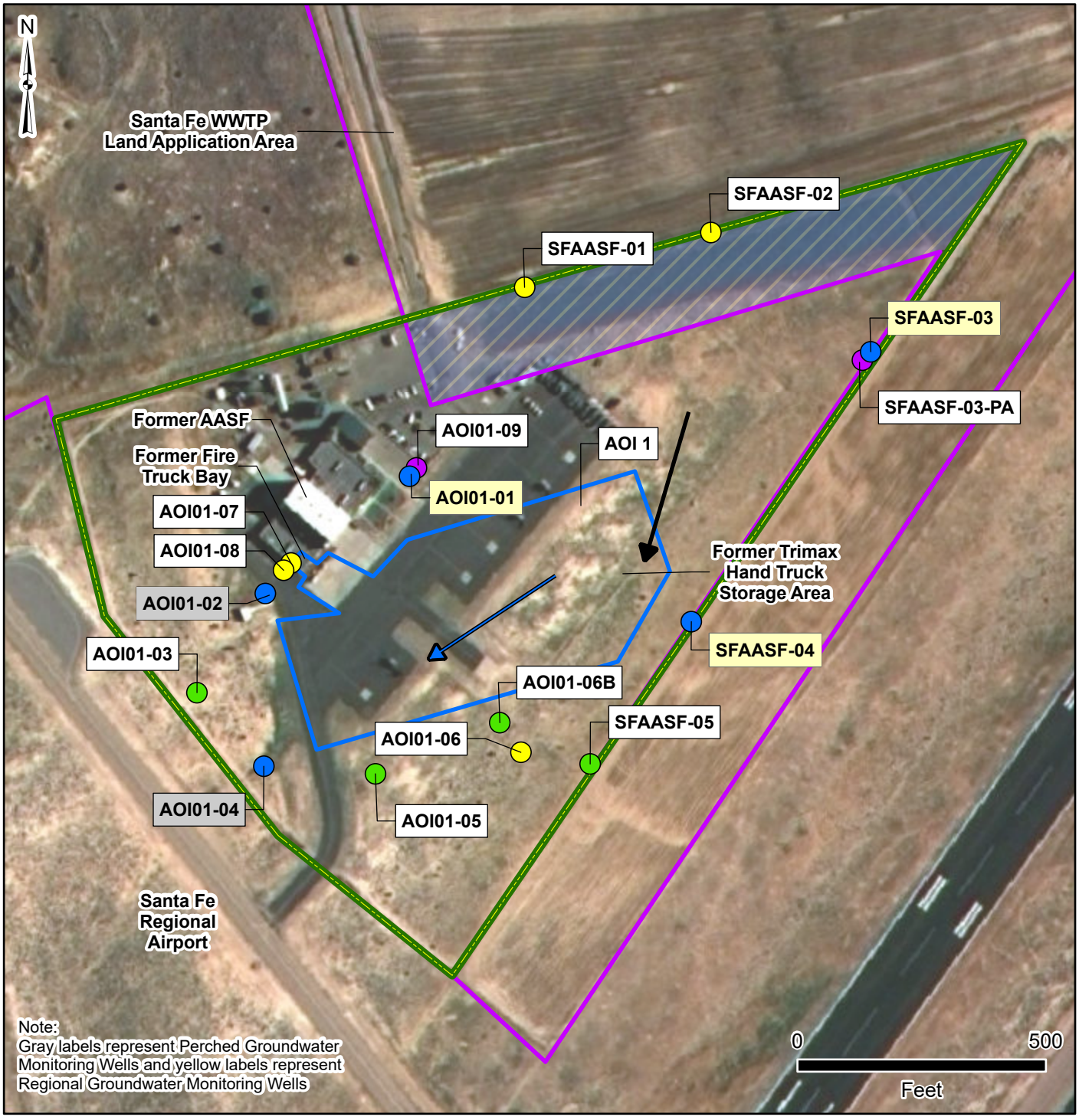
Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Figure 5-2
Site Inspection Sample Locations with Historical Imagery





Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\SantaFe\SantaFeSIReport.aprx

Facility Data
- Facility Boundary
- Area of Interest
- Adjacent Potential Source Areas
- Historical WWTP Biosolid Area

Sample Locations
- DPT Soil Boring
- Hand Auger Soil Boring
- Sonic Soil Boring
- Sonic Soil Boring/Monitoring Well

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction (Regional)

Data Sources:
AECOM 2020
RGIS UNM 2005

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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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 is provided in **Sections 6.3** and **6.4**. **Table 6-1** provides applicable screening levels. **Tables 6-2** through **6-5** present PFAS results for the relevant compounds in soil and groundwater. 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 may proceed to the next phase under CERCLA. The SLs established in the OSD memorandum apply to the five compounds presented on **Table 6-1**.

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

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

Notes:
1. Assistant Secretary of Defense. 2022. Risk-Based Screening Levels in Groundwater and Soil using USEPA's Regional Screening Level Calculator. Hazard Quotient = 0.1. May 2022.
2. Screening values for HFPO-DA were established after SI planning and execution; and thus, not included as an analyte. Future CERCLA phases will include HFPO-DA if warranted.

µg/kg = Microgram(s) per kilogram.
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 (0–2 ft bgs) and the industrial/commercial worker scenario is applied to all shallow subsurface soil results (2–15 ft bgs). The SLs are not applied to deep subsurface soil results (greater than 15 ft bgs) because 15 ft is the anticipated limit of construction activities.

6.2 SOIL PHYSICOCHEMICAL ANALYSES

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

The data collected in this investigation will be used in subsequent investigations, where appropriate, to assess fate and transport of PFAS contaminants. 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 can help in evaluating transport potential, though other geochemical factors (e.g., pH and presence of polyvalent cations) may also affect PFAS sorption to solid phases (ITRC 2018).

6.3 AOI 1

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 1, which includes Former Firetruck Bay and Tri-Max^{TM} Hand Truck Storage Area. The soil and groundwater results are summarized on **Tables 6-2** through **6-5**. Soil and groundwater results are presented on **Figures 6-1** through **6-7**.

In the sections below, estimated analyte concentrations are followed by a 'J' qualifier. Concentrations that are estimated and biased higher are followed by a 'J+' qualifier.

6.3.1 AOI 1 - Soil Analytical Results

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

Soil was sampled at 10 boring locations associated with potential release areas at AOI 1. Soil was sampled from three intervals at locations AOI01-01, AOI01-02, AOI01-03, AOI01-04, AOI01-05, AOI01-06B, and AOI01-09; and one interval at locations AOI01-06, AOI01-07, and AOI01-08.

PFOS was detected in seven of 10 surface soil sample locations with concentrations exceeding the applicable SL in three surface soil sample locations (AOI01-02, AOI01-07, and AOI01-08). The highest PFOS concentration of 920 µg/kg was detected at AOI01-07. PFOA, PFNA, and PFHxS were detected in surface soil at AOI 1 at concentrations that did not exceed the applicable residential SLs. PFOA was detected in 8 of 10 surface soil sample locations at concentrations below the SL of 19 µg/kg. PFOA had a maximum reported concentration of 1.2 µg/kg (AOI01-07). PFHxS was detected in 5 the 10 surface soil sample locations at concentrations below the SL of 130 µg/kg. PFHxS had a maximum reported concentration of 8.3 µg/kg (AOI01-07). PFNA was detected in 3 of the 10 surface soil sample locations at concentrations below the SL

of 19 µg/kg. PFNA had a maximum reported concentration of 3.8 µg/kg (AOI01-07). PFBS was not detected in any of the 10 surface soil sample locations at AOI 1.

Shallow subsurface soil[3] samples collected from 2 to 15 ft bgs did not exceed the SLs for the relevant compounds in any of the sample locations. PFOS was detected in AOI01-02, AOI01-03, and AOI01-04 at concentrations ranging up to 5.9 µg/kg. PFOA was detected in two locations, AOI01-02 and AOI01-04, with a maximum concentration of 0.59 J µg/kg (AOI01-02). PFHxS was detected in three soils samples, AOI01-02, AOI01-03, and AOI01-04, with a maximum concentration of 3 µg/kg (AOI01-02). PFNA was detected in one location (AOI01-04) at a concentration of 0.37 J µg/kg.

PFBS was not detected in any of the deep subsurface soil samples. In AOI01-02, PFHxS was detected at a concentration of 0.32 J µg/kg. In AOI01-04, PFOS, PFOA, PFHxS, and PFNA were detected at concentrations of 2.2 J+ µg/kg, 0.48 J µg/kg, 1.1 J µg/kg, and 0.32 J µg/kg, respectively.

6.3.2 AOI 1 - Groundwater Results

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

Groundwater samples were collected from three permanent monitoring wells associated with the potential release area AOI 1. Two wells, AOI01-02 and AOI01-04, are screened in perched groundwater between 105 to 117 ft bgs; one well, AOI01-01, is screened regional groundwater between 170 to 190 ft bgs. PFOA and PFHxS were detected in perched groundwater at concentrations exceeding the applicable SLs. The maximum concentrations of PFOA and PFHxS of 38 ng/L and 230 ng/L, respectively, were detected at AOI01-04. PFBS was detected below the applicable SL in both perched groundwater wells. PFOS and PFNA were not detected in perched groundwater.

PFOS, PFOA, PFBS, PFHxS, and PFNA were not detected in AOI01-01, which is screened in regional groundwater.

A shake test was administered to samples collected from each of the three monitoring wells in AOI 1. Foam was not observed in any of the samples.

6.3.3 AOI 1 - Conclusions

Based on the results of the SI, four relevant compounds (PFOA, PFOS, PFHxS, and PFNA) were detected in AOI 1. PFOS exceeded the SL in surface soil. Three of the five relevant compounds (PFOA, PFHxS, and PFBS) were detected in groundwater at AOI 1. PFOA and PFHxS exceeded SLs in groundwater. Based on the exceedance of the SLs, further evaluation at AOI 1 is warranted.

[3] Shallow subsurface soil also referred to as intermediate depth.

6.4 HISTORICAL WASTEWATER TREATMENT PLANT BIOSOLID APPLICATION AREA SAMPLE LOCATIONS

Based on historical aerial photographs, application of biosolids extended into the current Santa Fe AASF lease area; biosolid land application extended to the north end of the current AASF building prior to the 2012 renovations of the facility. This section presents the analytical results for soil in comparison to SLs for sample locations within the historical WWTP biosolid land application area that extends onto the current Santa Fe AASF lease area. **Tables 6-2** through **6-5** summarize detected compounds in soil. **Figures 6-1** through **6-5** present the ranges of detections in soil.

6.4.1 Historical Wastewater Treatment Plant Biosolid Application Area – Soil Analytical Results

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

Soil was sampled at two boring locations (SFAASF-01 and SFAASF-02) within the historical WWTP biosolid application area, as identified using historical aerial photography. Only surface soil was sampled at these locations.

PFOS and PFOA concentrations in surface soils exceeded SLs both sample locations within the historical WWTP biosolid application area. PFBS, PFNA, and PFHxS in soil, when detected, did not exceed the SLs. PFOS exceeded the applicable SL in both surface soil sample locations. The highest PFOS concentration of 60 µg/kg was detected at SFAASF-02. PFOA was detected in both surface soil sample locations with the concentration exceeding the applicable SL in one surface soil sample locations (SFAASF-02), which had a reported concentration of 33 µg/kg. PFHxS and PFNA were detected below their respective applicable SLs in both sample locations. PFBS was detected below the applicable SL in surface soil at one location (SFAASF-02).

6.4.2 Historical Wastewater Treatment Plant Biosolid Application Area – Groundwater Results

Groundwater was not sampled within the historical WWTP biosolid application area; however, groundwater samples at AOI01-01 are considered downgradient from the historical WWTP biosolid application area and upgradient of AOI 1, and samples from SFAASF-03 and SFAASF-04 are also considered downgradient from offsite biosolid application areas. There were no detections of the relevant compounds in these samples. Subsurface soil was not sampled at these locations and perched water was not encountered, thus the fate and transport of the relevant compounds in the surface soil is unknown.

6.4.3 Historical Wastewater Treatment Plant Biosolid Application Area – Conclusions

During the SI, PFBS, PFNA, and PFHxS were detected below SLs in surface soil samples. PFOS and PFOA were detected above SLs. Elevated PFAS concentrations within the historical WWTP biosolid land application area may be a result of the historical application of WWTP biosolids to the land currently leased by NMARNG or the current application of WWTP biosolids on the

adjacent property. Sub-surface soils and groundwater were not sampled at these locations. Based on the exceedance of SLs in surface soil within the historical WWTP biosolid application area, further evaluation is warranted.

6.5 BOUNDARY SAMPLE LOCATIONS

This section presents the analytical results for soil and groundwater in comparison to SLs for the boundary sample locations. **Tables 6-2** through **6-5** summarize the detected compounds in soil and groundwater. **Figures 6-1** through **6-7** present the ranges of detections in soil and groundwater.

6.5.1 Boundary Sample Locations – Soil Analytical Results

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

Soil was sampled at four boring locations associated with the facility boundary. Soil was sampled from three intervals at locations SFAASF-03-PA, SFAASF-04, and SFAASF-05. Only surface soil was sampled at SFAASF-03.

PFOS and PFOA were detected below SLs in surface soils at the facility boundary. PFBS, PFNA, and PFHxS were not detected. PFOS was detected below the SL in three of four boundary surface soil samples. The highest PFOS concentration of 0.94 µg/kg was detected at SFAASF-04. PFOA was detected below the SL in three of four surface soil sample locations with a maximum concentration of 0.96 µg/kg at SFAASF-05. PFHxS, PFNA, and PFBS were not detected. Relevant compounds were not detected in subsurface soil collected from these locations.

6.5.2 Boundary Sample Locations – Groundwater Results

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

Groundwater samples were collected from two well locations along the facility boundary (SFAASF-03 and SFAASF-04). The boundary wells were completed in regional groundwater due to the lack of observed perched groundwater. None of the relevant compounds were detected in groundwater samples collected from boundary wells.

A shake test was administered to samples collected from both monitoring wells along the facility boundary. Foam was not observed in either sample.

6.5.3 Boundary Sample Locations – Conclusions

Based on the results of the SI, PFBS, PFNA, and PFHxS were not detected in samples at the facility boundary. PFOS and PFOA were detected below SLs in surface soil. Relevant compounds were not detected in sub-surface soil.

Relevant compounds were not detected in groundwater monitoring wells installed for the purpose of characterizing off-facility contamination. Samples representing off-facility groundwater quality to the west (SFAASF-03 and SFAASF-04) and to the northwest (AOI01-01) suggest that PFAS compounds are not present in the regional groundwater upgradient of AOI 1. Perched groundwater was not observed at boundary monitoring well locations during the SI.

Based on the lack of SL exceedances in groundwater and soil at the boundary, further evaluation is not warranted.

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

Location ID		AOI01-01		AOI01-02		AOI01-02		AOI01-03		AOI01-04		AOI01-05		AOI01-06		AOI01-06B		AOI01-07	
Sample Name		AOI01-01-SB-0-2		AOI01-02-SB-0-2		AOI01-02-SB-0-2-D		AOI01-03-SB-0-2		AOI01-04-SB-0-2		AOI01-05-SB-0-2		AOI01-06-SB-0-2		AOI01-06B-SB-0-2		AOI01-07-SB-0-2	
Parent Sample ID						AOI01-02-SB-0-2													
Sample Date		2/8/2022		2/8/2022		2/8/2022		2/7/2022		2/7/2022		2/7/2022		2/7/2022		5/4/2022		2/8/2022	
Depth (bgs ft)		0-2		0-2		0-2		0-2		0-2		0-2		0-2		0-2		0-2	
Analyte[1,2]	**Screening Level[1,2]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																			
Perfluorobutanesulfonic acid (PFBS)	1900	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	130	0.41	J	0.5	J	0.96		1.4		0.64		ND	U	ND	U	ND	U	8.3	
Perfluorononanoic acid (PFNA)	19	ND	U	0.32	J	0.51	J	ND	U	ND	U	ND	U	ND	U	ND	U	3.8	
Perfluorooctanesulfonic acid (PFOS)	13	3.1		61		86		6.5		3.6		ND	U	ND	U	ND	U	920	
Perfluorooctanoic acid (PFOA)	19	0.64		0.26	J	0.53	J	0.39	J	0.36	J	ND	U	ND	U	ND	U	1.2	

Notes:
J = Estimated concentration.
U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
J+ = Estimated concentration, biased high.
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD). However, the associated numerical value is approximate.
µg/kg = Microgram(s) per kilogram.
1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.
2. The Screening Levels for soil are based on a residential scenario for direct ingestion of contaminated soil.
Values exceeding the Screening Level are shaded gray.
bgs = Below ground surface.
ft = Foot (feet).
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.

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

	Location ID	AOI01-08		AOI01-09		SFAASF-01		SFAASF-02		SFAASF-02		SFAASF-03-PA		SFAASF-03		SFAASF-04		SFAASF-05	
	Sample Name	AOI01-08-SB-0-2		AOI-01-09-SB-0-2		SFAASF-01-SB-0-2		SFAASF-02-SB-0-2		SFAASF-02-SB-0-2-D		SFAASF-03-PA-SB-0-2		SFAASF-03-SB-0-2		SFAASF-04-SB-0-2		SFAASF-05-SB-0-2	
	Parent Sample ID									SFAASF-02-SB-0-2									
	Sample Date	2/8/2022		5/9/2022		2/8/2022		2/8/2022		2/8/2022		2/7/2022		5/7/2022		2/7/2022		2/7/2022	
	Depth (bgs ft)	0-2		0-2		0-2		0-2		0-2		0-2		0-2		0-2		0-2	
Analyte[1,2]	**Screening Level[1,2]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																			
Perfluorobutanesulfonic acid (PFBS)	1900	ND	U	ND	U	ND	U	0.58	J	0.59	J	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	130	ND	J	ND	U	2.7		4.5		4.7		ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	19	ND	U	0.4	J	1.8		2.9		2.9		ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	13	21		7.5		42		60		49		0.48	J	ND	U	0.94		0.93	
Perfluorooctanoic acid (PFOA)	19	0.47	J	0.68		19		30		33		0.53	J	ND	U	0.6	J	0.96	

Notes:
J = Estimated concentration.
U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
J+ = Estimated concentration, biased high.
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD). However, the associated numerical value is approximate.
µg/kg = Microgram(s) per kilogram.
1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.
2. The Screening Levels for soil are based on a residential scenario for direct ingestion of contaminated soil.
Values exceeding the Screening Level are shaded gray.
bgs = Below ground surface.
ft = Foot (feet).
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.

Table 6-3. PFOA, PFOS, PFBS, PFNA, and PFHxS Detections in Shallow Subsurface Soil, Site Inspection Report, Santa Fe AASF

Location ID		AOI01-01		AOI01-02		AOI01-03		AOI01-03		AOI01-04		AOI01-05		AOI01-05		AOI01-06B	
Sample Name		AOI01-01-SB-13-15		AOI01-02-SB-13-15		AOI01-03-SB-13-15		AOI01-03-SB-6-8		AOI01-04-SB-13-15		AOI01-05-SB-13-15		AOI01-05-SB-6-8		AOI01-06B-SB-13-15	
Parent Sample ID																	
Sample Date		4/25/2022		4/27/2022		5/4/2022		5/4/2022		5/3/2022		5/4/2022		5/4/2022		5/4/2022	
Depth (bgs ft)		13-15		13-15		13-15		6-8		13-15		13-15		6-8		13-15	
Analyte[1,2]	**Screening Level[1,2]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
Perfluorobutanesulfonic acid (PFBS)	25000	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	1600	ND	U	3		0.27	J	0.23	J	1.2		ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	250	ND	U	ND	U	ND	U	ND	U	0.37	J	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	160	ND	U	1.2		5.9		0.66		3.2		ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	ND	U	0.59	J	ND	U	ND	U	0.52	J	ND	U	ND	U	ND	U

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

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

J = Estimated concentration.
U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD). However, the associated numerical value is approximate.
Values exceeding the Screening Level are shaded gray.
ft bgs = Foot (feet) below ground surface.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
µg/kg = Microgram(s) per kilogram.
Qual = Qualifier.

Table 6-3. PFOA, PFOS, PFBS, PFNA, and PFHxS Detections in Shallow Subsurface Soil, Site Inspection Report, Santa Fe AASF

Location ID		AOI01-06B		AOI01-09		SFAASF-03-PA		SFAASF-04		SFAASF-05		SFAASF-05		SFAASF-05	
Sample Name		AOI01-06B-SB-6-8		AOI01-09-SB-13-15		SFAASF-03-PA-SB-13-15		SFAASF-04-SB-13-15		SFAASF-05-SB-13-15		SFAASF-05-SB-13-15-DUP		SFAASF-05-SB-6-8	
Parent Sample ID												SFAASF-05-SB-13-15			
Sample Date		5/4/2022		5/5/2022		5/1/2022		4/28/2022		5/4/2022		5/4/2022		5/4/2022	
Depth (bgs ft)		6-8		13-15		13-15		13-15		13-15		13-15		6-8	
Analyte[1,2]	**Screening Level[1,2]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)															
Perfluorobutanesulfonic acid (PFBS)	25000	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	1600	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	250	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	160	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U

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

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

J = Estimated concentration.
U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD). However, the associated numerical value is approximate.
Values exceeding the Screening Level are shaded gray.
ft bgs = Foot (feet) below ground surface.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
µg/kg = Microgram(s) per kilogram.
Qual = Qualifier.

Table 6-4. PFOA, PFOS, PFBS, PFNA, and PFHxS Detections in Deep Subsurface Soil, Site Inspection Report, Santa Fe AASF

Location ID	AOI01-01		AOI01-02		AOI01-02		AOI01-04		AOI01-04		AOI01-09		SFAASF-03-PA		SFAASF-04	
Sample Name	AOI01-01-SB-181-182		AOI01-02-SB-113-115		AOI01-02-SB-113-115-DUP		AOI01-04-SB-109-110		AOI01-04-SB-109-110-DUP		AOI01-09-SB-111-112		SFAASF-03-PA-SB-183-184		SFAASF-04-SB-180-181	
Parent Sample ID					AOI01-02-SB-113-115				AOI01-04-SB-109-110							
Sample Date	4/26/2022		4/28/2022		4/28/2022		5/4/2022		5/4/2022		5/6/2022		5/2/2022		4/30/2022	
Depth (bgs ft)	181-182		113-115		113-115		109-110		109-110		111-112		183-184		180-181	
Analyte[1]	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																
Perfluorobutanesulfonic acid (PFBS)	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	ND	U	0.32	J	ND	U	1.1	J	ND	UJ	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	ND	U	ND	U	ND	U	0.32	J	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	ND	U	ND	U	ND	U	2.2	J+	ND	UJ	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	ND	U	ND	U	ND	U	0.48	J	ND	U	ND	U	ND	U	ND	U

Notes:
J = Estimated concentration.
U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
J+ = Estimated concentration, biased high.
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD). However, the associated numerical value is approximate.
µg/kg = Microgram(s) per kilogram.
ft bgs = Foot (feet) below ground surface.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.

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

	Location ID	AOI01-01		AOI01-02		AOI01-02		AOI01-04		SFAASF-03		SFAASF-04	
	Sample Name	AOI01-01-GW		AOI01-02-GW		AOI01-02-GW-DUP		AOI01-04-GW		SFAASF-03-GW		SFAASF-04-GW	
	Parent Sample ID					AOI01-02-GW							
	Sample Date	5/20/2022		5/20/2022		5/20/2022		5/20/2022		5/19/2022		5/19/2022	
Analyte[1]	**Screening Level[1]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (ng/L)													
Perfluorobutanesulfonic acid (PFBS)	601	ND	U	120		130		30		ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	39	ND	U	72		74		230		ND	U	ND	U
Perfluorononanoic acid (PFNA)	6	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	4	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	6	ND	U	2.5		2.3	J+	38		ND	U	ND	U

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

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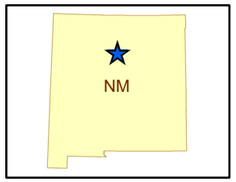
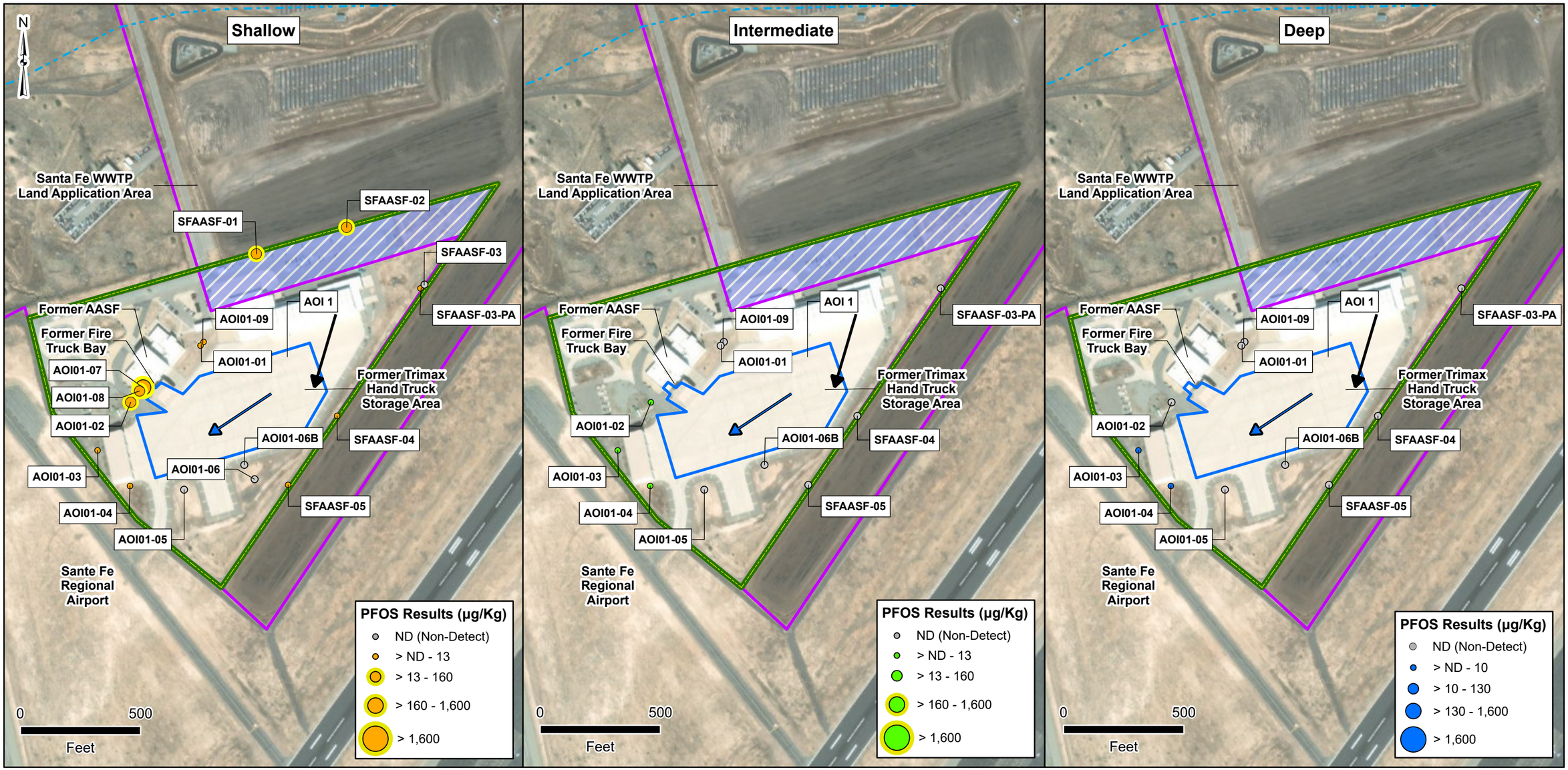
Santa Fe, New Mexico

Figure 6-1
AOI 1
PFOS Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Adjacent Potential Source Areas
- Historical WWTP Biosolid Area

Hydrology/Hydrogeology

- Surface Water Flow Direction
- Groundwater Flow Direction (Regional)

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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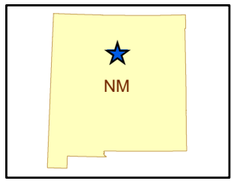
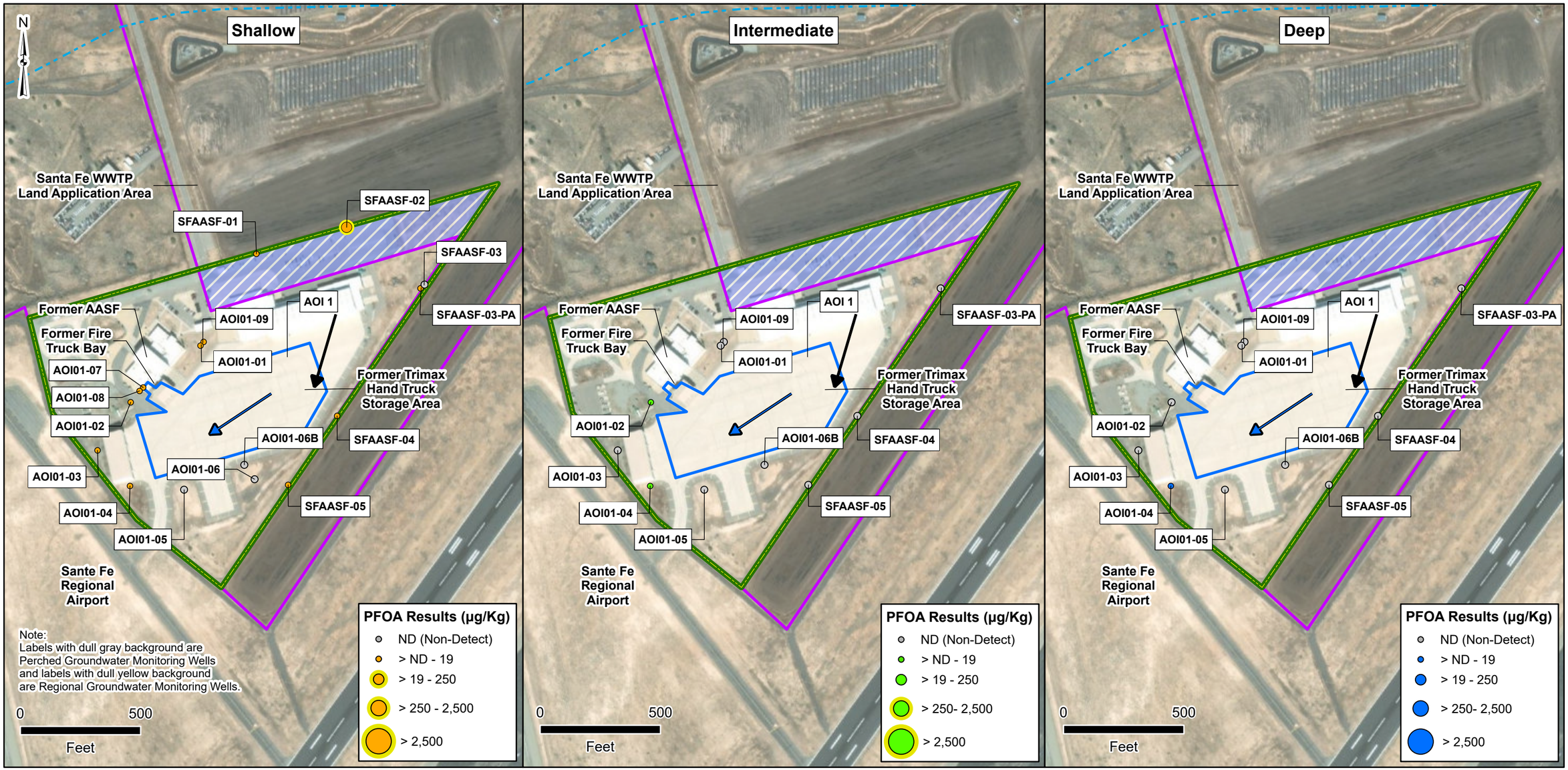
Army National Guard Site Inspections
Site Inspection Report
Santa Fe, New Mexico

Figure 6-2
AOI 1
PFOA Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Adjacent Potential Source Areas
- Historical WWTP Biosolid Area

Hydrology/Hydrogeology

- Surface Water Flow Direction
- Groundwater Flow Direction (Regional)

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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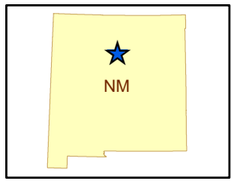
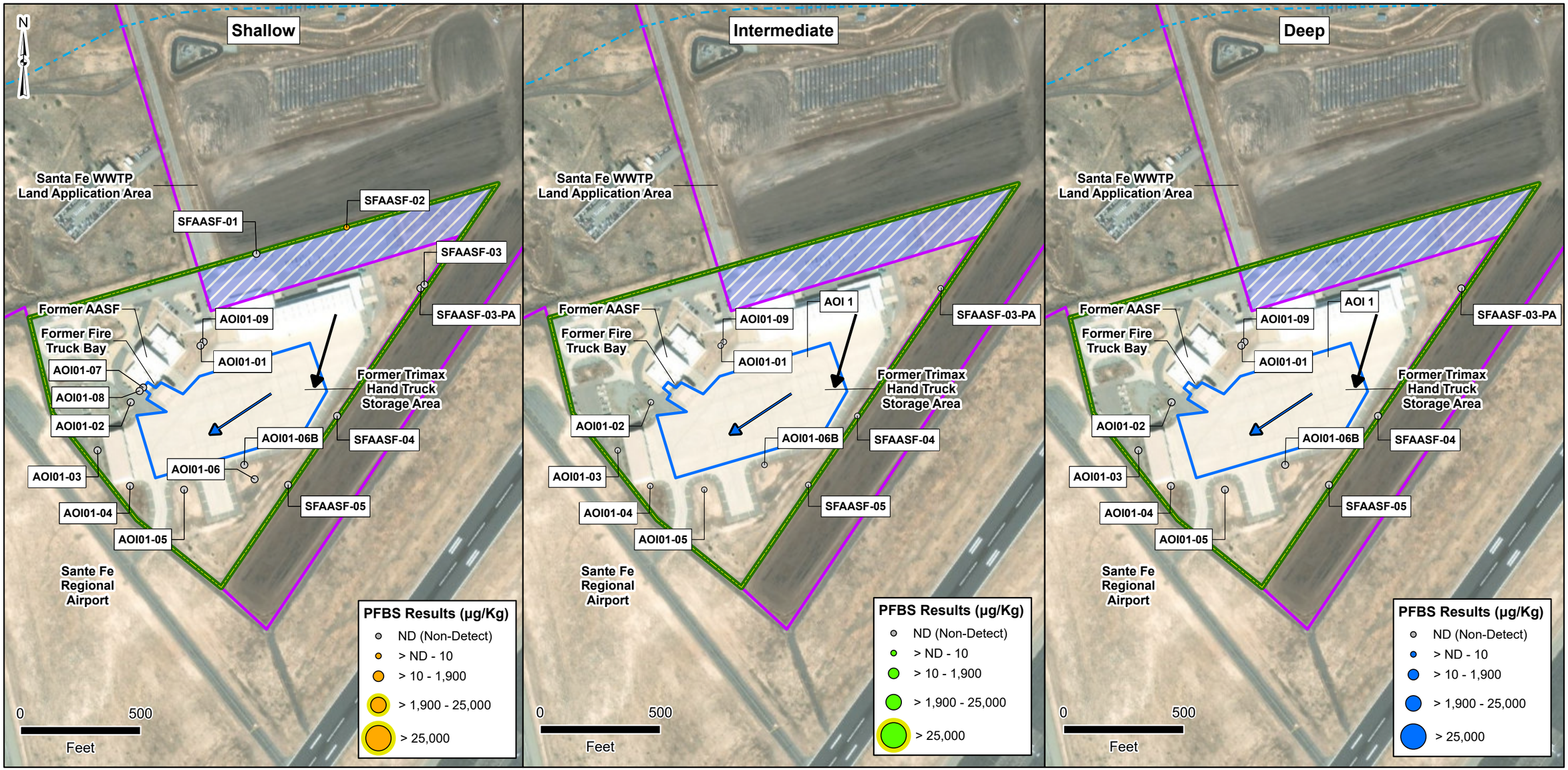
Army National Guard Site Inspections
Site Inspection Report
Santa Fe, New Mexico

Figure 6-3
AOI 1
PFBS Detections in Soil





Facility Data
- Facility Boundary
- Area of Interest
- Adjacent Potential Source Areas
- Historical WWTP Biosolid Area

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction (Regional)

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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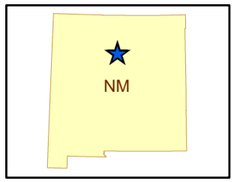
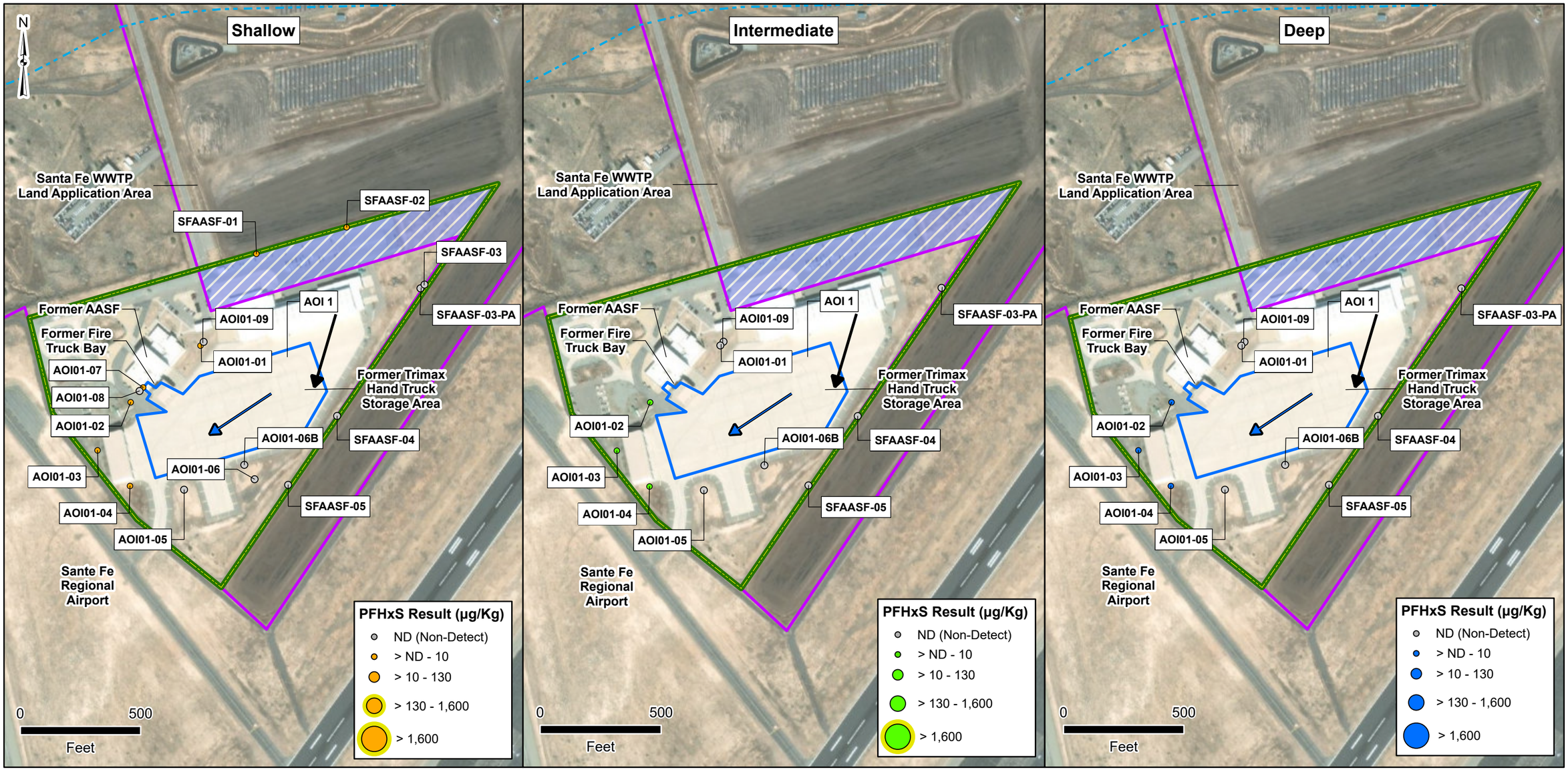
Army National Guard Site Inspections
Site Inspection Report
Santa Fe, New Mexico

Figure 6-4
AOI 1
PFHxS Detections in Soil





Facility Data
- Facility Boundary
- Area of Interest
- Adjacent Potential Source Areas
- Historical WWTP Biosolid Area

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction (Regional)

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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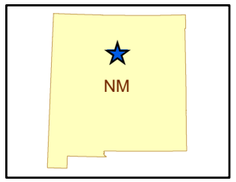
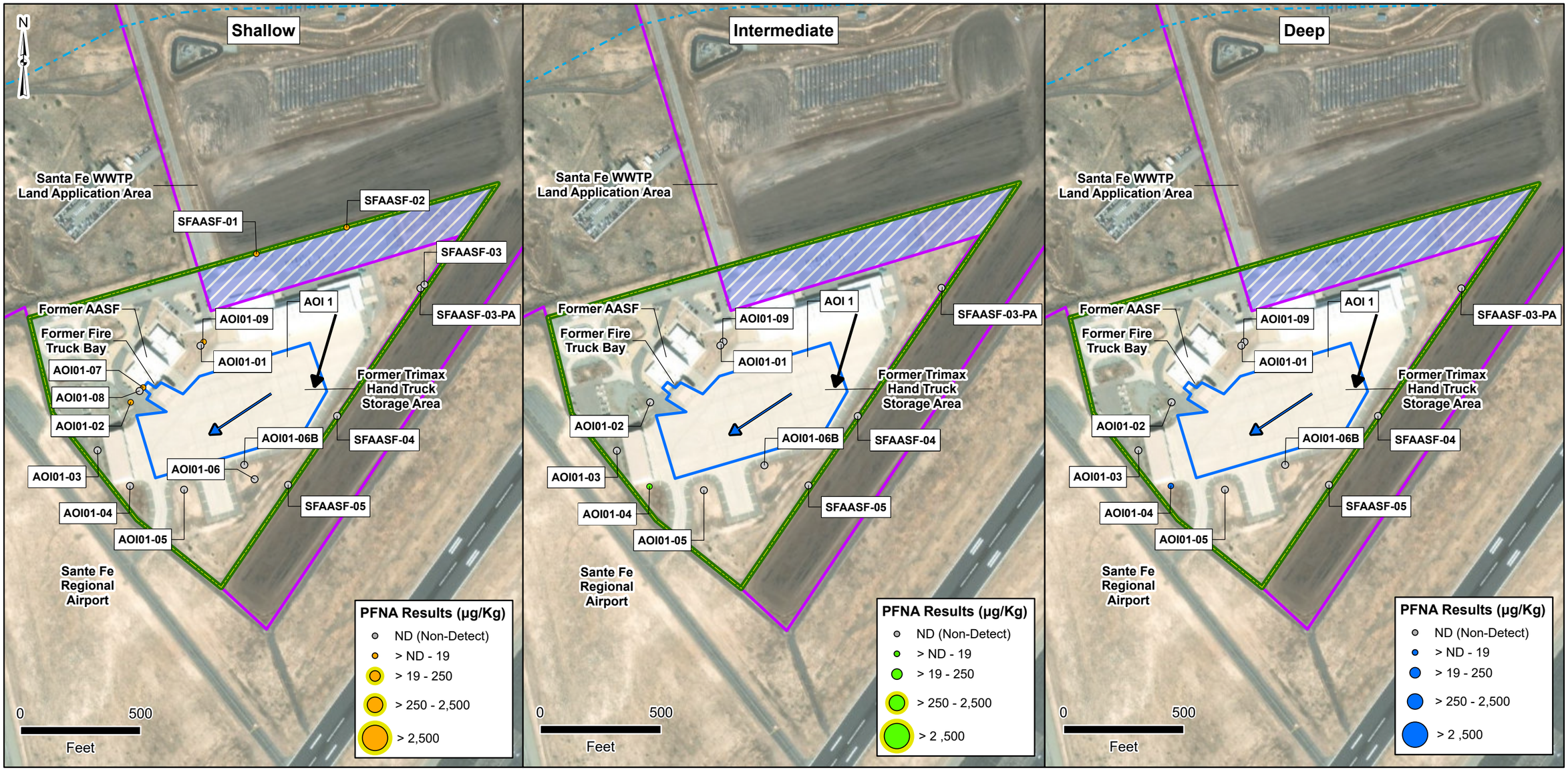
Army National Guard Site Inspections
Site Inspection Report
Santa Fe, New Mexico

Figure 6-5
AOI 1
PFNA Detections in Soil





Facility Data

- Facility Boundary
- Area of Interest
- Adjacent Potential Source Areas
- Historical WWTP Biosolid Area

Hydrology/Hydrogeology

- Surface Water Flow Direction
- Groundwater Flow Direction (Regional)

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

Data Sources:
ESRI 2022
AECOM 2019

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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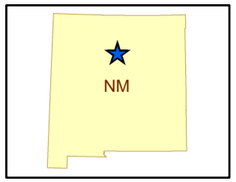
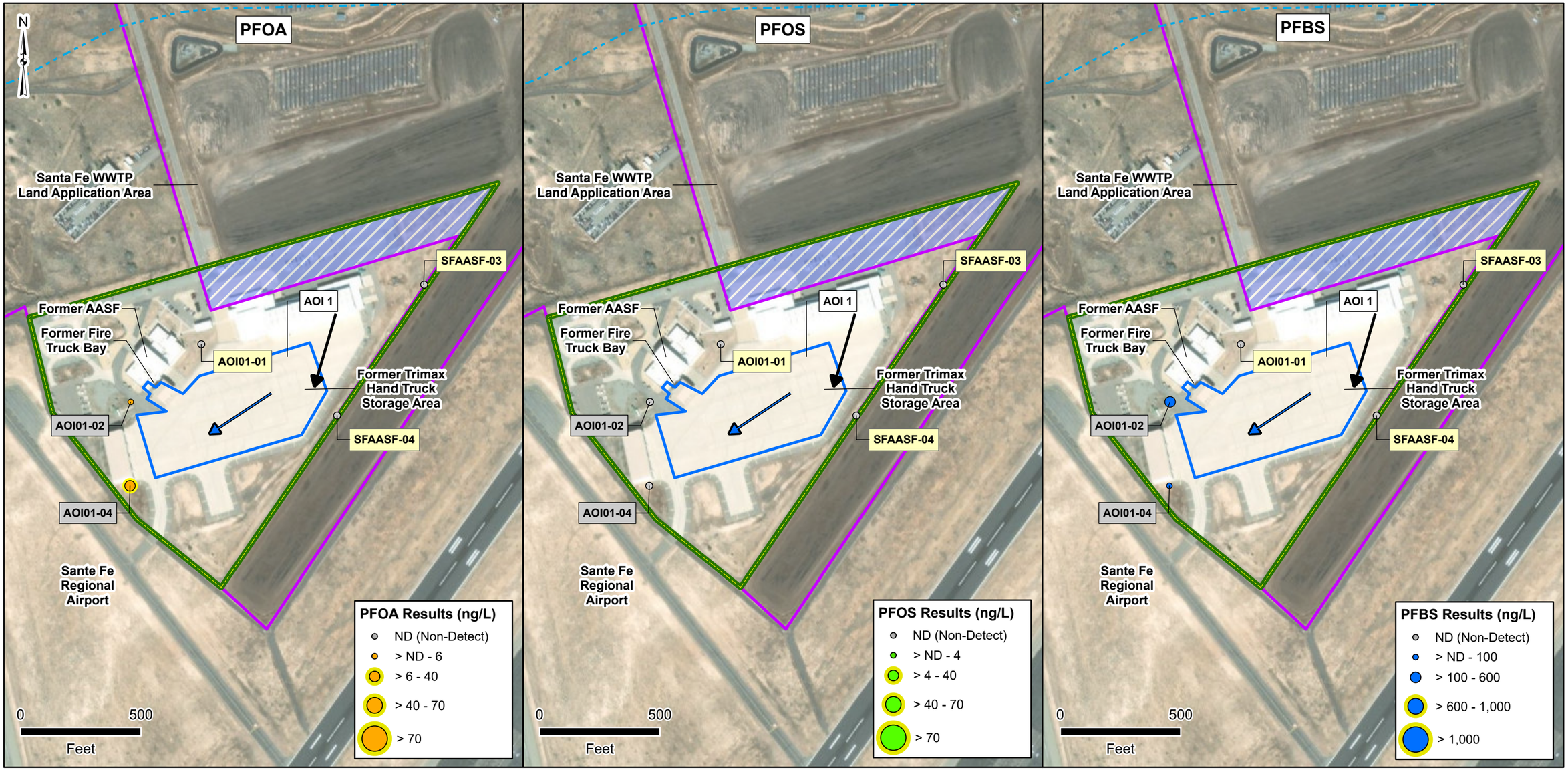
Army National Guard Site Inspections
Site Inspection Report
Santa Fe, New Mexico

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





Facility Data
- Facility Boundary
- Area of Interest
- Adjacent Potential Source Areas
- Historical WWTP Biosolid Area

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction (Regional)

Notes:
PFOA = Perfluorooctanesulfonic acid
PFOS = Perfluorooctanoic acid
PFBS = Perfluorobutanesulfonic acid
Exceedances of the OSD SL are depicted with a yellow halo.
Gray labels represent Perched Groundwater Monitoring Wells and yellow labels represent Regional Groundwater Monitoring Wells

Data Sources:
ESRI 2022
AECOM 2019

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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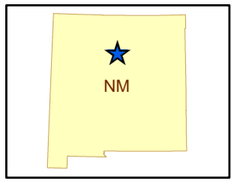
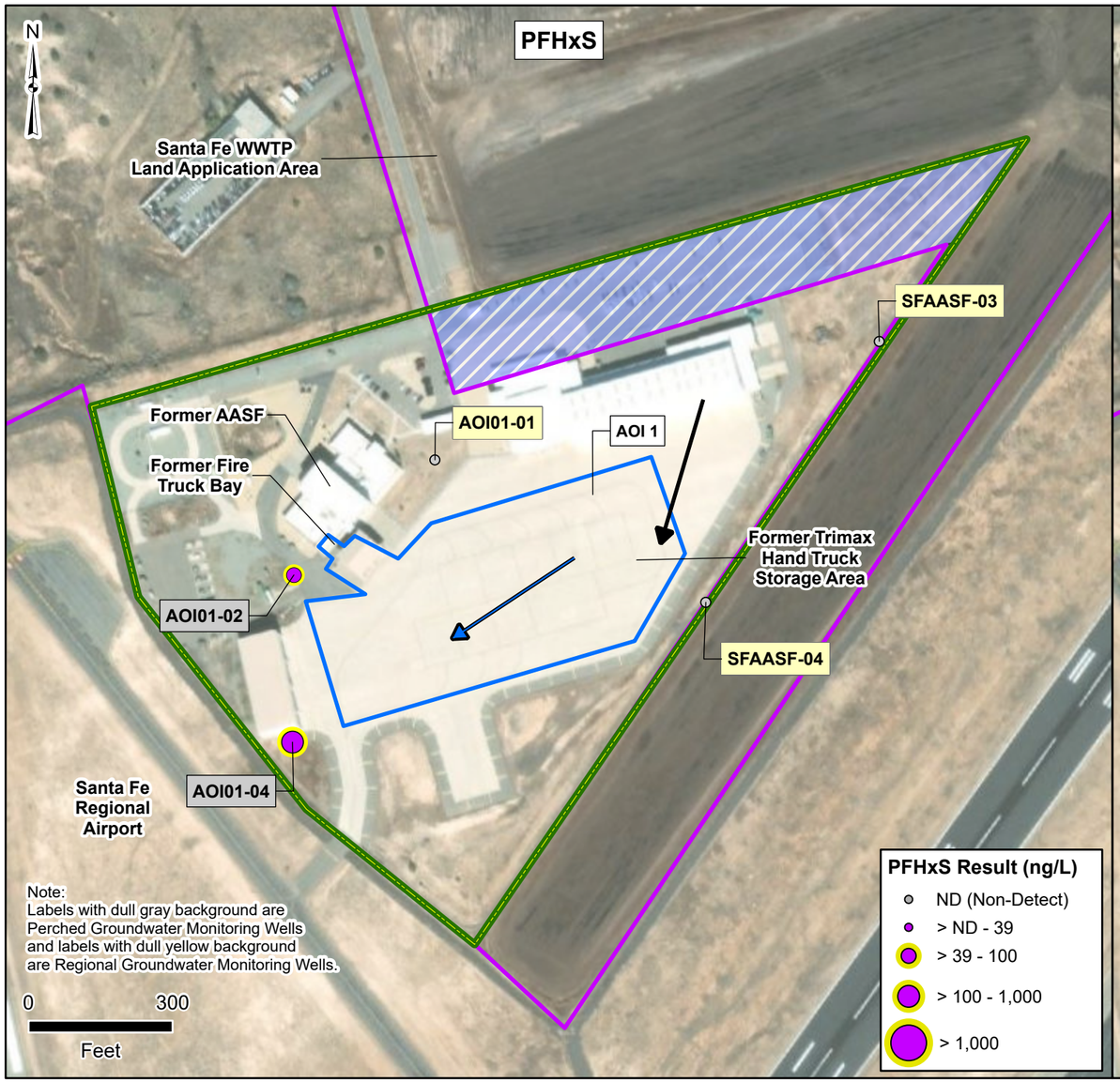
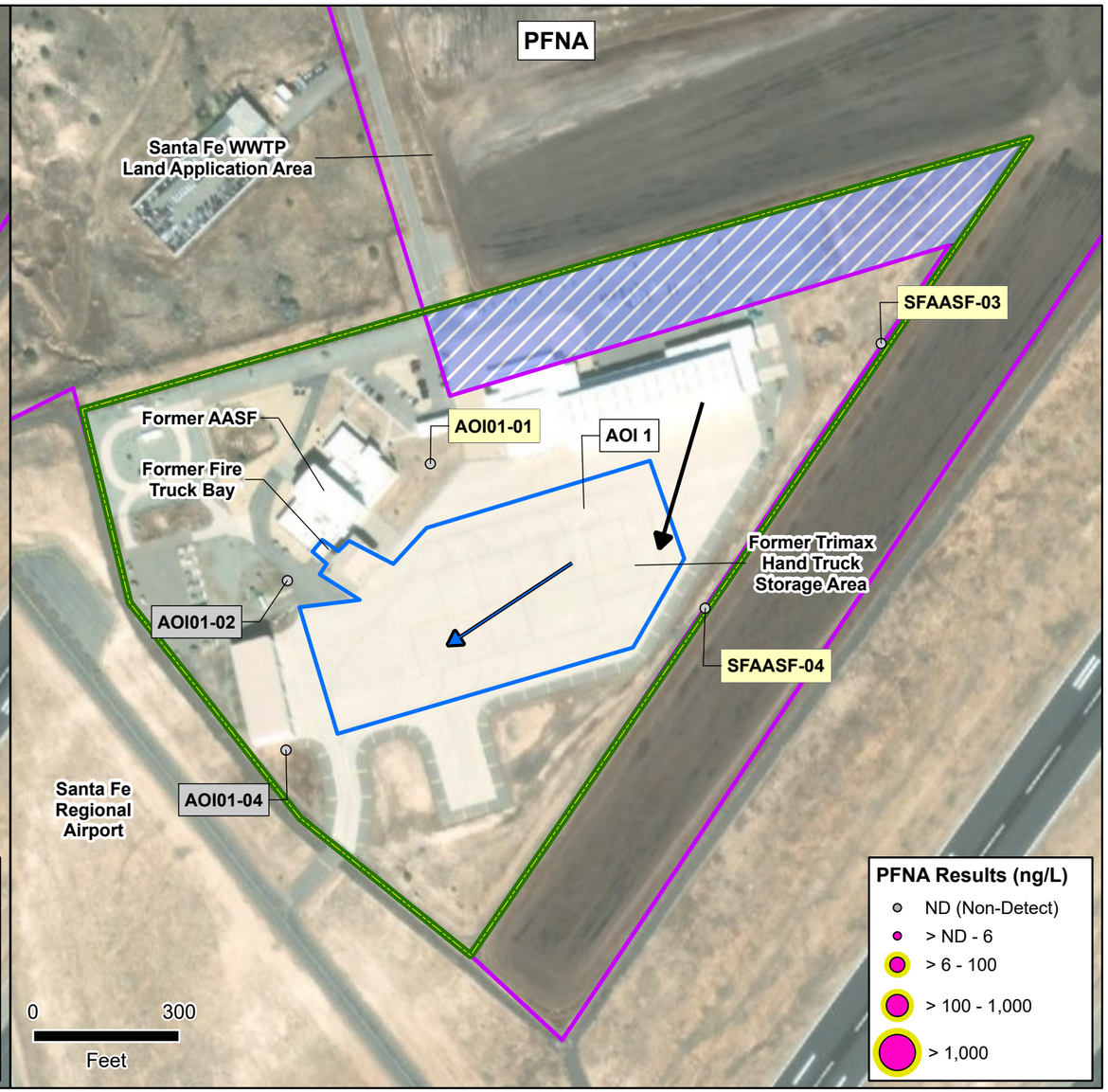
Army National Guard Site Inspections
Site Inspection Report
Santa Fe, New Mexico

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







Facility Data
- Facility Boundary
- Area of Interest
- Adjacent Potential Source Areas
- Historical WWTP Biosolid Area

Hydrology/Hydrogeology
- Surface Water Flow Direction
- Groundwater Flow Direction (Regional)

Notes:
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
Exceedances of the OSD SL are depicted with a yellow halo.
Gray labels represent Perched Groundwater Monitoring Wells and yellow labels represent Regional Groundwater Monitoring Wells

Data Sources:
ESRI 2020
AECOM 2020

Date:.....December 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

Path: G:\Federal\Nationwide\PFAS\MAES_634250383\PROJECTS\SIReport\SantaFe\SantaFeSIReport.aprx

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7. EXPOSURE PATHWAYS

The conceptual site model (CSM) for the AOI, revised based on the SI findings, is presented on **Figure 7-1**. Please note that while the CSM discussion assists in determining if a receptor may be impacted, the decision to move from SI to RI or interim action is determined based upon exceedances of the SLs for the relevant compounds and whether the release is more than likely attributable to the DoD. A CSM was also created for the Historical WWTP Biosolid Application Area. Because the potential source of contamination in this area is not likely a result of DoD activities, a complete pathway will not initiate the decision to move from SI to RI or to trigger a removal action but can result in additional investigation.

A CSM presents the current understanding of the site conditions with respect to known and suspected sources, potential transport mechanisms and migration pathways, and potentially exposed human receptors. A human exposure pathway is considered potentially complete when the following conditions are present:

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

If any of these elements are missing, the pathway is incomplete. The CSM figure uses an empty circle symbol to represent an incomplete exposure pathway. Areas with no identified complete pathway generally warrant no further action. However, the pathway is considered potentially complete if the relevant compounds are detected, in which case the CSM figure uses a half-filled circle symbol to represent a potentially complete exposure pathway. Additionally, a completely filled circle symbol is used to indicate when a potentially complete exposure pathway has detections of relevant compounds above the SLs. Areas with an identified potentially complete pathway that have detections of the relevant compounds above the SLs may warrant further investigation. Although the CSM indicates 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 PFAS exposure pathways 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 PFAS toxicological study. The receptors evaluated are consistent with those listed in USEPA guidance for risk screening (USEPA 2001). Receptors at the Facility include facility workers (e.g., staff and visiting soldiers), and construction workers. Construction workers are only considered as potential future receptors due to the lack of current construction activity at the Facility. Receptors also include off-facility residential for drinking water receptors. Trespassers are not considered as receptors due to the presence of secured entry and exit points at the Facility. The CSM for AOI 1, revised based on the SI findings, is presented on **Figure 7-1**. The CSM created for the Historical WWTP Biosolid Application Area is presented on **Figure 7-2**.

7.1 SOIL EXPOSURE PATHWAY

The SI results for soil were used to determine whether a potentially complete pathway exists between the source and potential receptors at AOI 1 or the historical WWTP biosolid application area based on the aforementioned criteria.

7.1.1 AOI 1

AOI 1 encompasses potential PFAS release areas associated with an AFFF-equipped firetruck parked within the former AASF building and Tri-Max™ 70/30 hand trucks stored at various places around the flight line and paved parking apron. AFFF releases could have occurred directly onto surface soil but may also have infiltrated soil via cracks in pavement or joints between areas that are paved with different materials.

PFOS was detected at 7 of 10 surface soil sample locations with concentrations exceeding the applicable SL in three surface soil sample locations completed at AOI 1. PFOA, PFHxS, and PFNA were detected at concentrations less than SLs at multiple locations within AOI 1. Facility workers and construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathways for facility workers and construction workers are potentially complete.

PFOS, PFOA, PFHxS, and PFNA were detected in sub-surface soil at concentrations less than SLs. Ground disturbing activities to subsurface soil could also result in exposure to those compounds by construction workers via ingestion. Therefore, the exposure pathways for inhalation and ingestion are potentially complete for future construction workers. The CSM is presented in **Figure 7-1**.

PFAS were detected in AOI 1 groundwater samples, indicating a complete soil to perched groundwater pathway. It is not known if the perched groundwater is in hydrologic communication with the deeper regional aquifer.

7.1.2 Historical Wastewater Treatment Plant Biosolid Application Area

The historical WWTP Biosolid Application Area encompasses the potential PFAS release area located within the facility boundary. Biosolids historically applied to this area may have contained PFAS.

PFOS was detected at both surface soil sample locations with concentrations exceeding the applicable SL. PFOA was detected at both locations, with the concentration exceeding the SL at SFAASF-02. PFBS, PFHxS, and PFNA were detected at concentrations less than SLs at one or more locations. 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.

Subsurface soil samples were not collected during the SI. As a result, the pathways of subsurface soil to construction workers via inhalation and ingestion are considered potentially complete pending further assessment.

Due to the presence of PFAS in soil, a potentially complete soil to groundwater pathway exists. The CSM is presented in **Figure 7-2**.

7.2 GROUNDWATER EXPOSURE PATHWAY

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

7.2.1 AOI 1

PFHxS and PFOA were detected above applicable SLs in AOI 1 perched groundwater. PFBS was detected below the SL. Domestic wells are present in a direction that is potentially downgradient of AOI 1. Although it is unclear if the contaminated perched groundwater is in communication with the regional aquifer, the potential for a complete pathway is present. As a result, the groundwater exposure pathway is considered potentially complete for off-facility residents via ingestion. The CSM is presented in **Figure 7-1**.

7.2.2 Historical Wastewater Treatment Plant Biosolid Application Area

Relevant compounds were not detected in groundwater downgradient from the historical wastewater treatment plant biosolid application area. However, subsurface soil was not sampled and perched water was not encountered, and the fate and transport of PFAS at this location is unknown. As a result, the groundwater exposure pathway to off-facility residents via ingestion is potentially complete pending further assessment. The CSM is presented in **Figure 7-2**.

7.3 SURFACE WATER/ SEDIMENT EXPOSURE PATHWAY

Surface water flow at the Facility is generally to the southwest. Two stormwater retention basins are present adjacent to the tarmac and a stormwater detention pond is present north of the former AASF. PFAS was not detected in surface soil collected from the stormwater retention basins adjacent to the tarmac; however, samples were not collected from the stormwater retention pond. The stormwater retention pond may receive runoff from PFAS-contaminated areas. As a result, the surface water/sediment exposure pathway is considered potentially complete.

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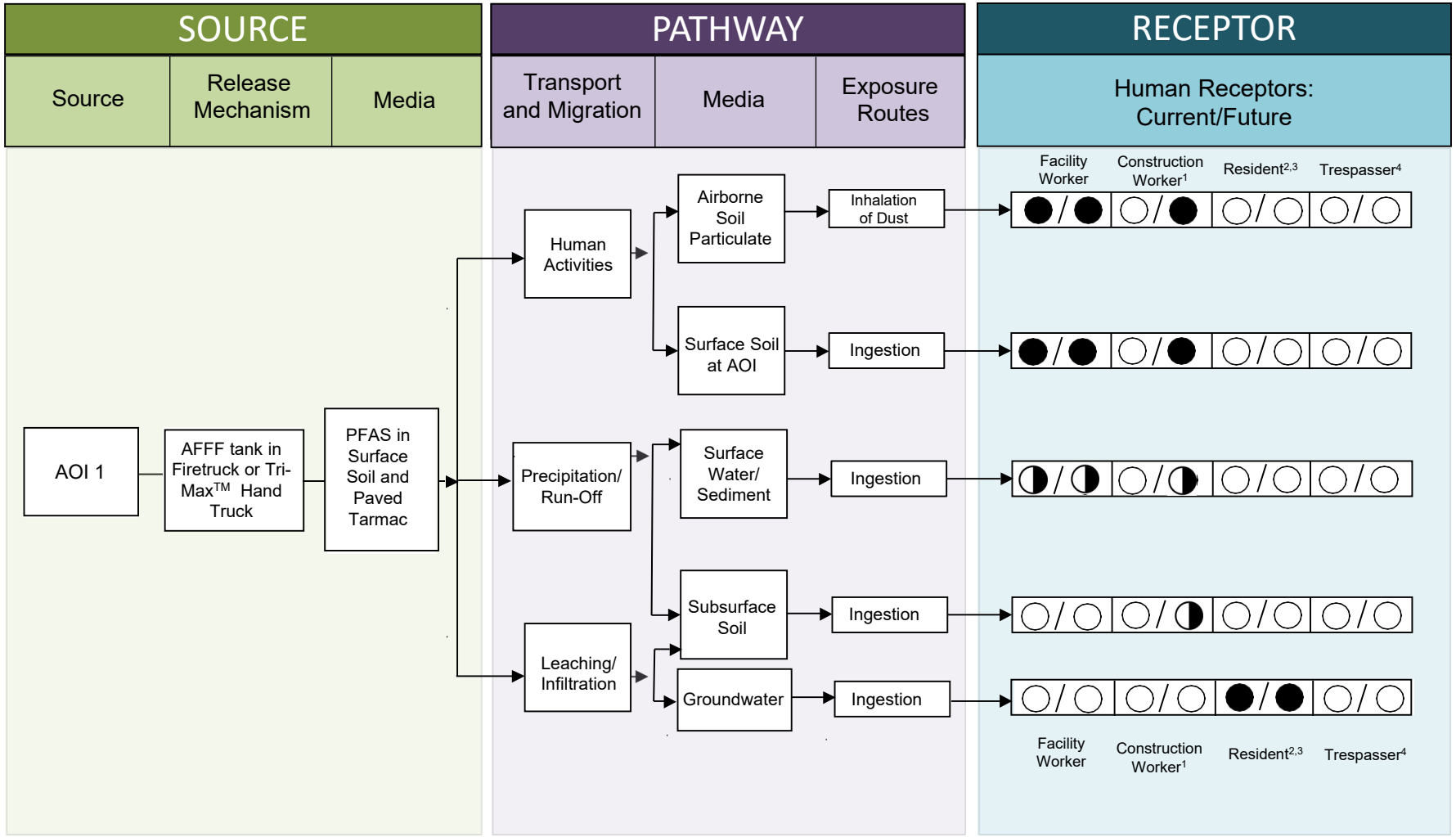

LEGEND

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

Notes:

1. No current active construction at the facility.
2. The resident refers to off-Facility drinking water receptors.
3. Inhalation of dust for off-Facility receptors is likely insignificant.
4. Trespassers are not considered likely due to the high level of security at the facility.

Figure 7-1
Conceptual Site Model
AOI 1 Santa Fe AASF

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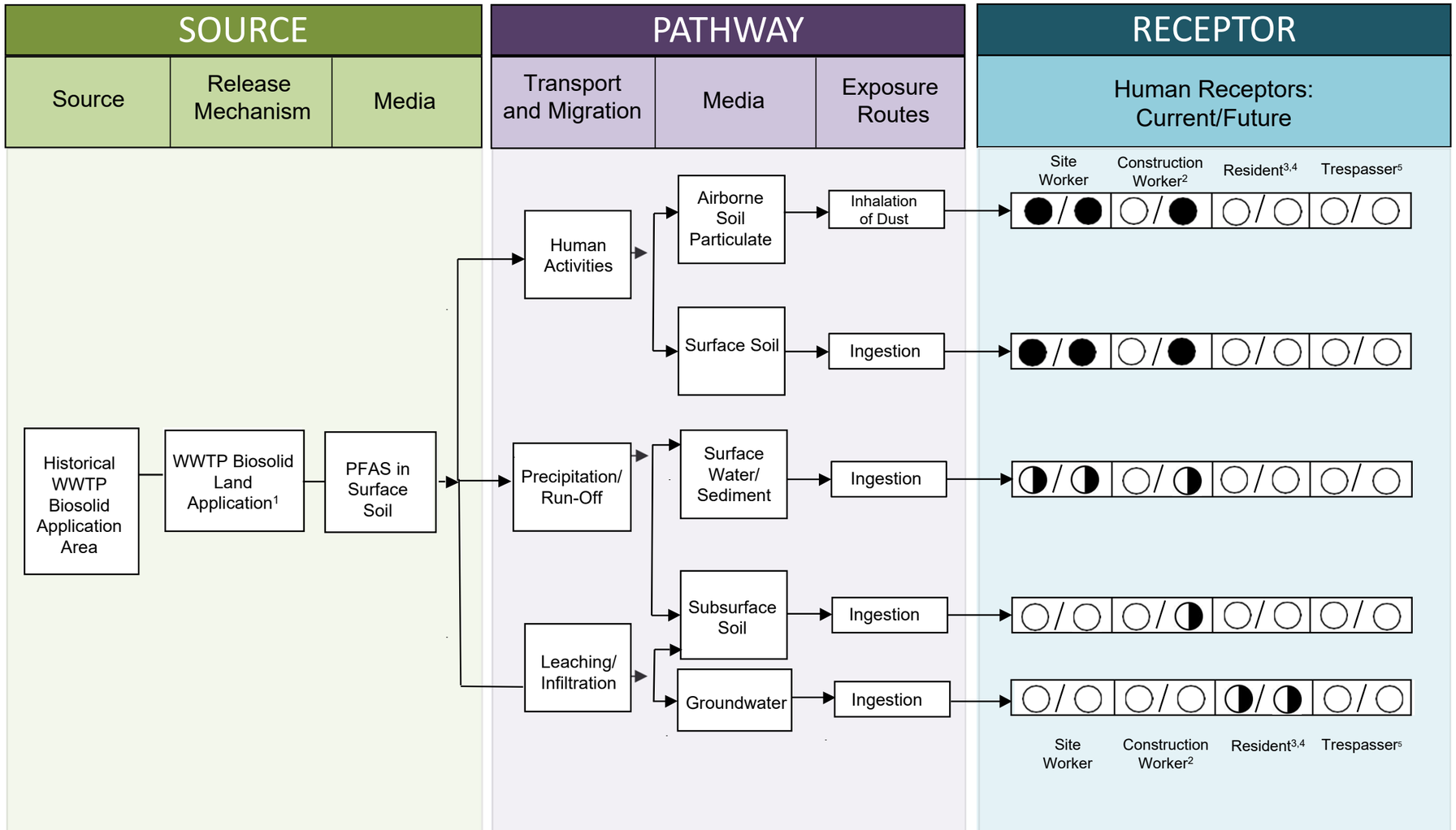

LEGEND

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

Notes:

1. Likely release mechanism for contaminated media is not the result of DoD activities.
2. No current active construction at the facility.
3. The resident refers to off-Facility drinking water receptors.
4. Inhalation of dust for off-Facility receptors is likely insignificant.
5. Trespassers are not considered likely due to the high level of security at the facility.

Figure 7-2
Conceptual Site Model
Historical WWTP Biosolid Application Area
Santa Fe 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 SITE INSPECTION ACTIVITIES SUMMARY

The SI field activities were conducted during two mobilizations. Field activities for the first mobilization were conducted from 7 to 8 February 2022 and consisted of hand augering and surface soil sample collection. The second mobilization was conducted 25 April through 3 June 2022. Field activities included sonic and DPT drilling, collection of soil samples, installation of permanent monitoring wells, groundwater gauging and sampling, and collection of spatial data. Field activities were conducted in accordance with the UFP-QAPP Addendum (EA 2021a), except as noted in **Section 5.8**.

To fulfill the project DQOs set forth in the approved SI UFP-QAPP Addendum (EA 2021), samples were collected and analyzed for a subset of 24 compounds by LC/MS/MS compliant with QSM 5.3 Table B-15. The 24 PFAS analyzed as part of the ARNG SI program are specified in **Section 5.6** of this SI Report. Samples collected and analyzed are as follows:

- Thirty-eight (38) soil grab samples from 16 boring locations
- Five (5) grab groundwater samples from five permanent monitoring wells
- Forty-six (46) quality assurance/quality control samples.

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

8.2 OUTCOME

Based on the results of this SI, further evaluation under CERCLA is warranted in an RI for AOI 1 (**Table 8-1**). The Historical WWTP Biosolid Application Area will also be assessed to determine if the contamination present poses a detrimental impact on human health for personnel at the Facility or the environment. Based on the CSMs developed and revised based on the SI findings, the exposure pathways are potentially complete for facility workers and construction workers during surface soil-disturbing activities and to construction workers during subsurface soil-disturbing activities from historical DoD activities. These pathways are also potentially complete from historical non-ARNG activities at the historical WWTP biosolid application area. Additionally, there are potentially complete exposure pathways for residential drinking water

receptors from releases during historical DoD activities and from historical non-ARNG sources at the Facility. Sample analytical concentrations collected during this SI were compared against the project SLs in soil and groundwater, as described in **Table 6-1**.

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

- At AOI 1:
  - PFOS was detected in surface soil above the SL in three of the 10 sampling locations with a maximum concentration of 920 µg/kg. PFOA, PFNA, and PFHxS were detected in soil samples at concentrations which did not exceed the SLs. PFBS was not detected in any soil samples collected from AOI 1.
  - PFOA and PFHxS were detected in groundwater at concentrations above the SL with a maximum concentration of 38 ng/L and 230 ng/L, respectively. PFHxS exceeded the SL in two of the three groundwater wells. Both wells with exceedances are screened in perched groundwater, downgradient of the suspected source area. PFBS was detected in both downgradient wells, but concentrations did not exceed the SL. PFOA and PFNA were not detected in groundwater at AOI 1.
- At the Historical WWTP Biosolids Area:
  - PFOA was detected in both surface soil sample locations and exceeded the SL in one location with a maximum concentration of 33 µg/kg.
  - PFOS was detected in both surface soil sample locations above the SL with a maximum concentration of 60 µg/kg.
  - PFBS, PFHxS, and PFNA were detected below SLs in one or more surface soil samples.
  - Neither subsurface soil nor groundwater were sampled in this area.
- At the facility boundary:
  - PFOA and PFOS were detected in three of four surface soil samples at concentrations below SLs. PFNA, PFBS, and PFHxS were not detected in surface soil samples.
  - PFOA, PFOS, PFBS, PFNA, and PFHxS were not detected in shallow or deep subsurface soil samples.
  - PFOA, PFOS, PFBS, PFNA, and PFHxS were not detected in groundwater samples.

Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI, as screening values were established after SI planning and execution. However, ARNG will add HFPO-DA to the list of constituents sampled during the next phase of CERCLA if warranted.

Table 8-1 summarizes the SI results for soil and groundwater used to determine if AOI 1 should be considered for further investigation under CERCLA and undergo an RI. It also summarizes SI results to determine if the historical WWTP biosolid application area should be considered for non-CERCLA evaluation.

Table 8-1. Summary of Site Inspection Findings

Area	Potential Release Area	Soil	Groundwater-On-Site	Groundwater – Facility Boundary	Future Action
AOI 1	Former Firetruck Bay and Tri-Max™ Hand Truck Storage Area	●	●	○	Proceed to RI
Historical WWTP Biosolid Application Area	Historical WWTP Biosolid Application	●	◑	○	Further Evaluation[1]

Notes:
1. This area will be assessed during the RI to determine if the contamination present poses a detrimental impact on human health for personnel at the facility or the environment

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Appendix A

Data Usability Assessment and Data Validation Reports

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DATA USABILITY ASSESSMENT

The Data Usability Assessment 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 data quality objectives (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.

Data quality indicators (DQIs) (precision, accuracy, representativeness, comparability, completeness, and sensitivity) are important components in assessing data usability. These DQIs are evaluated in the subsequent sections. The results of the evaluation demonstrate that the data presented in this Site Inspection (SI) Report are of high quality overall. Although most of the SI data are considered reliable, some degree of uncertainty can be associated with the data collected. Specific factors that may contribute to the uncertainty of the data evaluation are described below. The Data Validation Report (**Appendix A**) presents explanations for all qualified data in greater detail.

PRECISION

Precision is the degree of agreement among repeated measurements of the same characteristic on the same sample or on separate samples collected as close as possible in time and place. Field sampling precision is measured with the field duplicate relative percent differences (RPD), and laboratory precision is measured with RPDs for laboratory duplicates, such as laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) pairs and matrix spike (MS) and matrix spike duplicate (MSD) pairs.

LCS/LCSD pairs were prepared by addition of known concentrations of each analyte to a matrix-free media known to be free of target analytes. Results for LCS/LCSD pairs met the criterion of RPD≤30 percent (%), as specified in the Final Site Inspection Uniform Federal Policy (UFP)-Quality Assurance Project Plan (QAPP) Addendum, Santa Fe Army Aviation Support Facility, Santa Fe, New Mexico dated December 2021 (EA 2021), demonstrating that the analytical system was in control during sample preparation and analysis.

Matrix spike (MS)/matrix spike duplicate (MSD) pairs were prepared, analyzed, and reported for each preparation batch for PFAS analysis at a rate of 5%. MS/MSD results met the criterion of RPD≤30%, as specified in the UFP-QAPP Addendum (EA 2021), demonstrating good analytical precision for the matrix being tested.

Field duplicate samples were collected at a rate of 10% to assess the overall sampling and measurement precision for this sampling effort. The field duplicate samples were within the project established precision limits presented in the UFP-QAPP Addendum (50% for solid samples, 30% for water samples) (EA 2021) or differences were less than the average limit of quantitation (LOQ), indicating acceptable sampling and analytical precision, with the following exceptions. Perfluorohexanesulfonic acid (PFHxS) and perfluorooctanesulfonic acid (PFOS)

were detected in parent sample AOI01-04-SB-109-110 but not in duplicate sample AOI01-04-SB-109-110-DUP. The results were J or UJ qualified and are usable as qualified.

ACCURACY

Accuracy is a measure of confidence in a measurement. The smaller the difference between the measurement of a parameter and its "true" or expected value, the more accurate the measurement. The more precise or reproducible the result, the more reliable or accurate the result. Accuracy is measured through percent recoveries in calibration verification samples, LCS/LCSD, and MS/MSD, and through extraction internal standards (EIS).

LCS/LCSD samples were prepared by addition of known concentrations of each analyte to a matrix-free media known to be free of target analytes. LCS/LCSD samples were analyzed for each analytical batch and demonstrated that the analytical system was in control during sample preparation and analysis, with the following exceptions. perfluorohexanoic acid (PFHxA), perfluoroheptanoic acid, perfluorodecanoic acid, perfluorotridecanoic acid, perfluorotetradecanoic acid, PFHxS, perfluoroheptanesulfonic acid, perfluorononanesulfonic acid and/or 4:2 fluorotelomer sulfonic acid recoveries were low in LCS/LCSDs associated with field and equipment blanks. No data were qualified.

MS/MSDs were performed on soil samples SFAASF-04-SB-0-2 and AOI01-01-SB-13-15 and groundwater sample SFAASF-04-GW. Analyte recoveries in MS/MSD samples demonstrated that the analytical system was in control for both soil and water.

EIS were added by the laboratory during sample extraction to measure relative responses of target analytes and used to correct for bias associated with matrix interferences and sample preparation efficiencies, injection volume variances, mass spectrometry ionization efficiencies, and other associated preparation and analytical anomalies. Several field samples displayed EIS area counts less than the lower quality control (QC) limit of 50%. Four positive field sample results were associated with EIS recoveries less than the QC limit, but greater than 20%, and were qualified "J+"; these qualified results are considered usable as estimated values with a positive bias. Twenty non-detect field sample results associated with EIS recoveries less than the QC limit, but greater than 20%, were qualified UJ; these qualified results are also considered usable. The non-detect results for N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA) and N-ethylperfluorooctane sulfonamidoacetic acid (NEtFOSAA) in one soil sample and the non-detect result for NMeFOSAA in three other soil samples were associated with EIS recoveries less than 20%, and were qualified "X" by the validator, indicating that these results needed further evaluation during the Data Usability Assessment. As stated above, EIS recoveries are used to correct sample results for bias resulting from sample matrix as well as analytical variability; because the sample data are corrected based on the EIS recoveries, low recoveries do not necessarily impact data usability. Therefore, the project team has determined that results with very low EIS recoveries are usable for project purposes, and these five non-detect NMeFOSAA and NEtFOSAA soil results were UJ qualified.

Calibration verifications were performed routinely to ensure that instrument responses for all calibrated analytes were within established QC criteria. All calibration verifications were within the project established precision limits presented in the UFP-QAPP Addendum (EA 2021).

Transition ion ratios were outside the QSM-specified limits for one soil result and two groundwater results, which were qualified J. These data are usable as qualified.

REPRESENTATIVENESS

Representativeness qualitatively expresses the degree to which data accurately reflect site conditions. Factors that affect the representativeness of analytical data include appropriate sample population definitions, proper sample collection and preservation techniques, analytical holding times, use of standard analytical methods, and determination of matrix or analyte interferences.

Relating to the use of standard analytical methods, the laboratory followed the method as established in PFAS by liquid chromatography with tandem mass spectrometry (LC/MS/MS) compliant with QSM Version 5.3 Table B-15, including the specific preparation requirements (i.e., ENVI-Carb or equivalent used), mass calibration, spectra, all the ion transitions identified in Table B-15 were monitored, standards that contained both branch and linear isomers when available were used, and isotopically labeled standards were used for quantitation. The laboratory used approved standard methods in accordance with the UFP-QAPP Addendum (EA 2021) for all analyses.

Field QC samples were collected to assess the representativeness of the data collected. Field duplicates were collected at a rate of 10% and MS/MSD samples were collected at a rate of 5%. Appropriate preservation techniques were followed by the field staff, and maximum holding times for extraction and analysis were met by the laboratory.

Instrument blanks and method blanks were prepared by the laboratory in each batch as a negative control. Instrument blanks and method blanks were non-detect for all target analytes with the following exceptions. PFOS was detected in one laboratory blank associated with the analysis of field samples. Two PFOS results less than the LOQ were qualified U based on this detection.

Equipment blanks (EBs) and field blanks (FBs) were also collected for groundwater and soil samples. PFOS was above the detection limit in multiple EBs and FBs. PFBS was detected in four EBs. PFOSA was detected in two EBs and one FB. PFHxA, PFOA, and PFBA were detected in two EBs, and PFHxS was detected in one EB. Two detections of PFOS in associated field samples (one parent sample and one duplicate) were less than five times the concentration detected in the blank, but greater than the LOQ and were qualified J+. These qualified results are considered usable as estimated values with a positive bias. The detections of PFOS in associated field samples that were less than the limit of detection were the same results associated with a laboratory blank detection (see above) and were qualified as U. These results are usable as qualified and treated as non-detects. PFOS detections in associated samples that were greater than five times the concentration detected in the blank were not qualified.

COMPARABILITY

Comparability is the extent to which data from one study can be compared directly to either past data from the current project or data from another study. Using standardized sampling and analytical methods, units of reporting, and site selection procedures help ensure comparability. Standard field sampling and typical laboratory protocols were used during the SI and are considered comparable to ongoing investigations.

COMPLETENESS

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount of data expected under normal conditions. The laboratory provided data meeting system QC acceptance criteria for all samples tested. Project completeness was determined by evaluating the planned versus actual quantities of data. Percent completeness per parameter is as follows and reflects the exclusion of "R" flagged data:

- PFAS in groundwater by LC/MS/MS compliant with QSM Version 5.3 Table B-15 at 100%

- PFAS in soil by LC/MS/MS compliant with QSM Version 5.3 Table B-15 at 100%.

SENSITIVITY

Sensitivity is the capability of a test method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. Examples of QC measures for determining sensitivity include laboratory fortified blanks, a detection limit study, and calibration standards at the LOQ. In order to meet the needs of the data users, project data must meet the measurement performance criteria for sensitivity and project LOQs specified in the UFP-QAPP Addendum (EA 2021). The laboratory provided applicable calibration standards at the LOQ and reported all field sample results at the lowest possible dilution. Additionally, any analytes detected below the LOQ and above the detection limit were reported and qualified "J" as estimated values by the laboratory.

DATA USABILITY SUMMARY

Overall, the data are usable for evaluating the presence or absence of PFAS at the Facility. Sufficient usable data were obtained to meet the objectives of the SI and to complete the comparison to risk-based screening levels.

Data Validation Report

Santa Fe Army Aviation Support Facility
Santa Fe, New Mexico
Project # 3031200026.3000.****

Prepared for:

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

11/11/2021

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Table of Contents

List of Tables

List of Acronyms

%	percent
4:2 FTS	4:2 fluorotelomer sulfonic acid
ARNG	Army National Guard
CCV	continuing calibration verification
COC	chain of custody
DoD	Department of Defense
EA	EA Engineering, Science, and Technology, Inc., PBC
EIS	extracted internal standard
Eurofins	Eurofins Environment Testing America
ICAL	initial calibration
ICV	initial calibration verification
ID	identification
ISC	instrument sensitivity check
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOD	limit of detection
LOQ	limit of quantitation
MS	matrix spike
MSD	matrix spike duplicate
ng/L	nanograms per liter
PFAS	per- and polyfluoroalkyl substances
QAPP	quality assurance project plan
QC	quality control
QSM	Quality Systems Manual for Environmental Laboratories
RPD	relative percent difference
UFP	Uniform Federal Policy
Wood	Wood Environment & Infrastructure, Solutions, Inc.

1.0 Introduction

EA Engineering, Science, and Technology, Inc., PBC (EA) collected one aqueous sample on 14 October 2021 and submitted the sample to Eurofins Environment Testing America (Eurofins), located in Lancaster, Pennsylvania, where the sample was received on 15 October 2021 and assigned to job number 410-59356-1. Eurofins analyzed the sample for per- and polyfluoroalkyl substances (PFAS) by liquid chromatography tandem mass spectrometry compliant with Table B-15 of the Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3. The field sample identification (ID), collection date and time, and laboratory sample ID are presented in Table 1.

Table 1: Field Sample Submitted to Eurofins
Santa Fe Army Aviation Support Facility, Santa Fe, New Mexico

Field Sample ID	Collection Date and Time	Laboratory Sample ID
SFAASF-PW-01	10/14/21 10:47	410-59356-1

2.0 Data Validation Methodology

Wood Environment & Infrastructure Solutions, Inc. (Wood) performed DoD Stage 2B validation with review of the manual integration on data from the samples. The Stage 2B validation includes review of sample and instrument quality control (QC) results in the laboratory's analytical report and reported on QC summary forms, without review or validation of the raw analytical data. This data validation has been performed in accordance with:

- EA, 2020. Final Programmatic Uniform Federal Policy (UFP) Quality Assurance Project Plan (QAPP), Site Inspection for Per- and Polyfluoroalkyl Substances Impacted Sites, Army National Guard (ARNG) Installations, Nationwide, December.
- DoD, 2019a. DoD QSM, Version 5.3. May.
- DoD, 2019b. General Data Validation Guidelines, Revision 1. November.
- DoD, 2020. Data Validation Guidelines Module 3: Data Validation Procedure of Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-15. May.

The laboratory's certified analytical report and supporting documentation were reviewed to assess the following:

- Data package and electronic data deliverable completeness;
- Laboratory case narrative review;
- Chain of custody (COC) compliance;
- Holding time compliance;
- QC sample frequency;
- Initial calibration (ICAL), initial calibration verification (ICV), and continuing calibration verification (CCV) compliance with method specified criteria;
- Presence or absence of laboratory contamination as demonstrated by laboratory blanks;

- Accuracy and bias as demonstrated by recovery of surrogate spikes, laboratory control sample (LCS), and matrix spike (MS) samples;
- Internal standard recoveries;
- Analytical precision as relative percent difference (RPD) of analyte concentration between LCS/LCS duplicate (LCSD), laboratory duplicates, or MS/MS duplicate (MSD);
- Sampling and analytical precision as RPD of analyte concentration between primary samples and field duplicates;
- Assessment of field contamination as demonstrated by equipment and field blanks; and
- Insofar as possible, the degree of conformance to method requirements and good laboratory practices.

In general, it is important to recognize that no analytical data are guaranteed to be correct, even if all QC audits are passed. Strict QC serves to increase confidence in data, but any reported value may potentially contain error.

3.0 Explanation of Data Quality Indicators

Summary explanations of the specific data quality indicators reviewed during this data quality review are presented below.

3.1 Laboratory Control Sample Accuracy and Precision

LCSs and LCSDs are aliquots of analyte free matrices that are spiked with the analytes of interest for an analytical method, or a representative subset of those analytes. The spiked matrix is then processed through the same analytical procedures as the samples they accompany. LCS recovery and precision are an indication of a laboratory's ability to successfully perform an analytical method in an interference free matrix.

3.2 Matrix Spike Accuracy and Precision

MSs and MSDs are prepared by adding known amounts of the analytes of interest for an analytical method, or a representative subset of those analytes, to an aliquot of sample. The spiked sample is then processed through the same extraction, concentration, cleanup, and analytical procedures as the unspiked samples in an analytical batch.

MS recovery and precision are an indication of a laboratory's ability to successfully recover an analyte in the matrix of a specific sample or closely related sample matrices. It is important not to apply MS results for any specific sample to other samples without understanding how the sample matrices are related.

3.3 Blank Detections

Blank samples are aliquots of analyte free matrix that are used as negative controls to verify that the sample collection, storage, preparation, and analysis system does not produce false positive results.

Equipment blanks are prepared by passing analyte free water through or over sample collection equipment and collecting the water in sample containers. Equipment blanks are used to monitor for possible sample contamination during the sample collection process and serve as a check on the effectiveness of field decontamination procedures.

Field blanks are prepared by pouring an aliquot of analyte free water into a sample container in the field. Field blanks are analyzed for the analytical suite required for the project. Field blanks are used to monitor for possible sample contamination originating from the water used for equipment decontamination.

Laboratory blanks are processed by the laboratory using the same procedures as the field samples.

3.4 Laboratory and Field Duplicate Precision

Laboratory and field duplicate analyses verify acceptable method precision by the laboratory at the time of preparation and analysis and/or sampling precision at the time of collection.

4.0 Definitions of Qualifiers that May be Used During Data Validation

The qualifiers used in the text are the qualifiers applied for each individual QC issue and may not reflect the final qualifiers applied to the data.

J The reported result is an estimated quantity with an unknown bias.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

U The analyte was not detected and was reported as less than the limit of detection (LOD). The LOD has been adjusted for any dilution or concentration of the sample.

UJ The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.

X The sample results were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

5.0 Qualification Reason Codes

Wood applied the following reason codes to the data during validation:

EMPC The ion transition ratio is outside of expected limits.

TR The detected concentration is less than the limit of quantitation (LOQ).

6.0 Chain of Custody and Sample Receipt Condition Documentation

The sample was received at the laboratory under proper COC, intact, properly preserved, and at a temperature within the QAPP-specified temperature range of 2 to 6 degrees Celsius.

7.0 Specific Data Validation Findings

Data validation findings are presented in Sections 7.1 through 8.0.

7.1 Per- and Polyfluoroalkyl Substances Analysis

PFAS results generated by Eurofins may be considered usable with the limitations summarized in Sections 7.1 through 8.0.

7.1.1 Holding Time Compliance

The sample was extracted for PFAS within the QAPP-specified maximum holding time of 14 days from sample collection for water samples and the extract was analyzed within the QAPP-specified maximum hold time of 28 days from extraction.

7.1.2 Initial Calibration Compliance

The ICAL associated with the analysis of this sample met the QAPP-specified criteria of the calibration standards calculating to 70 to 130 percent (%) of their true concentrations and either correlation coefficients greater than or equal to 0.99 or relative standard deviations of the response factors less than or equal to 20%.

7.1.3 Initial Calibration Verification Accuracy

ICV recoveries were within the QAPP-specified 70% to 130% limits.

7.1.4 Instrument Sensitivity Check Standard Accuracy

Instrument sensitivity check (ISC) recoveries were within the QSM-specified 70 to 130% limits and samples were analyzed no more than 12 hours after a reported ISC.

7.1.5 Continuing Calibration Verification Accuracy

CCV recoveries were within the QAPP-specified 70 to 130% limits.

7.1.6 Laboratory Blank Detections

PFAS were not detected in the laboratory blank associated with the sample reviewed in this report.

7.1.7 Equipment and Field Blank Detections

EA did not collect equipment or field blanks with the sample reviewed in this report.

7.1.8 Laboratory Control Sample Accuracy and Precision

LCS recoveries were within QSM 5.3-specified limits and RPDs between LCS and LCSD results were less than the QSM-specified maxima of 30%.

7.1.9 Matrix Spikes/ Matrix Spike Duplicates Accuracy and Precision

Eurofins did not perform MS and MSD analyses on the sample reviewed in this report.

7.1.10 Laboratory Duplicate Precision

Eurofins did not perform a duplicate analysis on the sample reviewed in this report.

7.1.11 Extracted Internal Standard Accuracy

Extracted internal standard (EIS) recoveries were within the QAPP-specified limits of 50 to 150% of areas measured in the ICAL midpoint standard or 50 to 150% of the areas measured in the initial CCV on days when ICAL is not performed, with the following exception:

- Recovery of the EIS M2-4:2 fluorotelomer sulfonic acid (4:2 FTS) was high at 160% in sample SFAASF-PW-01. 4:2 FTS was not detected in the sample and data usability is not adversely affected by the high EIS recovery.

7.1.12 Data Reporting and Analytical Procedures

Eurofins I qualified results when ion transition ratios were outside of expected limits. Wood J qualified Eurofins' I qualified results. (Qualifier and reason code: J, EMPC)

Eurofins J qualified results with detected concentrations less than the LOQ. Wood agrees these results are quantitatively uncertain and has maintained the laboratory's J qualifiers. (J, TR)

8.0 Field Duplicate Precision

EA did not collect a field duplicate with the sample reviewed in this report.

9.0 Summary and Conclusions

Wood reviewed a total of 24 records from sample SFAASF-PW-01.

During validation Wood J qualified four results because the detected concentrations were less than the LOQ and/or because the ion transition ratio was outside of expected limits.

Data qualified during validation are summarized in Table 2.

Table 2: Qualifiers Applied During Validation
Santa Fe Army Aviation Support Facility, Santa Fe, New Mexico

Sample ID	Analyte	Concentration	Qualifier and Reason Code
SFAASF-PW-01	Perfluoroheptanoic acid	0.49 ng/L	J EMPC, TR
SFAASF-PW-01	Perfluorooctanoic acid	0.56 ng/L	J TR
SFAASF-PW-01	Perfluorobutanesulfonic acid	0.62 ng/L	J TR
SFAASF-PW-01	Perfluorooctanesulfonic acid	0.48 ng/L	J TR

Note:

ng/L = nanograms per liter

10.0 References

EA, 2020. Final Programmatic UFP-QAPP, Site Inspection for Per- and Polyfluoroalkyl Substances Impacted Sites, ARNG Installations, Nationwide, December.

DoD, 2019a. DoD QSM, Version 5.3. May.

DoD, 2019b. General Data Validation Guidelines, Revision 1. November.

DoD, 2020. Data Validation Guidelines Module 3: Data Validation Procedure of Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-15.

11.0 Limitations

This report was prepared for ARNG by Wood Environment & Infrastructure Solutions, Inc. The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in Wood services and based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This Data Validation report is intended to be used by ARNG for the Nationwide ARNG Installations Site Inspections for Per- and Polyfluoroalkyl Substances project only, subject to the terms and conditions of its contract with Wood. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

Data Validation Report

Santa Fe Army Aviation Support Facility
Santa Fe, New Mexico
Project # 3031200026.3000.****

Prepared for:

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

2/25/2022

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Table of Contents

List of Tables

List of Acronyms

%	percent
ARNG	Army National Guard
CCV	continuing calibration verification
COC	chain of custody
DoD	Department of Defense
EA	EA Engineering, Science, and Technology, Inc., PBC
EIS	extracted internal standard
Eurofins	Eurofins Environment Testing America
ICAL	initial calibration
ICV	initial calibration verification
ID	identification
ISC	instrument sensitivity check
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOD	limit of detection
LOQ	limit of quantitation
MS	matrix spike
MSD	matrix spike duplicate
NEtFOSAA	ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA	methyl perfluorooctanesulfonamidoacetic acid
PFAS	per- and polyfluoroalkyl substances
QAPP	quality assurance project plan
QC	quality control
QSM	Quality Systems Manual for Environmental Laboratories
RPD	relative percent difference
UFP	Uniform Federal Policy
Wood	Wood Environment & Infrastructure, Solutions, Inc.

1.0 Introduction

EA Engineering, Science, and Technology, Inc., PBC (EA) collected 19 samples, including 15 soil samples, two equipment blanks, and two field blanks on 7 and 8 February 2022 and submitted the sample to Eurofins Environment Testing America (Eurofins), located in Lancaster, Pennsylvania, where the samples were received on 9 February 2022 and assigned to job number 410-72247-1. Eurofins analyzed the sample for per- and polyfluoroalkyl substances (PFAS) by liquid chromatography tandem mass spectrometry compliant with Table B-15 of the Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3. The field sample identification (ID), collection date and time, and laboratory sample ID are presented in Table 1.

2.0 Data Validation Methodology

Wood Environment & Infrastructure Solutions, Inc. (Wood) performed DoD Stage 2B validation with review of the manual integration on data from the samples. The Stage 2B validation includes review of sample and instrument quality control (QC) results in the laboratory's analytical report and reported on QC summary forms, without review or validation of the raw analytical data. This data validation has been performed in accordance with:

- EA, 2020. Final Programmatic Uniform Federal Policy (UFP) Quality Assurance Project Plan (QAPP), Site Inspection for Per- and Polyfluoroalkyl Substances Impacted Sites, Army National Guard (ARNG) Installations, Nationwide, December.
- DoD, 2019a. DoD QSM, Version 5.3. May.
- DoD, 2019b. General Data Validation Guidelines, Revision 1. November.
- DoD, 2020. Data Validation Guidelines Module 3: Data Validation Procedure of Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-15. May.

The laboratory's certified analytical report and supporting documentation were reviewed to assess the following:

- Data package and electronic data deliverable completeness;
- Laboratory case narrative review;
- Chain of custody (COC) compliance;
- Holding time compliance;
- QC sample frequency;
- Initial calibration (ICAL), initial calibration verification (ICV), and continuing calibration verification (CCV) compliance with method specified criteria;
- Presence or absence of laboratory contamination as demonstrated by laboratory blanks;
- Accuracy and bias as demonstrated by recovery of surrogate spikes, laboratory control sample (LCS), and matrix spike (MS) samples;
- Internal standard recoveries;
- Analytical precision as relative percent difference (RPD) of analyte concentration between LCS/LCS duplicate (LCSD), laboratory duplicates, or MS/MS duplicate (MSD);

- Sampling and analytical precision as RPD of analyte concentration between primary samples and field duplicates;
- Assessment of field contamination as demonstrated by equipment and field blanks; and
- Insofar as possible, the degree of conformance to method requirements and good laboratory practices.

In general, it is important to recognize that no analytical data are guaranteed to be correct, even if all QC audits are passed. Strict QC serves to increase confidence in data, but any reported value may potentially contain error.

3.0 Explanation of Data Quality Indicators

Summary explanations of the specific data quality indicators reviewed during this data quality review are presented below.

3.1 Laboratory Control Sample Accuracy and Precision

LCSs and LCSDs are aliquots of analyte free matrices that are spiked with the analytes of interest for an analytical method, or a representative subset of those analytes. The spiked matrix is then processed through the same analytical procedures as the samples they accompany. LCS recovery and precision are an indication of a laboratory's ability to successfully perform an analytical method in an interference free matrix.

3.2 Matrix Spike Accuracy and Precision

MSs and MSDs are prepared by adding known amounts of the analytes of interest for an analytical method, or a representative subset of those analytes, to an aliquot of sample. The spiked sample is then processed through the same extraction, concentration, cleanup, and analytical procedures as the unspiked samples in an analytical batch.

MS recovery and precision are an indication of a laboratory's ability to successfully recover an analyte in the matrix of a specific sample or closely related sample matrices. It is important not to apply MS results for any specific sample to other samples without understanding how the sample matrices are related.

3.3 Blank Detections

Blank samples are aliquots of analyte free matrix that are used as negative controls to verify that the sample collection, storage, preparation, and analysis system does not produce false positive results.

Equipment blanks are prepared by passing analyte free water through or over sample collection equipment and collecting the water in sample containers. Equipment blanks are used to monitor for possible sample contamination during the sample collection process and serve as a check on the effectiveness of field decontamination procedures.

Field blanks are prepared by pouring an aliquot of analyte free water into a sample container in the field. Field blanks are analyzed for the analytical suite required for the project. Field blanks are used to monitor for possible sample contamination originating from the water used for equipment decontamination.

Laboratory blanks are processed by the laboratory using the same procedures as the field samples.

3.4 Laboratory and Field Duplicate Precision

Laboratory and field duplicate analyses verify acceptable method precision by the laboratory at the time of preparation and analysis and/or sampling precision at the time of collection.

4.0 Definitions of Qualifiers that May be Used During Data Validation

The qualifiers used in the text are the qualifiers applied for each individual QC issue and may not reflect the final qualifiers applied to the data.

J The reported result is an estimated quantity with an unknown bias.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

U The analyte was not detected and was reported as less than the limit of detection (LOD). The LOD has been adjusted for any dilution or concentration of the sample.

UJ The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.

X The sample results were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

5.0 Qualification Reason Codes

Wood applied the following reason codes to the data during validation:

EMPC The ion transition ratio is outside of expected limits.

ISL Low extracted internal standard (EIS) recovery.

TR The detected concentration is less than the limit of quantitation (LOQ).

6.0 Chain of Custody and Sample Receipt Condition Documentation

The sample was received at the laboratory under proper COC, intact, properly preserved, and at a temperature within the QAPP-specified temperature range of 2 to 6 degrees Celsius, with the following exception:

- According to the case narrative:
  - The collection date recorded on the COC for sample SFAASF-01-SB-0-2 was 28 February 2022 and the matrix was recorded as being water. Eurofins logged in the sample using the date and matrix recorded on the label.
  - Samples AOI01-04-SB-0-2 and AOI01-03-SB-0-2 were listed as AOI1-04-SB-0-2 and AOI1-03-SB-0-2 on the COC. Eurofins contacted the client and were instructed to log the samples as AOI01-04-SB-0-2 and AOI01-03-SB-0-2.
- The samples arrived at the laboratory with a temperature below the range specified in the QAPP, however, it does not appear that the samples were frozen and data usability is not adversely affected by the low temperature.

7.0 Specific Data Validation Findings

Data validation findings are presented in Sections 7.1 through 8.0.

7.1 Per- and Polyfluoroalkyl Substances Analysis

PFAS results generated by Eurofins may be considered usable with the limitations summarized in Sections 7.1 through 8.0.

7.1.1 Holding Time Compliance

The samples were extracted for PFAS within the QAPP-specified maximum holding time of 14 days from sample collection for water samples or 28 days from collection for soil samples and the extracts were analyzed within the QAPP-specified maximum hold time of 28 days from extraction.

7.1.2 Initial Calibration Compliance

The ICAL associated with the analysis of these samples met the QAPP-specified criteria of the calibration standards calculating to 70 to 130 percent (%) of their true concentrations and either correlation coefficients greater than or equal to 0.99 or relative standard deviations of the response factors less than or equal to 20%.

7.1.3 Initial Calibration Verification Accuracy

ICV recoveries were within the QAPP-specified 70% to 130% limits.

7.1.4 Instrument Sensitivity Check Standard Accuracy

Instrument sensitivity check (ISC) recoveries were within the QSM-specified 70 to 130% limits and samples were analyzed no more than 12 hours after a reported ISC.

7.1.5 Continuing Calibration Verification Accuracy

CCV recoveries were within the QAPP-specified 70 to 130% limits.

7.1.6 Laboratory Blank Detections

PFAS were not detected in the laboratory blanks associated with the samples reviewed in this report.

7.1.7 Equipment and Field Blank Detections

Target analytes were not detected in the equipment and field blanks associated with the samples reviewed in this report.

7.1.8 Laboratory Control Sample Accuracy and Precision

LCS and LCSD recoveries were within QSM 5.3-specified limits and RPDs between LCS and LCSD results were less than the QAPP-specified maximum of 30%.

7.1.9 Matrix Spikes/ Matrix Spike Duplicates Accuracy and Precision

Eurofins performed MS and MSD analyses on sample SFAASF-04-SB-0-2. MS and MSD recoveries were within QSM 5.3-specified limits and RPDs between MS and MSD results were less than the QAPP-specified maximum of 30%.

7.1.10 Laboratory Duplicate Precision

Eurofins did not perform duplicate analyses on any of the samples reviewed in this report.

7.1.11 Extracted Internal Standard Accuracy

The EISs reported in the Isotope Dilution Summaries associated with the samples reviewed in this report were incorrectly calculated using the average initial calibration (ICAL) response, however, the EISs were reported correctly in Form VIII: PFAS ISOTOPE DILUTION SUMMARY AREA AND RETENTION TIME SUMMARY, in accordance with the criteria listed below. For this report, Wood used this form to evaluate the recoveries of the EISs.

EIS area counts were within the QAPP-specified limits of 50 to 150% of areas measured in the ICAL midpoint standard or 50 to 150% of the areas measured in the initial CCV on days when ICAL is not performed, with the following exception:

- Recoveries of EIS d_3-N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA) and d_3-N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA) were low in the analysis of samples AOI01-01-SB-0-2 (37%, 23%), AOI01-02-SB-0-2-D (16%, 9.4%), AOI01-04-SB-0-2 (27%, 18%), AOI01-07-SB-0-2 (48%, 33%), AOI01-08-SB-0-2 (40%, 34%), SFAASF-03-SB-0-2 (40%, 29%), SFAASF-04-SB-0-2 (26%, 16%), and SFAASF-05-SB-0-2 (27%, 19%). Data limitations are summarized below.
  - Wood X qualified the non-detect NEtFOSAA and NMeFOSAA results from sample AOI01-02-SB-0-2-D; and the non-detect NMeFOSAA results from samples AOI01-04-SB-0-2, SFAASF-04-SB-0-2, and SFAASF-05-SB-0-2 due to extremely low EIS recoveries. (Qualification and reason code: X, ISL)
  - Wood J+ qualified the detected NEtFOSAA result from sample SFAASF-05-SB-0-2 because of low EIS recovery. (Qualifier and reason code: J+, ISL)
  - Wood UJ qualified the non-detect NEtFOSAA and NMeFOSAA results from samples SFAASF-03-SB-0-2, AOI01-01-SB-0-2, AOI01-07-SB-0-2, and AOI01-08-SB-0-2; and the non-detect NEtFOSAA results from samples AOI01-04-SB-0-2 and SFAASF-04-SB-0-2 because of the low EIS recoveries. (Qualifier and reason code: UJ, ISL)
- Recoveries of EIS d_3-NMeFOSAA were low in the analysis of samples AOI01-02-SB-0-2 (41%), SFAASF-01-SB-0-2 (39%), and SFAASF-02-SB-0-2-D (48%). Wood J+ qualified the detected NMeFOSAA results from samples SFAASF-01-SB-0-2 and SFAASF-02-SB-0-2-D; and UJ qualified the non-detect NMeFOSAA result from sample AOI01-02-SB-0-2 because of the low EIS recoveries. (Qualifier and reason code: J+/UJ, ISL)

7.1.12 Data Reporting and Analytical Procedures

Eurofins I qualified results when ion transition ratios were outside of expected limits. Wood J qualified Eurofins' I qualified results. (Qualifier and reason code: J, EMPC)

Eurofins J qualified results with detected concentrations less than the LOQ. Wood agrees these results are quantitatively uncertain and has maintained the laboratory's J qualifiers. (J, TR)

8.0 Field Duplicate Precision

Wood collected field duplicates with samples:

- SFAASF-02-SB-0-2 (SFAASF-02-SB-0-2-D); and
- AOI01-02-SB-0-2 (AOI01-02-SB-0-2-D).

Target analyte detections are summarized in Table 2. Precision values were less than the QAPP-specified maximum of 50% or differences between analyte concentrations were less than the LOQ.

9.0 Summary and Conclusions

Wood reviewed a total of 360 records from field samples during the validation and applied the following qualifiers to the data:

- X: Wood X qualified five records (1.4%) due to extremely low EIS recoveries.
- J+: Wood J+ qualified three records (0.83%) as having potential high analytical bias due to low EIS recoveries..
- J/UJ: Wood J or UJ qualified 59 records (16%) due to low EIS recoveries, detected concentrations were less than the LOQ and/or the ion transition ratio was outside of expected limits.

Data qualified during validation are summarized in Table 3.

10.0 References

EA, 2020. Final Programmatic UFP-QAPP, Site Inspection for Per- and Polyfluoroalkyl Substances Impacted Sites, ARNG Installations, Nationwide, December.

DoD, 2019a. DoD QSM, Version 5.3. May.

DoD, 2019b. General Data Validation Guidelines, Revision 1. November.

DoD, 2020. Data Validation Guidelines Module 3: Data Validation Procedure of Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-15.

11.0 Limitations

This report was prepared for EA by Wood Environment & Infrastructure Solutions, Inc. The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in Wood services and based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This Data Validation report is intended to be used by EA for the Nationwide ARNG Installations Site Inspections for Per- and Polyfluoroalkyl Substances project only, subject to the terms and conditions of its contract with Wood. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

Tables

Table 1
Field Samples Submitted to Eurofins Environment Testing America
Santa Fe Army Aviation Support Facility
Santa Fe, New Mexico

Sample Identification	Matrix	Collection Date	Laboratory Sample Identification	Notes
SFAASF-03-SB-0-2	Solid	2/7/2022 11:30	410-72247-1	
SFAASF-04-SB-0-2	Solid	2/7/2022 12:10	410-72247-2	
SFAASF-05-SB-0-2	Solid	2/7/2022 12:53	410-72247-3	
AOI01-06-SB-0-2	Solid	2/7/2022 13:10	410-72247-4	
AOI01-05-SB-0-2	Solid	2/7/2022 13:25	410-72247-5	
AOI01-04-SB-0-2	Solid	2/7/2022 13:40	410-72247-6	
AOI01-03-SB-0-2	Solid	2/7/2022 14:00	410-72247-7	
SFAASF-EB-01	Water	2/7/2022 11:50	410-72247-8	Equipment Blank
SFAASF-FB-01	Water	2/7/2022 12:00	410-72247-9	Field Blank
SFAASF-01-SB-0-2	Solid	2/8/2022 10:20	410-72247-10	
SFAASF-02-SB-0-2	Solid	2/8/2022 10:55	410-72247-11	
SFAASF-02-SB-0-2-D	Solid	2/8/2022 10:55	410-72247-12	Field Duplicate
AOI01-08-SB-0-2	Solid	2/8/2022 11:56	410-72247-13	
AOI01-07-SB-0-2	Solid	2/8/2022 12:22	410-72247-14	
AOI01-02-SB-0-2	Solid	2/8/2022 12:58	410-72247-15	
AOI01-02-SB-0-2-D	Solid	2/8/2022 12:58	410-72247-16	Field Duplicate
AOI01-01-SB-0-2	Solid	2/8/2022 13:50	410-72247-17	
SFAASF-EB-02	Water	2/8/2022 10:40	410-72247-18	Equipment Blank
SFAASF-FB-02	Water	2/8/2022 12:00	410-72247-19	Field Blank

Table 2
Field Duplicate Detections
Santa Fe Army Aviation Support Facility
Santa Fe, New Mexico

Analyte	Average Limit of Quantitation	Primary Sample	Field Duplicate	Relative Percent Difference	Notes
Samples SFAASF-02-SB-0-2 and SFAASF-02-SB-0-2-D					
Perfluorohexanoic acid	0.66 ng/g	3.8	3.9	2.6%	
Perfluoroheptanoic acid	0.66 ng/g	8.2	9.1	10%	
Perfluorooctanoic acid	0.66 ng/g	30	33	10%	
Perfluorononanoic acid	0.66 ng/g	2.9	2.9	0%	
Perfluorodecanoic acid	0.66 ng/g	6.1	5.4	12%	
Perfluorotridecanoic acid	0.66 ng/g	0.26 J	0.22 J	17%	
Perfluorotetradecanoic acid	0.66 ng/g	0.68	0.60 J	13%	
Perfluorobutanesulfonic acid	2.2 ng/g	0.58 J	0.59 J	1.7%	
Perfluorohexanesulfonic acid	0.66 ng/g	4.5	4.7	4.3%	
Perfluorooctanesulfonic acid	0.66 ng/g	60	49	20%	
NEtFOSAA	2.2 ng/g	12	9.8	20%	
NMeFOSAA	2.2 ng/g	1.4 J	1.1 J	24%	
Perfluoropentanesulfonic acid	3.3 ng/g	0.64 J	0.74 J	14%	
Perfluoroheptanesulfonic acid	0.66 ng/g	0.82	0.73	12%	
Perfluorodecanesulfonic acid	0.66 ng/g	13	9.5	31%	
Perfluorooctanesulfonamide	0.66 ng/g	2.3	1.7	30%	
Perfluoropentanoic acid	0.66 ng/g	1.9	1.9	0%	
Perfluoroundecanoic acid	0.66 ng/g	1.1	0.87	23%	
Perfluorododecanoic acid	0.66 ng/g	2.3	2.1	9.1%	
Samples AOI01-02-SB-0-2 and AOI01-02-SB-0-2-D					
Perfluorooctanoic acid	0.65 ng/g	0.26 J	0.53 J	68%	± LOQ
Perfluorononanoic acid	0.65 ng/g	0.32 J	0.51 J	46%	
Perfluorodecanoic acid	0.65 ng/g	0.34 J	0.46 U	NC	
Perfluorohexanesulfonic acid	0.65 ng/g	0.50 J	0.96	63%	± LOQ
Perfluorooctanesulfonic acid	0.65 ng/g	61	86	34%	
Perfluorodecanesulfonic acid	0.65 ng/g	0.33 J	0.46 U	NC	

Notes:
NC = not calculable
ng/g = nanograms per gram

Qualifier Definitions:
J = The reported result was an estimated value.
U = The analyte was not detected and was reported as less than the limit of detection (LOD). The LOD has been adjusted for any dilution or concentration of the sample.

Reason Code:
± LOQ = The difference between sample and field duplicate analyte concentrations is less than the limit of quantitation, demonstrating acceptable sampling and analytical precision.

Table 3
Qualifiers Added During Validation
Santa Fe Army Aviation Support Facility
Santa Fe, New Mexico

Sample Identification	Analyte	Result	Qualifier and Reason Code(s)
AOI01-01-SB-0-2	NEtFOSAA	0.41 ng/g	UJ ISL
AOI01-01-SB-0-2	NMeFOSAA	0.41 ng/g	UJ ISL
AOI01-01-SB-0-2	Perfluorohexanesulfonic acid	0.41 ng/g	J TR
AOI01-01-SB-0-2	Perfluorohexanoic acid	0.25 ng/g	J TR
AOI01-02-SB-0-2	NMeFOSAA	0.43 ng/g	UJ ISL
AOI01-02-SB-0-2	Perfluorodecanesulfonic acid	0.33 ng/g	J TR
AOI01-02-SB-0-2	Perfluorodecanoic acid	0.34 ng/g	J TR
AOI01-02-SB-0-2	Perfluorohexanesulfonic acid	0.50 ng/g	J TR
AOI01-02-SB-0-2	Perfluorononanoic acid	0.32 ng/g	J TR
AOI01-02-SB-0-2	Perfluorooctanoic acid	0.26 ng/g	J TR
AOI01-02-SB-0-2-D	NEtFOSAA	0.46 ng/g	X ISL
AOI01-02-SB-0-2-D	NMeFOSAA	0.46 ng/g	X ISL
AOI01-02-SB-0-2-D	Perfluorononanoic acid	0.51 ng/g	J TR
AOI01-02-SB-0-2-D	Perfluorooctanoic acid	0.53 ng/g	J TR
AOI01-03-SB-0-2	Perfluorooctanoic acid	0.39 ng/g	J TR
AOI01-04-SB-0-2	NEtFOSAA	0.42 ng/g	UJ ISL
AOI01-04-SB-0-2	NMeFOSAA	0.42 ng/g	X ISL
AOI01-04-SB-0-2	Perfluorohexanoic acid	0.32 ng/g	J TR
AOI01-04-SB-0-2	Perfluorooctanoic acid	0.36 ng/g	J TR
AOI01-07-SB-0-2	NEtFOSAA	0.44 ng/g	UJ ISL
AOI01-07-SB-0-2	NMeFOSAA	0.44 ng/g	UJ ISL
AOI01-07-SB-0-2	Perfluoroheptanoic acid	0.43 ng/g	J TR
AOI01-07-SB-0-2	Perfluoropentanesulfonic acid	0.30 ng/g	J TR
AOI01-07-SB-0-2	Perfluoropentanoic acid	0.48 ng/g	J TR
AOI01-07-SB-0-2	Perfluoroundecanoic acid	0.56 ng/g	J TR
AOI01-08-SB-0-2	NEtFOSAA	0.47 ng/g	UJ ISL
AOI01-08-SB-0-2	NMeFOSAA	0.47 ng/g	UJ ISL
AOI01-08-SB-0-2	Perfluorohexanesulfonic acid	0.30 ng/g	J TR
AOI01-08-SB-0-2	Perfluorooctanoic acid	0.47 ng/g	J EMPC, TR
SFAASF-01-SB-0-2	NMeFOSAA	0.93 ng/g	J+ ISL, TR
SFAASF-01-SB-0-2	Perfluoroheptanesulfonic acid	0.45 ng/g	J TR
SFAASF-01-SB-0-2	Perfluoropentanesulfonic acid	0.45 ng/g	J TR
SFAASF-01-SB-0-2	Perfluoropentanoic acid	0.52 ng/g	J TR
SFAASF-01-SB-0-2	Perfluorotetradecanoic acid	0.60 ng/g	J TR
SFAASF-01-SB-0-2	Perfluorotridecanoic acid	0.27 ng/g	J TR
SFAASF-02-SB-0-2	NMeFOSAA	1.4 ng/g	J TR
SFAASF-02-SB-0-2	Perfluorobutanesulfonic acid	0.58 ng/g	J TR
SFAASF-02-SB-0-2	Perfluoropentanesulfonic acid	0.64 ng/g	J TR
SFAASF-02-SB-0-2	Perfluorotridecanoic acid	0.26 ng/g	J TR
SFAASF-02-SB-0-2-D	NMeFOSAA	1.1 ng/g	J+ ISL, TR
SFAASF-02-SB-0-2-D	Perfluorobutanesulfonic acid	0.59 ng/g	J TR
SFAASF-02-SB-0-2-D	Perfluoropentanesulfonic acid	0.74 ng/g	J TR
SFAASF-02-SB-0-2-D	Perfluorotetradecanoic acid	0.60 ng/g	J TR
SFAASF-02-SB-0-2-D	Perfluorotridecanoic acid	0.22 ng/g	J TR
SFAASF-03-SB-0-2	NEtFOSAA	0.43 ng/g	UJ ISL
SFAASF-03-SB-0-2	NMeFOSAA	0.43 ng/g	UJ ISL
SFAASF-03-SB-0-2	Perfluorodecanoic acid	0.22 ng/g	J TR

Table 3
Qualifiers Added During Validation
Santa Fe Army Aviation Support Facility
Santa Fe, New Mexico

Sample Identification	Analyte	Result	Qualifier and Reason Code(s)
SFAASF-03-SB-0-2	Perfluorohexanoic acid	0.45 ng/g	J TR
SFAASF-03-SB-0-2	Perfluorooctanesulfonic acid	0.48 ng/g	J TR
SFAASF-03-SB-0-2	Perfluorooctanoic acid	0.53 ng/g	J TR
SFAASF-03-SB-0-2	Perfluoropentanoic acid	0.29 ng/g	J TR
SFAASF-04-SB-0-2	NEtFOSAA	0.43 ng/g	UJ ISL
SFAASF-04-SB-0-2	NMeFOSAA	0.43 ng/g	X ISL
SFAASF-04-SB-0-2	Perfluorodecanesulfonic acid	0.37 ng/g	J TR
SFAASF-04-SB-0-2	Perfluorodecanoic acid	0.47 ng/g	J TR
SFAASF-04-SB-0-2	Perfluorododecanoic acid	0.22 ng/g	J TR
SFAASF-04-SB-0-2	Perfluoroheptanoic acid	0.47 ng/g	J TR
SFAASF-04-SB-0-2	Perfluorohexanoic acid	0.48 ng/g	J TR
SFAASF-04-SB-0-2	Perfluorooctanoic acid	0.60 ng/g	J TR
SFAASF-04-SB-0-2	Perfluoropentanoic acid	0.23 ng/g	J TR
SFAASF-05-SB-0-2	NEtFOSAA	0.48 ng/g	J+ ISL, EMPC, TR
SFAASF-05-SB-0-2	NMeFOSAA	0.42 ng/g	X ISL
SFAASF-05-SB-0-2	Perfluorodecanesulfonic acid	0.28 ng/g	J TR
SFAASF-05-SB-0-2	Perfluorodecanoic acid	0.27 ng/g	J TR
SFAASF-05-SB-0-2	Perfluoroheptanoic acid	0.33 ng/g	J TR
SFAASF-05-SB-0-2	Perfluorohexanoic acid	0.43 ng/g	J TR
SFAASF-05-SB-0-2	Perfluoropentanoic acid	0.24 ng/g	J TR

Notes:
ng/g = nanograms per gram
NEtFOSAA = ethyl perfluorooctanesulfonamidoacetic acid
NMeFOSAA = methyl perfluorooctanesulfonamidoacetic acid

Qualifiers:
J = The reported result was an estimated value.
J+ = The reported result was an estimated value with a potential high bias.
UJ = The analyte was not detected and was reported as less than the limit of detection. However, the associated numerical value is approximate.
X = The sample results were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

Reason Codes:
EMPC = Ion transition ratio is outside of expected limits.
ISL = Low extracted internal standard recovery.
TR = The detected analyte concentration is less than the limit of quantitation.

Data Validation Report

Santa Fe Army Aviation Support Facility
Santa Fe, New Mexico
Project # 3031200026.3000.****

Prepared for:

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

6/27/2022

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Table of Contents

List of Tables

List of Acronyms

°C	degrees Celsius
%	percent
ARNG	Army National Guard
CCV	continuing calibration verification
COC	chain of custody
DoD	Department of Defense
EA	EA Engineering, Science, and Technology, Inc., PBC
EIS	extracted internal standard
Eurofins	Eurofins Environment Testing America
FTS	fluorotelomer sulfonic acid
g	grams
ICAL	initial calibration
ICV	initial calibration verification
ID	identification
ISC	instrument sensitivity check
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOD	limit of detection
LOQ	limit of quantitation
mL	milliliters
MS	matrix spike
MSD	matrix spike duplicate
NEtFOSAA	ethyl perfluorooctanesulfonamidoacetic acid
ng/g	nanograms per gram
ng/L	nanograms per liter
NMeFOSAA	methyl perfluorooctanesulfonamidoacetic acid
PFAS	per- and polyfluoroalkyl substances
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFHpA	perfluoroheptanoic acid
PFHpS	perfluoroheptanesulfonic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNS	perfluorononanesulfonic acid
PFOA	perfluorooctanoic acid

PFOS	perfluorooctanesulfonic acid
PFOSA	perfluorooctanesulfonamide
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
QAPP	quality assurance project plan
QC	quality control
QSM	Quality Systems Manual for Environmental Laboratories
RPD	relative percent difference
UFP	Uniform Federal Policy
Wood	Wood Environment & Infrastructure, Solutions, Inc.

1.0 Introduction

EA Engineering, Science, and Technology, Inc., PBC (EA) collected 26 soil samples (including 3 field duplicates) and 41 water samples (including 1 field duplicate, 18 equipment blanks, and 17 field blanks) between 25 April and 20 May 2022. EA submitted the samples to Eurofins Environment Testing America (Eurofins), located in Lancaster, Pennsylvania, where the samples were received between 27 April and 21 May 2022 and assigned to job number 410-81788-1, 410-82129-1, 410-82454-1, 410-82468-1, 410-83020-1, 410-83061-1, 410-83313-1, and 410-84932-1. Eurofins analyzed the samples for per- and polyfluoroalkyl substances (PFAS) by liquid chromatography tandem mass spectrometry compliant with Table B-15 of the Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3. The field sample identifications (IDs), collection dates and times, and laboratory sample IDs are presented in Table 1.

2.0 Data Validation Methodology

Wood Environment & Infrastructure Solutions, Inc. (Wood) performed DoD Stage 2B validation with review of the manual integration on PFAS data from the samples. The Stage 2B validation includes review of sample and instrument quality control (QC) results in the laboratory's analytical report and reported on QC summary forms, without review or validation of the raw analytical data. This data validation has been performed in accordance with:

- EA, 2020. Final Programmatic Uniform Federal Policy (UFP) Quality Assurance Project Plan (QAPP), Site Inspection for Per- and Polyfluoroalkyl Substances Impacted Sites, Army National Guard (ARNG) Installations, Nationwide, December.
- DoD, 2019a. DoD QSM, Version 5.3. May.
- DoD, 2019b. General Data Validation Guidelines, Revision 1. November.
- DoD, 2020. Data Validation Guidelines Module 3: Data Validation Procedure of Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-15. May.

The laboratory's certified analytical report and supporting documentation were reviewed to assess the following:

- Data package and electronic data deliverable completeness;
- Laboratory case narrative review;
- Chain of custody (COC) compliance;
- Holding time compliance;
- QC sample frequency;
- Initial calibration (ICAL), initial calibration verification (ICV), and continuing calibration verification (CCV) compliance with method specified criteria;
- Presence or absence of laboratory contamination as demonstrated by laboratory blanks;
- Accuracy and bias as demonstrated by recovery of surrogate spikes, laboratory control sample (LCS), and matrix spike (MS) samples;
- Internal standard recoveries;

- Analytical precision as relative percent difference (RPD) of analyte concentration between LCS/LCS duplicate (LCSD), laboratory duplicates, or MS/MS duplicate (MSD);
- Sampling and analytical precision as RPD of analyte concentration between primary samples and field duplicates;
- Assessment of field contamination as demonstrated by equipment and field blanks; and
- Insofar as possible, the degree of conformance to method requirements and good laboratory practices.

In general, it is important to recognize that no analytical data are guaranteed to be correct, even if all QC audits are passed. Strict QC serves to increase confidence in data, but any reported value may potentially contain error.

3.0 Explanation of Data Quality Indicators

Summary explanations of the specific data quality indicators reviewed during this data quality review are presented below.

3.1 Laboratory Control Sample Accuracy and Precision

LCSs and LCSDs are aliquots of analyte free matrices that are spiked with the analytes of interest for an analytical method, or a representative subset of those analytes. The spiked matrix is then processed through the same analytical procedures as the samples they accompany. LCS recovery and precision are an indication of a laboratory's ability to successfully perform an analytical method in an interference free matrix.

3.2 Matrix Spike Accuracy and Precision

MSs and MSDs are prepared by adding known amounts of the analytes of interest for an analytical method, or a representative subset of those analytes, to an aliquot of sample. The spiked sample is then processed through the same extraction, concentration, cleanup, and analytical procedures as the unspiked samples in an analytical batch.

MS recovery and precision are an indication of a laboratory's ability to successfully recover an analyte in the matrix of a specific sample or closely related sample matrices. It is important not to apply MS results for any specific sample to other samples without understanding how the sample matrices are related.

3.3 Blank Detections

Blank samples are aliquots of analyte free matrix that are used as negative controls to verify that the sample collection, storage, preparation, and analysis system does not produce false positive results.

Equipment blanks are prepared by passing analyte free water through or over sample collection equipment and collecting the water in sample containers. Equipment blanks are used to monitor for possible sample contamination during the sample collection process and serve as a check on the effectiveness of field decontamination procedures.

Field blanks are prepared by pouring an aliquot of analyte free water into a sample container in the field. Field blanks are analyzed for the analytical suite required for the project. Field blanks are used to monitor for possible sample contamination originating from the water used for equipment decontamination.

Laboratory blanks are processed by the laboratory using the same procedures as the field samples.

3.4 Laboratory and Field Duplicate Precision

Laboratory and field duplicate analyses verify acceptable method precision by the laboratory at the time of preparation and analysis and/or sampling precision at the time of collection.

4.0 Definitions of Qualifiers that May be Used During Data Validation

The qualifiers used in the text are the qualifiers applied for each individual QC issue and may not reflect the final qualifiers applied to the data.

J The reported result is an estimated quantity with an unknown bias.

J+ The result is an estimated quantity, but the result may be biased high.

J- The result is an estimated quantity, but the result may be biased low.

U The analyte was not detected and was reported as less than the limit of detection (LOD). The LOD has been adjusted for any dilution or concentration of the sample.

UJ The analyte was not detected and was reported as less than the LOD. However, the associated numerical value is approximate.

X The sample results were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

5.0 Qualification Reason Codes

Wood applied the following reason codes to the data during validation:

EBG The analyte was detected in the associated equipment blank and the concentration detected in the sample was greater than the limit of quantitation (LOQ) and less than five times the concentration detected in the blank.

EBL The analyte was detected in the associated equipment blank and the concentration detected in the sample was greater than the LOD and less than the LOQ.

EMPC The ion transition ratio is outside of expected limits.

FBL The analyte was detected in the associated field blank and the concentration detected in the sample was greater than the LOD and less than the LOQ.

FDD Imprecision between primary and field duplicate results.

ISL Low extracted internal standard (EIS) recovery.

LBL The analyte was detected in the associated laboratory blank and the concentration detected in the sample was greater than the LOD and less than the LOQ.

TR The detected concentration is less than the LOQ.

6.0 Chain of Custody and Sample Receipt Condition Documentation

Samples were received at the laboratory under proper COC, intact, properly preserved, and at temperatures within the QAPP-specified temperature range of 2 to 6 degrees Celsius (°C), with the following exceptions:

- According to the case narratives, all sample arrived at the laboratory at temperatures less than the QAPP-specified minimum of 2 °C, with measured temperatures between 0.4 and 1.9 °C. There is no evidence that the samples were frozen or otherwise compromised and in accordance with the DoD data validation guidelines, no data were qualified based on the low sample receipt temperatures.
- According to the case narrative, the samples reported AOI01-01-SB-13-15 and AOI01-01-SB-181-182 were recorded on the COC as AOI01-01-13-15 and AOI01-01-181. At EA's request, Eurofins updated the sample IDs.
- According to the case narrative, the samples reported as AOI01-02-SB-13-15, AOI01-02-SB-113-115, and AOI01-02-SB-113-115-DUP were recorded on the COC as AOI01-02-13-15, AOI01-02-113-115, and AOI01-02-113-115-DUP. At EA's request, Eurofins updated the sample IDs.
- According to the case narrative, the samples reported as SFAASF-03-PA-SB-13-15 and SFAASF-03-PA-SB-183-184 were recorded on the COC as SFAASF-03-SB-13-15 and SFAASF-03-SB-183. At EA's request, Eurofins updated the sample IDs.
- According to the case narrative, the sample reported as SFAASF-04-SB-180-181 was recorded on the COC as SFAASF-04-SB-180. At EA's request, Eurofins updated the sample ID.
- According to the case narrative, the samples reported as AOI01-04-SB-109-110 and AOI01-04-SB-109-110-DUP were recorded on the COC as AOI01-04-SB-109 and AOI01-04-SB-109-DUP. At EA's request, Eurofins updated the sample IDs.
- EA requested that Eurofins update IDs for the samples recorded on the COC as AOI01-06-SB-0-2 AOI01-06-SB-6-8, and AOI01-06-SB-13-15 to AOI01-06B-SB-0-2, AOI01-06B-SB-6-8, and AOI01-06B-SB-13-15, respectively. Eurofins reissued the report and EDD with the updated sample IDs.

7.0 Specific Data Validation Findings

Data validation findings are presented in Sections 7.1 through 8.0.

7.1 Per- and Polyfluoroalkyl Substances Analysis

PFAS results generated by Eurofins may be considered usable with the limitations summarized in Sections 7.1 through 8.0.

7.1.1 Holding Time Compliance

The samples were extracted for PFAS within the QAPP-specified maximum holding time of 14 days from sample collection for water samples or 28 days from collection for soil samples and the extracts were analyzed within the QAPP-specified maximum hold time of 28 days from extraction.

7.1.2 Initial Calibration Compliance

The ICAL associated with the analysis of these samples met the QAPP-specified criteria of the calibration standards calculating to 70 to 130 percent (%) of their true concentrations and either correlation

coefficients greater than or equal to 0.99 or relative standard deviations of the response factors less than or equal to 20%.

7.1.3 Initial Calibration Verification Accuracy

ICV recoveries were within the QAPP-specified 70% to 130% limits.

7.1.4 Instrument Sensitivity Check Standard Accuracy

Instrument sensitivity check (ISC) recoveries were within the QSM-specified 70 to 130% limits and samples were analyzed no more than 12 hours after a reported ISC.

7.1.5 Continuing Calibration Verification Accuracy

CCV recoveries were within the QAPP-specified 70 to 130% limits.

7.1.6 Laboratory Blank Detections

PFAS were not detected in the laboratory blanks associated with the samples reviewed in this report, with the following exceptions:

- Perfluorooctanesulfonic acid (PFOS) was detected at a concentration of 0.604 nanograms per liter (ng/L) in the laboratory blank associated with the extraction of samples AOI01-01-GW, AOI01-02-GW, AOI01-02-GW-DUP, AOI01-04-GW, SFAASF-03-GW, and SFAASF-04-GW; equipment blanks SFAASF-EB-20 and SFAASF-EB-21; and field blanks SFAASF-FB-18 and SFAASF-FB-19. Data limitations are summarized below.
  - Wood U qualified the PFOS results from samples AOI01-04-GW and SFAASF-03-GW at the LOQs of 1.8 ng/L and 1.7 ng/L, respectively, because the concentrations detected in the samples, at 0.54 ng/L and 0.92 ng/L, respectively, were greater than the LODs but less than the LOQs. (Qualifier and reason code: U, LBL)
  - PFOS either was not detected in the remaining field samples or the concentrations detected in the samples were greater than the LOQ and greater than five times the concentration detected in the blank. Data usability is not adversely affected by the blank detection.
  - Wood does not qualify data from QC samples that are being used to assess data from field samples and no data from the equipment or field blanks were qualified based on the laboratory blank detection.
- PFOS was detected at a concentration of 0.632 ng/L in the laboratory blank associated with the extraction of equipment blanks SFAASF-EB-04 and SFAASF-EB-05, field blanks SFAASF-FB-03 and SFAASF-FB-04, and the non-reportable extraction of equipment blank SFAASF-EB-03. Wood does not qualify data from QC samples that are being used to assess data from field samples and no data were qualified based on the blank detection.
- PFOS was detected at a concentration of 0.526 ng/L in the laboratory blank associated with the extraction of equipment blank SFAASF-EB-03 and the non-reportable extractions equipment and field blanks SFAASF-EB-05, SFAASF-FB-03, and SFAASF-FB-04. Wood does not qualify data from QC samples that are being used to assess data from field samples and no data were qualified based on the blank detection.
- PFOS was detected at a concentration of 0.652 ng/L in the laboratory blank associated with the extraction of equipment blank SFAASF-EB-07 and the non-reportable extraction of field blank

SFAASF-FB-06. PFOS was not detected in the associated equipment blank and no data were qualified based on the blank detection.

- PFOS was detected at a concentration of 0.659 ng/L in the laboratory blank associated with the extraction of field blanks SFAASF-FB-05 and SFAASF-FB-06, and the non-reportable extraction of equipment blank SFAASF-EB-07. Wood does not qualify data from QC samples that are being used to assess data from field samples and no data were qualified based on the blank detection.
- PFOS and perfluorooctanesulfonamide (PFOSA) were detected at concentrations of 0.911 ng/L and 0.560 ng/L, respectively, in the laboratory blank associated with the extraction of equipment blanks SFAASF-EB-10 and SFAASF-EB-11, and field blank SFAASF-FB-09. Wood does not qualify data from QC samples that are being used to assess data from field samples and no data were qualified based on the blank detections.
- PFOS was detected at a concentration of 0.831 ng/L in the laboratory blank associated with the extraction of equipment blanks SFAASF-EB-12, SFAASF-EB-14, SFAASF-EB-15; and field blanks SFAASF-FB-10, SFAASF-FB-11, and SFAASF-FB-12. Wood does not qualify data from QC samples that are being used to assess data from field samples and no data were qualified based on the blank detection.
- PFOS was detected at a concentration of 0.503 ng/L in the laboratory blank associated with the extraction of field blanks SFAASF-FB-07 and SFAASF-FB-08, and the non-reportable extraction of equipment blank SFAASF-EB-10. Wood does not qualify data from QC samples that are being used to assess data from field samples and no data were qualified based on the blank detection.

7.1.7 Equipment and Field Blank Detections

Wood used the following equation to assess the detections in the aqueous equipment blank against detections in the associated solid samples.

$$Concentration\ \left(\frac{ng}{g}\right) = \frac{Concentration\ \left(\frac{ng}{L}\right) * 250\ mL * 4\ mL}{1\ mL * 1{,}000\frac{mL}{L} * 1\ g}$$

Where:

ng/g = nanograms per gram

250 mL is a standard aqueous sample volume in milliliters,

4 mL is the standard extract volume for a soil sample,

1 mL is the standard extract volume for a water sample,

1,000 is the conversion from milliliters to liters, and

1 g is the standard soil mass used for extraction in grams.

Target analytes were not detected in the equipment and field blanks associated with the samples reviewed in this report, with the following exceptions:

- PFOS was detected at a concentration of 0.70 ng/L (equivalent to 0.70 ng/g) in equipment blank SFAASF-EB-14, associated with sample AOI01-04-SB-109-110 and its field duplicate AOI01-04-SB-109-110-DUP. Data limitations are summarized below:

  - Wood J+ qualified the PFOS result from sample AOI01-04-SB-109-110 because the concentration detected in the sample was greater than the LOQ and less than five times the concentration detected in the blank. (Qualifier and reason code: J+, EBG)
  - PFOS was not detected in sample AOI01-04-SB-109-110-DUP and data usability is not adversely affected by the blank detection.
- PFOS was detected at a concentration of 1.0 ng/L in field blank SFAASF-FB-18, associated with samples SFAASF-03-GW and SFAASF-04-GW. Data limitations are summarized below.
  - Wood U qualified the PFOS result from sample SFAASF-03-GW at the LOQ of 1.7 ng/L because the concentrations detected in the sample, at 0.92 ng/L, was greater than the LOD but less than the LOQ. (Qualifier and reason code: U, FBL)
  - PFOS was not detected in sample SFAASF-04-GW and data usability is not adversely affected by the blank detection.
- PFOS and PFOSA were detected at concentrations of 1.2 ng/L and 1.4 ng/L, respectively, in equipment blank SFAASF-EB-20, associated with samples SFAASF-03-GW and SFAASF-04-GW. Data limitations are summarized below.
  - Wood U qualified the PFOS result from sample SFAASF-03-GW at the LOQ of 1.7 ng/L because the concentrations detected in the sample, at 0.92 ng/L, was greater than the LOD but less than the LOQ. (Qualifier and reason code: U, EBL)
  - PFOSA was not detected in either sample, PFOS was not detected in sample SFAASF-04-GW, and data usability is not adversely affected by the blank detections.
- PFOS was detected at a concentration of 0.87 ng/L in field blank SFAASF-FB-19, associated with samples AOI01-01-GW, AOI01-02-GW, AOI01-02-GW-DUP, and AOI01-04-GW. Data limitations are summarized below.
  - Wood U qualified the PFOS result from sample AOI01-04-GW at the LOQ of 1.8 ng/L because the concentration detected in the sample, at 0.54 ng/L, was greater than the LOD but less than the LOQ. (Qualifier and reason code: U, FBL)
  - PFOS was not detected in the remaining associated samples and data usability is not adversely affected by the blank detection.
- Perfluorohexanoic acid (PFHxA [0.42 ng/L]), perfluorooctanoic acid (PFOA [0.45 ng/L]), perfluorohexanesulfonic acid (PFHxS [2.0 ng/L]), and PFOS (5.7 ng/L) were detected in equipment blank SFAASF-EB-21, associated with samples AOI01-01-GW, AOI01-02-GW, AOI01-02-GW-DUP, and AOI01-04-GW. Data limitations are summarized below.
  - Wood J+ qualified the PFOA result from sample AOI01-02-GW-DUP because the concentration detected in the sample was greater than the LOQ and equal to than five times the concentration detected in the blank. (Qualifier and reason code: J+, EBG)
  - Wood U qualified the PFOS result from sample AOI01-04-GW at the LOQ of 1.8 ng/L because the concentration detected in the sample, at 0.54 ng/L, was greater than the LOD but less than the LOQ. (Qualifier and reason code: U, EBL)
  - The remaining analytes either were not detected in the associated samples or the detected concentrations were greater than the LOQ and greater than five times the concentrations detected in the blank. Data usability is not adversely affected by the blank detections.

- PFOS was detected at concentrations of 0.63 ng/L and 0.61 ng/L in equipment and field blanks SFAASF-EB-03 and SFAASF-FB-03, associated with sample AOI01-01-SB-13-15. PFOS was not detected in the associated sample and data usability is not adversely affected by the blank detections.
- PFOS was detected at a concentration of 0.53 ng/L in field blank SFAASF-FB-04, associated with sample AOI01-01-SB-181-182. PFOS was not detected in the associated sample and data usability is not adversely affected by the blank detection.
- PFHxA (0.54 ng/L), PFOA (0.66 ng/L), PFOSA (3.3 ng/L), and perfluorobutanoic acid (PFBA [3.2 ng/L]) were detected in equipment blank SFAASF-EB-05, associated with sample AOI01-01-SB-181-182. These analytes were not detected in the associated sample and data usability is not adversely affected by the blank detections.
- Perfluorobutanesulfonic acid (PFBS) and PFBA were detected at concentrations of 0.67 ng/L and 3.1 ng/L, respectively, in equipment blank SFAASF-EB-07 and PFOS was detected at a concentration of 0.60 ng/L in field blank SFAASF-FB-06, associated with sample AOI01-02-SB-113-115 and its field duplicate AOI01-02-SB-113-115-DUP. These analytes were not detected in the associated samples and data usability is not adversely affected by the blank detections.
- PFBS and PFOS were detected at concentration of 0.52 ng/L and 0.69 ng/L, respectively, in equipment blank SFAASF-EB-11 and PFOS was detected at a concentration of 0.72 ng/L in field blank SFAASF-FB-09, associated with sample SFAASF-03-PA-SB-13-15. Target analytes were not detected in the associated sample and data usability is not adversely affected by the blank detection.
- PFOS and PFOSA were detected at concentrations of 0.84 ng/L and 0.53 ng/L, respectively, in field blank SFAASF-FB-10, associated with sample SFAASF-03-PA-SB-183-184. Target analytes were not detected in the associated sample and data usability is not adversely affected by the blank detections.
- PFBS was detected at a concentration of 1.1 ng/L in equipment blank SFAASF-EB-10, associated with sample SFAASF-04-SB-180-181. Target analyte was not detected in the associated sample and data usability is not affected by the blank detection.
- PFOS was detected at a concentration of 0.64 ng/L in equipment blank SFAASF-EB-16, associated with sample AOI01-09-SB-13-15. Target analyte was not detected in the associated sample and data usability is not adversely affected by the blank detection.
- PFBS and PFOS were detected at concentrations of 0.47 ng/L and 0.48 ng/L, respectively, in equipment blank SFAASF-EB-18, associated with sample SFAASF-03-SB-0-2. Target analytes were not detected in the associated sample and data usability id not adversely affected by the blank detections.

7.1.8 Laboratory Control Sample Accuracy and Precision

LCS and LCSD recoveries were within QSM 5.3-specified limits and RPDs between LCS and LCSD results were less than the QAPP-specified maximum of 30%, with the following exceptions:

- PFHxA (66%, 64%), perfluoroheptanoic acid (PFHpA [68%, LCS]), perfluorodecanoic acid (PFDA [66%, LCS]), perfluorotridecanoic acid (PFTrDA [56%, LCS]), perfluorotetradecanoic acid (PFTeDA [68%, 68%]), PFHxS (67%, LCSD), perfluoroheptanesulfonic acid (PFHpS [67%, 65%]), and perfluorononanesulfonic acid (PFNS [66%, 68%]) recoveries were low in the LCS and/or LCSD associated with the extraction of equipment blank SFAASF-EB-07. Wood does not qualify data from QC samples that are being used to assess data from field samples and no data were qualified based on the low LCS recoveries.

- 4:2 Fluorotelomer sulfonic acid (FTS) recovery was high at 144% in the LCSD associated with the extraction of field blanks SFAASF-FB-05 and SFAASF-FB-06. Wood does not qualify data from QC samples that are being used to assess data from field samples and no data were qualified based on the high LCSD recovery.
- 4:2 FTS recovery was high at 151% in the LCS and LCSD associated with the extraction of equipment blank SFAASF-EB-03 and the non-reportable extractions equipment and field blanks SFAASF-EB-05, SFAASF-FB-03, and SFAASF-FB-04. Wood does not qualify data from QC samples that are being used to assess data from field samples and no data were qualified based on the high LCS and LCSD recoveries.

7.1.9 Matrix Spikes/ Matrix Spike Duplicates Accuracy and Precision

Eurofins performed MS and MSD analyses on samples AOI01-01-SB-13-15 and SFAASF-04-GW. MS and MSD recoveries were within QSM 5.3-specified limits and RPDs between MS and MSD results were less than the QAPP-specified maximum of 30%.

7.1.10 Laboratory Duplicate Precision

Eurofins did not perform duplicate analyses on any of the samples reviewed in this report.

7.1.11 Extracted Internal Standard Accuracy

Eurofins' reported EIS recoveries are based on the average response from the initial calibration instead of the area counts from either the ICAL midpoint standard or the areas measured in the initial CCV. For this assessment Wood recalculated EIS recoveries for field samples based on QC summary form VIII.

Wood did not recalculate EISs that were only associated with QC samples because data from field samples would not be qualified based on EIS recoveries in the associated QC samples.

EIS area counts were within the QAPP-specified limits of 50 to 150% of areas measured in the ICAL midpoint standard or 50 to 150% of the areas measured in the initial CCV on days when ICAL is not performed, with the following exceptions:

- Recovery of EIS d_3-N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA) was low at 48% in sample AOI01-04-SB-109-110. Wood UJ qualified the non-detected NMeFOSAA result from this sample because of the low EIS recovery. (Qualifier and reason code: UJ, ISL)
- Recoveries of the EISs d_3-NMeFOSAA and d_5-N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA) were low in sample AOI01-09-SB-111-112 (43%, 47%), SFAASF-03-SB-0-2 (43%, 47%), and SFAASF-05-SB-6-8 (23%, 32%). Wood UJ qualified the non-detected NMeFOSAA and NEtFOSAA results from these samples because of the low EIS recoveries. (Qualifier and reason code: UJ, ISL)
- Recoveries of the EISs d3-NMeFOSAA and d5-NEtFOSAA were low at 43 and 47%, respectively, in sample AOI-01-09-SB-0-2. Data limitations are summarized below.
  - In accordance with the DoD data validation guidelines, Wood UJ qualified the non-detected NMeFOSAA result from this sample because of the low EIS recovery. (Qualifier and reason code: UJ, ISL)
  - In accordance with the DoD data validation guidelines, Wood J+ qualified the detected NEtFOSAA result from this sample because of the low EIS recovery. (Qualifier and reason code: J+, ISL)

- Recovery of the EIS $^{13}C_2$-PFTeDA was low at 45% in sample AOI01-04-GW. Wood UJ qualified the non-detected PFTeDA result from this sample because of the low EIS recovery. (Qualifier and reason code: UJ, ISL)
- Recovery of the EISs M_2-4:2 FTS and M_2-6:2 FTS were high at 187% and 170%, respectively, in sample SFAASF-03-GW. 4:2 FTS and 6:2 FTS were not detected in this sample and per the DoD data validation guidelines, no data were qualified based on the high EIS recoveries.
- Recovery of the EIS $^{13}C_2$-PFTeDA was low at 46% in the MS performed on sample SFAASF-04-GW. Wood does not qualify data from field samples based on EIS recoveries in MSs and no data were qualified based on the low EIS recovery.
- Recovery of the EIS M_2-4:2 FTS was high at 192% in equipment blank SFAASF-EB-20. Wood does not qualify data from QC samples that are being used to assess data from field samples and no data were qualified based on the high EIS recovery

7.1.12 Data Reporting and Analytical Procedures

Eurofins I qualified results when ion transition ratios were outside of expected limits. Wood J qualified Eurofins' I qualified results. (Qualifier and reason code: J, EMPC)

Eurofins J qualified results with detected concentrations less than the LOQ. Wood agrees these results are quantitatively uncertain and has maintained the laboratory's J qualifiers. (Qualifier and reason code: J, TR)

8.0 Field Duplicate Precision

Wood collected field duplicates with samples:

- AOI01-02-GW (AOI01-02-GW-DUP);
- AOI01-02-SB-113-115 (AOI01-02-SB-113-115-DUP); and
- AOI01-04-SB-109-110 (AOI01-04-SB-109-110-DUP).

Target analyte detections are summarized in Table 2. Precision values were less than the QAPP-specified maximum of 50% or differences between analyte concentrations were less than the LOQ, with the following exceptions:

- PFHxS and PFOS were detected at concentrations of 1.1 ng/g and 2.2 ng/g, respectively, in sample AOI01-04-SB-109-110, but neither analyte was detected in field duplicate AOI01-04-SB-109-110-DUP. The difference between the detected results and the LODs were greater than the average LOQ of 0.60 ng/L. Data limitations are summarized below.
  - Wood previously J+ qualified the PFOS result from sample AOI01-04-SB-109-110 due to a blank detection. Wood added the FDD reason code to this result because of sampling and/or analytical imprecision. (Reason code: FDD)
  - Wood J qualified the detected PFHxS result from sample AOI01-04-SB-109-110 and UJ qualified the non-detected PFOS and PFHxS results from sample AOI01-04-SB-109-110-DUP because of sampling and/or analytical imprecision. (Qualifiers and reason code: J/UJ, FDD)

9.0 Summary and Conclusions

Wood reviewed a total of 768 records from field samples during the validation and applied the following qualifiers to the data:

- J+: Wood J+ qualified three records (0.4%) as having potential high analytical bias due to detections in the associated equipment blanks or low EIS recoveries;
- J: Wood J qualified 44 records (5.7%) due detected concentrations that were less than the LOQ, ion transition ratios outside of expected limits, and/or imprecision between primary and field duplicate results;
- U: Wood U qualified two records (0.3%) because of detections in the associated laboratory, equipment, and field blanks; and
- UJ: Wood UJ qualified 11 records (1.4%) because of low EIS recoveries or imprecision between primary and field duplicate results.

Data qualified during validation are summarized in Table 3.

10.0 References

EA, 2020. Final Programmatic UFP-QAPP, Site Inspection for Per- and Polyfluoroalkyl Substances Impacted Sites, ARNG Installations, Nationwide, December.

DoD, 2019a. DoD QSM, Version 5.3. May.

DoD, 2019b. General Data Validation Guidelines, Revision 1. November.

DoD, 2020. Data Validation Guidelines Module 3: Data Validation Procedure of Per- and Polyfluoroalkyl Substances Analysis by QSM Table B-15.

11.0 Limitations

This report was prepared for EA by Wood Environment & Infrastructure Solutions, Inc. The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in Wood services and based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This Data Validation report is intended to be used by EA for the Nationwide ARNG Installations Site Inspections for Per- and Polyfluoroalkyl Substances project only, subject to the terms and conditions of its contract with Wood. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

Tables

Table 1
Field Samples Submitted to Eurofins Environment Testing America
Army Aviation Support Facility
Santa Fe, New Mexico

Field Sample Identification	Matrix	Collection Date and Time	Laboratory Sample Identification	Notes
SFAASF-EB-03	Water	4/25/2022 11:45	410-81788-1	Equipment blank
SFAASF-FB-03	Water	4/25/2022 11:50	410-81788-2	Field blank
AOI01-01-SB-13-15	Solid	4/25/2022 12:05	410-81788-3	
SFAASF-EB-04	Water	4/26/2022 8:35	410-81788-4	Equipment blank
SFAASF-FB-04	Water	4/26/2022 8:40	410-81788-5	Field blank
SFAASF-EB-05	Water	4/26/2022 9:00	410-81788-6	Equipment blank
AOI01-01-SB-181-182	Solid	4/26/2022 13:20	410-81788-7	
SFAASF-EB-06	Water	4/27/2022 11:40	410-82129-1	Equipment blank
SFAASF-FB-05	Water	4/27/2022 11:45	410-82129-2	Field blank
AOI01-02-SB-13-15	Solid	4/27/2022 12:00	410-82129-3	
SFAASF-EB-07	Water	4/28/2022 7:45	410-82129-4	Equipment blank
SFAASF-FB-06	Water	4/28/2022 8:05	410-82129-5	Field blank
AOI01-02-SB-113-115	Solid	4/28/2022 11:05	410-82129-6	
AOI01-02-SB-113-115-DUP	Solid	4/28/2022 11:05	410-82129-7	Field duplicate
SFAASF-EB-11	Water	5/1/2022 7:40	410-82454-1	Equipment blank
SFAASF-FB-09	Water	5/1/2022 8:00	410-82454-2	Field blank
SFAASF-03-PA-SB-13-15	Solid	5/1/2022 8:20	410-82454-3	
SFAASF-EB-12	Water	5/2/2022 8:00	410-82454-4	Equipment blank
SFAASF-FB-10	Water	5/2/2022 7:50	410-82454-5	Field blank
SFAASF-03-PA-SB-183-184	Solid	5/2/2022 11:13	410-82454-6	
SFAASF-04-SB-13-15	Solid	4/28/2022 17:15	410-82468-1	
SFAASF-EB-08	Water	4/28/2022 16:35	410-82468-2	Equipment blank
SFAASF-FB-07	Water	4/29/2022 7:35	410-82468-4	Field blank
SFAASF-EB-10	Water	4/30/2022 7:20	410-82468-5	Equipment blank
SFAASF-FB-08	Water	4/30/2022 7:45	410-82468-6	Field blank
SFAASF-04-SB-180-181	Solid	4/30/2022 9:40	410-82468-7	
SFAASF-FB-11	Water	5/3/2022 8:20	410-83020-1	Field blank
SFAASF-EB-13	Water	5/3/2022 14:20	410-83020-2	Equipment blank
AOI01-04-SB-13-15	Solid	5/3/2022 15:15	410-83020-3	
SFAASF-EB-14	Water	5/4/2022 8:20	410-83020-4	Equipment blank
SFAASF-FB-12	Water	5/4/2022 8:40	410-83020-5	Field blank
AOI01-04-SB-109-110	Solid	5/4/2022 11:48	410-83020-6	
AOI01-04-SB-109-110-DUP	Solid	5/4/2022 11:48	410-83020-7	Field duplicate
AOI01-03-SB-6-8	Solid	5/4/2022 15:05	410-83061-1	
AOI01-03-SB-13-15	Solid	5/4/2022 15:30	410-83061-2	
AOI01-05-SB-6-8	Solid	5/4/2022 9:45	410-83061-3	
AOI01-05-SB-13-15	Solid	5/4/2022 10:10	410-83061-4	
AOI01-06B-SB-0-2	Solid	5/4/2022 10:45	410-83061-5	
AOI01-06B-SB-6-8	Solid	5/4/2022 11:20	410-83061-6	
AOI01-06B-SB-13-15	Solid	5/4/2022 11:45	410-83061-7	
SFAASF-05-SB-6-8	Solid	5/4/2022 13:45	410-83061-8	

Table 1
Field Samples Submitted to Eurofins Environment Testing America
Army Aviation Support Facility
Santa Fe, New Mexico

Field Sample Identification	Matrix	Collection Date and Time	Laboratory Sample Identification	Notes
SFAASF-05-SB-13-15	Solid	5/4/2022 14:10	410-83061-9	
SFAASF-05-SB-13-15-DUP	Solid	5/4/2022 14:10	410-83061-10	Field duplicate
SFAASF-EB-15	Water	5/4/2022 15:00	410-83061-11	Equipment blank
SFAASF-EB-16	Water	5/5/2022 12:50	410-83313-1	Equipment blank
SFAASF-FB-13	Water	5/5/2022 12:54	410-83313-2	Field blank
AOI01-09-SB-13-15	Solid	5/5/2022 15:35	410-83313-3	
SFAASF-EB-17	Water	5/6/2022 8:20	410-83313-4	Equipment blank
SFAASF-FB-14	Water	5/6/2022 8:32	410-83313-5	Field blank
AOI01-09-SB-111-112	Solid	5/6/2022 14:15	410-83313-6	
SFAASF-EB-18	Water	5/7/2022 11:50	410-83313-7	Equipment blank
SFAASF-FB-15	Water	5/7/2022 11:55	410-83313-8	Field blank
SFAASF-03-SB-0-2	Solid	5/7/2022 12:05	410-83313-9	
SFAASF-FB-16	Water	5/8/2022 7:40	410-83313-10	Field blank
SFAASF-FB-17	Water	5/9/2022 7:15	410-83313-11	Field blank
AOI-01-09-SB-0-2	Solid	5/9/2022 11:45	410-83313-12	
SFAASF-EB-19	Water	5/9/2022 16:00	410-83313-13	Equipment blank
AOI01-02-GW	Water	5/20/2022 15:20	410-84932-1	
AOI01-02-GW-DUP	Water	5/20/2022 15:20	410-84932-2	Field duplicate
AOI01-01-GW	Water	5/20/2022 10:28	410-84932-3	
AOI01-04-GW	Water	5/20/2022 13:10	410-84932-4	
SFAASF-03-GW	Water	5/19/2022 17:15	410-84932-5	
SFAASF-04-GW	Water	5/19/2022 13:35	410-84932-6	
SFAASF-FB-18	Water	5/19/2022 9:15	410-84932-7	Field blank
SFAASF-EB-20	Water	5/19/2022 15:30	410-84932-8	Equipment blank
SFAASF-FB-19	Water	5/20/2022 8:00	410-84932-9	Field blank
SFAASF-EB-21	Water	5/20/2022 8:15	410-84932-10	Equipment blank

Table 2
Target Analyte Detections in Primary and Field Duplicate Samples
Army Aviation Support Facility
Santa Fe, New Mexico

Analyte	Average Limit of Quantitation	Primary Result	Field Duplicate Result	Relative Percent Difference	Notes
Samples AOI01-02-SB-113-115 and AOI01-02-SB-113-115-DUP					
Perfluorohexanesulfonic acid	0.67 ng/g	0.32 J	0.46 U	NC	± LOQ
Samples AOI01-04-SB-109-110 and AOI01-04-SB-109-110-DUP					
Perfluorohexanoic acid	0.60 ng/g	0.70 J	0.39 U	NC	± LOQ
Perfluoroheptanoic acid	0.60 ng/g	0.44 J	0.39 U	NC	± LOQ
Perfluorooctanoic acid	0.60 ng/g	0.48 J	0.39 U	NC	± LOQ
Perfluorononanoic acid	0.60 ng/g	0.32 J	0.39 U	NC	± LOQ
Perfluorodecanoic acid	0.60 ng/g	0.30 J	0.39 U	NC	± LOQ
Perfluorotridecanoic acid	0.60 ng/g	0.31 J	0.39 U	NC	± LOQ
Perfluorotetradecanoic acid	0.60 ng/g	0.33 J	0.39 U	NC	± LOQ
Perfluorohexanesulfonic acid	0.60 ng/g	1.1	0.39 U	NC	J/UJ, FD
Perfluorooctanesulfonic acid	0.60 ng/g	2.2	0.39 U	NC	J/UJ, FD
NEtFOSAA	2.0 ng/g	0.28 J	0.39 U	NC	± LOQ
Perfluoropentanesulfonic acid	3.00 ng/g	0.38 J	0.39 U	NC	± LOQ
Perfluoroheptanesulfonic acid	0.60 ng/g	0.34 J	0.39 U	NC	± LOQ
Perfluorononanesulfonic acid	0.60 ng/g	0.28 J	0.39 U	NC	± LOQ
Perfluorodecanesulfonic acid	0.60 ng/g	0.30 J	0.39 U	NC	± LOQ
Perfluorooctanesulfonamide	0.60 ng/g	0.34 J	0.39 U	NC	± LOQ
Perfluoropentanoic acid	0.60 ng/g	0.37 J	0.39 U	NC	± LOQ
Perfluoroundecanoic acid	0.60 ng/g	0.30 J	0.39 U	NC	± LOQ
Perfluorododecanoic acid	0.60 ng/g	0.32 J	0.39 U	NC	± LOQ
Samples AOI01-02-GW and AOI01-02-GW-DUP					
Perfluorohexanoic acid	1.7 ng/L	130	120	8.0%	
Perfluoroheptanoic acid	1.7 ng/L	15	14	6.9%	
Perfluorooctanoic acid	1.7 ng/L	2.5	2.3 J+	8.3%	
Perfluorobutanesulfonic acid	1.7 ng/L	120	130	8.0%	
Perfluorohexanesulfonic acid	1.7 ng/L	72	74	2.7%	
Perfluoropentanesulfonic acid	1.7 ng/L	60	61	1.7%	
Perfluorooctanesulfonamide	1.7 ng/L	0.98 J	0.85 U	NC	± LOQ
Perfluorobutanoic acid	4.2 ng/L	40	40	0.0%	
Perfluoropentanoic acid	1.7 ng/L	87	90	3.4%	

Notes:
NC = not calculable
ng/g = nanograms per gram
ng/L = nanograms per liter

Qualifier Definitions:
J = The reported result is an estimated quantity with an unknown bias.
J+ = The result is an estimated quantity, but the result may be biased high.
U = The analyte was not detected and was reported as less than the limit of detection.

Table 2
Target Analyte Detections in Primary and Field Duplicate Samples
Army Aviation Support Facility
Santa Fe, New Mexico

Reason Codes:

± LOQ = the difference between analyte concentrations is less than the limit of quantitation, indicating acceptable sampling and analytical precision.

FDD = Imprecision between primary and field duplicate results.

Table 3
Qualifiers Applied During Validation
Army Aviation Support Facility
Santa Fe, New Mexico

Sample Identification	Analyte	Concentration	Qualifier and Reason Code
AOI01-01-GW	Perfluorooctanesulfonamide	0.48 ng/L	J TR
AOI01-02-GW	Perfluorooctanesulfonamide	0.98 ng/L	J TR
AOI01-02-GW-DUP	Perfluorooctanoic acid	2.3 ng/L	J+ EBG
AOI01-02-SB-113-115	Perfluorohexanesulfonic acid	0.32 ng/g	J TR
AOI01-02-SB-13-15	Perfluoroheptanesulfonic acid	0.48 ng/g	J TR
AOI01-02-SB-13-15	Perfluorooctanoic acid	0.59 ng/g	J TR
AOI01-03-SB-13-15	Perfluorohexanesulfonic acid	0.27 ng/g	J TR
AOI01-03-SB-6-8	Perfluorohexanesulfonic acid	0.23 ng/g	J TR
AOI01-04-GW	Perfluorooctanesulfonic acid	1.8 ng/L	U LBL, FBL, EBL
AOI01-04-GW	Perfluorotetradecanoic acid	0.89 ng/L	UJ ISL
AOI01-04-SB-109-110	NEtFOSAA	0.28 ng/g	J TR
AOI01-04-SB-109-110	NMeFOSAA	0.41 ng/g	UJ ISL
AOI01-04-SB-109-110	Perfluorodecanesulfonic acid	0.30 ng/g	J TR
AOI01-04-SB-109-110	Perfluorodecanoic acid	0.30 ng/g	J TR
AOI01-04-SB-109-110	Perfluorododecanoic acid	0.32 ng/g	J TR
AOI01-04-SB-109-110	Perfluoroheptanesulfonic acid	0.34 ng/g	J TR
AOI01-04-SB-109-110	Perfluoroheptanoic acid	0.44 ng/g	J TR
AOI01-04-SB-109-110	Perfluorohexanesulfonic acid	1.1 ng/g	J FDD
AOI01-04-SB-109-110	Perfluorononanesulfonic acid	0.28 ng/g	J TR
AOI01-04-SB-109-110	Perfluorononanoic acid	0.32 ng/g	J TR
AOI01-04-SB-109-110	Perfluorooctanesulfonamide	0.34 ng/g	J TR
AOI01-04-SB-109-110	Perfluorooctanesulfonic acid	2.2 ng/g	J+ EBG, FDD
AOI01-04-SB-109-110	Perfluorooctanoic acid	0.48 ng/g	J TR
AOI01-04-SB-109-110	Perfluoropentanesulfonic acid	0.38 ng/g	J TR
AOI01-04-SB-109-110	Perfluoropentanoic acid	0.37 ng/g	J TR
AOI01-04-SB-109-110	Perfluorotetradecanoic acid	0.33 ng/g	J TR
AOI01-04-SB-109-110	Perfluorotridecanoic acid	0.31 ng/g	J TR
AOI01-04-SB-109-110	Perfluoroundecanoic acid	0.30 ng/g	J TR
AOI01-04-SB-109-110-DUP	Perfluorohexanesulfonic acid	0.39 ng/g	UJ FDD
AOI01-04-SB-109-110-DUP	Perfluorooctanesulfonic acid	0.39 ng/g	UJ FDD
AOI01-04-SB-13-15	Perfluorodecanesulfonic acid	0.29 ng/g	J TR
AOI01-04-SB-13-15	Perfluorodecanoic acid	0.30 ng/g	J TR
AOI01-04-SB-13-15	Perfluorododecanoic acid	0.34 ng/g	J TR
AOI01-04-SB-13-15	Perfluoroheptanesulfonic acid	0.33 ng/g	J TR
AOI01-04-SB-13-15	Perfluoroheptanoic acid	0.40 ng/g	J TR
AOI01-04-SB-13-15	Perfluorohexanoic acid	0.63 ng/g	J TR
AOI01-04-SB-13-15	Perfluorononanesulfonic acid	0.28 ng/g	J TR
AOI01-04-SB-13-15	Perfluorononanoic acid	0.37 ng/g	J TR
AOI01-04-SB-13-15	Perfluorooctanesulfonamide	0.35 ng/g	J TR
AOI01-04-SB-13-15	Perfluorooctanoic acid	0.52 ng/g	J TR
AOI01-04-SB-13-15	Perfluoropentanesulfonic acid	0.34 ng/g	J TR
AOI01-04-SB-13-15	Perfluoropentanoic acid	0.33 ng/g	J TR

Table 3
Qualifiers Applied During Validation
Army Aviation Support Facility
Santa Fe, New Mexico

Sample Identification	Analyte	Concentration	Qualifier and Reason Code
AOI01-04-SB-13-15	Perfluorotetradecanoic acid	0.33 ng/g	J TR
AOI01-04-SB-13-15	Perfluorotridecanoic acid	0.30 ng/g	J TR
AOI01-04-SB-13-15	Perfluoroundecanoic acid	0.31 ng/g	J TR
AOI-01-09-SB-0-2	NEtFOSAA	0.55 ng/g	J+ ISL, TR
AOI-01-09-SB-0-2	NMeFOSAA	0.38 ng/g	UJ ISL
AOI-01-09-SB-0-2	Perfluorodecanesulfonic acid	0.37 ng/g	J TR
AOI-01-09-SB-0-2	Perfluorododecanoic acid	0.54 ng/g	J TR
AOI-01-09-SB-0-2	Perfluorononanoic acid	0.40 ng/g	J TR
AOI-01-09-SB-0-2	Perfluoroundecanoic acid	0.27 ng/g	J TR
AOI01-09-SB-111-112	NEtFOSAA	0.52 ng/g	UJ ISL
AOI01-09-SB-111-112	NMeFOSAA	0.52 ng/g	UJ ISL
SFAASF-03-GW	Perfluorohexanoic acid	0.84 ng/L	J TR, EMPC
SFAASF-03-GW	Perfluorooctanesulfonic acid	1.7 ng/L	U LBL, FBL, EBL
SFAASF-03-SB-0-2	NEtFOSAA	0.43 ng/g	UJ ISL
SFAASF-03-SB-0-2	NMeFOSAA	0.43 ng/g	UJ ISL
SFAASF-04-GW	Perfluorohexanoic acid	0.60 ng/L	J TR, EMPC
SFAASF-05-SB-6-8	NEtFOSAA	0.41 ng/g	UJ ISL
SFAASF-05-SB-6-8	NMeFOSAA	0.41 ng/g	UJ ISL

Notes:
NEtFOSAA = N-ethylperfluorooctanesulfonamidoacetic acid
ng/g = nanograms per gram
ng/L = nanograms per liter
NMeFOSAA = N-methylperfluorooctanesulfonamidoacetic acid

Qualifier Definitions:
J = The reported result is an estimated quantity with an unknown bias.
J+ = The result is an estimated quantity, but the result may be biased high.
U = The analyte was not detected and was reported as less than the limit of detection (LOD). The LOD has been adjusted for any dilution or concentration of the sample.
UJ = The analyte was not detected and was reported as less than the limit of detection. However, the associated numerical value is approximate.

Table 3
Qualifiers Applied During Validation
Army Aviation Support Facility
Santa Fe, New Mexico

Reason Codes:

EBG = The analyte was detected in the associated equipment blank and the concentration detected in the sample was greater than the limit of quantitation (LOQ) and less than five times the concentration detected in the blank.

EBL = The analyte was detected in the associated equipment blank and the concentration detected in the sample was greater than the LOD and less than the LOQ.

EMPC = The ion transition ratio is outside of expected limits.

FBL = The analyte was detected in the associated field blank and the concentration detected in the sample was greater than the LOD and less than the LOQ.

FDD = Imprecision between primary and field duplicate results.

ISL = Low extracted internal standard recovery.

LBL = The analyte was detected in the associated laboratory blank and the concentration detected in the sample was greater than the LOD and less than the LOQ.

TR = The detected concentration is less than the limit of quantitation.

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Appendix B

Field Documentation

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Appendix B1

Logs of Daily Notice of Field Activities

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Log of Daily Notice of Field Activity
Santa Fe AASF
Santa Fe, NM

Date	EA Personnel	Weather	Summary Daily Activities	Issues	Progress to Date	Subcontractor(s)/ Visitors
Mobilization 2						
6/17/2022	Gina Mullen	Sunny, high of 76 degrees F	EA onsite at 1000 hrs. Health and safety meeting was conducted. GPS locations collected for IDW areas.EA offsite at 1215.	Today's task was to re-collect GPS locations for features that did not meet 1 meter accuracy. GPS locations were successfully collected, except for 0-2 ft soil boring AOI01-06. Neither the stake marking the location nor bentonite plug could be located. The originally collected GPS location will be included in the SI report.	GPS data collection was completed . **Total progress is summarized below:** 5/5 monitoring wells surveyed - **COMPLETE** 5/5 monitoring wells sampled - **COMPLETE** 5/5 monitoring wells developed - **COMPLETE** 5/6* monitoring wells installed - **COMPLETE** 5/5 well pads completed - **COMPLETE** 4/4 DPT soil borings installed - **COMPLETE** *6th well abandoned on 5/7/2022 as previously noted.	Jeff Bogart (NMARNG)
6/3/2022	Sindy Lauricella	Sunny, high of 76 degrees F	EA onsite at 0800 hrs. High Mesa arrived at 0930 and health and safety meeting was conducted. Monitoring wells were surveyed and gauged. EA materials were removed from storage. High Mesa offsite at 1230. EA offsite at 1300.	N/A	**Total progress is summarized below:** 5/5 monitoring wells surveyed - **COMPLETE** 5/5 monitoring wells sampled - **COMPLETE** 5/5 monitoring wells developed - **COMPLETE** 5/6* monitoring wells installed - **COMPLETE** 5/5 well pads completed - **COMPLETE** 4/4 DPT soil borings installed - **COMPLETE** *6th well abandoned on 5/7/2022 as previously noted.	Kiara Takacs (NMARNG), Mark VanZuider and David Reines (High Mesa)
5/20/2022	Joseph Glover and Gina Mullen	Windy, gusts to 25 mph, high of 77 degrees F	Met onsite at 0730 hrs. Completed health and safety tailgate meeting. Collected groundwater samples at AOI01-01, AOI01-02, and AOI01-02. Completed groundwater sampling. Finished collecting GPS locations of soil borings and soil cutting land application areas. Offsite at 1630.	N/A	Groundwater sampling and GPS location collection were completed. **Samples Collected:** AOI01-01-GW, AOI01-02-GW, AOI01-02-GW-DUP, and AOI01-04 **Blanks Collected:** SFAASF-EB-21 and SFAASF-FB-19 **Total progress is summarized below:** 5/5 monitoring wells sampled - **COMPLETE** 5/5 monitoring wells developed - **COMPLETE** 5/6* monitoring wells installed - **COMPLETE** 5/5 well pads completed - **COMPLETE** 4/4 DPT soil borings installed - **COMPLETE** *6th well abandoned on 5/7/2022 as previously noted.	Kiara Takacs (NMARNG)

Log of Daily Notice of Field Activity
Santa Fe AASF
Santa Fe, NM

Date	EA Personnel	Weather	Summary Daily Activities	Issues	Progress to Date	Subcontractor(s)/ Visitors
5/19/2022	Joseph Glover, Stella Finch, and Gina Mullen	Windy, gusts to 25 mph, high of 80 degrees F	Met onsite at 0730 hrs. Completed health and safety tailgate meeting. Sampled groundwater at SFAASF-03 and SFAASF-04. Collected GPS locations of soil borings and soil cutting land application areas. Offsite at 1805.	N/A	**Samples Collected:** SFAASF-03-GW, SFAASF-04-GW **Blanks Collected:** SFAASF-EB-20 and SFAASF-FB-18 **Total progress is summarized below:** 2/5 monitoring wells sampled 5/5 monitoring wells developed - **COMPLETE** 5/6* monitoring wells installed - **COMPLETE** 5/5 well pads completed - **COMPLETE** 4/4 DPT soil borings installed - **COMPLETE** *6th well abandoned on 5/7/2022 as previously noted.	Kiara Takacs (NMARNG)
5/11/2022 Wednesday	Gary Desselle; Sindy Lauricella was on site for ~ 45 minutes	Windy, gusts to 25 mph, high of 80 degrees F	Met onsite at 0700 hrs. Completed health and safety tailgate meeting. Completed well development at SFAASF-04 and -03. Offsite at 1400.	N/A	Well installation and development complete. Construction of well pads is complete. Groundwater sampling will be conducted next week. Well survey is being scheduled. **Samples Collected:** None. **Total progress is summarized below:** 5/5 monitoring wells developed - **COMPLETE** 5/6* monitoring wells installed - **COMPLETE** 5/5 well pads completed - **COMPLETE** 4/4 DPT soil borings installed - **COMPLETE** *6th well abandoned on 5/7/2022 as previously noted.	Kiara Takacs (NMARNG), Alex Chapin (Environmental Works).
5/10/2022 Tuesday	Stella Finch and Gary Desselle	Windy, gusts to 30 mph, high of 80 degrees F	Met onsite at 0645 hrs. Completed health and safety tailgate meeting. Completed well development at AOI01-01, -02, and -04. Completed all well pads. Offsite at 1645.	N/A	Well installations are complete. Construction of well pads is complete. **Samples Collected:** None. **Total progress is summarized below:** 3/5 monitoring wells developed 5/6 monitoring wells installed - **COMPLETE** 5/5 well pads completed - **COMPLETE** 4/4 DPT soil borings installed - **COMPLETE**	Crystal Montoya (NMARNG), Justen Maples (Environmental Works), Victor Taylor (Environmental Works), Robert Romines (Environmental Works), Alex Chapin (Environmental Works).

Log of Daily Notice of Field Activity
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Date	EA Personnel	Weather	Summary Daily Activities	Issues	Progress to Date	Subcontractor(s)/ Visitors
5/9/2022 Monday	Sindy Lauricella and Gary Desselle	Windy, gusts to 50 mph, high of 80 degrees F	Met onsite at 0645 hrs. Completed health and safety tailgate meeting. Completed well construction at SFAASF-03 and completed the P&A of the first SFAASF-03 well. Completed the well pads at AOI-01-02 and AOI-01-04. Offsite at 1718.	The soil sample from 0-2 ft bgs at AOI01-09 was collected to replace the compromised sample.	Well installations are complete. Construction of well pads has begun. **Samples Collected:** SFAASF-FB-17 (Field Blank). SFAASF-EB-19 (Equipment Blank) AOI-01-09-SB-0-2 (Soil Sample) **Total progress is summarized below:** 5/6 monitoring wells installed - **COMPLETE** 2/5 well pads completed 4/4 DPT soil borings installed - **COMPLETE**	Crystal Montoya (NMARNG), Justen Maples (Environmental Works), Victor Taylor (Environmental Works), Robert Romines (Environmental Works), Alex Chapin (Environmental Works well development - arrived at 1605).
5/8/2022 Sunday	Sindy Lauricella and Gary Desselle	Windy, gusts to 45 mph, high of 81 degrees F	Met onsite at 0700 hrs. Completed health and safety tailgate meeting. Continued drilling and began well construction at replacement well SFAASF-03; grout tagged at 90 ft bgs. Began plugging original well SFAASF-03; placed bentonite chips to a depth of 136.8 ft bgs. Offsite at 1805.	High winds and blowing dust. The soil sample from 0-2 ft bgs at AOI01-09 was compromised. The interval will be re-sampled.	SFAASF-03 replacement drilled to a total depth of 197 ft bgs and screened at 175-195 ft bgs. Grouting was completed to a depth of 90 ft bgs at the replacement for well SFAASF-03. **Samples Collected:** SFAASF-FB-16 (Field Blank). **Total progress is summarized below:** 5/6 monitoring wells installed* 4/4 DPT soil borings installed * Well monument and pad construction will be constructed at a later date.	Chris Fritzsche (NMARNG), Justen Maples (Environmental Works), Victor Taylor (Environmental Works), Robert Romines (Environmental Works)
5/7/2022	Sindy Lauricella and Robert Marley	clear, high of 80 degrees	Met onsite at 0700 hrs. Plugged and abandoned AOI01-09. Drilled to 107 ft bgs at SFAASF-03 replacement. Offsite at 1810.	Boring AOI01-09 did not accumulate water overnight. Due to the lack of a viable water-bearing zone, the boring was plugged and abandoned.	Boring AOI01-09 was plugged and abandoned. SFAASF-03 replacement drilling commenced. Drilled to 107 ft bgs. **Soil Samples Collected:** SFAASF-03-SB-0-2 **Blanks Collected:** SFAASF-EB-18 and SFAASF-FB-15 **Total progress is summarized below:** 4/6 monitoring wells installed* 4/4 DPT soil borings installed * Well monument and pad construction will be constructed at a later date.	Chris Fritzsche (NMARNG), Justen Maples (Environmental Works), Victor Taylor (Environmental Works), Robert Romines (Environmental Works).

Log of Daily Notice of Field Activity
Santa Fe AASF
Santa Fe, NM

Date	EA Personnel	Weather	Summary Daily Activities	Issues	Progress to Date	Subcontractor(s)/ Visitors
5/6/2022	Sindy Lauricella and Robert Marley	clear, high of 77 degrees	Met onsite at 0700 hrs. Completed health and safety tailgate meeting. Well construction materials picked by driller's helper while drilling continued. Drilled to 115 ft bgs at AOI01-09. Began well installation. Offsite at 1630.	Water has not accumulated in the potential perched zone in boring/monitoring well AOI01-09. The lack of water in the borehole and presence of sand has caused the PVC and casing to become sand locked. The hole will sit open to see if water accumulates overnight. Construction materials for remaining wells are now onsite. Driller is equipped to complete well installations, abandonment, and monuments. On 5/5/22 EA field staff left the site without notifying NMARNG and without ensuring that the bulk fuels area was secured. Steps taken to improve communication include designation of SSHO as the person responsible (1) for notifying the NMARNG POC that EA staff and subcontractors are offsite, (2) ensuring that the bulk fuels area is locked, and (3) notifying the EA task manager at the end of the day that those actions have been taken.	Boring AOI01-09 was drilled to a depth of 115 ft bgs. A monitoring well is being installed with screen from 105 to 115 ft bgs. Well construction is stalled due to sand locking. The situation is described under 'Issues' and will be reevaluated in the morning after we see if water has accumulated. **Soil Samples Collected:** AOI01-09-SB-111-112 **Blanks Collected:** SFAASF-EB-17 and SFAASF-FB-14 **Total progress is summarized below:** 4/6 monitoring wells installed* 4/4 DPT soil borings installed * Well monument and pad construction will be constructed at a later date.	Chris Fritzsche (NMARNG), Crystal Montoya (NMARNG), Kiara Takacs (NMARNG), Justen Maples (Environmental Works), Victor Taylor (Environmental Works), Robert Romines (Environmental Works).
5/5/2022	Sindy Lauricella and Robert Marley	clear, high of 67 degrees	Met onsite at 0700 hrs. Completed health and safety tailgate meeting. Installed well at AOI01-04. Began drillng at AOI01-09. Offsite at 1700.	Well construction materials for monitoring well AOI01-09 were supposed to be delivered today, but did not arrive. They are expected to arrive tomorrow.	Monitoring well AOI01-04 was installed with the screen at 105 to 115 ft bgs. Boring AOI01-09 was installed to a depth of 36 ft bgs. Drilling will continue tomorrow. **Soil Samples Collected:** AOI01-09-SB-0-2, AOI01-09-SB-13-15 **Blanks Collected:** SFAASF-EB-16 and SFAASF-FB-13 **Total progress is summarized below:** 4/6 monitoring wells installed* 4/4 DPT soil borings installed * Well monument and pad construction will be constructed at a later date.	Chris Fritzsche (NMARNG), Kiara Takacks (NMARNG), Justen Maples (Environmental Works), Victor Taylor (Environmental Works), Robert Romines (Environmental Works).

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Date	EA Personnel	Weather	Summary Daily Activities	Issues	Progress to Date	Subcontractor(s)/ Visitors
5/4/2022	Sindy Lauricella and David Werth	clear, high of 57 degrees	Met onsite at 0700 hrs. Completed health and safety tailgate meeting. Installed 4 direct push soil borings to 15 ft bgs. Drilled AOI01-04 to a depth of 115 ft bgs. Offsite at 1600.	Well SFAASF-03 will be replaced due to the presence of grout in the well. During direct push drilling all boreholes were hand augered to 5 ft bgs, except for borehole AOI01-05, which could only be advanced to 4 ft bgs by hand.	Boring AOI01-04 was drilled to a depth of 115 ft bgs. Well will be built when supplies are delivered or can be procured locally, which will likely be tomorrow. A direct push rig was used to install all four 15-ft soil borings. **Soil Samples Collected:** AOI01-03-SB-6-8, AOI01-03-SB-13-15, AOI01-04-SB-109, AOI01-04-SB-109-Dup, AOI01-05-SB-6-8, AOI01-05-SB-13-15, AOI01-05-SB-13-15-Dup, AOI01-06-SB-0-2, AOI01-06-SB-6-8, AOI01-06-SB-13-15, SFAASF-05-SB-6-8, SFAASF-05-SB-13-15 **Blanks Collected:** SFAASF-EB-14, SFAASF-EB-15. amd SFAASF-FB-12 **Total progress is summarized below:** 3/6 monitoring wells installed* 4/4 DPT soil borings installed * Well monument and pad construction will be constructed at a later date.	Byron Kesner (NMARNG), Justen Maples (Environmental Works), Victor Taylor (Environmental Works), Robert Romines (Environmental Works), Rob Helton (JR Drilling).
5/3/2022	Sindy Lauricella and Joseph Glover	clear, high of 73	Met onsite at 0600 hrs. Completed health and safety tailgate meeting. Completed well construction at SFAASF-03 but observed grout in the well. Started drilling AOI01-04 and stopped at 86 ft bgs for the day. Offsite at 1810.	Grout was observed in well SFAASF-03. Observations will be made tomorrow morning to determine how to proceed. Installation of an additional well to characterize the perched aquifer upgradient of AOI01-02 has been proposed. A field change request has been submitted.	Grouting was completed at well SFAASF-03. Boring AOI01-04 was drilled to a depth of 86 ft bgs. **Samples Collected:** AOI01-04-SB-13-15 (Soil Sample), SFAASF-EB-13 (Equipment Blank) and SFAASF-FB-11 (Field Blank). **Total progress is summarized below:** 4/6 monitoring wells installed* 0/4 DPT soil borings installed * Well monument and pad construction will be constructed at a later date.	Byron Kesner (NMARNG), Justin Maples (Environmental Works), Victor Taylor (Environmental Works), Robert Romines (Environmental Works)

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Santa Fe AASF
Santa Fe, NM

Date	EA Personnel	Weather	Summary Daily Activities	Issues	Progress to Date	Subcontractor(s)/ Visitors
5/2/2022	Sindy Lauricella and Joseph Glover	clear, high of 69	Met onsite at 0700 hrs. Completed health and safety tailgate meeting. Continued drilling SFAASF-03 and started well construction. Put sand pack around well screen and then put in bentonite plug and hydrated. Offsite at 1800.	N/A	Boring SFAASF-03 was drilled to depth 197 ft bgs and the screen was installed at 175 - 195 ft bgs. Started well construction putting in sand and bentonite plug. Will grout well in the morning. **Samples Collected:** SFAASF-03-SB-183 (Soil Sample), SFAASF-EB-12 (Equipment Blank) and SFAASF-FB-10 (Field Blank). **Total progress is summarized below:** 4/5 monitoring wells installed* 0/4 DPT soil borings installed * Well monument and pad construction will be constructed at a later date.	Byron Kesner (NMARNG), Justin Maples (Environmental Works), Victor Taylor (Environmental Works), Robert Romines (Environmental Works)
5/1/2022	Teri McMillian and Joseph Glover	clear, windy, high of 74	Met onsite at 0700 hrs. Completed health and safety tailgate meeting. Started drilling SFAASF-03 and stopped at 166' bgs for the day. Offsite at 1800.	N/A	Boring SFAASF-03 was drilled to depth 166'. **Samples Collected**:** SFAASF-03-SB-13-15 (Soil Sample), SFAASF-EB-11 (Equipment Blank), and SFAASF-FB-09 (Field Blank). **Total progress is summarized below:** 3/5 monitoring wells* 0/4 DPT soil borings installed * Well monument and pad construction will be constructed at a later date. ** 5/1/22 update contained an incorrect list of samples collected. This list represents the correct samples (5/2/22).	Chris Fritzche (NMARNG), Justin Maples (Environmental Works), Victor Taylor (Environmental Works), Robert Romines (Environmental Works)
4/30/2022	David Werth and Joseph Glover	clear, high of 70	Met onsite at 0700 hrs. Completed health and safety tailgate meeting. Continued and finished drilling SFAASF-04 and completed well construction. Hand augered SFAASF-03 and set up to start drilling. Offsite at 1800.	N/A	Boring SFAASF-04 was drilled to depth 193 ft bgs and well constructed with screen at 171-191 ft bgs. **Samples Collected:** SFAASF-04-SB-180 (Soil Sample), SFAASF-EB-10 (Equipment Blank) and SFAASF-FB-008 (Field Blank). **Total progress is summarized below:** 3/5 monitoring wells* 0/4 DPT soil borings installed * Well monument and pad construction will be constructed at a later date.	Chris Fritzche (NMARNG), Justin Maples (Environmental Works), Victor Taylor (Environmental Works), Robert Romines (Environmental Works)

Log of Daily Notice of Field Activity
Santa Fe AASF
Santa Fe, NM

Date	EA Personnel	Weather	Summary Daily Activities	Issues	Progress to Date	Subcontractor(s)/ Visitors
4/29/2022	Sindy Lauricella and Joseph Glover	clear and then smokey, windy, high of 69	Met onsite at 0700 hrs. Completed health and safety tailgate meeting. Continued drilling SFAASF-04. Drilled down to 178 ft bgs. Offsite at 1800.	N/A	Boring SFAASF-04 was drilled from 39 ft bgs to 178 ft bgs. **Samples Collected:** SFAASF-FB-007 (Field Blank) **Total progress is summarized below:** 2/5 monitoring wells* 0/4 DPT soil borings installed * Well monument and pad construction will be constructed at a later date.	Byron Kesner (NMARNG), Justin Maples (Environmental Works), Victor Taylor (Environmental Works), Robert Romines (Environmental Works)
4/28/2022	Sindy Lauricella, and Joseph Glover	clear, high of 71	Met onsite at 0700 hrs. Completed health and safety tailgate meeting. Finished completion of AOI01-02 well. Spread AOI01-02 dry drill cutting around the well. Decontaminated drill tooling in designated area. Shipped samples from AOI01-02 to lab. Hand augered down to 5 ft bgs at SFAASF-04 and began drilling operations. Drilled down to 39' bgs. Offsite at 1800.	N/A	Boring AOI01-02 was constructed in a perched water table with the screen set at 107-117 ft bgs. Well monument and pad will be constructed at a later date.oring SFAASF-04 was advanced to 39 ft bgs. **Samples Collected:** AOI01-02-119-120 (grain size), AOI01-02-113-115 (soil sample), SFAASF-04-13-15 (soil sample), SFAASF-EB-07 (equipment blank), SFAASF-EB-08 (equipment blank), and SFAASF-FB-006 (field blank). **Total progress is summarized below:** 2/5 monitoring wells 0/4 DPT soil borings installed	Byron Kesner (NMARNG), Crystal Montoya (NMARNG), Justin Maples (Environmental Works), Victor Taylor (Environmental Works), and Robert Romines (Environmental Works).
4/27/2022	Regina Mullen, Sindy Lauricella, and Joseph Glover	Partly cloudy, high of 73 degrees	Met onsite at 0700 hrs. Completed health and safety tailgate meeting. Finished completion of AOI01-01 well by toping off the well with grout to a few feet below ground surface. Spread AOI01-01 dry drill cutting around the well. completed for AOI01-02 and AOI01-06. AOI01-05 was also re-cleared since the stake was no longer in place. Decontaminated drill tooling in designated area. After utility clearance confirmed hand augered down to 5' bgs at AOI01-02 and began drilling operations. Drilled down to 126' bgs. Offsite at 1640.	Two separate spills occurred onsite today. One spill occurred when a leak/failure occurred in the hydraulic system of the United Rental Skid Steer. Approximately one gallon of hydraulic oil is estimated to have spilled onto uncracked asphalt. Oil pads were deployed to absorb oil. Used oil pads were collected into a black trash bag to await proper disposal. A spill incident was filled out by EA and provided to the AASF facility. A second spill occurredwhen the power washer fuel system failed/leaked during decontamination activities. Leak was found after decon was performed leaking under the truck onto gravel and soil. It is estimated a maximum of 1 gallon of diesel fuel leaked onto the ground. Impacted soil was hand dug and containerized into a steel drum. All impacted soil was captured and EA completed another spill report incident form and provided that to the AASF Facility.	Boring AOI01-01 was completed with grout to just below ground surface. Boring AOI01-02 was advanced to 126 ft bgs. All utility locates completed. **Samples Collected:** AOI01-02-13-15 (soil sample), SFAASF-EB-06 (equipment blank), and SFAASF-FB-005 (field blank). **Total progress is summarized below:** 1/5 monitoring wells* 0/4 DPT soil borings installed * Well monument and pad construction will be constructed at a later date.	Chris Fritzsche (NMARNG), Byron Kesner (NMARNG), Crystal Montoya (NMARNG), Justin Maples (Environmental Works), Victor Taylor (Environmental Works), and Robert Romines (Environmental Works), Abraham Ortiz (MT), Max Chavez (MT).

Log of Daily Notice of Field Activity
Santa Fe AASF
Santa Fe, NM

Date	EA Personnel	Weather	Summary Daily Activities	Issues	Progress to Date	Subcontractor(s)/ Visitors
4/26/2022	Sindy Lauricella, and Joseph Glover	Partly cloudy, windy, high of 65 degrees	Met onsite at 0700 hrs. SSHO conducted health and safety meeting. Completed borehole at AOI01-01. Monitoring well installed and grouted to 18' below ground surface. Samples for AOI01-01 shipped to lab. Offsite at 1820.	Equipment blank was collected from hose used to fill water tank, as discussed on 4/25/2022.	Boring AOI01-01 was completed and monitoring well installed with the screen set at 170 to 190 ft bgs. Well was grouted to 18 ft bgs. Grouting will be completed tomorrow. Capillary fringe sample was collected based on observations in core samples. **Samples Collected:** AOI01-01-181-182 (soil sample), SFAASF-EB-04 (equipment blank), SFAASF-EB-05 (equipment blank), and SFAASF-FB-04 (field blank). **Total progress is summarized below:** 1/5 monitoring wells installed 0/4 DPT soil borings installed	Byron Kesner (NMARNG), Justin Maples (Environmental Works), Victor Taylor (Environmental Works), and Robert Romines (Environmental Works).
4/25/2022	Regina Mullen, Sindy Lauricella, and Joseph Glover	Sunny, windy, high of 60 degrees	Met onsite at 0700 hrs. Visited all sonic drilling locations, laydown/IDW area, and approved water source. SSHO conducted health and safety meeting. Drilling began at location AOI01-01. Borehole was advanced to 155 feet below ground surface. Offsite at 1815 hrs.	The driller was not equiped with a hose known to be PFAS-free. They were instructed to remove the rubber gasket and flush the hose before filling the tank. An equipment blank will be collected from the hose.	Boring AOI01-01 was advanced to 155 feet below ground surface. Drilling will continue tomorrow. **Samples Collected:** AOI01-01-13-15 (soil sample with MS/MSD), AOI01-01-135-136 (grain size sample), SFAASF-EB-03 (Equipment Blank), and SFAASF-FB-03 (Field Blank). **Total progress is summarized below:** 0/5 monitoring wells installed 0/4 DPT soil borings installed	Byron Kesner (NMARNG), Justin Maples (Environmental Works), Victor Taylor (Environmental Works), and Robert Romines (Environmental Works).
Mobilization 1						
2/8/2022	Regina Mullen, and David Werth	Sunny, breezy, high of 45 degrees	Met onsite at 0950 hrs. Regina Mullen presented safety brief to all on-site presonnel, including NMARNG representative. Following the brief, the EA team installed 6 soil borings to 2 ft bgs using a hand auger, collected associated samples, and used bentonite to fill all soil borings. A labeled stake marks all locations where deeper (greater than 2 ft bgs) soil borings will be installed during the Phase 2 Mobilization. IDW is labeled and stored on-site.	Six (6) soil borings were installed to 2 ft bgs. These borings include AOI01-02, which was re-installed after being installed in the wrong location on 2/7/2022. The intended location for this boring is just over 20 feet from location survyed for utilities and sampled yesterday. As a result, the current and correct location is outside the area that was surveyed for utilities. Ms. Montoya was informed of the situation. She allowed installation of the 0-2 ft boring with the condition that the private utility locator will survey the current and correct location before a drilling rig installs the well at location AOI01-02.	Six (6) 2 ft soil borings were installed at the locations indicated in the UFP-QAPP: AOI01-01, AOI01-02, AOI01-07, AOI01-08, SFAASF-01 and SFAASF-02. Associated samples were collected. Sampling of surface soil at 0-2 ft bgs is complete. A private utility locator will survey location AOI01-02 for the presence of utilities before drilling with a drill rig occurs at that location. EA will mobilize to the site a second time in April 2022 and install remaining soil borings (those with a depth greater than 2 ft bgs using a drill rig). PFAS samples will analyzed with an expedited turn-around time so that results can be discussed with NMED to determine IDW disposal. **Total progress is summarized below:** Soil borings (0-2 ft) 13 of 13 completed.	Crystal Montoya (NMARNG)

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Santa Fe AASF
Santa Fe, NM

Date	EA Personnel	Weather	Summary Daily Activities	Issues	Progress to Date	Subcontractor(s)/ Visitors
2/7/2022	Regina Mullen, and David Werth	Sunny, windy,high of 40 degrees	Met onsite at 0830 hrs. David Werth (SSHO) presented a safety brief to all on-site personnel, including MT Private Utility Locating (MT) team. Following the brief, the EA team marked locations and MT Locating marked utilities for all 13 soil boring and/or monitoring well locations. EA team installed eight (8) soil borings to 2 ft bgs using a hand auger and collected associated samples.	Eight (8) soil borings were installed to 2' at the discussed locations. Snow cover was present, but did not prevent installation of soil borings.	The purpose of this mobilization (Phase 1 Mobilization) is to mark locations, conduct utility locates, and collect surface soil samples (0-2 ft bgs) at 13 locations. Eight (8) 2 ft soil borings were installed at the locations indicated in the UFP-QAPP: AOI01-02, AOI01-03, AOI01-04, AOI01-05, AOI01-06, SFAASF-03, SFAASF-04, and SFAASF-05. Associated samples were collected. Installation of the remaining soil borings is planned for tomorrow. Tomorrow's field work is scheduled to begin at 1000 hrs. **Total progress is summarized below:** Soil borings (0-2 ft) 8 of 13 completed.	Chris Fritzsche (NMARNG), Manuel Oritz, (MT) and Max Chavez (MT).

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Appendix B2

Field Forms

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EA Engineering, Science, and Technology, Inc.

WELL PURGING AND SAMPLING RECORD

WELL ID AOI01-01 SAMPLE NO. AOI01-01-GW

WELL/SITE DESCRIPTION SFAASF

DATE 5/20/22 TIME 1028 AIR TEMP. 62°

WELL DEPTH 192 ft
WATER DEPTH 176.05 ft
WATER COL. HEIGHT 14 ft
EQUIVALENT VOLUME OF STANDING WATER 24.75 (gal) (L)
PUMP RATE 400 (gpm) (LPM)
PUMP TIME 60 min
WELL WENT DRY? ( ) Yes (X) No
VOL. REMOVED ____ (gal) (L)
PURGE AGAIN? ( ) Yes ( ) No

CASING HEIGHT 0 ft
WELL DIAMETER 2 in
SANDPACK DIAM. 6 in
PUMP TIME 60 min
RECOVERY TIME 0 min
TOTAL VOL. REMOVED ____ (gal) (L)

Date	Time	Volume Removed Unit: L	pH	Cond. uS	Temp. °C	ORP mV	NTU Turb. ~~507~~	DO %	Depth to Water from TOC	Pump Rate mL/min
5/20/22	0925	3	7.26	263	17.2	-28	507	60.2	176.08	600
	0930	1.5	7.28	263.8	17.9	-40.8	493	62.5	176.08	300
	0935	1.75	7.30	262.1	17.7	-81.7	313	60.8	176.08	350
	0940	1.5	7.31	261.5	18.2	-97.9	187	60.9	176.08	300
	0945	1.5	7.32	261.5	18.5	-112	175	60.4	176.08	300
	0950	1.5	7.33	261.9	19.5	-122.9	172	60.2	176.08	300
	0955	2.0	7.38	264.1	19.3	-166.4	501	56.7	176.09	400
	1000	2.0	7.38	264.2	19.5	-177.5	355	55.9	176.09	400
	1005	2.0	7.37	264.0	20.1	-180.7	230.1	56.1	176.09	400
	1010	2.0	7.37	263.5	20.3	-183.8	180	57.0	176.09	400
	1015	2.0	7.36	262.9	20.0	-189.5	160	56.9	176.09	400
	1020	2.0	7.36	262.7	20.0	-194.4	139	56.9	176.09	400
	1025	2.0	7.36	262.3	20.0	-195.1	129	57.2	176.09	400

COMMENTS PID = 2.4 ppm
Shaken test conducted. No foam observed
Sample time 10:28

SIGNATURE

EA Engineering, Science, and Technology, Inc.

WELL PURGING AND SAMPLING RECORD

WELL ID AOI01-02 SAMPLE NO. AOI01-02-GW

WELL/SITE DESCRIPTION SFAASF

DATE 5 / 20 / 22 TIME 1520 AIR TEMP. 76°

WELL DEPTH 119 (Saw 107-117) ft CASING HEIGHT 0 ft

WATER DEPTH 110.72 ft WELL DIAMETER 2" in

WATER COL. HEIGHT 6.28 ft SANDPACK DIAM. 4" in

EQUIVALENT VOLUME OF STANDING WATER 32.25 (gal) (L)

PUMP RATE ~500 mL/min (gpm) (LPM)

PUMP TIME 65 min min

WELL WENT DRY? ( ) Yes (X) No PUMP TIME min

VOL. REMOVED (gal) (L) RECOVERY TIME min

PURGE AGAIN? ( ) Yes ( ) No TOTAL VOL. REMOVED (gal) (L)

0.1 3% 10 mV 10% 10%

Date	Time	Volume Removed Unit:	pH	Cond. µS/cm	Temp. °C	ORP mV	Turb. NTU	DO %	Depth to Water from TOC	Pump Rate mL/min
5/20/22	1415	2.5	7.27	1321	18.7	229	1170	68.8	111.62	500
	1420	3.0	7.22	1324	19.4	240.4	252	74.9	111.66	600
	1425	2.0	7.21	1334	20.3	243.6	100.9	76.1	111.38	400
	1430	2.5	7.20	1333	19.2	248.3	52.2	76.3	111.38	500
	1435	2.5	7.19	1334	20.2	247.5	39.2	77.5	111.19	500
	1440	2.0	7.21	1333	21.1	217.7	110.6	79.1	111.58	400
	1445	1.75	7.22	1330	20.6	198.6	164.1	78.1	111.50	350
	1450	4.0	7.21	1330	21.0	233.9	67.8	76.5	111.68	800
	1455	2.0	7.23	1326	21.0	225.8	91.4	~~79.2~~ 91.1	111.70	400
	1500	1.75	7.23	1329	21.2	233.6	91.4	78.4	111.54	350
	1505	2.5	7.21	1341	19.4	247.3	92.6	76.8	111.45	500
	1510	4.0	7.17	1336	19.3	249	191	78	112.46	800
	1515	1.75	7.18	1334	19.2	221	257	77	112.11	850
	1520						220			

COMMENTS PID 1.1 ppm

Shaken test - no foam

Samples collected 1520

Final WL 111.07

TD: 118.95

SIGNATURE

EA Engineering, Science, and Technology, Inc.

WELL PURGING AND SAMPLING RECORD

WELL ID AOI01-04 SAMPLE NO. AOI01-04-GW

WELL/SITE DESCRIPTION SFAA SF

DATE 5/20/22 TIME 1310 AIR TEMP. 70°

WELL DEPTH 115 (screen 105-115) ft CASING HEIGHT 0 ft

WATER DEPTH ~~110~~ 109.88 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 5 ft SANDPACK DIAM. 6 in

EQUIVALENT VOLUME OF STANDING WATER 27.25 (gal) (L)

PUMP RATE 400 mL/min (gpm) (LPM)

PUMP TIME 53 mn min

WELL WENT DRY? ( ) Yes (X) No PUMP TIME _____ min

VOL. REMOVED _____ (gal) (L) RECOVERY TIME _____ min

PURGE AGAIN? ( ) Yes ( ) No TOTAL VOL. REMOVED _____ (gal) (L)

10mV ✓ 10% 10%

Date	Time	Volume Removed Unit: L	pH	Cond. uS/cm	Temp. °C	ORP mV	Turb. NTU	DO %	Depth to Water from TOC	Pump Rate mL/mn
5/20/22	1215	2.5	7.30	1125	17.5	-118.5	1601	31.2	110.12	500
	1220	2.25	7.27	1137	18.0	-143.8	1206	35.5	110.0	450
	1225	1.0	7.25	1167	19.0	-157.3	453	44.9	110.0	200
	1230	2.0	7.24	1176	18.8	-159.9	61	46.8	110.04	400
	1235	2.0	7.25	1173	19.7	-163.9	59.2	48.2	110.05	400
	1240	2.0	7.25	1174	19.5	-164.5	39.2	49.7	110.03	400
	1245	2.0	7.24	1171	19.4	-160.3	27.5	51.2	110.03	400
	1250	2.0	7.24	1172	19.5	-150.2	16.86	52.7	110.03	400
	1253	2.0	7.24	1169	19.3	-145.8	15.2	53.3	110.03	400
	1256	2.0	7.24	1168	19.6	-138.1	12.5	54.6	110.03	400
	1259	2.0	7.24	1169	19.4	-134.4	11.0	54.6	110.03	400
	1302	2.0	7.24	1168	19.8	-129.1	9.8	55.4	110.03	400
	1305	2.0	7.24	1167	19.8	-127.5	10.0	55.6	110.03	400

COMMENTS See pg 2

SIGNATURE

EA Engineering, Science, and Technology, Inc.

WELL PURGING AND SAMPLING RECORD

WELL ID AOI01-04 SAMPLE NO. AOI01-04-GW

WELL/SITE DESCRIPTION SFAASF

DATE 5/20/22 TIME 1310 AIR TEMP. 70°

WELL DEPTH 115 ft CASING HEIGHT 0 ft
WATER DEPTH 109.88 ft WELL DIAMETER 2 in
WATER COL. HEIGHT 5 ft SANDPACK DIAM. 6 in
EQUIVALENT VOLUME OF STANDING WATER 2?.75 (gal) (L)
PUMP RATE 400 mL/min (gpm) (LPM)
PUMP TIME 53 min
WELL WENT DRY? ( ) Yes (X) No PUMP TIME ____ min
VOL. REMOVED ____ (gal) (L) RECOVERY TIME ____ min
PURGE AGAIN? ( )Yes ( ) No TOTAL VOL. REMOVED ____ (gal) (L)

Date	Time	Volume Removed Unit: L	pH	Cond. uS/cm	Temp. °C	ORP mV	Turb. NTU	DO %	Depth to Water from TOC	Pump Rate mL/min
	1308	2.0	7.24	1164	19.6	-125.1	9.2	56.1	110.02	400

COMMENTS Measure TD 114.9
Shaken test - No foam
Sample collected at 1310

SIGNATURE

EA Engineering, Science, and Technology, Inc.

WELL PURGING AND SAMPLING RECORD

WELL ID SFAASF-03 SAMPLE NO. SFAASF-03-GW

WELL/SITE DESCRIPTION SFAASF

DATE 6/19/2022 TIME 1500 AIR TEMP. 83°F

WELL DEPTH ~~197~~ SF 195 ft CASING HEIGHT 0 ft

WATER DEPTH 184.58 ft WELL DIAMETER 2 in

WATER COL. HEIGHT ~~12.42~~ SF 10.42 ft SANDPACK DIAM. 6 in

EQUIVALENT VOLUME OF STANDING WATER 31.25 (gal) (L)

PUMP RATE 400 mL/min (gpm) (LPM)

PUMP TIME 60 min min

WELL WENT DRY? ( ) Yes (X) No PUMP TIME _____ min

VOL. REMOVED _____ (gal) (L) RECOVERY TIME _____ min

PURGE AGAIN? ( )Yes ( ) No TOTAL VOL. REMOVED _____ (gal) (L)

Date	Time	Volume Removed Unit:	pH	Cond. SPC	Temp. °C	ORP mV	Turb. NTU	DO %	Depth to Water from TOC	Pump Rate
	1615	3.0	7.86	~~598.5~~	19.1	6.2	46	24	184.58	600
	1620	2.5	7.85	~~598.6~~	19.1	-454.3	1180	14.5	184.9	500
	1625	2.0	7.81	~~598.5~~ 258.2	19.0	-423	503	17.3	185.01	400
	1630	2.0	7.79	250.5	23.0	-377.2	266	23.0	185.01	400
	1635	2.5	7.78	242.1	20.5	-338.7	200.8	29.6	184.98	500
	1640	2.5	7.78	237.7	20.5	-326.4	198.5	33.9	184.97	500
	1645	2.0	7.78	234.7	20.5	-320.2	220.2	35.3	184.95	400
	1650	4.0	7.78	231.3	19.9	-315.1	286.4	40.4	185.07	800
	1655	2.0	7.78	230.5	20.5	-316.6	284	41.2	185.02	400
	1700	1.75	7.78	228.3	20.5	-308.2	304	42.2	184.90	350
	1705	2.0	7.78	229.5	20.3	-313.2	319.05	41.6	184.88	400
	1710	2.0	7.78	229.7	20.7	-315.9	334.3	42.1	184.97	400
	1715	3.0	7.78	229.1	20.8	-315.8	358	42.7	184.88	600

COMMENTS Initial PID: 1.9 PPM

Shaken test - No foam

SIGNATURE

EA Engineering, Science, and Technology, Inc.

WELL PURGING AND SAMPLING RECORD

WELL ID SFAASF-04 SAMPLE NO. SFAASF-04-GW

WELL/SITE DESCRIPTION SFAASF

DATE 5/19/2022 TIME 0915 AIR TEMP. 80°F

WELL DEPTH 193 ft CASING HEIGHT ~~193~~ SF 0 ft

WATER DEPTH 180.38 ft WELL DIAMETER 2 in

WATER COL. HEIGHT 12.62 ft SANDPACK DIAM. 6 in

EQUIVALENT VOLUME OF STANDING WATER 2.15 (gal) (L)

PUMP RATE 400 ml/min (gpm) (LPM)

PUMP TIME 1280 min

WELL WENT DRY? ( ) Yes (X) No PUMP TIME _____ min

VOL. REMOVED _____ (gal) (L) RECOVERY TIME _____ min

PURGE AGAIN? ( )Yes ( ) No TOTAL VOL. REMOVED _____ (gal) (L)

Date	Time	Volume Removed Unit:	pH pH units	Cond. µS/cm	Temp. °C	ORP mV	Turb. NTU	DO %	Depth to Water from TOC	Pump Rate mL/min	
	1233	2.0	8.07	232.4	19.9	-463.0	205.70	11.2	180.38	400	
	1238	1.0	8.05	231.7	22.9	-450.6	146	13.0	180.36	200	
	1243	1.0	8.05	227.8	22.6	-429.2	119	14.6	180.36	~~200~~ SF 200	200
	1248	4.0	8.04	223.6	18.9	-415.4	71.6	19.3	180.1	800	
	1253	2.5	8.01	224.1	20.9	-410.0	60.98	21.3	180.38	500	
	1258	2.0	7.99	222.4	20.8	-403.	62.5	22.8	180.37	400	
	1303	1.5	7.97	221.6	20.8	-398.2	64.8	24.6	180.37	300	
	1308	1.5	7.97	220.9	21.2	-396.7	79.4	25.2	180.35	300	
	1313	1.25	7.95	218.8	22.6	-393.3	85.6	26.0	180.35	~~250~~ SF 250	250
	1318	1.0	7.95	221.4	22.9	-392.2	86.10	26.7	180.32	200	
	1323		—	NO PARAMETERS COLLECTED - PURGE STOPPED/HAD TO RESTART PUMP -SF							
	1328	2.5	7.95	214.3	18.5	-396.4	17.4	31.5	180.43	500	
	1333	2.5	7.93	214.9	21.7	-399.0	187	28.1	180.42	500	

COMMENTS PID initial reading: 14.3 PPM

Pump stopped purging water @ 1320 - water level did not differ much from before & pump was still submerged(?) restarted and pumping worked

SAMPLED AT 1335

SIGNATURE

Appendix B3

Survey Data

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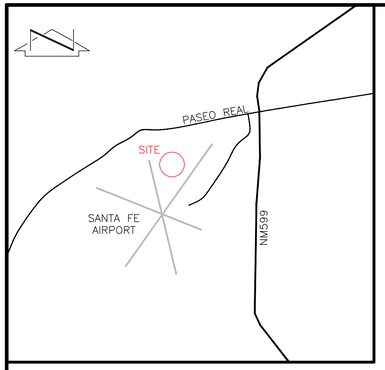


VICINITY MAP

NOT TO SCALE

COORDINATE TABLE

POINT NO.	NORTHING GRID	EASTING GRID	ELEVATION	DESCRIPTION	LATITUDE NORTH	LONGITUDE WEST	UTM 13N NORTH (m)	UTM 13N EAST (m)
1	1682309.82	1687757.09	6318.00	BRASS CAP "SANTA FE WEST BASE"	35°37'25.08866"	106°05'26.52728"	3942753.08	401230.73
10101	1682747.81	1688653.59	6328.84	AOI01-01 WELL CASING	35°37'29.40619"	106°05'15.65862"	3942883.07	401505.60
10102	1682748.27	1688653.55	6329.36	AOI01-01 WELL LID	35°37'29.41077"	106°05'15.65909"	3942883.21	401505.59
10103	1682749.74	1688653.37	6329.35	AOI01-01 CONCRETE	35°37'29.42526"	106°05'15.66116"	3942883.66	401505.54
10104	1682750.26	1688653.27	6328.95	AOI01-01 GROUND	35°37'29.43041"	106°05'15.66243"	3942883.82	401505.51
10201	1682499.59	1688365.64	6324.96	AOI01-02 WELL CASING	35°37'26.95581"	106°05'19.15169"	3942808.55	401416.90
10202	1682500.05	1688365.59	6325.43	AOI01-02 WELL LID	35°37'26.96031"	106°05'19.15237"	3942808.69	401416.88
10203	1682501.59	1688365.40	6325.41	AOI01-02 CONCRETE	35°37'26.97558"	106°05'19.15464"	3942809.16	401416.83
10204	1682501.93	1688365.31	6325.13	AOI01-02 GROUND	35°37'26.97899"	106°05'19.15572"	3942809.26	401416.80
10401	1682156.56	1688364.77	6323.20	AOI01-04 WELL CASING	35°37'23.56303"	106°05'19.16907"	3942704.02	401415.30
10402	1682157.00	1688364.95	6323.77	AOI01-04 WELL LID	35°37'23.56739"	106°05'19.16693"	3942704.16	401415.36
10403	1682158.52	1688365.41	6323.71	AOI01-04 CONCRETE	35°37'23.58238"	106°05'19.16135"	3942704.62	401415.51
10404	1682158.88	1688365.63	6323.35	AOI01-04 GROUND	35°37'23.58594"	106°05'19.15856"	3942704.72	401415.58
10301	1683006.23	1689575.33	6337.69	SFAASF-03 WELL CASING	35°37'31.94694"	106°05'04.48741"	3942958.24	401787.48
10302	1683006.71	1689575.27	6338.29	SFAASF-03 WELL LID	35°37'31.95166"	106°05'04.48810"	3942958.39	401787.46
10303	1683008.66	1689575.32	6338.21	SFAASF-03 CONCRETE	35°37'31.97093"	106°05'04.48750"	3942958.98	401787.48
10304	1683009.10	1689575.29	6337.86	SFAASF-03 GROUND	35°37'31.97534"	106°05'04.48787"	3942959.12	401787.47
110401	1682458.52	1689221.12	6332.85	SFAASF-04 WELL CASING	35°37'26.53557"	106°05'08.78940"	3942792.72	401677.42
110402	1682458.95	1689221.16	6333.36	SFAASF-04 WELL LID	35°37'26.53985"	106°05'08.78894"	3942792.85	401677.43
110403	1682460.81	1689221.05	6333.33	SFAASF-04 CONCRETE	35°37'26.55823"	106°05'08.79020"	3942793.42	401677.41
110404	1682461.48	1689221.10	6333.06	SFAASF-04 GROUND	35°37'26.56490"	106°05'08.78965"	3942793.62	401677.42

MONITORING WELL LOCATIONS WITH AERIAL IMAGERY

GENERAL NOTES

1. AN UNCLASSIFIED SURVEY FOR WELL LOCATIONS WAS PERFORMED ON JUNE 3, 2022. THIS IS NOT A BOUNDARY SURVEY OR RIGHT-OF-WAY SURVEY.
2. WELL LOCATIONS ARE NAD 83 GRID COORDINATES (NEW MEXICO CENTRAL ZONE).
3. SITE LOCATED WITHIN THE SANTA FE MUNICIPAL AIRPORT, SANTA FE COUNTY, NEW MEXICO.
4. THE PHOTOBASED IMAGE, DEPICTED ON THIS SURVEY, WAS IMPORTED FROM GOOGLE EARTH WEB SITE. THIS PHOTOBASE IMAGE IS SHOWN TO PROVIDE A GENERAL SITE ORIENTATION AND MAY NOT REFLECT THE CURRENT SITE CONDITIONS.
5. THE PURPOSE OF THIS SURVEY IS TO ESTABLISH NEW MEXICO STATE PLANE GRID COORDINATES AND ELEVATIONS FOR THE LOCATIONS OF THE NEWLY INSTALLED AND EXISTING GROUNDWATER MONITORING WELLS.

CONTROL SURVEY NOTE

A CONTROL SURVEY WAS CONDUCTED AT THE SITE ON JUNE 3, 2022. BEARINGS ARE STATE PLANE GRID (NM CENTRAL ZONE). CONTROL WAS PROJECTED ONTO THE SUBJECT SITE UTILIZING RTK OBSERVATIONS TO ESTABLISH HORIZONTAL AND VERTICAL POSITIONS BASED UPON NAD 83/NAVD 88.

THIS SURVEY HAS BEEN PREPARED BASED UPON NAVD 88 DATUM USING GEOID 18. PREVIOUSLY PUBLISHED ORTHOMETRIC ELEVATIONS MAY HAVE USED OLDER GEOIDS. SPECIAL CARE SHOULD BE EXERCISED WHEN COMPARING ELEVATIONS FROM THIS SURVEY TO CURRENT AND PREVIOUS SURVEYS, PLANS AND AS-BUILT DOCUMENTS.

THE POINTS OBSERVED HAVE BEEN QUALITY CONTROLLED FOR RELATIVE ACCURACY. AN NGS MONUMENT "SANTA FE WEST BASE" IN THE VICINITY OF THE PROJECT WAS OBSERVED IN ORDER TO PROVIDE REFERENCE TIES TO THE SITE.

PROJECT BENCHMARK: A STANDARD SURVEY DISK STAMPED "SANTA FE WEST BASE 1945", SET INTO THE TOP OF A CONCRETE MONUMENT THAT IS FLUSH WITH THE GROUND. IT IS LOCATED 377 FT SOUTHEAST OF THE CENTERLINE END OF RUNWAY 15, 180 FT NORTH OF A WINDSOCK. AS SHOWN ON THIS SHEET.

SEE TABLE FOR COORDINATES

PROJECT BENCHMARK #1

A STANDARD SURVEY DISK STAMPED "SANTA FE WEST BASE 1945", SET INTO THE TOP OF A CONCRETE MONUMENT THAT IS FLUSH WITH THE GROUND. IT IS LOCATED 377 FT SOUTHEAST OF THE CENTERLINE END OF RUNWAY 15, 180 FT NORTH OF A WINDSOCK. AS SHOWN ON THIS SHEET.

ELEVATION = 6318.00 FEET (NAVD 1988/GEOID18)

LEGEND

⊕ WELL LOCATION

SURVEYORS CERTIFICATION

I, JOSEPH M. SOLOMON, JR., NEW MEXICO PROFESSIONAL SURVEYOR NO. 15075, DO HEREBY CERTIFY; THAT THIS UNCLASSIFIED SURVEY AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO, AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

JOSEPH M. SOLOMON, JR., NMPS 15075

JOSEPH M. SOLOMON, JR. NEW MEXICO 15075 REGISTERED PROFESSIONAL SURVEYOR

June 13, 2022

DATE

HIGH MESA Consulting Group
Engineers, Surveyors & Subsurface Utility Consultants
6010-B Midway Park Blvd. NE • Albuquerque, New Mexico 87109
Phone: 505.345.4250 • Fax: 505.345.4254 • www.highmesacg.com

SCALE: 1" = 200'

200 0 400

100 200

UNCLASSIFIED SURVEY - MONITOR WELL LOCATION SURVEY
SANTA FE AIRPORT
SANTA FE, NEW MEXICO

SURVEYED BY M.V.Z.
DRAWN BY P.J.S.
APPROVED BY J.M.S.

NO.	DATE	BY	REVISIONS

JOB NO. 2022.033.1
DATE 06-2022
SHEET 1 OF 1

File Name: P:\data\2022\2022.033.1\SUR\20220331_GRID.dwg - 1 Plot Date: 6/13/22 Plot Time: 08:08

POINT NO.	NM SP Central NORTH (US Survey Feet)	NM SP Central EAST (US Survey Feet)	ELEVATION (Feet)	DESCRIPTION	LATITUDE - NORTH	LATITUDE - WEST	UTM13N - NORTH (Meters)	UTM13N - EAST (Meters)
1	1682309.82	1687757.09	6318.00	BRASS CAP "SANTA FE WEST BASE"	35°37'25.08866"	106°05'26.52728"	3942753.08	401230.73
10101	1682747.81	1688653.59	6328.84	AOI01-01 WELL CASING	35°37'29.40619"	106°05'15.65862"	3942883.07	401505.60
10102	1682748.27	1688653.55	6329.36	AOI01-01 WELL LID	35°37'29.41077"	106°05'15.65909"	3942883.21	401505.59
10103	1682749.74	1688653.37	6329.35	AOI01-01 CONCRETE	35°37'29.42526"	106°05'15.66116"	3942883.66	401505.54
10104	1682750.26	1688653.27	6328.95	AOI01-01 GROUND	35°37'29.43041"	106°05'15.66243"	3942883.82	401505.51
10201	1682499.59	1688365.64	6324.96	AOI01-02 WELL CASING	35°37'26.95581"	106°05'19.15169"	3942808.55	401416.90
10202	1682500.05	1688365.59	6325.43	AOI01-02 WELL LID	35°37'26.96031"	106°05'19.15237"	3942808.69	401416.88
10203	1682501.59	1688365.40	6325.41	AOI01-02 CONCRETE	35°37'26.97558"	106°05'19.15464"	3942809.16	401416.83
10204	1682501.93	1688365.31	6325.13	AOI01-02 GROUND	35°37'26.97899"	106°05'19.15572"	3942809.26	401416.80
10401	1682156.56	1688364.77	6323.20	AOI01-04 WELL CASING	35°37'23.56303"	106°05'19.16907"	3942704.02	401415.30
10402	1682157.00	1688364.95	6323.77	AOI01-04 WELL LID	35°37'23.56739"	106°05'19.16693"	3942704.16	401415.36
10403	1682158.52	1688365.41	6323.71	AOI01-04 CONCRETE	35°37'23.58238"	106°05'19.16135"	3942704.62	401415.51
10404	1682158.88	1688365.63	6323.35	AOI01-04 GROUND	35°37'23.58594"	106°05'19.15856"	3942704.72	401415.58
10301	1683006.23	1689575.33	6337.69	SFAASF-03 WELL CASING	35°37'31.94694"	106°05'04.48741"	3942958.24	401787.48
10302	1683006.71	1689575.27	6338.29	SFAASF-03 WELL LID	35°37'31.95166"	106°05'04.48810"	3942958.39	401787.46
10303	1683008.66	1689575.32	6338.21	SFAASF-03 CONCRETE	35°37'31.97093"	106°05'04.48750"	3942958.98	401787.48
10304	1683009.10	1689575.29	6337.86	SFAASF-03 GROUND	35°37'31.97534"	106°05'04.48787"	3942959.12	401787.47
110401	1682458.52	1689221.12	6332.85	SFAASF-04 WELL CASING	35°37'26.53557"	106°05'08.78940"	3942792.72	401677.42
110402	1682458.95	1689221.16	6333.36	SFAASF-04 WELL LID	35°37'26.53985"	106°05'08.78894"	3942792.85	401677.43
110403	1682460.81	1689221.05	6333.33	SFAASF-04 CONCRETE	35°37'26.55823"	106°05'08.79020"	3942793.42	401677.41
110404	1682461.48	1689221.10	6333.06	SFAASF-04 GROUND	35°37'26.56490"	106°05'08.78965"	3942793.62	401677.42

Note: Horizontal datum is NAD83. Vertical datum is NAVD 1988 using Geoid 18.

Coordinates for Soil Borings at Santa Fe Army Air Support Facility

GPS Coordinates

19-20 May 2022

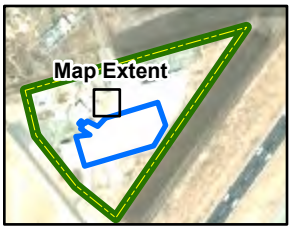
Sample Location	Northing_UTM _Zone13_meters*	Easting_UTM_Zone13_meters*	Latitutde_degrees*	Longitude_degrees*
AOI01-03	3,942,749.1	401,374.2	35.623614	-106.089117
AOI01-05	3,942,699.3	401,483.8	35.623177	-106.087902
AOI01-06**	3,942,712.0	401,573.1	35.623300	-106.086917
AOI01-06b	3,942,730.7	401,560.0	35.623467	-106.087064
AOI01-07	3,942,828.7	401,432.0	35.624337	-106.088489
AOI01-08	3,942,824.3	401,427.4	35.624297	-106.088539
AOI01-09	3,942,885.2	401,507.5	35.624855	-106.087662
SFAASF-01	3,942,997.8	401,575.3	35.625877	-106.086928
SFAASF-02	3,943,031.4	401,689.5	35.626191	-106.085671
SFAASF-03-PA	3,942,954.9	401,783.7	35.625510	-106.084621
SFAASF-05	3,942,705.4	401,615.4	35.623245	-106.086449

* Horizontal Datum: World Geodetic System 1984 (WGS84)

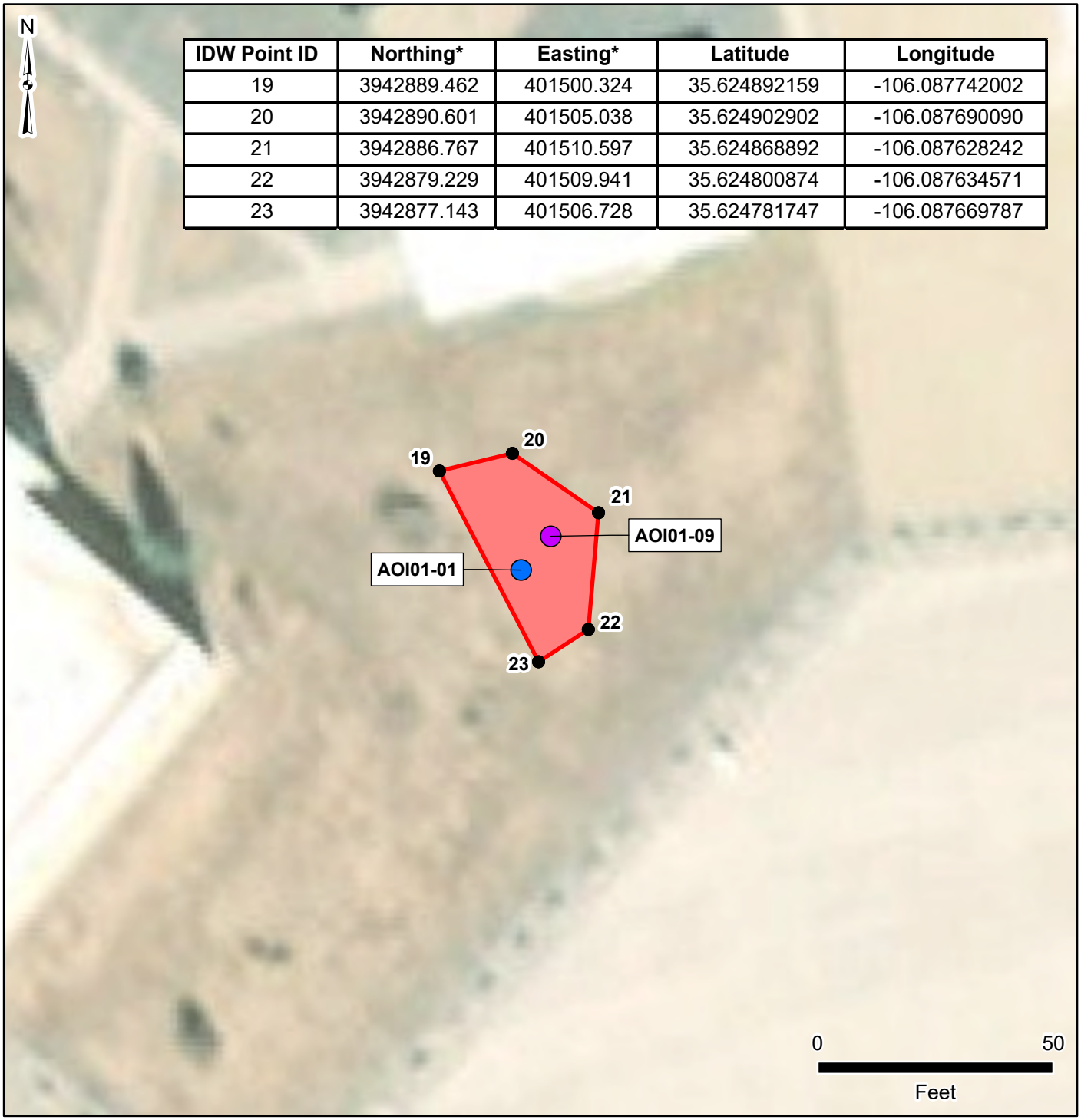
** Location collected 08 February 2022. Coordinate accuracy is greater than 1 meter.

Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Soil Cutting Land Application Area for AOI01-01 and AOI01-09



IDW Point ID	Northing*	Easting*	Latitude	Longitude
19	3942889.462	401500.324	35.624892159	-106.087742002
20	3942890.601	401505.038	35.624902902	-106.087690090
21	3942886.767	401510.597	35.624868892	-106.087628242
22	3942879.229	401509.941	35.624800874	-106.087634571
23	3942877.143	401506.728	35.624781747	-106.087669787



Facility Data
- Facility Boundary
- Area of Interest
- IDW Area

Sample Locations
- Sonic Soil Boring
- Sonic Soil Boring/Monitoring Well
- IDW Point

*Note: Northing and Easting Coordinates are in WGS 1984 UTM Zone 13 Meters.

Data Sources:
ESRI 2022
AECOM 2020

Date:.....July 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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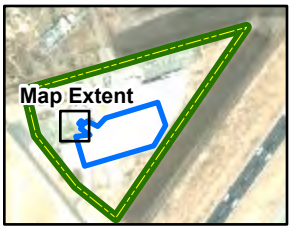
Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Soil Cutting Land Application Area for AOI01-02 and AOI01-07



IDW Point ID	Northing*	Easting*	Latitude	Longitude
24	3942807.702	401418.546	35.624146952	-106.088634949
25	3942805.348	401412.947	35.624125173	-106.088696483
26	3942811.318	401412.62	35.624178961	-106.088700816
28	3942810.461	401417.286	35.624171693	-106.088649199
42	3942828.674	401431.989	35.624337354	-106.088489084

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Facility Data
- Facility Boundary
- Area of Interest
- IDW Area

Sample Locations
- Hand Auger Soil Boring
- Sonic Soil Boring/Monitoring Well
- IDW Point

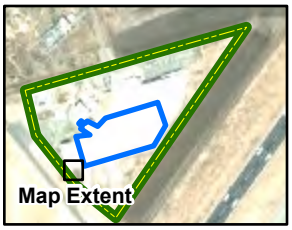
*Note: Northing and Easting Coordinates are in WGS 1984 UTM Zone 13 Meters.

Data Sources:
ESRI 2022
AECOM 2020

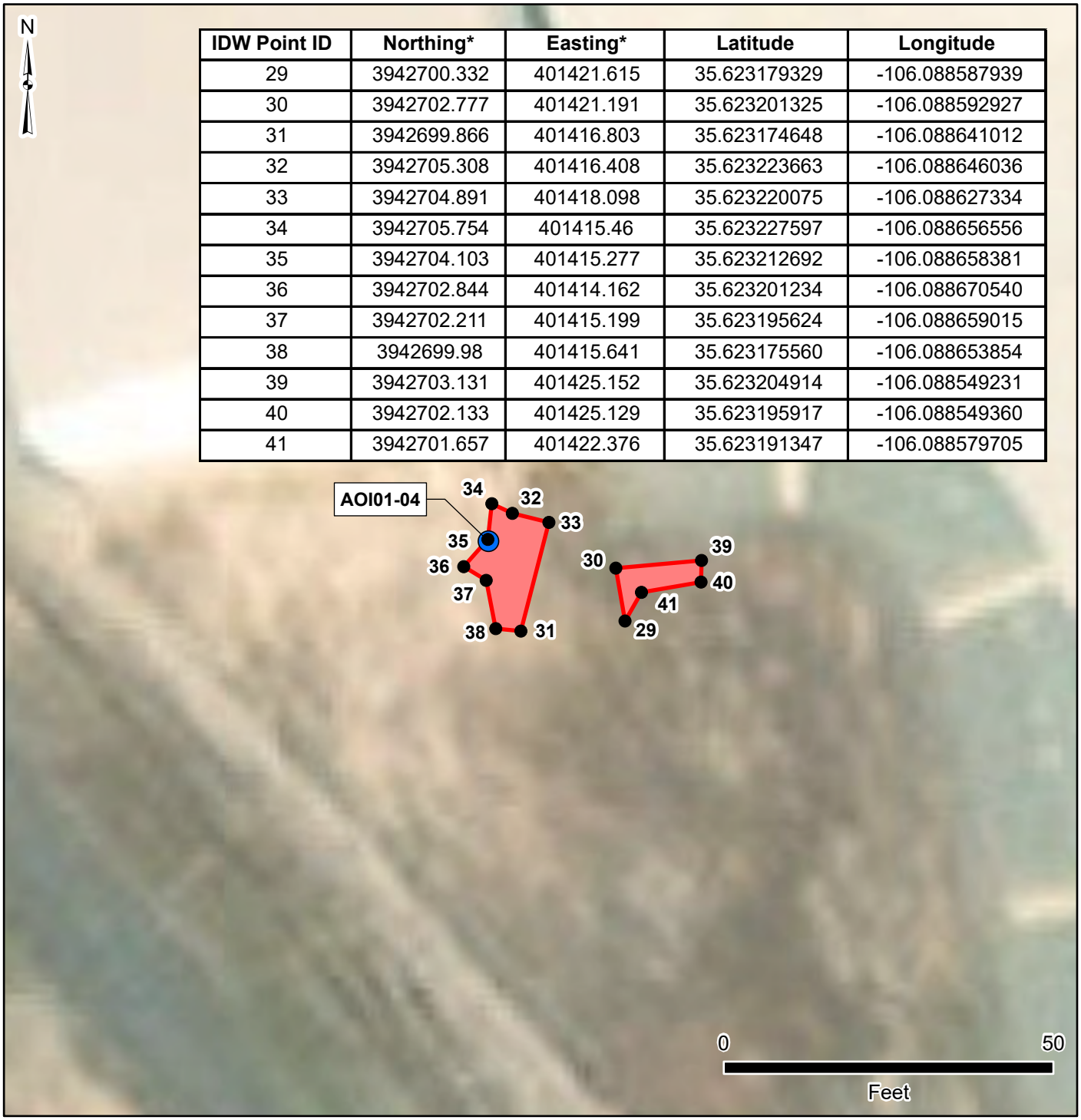
Date:.....July 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Soil Cutting Land Application Area for AOI01-04



IDW Point ID	Northing*	Easting*	Latitude	Longitude
29	3942700.332	401421.615	35.623179329	-106.088587939
30	3942702.777	401421.191	35.623201325	-106.088592927
31	3942699.866	401416.803	35.623174648	-106.088641012
32	3942705.308	401416.408	35.623223663	-106.088646036
33	3942704.891	401418.098	35.623220075	-106.088627334
34	3942705.754	401415.46	35.623227597	-106.088656556
35	3942704.103	401415.277	35.623212692	-106.088658381
36	3942702.844	401414.162	35.623201234	-106.088670540
37	3942702.211	401415.199	35.623195624	-106.088659015
38	3942699.98	401415.641	35.623175560	-106.088653854
39	3942703.131	401425.152	35.623204914	-106.088549231
40	3942702.133	401425.129	35.623195917	-106.088549360
41	3942701.657	401422.376	35.623191347	-106.088579705



Facility Data
- Facility Boundary
- Area of Interest
- IDW Area

Sample Locations
- Sonic Soil Boring/Monitoring Well
- IDW Point

*Note: Northing and Easting Coordinates are in WGS 1984 UTM Zone 13 Meters.

Data Sources:
ESRI 2022
AECOM 2020

Date:.....July 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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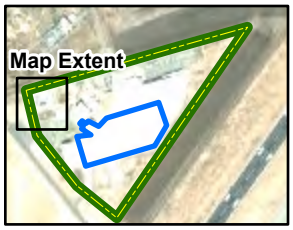
Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Soil Cutting Land Application Area SFAASF-01 through SFAASF-05, AOI01-01 through AOI01-06, and AOI01-08



IDW Point ID	Northing*	Easting*	Latitude	Longitude
43	3942875.735	401329.581	35.624751375	-106.089625550

Facility Data
- Facility Boundary
- Area of Interest

Sample Locations
- IDW Point

*Note: Northing and Easting Coordinates are in WGS 1984 UTM Zone 13 Meters.

Data Sources:
ESRI 2022
AECOM 2020

Date:.....July 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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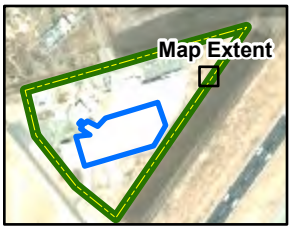
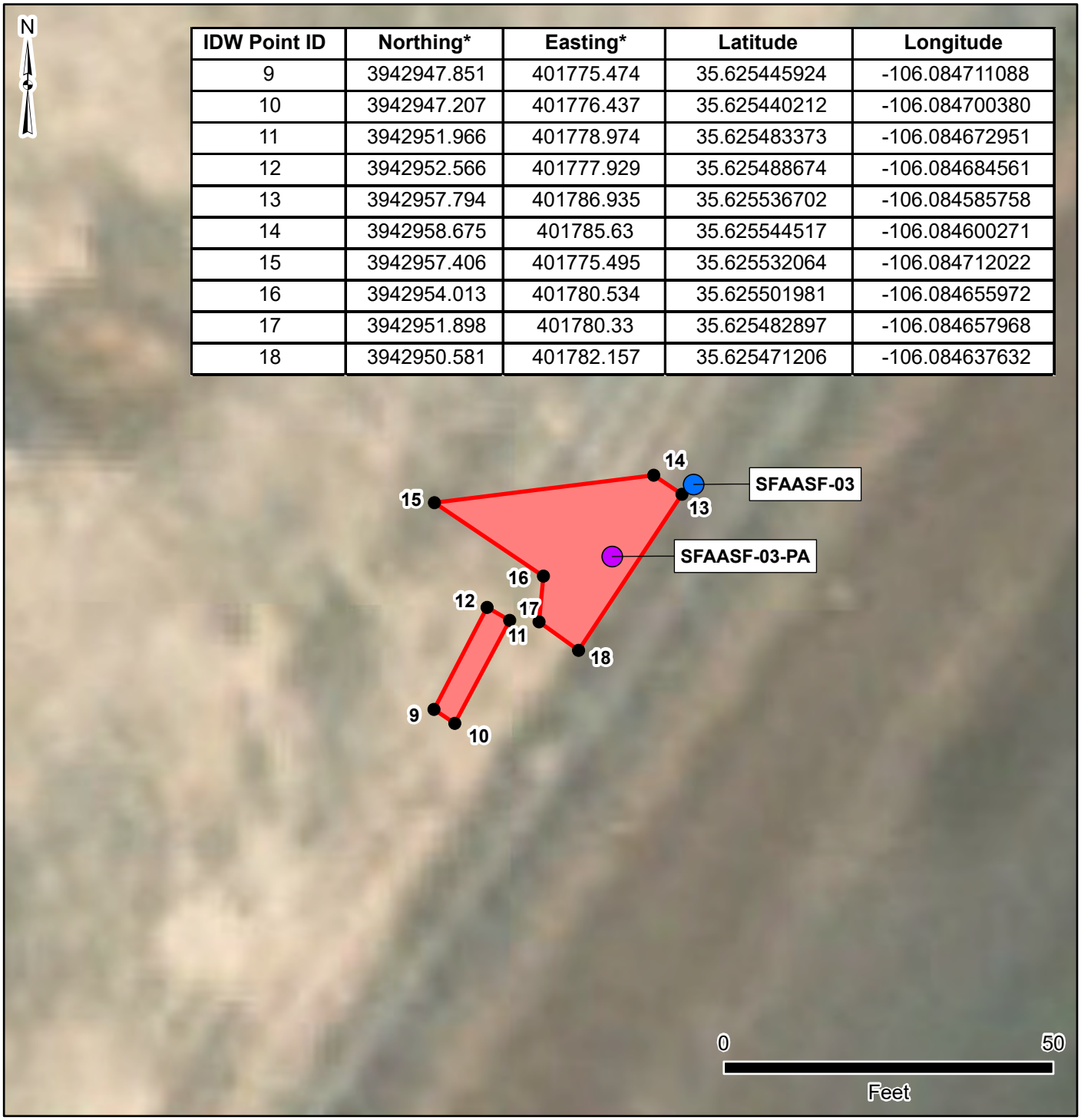
Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Soil Cutting Land Application Area for SFAASF-03 and SFAASF-03-PA



IDW Point ID	Northing*	Easting*	Latitude	Longitude
9	3942947.851	401775.474	35.625445924	-106.084711088
10	3942947.207	401776.437	35.625440212	-106.084700380
11	3942951.966	401778.974	35.625483373	-106.084672951
12	3942952.566	401777.929	35.625488674	-106.084684561
13	3942957.794	401786.935	35.625536702	-106.084585758
14	3942958.675	401785.63	35.625544517	-106.084600271
15	3942957.406	401775.495	35.625532064	-106.084712022
16	3942954.013	401780.534	35.625501981	-106.084655972
17	3942951.898	401780.33	35.625482897	-106.084657968
18	3942950.581	401782.157	35.625471206	-106.084637632



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Facility Data

- Facility Boundary
- Area of Interest
- IDW Area

Sample Locations

- Sonic Soil Boring
- Sonic Soil Boring/Monitoring Well
- IDW Point

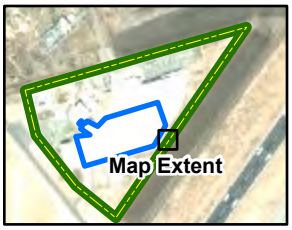
*Note: Northing and Easting Coordinates are in WGS 1984 UTM Zone 13 Meters.

Data Sources:
ESRI 2022
AECOM 2020

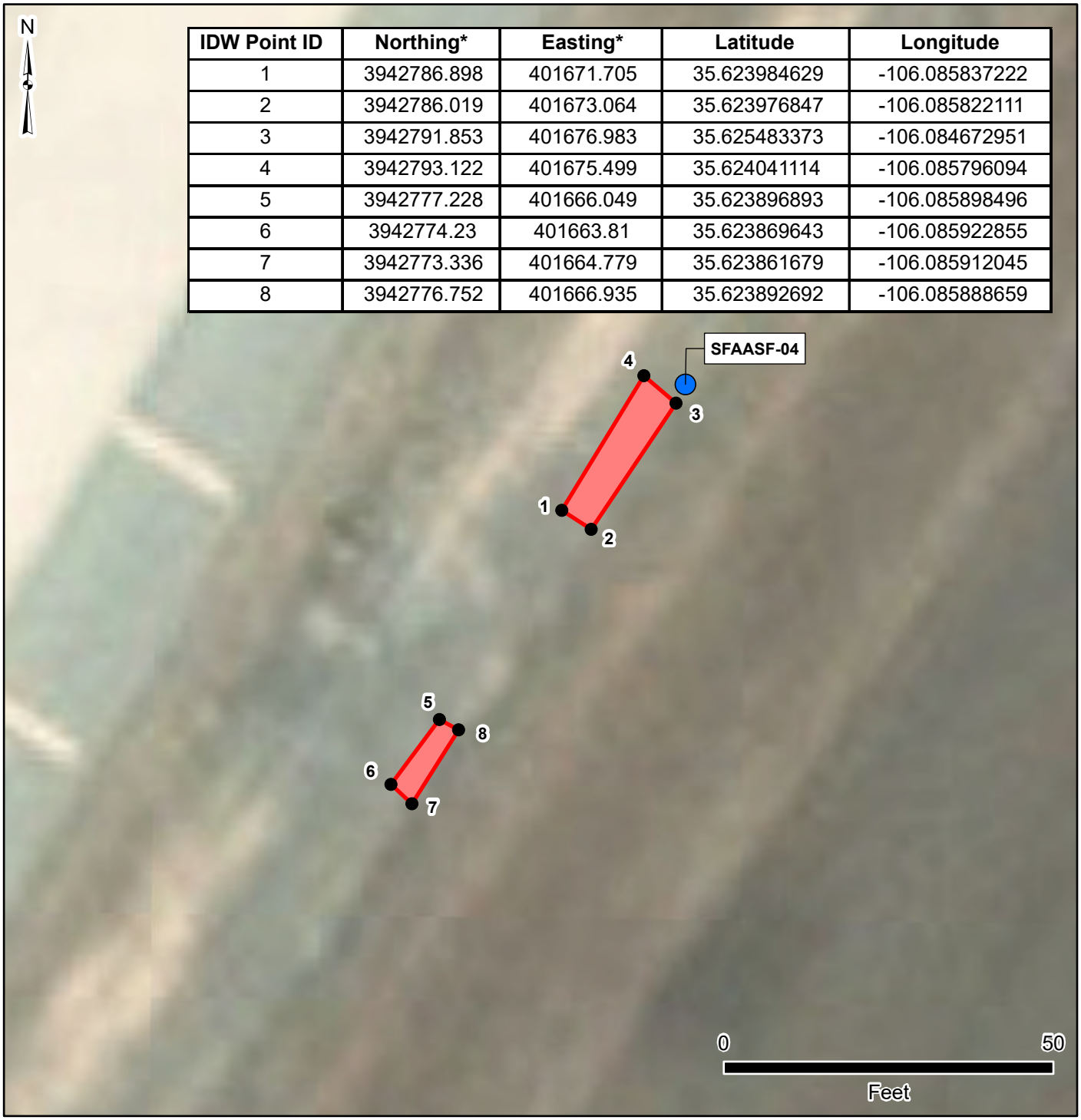
Date:.....July 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

Army National Guard Site Inspections
Site Inspection Report
Santa Fe AASF, New Mexico

Soil Cutting Land Application Area for AOI01-01 and AOI01-09



IDW Point ID	Northing*	Easting*	Latitude	Longitude
1	3942786.898	401671.705	35.623984629	-106.085837222
2	3942786.019	401673.064	35.623976847	-106.085822111
3	3942791.853	401676.983	35.625483373	-106.084672951
4	3942793.122	401675.499	35.624041114	-106.085796094
5	3942777.228	401666.049	35.623896893	-106.085898496
6	3942774.23	401663.81	35.623869643	-106.085922855
7	3942773.336	401664.779	35.623861679	-106.085912045
8	3942776.752	401666.935	35.623892692	-106.085888659



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Facility Data
- Facility Boundary
- Area of Interest
- IDW Area

Sample Locations
- Sonic Soil Boring/Monitoring Well
- IDW Point

*Note: Northing and Easting Coordinates are in WGS 1984 UTM Zone 13 Meters.

Data Sources:
ESRI 2022
AECOM 2020

Date:.....July 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

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Appendix B4

Field Change Request Forms

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FIELD CHANGE REQUEST FORM

ARNG PFAS SITE INSPECTION PROGRAM

Contract: W912DR-19-D-005

Installation: Santa Fe Army Aviation Support Facility (AASF)

Project No. 634250383.0004.0023A

Requested By: Gina Mullen, Task Manager

Field Change Request Number: 01

Description of Modification: Modification is related to a change in the mobilization plan and the plan to handle solid (soil) investigation derived waste (IDW). The Final Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) for Santa Fe AASF (EA 2021) indicates that non-hazardous waste generated during Site Inspection activities will be containerized in 55-gallon drums. Based on recent discussions with ARNG and with the New Mexico Environment Department (NMED), a modification to the UFP-QAPP is being proposed. The change includes two mobilization phases to complete field work in an attempt to minimize IDW generation. Surface soil samples collected during the first mobilization will be analyzed for PFAS and TOC, pH and grain size if appropriate. Samples will be validated, and validated soil analytical results from sampling during this initial mobilization will determine how solid IDW from drilling during a second mobilization will be managed. The new sampling plan will be as follows:

> Phase 1 Mobilization: EA will mobilize to the site on 7 February 2022 and perform utility clearance and collect surface soils samples (0-2 ft below ground surface [bgs]) in 13 locations using a hand auger. EA will collect 13 samples from 0-2 ft bgs along with the appropriate QC sampling. Any additional soils generated during this process will be containerized in individual storage bags (trash bags or zip lock baggies) which will be placed in a 5-gallon bucket with a lid and stored at the facility. Samples will be analyzed via QSM 5.3 per the UFP-QAPP, and validated results will be compared to New Mexico (NM) industrial standards (See Table 1). If the sample results are below the screening levels (SLs) in Table 1, then all the soil/boring cuttings from surface to the top of the capillary fringe would be land applied at the point of generation. If above NM SLs, then

the entirety of the soil/boring cuttings would be containerized and disposed of offsite. EA will conduct a conference call with ARNG, USACE and NMED to present Phase 1 Mobilization results prior to Phase 2 Mobilization, and to confirm IDW handling decisions. Decisions will be memorialized in meeting minutes generated by EA.

Table 1. Preliminary screening Levels for Select PFAS. Source: New Mexico Environment Department. 2021. Risk Assessment Guidance for Investigations and Remediation, Volume 1. November.

Constituent	Residential (mg/kg) Noncancer	Industrial (mg/kg) Noncancer	Construction Worker (mg/kg) Noncancer	Tap Water (µg/L)
PFBS	1.56E+04	2.60E+05	7.08E+.4	7.00E-02
PFHxS	1.56E+00	2.60E+01	7.08E+00	7.00E-02[a]
PFNA	2.35E-01	3.89E+00	1.06E+00	7.00E-02
PFOA	1.56E+00	2.60E+01	7.08E+00	7.00E-02[a]
PFOS	1.56E+00	2.60E+01	7.08E+00	7.00E-02[a]

[a] When evaluating groundwater data for ingestion as drinking water, and only PFHxS is detected, PFHxS should be evaluated against the health advisory concentration of 0.07 µg/L. When PFHxS and other longer-chain PFAs are detected in drinking water, the sum of the concentrations of all longer-chain PFAs should be compared to 0.07 µg/L. For example, if PFOS, PFOA, and PFHxS are all detected in the drinking water/groundwater sample, their concentrations should be summed, and the sum compared to 0.07 µg/L.

NA – not available

Phase 2 Mobilization: EA will mobilize to the site a second time in early April 2022 and install remaining soil borings (those with a depth greater than 2 ft bgs) using a drill rig. IDW will be handled as documented in the meeting minutes from the Phase 1 Mobilization. Deep soil borings (to 200 ft bgs) will be installed using a sonic rig, as specified in the UFP-QAPP. Soil borings installed to 15 ft bgs, however, may be installed using sonic or direct push technology either during a separate sampling event or simultaneously. Both methods of drilling are approved, and the determination will be based on driller availability and cost.

Reason for Modification: Ms. Pamela Hess (Army National Guard [ARNG]) had ongoing communications with NMED regarding IDW disposal. As a result, Mr. John Rhoderick (NMED) agreed to the above modification, which may result in a cost savings for ARNG while remaining protective of the environment and human health.

Approval

Representing: EA

By: Gina Mullen

Title: Task Manager

Date: 1/26/2022

Representing: EA

By: Michael O'Neil

Title: Project Manager

Date: 1/26/2022

Representing: ARNG

By:

Title: ARNG PFAS Project Manager

Date: 2/4/2022

Representing: USACE

By:

Title: USACE PM

Date: 2/04/22

FIELD CHANGE REQUEST FORM

ARNG PFAS SITE INSPECTION PROGRAM

Contract: W912DR-19-D-005

Installation: Santa Fe Army Aviation Support Facility (AASF)

Project No. 634250383.0004.0023A

Requested By: Gina Mullen, Task Manager

Field Change Request Number: 02

Description of Modification: Soil boring AOI01-03 was identified as a monitoring well location in the UFP-QAPP but this location will be changed to a 15-foot soil boring. Soil boring

AOI01-01 was identified as a 15-foot soil boring in the UFP-QAPP but this location will continue past 15 feet to the water table and the location will become a monitoring well.

Additionally, soil boring AOI01-06 will be reinstalled. In February, the 0-2 ft surface soil sample was collected from the lowest point in the area rather than at the edge of the pavement, as depicted in the UFP-QAPP Figure 17-1. The boring will be installed in the planned location and the 0-2 ft surface soil will be re-sampled. IDW will be containerized until surface soil results can be used to determine the method of disposal.

Reason for Modification: Surface soil analytical results from the northern boundary of the facility indicates the possibility of groundwater contamination from off-site land application of biosolids. Conversion of location AOI1-01 from a 15-foot soil boring to a monitoring well can identify off-site groundwater contamination, thereby aiding in the delineation and characterization of groundwater contamination from the former fire truck bay.

Conversion of sample location AOI01-03 from a monitoring well to a 15-foot soil boring can preserve the budget of the project while achieving project objectives due to the close proximity of monitoring wells at AOI01-02 and AOI01-04. Ms. Pamela Hess (Army National Guard [ARNG]), Mr. Chris Fritzsche (New Mexico ARNG), and Mr. John Rhoderick (New Mexico Environment Department) concurred with the above modification.

Soil boring AOI01-06 will be reinstalled in the original planned location so that it is in closer proximity to the former parking apron, which is a possible PFAS source.

Approval

Representing: EA

By: Gina Mullen

Title: Task Manager

Date: 03/09/2022

Representing: EA

By: Michael O'Neil

Title: Project Manager

Date: 03/09/2022

Representing: ARNG

By: HESS.PAMELA.SUE.1146563313 Digitally signed by HESS.PAMELA.SUE.1146563313 Date: 2022.03.10 05:56:56 -07'00'

Title: Project Manager

Date: 3/10/2022

Representing: USACE

By: LUKASKO.JAMES.JOHN.1247033161 Digitally signed by LUKASKO.JAMES.JOHN.1247033161 Date: 2022.03.13 19:32:49 -07'00'

Title:

Date:

FIELD CHANGE REQUEST FORM

ARNG PFAS SITE INSPECTION PROGRAM

Contract: W912DR-19-D-005

Installation: Santa Fe Army Aviation Support Facility (AASF)

Project No. 634250383.0004.0023A

Requested By: Gina Mullen, Task Manager

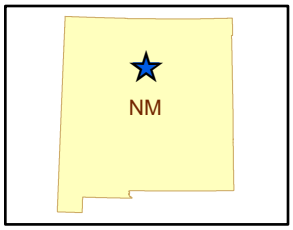
Field Change Request Number: 03

Description of Modification: An additional soil boring/monitoring well (AOI01-09) will be installed 7 feet northeast of monitoring well AOI01-01, which is screened in the regional aquifer. The proposed monitoring well will be installed in the perched aquifer. Soil samples will be collected at 0-2 ft bgs, 13-15 ft bgs, and in the foot above the perched aquifer.

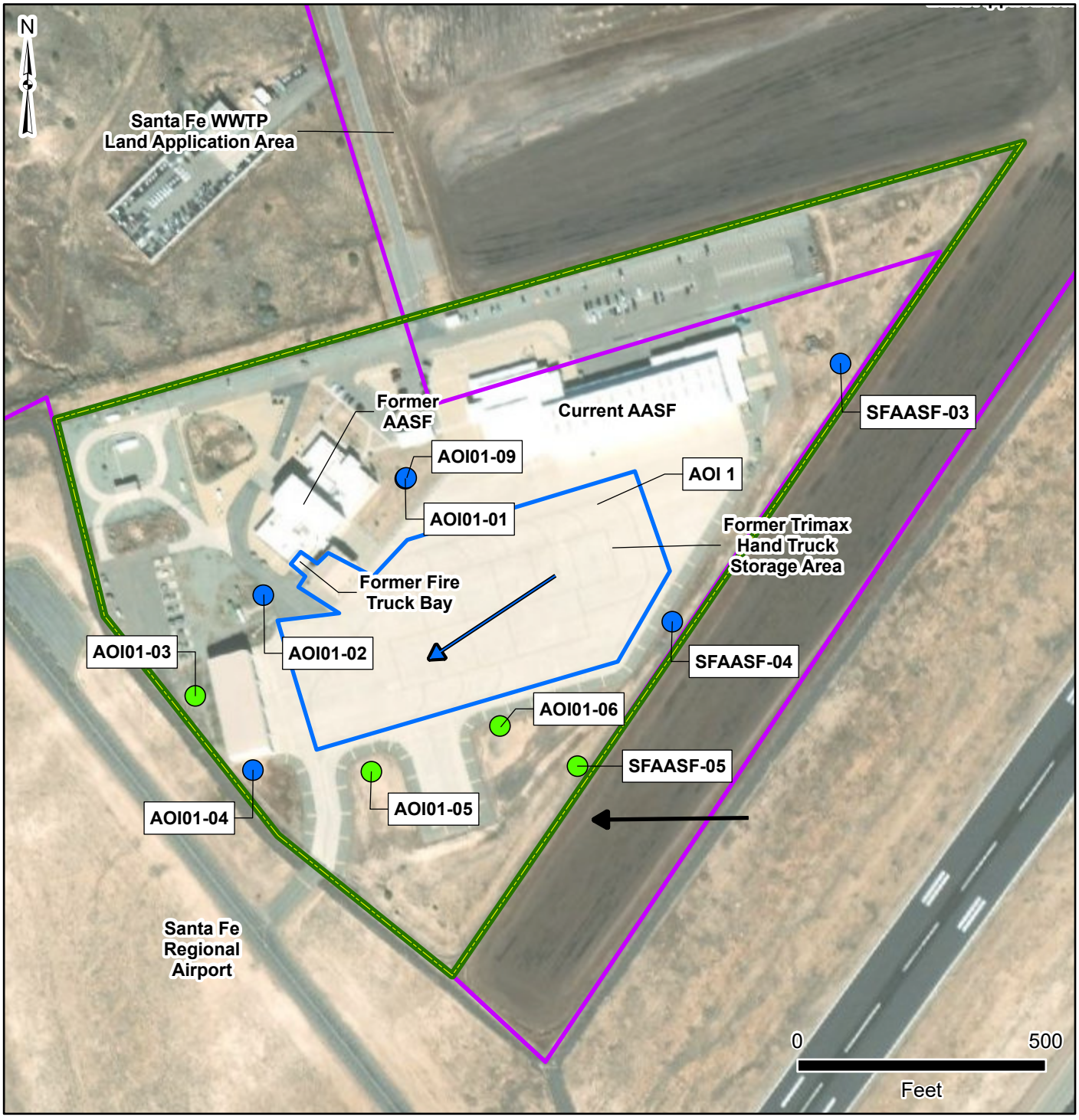
Reason for Modification: AOI01-09 is proposed to characterize groundwater upgradient of monitoring well AOI01-02, which is in close proximity to the former fire truck bay. An upgradient sample is required to determine if potential PFAS contamination at AOI01-02 is sourced from ARNG or offsite activities.

AOI01-01 is in a directionally appropriate location but is screened in the regional aquifer rather than the perched aquifer. The well was not completed in the perched aquifer due to low confidence that it is a viable water bearing unit. However, an attempt will be made to complete a well in the perched aquifer due to the importance of characterizing groundwater upgradient of AOI01-02.

Army National Guard Site Inspections
Site-Specific Quality Assurance Project Plan
Santa Fe AASF, New Mexico



Site Inspection Drilling Locations



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Facility Data
- Facility Boundary
- Area of Interest
- Adjacent Source Areas

Sample Locations
- Well Boring/Monitoring Well (Sonic)
- Soil Boring (Direct Push)

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

Data Sources:
ESRI 2020
AECOM 2020

Date:.....May 2022
Prepared By:.....EA
Prepared For:.....USACE
Projection:.....WGS 84 UTM 13N

Approval

Representing: EA

By: Gina Mullen

Title: Task Manager

Date: 5/2/2022

Representing: EA

By:

Title: Project Manager

Date: 5/2/2022

Representing: ARNG

By: HESS.PAMELA.SUE.1146563313 Digitally signed by HESS.PAMELA.SUE.1146563313 Date: 2022.05.04 04:41:19 -06'00'

Title: Project Manager

Date: 5/4/2022

Representing: USACE

By: PECK.TIMOTHY.JOSEPH.12 52325553 Digitally signed by PECK.TIMOTHY.JOSEPH.1252325553 Date: 2022.05.04 15:12:23 -04'00'

Title:

Date:

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Appendix C

Photographic Log

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Appendix C - Photographic Log

Site Inspection for PFAS	Santa Fe Army Air Support Facility	Santa Fe, NM

Photograph No. 01

Date 10/14/2021
Time 1050

Description:
Source water from the yard hydrant to the right was tested for PFAS to determine if it could be used for decontamination of field equipment. Yard hydrant is located northwest of the wash rack and southeast of the Readiness Center.

Orientation:
northwest

Photograph No. 02

Date 02/07/2022
Time 1200

Description:
EA Engineering advancing boring at SFAASF-04 with hand auger.

Orientation:
south

Appendix C - Photographic Log

Site Inspection for PFAS	Santa Fe Army Air Support Facility	Santa Fe, NM

Photograph No. 03

Date 02/08/2022
Time 1100

Description:
EA Engineering decontaminating the hand auger between locations

Orientation:
east

Photograph No. 04

Date 04/25/2022
Time 1350

Description:
Drill rig setup at AOI01-01 to complete soil boring

Orientation:
northwest

Appendix C - Photographic Log

Site Inspection for PFAS	Santa Fe Army Air Support Facility	Santa Fe, NM

Photograph No. 05

Date 04/25/2022
Time 1325

Description:
EA Engineering screening soil with a Photo-Ionization Detector before logging soil during AOI01-01 drilling activities.

Orientation:
south

Photograph No. 06

Date 04/29/2022
Time 0850

Description:
EA Engineering logging soil cuttings during the drilling of SFAASF-04.

Orientation:
northwest

Appendix C - Photographic Log

Site Inspection for PFAS	Santa Fe Army Air Support Facility	Santa Fe, NM

Photograph No. 07

Date 05/04/2022
Time 1000

Description:
Direct push drill rig advancing soil boring AOI01-06B.

Orientation:
southwest

Photograph No. 08

Date 05/09/2022
Time 1550

Description:
Concrete form created over well AOI01-04 in preparation of pouring the concrete pad.

Orientation:
east

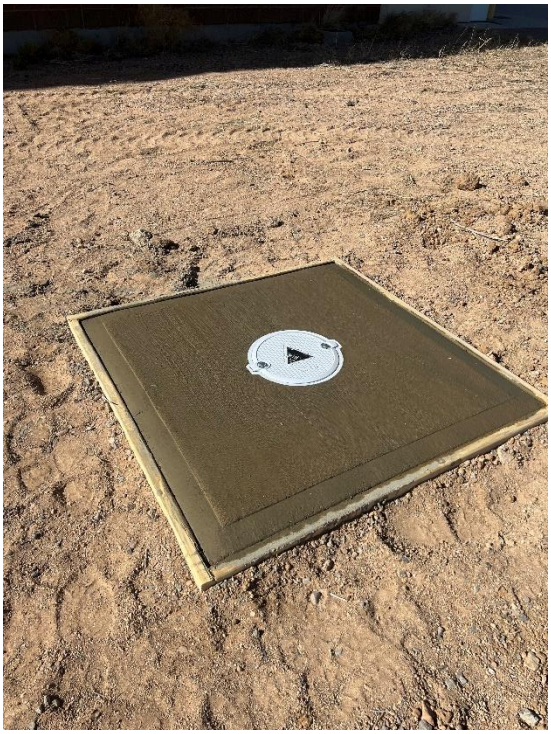
Appendix C - Photographic Log

Site Inspection for PFAS	Santa Fe Army Air Support Facility	Santa Fe, NM

Photograph No. 09

Date 05/09/2022
Time 1650

Description:
Completed pad for well AOI01-04



Orientation:
north

Photograph No. 10

Date 05/10/2022
Time 0830

Description:
Bailing well AOI01-01 during well development.

Orientation:
north

Appendix C - Photographic Log

Site Inspection for PFAS	Santa Fe Army Air Support Facility	Santa Fe, NM

Photograph No. 1 1

Date 05/10/2022
Time 1440

Description:
Developing well AOI01-02. Initially groundwater was turbid with sediment.

Orientation:
north

Photograph No. 12

Date 05/10/2022
Time 1530

Description:
Developing well AOI01-02. As developing continues sediment is removed from the well resulting in clear groundwater.

Orientation:
north

Appendix C - Photographic Log

Site Inspection for PFAS	Santa Fe Army Air Support Facility	Santa Fe, NM

Photograph No. 1 3

Date 05/20/2022
Time 0830

Description:
EA groundwater sampling setup at well AOI01-01.

Orientation:
southwest

Photograph No. 14

Date 05/20/2022
Time 1530

Description:
EA completing groundwater sampling activities at well AOI01-02.

Orientation:
northeast

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Appendix D

Technical Project Planning Meeting Minutes

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Meeting Minutes
Santa Fe Army Aviation Support Facility (AASF) – Site Inspection (SI)
Technical Project Planning (TPP) – Meeting 1/Meeting 2
SI for Per- and Polyfluoroalkyl Substances Impacted Sites, Army National Guard (ARNG) Installations, Nationwide
Contract Number (No.) W912DR-19-D-0005, Task Order No. W912DR20F0383
Friday, 1 October 2021
1230 to 1330 hrs

Participants			
Name	Affiliation*	Phone	E-Mail
John Rhoderick	NMED	505-819-8284	John.rhoderick@state.nm.us
Justin Ball	NMED	505-670-1428	Justin.ball@state.nm.us
Paul Chamberlain	NMED	--	Paul.chamberlain@state.nm.us
Byron Kesner	NMARNG	505-365-4406	Byron.t.kesner.nfg@army.mil
Christopher Fritzsche	NMARNG	505-365-4404	Christopher.e.fritzsche.nfg@army.mil
Aaron Roybal	NMARNG	--	Aaron.d.roybal.nfg@army.mil
Pam Hess	ARNG G9	208-880-9734	Pamela.s.hess.mil@army.mil
Jim Lukasko	USACE - Sacramento	916-557-5392	James.j.lukasko@usace.army.mil
Mike O'Neill	EA	410-329-5142	moneill@eaest.com
Regina Mullen	EA	505-715-4279	rmullen@eaest.com
Caitlin Helms	EA	410-329-5174	chelms@eaest.com
*ARNG G9 – Army National Guard; NMARNG – New Mexico Army National Guard; NMED – New Mexico Environment Department; USACE – United States Army Corps of Engineers; and EA – EA Engineering, Sciences, and Technology, Inc., PBC			

Ms. Regina Mullen (EA SI Task Manager/Site Lead) welcomed participants and began the meeting with an overview of the agenda and a roll call with introductions. She noted the purpose of the meeting is to discuss the SI sampling for per- and polyfluoroalkyl substance (PFAS) to determine presence/absence of releases at the Santa Fe AASF. The meeting was held virtually so there is no sign in sheet for attendees. The TPP briefing slides are included as **Attachment A** to these meeting minutes.

Ms. Mullen began the presentation with a safety reminder, noting that the SI will conform to requirements in United States Army Corps of Engineers (USACE) Engineering Manual (EM) 385-1-1. Site-specific safety procedures will be planned for and followed during SI field work, including establishing controlled work zones during field activities. Key points discussed during the presentation are provided below.

Programmatic Discussion:

- The TPP process is a USACE-established process with the main goal of engaging stakeholders in project planning and reporting. The ARNG has embraced a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) model for the SIs being completed nationwide that will incorporate state-specific guidance, as necessary. The TPP #1 meeting (which serves as an introduction to the ARNG program/SI process and Preliminary Assessment [PA] findings) and the TPP #2

meeting (which focuses on a discussion of Data Quality Objectives (DQOs), sampling locations, etc.) have been combined in an effort to streamline the process.
- This TPP #1/TPP #2 meeting provides an overview of the results of the PA, and an opportunity for stakeholders to discuss the SI Work Plan (Unified Federal Policy-Quality Assurance Project plan [UFP-QAPP]), sampling locations, and rationale for the SI project. Regulatory stakeholders are also afforded the opportunity to formally review and comment on the SI Work Plan.
- Another TPP meeting will occur (TPP #3) to present the SI Report findings to all stakeholders; identified stakeholders will be afforded the opportunity to review and comment on the SI Report.
- The ARNG PFAS program is centrally contracted through USACE and managed by ARNG. Every ARNG facility nationwide responded to a questionnaire on potential PFAS releases. Facilities were prioritized by the likelihood of release and proximity to drinking water sources. The facility-wide PA for Santa Fe AASF was completed in August 2020.
- There are nearly 200 facilities on the ARNG's nationwide PA list.

Santa Fe AASF PA Findings:
- Ms. Mullen provided a brief overview of the PA findings. During the PA, two potential source areas were identified and combined into one Area of Interest (AOI 1) for the Santa Fe AASF. This location is described in the briefing slides, and more detail was provided during the SI overview. The potential PFAS releases were attributed to potential aqueous film forming foam (AFFF) release and storage.
- Potential adjacent sources of PFAS that are not attributable to ARNG activities, were also discussed during the overview.

Santa Fe AASF SI Overview:
- During the SI planning phase, DQOs were established to collect the appropriate data to feed into the conceptual site model (CSM).
- The primary goal of the SI is to determine the presence/absence of a release of PFOS/PFOA/PFBS above DoD screening levels from potential source areas.
- Ms. Mullen reviewed the one AOI:
    - AOI 1: Former Firetruck Bay and Tri-Max™ Hand Truck Storage Area
- Geologic and hydrogeological data will inform the CSM, specifically with respect to the direction and rate of groundwater flow.
- The ARNG PFAS program includes consideration of enhanced DQOs that assess PFAS at the point of exposure and at the Santa Fe AASF boundary.

Santa Fe AASF SI Proposed Activities:
- Proposed sampling methods, locations and rationale were discussed. Sampling is planned as follows:
    - Hand auger samples will be collected from 0-2 ft below ground surface (bgs) at select locations

  - Continuous soil cores to target depths (several at 15 bgs and some up to 200 ft bgs) will be collected during the field work in and around the potential source areas. Continuous logging of borings will support understanding lithologic controls of preferential pathways.
  - Three soil samples will be collected from each boring. Soil samples will include one surface soil sample (0-2 ft) and two subsurface soil samples. Depths of the subsurface soil samples will be dependent on the total depth of the boring:
    - 15 ft borings: Subsurface samples will be collected at 6-8 ft and bottom of the boring (15 ft).
    - Up to 200 ft borings: Subsurface samples will be collected at 6-8 ft and in the capillary fringe above the water table.
  - Permanent monitoring wells will be installed in the boreholes up to a depth of 200 ft bgs (depending on groundwater elevation) and groundwater will be purged/sampled using low flow techniques.
  - The group discussed Investigation Derived Waste (IDW) and it was determined that NMED would require additional time to determine a preferred IDW disposal procedure.
- Document Review and Distribution was discussed as follows:
  - EA asked about the current distribution process which include delivering documents electronically.
  - NMED concurred that SI documents can be sent electronically.

Questions and Open Discussion:

- Ms. Pam Hess (ARNG G9, Project Manager) informed the group that she performed a site walk with NMARNG and NMED personnel immediately before the TPP # 1 and 2 meeting, but they had not yet visited the Former Firetruck Bay. Ms. Hess indicated, based on photographs, there was no evidence that a drain existed within the Former Firetruck Bay, but that she would visit and verify later in the day.
- Based on input from NMED, Ms. Hess suggested an additional two hand auger sample locations in the grassy area adjacent to the paved ramp associated with the Former Firetruck Bay. In addition, Ms. Hess suggested monitoring well location AOI01-02 be relocated into the grass to the southwest of the Former Firetruck Bay, towards a low-lying area presumably downgradient relative to groundwater and surface water flow leaving the truck bay. NMED, USACE, and EA concurred on these suggestions.
- Ms. Hess discussed the potential to sample an existing facility well but indicated that due to the unknown depth of the well, it was unclear if sampling the well would be beneficial to address the SI DQOs. Ms. Hess indicated that Mr. Byron Kesner (NMARNG, Project Lead) or Mr. Christopher Fritzsche (NMARNG, Environmental Department Supervisor) should try to gather information on the well screening/aquifer to see if corresponds to what is being sampled in the proposed sampling plan. Ms. Mullen inquired about the status of the facility well. Mr. Fritzsche explained that the well in question was a former production well that provided drinking water to the former AASF prior to the

renovations. Mr. Fritzsche indicated the well has been capped and NMARNG are in the process of acquiring funding to permanently abandon the well. Ms. Hess indicated she would provide a photograph of the well to Ms. Mullen. Mr. Paul Chamberlain (NMED, Geoscientist for the Ground Water Quality Bureau) informed the group that the existing facility well is screened from 376-469 ft bgs. Ms. Hess confirmed that the well is screened too deep to be sampled as part of the SI. NMED concurred.

- Ms. Mullen indicated that Santa Fe municipal water had previously been sampled for PFAS and asked the group if EA should collect a sample from the facility tap to determine if it could be used for decontamination water. Ms. Hess indicated that the previously collected sample was analyzed by EPA 537 rather than Quality Systems Manual Version 5.3, and as a result a new sample would need to be collected.
- Ms. Mullen indicated that a private utility locator would be contracted to support utility clearance at the facility. Mr. Mike O'Neill (EA, Project Manager) requested facility utility maps from the NMARNG to support the utility clearance.
- Ms. Hess asked Mr. Justin Ball (NMED, Acting Bureau Chief of the Groundwater Quality Bureau) if NMED allows for land application if the PFAS concentrations detected fall below applicable screening levels. Mr. Ball indicated that would be a possibility. Ms. Hess explained the PFAS liquid IDW disposal treatment utilizing granulated activated carbon filters to remove contamination prior to the release of the IDW back into the environment. Mr. Ball requested the available Standard Operating Procedure for the treatment of PFAS liquid IDW.
- Ms. Mullen asked NMED if they would be able to provide comments on the SI Uniform Federal Policy for Quality Assurance Project Plan (UFP-QAPP) Addendum by 6 November 2021. Mr. John Rhoderick (NMED, Acting Director for the Water Protection Division) indicated NMED comments would be provided by that date.
- Mr. O'Neill asked the group if any additional permits would be required prior to conducting the field work at the Santa Fe AASF. Ms. Hess indicated she would complete the Federal Aviation Administration notification for the airport and that the NMARNG would verify that no additional permits are required for working onsite. NMARNG will contact the Construction Facilities Management to confirm any permit requirements.
- Ms. Mullen asked NMED when EA could expect to receive comments on the Rio Rancho SI UFP-QAPP Addendum. Mr. Rhoderick indicated that NMED had provided comments on the Rio Rancho PA and SI UFP-QAPP Addendum; he and Ms. Hess had discussed modifications to the QAPP regarding the discovery of a Tri-Max™ extinguisher found to be stored on site. NMED is currently waiting to receive and review edits to the QAPP text. Ms. Hess indicated she would follow-up with the remaining action items owed to NMED. No date was provided for UFP-QAPP comments.
- Mr. Ball requested clarification on the nature of the interviews conducted as part of the PA, and the informational gaps existing between the facility opening in 1979 and the use of the Tri-Max™ fire extinguishers in the 2000s. Ms. Hess explained the interview process, and that it is typical for ARNG installations to not have a full documented history of AFFF use. As such, the ARNG PFAS Program is operated using a conservative approach. Ms. Hess indicated that the PAs have been finalized and will not be revised;

however, text may be added to the UFP-QAPP Addendum if deemed necessary. Mr. Ball indicated it would be beneficial to add text regarding the typical historical operations conducted by the ARNG with regards to AFFF and Tri-Max™ fire extinguishers. Ms. Hess explained that site specific history would be beneficial to add to the UFP-QAPP Addendum, but generalized training and use conducted by the ARNG across all states and territories may not be as helpful. Ms. Hess indicated she would work with NMARNG to ensure that available information on the history of the Tri-Max and AFFF use at Santa Fe AASF is included.

- Mr. Rhoderick asked about the SI being conducted in Roswell and Ms. Hess indicated that NMED should receive a Draft Final SI UFP-QAPP Addendum for Roswell within the next couple of months.

Visual Reconnaissance:

- Proposed sample locations were visually inspected during a site walk conducted by Ms. Hess, NMED, and the NMARNG on 1 October 2021.

Action Items:

- EA will issue the Final Uniform Federal Policy for Quality Assurance Project Plan (UFP-QAPP) Addendum upon issuance of NMED comments on the Draft Final UFP-QAPP Addendum and concurrence with responses to NMED comments.
- Obtain facility utility maps from NMARNG.
- Provide the Standard Operating Procedure for PFAS liquid IDW disposal to NMED.

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Attachment A

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Santa Fe Army Aviation Support Facility (AASF), New Mexico
Site Inspection
New Mexico Army National Guard (NMARNG)

Technical Project Planning (TPP) Meeting 1 & 2

Preliminary Assessments and Site Inspections (PA/SI) for Perfluorooctanesulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites

September 2021

Prepared for:

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC

AGENDA

- Introductions
- Safety Moment
- TPP Meeting Goals
- Army National Guard (ARNG) PA/SI Overview
- Santa Fe AASF PA Results
- Santa Fe AASF SI Overview
- Stakeholder Involvement
- Questions and Open Discussion

INTRODUCTIONS

- ARNG G9
  - Pamela Hess, SI Project Manager
  - David Connolly, Nationwide Program Manager
- United States Army Corps of Engineers (USACE)
  - Tim Peck, Nationwide Program Manager/SI Project Manager
  - Jim Lukasko, SI Project Manager
- New Mexico Army National Guard (NMARNG)
  - Byron Kesner, Environmental Specialist
  - Christopher Fritzsche, Environmental Specialist
  - Cecelia Abeyta, Environmental Specialist
- New Mexico Environment Department (NMED)
  - John Rhoderick, Acting Director for the Water Protection Division
- EA Engineering
  - Regina Mullen, SI Task Manager
  - Mike O'Neill, SI Project Manager

SAFETY MOMENT

Site Safety Procedures

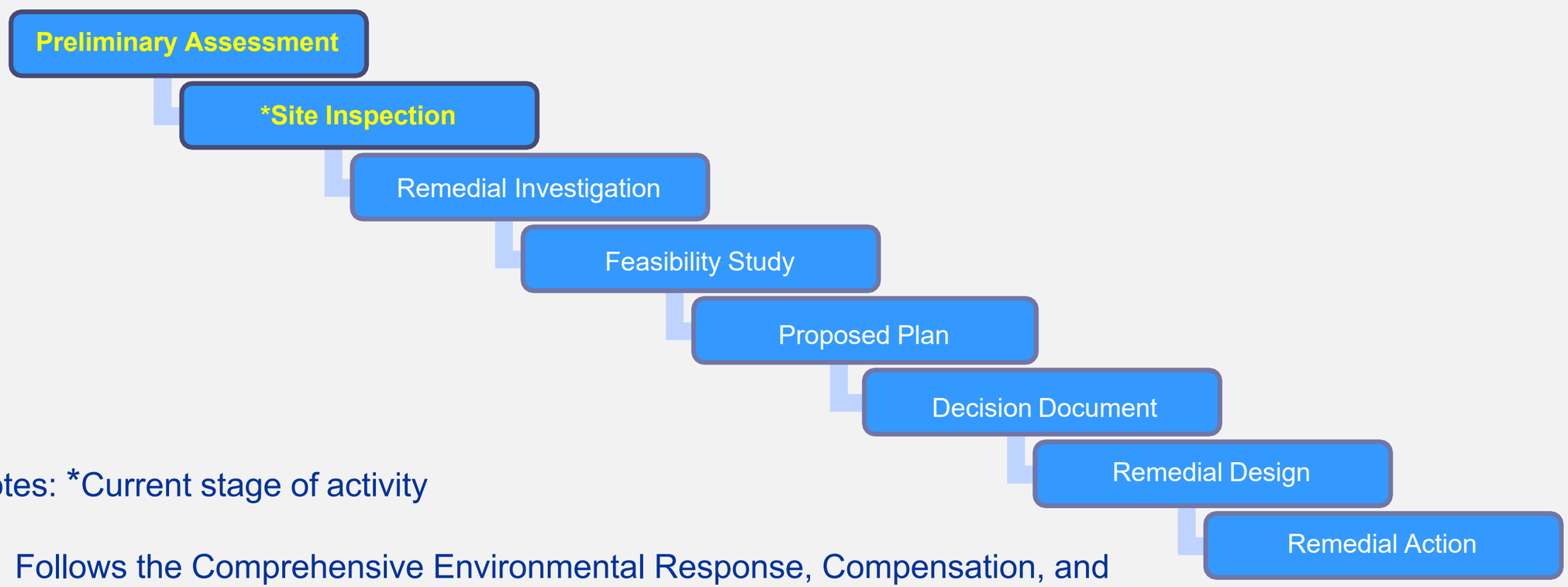
- SI will follow USACE Engineering Manual (EM) 385-1-1 requirements:
  - Accident Prevention Plan addresses all component plans for EM 385-1-1, including Construction Support during drilling operations
  - Site Specific Safety and Health Plan addresses project participants, training, and hazard identification and mitigation
- Health and safety documents prepared during SI planning phase
- Pre-field kickoff meeting and daily safety briefings

TPP MEETING GOALS

- TPP1:
  - Provide an overview of the ARNG PA/SI Program
    - Regulatory framework
  - Discuss PA Findings
- TPP2: Discuss proposed SI approach
  - Define objectives for SI data collection
  - Encourage stakeholder involvement
  - Review project schedule
  - Capture action items
- TPP3: Discuss SI findings
- Participants:
  - TPP1 and 2: ARNG, USACE, NMED
  - TPP3: ARNG, USACE, NMED, other local stakeholders

ARNG PA/SI OVERVIEW

WORK PHASES



Notes: *Current stage of activity

- Follows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Process
- An interim removal action can be conducted or a No Further Action determination can be made at any phase

ARNG PA/SI OVERVIEW

- Activities centrally contracted through USACE and managed by ARNG G9
  - USACE Baltimore manages the contract, with technical project support from other Districts (Louisville, Omaha, Alaska, Sacramento, Jacksonville, and Seattle Districts)
  - Project support: chemistry, geology, risk screening
- PA ranking (~200 facilities) - state ARNG input
  - Likelihood of release
  - Complete pathway to drinking water receptor
  - Priority assigned to facilities with highest likelihood of release near drinking water intake
- PA – facility-wide; SI – areas of interest (AOIs)

ARNG PA/SI OVERVIEW

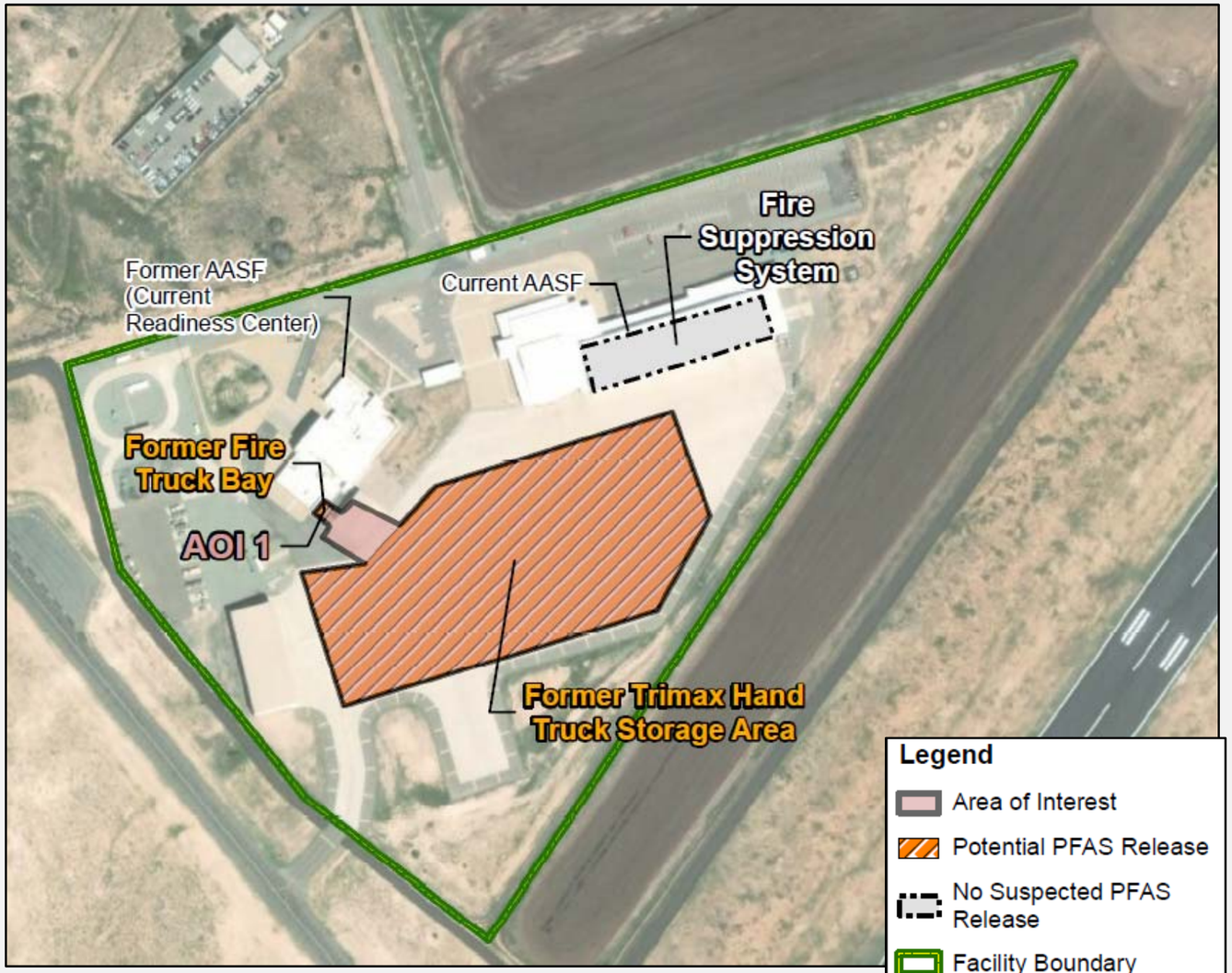
- ARNG / NMARNG
  - Identify potential per- and polyfluoroalkyl substances (PFAS) release locations
  - Provide facility access and points of contact
  - Gather and provide appropriate documents
  - Identify/schedule personnel to interview
  - Supply final PA to the regulatory agencies
- SI Regulatory Involvement
  - CERCLA SI conducted in conjunction with the appropriate regulatory agencies

SANTA FE AASF ARNG PA RESULTS

- Potential PFAS release areas: 2 areas identified during the PA grouped into 1 AOI
- AOI 1: Former Firetruck Bay and Tri-Max™ Hand Truck Storage Area
  - The former AASF building, now the current NMARNG Readiness Center, formerly housed a single firetruck. Additionally, Tri-Max™ 70/30 hand trucks were stored in various places around the flight line and parking apron prior to the renovations that took place in 2012.

SANTA FE AASF ARNG

SUMMARY OF FINDINGS AND AOIs



AECOM 2020

SANTA FE AASF ARNG
PA RESULTS
AOI 1: FORMER FIRETRUCK BAY AND TRI-MAX™ HAND TRUCK STORAGE AREA

- Former AASF Building (current Readiness Center):
  - Formerly housed a single firetruck.
  - The building was renovated in 2012.
  - The firetruck was sold in 2005 to the Santa Fe Fire Department and it is unknown how long the truck was stored in the bay.
  - Personnel interviews confirmed the truck stored AFFF foam, but there are no records or recollection of use or spills.
  - It is possible that the truck leaked AFFF or had its AFFF tank flushed out during maintenance.
  - It is unknown if the former firetruck bay contained floor drains.

SANTA FE AASF ARNG
PA RESULTS
AOI 1: FORMER FIRETRUCK BAY AND TRI-MAX™ HAND TRUCK STORAGE AREA

- Former Tri-Max™ Hand Truck Storage Area:
  - The flight line and paved parking apron at the facility currently stretch across the majority of the facility. The area was expanded and repaved in 2012 during renovations.
  - Prior to the renovation, hand trucks were stored in various places and were regularly serviced.
  - Hand trucks were used for 4 to 5 years in the mid-2000s and eventually were turned in and replaced with non-PFAS extinguishers.
  - There are no records of training or nozzle testing.

The installation prior to renovations in 2009 (top) and the current footprint (bottom)

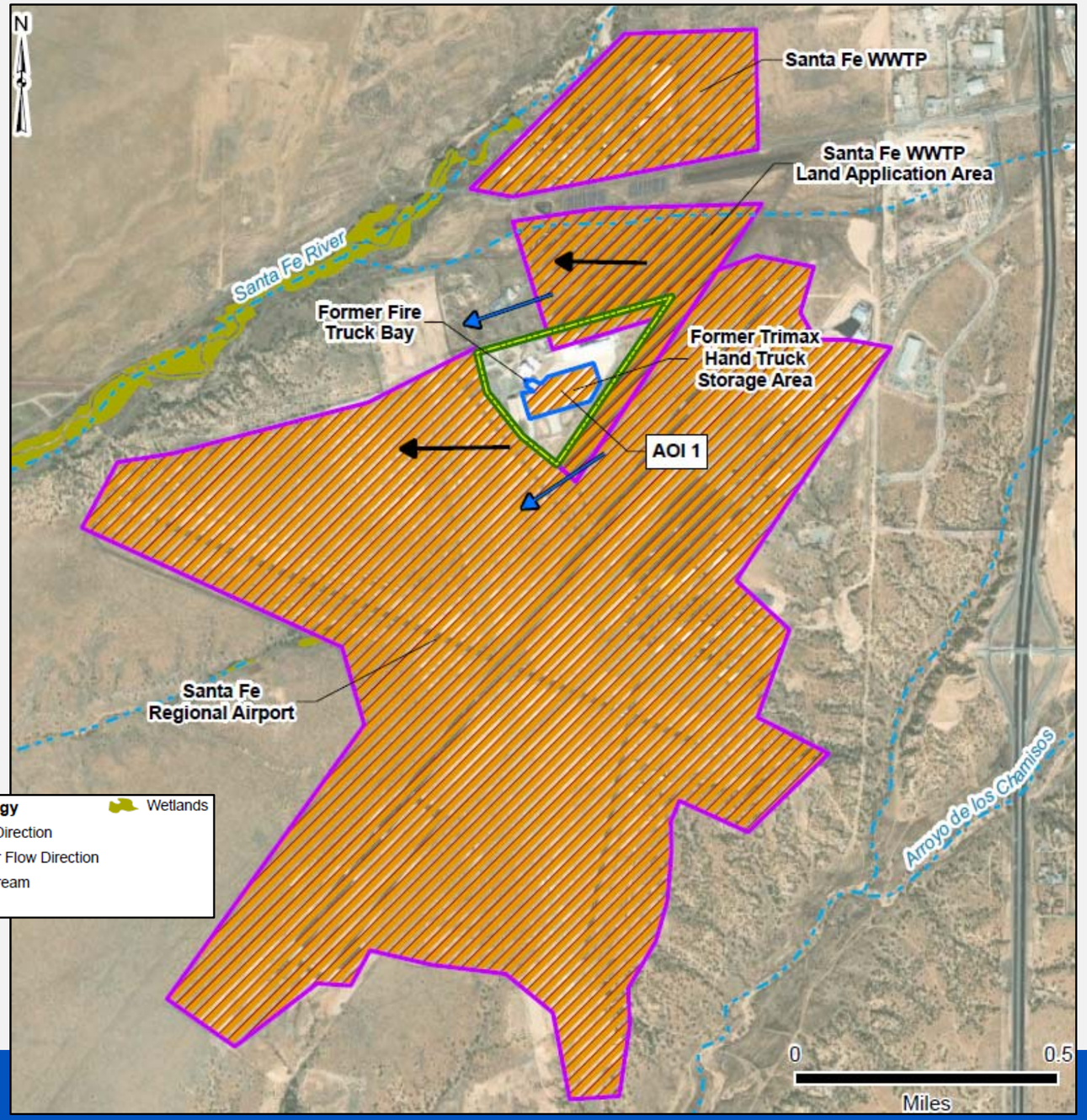
SANTA FE AASF

PA FINDINGS - ADJACENT SOURCES

- Santa Fe Regional Airport (SAF)
  - Interviews with NMARNG facility staff and a historical records search provided little information regarding use of AFFF at SAF; however, the records search detailed two emergency incidents that happened on or near the runway. It is unknown if AFFF was used as part of the emergency response to either incident. The crash sites are potentially located upgradient of the AOI as well as upstream of surface water flow, and they may impact PFAS concentrations in the groundwater underlying the facility.
- Santa Fe wastewater treatment plant (WWTP) and Associated Land Application Areas
  - The Santa Fe WWTP is located north of the Santa Fe AASF. Areas to the north and east of the Santa Fe AASF are currently used for land application of biosolids. Based on historical aerial photographs, application of biosolids may have extended to the north end of the current AASF building prior to the 2012 renovations of the facility. The biosolids are located upgradient of the AOI as well as upstream of surface water flow, and they may impact PFAS concentrations in the groundwater underlying the facility.

SANTA FE AASF
PA FINDINGS

Adjacent Sources



SANTA FE AASF
SI OVERVIEW
DATA QUALITY OBJECTIVES (DQOs)

- Primary SI DQOs
  - Confirm the presence/absence of a release
  - Gather data for conceptual site model (CSM): Understanding of Source-Pathway-Receptor relationships required for establishing sampling strategy
- Extended SI DQOs
  - Determine the presence/absence at facility boundary
  - Check for alternate sources, up- or downgradient
  - Measure PFAS at/near receptor, if warranted

SANTA FE AASF SI OVERVIEW
SCREENING LEVELS

- Results compared to Office of the Secretary of Defense (OSD) Screening Levels (SLs) for soil and groundwater for PFOA, PFOS, and PFBS.
  - Memorandum from the OSD dated 15 September 2021
  - SLs for groundwater based on direct ingestion
  - SLs for soil based on incidental ingestion; 0-2 ft compared to Residential SL, 2-15 ft compared to Industrial SL, > 15 ft is not compared to either SL
- AOIs exceeding OSD SLs will proceed to the next phase under CERCLA (i.e., Remedial Investigation)

Analyte	Residential (Soil) (µg/kg)[1]	Industrial / Commercial Composite Worker (Soil) (µg/kg)[1]	Tap Water (Groundwater) (ng/L)[1]
PFOA	130	1,600	40
PFOS	130	1,600	40
PFBS	1,900	25,000	600

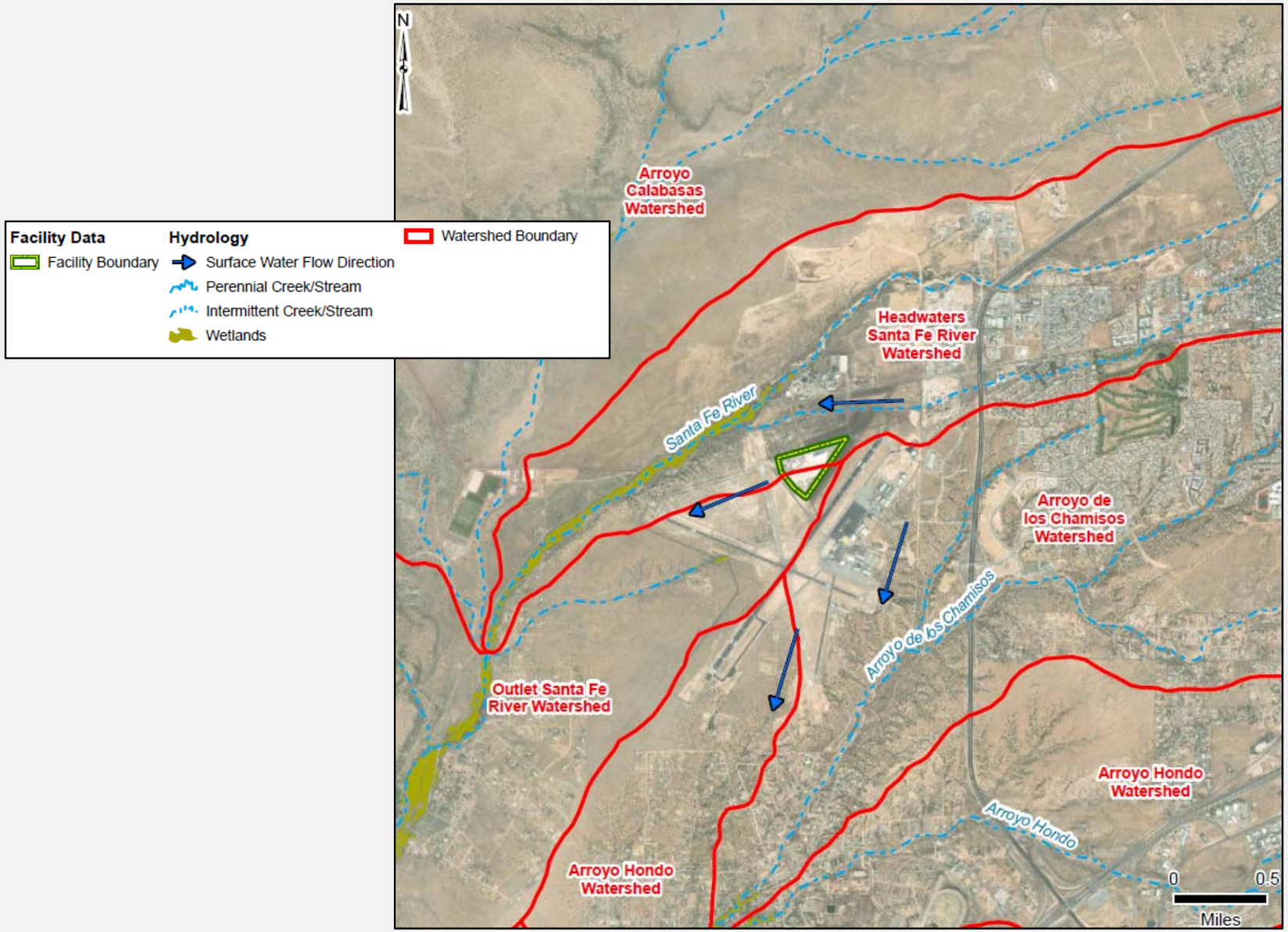
Notes:

1. Deputy Assistant Secretary of Defense. 2021. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. 15 September 2021.

µg/kg = Microgram(s) per kilogram.
ng/L = Microgram(s) per liter.

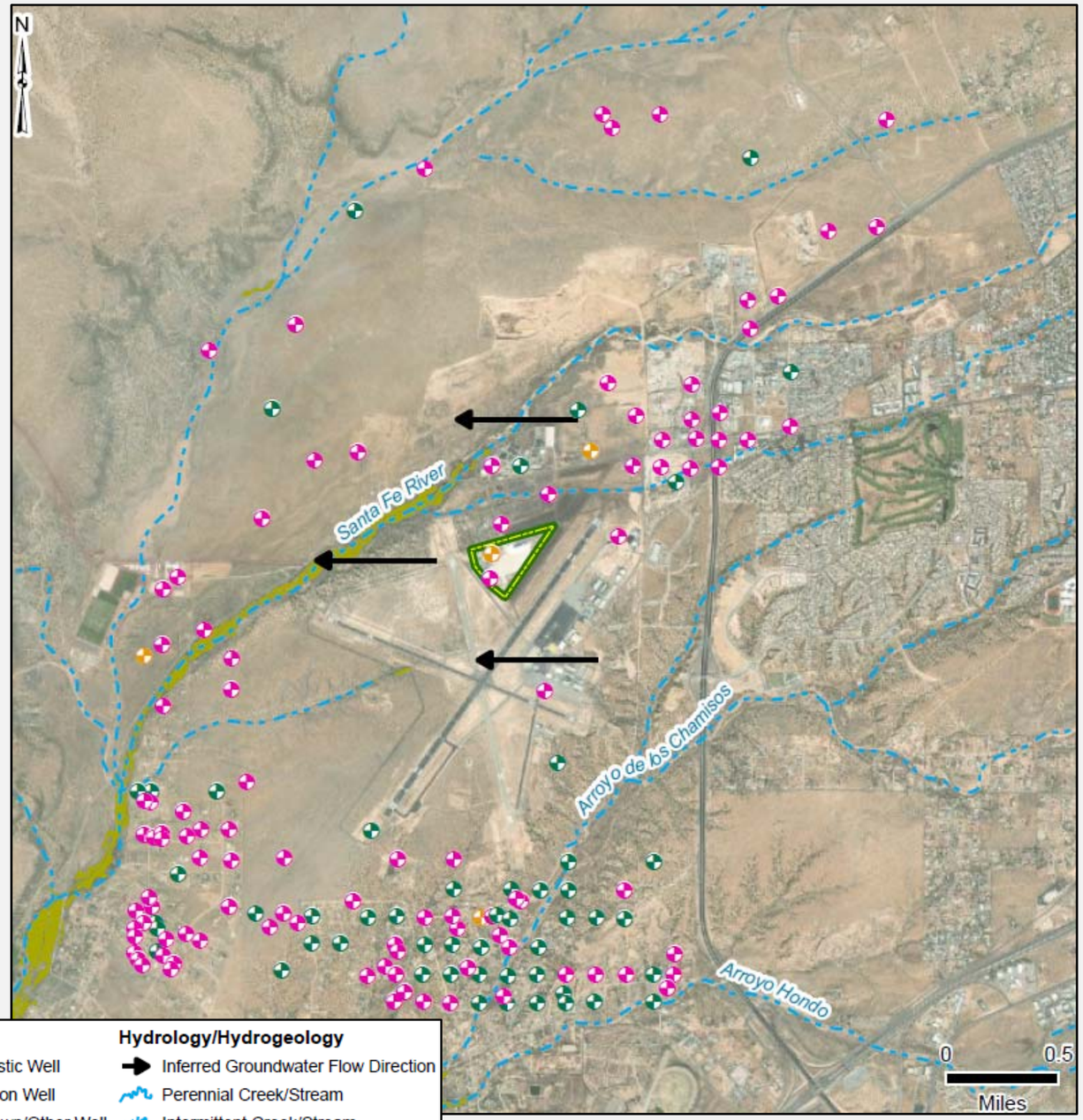
SANTA FE AASF SI OVERVIEW

CSM – SURFACE WATER FEATURES

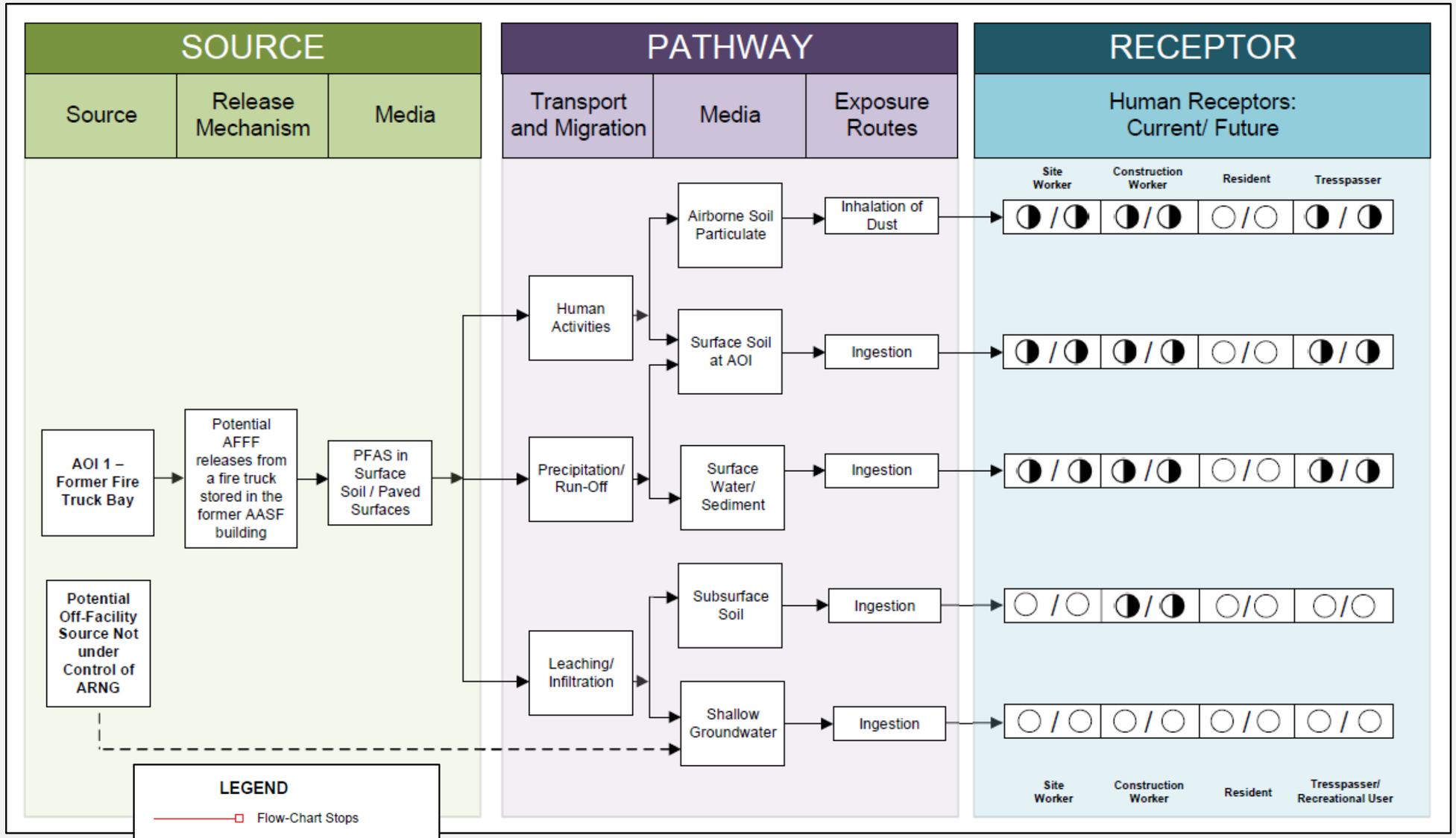


SANTA FE AASF SI OVERVIEW

CSM – GROUNDWATER FEATURES



SANTA FE AASF
SI OVERVIEW
CSM

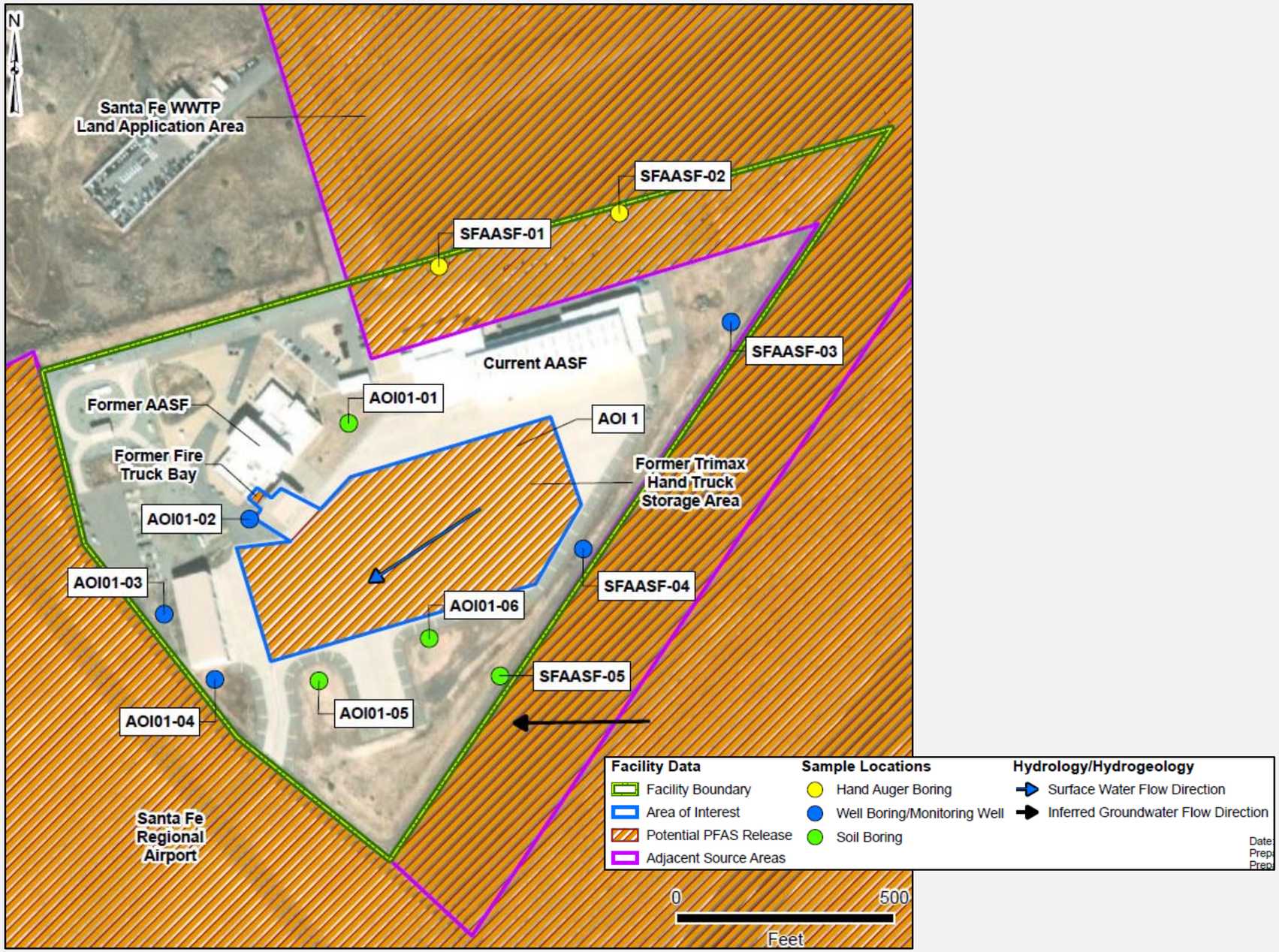


SANTA FE AASF SI OVERVIEW
PLANNING AND SAMPLING

- Finalize Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP) Addendum
  - Draft Final submitted on 7 September 2021
  - Final to be submitted following the TPP 1&2 meeting after addressing NMED comments
- Continuous soil cores to target depth
  - Well Locations: Target depth up to 200 ft bgs. Soil samples collected at surface (0-2 ft bgs with hand auger), mid point (not to exceed 15 ft bgs), and 1 ft above water table.
  - Soil Borings: Target depth of 15 ft bgs. Soil samples collected at surface (0-2 ft bgs with hand auger), mid point (6-8 ft bgs), and at 15 ft bgs for soil borings drilled to 15 ft bgs.
- Collect hand auger samples (0-2 ft bgs) at select locations along the northern facility boundary
- Collect a groundwater sample from each well (up to 200-ft borings)
- Wells will be surveyed and depth to the water table will be recorded

SANTA FE AASF SI OVERVIEW

PROPOSED SAMPLING LOCATIONS



SANTA FE AASF
SI OVERVIEW

Location	# of Soil Borings (to 15 ft bgs)	# of Hand Auger Borings (to 2 ft bgs)	# of Monitoring Wells (to 200 ft bgs)	Soil Samples	Target Interval for GW samples	Groundwater Samples	Decontamination Water Samples
AOI 1	3	0	3	18	Mid-screen	3	-
Facility Boundary	1	2	2	11	Mid-screen	2	-
Total	**4**	**2**	**5**	**29**	**---**	**5**	**1**

- Sample locations will be refined in the field
  - Confirm placement is accessible and will meet DQOs prior to the utility mark-out and locate

SANTA FE AASF SI OVERVIEW

ANALYTICAL PARAMETERS

Perfluorooctanesulfonic acid (PFOS)	Perfluoroheptanoic acid (PFHpA)
Perfluorohexanesulfonic acid (PFHxS)	Perfluorononanoic acid (PFNA)
Perfluorooctanoic acid (PFOA)	Perfluorobutanesulfonic acid (PFBS)
Perfluorobutanoic acid (PFBA)	Perfluoropentanoic acid (PFPeA)
N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)
Perfluorodecanoic acid (PFDA)	Perfluorotetradecanoic acid (PFTA)
Perfluorododecanoic acid (PFDoA)	Perfluorohexanoic acid (PFHxA)
Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnA)
6:2 Fluorotelomer sulfonate (6:2 FTS)	8:2 Fluorotelomer sulfonate (8:2 FTS)
4:2 Fluorotelomer sulfonate (4:2 FTS)	Perfluorodecane sulfonate PFDS (PFDS)
Perfluoroheptane sulfonate (PFHpS)	Perfluorononane sulfonate (PFNS)
Perfluoropentane sulfonate (PFPS)	Perfluorotetradecanoic acid (PFTeDA)

- Analysis completed by an Environmental Laboratory Accreditation Program/National Environmental Laboratory Accreditation Program-certified laboratory
- Requirement for state-certified laboratory?
- Data will undergo stage 2B (soil and non-drinking water) and stage 4 (drinking water) validation as defined in Department of Defense (DoD) Federal Data Validation Guidelines

STAKEHOLDER INVOLVEMENT

- Use TPPs and open communication to encourage stakeholder involvement
- Key involvement topics
  - Proposed approaches
  - Document review time for NMED and other stakeholders
- Schedule:
  - Address remaining comments and issue Final UFP-QAPP Addendum: November 2021
  - Field Investigation: December 2021
  - Reporting including regulator review: March (Draft) / May (Draft Final) / June 2022 (Final)

QUESTIONS AND OPEN DISCUSSION

- Coordination
  - Data transfer
  - Access
  - Decontamination Water
  - Utility mark-out and utility clearance procedures
  - Report distribution (paper, electronic, portable document format)
  - IDW Handling
  - Site Walk
  - Stakeholder relations
- Schedule

ACRONYMS

- AASF – Army Aviation Support Facility
- AFFF – Aqueous Film Forming Foam
- AOI – Area of Interest
- ARNG – Army National Guard
- CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
- COVID-19 – Coronavirus Disease 2019
- CSM – Conceptual Site Model
- DQO – Data Quality Objective
- ELAP – Environmental Laboratory Accreditation Program
- EM – Engineering Manual
- NELAP – National Environmental Laboratory Accreditation Program
- NMARNG – New Mexico Army National Guard
- NMED – New Mexico Environment Department
- PA – Preliminary Assessment
- PFAS – Per- and Polyfluorinated Alkyl Substances
- PFOS – Perfluorooctanesulfonic Acid
- PFOA – Perfluorooctanoic Acid
- SAF – Santa Fe Regional Airport
- SI – Site Inspection
- SSHP – Site Safety and Health Plan
- TPP – Technical Project Planning
- UFP-QAPP – Uniform Federal Policy- Quality Assurance Project Plan
- USACE – United States Army Corps of Engineers
- WWTP – Wastewater Treatment Plant

Appendix E

Boring Logs and Well Construction Diagrams

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EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.625876, -106.086927
Surface Elevation:	NA
Casing Elevation:	NA
GW level at time of drilling:	NA
GW level at time of sampling:	NA

Job. No. 634250383	Client: ARNG	Location: Santa Fe, NM Army Aviation Support Facility
Drilling Method: Hand Auger		Boring No. SFAASF-01
Sampling Method: Hand Auger (Grab)		Sheet 1 of 1
		Drilling

Water Level		Start	Finish
Time	-	2/8/2022	2/8/2022
Date	-		

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Snow, gravel
Composite / SFAASF-01-SB-0-2	2/2		1	GP	0-0.5': gravel, poorly graded (decorative), gray (10 YR 5/1), loose, dry to moist, little sand fine to coarse
			2	ML	0.5'-2': silt, brown (10 YR 5/3), loose, dry
			3		
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
			20		
			21		TD' = 2'

Logged by: D. Werth Date: 02/08/2022

Drilling Contractor: EA Driller: D. Werth

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.626190, -106.085671
Surface Elevation: NA
Casing Elevation: NA
GW level at time of drilling: NA
GW level at time of sampling: NA

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Hand Auger		SFAASF-02
Sampling Method:		
Hand Auger (Grab)		Sheet 1 of 1
		Drilling

Water Level		Start	Finish
Time	-	2/8/2022	2/8/2022
Date	-		

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Snow, gravel
				GP	0-0.5': gravel (decorative), gray (10 YR 5/1), loose, dry to moist, little sand fine
Composite / SAAASF-02-SB-0-2	2/2		1		to coarse
				ML	0.5'-2': silt, brown (10 YR 5/3), loose, dry
			2		
			3		
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
			20		
			21		TD' = 2'

Logged by: D. Werth Date: 02/08/2022

Drilling Contractor: EA Driller: D. Werth

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.62551044	-106.0845898
Surface Elevation:	NA	
Casing Elevation:	NA	
GW level at time of drilling:	NA	
GW level at time of sampling:	NA	

Job. No. 634250383	Client: ARNG	Location: SF AASF
Drilling Method: Sonic		Boring No. SFAASF-03-PA
Sampling Method: Soil Sample (Grab)		Sheet 1 of 10
		Drilling
Water Level		Start: 5/1/2022 0727
Time	-	Finish: 5/9/2022 1130
Date		

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
Composite / SFAASF-03-SB-0-2	N/A		1		Slough
			2	SM	2'-5': Silty sand, very pale brown (10 YR 7/3), very fine gravel, coarse, dry
		1.6	3		
			4		
		4.8	5	SM	5'-6': Silty sand, very pale brown (10 YR 7/3), trace clay, medium dense, minor gravel, round, dry
			6		6'-8.5': Silty sand, reddish brown (7.5 YR 6/6), loose, dry to slightly moist, very fine grained, minor clay
		10.6	7		
			8		
			9	ML	8.5'-13': Silt, minor clay, very fine grained, medium dense, dry
		6.6	10		
			11		
		6.4	12		
			13	SW	13'-16': Well-graded sand, pink (7.5 YR 7/3), very fine grained to coarse grained, 10% gravel (subangular to subround), 0.5-3.0 inch diameter, loose, dry
Composite / SFAASF-03-SB-13-15		4.1	14		
			15		
			16		16'-18.5': Well-graded sand, pink (7.5 YR 7/3), very fine grained to coarse grained, 10% gravel (subangular to subround), 0.5-3.0 inch diameter, loose, dry
		1.3	17		
			18		
		1.2	19	SM	18.5'-21': Silty sand with minor gravel, very pale brown (10 YR 7/2), dry, loose, gravel 3/4-1 inch, minor coarse grained
			20		
			21		

Logged by: T. McMillan Date: 05/01/2022

Drilling Contractor: Environmental Works Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.62551044	-106.0845898	
Surface Elevation:	NA		
Casing Elevation:	NA		
GW level at time of drilling:	NA		
GW level at time of sampling:	NA		

Job. No. 634250383	Client: ARNG	Location: SF AASF
Drilling Method: Sonic		Boring No. SFAASF-03-PA
Sampling Method: Soil Sample (Grab)		Sheet 2 of 10
		Drilling
Water Level		Start / Finish
Time	-	5/1/2022 / 5/9/2022
Date		0727 / 1130

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions:
Sonic Core	N/A		21	SM	21'-23.5': Silty sand with minor clay, very pale brown (10 YR 7/4), medium dense, dry, very fine grained
		2.0	22		
			23	GM	23'-26.5': Silty gravel, very pale brown (10 YR 7/2), loose, dry, gravel subround 1/2 inch to 2 inch
		2.2	24		
			25		
			26		
		2.3	27	SM	26.5'-28.5': Silty sand with gravel, very pale brown (10 YR 7/2), loose, very fine grained with gravel 5% 1/2 inch-1 inch, dry
			28		
		5.3	29		28.5'-33.5': Silty sand with trace clay, very pale brown (10 YR 7/4), loose, dry, very fine grained
			30		
			31		
		4.0	32		
			33		
		1.2	34		33.5'-36': Silty sand, very pale brown (10 YR 7/4), loose, dry, very fine grained, trace gravel - 1/2 inch diameter, subround
			35		
			36	ML	36'-38.5': Silt with gravel, very pale brown (10 YR 7/3), loose, dry, very fine grained, 5% gravel - 0.5 inch to 2.5 inch
		4.7	37		
			38		
		1.1	39	GM	38.5'-46': Silty gravel, very pale brown (10 YR 7/3), loose, 15-20% gravel- 1/2 inch to 3 inch subround
			40		
			41		

Logged by: T. McMillan Date: 05/01/2022

Drilling Contractor: Environmental Works Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Job. No. 634250383	Client: ARNG	Location: SF AASF			
Drilling Method: Sonic		Boring No. SFAASF-03-PA			
Sampling Method: Soil Sample (Grab)		Sheet 3 of 10			
		Drilling			
Water Level		Start	Finish		
Time	-	5/1/2022	5/9/2022		
Date		0727	1130		

Coordinates: 35.62551044 -106.0845898
Surface Elevation: NA
Casing Elevation: NA
GW level at time of drilling: NA
GW level at time of sampling: NA

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet		USCS Log	Surface Conditions:
Sonic Core			41		GM	
		0.6	42			
			43			
		1.8	44			
	Little-to-no recovery	NM	45			
			46		ML	46'-48.5': Clayey silt, reddish brown (7.5 YR 6/6), dense, dry, very fine grained, minor fine grained sand
		6.2	47			
			48			
			49		GM	48.5'-52.5': Silty gravel, very pale brown (10 YR 7/3), 15% gravel (up to 2.5 inch diameter), very fine grained, loose, dry
		1.8	50			
			51			
		0.8	52			
			53		ML	52.5'-54': Clayey silt, reddish yellow (7.5 YR 6/8), very fine grained, dry, medium dense
		0.1	54		SW	54'-55': Well graded sand, reddish yellow (7.5 YR 6/8) very fine to coarse grained, loose, dry
			55		GM	55'-58': Silty gravel, very pale brown (10 YR 7/3), loose, dry, gravel subround, up to 2.5 inch diameter
		1.4	56			
			57			
		3.8	58		SW	58'-61': Well graded sand, reddish brown (7.5 YR 6/6), fine to coarse grained, 5% gravel subround, up to 3 inch diameter
			59			
		1.9	60			
			61			

Logged by: T. McMillan Date: 05/01/2022

Drilling Contractor: Environmental Works Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.62551044	-106.0845898	
Surface Elevation:	NA		
Casing Elevation:	NA		
GW level at time of drilling:	NA		
GW level at time of sampling:	NA		

Job. No. 634250383	Client: ARNG	Location: SF AASF
Drilling Method: Sonic		Boring No. SFAASF-03-PA
Sampling Method: Soil Sample (Grab)		Sheet 4 of 10
		Drilling
Water Level		Start / Finish
Time	-	5/1/2022 / 5/9/2022
Date		0727 / 1130

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions:
Sonic Core	N/A		61	GW	61'-66': Well graded gravel, reddish brown (7.5 YR 7/6), fine to coarse grained sand, loose, dry, subround gravel up to 2 inch diameter
		2.2	62		
			63		
		1.3	64		
			65		
			66	SW	66'-67': Well graded sand, strong brown (7.5 YR 5/6), loose, moist, fine to coarse grained, trace gravel
		3.4	67	GW	67'-68.5': Well graded gravel, strong brown (7.5 YR 5/6), loose, fine to coarse grained, dry
			68		
		1.2	69	SW	68.5'-76': Well graded sand, strong brown (7.5 YR 5/6), fine to coarse grained sand, minor clay near 68.5', minor gravel (3-5%, up to 1 inch diameter, subround), loose, moist
			70		
			71		
		0.2	72		
			73		
		0.3	74		
			75		
			76	SW	76'-83': Well graded sand with gravel, strong brown (7.5 YR 5/6), fine to coarse grained sand, minor clay, subround gravel 3-5% up to 1 inch diameter, loose, moist
		3.3	77		
			78		
		2.9	79		
			80		
			81		

Logged by: T. McMillan Date: 05/01/2022

Drilling Contractor: Environmental Works Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Job. No. 634250383	Client: ARNG	Location: SF AASF			
Drilling Method: Sonic		Boring No. SFAASF-03-PA			
Sampling Method: Soil Sample (Grab)		Sheet 5 of 10			
		Drilling			
Water Level		Start	Finish		
Time	-	5/1/2022 0727	5/9/2022 1130		
Date					

Coordinates: 35.62551044 -106.0845898
Surface Elevation: NA
Casing Elevation: NA
GW level at time of drilling: NA
GW level at time of sampling: NA

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions:
	N/A	3.9	81		
			82		
Discrete / SFAASF-03-SB-183		3.8	83	GW	83'-84': Well graded gravel, very pale brown (10 YR 7/3), minor silt, fine grained to coarse grained sand, loose, dry, subround gravel up to 2.5" diameter
			84	SW	84'-85': Well graded sand with gravel, strong brown (7.5 YR 5/6), fine to coarse grained, gravel up to 1.5" diameter, loose, moist
		2.2	85	GM	85'-89': Silty gravel, very pale brown (10 YR 7/3), very fine grained, gravel 3/4" to 4", loose, dry
			86		
			87		
		0.2	88		
			89	GW	89'-94': Sandy gravel, well-graded, strong brown (7.5 YR 5/6), fine to medium grained sand, subround gravel 0.5"-2" increasing with depth, loose, moist
		0.5	90		
			91		
		3.5	92		
			93		
			94		
	No recovery		95	GW	94'-102': Sandy gravel, well-graded, strong brown (7.5 YR 5/6), fine to medium grained sand, subround gravel 0.5"-2" increasing with depth, loose, moist
			96		
		0.9	97		
			98		
			99		
		3.1	100		
			101		

Logged by: T. McMillan Date: 05/01/2022

Drilling Contractor: Environmental Works Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Job. No. 634250383	Client: ARNG	Location: SF AASF			
Drilling Method: Sonic		Boring No. SFAASF-03-PA			
Sampling Method: Soil Sample (Grab)		Sheet 6 of 10			
		Drilling			
Water Level		Start	Finish		
Time	-	5/1/2022	5/9/2022		
Date		0727	1130		

Coordinates: 35.62551044 -106.0845898
Surface Elevation: NA
Casing Elevation: NA
GW level at time of drilling: NA
GW level at time of sampling: NA

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions:
	N/A		101		
			102	GW	102'-104': Sandy gravel, very pale brown (10 YR 7/3), fine to coarse sand, at least one cobble present (4" diameter), otherwise subround, reworked, weathered gravel up to 2" diameter, friable
		1.3	103		
			104		
		1.5	105	SC	105'-108.5': Clayey sand, brown (7.5 YR 4/2), fine grained, clay is slightly plastic, moist
		4.0	106		
			107		
		25.7	108		
			109	ML	108.5'-116': Clayey silt, light brown (7.5 YR 6/4), very fine grained, clay present, clay increasing with depth, slightly plastic, moist
		8.8	110		
			111		
			112		
		4.5	113		
			114		
		0.7	115		
			116	CL/SC	116'-118': Sandy clay to clayey sand, brown (7.5 YR 4/4), fine grained sand, slightly plastic, minor gravel (2%), wet to very moist
		23.2	117		
			118	ML	118'-120': Clayey silt, light yellowish brown (10 YR 6/4), dry, medium dense, moist
		5.9	119		
			120	ML	120'-122': Clayey silt, yellow (2.5 YR 7/6), dry, medium dense, moist
			121		

Logged by: T. McMillan Date: 05/01/2022

Drilling Contractor: Environmental Works Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Job. No. 634250383	Client: ARNG	Location: SF AASF			
Drilling Method: Sonic		Boring No. SFAASF-03-PA			
Sampling Method: Soil Sample (Grab)		Sheet 7 of 10			
		Drilling			
Water Level		Start	Finish		
Time	-	5/1/2022	5/9/2022		
Date		0727	1130		

Coordinates: 35.62551044 -106.0845898
Surface Elevation: NA
Casing Elevation: NA
GW level at time of drilling: NA
GW level at time of sampling: NA

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions:
	N/A	6.1	121		
			122	ML	122'-124': Clayey silt, reddish yellow (7.5 YR 6/6), medium dense, dry
		5.8	123		
			124	GM	124'-128': Silty gravel, very pale yellow (10 YR 7/4), gravel up to 2", subround,
		1.2	125		loose, dry
			126		
		1.6	127		
			128	ML	128'-134': Clayey silt, reddish yellow (7.5 YR 6/6), clay content
			129		increases with depth, medium dense, dry to slightly moist
		5.2	130		
			131		
		7.5	132		
			133		
			134	CL	134'-137': Silty clay, brown (7.5 YR 4/3), plastic to slightly plastic, moist
		4.1	135		
			136		
		3.0	137	ML	137'-139': Clayey silt, light brown (7.5 YR 6/4), medium dense, slightly moist
			138		to dry
			139	SW	139'-145.5': Well graded sand with gravel, reddish yellow (7.5 YR 6/6), fine to
		1.3	140		coarse grained with depth, loose, moist, gravel subround up to 1"
			141		

Logged by: T. McMillan Date: 05/01/2022

Drilling Contractor: Environmental Works Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Job. No. 634250383	Client: ARNG	Location: SF AASF			
Drilling Method: Sonic		Boring No. SFAASF-03-PA			
Sampling Method: Soil Sample (Grab)		Sheet 8 of 10			
		Drilling			
Water Level		Start	Finish		
Time	-	5/1/2022	5/9/2022		
Date		0727	1130		

Coordinates: 35.62551044 -106.0845898
Surface Elevation: NA
Casing Elevation: NA
GW level at time of drilling: NA
GW level at time of sampling: NA

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet		USCS Log	Surface Conditions:
	N/A		141			
			142			
		19.4				
			143			
			144			
		1.0	145			
					SP	145.5'-146.5': Poorly graded sand with minor clay, pinkish gray (7.5 YR 7/2)
			146			
					ML	146.5'-148': Clayey silt, reddish yellow (7.5 YR 6/6), slightly
		0.4	147			moist, medium dense
			148		ML	148'-150': Clayey silt, reddish yellow (7.5 YR 6/6), slightly
						moist, medium dense
			149			
		75.2				
			150		SM	150'-152': Silty sand, very pale brown (10 YR 7/3), loose, dry, some medium
						sand and gravel (1" diameter), grades to SW
			151			
		2.1	152		SW	152'-153': Well graded sand, reddish yellow (7.5 YR 6/6), fine to coarse grained,
						loose, dry, 2% gravel up to 1/2"
			153			153'-158': Well graded sand, reddish yellow (7.5 YR 6/6), fine to coarse grained,
						loose, dry, 5% gravel up to 1", subangular to subround
			154			
		3.0				
			155			
			156			
		3.4	157			
			158			158'-161': Well graded sand, reddish yellow (7.5 YR 6/6), fine to coarse grained,
						loose, dry, 5% gravel up to 1", subangular to subround
		1.5	159			
			160			
			161			

Logged by: T. McMillan Date: 05/01/2022

Drilling Contractor: Environmental Works Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.62551044	-106.0845898	
Surface Elevation:	NA		
Casing Elevation:	NA		
GW level at time of drilling:	NA		
GW level at time of sampling:	NA		

Job. No. 634250383	Client: ARNG	Location: SF AASF
Drilling Method: Sonic		Boring No. SFAASF-03-PA
Sampling Method: Soil Sample (Grab)		Sheet 9 of 10
		Drilling
Water Level		Start: 5/1/2022 0727
Time	-	Finish: 5/9/2022 1130
Date		

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions:
	N/A	0.8	161	GW	161'-162': Silty gravel, very pale brown (10 YR7/4), grades to GW, very fine to fine sand, loose, dry, gravel 3" diameter
			162	ML	162'-164': Clayey silt, reddish yellow (7.5 YR 6/6), very fine grained, minor clay, moist, medium dense
		0.8	163		
			164	GW	164'-166': Well graded gravel, very pale brown (10 YR 7/4), fine to medium grained sand, one 4" cobble, mostly 2" gravel, loose, dry to slightly moist
		1.1	165		
			166	SW	166'-168.5': Well graded sand, strong brown (7.5 YR 5/6), loose, dry to slightly moist, fine to medium grained sand, trace coarse grain sand, minor clay with depth, 1% gravel up to 1/2"
		5.7	167		
			168		
			169	CL	168.5'-170': Sandy clay, dense, slightly moist, fine to medium grained sand, trace gravel up to 3" diameter
		5.9	170	SW	170'-172': Well graded sand, strong brown (7.5 YR 5/6), loose, slightly moist, fine to medium grained sand, trace gravel up to 3" diameter
			171		
		52.2	172	CL	172'-173.5': Sandy clay, dense, slightly moist, fine to medium grained sand, trace gravel up to 3" diameter
			173		
		3.5	174	GM	173.5'-178': Silty gravel, very pale brown (10 YR 7/3), very fine to fine grained sand, loose, dry, two 4" diameter cobbles, 2-3" diameter gravel, subround to subangular, trace medium to coarse grained sand, bottom 2" slightly moist
			175		
		9.7	176		
			177		
			178	CL	178'-180': Sandy clay, loose to medium dense, moist, fine to medium grained sand, no silt, non plastic, becomes stiff and minor clay at bottom 5"
		1.5	179		
			180	CL	180'-185': Sandy clay, loose to medium dense, moist, fine to medium grained sand, no silt, low to non plastic, becomes stiff and minor clay at bottom 5"
		1.6	181		

Logged by: T. McMillan/S. Lauricella Date: 05/02/2022

Drilling Contractor: Environmental Works Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.62551044 -106.0845898
Surface Elevation: NA
Casing Elevation: NA
GW level at time of drilling: NA
GW level at time of sampling: NA

Job. No.	Client:	Location:
634250383	ARNG	SF AASF
Drilling Method:		Boring No.
Sonic		SFAASF-03-PA
Sampling Method:		
Soil Sample (Grab)		Sheet 10 of 10
		Drilling

Water Level	184.5'	Start	Finish
Time	-	5/1/2022	5/9/2022
Date	5/2/2022	0727	1130

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions:
	N/A		181		
			182		
Discrete / SFAASF-03-SB-183		85	183	CL	
			184		
			185		
		71.4	186	ML	185-188': Clayey silt, dark yellowish brown (10 YR 4/6), stiff, moist, low plasticity, fine grained sand, minor medium to coarse gravel up to 1/2" diameter, subrounded to rounded
			187		
			188		
			189	CL	188-190': Sandy clay, yellowish brown (10 YR 5/6), moist to wet, medium dense to loose, medium and coarse grained sand, low to non plastic, trace gravel up to 1/2" diameter, subangular to subrounded
			190		
		3.4	191		190-195': Sandy clay, yellowish brown (10 YR 5/6), medium dense to dense with depth, wet, medium grained sand, trace fine sand, trace gravel up to 2.5" diameter, subrounded to rounded
			192		
		2.6	193		
			194		
			195		
		0.6	196	SW	195-196': Sand, brownish yellow (10 YR 6/8), loose, medium dense, medium to coarse grain sand, trace very fine to fine grain sand, trace gravel up to 1" diameter, one cobble up to 3" diameter, subangular to subround, wet
		3.8	197		196'-197': Sand, brownish yellow (10 YR 6/8), loose, medium dense, medium to coarse grain sand, trace very fine to fine grain sand, trace gravel up to 2" diameter, subangular to subround, wet, no larger cobbles
			198		
			199		TD = 197'
			200		2" PVC SCH 80: riser 0-175', 0.010" screen 175-195', sump 195-197' 10/20 Silica sand: 173-197' 3/8" Hole plug bentonite chips: 167-173'
			201		Grout: 0-167'

Logged by: S. Lauricella Date: 05/02/2022

Drilling Contractor: Environmental Works Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.625548, -106.084589
Surface Elevation:	6,337.86 ft
Casing Elevation:	6,337.69 ft
GW level at time of drilling:	184.95 ft
GW level at time of sampling:	184.54 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		SFAASF-03
Sampling Method:		
Sonic/Continuous Core		Sheet 1 of 1
		Drilling

		Start	Finish
Water Level	-		
Time	-	5/7/2022	5/11/2022
Date	5/7/2022	1400	1130

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Top Soil
Composite / SFAASF-03-SB-0-2			1		* Refer to SFAASF-03-PA boring log for lithology*
			2		
			3		
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
			20		
			21		

Logged by: NA Date: 05/08/2022

Drilling Contractor: Environmental Works Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624041, -106.085784
Surface Elevation:	6,333.06 ft
Casing Elevation:	6,332.85 ft
GW level at time of drilling:	181.00 ft
GW level at time of sampling:	180.38 ft

Job. No. 634250383	Client: ARNG	Location: Santa Fe, NM Army Aviation Support Facility	
Drilling Method: Sonic		Boring No. SFAASF-04	
Sampling Method: Sonic/Continuous Core		Sheet 1 of 10	
		Drilling	
Water Level	-	Start	Finish
Time	-	4/28/2022	5/9/2022
Date	4/28/2022	1645	1000

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
Composite / SFAASF-04-SB-0-2	Full recovery unless noted		1	SM	0-1' silty sand, strong brown (10YR 5/6), loose, slightly moist, trace gravel up to 1/2" diameter, fine to medium grain sand
		5.7	2		1'-5', silty sand, very pale brown (10YR 7/4), loose, dry, very fine sands, poorly graded, trace gravel up to 1/2" diameter, caliche like
			3		
		16.9	4		
			5		
			6		5'-6', silty sand, very pale brown (10YR 7/4), loose, dry, very fine sands, poorly graded, trace gravel up to 2" diameter, subangular, sand, coarsens downward
		2.5	7	ML	6'-10', sandy silt, yellowish brown (10YR 5/4), loose, dry, very fine to fine sand, trace gravel up to 1" diameter, coarsens downward
			8		
		2.4	9		
			10		
			11	SM	10'-11', silty sand, very pale brown (10YR 7/4), loose, dry, very fine sands, poorly graded, trace gravel up to 1/2" diameter, caliche like
		0.7	12	ML	11'-14', sandy silt, light yellowish brown (10YR 6/4), loose, dry, fine to coarse grain sand, coarsens downward, trace gravel downward up to 1" diameter
			13		
Composite / SFAASF 04-SB-13-15		3.3	14		
			15		14'-15', clayey silt, light brownish gray (10YR 4/6), medium dense, dry, low plastic
			16		15'-16', sandy silt, light yellowish brown (10YR 6/4), loose, dry, fine to coarse grain sand, coarsens downward, trace gravel downward up to 1" diameter
	No Recovery		17		16'-18.5', no recovery
			18		
		1.7	19	SM	18.5'-19.5', silty sand, light brownish gray (10YR 6/2), loose, dry, very fine to coarse grain sand
			20	SW	19.5'-22', sand, brownish yellow (10YR 6/8), loose, dry, medium and coarse grain sand, trace fine sand, fines downward into fine to medium sand, trace coarse
		1.2	21		

Logged by: S. Lauricella Date: 04/28/2022

Drilling Contractor: Environmental Works Inc., Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.624041, -106.085784
Surface Elevation: 6,333.06 ft
Casing Elevation: 6,332.85 ft
GW level at time of drilling: 181.00 ft
GW level at time of sampling: 180.38 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		SFAASF-04
Sampling Method:		
Sonic/Continuous Core		Sheet 2 of 10
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/28/2022	5/9/2022
Date	4/28/2022	1645	1000

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted		21		
		4.8	22		
			23	SM	22'-26', silty sand, very pale brown (10YR 7/3), loose, dry, very fine to coarse grain sand, trace gravel up to 1/2" - 2" diameter going downward, caliche like, subrounded, subangular
			24		
			25		
			26		
		0.5	27	GM	26'-29', silty gravel, light yellowish brown (10YR 6/4), loose, dry, gravel up to 4" diameter, subrounded, poorly graded, trace fine to coarse grain sand
			28		
		1.7	29		
			30		29'-33',silty gravel, light yellowish brown (10YR 6/4), loose, dry, gravel cobbles up to 5" diameter, subrounded, poorly graded, trace fine to coarse grain sand, becomes more silt than gravel downwards
			31		
		16.4	32		
			33		
	23"	18.7	34	GW	33'-36', well graded gravel, light yellowish brown (10YR 6/4), loose, dry, medium to coarse sand, trace silt, gravel up to 5" diameter, subrounded
			35		
	24"	1.7	36	SW	36'-38.5', sand, yellowish brown (10YR 5/4), loose, slightly moist, fine to coarse grain sand, trace gravel up ti 2" diameter, subrounded, subangular
			37		
			38		
		3.4	39	GM	38.5'-39', silty gravel, light yellowish brown (10YR 6/4), loose, dry, gravel up to 4" diameter, subrounded, poorly graded, trace fine to coarse grain sand
			40	SW	39'-41', sand, yellowish brown (10YR 5/4), loose, slightly moist, fine to coarse grain sand, trace gravel up ti 2" diameter, subrounded, subangular
			41		becomes more stiff downwards

Logged by: S. Lauricella Date: 04/28/2022

Drilling Contractor: Environmental Works Inc., Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.624041, -106.085784
Surface Elevation: 6,333.06 ft
Casing Elevation: 6,332.85 ft
GW level at time of drilling: 181.00 ft
GW level at time of sampling: 180.38 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		SFAASF-04
Sampling Method:		
Sonic/Continuous Core		Sheet 3 of 10
		Drilling

Water Level	-	Start	Finish
Time	-	4/28/2022	5/9/2022
Date	4/28/2022	1645	1000

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
			41	SW	
	Full recovery unless noted				
		21.6	42	ML	41'-46', gravely silt, light brownish gray (10YR 6/2), loose, dry, trace medium to coarse grain sand
			43		
		9.1	44		
			45		
			46		
		35.7	47	GM	46'-54', silty gravel, light brownish gray (10YR 6/2), loose, dry, medium to coarse grain sand, gravel up to 3" diameter, trace 1" gravel, subrounded, subangular, well graded
			48		
		35.2	49		
			50		
		32.9	51		
			52		
			53		
		13.6	54		
			55	SW	54'-55.5', sand, dark yellowish brown (10YR 4/6), loose, dry, fine to medium grain sand, poorly graded, trace coarse, trace gravel up to 2" diameter
			56	GM	55.5'-56', silty gravel, light brownish gray (10YR 6/2), loose, dry, medium to coarse
		8.3	57	ML	coarse grain sand, , gravel up to 2" diameter subrounded, rounded, well graded
			58		56'-59', gravely silt, brownish yellow (10YR 6/6), loose, dry, trace medium to coarse grain, gravel up to 3" diameter, well graded
		15.6	59		
			60	GW	59'-66', sandy gravel, yellowish brown (10YR 5/6), loose, dry, fine to coarse grain sand, gravel up to 2" diameter, well graded
			61		

Logged by: S. Lauricella Date: 4/28/2022-04/29/22

Drilling Contractor: Environmental Works Inc., Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.624041, -106.085784
Surface Elevation: 6,333.06 ft
Casing Elevation: 6,332.85 ft
GW level at time of drilling: 181.00 ft
GW level at time of sampling: 180.38 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		SFAASF-04
Sampling Method:		
Sonic/Continuous Core		Sheet 4 of 10
		Drilling

Water Level	-	Start	Finish
Time	-	4/28/2022	5/9/2022
Date	4/28/2022	1645	1000

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted		61	GW	59'-66', sandy gravel, yellowish brown (10YR 5/6), loose, dry, fine to coarse grain sand, gravel up to 2" diameter, well graded
		10.2	62		
			63		
		5.0	64		
			65		
			66		
		7.1	67	GW	66'-68.5', sandy gravel, yellowish brown (10YR 5/6), loose, dry, fine to coarse grain sand, trace silt, trave gravel up to 3" diameter, well graded
			68		
		27.4	69	SW	68.5'-71', gravely sand, well graded, yellowish brown (10YR 5/6), loose, dry, gravel up to 2" diameter, medium to coarse, trace fine sand
			70		
			71		
		14.4	72	SW	71'-76', sand, dark yellowish brown (10YR 4/6), 75% loose, 25% dense, very fine to coarse grain sand, poorly graded, trace gravel up to 1" diameter, trace silt going downward
			73		
		12.7	74		
			75		
			76		
		1.9	77		76'-78.5', sand, dark yellowish brown (10YR 4/6), loose, trace gravel up to 3" diameter, subangular
			78		
		2.9	79		78.5'-80', sand, dark yellowish brown (10YR 4/6), loose, trace gravel up to 1/2" diameter, rounded
			80		
			81	GW	80'-82', sandy gravel, pale brown (10YR 6/3), loose, dry, fine to coarse grain sand, gravel up to 1" diameter, subrounded, subangular

Logged by: S. Lauricella Date: 04/29/2022

Drilling Contractor: Environmental Works Inc., Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.624041, -106.085784
Surface Elevation: 6,333.06 ft
Casing Elevation: 6,332.85 ft
GW level at time of drilling: 181.00 ft
GW level at time of sampling: 180.38 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		SFAASF-04
Sampling Method:		
Sonic/Continuous Core		Sheet 5 of 10
		Drilling

Water Level	-	Start	Finish
Time	-	4/28/2022	5/9/2022
Date	4/28/2022	1645	1000

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted		81	GW	
		0.1	82		
			83		82'-86', sandy gravel, pale brown (10YR 6/3), loose, dry, fine to to medium sand, gravel up to 1" diameter, subrounded, subangular, trace coarse
			84		
		12.6	85		
			86		
		10.6	87	SM	86'-91', silty sand, yellowish brown (10YR 5/6), loose, dry, fine to coarse grain sand, trace gravel up to 1" diameter, subrounded, subangular
			88		
		19.5	89		
			90		
			91		
		6.5	92	GM	91'-96', silty gravel, light gray (10YR 7/2), loose, dry, trace medium to coarse grain sand, gravel up to 2"-3" diameter, coarsens into more gravely silt downward
			93		
		20.4	94		
			95		
			96		
		9.7	97	GW	96'-100', sandy gravel, pale brown (10YR 6/3), loose, dry, very fine to coarse grain sand, trace silt, trace gravel up to 2" diameter, subrounded, trace stiff sand pieces
			98		
		48.9	99		
			100		
		23.2	101	GM	100'-102', silty gravel, light gray (10YR 7/2), loose, dry, trace medium to coarse, gravels up to 1" diameter, poorly graded

Logged by: S. Lauricella Date: 04/29/2022

Drilling Contractor: Environmental Works Inc., Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.624041, -106.085784
Surface Elevation: 6,333.06 ft
Casing Elevation: 6,332.85 ft
GW level at time of drilling: 181.00 ft
GW level at time of sampling: 180.38 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		SFAASF-04
Sampling Method:		
Sonic/Continuous Core		Sheet 6 of 10
		Drilling

Water Level	-	Start	Finish
Time	-	4/28/2022	5/9/2022
Date	4/28/2022	1645	1000

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted	23.2	101		
			102		
		25.8	103	SM	102'-106', silty sand, poorly graded, yellowish brown (10YR 5/6), 60% loose, 40% stiff, slightly moist, fine grain sand, trace medium grain sand
			104		
		20.5	105		
		4.2	106		
			107		106'-108.5', silty sand, dark yellowish brown (10YR 4/4), loose, slightly moist, fine to medium sand, poorly graded, trace stiff silty sands downward
			108		
		14.3	109	SP	108.5'-110', sand, yellowish brown (10YR 5/6), loose, slightly moist, fine to coarse sand, trace gravel up to 1" diameter
			110		
			111	ML	110'-116', silty sand, brownish yellow (10YR 6/6), 75% loose, 25% medium dense pieces, dry, fine grain sand, trace gravel up to 5" diameter
		19.9	112		has more stiff pieces downward
			113		
		28.3	114		
			115		
			116		
		20.9	117		116'-119', silty sand, brownish yellow (10YR 6/6), 75% loose, 25% medium, dense pieces, dry, fine grain sand, trace gravel up to 1" diameter, rounded
			118		has more stiff pieces downward
		3.5	119		
			120	SM	119'-120', silty sand, dark yellowish brown (10YR 4/6), loose, dry, medium and coarse grain, poorly graded
			121		120'-121', silty sand, brownish yellow (10YR 6/6), 75% loose, 25% medium, dense pieces, dry, fine grain sand, trace gravel up to 1" diameter, rounded

Logged by: S. Lauricella Date: 04/28/2022

Drilling Contractor: Environmental Works Inc., Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.624041, -106.085784
Surface Elevation: 6,333.06 ft
Casing Elevation: 6,332.85 ft
GW level at time of drilling: 181.00 ft
GW level at time of sampling: 180.38 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		SFAASF-04
Sampling Method:		
Sonic/Continuous Core		Sheet 7 of 10
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/28/2022	5/9/2022
Date	4/28/2022	1645	1000

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
			121	SM	
	Full recovery unless noted	20.3	122		121'-122', silty sand, dark yellowish brown (10YR 4/6), loose, dry, medium and dense pieces, dry, fine grain sand, trace gravel up to 1" diameter, rounded
			123		122'-123.5', silty sand, brown (10YR 4/3), loose to dense pieces, trace medium grain sand, poorly graded
		13.7	124	ML	123.5'-126', clayey silt, yellowish brown (10YR 5/6), low plastic, trace gravel up to 1" diameter, moist, dense, trace medium grain sand
			125		
			126		
		25.8	127		126'-128.5', clayey silt, yellowish brown (10YR 5/6), plastic, dense, moist, trace gravel up to 1" diameter, trace medium grain sand
			128		
		24.4	129	SW	128.5'-133.5', sand, pale brown (10YR 6/3), loose, dry, fine to coarse grain, trace gravel up to 2" diameter
			130		
	16"		131		
		15.6	132		
			133		
		19.9	134	GM	133.5'-134.5', silty gravel, very pale brown (10YR 7/3), loose, dry, coarsens downward to coarse grain sand, trace gravel up to 2" diameter
			135	SM	134.5'-136', silty sand, brown (10YR 4/3), loose to dense pieces, trace medium grain sand, poorly graded
			136		
		186.5	137	SM	136'-138', silty sand, yellowish brown (10YR 5/6), medium dense, fine to medium grain sand, poorly graded
			138		
		124.2	139	CL	138'-141', sandy clay, dark yellowish brown (10YR 4/4), dense moist, medium to coarse grain sand, low plastic
			140		
			141		

Logged by: S.Lauricella Date: 04/29/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.624041, -106.085784
Surface Elevation: 6,333.06 ft
Casing Elevation: 6,332.85 ft
GW level at time of drilling: 181.00 ft
GW level at time of sampling: 180.38 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		SFAASF-04
Sampling Method:		
Sonic/Continuous Core		Sheet 8 of 10
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/28/2022	5/9/2022
Date	4/28/2022	1645	1000

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted		141	CL	
		6.8	142	SW	141'-144', sand, pale brown (10YR 6/3), loose, dry, fine to coarse grain, trace gravel up to 2" diameter
			143		
		3.4	144		
			145	CL	144'-145', sandy clay, dark yellowish brown (10YR 4/4), dense moist, medium to coarse grain sand, low plastic
			146	GM CL	145'-145.5', silty gravel, very pale brown (10YR 7/3), loose, dry, coarsens downward to coarse grain sand, trace gravel up to 2" diameter
			147	ML	145.5'-146', sandy clay, dark yellowish brown (10YR 4/4), dense moist, medium to coarse grain sand, low plastic
		14.8	148		146'-152', sandy silt, dark yellowish brown (10YR 4/6), loose to dense, pieces <3" fine to medium sand, trace gravel up to 1", dry
			149		
		5.2	150		
			151		
		1.6	152		
			153	SW	152'-155', sand, well graded, brownish yellow (10YR 4/4), loose, trace silt, dry, medium to coarse grain, trace gravel up to 1" diameter,
		3.5	154		
			155		
			156		155'-156', sand, yellowish brown (10YR 5/6), loose, moist at bottom 2", fine to coarse grain sand, well graded
		2.6	157		156'-158.5', gravely sand, strong brown (7.5YR 5/6), loose, dry, fine to coarse grain, gravel up to 1"-2" diameter, trace silt downward, subrounded, rounded
			158		
		4.4	159	ML	158,5'-161', silt, light gray (10YR 7/2), loose, dry, 60% silt, 40% gravely sands, medium to coarse, gravel up to 4" diameter, subrounded, subangular
			160		
			161		

Logged by: S.Lauricella Date: 04/29/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624041, -106.085784
Surface Elevation:	6,333.06 ft
Casing Elevation:	6,332.85 ft
GW level at time of drilling:	181.00 ft
GW level at time of sampling:	180.38 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		SFAASF-04
Sampling Method:		
Sonic/Continuous Core		Sheet 9 of 10
		Drilling

Water Level	-	Start	Finish
Time	-	4/28/2022	5/9/2022
Date	4/28/2022	1645	1000

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted		161		
		8.6	162	SW	161'-164', gravely sand, light yellowish brown (10YR 6/4), loose, dry, fine to coarse grain sand, well graded, gravel up to 4" diameter, subrounded, trace silt downward
			163		
		6.5	164		
			165		164'-167', sand, reddish yellow (7.5YR 6/6), loose, dry, fine to coarse grain sand, trace silt, well graded, trace gravel up to 1" diameter
			166		
		5.8	167		
			168	SM CL	167'-167.5', silty sand, gray (7.5YR 6/1), loose, dry, fine to coarse grain, well graded 167.5'-168.5', sandy clay, yellowish brown (10YR 5/6), stiff, moist, medium sand and fine sand grain, trace coarse grain sand, low plastic
		3.6	169	SW	168.5'-172', sand, yellowish brown (10YR 5/8), loose, dry, very fine to coarse sand, trace gravel up to 1" diameter, subrounded, trace silt
			170		
		3.7	171		
			172		
		22.5	173	CL	172'-175', gravely clay, strong brown (7.5YR 5/6), stiff, dry, medium to coarse grain sand
			174		
			175		
			176	SM	175'-176', silty sand, pinkish gray (7.5YR 7/2), loose, dry, trace coarse grain, fine to medium grain, well graded, trace gravel up to 2" diameter
			177	SW	176'-183.5', sand, well graded, yellowish red (5YR 4/6), loose, dry to moist, loose, fine to coarse grained, wet at 181'
		64.1	178		
			179		
Discrete / SFAASF-04 SB-180		102.6	180		
			181		

Logged by: S.Lauricella/D.Werth Date: 04/29/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624041, -106.085784
Surface Elevation:	6,333.06 ft
Casing Elevation:	6,332.85 ft
GW level at time of drilling:	181.00 ft
GW level at time of sampling:	180.38 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		SFAASF-04
Sampling Method:		
Sonic/Continuous Core		Sheet 10 of 10
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/25/2022	5/9/2022
Date	4/25/2022	850	1647

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted		181	SW	176'-183.5', sand, well graded, yellowish red (5YR 4/6), loose, dry to moist, fine to coarse grained, wet at 181'
		306.9	182		
			183		
		14.6	184	ML	183.5'-184.5', silt, reddish brown (5YR 5/4), loose to medium dense, wet
			185	SW	184.5'-192', sand, well graded, yellowish red (5YR 4/6), loose, dry to moist, with trace small cobbles and wet
		20.6	186		
			187		
		29.3	188		
			189		
		66.7	190		
			191		
		90.3	192		
			193	SM	192'-193', silty sand, yellowish red (5YR 4/6), loose, wet, fine to coarse sand
			194		
			195		
			196		
			197		
			198		TD' = 193'
			199		2" PVC SCH 80 0.010" screen: 171' - 191'
			200		2" PVC SCH 80 riser: 0 - 191'
			201		2" PVC SCH 80 sump: 191'- 193'
					10/20 silica sand: 169' - 193'
					3/8" bentonite chips hole plug: 163.5' - 169'
					grout: <1' - 163.5'

Logged by: D. Werth Date: 04/30/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.623244, -106.086448
Surface Elevation: NA
Casing Elevation: NA
GW level at time of drilling: NA
GW level at time of sampling: NA

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Direct Push Geoprobe		SFAASF-05
Sampling Method:		
PVC Sleeve		Sheet 1 of 1
		Drilling
Water Level		Start / Finish
Time	-	
Date	-	5/4/2022 1315 / 5/4/2022 1420

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions:
Composite / SFAASF-05-SB-0-2	60"		1	ML	0-10', sandy silt, pink (5YR 7/3), loose, dry, fine sand, trace gravel
		0.6	2		
			3		
		0.5	4		
			5		
	35"	0.2	6		
Composite / SFAASF-05-SB-6-8			7		
		0.2	8		
	40"		9		
		0.3	10		
			11	SM	10'-12', silty sand, pink (5YR 7/3), loose, dry, fine to coarse sand, trace gravel
		0.4	12		
			13	SW	12'-15', sand, well graded, pink (5YR 7/3), loose, dry, fine to coarse sand, trace fine gravel
Composite / SFAASF-05-SB-13-15	30"	0.4	14		
			15		
			16		
			17		
			18		
			19		
			20		
			21		TD' = 15'

Logged by: D. Werth Date: 05/04/2022

Drilling Contractor: JR Drilling Driller: Rob Helton

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624835, -106.087693
Surface Elevation:	6,328.95 ft
Casing Elevation:	6,328.84 ft
GW level at time of drilling:	176.31 ft
GW level at time of sampling:	176.05 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-01
Sampling Method:		
Sonic/Continuous Core		Sheet 1 of 10
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/25/2022	5/9/2022
Date	4/25/2022	850	1647

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
Composite / AOI01-01 SB-0-2	Full recovery unless noted		1	ML	0-5', sandy silt, yellow brown (10YR 5/6), loose, dry, trace gravel up to 5", fine grain sand
		9.6	2		
			3		
			4		
		11.0	5		
			6		5'-7.5', sandy silt, light yellowish brown (10YR 6/4), loose, dry, trace gravel up to 5", fine grain sand
			7		
		30.5	8		7.5'-10', sandy silt, dark yellowish brown (10YR 4/4), loose, dry, trace gravel up to 5", fine grain sand
			9		
		14.9	10		
			11		10'-12.5', sandy silt, dark yellowish brown (10YR 4/4), dense, dry, trace gravel up to 5" dimeter, fine grain sand
			12		
		30.2	13	SM	12.5'- 15', silty sand, dark yellowish brown (10YR 4/6), loose, slightly dense, fine grain sand
Composite / AIO01-01 SB-13-15			14		
		1.8	15		
			16	SP	15'-17.5', sand, brownish yellow (10YR 6/6), loose, dry, fine grain sand, trace silt, poorly graded
			17		
		71.4	18		17.5'-20', sand, brownish yellow (10YR 6/6), loose, dry, fine sand, poorly graded
			19		
		85.7	20		
			21	SP	20'-22.5', sand, brownish yellow (10YR 6/6), loose, dry, fine sand, poorly graded, trace medium to coarse sand

Logged by: S.Lauricella Date: 04/25/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624835, -106.087693
Surface Elevation:	6,328.95 ft
Casing Elevation:	6,328.84 ft
GW level at time of drilling:	176.31 ft
GW level at time of sampling:	176.05 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-01
Sampling Method:		
Sonic/Continuous Core		Sheet 2 of 10
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/25/2022	5/9/2022
Date	4/25/2022	850	1647

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted		21		
			22		
			23	SW	22.5'-25', sand, pale brown (10YR 6/3), loose, dry, coarsens downward, trace gravel up to 1" diameter, fine to coarse grain sand
			24		
		27.8	25		
			26		25'-27.5', sand, light gray (10YR 7/1), loose, dry, coarsens downward, trace gravel up to 1" diameter, fine to coarse grain sand
			27		
			28		27.5'-30', sand, light gray (10YR 7/1), loose, dry, coarsens downward, trace silt and gravel up to 2" diameter, fine to coarse grain sand
		21.3	29		
			30		
		28.1	31	SP	30'-33', sand, light gray (10YR 7/1), loose, dry, coarsens downward, trace silt and gravel up to 2" diameter, fines downward, fine grain sand
			32		
		27.4	33		
			34	ML	33'-36.5', silt, yellowish brown (10YR 5/6), loose, moist
			35		
			36		
		74.4	37		36.5'-37.5', sandy silt, yellowish brown (10YR 5/6), loose, moist, trace gravel up to 2" diameter, fine grain sand
			38	GW	37.5'-40', gravely sand, light brownish gray (10YR 6/2), loose, dry, trace of fine to , gravel up to 2.5" diameter
		40.3	39		
			40		
			41	GW	40'-42.5', gravely sand, light brownish gray (10YR 6/2), loose, slightly moist, gravel up to 3" diameter, coarse grain sand

Logged by: S.Lauricella Date: 04/25/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624835, -106.087693
Surface Elevation:	6,328.95 ft
Casing Elevation:	6,328.84 ft
GW level at time of drilling:	176.31 ft
GW level at time of sampling:	176.05 ft

Job. No. 634250383	Client: ARNG	Location: Santa Fe, NM Army Aviation Support Facility
Drilling Method: Sonic		Boring No. AOI01-01
Sampling Method: Sonic/Continuous Core		Sheet 3 of 10
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/25/2022 850	5/9/2022 1647
Date	4/25/2022		

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted		41	GW	40'-42.5', gravely sand, light brownish gray (10YR 6/2), loose, slightly moist, trace of fine to coarse grain sand, gravel up to 3" diameter
			42		
		83.8	43	GW	42.5'-45', sandy gravel, light yellowish brown (10YR 6/4), loose, dry, fine grain sand, gravel up to 1.5" diameter, trace silt
			44		
			45		
			46	SP	45'-47.5', sand, reddish brown (5YR 4/4), loose, slightly moist, coarse grain sand, trace gravel up to 1" diameter
		90.3	47		
			48		47.5'-48.5', sand, reddish brown (5YR 4/4), loose, slightly moist, coarse grain sand
		33.9	49		
			50	CL	48.5'- 50', silty clay, brown (7.5YR 5/3), stiff, moist 50'-51', clay, dark yellowish brown (10YR 4/4), slightly moist, very stiff, plastic
		56.0	51	ML	51'-53', clayey silt, yellowish brown (10YR 5/4), very dense, plastic, moist
			52		
		13.2	53		53'-56.5', clayey silt, yellowish brown (10YR 5/4), medium dense, low plastic, moist
			54		
		114.2	55		
			56		
		133.3	57	SW	56.5'-57.5', sand, brown (7.5YR 5/4), loose, dry, medium to coarse grain sand, trace gravel up to 1" diameter
			58	GW	57.5'-62', sandy gravel, brown (10YR 4/3), loose, dry, trace cobbles up to 6" diameter, medium to coarse grain sand
			59		
			60		
		171.2	61		

Logged by: S.Lauricella Date: 04/25/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624835, -106.087693
Surface Elevation:	6,328.95 ft
Casing Elevation:	6,328.84 ft
GW level at time of drilling:	176.31 ft
GW level at time of sampling:	176.05 ft

Job. No. 634250383	Client: ARNG	Location: Santa Fe, NM Army Aviation Support Facility
Drilling Method: Sonic		Boring No. AOI01-01
Sampling Method: Sonic/Continuous Core		Sheet 4 of 10
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/25/2022 850	5/9/2022 1647
Date	4/25/2022		

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted	171.2	61		
			62		
		42.5	63	SW	62'-63.5', sandy gravel, yellowish brown (10yr 5/4), mostly sand, loose, dry, trace cobbles up to 6"gravel up to 1" diameter
			64		63.5'-65', sand, yellowish brown (10YR 5/6), medium dense, dry, trace gravel up to 1" diameter, medium to coarse sand
		40.2	65		
			66	SM	65'-67.5', sandy silt, dark yellowish brown (10YR 4/4), medium dense, moist, fine to medium sand, trace coarse grain
		32.8	67		
			68	SW	67.5'-70', well graded sand, dark yellowish brown (10YR 4/4), loose, dry, medium grain sand, trace coarse grain sand
			69		
			70		
		12.8	71		70'-74.5', sand, dark yellowish brown (10YR 4/4), medium dense, fine grain sand, trace medium, trace silt
			72		
		1.1	73		
			74		
		60.2	75		74.5'-75', sand well graded, loose, dry, trace coarse grain sand, medium grain sand, brown (10YR 5/3),
			76	SP	75'-79', well graded sand, dark yellowish brown (10YR 4/4), loose, dry, fine to coarse grain sand, coarsens downward, trace gravel up to 2" diameter
		64.8	77		
			78		
			79		
			80	GW	79'-82.5', sandy gravel, well graded, dark yellowish brown (10YR 4/4), loose, dry, fine to well graded gravel up to 2" diameter,
		77.9	81		

Logged by: S.Lauricella Date: 04/25/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624835, -106.087693
Surface Elevation:	6,328.95 ft
Casing Elevation:	6,328.84 ft
GW level at time of drilling:	176.31 ft
GW level at time of sampling:	176.05 ft

Job. No. 634250383	Client: ARNG	Location: Santa Fe, NM Army Aviation Support Facility
Drilling Method: Sonic		Boring No. AOI01-01
Sampling Method: Sonic/Continuous Core		Sheet 5 of 10
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/25/2022 850	5/9/2022 1647
Date	4/25/2022		

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted	77.9	81		
			82		
		33.5	83	GW	82.5'-85', sandy gravel, well graded, brown (10YR 5/3), loose, dry, fine to well graded gravel up to 2" diameter
			84		
			85		
			86	SP	85'-87.5', poorly graded sand, loose, dry, medium grain sand, trace cobble up to 6" diameter, subangular
		16.7	87	SW	87.5'-89', gravely sand, gray (10YR 6/1), well graded, loose, dry, gravel up to 2" diameter, subrounded
			88		
		12.4	89		
			90	SP	89'-92.5', poorly graded sand, loose, dry, medium grain sand, trace cobble up to 6" diameter, subangular
		3.9	91		
			92		
		20.4	93	SW	92.5'-93.5', gravely sand, gray (10YR 6/1), well graded, loose, dry , gravel up to 4" diameter, subrounded
			94	SP	93.5'-95', poorly graded sand, loose, dry, medium grain sand, trace cobble up to, trace gravel up to 2" diameter, subrounded
		36.5	95		
			96	SW	95'-97.5', sand, yellowish brown (10YR 5/4), loose, dry, fine to coarse sand, well graded, trace gravel up to 5" diameter, subangular
		37.1	97		
			98	SW	97.5'-99', gravely sand, light brownish gray (10YR 6/2), loose, dry, well graded
			99		
			100		99'-102.5', sand, yellowish brown (10YR 5/4), loose, dry, fine to coarse sand, well, trace gravel up to 2" diameter, subangular
		38.6	101		

Logged by: S.Lauricella Date: 04/25/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624835, -106.087693
Surface Elevation:	6,328.95 ft
Casing Elevation:	6,328.84 ft
GW level at time of drilling:	176.31 ft
GW level at time of sampling:	176.05 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-01
Sampling Method:		
Sonic/Continuous Core		Sheet 6 of 10
		Drilling

Water Level	-	Start	Finish
Time	-	4/25/2022	5/9/2022
Date	4/25/2022	850	1647

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted	38.6	101	SW	
			102		
		36.2	103	SW	102.5'-105', well graded sand, yellowish brown (10YR 5/4), loose, dry, medium
			104		to coarse sand, trace gravel throughout cutting up to 3" diameter, subrounded to subangular
		47.2	105		
			106		105'-108', gravely sand, light brownish gray (10YR 6/2), loose, dry, well graded
		10.8	107		
			108		
			109	GW	108'-111', sandy gravel, pale brown (10YR 6/3), loose, dry, gravel up to 4" diameter, subrounded, sub angular
			110		
		64.7	111		
			112	SW	111'- 112.5', sand, dark yellowish brown (10YR 4/6), loose, slightly moist, medium to coarse grain sand, trace gravel up to 2" diameter
		66.2	113	SM	112.5'-115', silty sand, dark yellowish brown (10YR 4/6), dense, moist to wet downward, fine grain sand, trace coarse sand grain, minor trace clay, low plasticity
			114		
			115		
			116	ML	115'-120', silt, dark yellowish brown (10YR 4/6), moist, loose, trace fine sand
		20.7	117		
			118		
		81.8	119		
			120		
		22.8	121	GW	120'-124', sandy gravel, yellowish brown (10YR 5/4), loose, dry, one cobble up to 7" diameter, subrounded and subangular

Logged by: S.Lauricella Date: 04/25/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624835, -106.087693
Surface Elevation:	6,328.95 ft
Casing Elevation:	6,328.84 ft
GW level at time of drilling:	176.31 ft
GW level at time of sampling:	176.05 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-01
Sampling Method:		
Sonic/Continuous Core		Sheet 7 of 10
		Drilling

Water Level	-	Start	Finish
Time	-	4/25/2022	5/9/2022
Date	4/25/2022	850	1647

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted	22.8	121	GW	120'-124', sandy gravel, yellowish brown (10YR 5/4), loose, dry, one cobble up to 7" diameter, subrounded and subangular
			122		
		23.5	123		
			124		
			125	SC	124'-125', Clayey sand, brown (10YR 4/3), medium dense, moist, fine to medium grain sand
			126	GW	125'-130', sandy gravel, poorly graded, light yellowish brown (10YR 6/4), loose, dry, fine to coarse grain sand, gravel up to 3" diameter
		19.2	127		
			128		
		7.7	129		
			130		
	16"	9.5	131	SW	130'-132.5', sand, dark yellowish brown (10YR 4/4), loose, dry, medium to coarse grain sand, trace gravel up to 1" diameter
			132		
		10.8	133		132.5'-135', sand, dark yellowish brown (10YR 4/4), loose, dry, medium to fine grain, trace gravel up to 3" diameter
			134		
			135		
		21.2	136	CL	135'-139', clay, brown (7.5YR 5/4), soft, slightly moist, low plasticity, trace silt, fine to medium grain sand throughout
			137		
		71.1	138		
			139		
			140	SW	139'-142.5', sand, strong brown (7.5YR 5/6), loose, dry, medium to coarse grain sand, trace gravel up to 1.5" diameter
		2.8	141		

Logged by: S.Lauricella Date: 04/25/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624835, -106.087693
Surface Elevation:	6,328.95 ft
Casing Elevation:	6,328.84 ft
GW level at time of drilling:	176.31 ft
GW level at time of sampling:	176.05 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-01
Sampling Method:		
Sonic/Continuous Core		Sheet 8 of 10
		Drilling

Water Level		Start	Finish
Time	-	4/25/2022	5/9/2022
Date	4/25/2022	850	1647

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted	2.8	141	SW	139'-142.5', sand, strong brown (7.5YR 5/6), loose, dry, medium to coarse grain sand, trace gravel up to 1.5" diameter
			142		
		6.8	143	SW	142.5'-145', sand, reddish yellow (5YR 6/6), loose, dry, medium to coarse grain sand, trace gravel up to 1" diameter, fines downward into slightly moist
			144		
			145		
		9.7	146		145'-147.5', sand, reddish brown (7.5YR 5/6), loose, dry, medium to coarse grain, trace gravel up to 3" diameter, fines downward into slightly moist
			147		
			148	SW	147.5'-150', sand, strong brown (7.5YR 5/6), slightly dense, dry, medium to coarse sand, trace gravel up to 2" diameter, subrounded
		11.1	149		
			150		
		13.1	151		150'-152.5', sand, strong brown (7.5YR 5/6), slightly dense, dry, medium to coarse sand, fines downward, trace gravel up to 2" diameter, subrounded
			152		
		4.9	153		152.5'-155', sand, strong brown (7.5YR 5/6), slightly dense, dry, medium to coarse sand, trace gravel up to 2" diameter, subrounded
			154		
			155		
			156	SW	155'-157', sand, yellowish brown (10YR 5/6), loose, dry, fine to coarse grain sand, coarsens into gravel downward, gravel up to 1.5" diameter
		241.5	157		
			158	ML	157'-160', sandy silt, light brownish gray (10YR 6/2), loose, dry, fine grain sand, trace medium to coarse, trace gravel up to 2" diameter, subrounded, subangular
		5.5	159		
			160		
		19.7	161	SW	160'-161.5', sand, light yellowish brown (10YR 6/4), loose, dry, fine to coarse throughout cutting, trace gravel up to 1" diameter, subangular

Logged by: S.Lauricella Date: 4/25/2022-4/26/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.624835, -106.087693
Surface Elevation: 6,328.95 ft
Casing Elevation: 6,328.84 ft
GW level at time of drilling: 176.31 ft
GW level at time of sampling: 176.05 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-01
Sampling Method:		
Sonic/Continuous Core		Sheet 9 of 10
		Drilling

Water Level	-	Start	Finish
Time	-	4/25/2022	5/9/2022
Date	4/25/2022	850	1647

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted	19.7	161	SW	160'-161.5', sand, light yellowish brown (10YR 6/4), loose, dry, fine to coarse throughout cutting, trace gravel up to 1" diameter, subangular
			162	SM	161.5'-165', sandy silt, light brownish gray (10YR 6/2), loose, dry, fine grain sand, becomes more silty downward, trace gravel up to 3" diameter, subrounded subangular
		4.5	163		
			164		
			165		
			166	SW	165'-166', sand, reddish yellow (5YR 6/6), loose, dry, medium to coarse grain sand, trace fine grain
		46.4	167	SC	166'-167.5', clayey sand, reddish brown (5YR 4/6), dense, stiff, medium to coarse grain sand, trace silt, well graded
			168	SW	167.5'-175', sand, reddish yellow (7.5YR 6/6), loose, dry, fine to coarse grain, trace silt, well graded, trace gravel up to 2" diameter, subangular
		51.6	169		
			170		
		59.5	171		
			172		
		80.4	173		
			174		
			175		
			176	SC	175'-176', clayey sand, reddish brown (5YR 4/6), dense, stiff, trace gravel up to 1" diameter, subrounded, medium to coarse grain sand, trace silt, well graded
		31.8	177	SP	176'-179', sand, light yellowish brown (10YR 6/4), loose, dry, fine to coarse throughout cutting, trace gravel up to 1" diameter, subangular
			178		
		14.8	179		
			180	SW	179'-180, gravley sand, reddish yellow (7.5YR 6/6), loose, dry, fine to coarse grain sand, well graded, trace silt, gravel up to 3" diameter, subrounded
Discrete / AOI01-01-181		51.2	181	SW	180'-181', sand, brown (7.5YR 4/4), loose, dry, medium to coarse, trace fine grain, trace gravel up to 1" diameter

Logged by: S.Lauricella Date: 04/26/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.624835, -106.087693
Surface Elevation: 6,328.95 ft
Casing Elevation: 6,328.84 ft
GW level at time of drilling: 176.31 ft
GW level at time of sampling: 176.05 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-01
Sampling Method:		
Sonic/Continuous Core		Sheet 10 of 10
		Drilling

Water Level	-	Start	Finish
Time	-	4/25/2022	5/9/2022
Date	4/25/2022	850	1647

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted	51.2	181	SW	180'-181', sand, brown (7.5YR 4/4), loose, dry, medium to coarse, trace fine grain, trace gravel up to 1" diameter
			182	SW	181'-182', gravley sand, reddish yellow (7.5YR 6/6), loose, dry, fine to coarse grain sand, well graded, trace silt, gravel up to 3" diameter, subrounded
		1.9	183	SW	182'-186', sand, yellowish brown (10YR 5/6), loose, wet, fine to coarse grain throughout, trace gravel up to 4" diameter, subround, subangular going downward
			184		
		2.7	185		
			186		
		1.4	187	SC	186'-189', clayey sand, dark yellowish brown (10YR 3/6), wet, stiff, fine to coarse grain sand, coarsens downward, trace gravel up to 2.5" diameter, plastic
			188		
		11.5	189		
		10.2	190	SW	189'-192', well graded gravely sand, brown (10YR 6/6), loose, dry, fine to medium grain size throughout, gravel up to 1"-4' in diameter size increases in size going downward, sunangular to angular, trace silt
			191		
			192		
			193		
			194		
			195		
			196		
			197		
			198		TD' = 192'
			199		2" PVC SCH 80 0.010" screen: 170' - 190'
			200		2" PVC SCH 80 riser: 0 - 170'
			201		2" PVC SCH 80 sump: 190'- 192'
					10/20 silica sand: 168' - 192'
					3/8" bentonite chips hole plug: 162' - 168'
					grout: <1' - 162'

Logged by: S.Lauricella Date: 04/26/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.624167, -106.088661
Surface Elevation: 6,325.13 ft
Casing Elevation: 6,324.96 ft
GW level at time of drilling: 110.80 ft
GW level at time of sampling: 110.72 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-02
Sampling Method:		
Sonic/Continuous Core		Sheet 1 of 7
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/27/2022	5/9/2022
Date	4/27/2022	1145	1650

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
Composite / AOI01-02 SB-0-2	Full recovery unless noted		1	SP	0-5', sand, dark brown (10YR 3/3), loose, dry, fine grain sand, trace coarse, trace gravel up to 1" diameter, poorly graded
		25.2	2		
			3		
		31.6	4		
			5		
		16.6	6	SM	5'-7.5', silty sand, dark yellowish brown (10YR 4/6), loose, dry, fine grain sand, trace gravel up to 1" diameter, subangular
	17"		7		
		54.9	8		7.5'-10', silty sand, dark yellowish brown (10YR 4/6), medium dense, dry, fine grain sand, trace gravel up to 1" diameter, subangular
			9		
			10		
		30.0	11	SC	10'-13', clayey sand, dark yellowish brown (10YR4/6), stiff, dense, plastic, trace fine grain sand
			12		
		18.2	13		
Composite / AOI01-02 13-15			14	SP	13'-15', sand, dark yellowish brown (10YR4/6), poorly graded, loose, fine to medium grain
			15		
		16.7	16	SC	15'-17.5', clayey sand, dark yellowish brown (10YR4/6), stiff, dense, plastic, trace fine grain sand
	12"		17		17.5'-18', sand, yellowish brown (10YR 5/4), loose, dry, fine to coarse grain coarsens downward into trace gravel up to 1.5" diameter, subrounded, subangular, well graded
		21.3	18	SW	
			19	SW	18'-25', gravelly sand, light yellowish brown (10YR 6/4), loose, dry, fine to gravel grain, gravel up to 2" diameter, well graded
			20		
		7.2	21		

Logged by: S. Lauricella Date: 04/27/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624167, -106.088661
Surface Elevation:	6,325.13 ft
Casing Elevation:	6,324.96 ft
GW level at time of drilling:	110.80 ft
GW level at time of sampling:	110.72 ft

Job. No. 634250383	Client: ARNG	Location: Santa Fe, NM Army Aviation Support Facility
Drilling Method: Sonic		Boring No. AOI01-02
Sampling Method: Sonic/Continuous Core		Sheet 2 of 7
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/27/2022	5/9/2022
Date	4/27/2022	1145	1650

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted		21	SW	
			22		
		54.7	23		
			24		
			25		
	17"	15.2	26	GW	25'-30', sandy gravel, poorly graded, dark yellowish brown (10YR 4/6), loose, dry, fine to coarse grain sand, gravel up to 1" diameter
			27		
		29.6	28		
			29		
			30		
		8.4	31	SW	30'-31.5', gravely sand, well graded, light brown (7.5YR 6/4), loose, dry, silt to gravel up to 1.5" diameter, well graded
			32	GC	31.5'-32.5', clayey gravel, brown (7.5YR 4/4), soft, moist, plastic, trace gravel up to 5" diameter, subrounded
		36.2	33	SW	32.5'-35.5', gravely sand, well graded, light brown (7.5YR 6/4), loose, dry, silt to gravel up to 1.5" diameter, well graded
	13"		34		
			35		
		12.6	36	GC	35.5'-36', clayey gravel, brown (7.5YR 4/4), soft, moist, plastic, trace gravel up to 5" diameter, subrounded
			37	GW	36'-42', gravely sand, well graded, light yellowish brown (10YR 5/4), loose, dry, silt to gravel up to 4" diameter, subrounded, subangular
		43.3	38		
	11.4"		39		
		25.6	40		
			41		

Logged by: S.Lauricella Date: 04/27/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624167, -106.088661
Surface Elevation:	6,325.13 ft
Casing Elevation:	6,324.96 ft
GW level at time of drilling:	110.80 ft
GW level at time of sampling:	110.72 ft

Job. No. 634250383	Client: ARNG	Location: Santa Fe, NM Army Aviation Support Facility
Drilling Method: Sonic		Boring No. AOI01-02
Sampling Method: Sonic/Continuous Core		Sheet 3 of 7
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/27/2022 1145	5/9/2022 1650
Date	4/27/2022		

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted		41	SW	36'-42', gravely sand, well graded, light yellowish brown (10YR 5/4), loose, dry, silt to, gravel up to 4" diameter, subrounded, subangular
			42		
		36.9	43	CL	42'-42.5', silty clay, brown (10YR 4/4), stiff, moist, plastic, trace coarse grain sand
				GW	42.5'-46', sandy gravel, yellowish brown (10YR 5/4), loose, dry, medium to coarse grain sand, gravel up to 5" diameter, poorly graded
			44		
			45		
			46		
		28.2	47		46'-48.5', sandy gravel, yellowish brown (10YR 5/4), loose, dry, fine to coarse grain sand, gravel up to 2" diameter, subrounded, rounded,
			48		
		25.6	49	SC	48.5'-49', clayey sand, brown (10YR 5/3), stiff, moist, plastic, fine grain to medium grain
			50	SW	49'-53.5', gravely sand, well graded, strong brown (7.5YR 5/6), loose, dry, medium to coarse grain, gravel up to 2" diameter, subrounded,
		5.7	51		
			52		
		42.4	53		
			54	SW	53.5'-54.5', sand, strong brown (10YR 5/6), loose, dry, medium to coarse grain sand, trace gravel up tp 2" diameter, rounded, subrounded
			55	SW	54.5'-56', gravely sand, well graded, strong brown (7.5YR 5/6), loose, dry, medium to coarse grain, gravel up to 2" diameter, subrounded,
	26"		56		
		34.5	57	GW	56'-59', sandy gravel, dark brown (7.5YR 3/4), loose, dry, medium to coarse grain sand, gravel up to 2" diameter, subrounded, subangular, well graded
			58		
		70.2	59		
			60	SM	59'-61', silty sand, dark yellowish brown (10YR 4/2), medium dense, trace coarse grain sand, fine grain sand
			61		

Logged by: S.Lauricella Date: 04/27/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624167, -106.088661
Surface Elevation:	6,325.13 ft
Casing Elevation:	6,324.96 ft
GW level at time of drilling:	110.80 ft
GW level at time of sampling:	110.72 ft

Job. No. 634250383	Client: ARNG	Location: Santa Fe, NM Army Aviation Support Facility
Drilling Method: Sonic		Boring No. AOI01-02
Sampling Method: Sonic/Continuous Core		Sheet 4 of 7
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/27/2022	5/9/2022
Date	4/27/2022	1145	1650

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted	14.7	61		
			62	ML	61'-64', sandy silt, brown (10YR 4/3), medium dense, dry, fine to medium grain, trace gravel up to 1" diameter
			63		
		32.5	64		
			65	CL	64'-66', sand clay, brown (10YR 5/3), soft, moist, low plasticity, trace medium and coarse grain sand
			66		
		6.9	67	SW	66'-69', sand, yellowish brown (10YR 5/4), loose, moist, fine to medium coarse grain sand, trace gravel up to 2" diameter, rounded, subrounded, fines downward into fine grain sand, trace clay throughout, soft, low plasticity
			68		
		8.0	69		
			70	CL	69'-72', sandy clay, brown (10YR 4/3), medium stiff, moist, fine to coarse grain sand, trace gravel up to 1" diameter
			71		
		16.1	72		
			73	GW	72'-73', sandy gravel, dark yellowish brown (10YR 4/4), loose, dry, fine to gravel grain, gravel up to 2" diameter, subrounded, subangular
		8.8	74	CL	73'-74', sandy clay, brown (10YR 4/3), medium stiff, moist, fine to coarse grain sand, trace gravel up to 1" diameter
			75	GW	74'-76', sandy gravel, dark yellowish brown (10YR 4/4), loose, dry, fine to gravel grain, gravel up to 2" diameter, subrounded, subangular
			76		
		15.1	77	SW	76'-78.5', sand, yellowish brown (10YR 5/4), loose, dry to moist, fine to coarse grain sand, trace gravel up to 2" diameter
			78		
		18.9	79	GW	78.5'-81', sandy gravel, yellowish brown (10YR 5/4), loose, dry, medium to coarse grain, gravel up to 3" diameter, subangular, angular
			80		
			81		

Logged by: S.Lauricella Date: 04/27/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624167, -106.088661
Surface Elevation:	6,325.13 ft
Casing Elevation:	6,324.96 ft
GW level at time of drilling:	110.80 ft
GW level at time of sampling:	110.72 ft

Job. No. 634250383	Client: ARNG	Location: Santa Fe, NM Army Aviation Support Facility
Drilling Method: Sonic		Boring No. AOI01-02
Sampling Method: Sonic/Continuous Core		Sheet 5 of 7
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/27/2022	5/9/2022
Date	4/27/2022	1145	1650

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted	2.0	81	GW	78.5'-81', sandy gravel, yellowish brown (10YR 5/4), loose, dry, medium to coarse grain, gravel up to 3" diameter, subangular, angular
			82	SW	81'-83.5', gravely sand, light gray (10YR 7/2), loose, very fine to coarse grain sand, trace silt, gravel up to 3" diameter, subrounded, subangular, poorly graded
			83		
		5.3	84	GW	83.5'-85.5', sandy gravel, yellowish brown (10YR 5/4), loose, dry, medium to coarse grain, gravel up to 3" diameter, subangular, angular
			85		
			86	ML	85.5'-86', sandy silt, dark yellowish brown (10YR 4/4), medium dense, moist, fine grain sand, trace coarse grain sand
		4.6	87	SW	86'-88', sand, dark yellowish brown (10YR 3/6), moist, medium dense, well graded, fine to coarse grain throughout, trace gravel up to 1.5" diameter, subrounded, subangular
			88		
		40.1	89		88'-92', sand, dark yellowish brown (10YR 3/6), moist, loose, dry, trace silt between 88'-88.5', well graded, fine to coarse grain throughout, trace gravel up to 4" diameter, subangular to angular
			90		
			91		
		17.6	92		
			93		92'-93', sand, dark yellowish brown (10YR 3/6), moist, medium dense, well graded, fine to coarse grain throughout, trace gravel up to 1.5" diameter, subrounded, subangular
		10.4	94	GW	93'-96', sandy gravel, yellowish brown (10YR 5/6), loose, dry, trace silt, gravel up to 4" diameter, subrounded, angular, fine to coarse grain sand throughout
			95		
			96		
		29.5	97		96'-98.5', sandy gravel, yellowish brown (10YR 5/6), loose, dry, trace silt, gravel up to 3" diameter, rounded, subangular, fine to coarse grain sand throughout
			98		
		23.0	99	CL	98.5'-99.5', sandy clay, yellowish brown (10YR 5/6), moist, dense, fine to coarse grain sand
			100	SW	99.5'-103', sand, yellowish brown (10YR 5/6), loose, dry, medium to coarse grain sand, trace silt, trace gravel up to 3" subrounded, rounded, well graded
			101		

Logged by: S.Lauricella Date: 04/27/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624167, -106.088661
Surface Elevation:	6,325.13 ft
Casing Elevation:	6,324.96 ft
GW level at time of drilling:	110.80 ft
GW level at time of sampling:	110.72 ft

Job. No. 634250383	Client: ARNG	Location: Santa Fe, NM Army Aviation Support Facility
Drilling Method: Sonic		Boring No. AOI01-02
Sampling Method: Sonic/Continuous Core		Sheet 6 of 7
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/27/2022	5/9/2022
Date	4/27/2022	1145	1650

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted		101	SW	99.5'-103', sand, yellowish brown (10YR 5/6), loose, dry, medium to coarse grain sand, trace fine silt, trace gravel up to 3" subrounded, rounded, well graded
		9.3	102		
			103		
		53.8	104	GW	103'-106', sandy gravel, brownish yellow (10YR 6/6), loose, dry, fine to coarse grain gravel, gravel up to 2"-3" diameter, subrounded, subangular, gravel reduces
			105		
		3.8	106		
			107		106'-109', sandy gravel, yellowish brown (10YR 5/6), loose, dry, very fine to gravel, well graded, gravel fines downward, up to 3"-1" diameter, subrounded
		36.1	108		
			109		
			110	CL	109'-115', clay, dark yellowish brown (10YR 4/6), stiff, moist, plastic to low plasticity downward, trace medium and coarse grain sand, trace gravel up to 1" diameter subrounded, trace sand becomes less sand to trace silt going downward
		44.4	111		
			112		
		3.6	113		
Composite / AOI01-02 113-115			114		
			115		
		10.7	116	ML	115-116', silt, yellowish brown (10YR 4/6), medium dense, slightly moist, trace medium to coarse grain sand, no gravel
			117	CL	116'-117', clay, dark yellowish brown (10YR 4/6), soft, moist, plastic, trace coarse grain sand
			118		117'-122', clay, dark yellowish brown (10YR 4/6), very stiff, moist, plastic, trace coarse grain sand
		22.5	119		
			120		
		1.6	121		

Logged by: S.Lauricella Date: 04/27/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624167, -106.088661
Surface Elevation:	6,325.13 ft
Casing Elevation:	6,324.96 ft
GW level at time of drilling:	110.80 ft
GW level at time of sampling:	110.72 ft

Job. No. 634250383	Client: ARNG	Location: Santa Fe, NM Army Aviation Support Facility
Drilling Method: Sonic		Boring No. AOI01-02
Sampling Method: Sonic/Continuous Core		Sheet 7 of 7
		Drilling

		Start	Finish
Water Level	-		
Time	-	4/27/2022 1145	5/9/2022 1650
Date	4/27/2022		

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
	Full recovery unless noted	1.6	121	CL	117'-122', clay, dark yellowish brown (10YR 4/6), very stiff, moist, plastic, trace coarse grain sand
			122		*upper boring from 122'-126' was wet*
			123	GW	122'-126', sandy gravel, very pale brown (10YR 7/3), loose, dry, very fine to coarse grain, trace silt, one cobble up to 6" diameter, subrounded
			124		*122'-126' sloughed in by next day up to 122'*
			125		
			126		
			127		
			128		
			129		
			130		
			131		
			132		
			133		
			134		
			135		
			136		
			137		TD' = 119'
			138		2" PVC SCH 80 0.010" screen: 107' - 117'
			139		2" PVC SCH 80 riser: 0 - 107'
			140		2" PVC SCH 80 sump: 117'- 119'
			141		slough: 122' - 126'
					tr30 bentonite pallets: 119' - 122'
					10/20 silica sand: 105' - 119'
					3/8" bentonite chips hole plug: 100' - 105"
					grout: <1' - 100'

Logged by: S.Lauricella Date: 04/28/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.6236143, -106.089117
Surface Elevation: NA
Casing Elevation: NA
GW level at time of drilling: NA
GW level at time of sampling: NA

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Direct Push - Geoprobe		AOI01-03
Sampling Method:		
PVC Sleeve		Sheet 1 of 1
		Drilling

Water Level		Start	Finish
Time	-		
Date	-	5/4/2022	5/4/2022
		1445	1545

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions:
			1	ML	0-6.5', sandy silt, pink (5YR 7/3), loose, dry, fine sand
Composite / AOI01-03 SB-0-2		0.3	2		
	60"		3		
		0.3	4		
			5		
		0.4	6		
	32"		7	SW	6.5'-15', sand, well graded, pink (5YR 7/3), loose, dry, fint to coarse sand, trace fine
Composite / AOI01-03 SB-6-8		0.3	8		grained
			9		
		0.1	10		
	45"		11		
		0.2	12		
			13		
	32"	0.2	14		
Composite / AOI01-03 SB-13-15			15		
			16		
			17		
			18		
			19		
			20		
			21		TD' = 15'

Logged by: D. Werth Date: 05/04/2020

Drilling Contractor: JR Drilling Driller: Rob Helton

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.623216, -106.088671
Surface Elevation: 6,323.35 ft
Casing Elevation: 6,323.20 ft
GW level at time of drilling: 110.57 ft
GW level at time of sampling: 109.88 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-04
Sampling Method:		
Sonic/Continuous Core		Sheet 1 of 6

		Drilling	
Water Level	-	Start	Finish
Time	-	5/3/2022	5/9/2022
Date	5/3/2022	1220	1650

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground, 1" gravel
Composite / AOI01-04 SB-0-2	Full recovery unless noted		1		0-2', slough
		9.6	2		
		1.3	3	ML	2'-4', sandy silt, yellowish brown (1YR 5/6), loose, dry, very fine sand to fine sand, trace coarse and medium grain sand, coarsens downward into trace gravel up to 1" diameter, subrounded, subangular
			4		
		4.3	5		4'-6', sandy silt, brown (10YR 5/3), loose, dry, minor trace of clay, very fine to fine sand, trace coarse grain sand, trace gravel up to 1" diameter, subangular
			6		
		0.3	7		6'-8.5', sandy silt, brown (10YR 5/3), loose, dry, minor trace of clay, very fine to fine, less trace of coarse grain sand, trace gravel up to 1.5" diameter, subround
			8		
		5.5	9		8.5'-9.5', sandy silt, brown (7.5YR 4/4), loose, very fine to fine grain sand, dry
			10	SW	9.5'-13', sand, brown (7.5YR 4/4), well graded, fine to coarse grain sand, trace gravel up to 1" diameter, rounded, subrounded
			11		
		9.5	12		
			13		
Composite / AOI01-04 SB-13-15			14		13'-15', well graded sand, strong brown (7.5YR 4/6), loose, dry, very fine to medium grain, trace gravel, trace coarse grain sand, trace silt
		7.7	15		
			16	SM	15'-16', silty sand, well graded, trace gravel up to 1.5" diameter, strong brown (7.5YR 4/6), loose, dry
		2.4	17	SW	16'-18.5', sand, brown (7.5YR 4/4), well graded, fine to coarse grain sand, fines downward, less coarse, one cobble up to 3" diameter, subrounded, loose to slightly moist
			18		
			19		18.5'-23.5', sand, brown (7.5YR 4/4), well graded, fine to coarse grain sand,
		5.2	20		slightly moist, fines downward to minor, one cobble up to 3" diameter, subrounded
			21		

Logged by: S. Lauricella Date: 05/03/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.623216, -106.088671
Surface Elevation: 6,323.35 ft
Casing Elevation: 6,323.20 ft
GW level at time of drilling: 110.57 ft
GW level at time of sampling: 109.88 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-04
Sampling Method:		
Sonic/Continuous Core		Sheet 2 of 6
		Drilling
Water Level	-	Start: 5/3/2022 1220 / Finish: 5/9/2022 1650
Time	-	
Date	5/3/2022	

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground, 1" gravel
	Full recovery unless noted	0.8	21	SW	
			22		
			23		
		3.4	24		23.5'-26', sand, brown (7.5YR 4/4), well graded, fine to coarse grain sand,
			25		trace gravel is subrounded, rounded, fines downward into very fine sand, trace minor silt,
			26		
	12"	6.9	27		26'-27.5', no recovery
			28	ML	27.5'-28.5', silt, gray (10YR 6/1), loose, dry, trace sand medium to coarse, one gravel up to 2.5" diameter, subangular
			29	SW	28.5'-31', gravely sand, pale brown (10YR 6/3), loose, dry, very fine to coarse
		5.8	30		grain, well graded, trace cobbles up to 3"-4" diameter, trace silt, subrounded, subangular
			31		
			32	SW	31'-35', gravely sand, well graded, loose, dry, very fine to medium grain, coarse grain is minor, one cobble is 3" minor, trace silt
		6.9	33		
			34		
			35		
		2.9	36	GW	35'-36', gravely sand, pale brown (10YR 6/3), loose, dry, very fine to coarse grain, well graded, trace cobbles up to 3"-4" diameter, trace silt, subrounded,
			37	ML	36'-37.5', silt, gray (10YR 5/1), loose, dry, trace coarse grain sand, trace gravel up to 1.5" diameter, subangular
			38	SW	37.5'-38', sand, yellowish brown (10YR 5/6), loose, dry, trace of medium dense,
		1.8	39	SW	slightly moist, minor traces of clay, non plastic 38'-41' gravely sand, yellowish brown (10YR 5/6), loose to medium dense, dry, coarse to gravel grains, trace fine to medium grain, gravel is up to 1"-3" diameter
			40		upward, trace cobbles up to 4"-5" diameter, subangular, angular downward
			41		

Logged by: S. Lauricella Date: 05/03/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.623216, -106.088671
Surface Elevation: 6,323.35 ft
Casing Elevation: 6,323.20 ft
GW level at time of drilling: 110.57 ft
GW level at time of sampling: 109.88 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-04
Sampling Method:		
Sonic/Continuous Core		Sheet 3 of 6
		Drilling
Water Level	-	Start: 5/3/2022 1220 / Finish: 5/9/2022 1650
Time	-	
Date	5/3/2022	

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground, 1" gravel
	Full recovery unless noted	3.6	41		
			42	GC / SW	41'-41.5', clayey gravel, dark yellowish brown (10YR 4/6), medium dense, slightly moist, low plasticity, gravel is 1.5"-4" diameter, trace medium to coarse grain
			43		41.5'-46', sand, brown (7.5YR 5/4), medium dense to loose, dry, fine to coarse grain sand, trace clayey silt, stiff, trace gravel up to 1.5" diameter, dimension increases downward
		2.4	44		
			45		
			46		
		15.2	47		46'-47.5', sand, reddish yellow (7.5YR 6/6), loose, dry, fine to coarse grain sand, well graded, trace gravel up to 2", trace silt
			48	SM	47.5'-48.5', silty sand, very fine to medium grain, well graded, yellowish brown (10YR 5/4), loose, dry, trace gravel up to 1" diameter, subangular, angular
			49	SW	48.5'-51', sand, yellowish brown (10YR 5/6), loose, dry, very fine to coarse grain, well graded, trace gravel up to 3" diameter, subrounded, subangular, trace silt, loose, with minor dense silty sand throughout
		29.4	50		
			51		
			52	SM	51'-56', silty sand, yellowish brown (10YR5/6), 50% loose, 50% dense, well graded, fine to medium grain sand, trace coarse grain, trace gravel up uo 1" diameter, one cobble 3.5" diameter, subangular, trace clay throughout
		3.7	53		
			54		
			55		
		2.9	56		
			57	ML	56'-61', gravely silt, light gray (10YR 7/2), loose, dry, slightly moist bottom 4", well graded, trace very fine to medium sand, gravel up to 1"-2" diameter, subrounded, subangular, trace coarse grain sand, trace silty clay, stiff to medium stiff, non plastic
			58		
		21.8	59		
			60		
			61		

Logged by: S.Lauricella Date: 05/03/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.623216, -106.088671
Surface Elevation: 6,323.35 ft
Casing Elevation: 6,323.20 ft
GW level at time of drilling: 110.57 ft
GW level at time of sampling: 109.88 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-04
Sampling Method:		
Sonic/Continuous Core		Sheet 4 of 6
		Drilling
Water Level	-	Start / Finish
Time	-	5/3/2022 / 5/9/2022
Date	5/3/2022	1220 / 1650

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground, 1" gravel
	Full recovery unless noted	14.4	61	ML	
			62		61'-63.5', clayey silt, dark yellowish brown (10YR 4/6), stiff, moist, low plasticity, minor coarse sand and gravel, gravel up to 1/2" diameter, subrounded, subangular
		1.8	63		
			64	SW	63.5'-64.5', sand, brown (7.5YR 5/4), loose, slightly moist, well graded, fine to coarse grain sand, trace gravel up to 1" diameter
			65	ML	64.5'-65.5', clayey silt, dark yellowish brown (10YR 4/6), stiff, plastic, medium dense, gravel traces up to 2" diameter, moist, low plasticity, minor coarse sand and
		29.9	66	SW	gravel, gravel up to 1/2", subrounded, subangular
			67	SC	65.5'-66', sand, brown (7.5YR 5/4), loose, slightly moist, well graded, fine to coarse grain sand, trace gravel up to 1" diameter
		8.4	68		66'-68.5', clayey sand, dark yellowish brown (10YR 4/6), stiff, medium dense, moist, trace stiff, very fine to fine sand, minor trace coarse grain, low plasticity, trace silt
			69	CL	68.5'-71.5', sandy clay, dark yellowish brown (10YR 4/6), stiff to medium stiff
		2.7	70		moist, fine to medium sand grain, trace coarse, minor trace gravel up to 1" diameter, subrounded, rounded, trace silt
			71		
		2.4	72	SW	71.5'-73.5', sand, yellowish brown (10YR 5/6), loose to medium dense, moist, fine to coarse grain sand, trace silty clay, non plastic, well graded
			73		
		0.3	74	ML	73.5'-75.5', silty clay, dark yellowish brown (10YR 4/6), soft, moist to wet, low plastic to non plasticity, minor coarse grain sand and very fine sand
			75		
			76	SW	75.5'-76', sand, yellowish brown (10YR 5/6), loose to medium dense, moist,
		13.5	77	CL	fine to coarse grain sand, trace silty clay, non plastic, well graded 76'-78.5', sandy clay, dark yellowish brown (10YR 4/6), medium dense, moist
			78		fine to medium sand grain, trace coarse, minor trace gravel up to 1" diameter, subrounded, rounded, trace silt
		11.4	79	GW	78.5'-81', sandy gravel, well graded, loose, slightly moist, trace silty clay,
			80		medium dense, slightly moist, meium to coarse grain sand, trace fine grain, gravel up to 3" diameter, dark yellowish brown (10YR 4/6)
			81		

Logged by: S.Lauricella Date: 05/03/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.623216, -106.088671
Surface Elevation: 6,323.35 ft
Casing Elevation: 6,323.20 ft
GW level at time of drilling: 110.57 ft
GW level at time of sampling: 109.88 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-04
Sampling Method:		
Sonic/Continuous Core		Sheet 5 of 6
		Drilling
Water Level	-	Start: 5/3/2022 1220 / Finish: 5/9/2022 1650
Time	-	
Date	5/3/2022	

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground, 1" gravel
	Full recovery unless noted	57.4	81	GW	
			82	SW	81'-86', gravely sand, brownish yellow (10YR 6/6), well graded, fine to coarse grain sand, loose, dry to slightly moist, minor trace of very fine sand, minor silty clay, non plastic, moist, stiff, two cobbles up to 3"-4" diameter, subangular, angular
			83		
		7.7	84		
			85		
			86		
		21.5	87		86'-88', gravely sand, brownish yellow (10YR 6/6), well graded, fine to coarse grain, dry to slightly moist, minor trace of very fine sand, minor silty clay, non plastic, moist, stiff, two cobbles up to 3"-4" diameter, subangular, angular
			88		
		75.5	89	GW	88'-91', sandy gravel, yellowish brown (10YR 5/6), loose, dry to slightly moist, fine to coarse grain sand, 2-3 cobbles 3"-4.5" diameter, subangular, subrounded, minor silt, fines downward into more sand than gravel, medium dense to dense, sandy silt downward, well graded
			90		
		83.4	91		
			92		91'-96', sandy gravel, yellowish brown (10YR 5/6), loose, slightly moist, fine to medium well graded, trace coarse grain sand, gravel up to 2" diameter, subangular, angular, well graded
			93		
		0.6	94		
			95		
			96		
		3.8	97		96'-100', sandy gravel, yellowish brown (10YR 5/6), loose, slightly moist, fine to medium well graded, trace coarse grain sand, gravel up to 2" diameter, one cobble up to 4.5" diameter, subangular, angular, well graded
			98		
		1.7	99		
			100		
			101	SW	100'-102', sand, well graded, yellowish brown (10YR 5/6), loose, slightly moist, medium to coarse grain, trace gravel up to 1" diameter

Logged by: S.Lauricella Date: 5/3/2022 - 5/4/22

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.623216, -106.088671
Surface Elevation:	6,323.35 ft
Casing Elevation:	6,323.20 ft
GW level at time of drilling:	110.57 ft
GW level at time of sampling:	109.88 ft

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-04
Sampling Method:		
Sonic/Continuous Core		Sheet 6 of 6
		Drilling

		Start	Finish
Water Level	-		
Time	-	5/3/2022	5/9/2022
Date	5/3/2022	1220	1650

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground, 1" gravel
	Full recovery unless noted	55.7	101	SW	
			102		
			103		102'-103.5', sand, well graded, yellowish brown (10YR 5/6), loose, slightly moist, minor trace gravel up to 1" diameter, minor silty clay, non plastic, fine to coarse grain sand, slightly moist
		3.9	104	CL	103.5'-105.5', silty clay, dark yellowish brown (10YR 4/6), medium stiff, moist, non plastic to low plasticity, minor coarse grain sand
			105		
			106		105.5'-106', sand, well graded, yellowish brown (10YR 5/6), loose, slightly moist, minor, one cobble 4" diameter, subrounded
		6.0	107	GW	106'-110.5', sandy gravel, yellowish brown (10YR 5/4), loose, moist, fine to medium grain sand, trace coarse sand, gravel up to 2" diameter, well graded, subangular to subround
			108		
Discrete / AOI01-04-SB-109			109		
			110		
			111	CL	110.5'-113.5', sandy clay, yellowish brown (10YR 5/4),stiff to medium stiff, moist, trace wet areas inbetween stiff clayey sand, fine to coarse grain sand, minor silt, minor gravel up to 1/2" diameter, rounded, subrounded, non plastic
		32.8	112		
			113		
			114		113.5'-114.5', sandy clay, dark yellowish (10YR3/4), stiff, wet, medium to coarse grain sand, trace very fine to fine grain , minor gravel up to 1/2" diameter, subrounded, non plastic
		6.5	115	CL	114.5'-116', silty clay, dark brown (10YR 3/3), soft, moist, low plasticity, minor medium to coarse sand, non plastic downward
			116		
		2.5	117		
			118		
			119		TD'= 115' 2" PVC SCH 80 0.010" screen: 105'-115'
			120		2" PVC SCH 80 riser: 0-105' 10/20 silica sand: 103'-115'
			121		3/8" hole plug bentonite chips: 100'- 103' grout: <1 - 100'

Logged by: S.Lauricella Date: 05/04/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.623176, -106.087902
Surface Elevation: NA
Casing Elevation: NA
GW level at time of drilling: NA
GW level at time of sampling: NA

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Direct push Geoprobe		AOI01-05
Sampling Method:		
PVC Sleeve		Sheet 1 of 1
		Drilling

Water Level		Start	Finish
Time	-		
Date	5/4/2022	5/4/2022	5/4/2022
		0900	1020

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions:
			1	ML	0-8', sandy silt, yellowish red (5YR 5/6), loose, dry, fine sand, trace fine gravel, could not advance hand auger past 4'
Composite / AOI01-05 SB-0-2	48"	0.2	2		
			3		
		0.4	4		
	45"		5		
		0.2	6		
Composite / AOI01-05 SB-6-8			7		
		0.3	8		
	48"		9	SW	8'-15', sand, well graded, reddish brown (5YR 5/3), loose, dry, fine to coarse sand, trace silt, trace fine gravel
		0.6	10		
			11		
		0.3	12		
	32"		13		
Composite / AOI01-05 SB-13-15		0.5	14		
			15		
			16		
			17		
			18		
			19		
			20		
			21		TD' = 15

Logged by: D. Werth Date: 05/04/2022

Drilling Contractor: JR Drilling Driller: Rob Helton

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.623467, -106.086917
Surface Elevation: NA
Casing Elevation: NA
GW level at time of drilling: NA
GW level at time of sampling: NA

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Hand Auger		AOI01-06
Sampling Method:		
Hand Auger (Grab)		Sheet 1 of 1
		Drilling

Water Level		Start	Finish
Time	-	2/7/2022	2/7/2022
Date	-		

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Snow, unpaved
Composite / AOI01-06 SB-0-2	2/2		1	ML	0'-2': silt, brown (10 YR 5/3), loose, dry, little sand and fine gravel top few inches
			2		
			3		
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
			20		
			21		TD' = 2'

Logged by: D. Werth Date: 02/07/2022

Drilling Contractor: EA Driller: D. Werth

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates: 35.623467, -106.087064
Surface Elevation: NA
Casing Elevation: NA
GW level at time of drilling: NA
GW level at time of sampling: NA

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Direct Push Geoprobe		AOI01-06B
Sampling Method:		
PVC Sleeve		Sheet 1 of 1
		Drilling
Water Level		Start / Finish
Time	-	
Date	5/4/2022	5/4/2022 / 5/4/2022
		1030 / 1200

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions:
			1	SM	0-6', silty sands, reddish brown (5YR 5/4), loose, dry, fine sand
Composite / AOI01-06B-SB-0-2	48"	0.4	2		
			3		
		0.5	4		
	36"		5		
		0.5	6		
Composite / AOI01-06B-SB-6-8			7	SW	6-9', sand, well graded, reddish brown (5YR 5/3), loose, dry, fine to coarse sand, trace gravel, trace silt
		0.2	8		
	48"		9		
		0.3	10	SM	9'-10.5', silty sand, reddish brown (5YR 4/3), loose, dry to moist, fine sand, trace gravel
			11	SW	10.5'-15', sand, well graded, reddish brown (5YR 5/3), loose, dry, fine to coarse sand, gravel
		0.3	12		
	30"		13		
Composite / AOI01-06B-SB-13-15			14		
			15		
			16		
			17		
			18		
			19		
			20		
			21		TD' = 15'

Logged by: D. Werth Date: 05/04/2022

Drilling Contractor: JR Drilling Driller: Rob Helton

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624337, -106.088489
Surface Elevation:	NA
Casing Elevation:	NA
GW level at time of drilling:	NA
GW level at time of sampling:	NA

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Hand Auger		AOI01-07
Sampling Method:		
Hand Auger (Grab)		Sheet 1 of 1
		Drilling

Water Level		Start	Finish
Time	-	2/8/2022	2/8/2022
Date	-		

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Cleared away decorative gravel from location; log starts under landscaping fabric
Composite / AOI01-07 SB-0-2	2/2		1	ML	0'-2': silt, brown (10 YR 5/3), loose, dry
			2		
			3		
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
			20		
			21		TD' = 2'

Logged by: D. Werth Date: 02/08/2022

Drilling Contractor: EA Driller: D. Werth

EA Engineering, Science,
and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.624297, -106.088539
Surface Elevation:	NA
Casing Elevation:	NA
GW level at time of drilling:	NA
GW level at time of sampling:	NA

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Hand Auger		AOI01-08
Sampling Method:		
Hand Auger (Grab)		Sheet 1 of 1
		Drilling

Water Level		Start	Finish
Time	-	2/8/2022	2/8/2022
Date	-		

Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Cleared away decorative gravel from location; log starts under landscaping fabric
Composite / AOI01-08 SB-0-2	2/2		1	ML	0'-2': silt, brown (10 YR 5/3), loose, dry
			2		
			3		
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		
			20		
			21		

Logged by: D. Werth Date: 02/08/2022

Drilling Contractor: EA Driller: D. Werth

EA Engineering, Science, and Technology, Inc., PBC

LOG OF SOIL/ROCK BORING

Coordinates:	35.623216, -106.087662
Surface Elevation:	NA
Casing Elevation:	NA
GW level at time of drilling:	NA
GW level at time of sampling:	NA

Job. No.	Client:	Location: Santa Fe, NM
634250383	ARNG	Army Aviation Support Facility
Drilling Method:		Boring No.
Sonic		AOI01-09
Sampling Method:		
Sonic/Continuous Core		Sheet 1 of 1
		Drilling

Water Level		Start	Finish
Time	-	5/5/2022	5/9/2022
Date	5/5/2022	1520	1200
			P&A

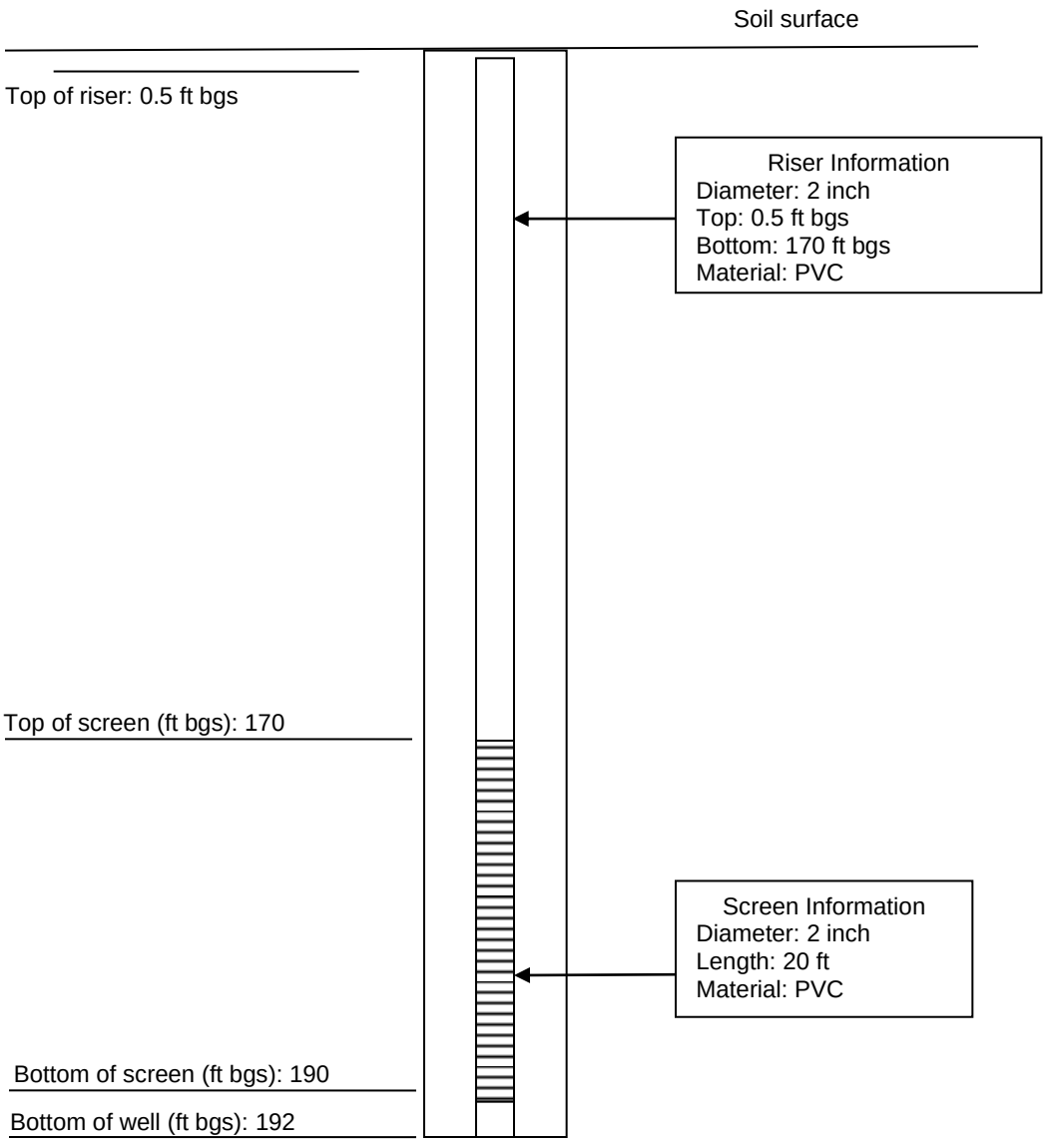
Sample Type/ID	Feet Driven /Feet Recovered	PID ppm	Depth in Feet	USCS Log	Surface Conditions: Bare ground
Composite / AOI01-09-SB-0-2			1		* Refer to AOI01-01 Boring log for lithology*
			2		
			3		
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
Composite / AOI01-09-SB-13-15			14		
			15		
			…		
			111		
Discrete / AOI01-09-SB-111-112			112		

Logged by: NA Date: 05/07/2022

Drilling Contractor: Environmental Works Inc. Driller: Justin Maples

RECORD OF MONITORING WELL CONSTRUCTION

EA Engineering, Science, and Technology, Inc., PBC	Monitoring Well/Soil Boring ID No.: AOI01-01
Project Title/ Project No.: Site Investigation for Per- and Polyfluoroalkyl Substances, Santa Fe Army Aviation Support Facility (AASF) (634250383)	Date/Time Installed: 04/25/2022 at 0850 Time Finished: 05/9/2022 at 1647
Location: East of former AASF	Depth to Water: 176.31 ft bgs
Site Geologist: Sindy Lauricella	Drilling Method: Sonic

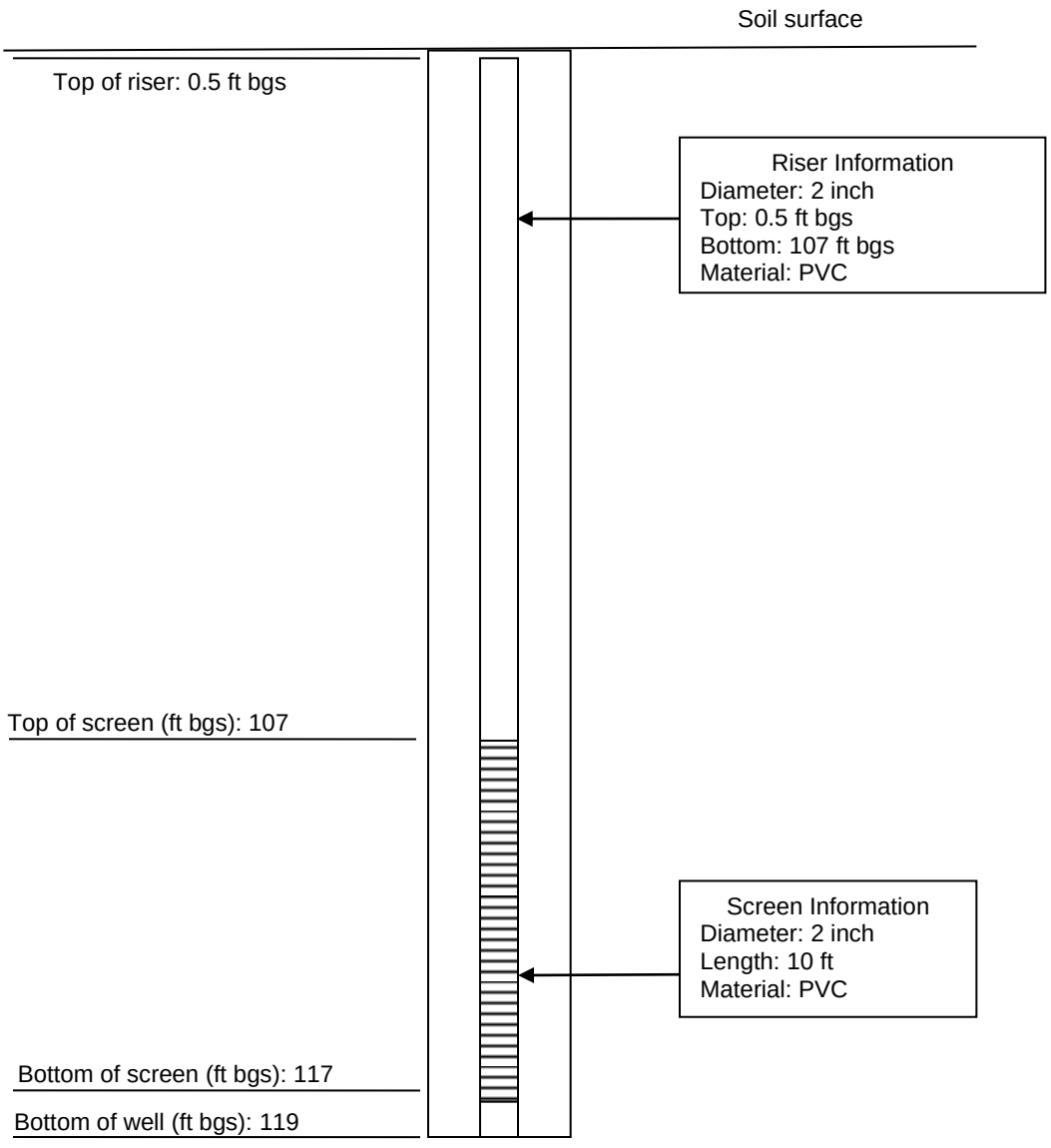


Note: All features not to scale

ags – Above Ground Surface
bgs – Below Ground Surface
ft – Feet
PVC – Polyvinyl Chloride

RECORD OF MONITORING WELL CONSTRUCTION

EA Engineering, Science, and Technology, Inc., PBC	Monitoring Well/Soil Boring ID No.: AOI01-02
Project Title/ Project No.: Site Investigation for Per- and Polyfluoroalkyl Substances, Santa Fe Army Aviation Support Facility (AASF) (634250383)	Date/Time Installed: 04/27/2022 at 1145 Time Finished: 05/9/2022 at 1650
Location: Southwest of former AASF	Depth to Water: 110.80 ft bgs
Site Geologist: Sindy Lauricella	Drilling Method: Sonic

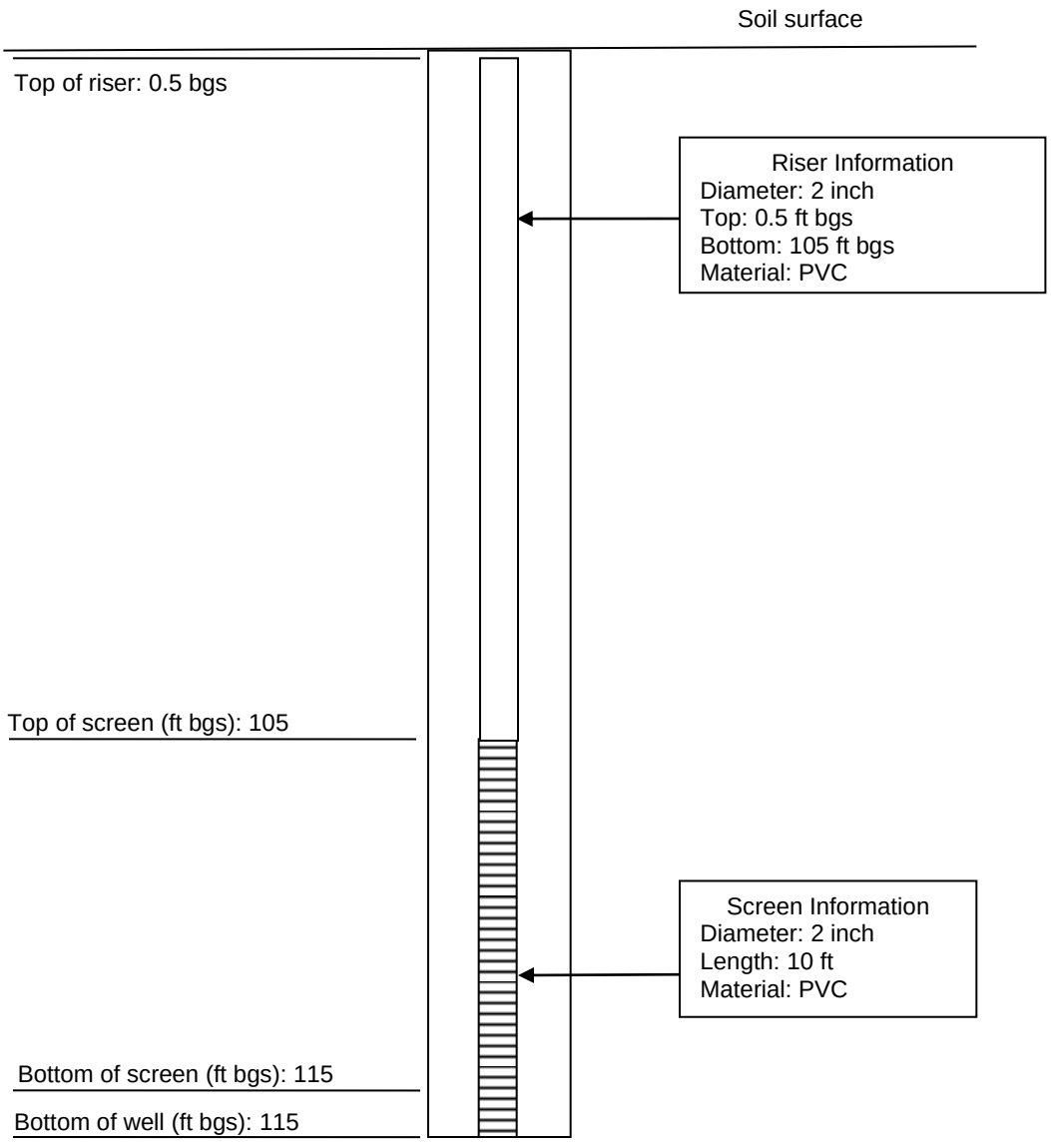


Note: All features not to scale

ags – Above Ground Surface
bgs – Below Ground Surface
ft – Feet
PVC – Polyvinyl Chloride

RECORD OF MONITORING WELL CONSTRUCTION

EA Engineering, Science, and Technology, Inc., PBC	Monitoring Well/Soil Boring ID No.: AOI01-04
Project Title/ Project No.: Site Investigation for Per- and Polyfluoroalkyl Substances, Santa Fe Army Aviation Support Facility (634250383)	Date/Time Installed: 05/3/2022 at 1220 Time Finished: 05/9/2022 at 1650
Location: Southwest facility boundary	Depth to Water: 110.57 ft bgs
Site Geologist: Sindy Lauricella	Drilling Method: Sonic

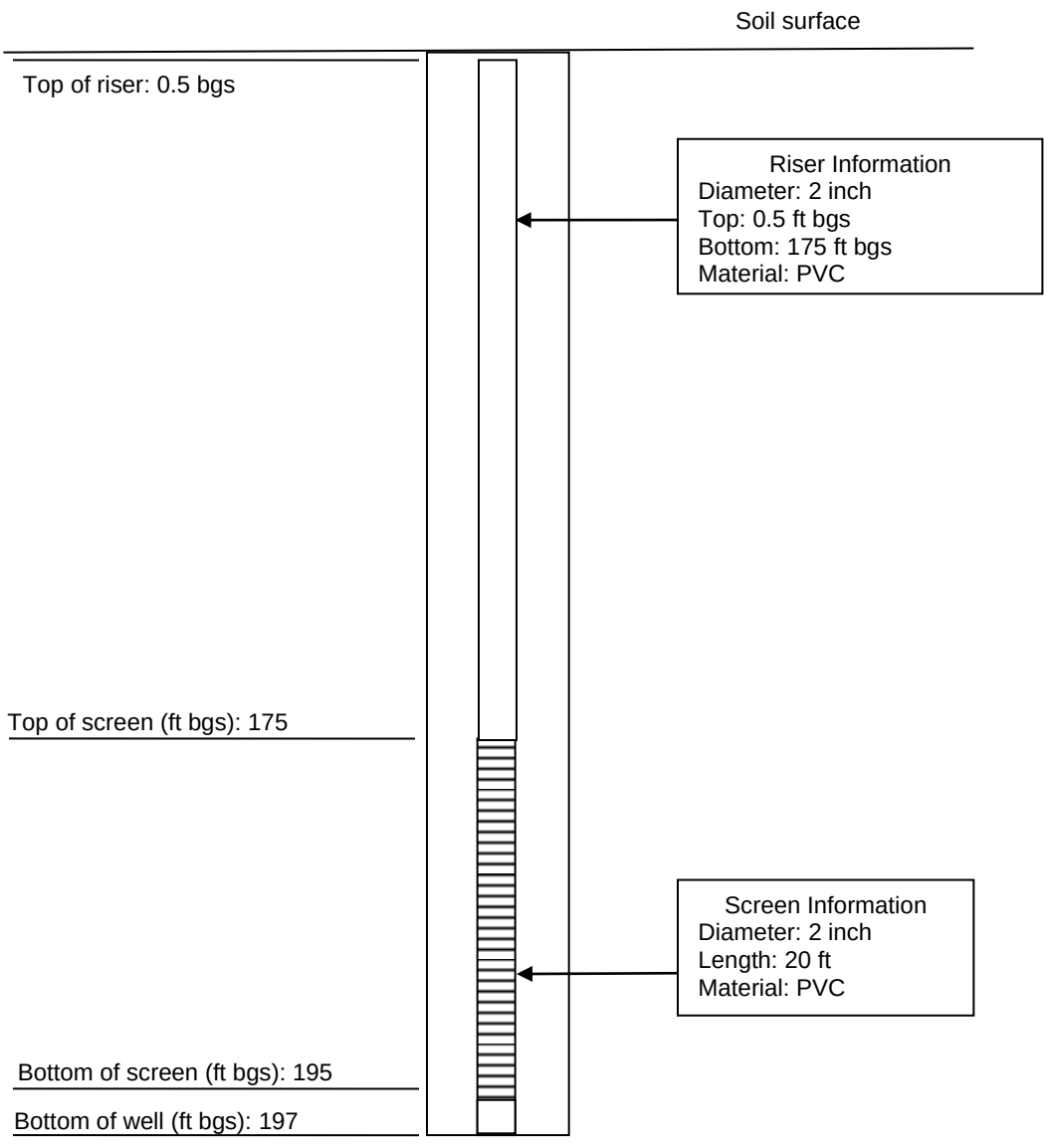


Note: All features not to scale

ags – Above Ground Surface
bgs – Below Ground Surface
ft – Feet
PVC – Polyvinyl Chloride

RECORD OF MONITORING WELL CONSTRUCTION

EA Engineering, Science, and Technology, Inc., PBC	Monitoring Well/Soil Boring ID No.: SFAASF-03
Project Title/ Project No.: Site Investigation for Per- and Polyfluoroalkyl Substances, Santa Fe Army Aviation Support Facility (AASF) (634250383)	Date/Time Installed: 05/7/2022 at 1400 Time Finished: 05/11/2022 at 1130
Location: Eastern facility boundary, east of current AASF	Depth to Water: 184.95 ft bgs
Site Geologist: Sindy Lauricella	Drilling Method: Sonic

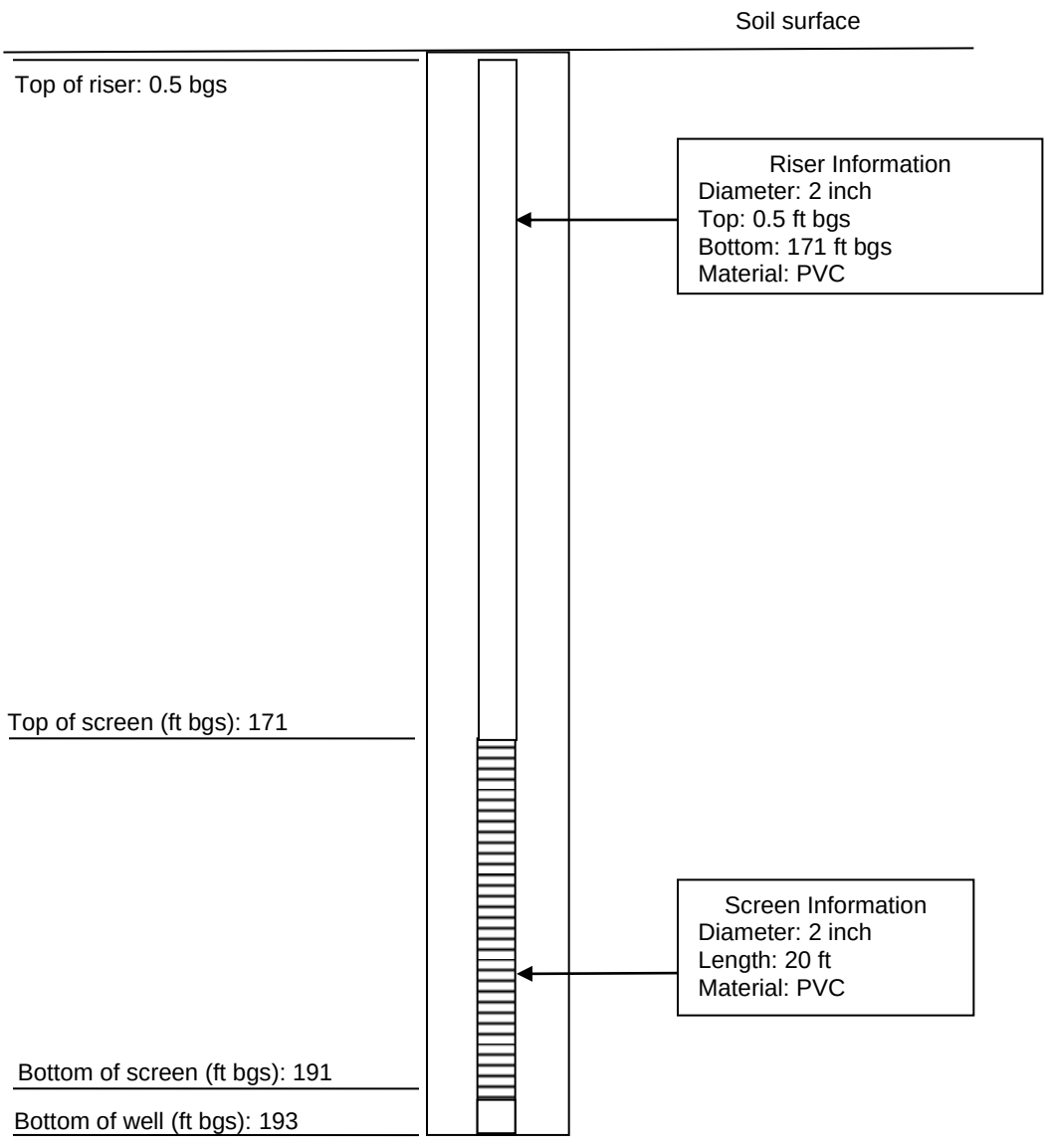


Note: All features not to scale

ags – Above Ground Surface
bgs – Below Ground Surface
ft – Feet
PVC – Polyvinyl Chloride

RECORD OF MONITORING WELL CONSTRUCTION

EA Engineering, Science, and Technology, Inc., PBC	Monitoring Well/Soil Boring ID No.: SFAASF-04
Project Title/ Project No.: Site Investigation for Per- and Polyfluoroalkyl Substances, Santa Fe Army Aviation Support Facility (634250383)	Date/Time Installed: 04/28/2022 at 1645 Time Finished: 05/9/2022 at 1000
Location: Eastern facility boundary, east of tarmac	Depth to Water: 181.00 ft bgs
Site Geologist: Sindy Lauricella	Drilling Method: Sonic



Note: All features not to scale

ags – Above Ground Surface
bgs – Below Ground Surface
ft – Feet
PVC – Polyvinyl Chloride

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Appendix F

Analytical Results

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	Location ID	AOI01-01				AOI01-02				AOI01-02				AOI01-04				PW-01				SFAASF-03				SFAASF-04			
	Sample Name	AOI01-01-GW				AOI01-02-GW				AOI01-02-GW-DUP				AOI01-04-GW				SFAASF-PW-01				SFAASF-03-GW				SFAASF-04-GW			
	Parent Sample ID									AOI01-02-GW-05202022																			
	Sample Date	5/20/2022				5/20/2022				5/20/2022				5/20/2022				10/14/2021				5/19/2022				5/19/2022			
Analyte[1]	Screening Level[1]	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (ng/L)																													
4:2 Fluorotelomer sulfonate	--	<	0.87	1.7	U	<	0.85	1.7	U	<	0.85	1.7	U	<	0.89	1.8	U	<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U
6:2 Fluorotelomer sulfonate	--	<	3.5	4.4	U	<	3.4	4.2	U	<	3.4	4.2	U	35	3.6	4.4		<	3.5	4.4	U	<	3.4	4.3	U	<	3.3	4.1	U
8:2 Fluorotelomer sulfonate	--	<	1.7	2.6	U	<	1.7	2.5	U	<	1.7	2.5	U	<	1.8	2.7	U	<	1.8	2.6	U	<	1.7	2.6	U	<	1.6	2.5	U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	<	0.87	2.6	U	<	0.85	2.5	U	<	0.85	2.5	U	<	0.89	2.7	U	<	0.88	2.6	U	<	0.86	2.6	U	<	0.82	2.5	U
N-methyl perfluorooctanesulfonamidoacetic acid	--	<	1	1.7	U	<	1	1.7	U	<	1	1.7	U	<	1.1	1.8	U	<	1.1	1.8	U	<	1	1.7	U	<	0.98	1.6	U
Perfluorobutanesulfonic acid (PFBS)	601	<	0.87	1.7	U	120	0.85	1.7		130	0.85	1.7		30	0.89	1.8		0.62	0.88	1.8	J	<	0.86	1.7	U	<	0.82	1.6	U
Perfluorobutanoic acid	--	<	3.5	4.4	U	40	3.4	4.2		40	3.4	4.2		130	3.6	4.4		<	3.5	4.4	U	<	3.4	4.3	U	<	3.3	4.1	U
Perfluorodecanesulfonic acid	--	<	0.87	1.7	U	<	0.85	1.7	U	<	0.85	1.7	U	<	0.89	1.8	U	<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U
Perfluorodecanoic acid	--	<	0.87	1.7	U	<	0.85	1.7	U	<	0.85	1.7	U	<	0.89	1.8	U	<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U
Perfluorododecanoic acid	--	<	0.87	1.7	U	<	0.85	1.7	U	<	0.85	1.7	U	<	0.89	1.8	U	<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U
Perfluoroheptanesulfonic acid	--	<	0.87	1.7	U	<	0.85	1.7	U	<	0.85	1.7	U	<	0.89	1.8	U	<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U
Perfluoroheptanoic acid	--	<	0.87	1.7	U	15	0.85	1.7		14	0.85	1.7		200	8.9	18		0.49	0.88	1.8	J	<	0.86	1.7	U	<	0.82	1.6	U
Perfluorohexanesulfonic acid (PFHxS)	39	<	0.87	1.7	U	72	0.85	1.7		74	0.85	1.7		230	0.89	1.8		<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U
Perfluorohexanoic acid	--	<	0.87	1.7	U	130	0.85	1.7		120	0.85	1.7		330	8.9	18		<	0.88	1.8	U	0.84	0.86	1.7	J	0.6	0.82	1.6	J
Perfluorononanesulfonic acid	--	<	0.87	1.7	U	<	0.85	1.7	U	<	0.85	1.7	U	<	0.89	1.8	U	<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U
Perfluorononanoic acid (PFNA)	6	<	0.87	1.7	U	<	0.85	1.7	U	<	0.85	1.7	U	<	0.89	1.8	U	<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U
Perfluorooctanesulfonamide	--	0.48	0.87	1.7	J	0.98	0.85	1.7	J	<	0.85	1.7	U	<	0.89	1.8	U	1.8	0.88	1.8		<	0.86	1.7	U	<	0.82	1.6	U
Perfluorooctanesulfonic acid (PFOS)	4	<	0.87	1.7	U	<	0.85	1.7	U	<	0.85	1.7	U	<	1.8	1.8	U	0.48	0.88	1.8	J	<	1.7	1.7	U	<	0.82	1.6	U
Perfluorooctanoic acid (PFOA)	6	<	0.87	1.7	U	2.5	0.85	1.7		2.3	0.85	1.7	J+	38	0.89	1.8		0.56	0.88	1.8	J	<	0.86	1.7	U	<	0.82	1.6	U
Perfluoropentanesulfonic acid	--	<	0.87	1.7	U	60	0.85	1.7		61	0.85	1.7		25	0.89	1.8		<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U
Perfluoropentanoic acid	--	<	0.87	1.7	U	87	0.85	1.7		90	0.85	1.7		300	0.89	1.8		<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U
Perfluorotetradecanoic acid	--	<	0.87	1.7	U	<	0.85	1.7	U	<	0.85	1.7	U	<	0.89	1.8	UJ	<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U
AOI = Area of Interest.	--	<	0.87	1.7	U	<	0.85	1.7	U	<	0.85	1.7	U	<	0.89	1.8	U	<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U
mm = Millimeter(s).	--	<	0.87	1.7	U	<	0.85	1.7	U	<	0.85	1.7	U	<	0.89	1.8	U	<	0.88	1.8	U	<	0.86	1.7	U	<	0.82	1.6	U

µm = Micrometer(s).
ft = Foot (feet).
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
% = Percent passing.
J+ = Estimated concentration, biased high.
Values exceeding the Screening Level are shaded gray.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
ng/L = Nanogram(s) per liter.
Qual = Qualifier.
< = Analyte not detected above the LOD.
-- = No screening level available.

	Location ID	AOI01-01				AOI01-02				AOI01-02				AOI01-03			
	Sample Name	AOI01-01-SB-0-2				AOI01-02-SB-0-2				AOI01-02-SB-0-2-D				AOI01-03-SB-0-2			
	Parent Sample ID									AOI01-02-SB-0-2							
	Sample Date	2/8/2022				2/8/2022				2/8/2022				2/7/2022			
	Depth (ft bgs)	0-2				0-2				0-2				0-2			
Analyte[1]	**Screening Level[1]**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
4:2 Fluorotelomer sulfonate	--	<	1.6	2	U	<	1.7	2.2	U	<	1.9	2.3	U	<	1.8	2.2	U
6:2 Fluorotelomer sulfonate	--	<	1.6	2	U	<	1.7	2.2	U	<	1.9	2.3	U	<	1.8	2.2	U
8:2 Fluorotelomer sulfonate	--	<	1.6	3.1	U	<	1.7	3.3	U	<	1.9	3.5	U	<	1.8	3.4	U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	<	0.41	2	UJ	<	0.43	2.2	U	<	0.46	2.3	UJ	<	0.45	2.2	U
N-methyl perfluorooctanesulfonamidoacetic acid	--	<	0.41	2	UJ	<	0.43	2.2	UJ	<	0.46	2.3	UJ	<	0.45	2.2	U
Perfluorobutanesulfonic acid (PFBS)	1900	<	1.6	2	U	<	1.7	2.2	U	<	1.9	2.3	U	<	1.8	2.2	U
Perfluorobutanoic acid	--	<	1.6	2	U	<	1.7	2.2	U	<	1.9	2.3	U	<	1.8	2.2	U
Perfluorodecanesulfonic acid	--	<	0.41	0.61	U	0.33	0.43	0.65	J	<	0.46	0.7	U	<	0.45	0.67	U
Perfluorodecanoic acid	--	<	0.41	0.61	U	0.34	0.43	0.65	J	<	0.46	0.7	U	<	0.45	0.67	U
Perfluorododecanoic acid	--	<	0.41	0.61	U	<	0.43	0.65	U	<	0.46	0.7	U	<	0.45	0.67	U
Perfluoroheptanesulfonic acid	--	<	0.41	0.61	U	<	0.43	0.65	U	<	0.46	0.7	U	<	0.45	0.67	U
Perfluoroheptanoic acid	--	<	0.41	0.61	U	<	0.43	0.65	U	<	0.46	0.7	U	<	0.45	0.67	U
Perfluorohexanesulfonic acid (PFHxS)	130	0.41	0.41	0.61	J	0.5	0.43	0.65	J	0.96	0.46	0.7		1.4	0.45	0.67	
Perfluorohexanoic acid	--	0.25	0.41	0.61	J	<	0.43	0.65	U	<	0.46	0.7	U	<	0.45	0.67	U
Perfluorononanesulfonic acid	--	<	0.41	0.61	U	<	0.43	0.65	U	<	0.46	0.7	U	<	0.45	0.67	U
Perfluorononanoic acid (PFNA)	19	<	0.41	0.61	U	0.32	0.43	0.65	J	0.51	0.46	0.7	J	<	0.45	0.67	U
Perfluorooctanesulfonamide	--	<	0.41	0.61	U	<	0.43	0.65	U	<	0.46	0.7	U	<	0.45	0.67	U
Perfluorooctanesulfonic acid (PFOS)	13	3.1	0.41	0.61		61	0.43	0.65		86	0.46	0.7		6.5	0.45	0.67	
Perfluorooctanoic acid (PFOA)	19	0.64	0.41	0.61		0.26	0.43	0.65	J	0.53	0.46	0.7	J	0.39	0.45	0.67	J
Perfluoropentanesulfonic acid	--	<	0.41	3.1	U	<	0.43	3.3	U	<	0.46	3.5	U	<	0.45	3.4	U
Perfluoropentanoic acid	--	<	0.41	0.61	U	<	0.43	0.65	U	<	0.46	0.7	U	<	0.45	0.67	U
AOI = Area of Interest.	--	<	0.41	0.61	U	<	0.43	0.65	U	<	0.46	0.7	U	<	0.45	0.67	U
mm = Millimeter(s).	--	<	0.41	0.61	U	<	0.43	0.65	U	<	0.46	0.7	U	<	0.45	0.67	U
µm = Micrometer(s).	--	<	0.41	0.61	U	<	0.43	0.65	U	<	0.46	0.7	U	<	0.45	0.67	U

ft = Foot (feet).
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
% = Percent passing.
J+ = Estimated concentration, biased high.
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
Associated numerical value is approximate.
Values exceeding the Screening Level are shaded gray.
ft bgs = Feet below ground surface.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
µg/kg = Microgram(s) per kilogram.
< = Analyte not detected above the LOD.
-- = No screening criteria available.

	Location ID	AOI01-04				AOI01-05				AOI01-06				AOI01-06B			
	Sample Name	AOI01-04-SB-0-2				AOI01-05-SB-0-2				AOI01-06-SB-0-2				AOI01-06B-SB-0-2			
	Parent Sample ID																
	Sample Date	2/7/2022				2/7/2022				2/7/2022				5/4/2022			
	Depth (ft bgs)	0-2				0-2				0-2				0-2			
Analyte[1]	**Screening Level[1]**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
4:2 Fluorotelomer sulfonate	--	<	1.7	2.1	U	<	1.7	2.2	U	<	1.7	2.1	U	<	1.8	2.2	U
6:2 Fluorotelomer sulfonate	--	<	1.7	2.1	U	<	1.7	2.2	U	<	1.7	2.1	U	<	1.8	2.2	U
8:2 Fluorotelomer sulfonate	--	<	1.7	3.2	U	<	1.7	3.3	U	<	1.7	3.1	U	<	1.8	3.3	U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	<	0.42	2.1	UJ	<	0.43	2.2	U	<	0.42	2.1	U	<	0.44	2.2	U
N-methyl perfluorooctanesulfonamidoacetic acid	--	<	0.42	2.1	UJ	<	0.43	2.2	U	<	0.42	2.1	U	<	0.44	2.2	U
Perfluorobutanesulfonic acid (PFBS)	1900	<	1.7	2.1	U	<	1.7	2.2	U	<	1.7	2.1	U	<	1.8	2.2	U
Perfluorobutanoic acid	--	<	1.7	2.1	U	<	1.7	2.2	U	<	1.7	2.1	U	<	1.8	2.2	U
Perfluorodecanesulfonic acid	--	<	0.42	0.63	U	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
Perfluorodecanoic acid	--	<	0.42	0.63	U	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
Perfluorododecanoic acid	--	<	0.42	0.63	U	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
Perfluoroheptanesulfonic acid	--	<	0.42	0.63	U	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
Perfluoroheptanoic acid	--	<	0.42	0.63	U	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
Perfluorohexanesulfonic acid (PFHxS)	130	0.64	0.42	0.63		<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
Perfluorohexanoic acid	--	0.32	0.42	0.63	J	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
Perfluorononanesulfonic acid	--	<	0.42	0.63	U	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
Perfluorononanoic acid (PFNA)	19	<	0.42	0.63	U	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
Perfluorooctanesulfonamide	--	<	0.42	0.63	U	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
Perfluorooctanesulfonic acid (PFOS)	13	3.6	0.42	0.63		<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
Perfluorooctanoic acid (PFOA)	19	0.36	0.42	0.63	J	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
Perfluoropentanesulfonic acid	--	<	0.42	3.2	U	<	0.43	3.3	U	<	0.42	3.1	U	<	0.44	3.3	U
Perfluoropentanoic acid	--	<	0.42	0.63	U	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
AOI = Area of Interest.	--	<	0.42	0.63	U	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
mm = Millimeter(s).	--	<	0.42	0.63	U	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U
µm = Micrometer(s).	--	<	0.42	0.63	U	<	0.43	0.65	U	<	0.42	0.63	U	<	0.44	0.66	U

ft = Foot (feet).
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
% = Percent passing.
J+ = Estimated concentration, biased high.
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
Associated numerical value is approximate.
Values exceeding the Screening Level are shaded gray.
ft bgs = Feet below ground surface.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
µg/kg = Microgram(s) per kilogram.
< = Analyte not detected above the LOD.
-- = No screening criteria available.

Location ID		AOI01-07				AOI01-08				AOI01-09				SFAASF-01			
Sample Name		AOI01-07-SB-0-2				AOI01-08-SB-0-2				AOI-01-09-SB-0-2				SFAASF-01-SB-0-2			
Parent Sample ID																	
Sample Date		2/8/2022				2/8/2022				5/9/2022				2/8/2022			
Depth (ft bgs)		0-2				0-2				0-2				0-2			
Analyte[1]	**Screening Level[1]**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
4:2 Fluorotelomer sulfonate	--	<	1.8	2.2	U	<	1.9	2.4	U	<	1.5	1.9	U	<	1.8	2.2	U
6:2 Fluorotelomer sulfonate	--	<	1.8	2.2	U	<	1.9	2.4	U	<	1.5	1.9	U	<	1.8	2.2	U
8:2 Fluorotelomer sulfonate	--	<	1.8	3.3	U	<	1.9	3.5	U	<	1.5	2.8	U	<	1.8	3.3	U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	<	0.44	2.2	UJ	<	0.47	2.4	UJ	0.55	0.38	1.9	J+	7.6	0.44	2.2	
N-methyl perfluorooctanesulfonamidoacetic acid	--	<	0.44	2.2	UJ	<	0.47	2.4	UJ	<	0.38	1.9	U	0.93	0.44	2.2	J+
Perfluorobutanesulfonic acid (PFBS)	1900	<	1.8	2.2	U	<	1.9	2.4	U	<	1.5	1.9	U	<	1.8	2.2	U
Perfluorobutanoic acid	--	<	1.8	2.2	U	<	1.9	2.4	U	<	1.5	1.9	U	<	1.8	2.2	U
Perfluorodecanesulfonic acid	--	0.72	0.44	0.66		<	0.47	0.71	U	0.37	0.38	0.57	J	11	0.44	0.67	
Perfluorodecanoic acid	--	2.1	0.44	0.66		<	0.47	0.71	U	1.4	0.38	0.57		4.8	0.44	0.67	
Perfluorododecanoic acid	--	<	0.44	0.66	U	<	0.47	0.71	U	0.54	0.38	0.57	J	2	0.44	0.67	
Perfluoroheptanesulfonic acid	--	2	0.44	0.66		<	0.47	0.71	U	<	0.38	0.57	U	0.45	0.44	0.67	J
Perfluoroheptanoic acid	--	0.43	0.44	0.66	J	<	0.47	0.71	U	<	0.38	0.57	U	7.8	0.44	0.67	
Perfluorohexanesulfonic acid (PFHxS)	130	8.3	0.44	0.66		<	0.47	0.71	J	<	0.38	0.57	U	2.7	0.44	0.67	
Perfluorohexanoic acid	--	0.73	0.44	0.66		<	0.47	0.71	U	<	0.38	0.57	U	1.2	0.44	0.67	
Perfluorononanesulfonic acid	--	1.4	0.44	0.66		<	0.47	0.71	U	<	0.38	0.57	U	<	0.44	0.67	U
Perfluorononanoic acid (PFNA)	19	3.8	0.44	0.66		<	0.47	0.71	U	0.4	0.38	0.57	J	1.8	0.44	0.67	
Perfluorooctanesulfonamide	--	1.2	0.44	0.66		<	0.47	0.71	U	<	0.38	0.57	U	1.3	0.44	0.67	
Perfluorooctanesulfonic acid (PFOS)	13	920	4.4	6.6		21	0.47	0.71		7.5	0.38	0.57		42	0.44	0.67	
Perfluorooctanoic acid (PFOA)	19	1.2	0.44	0.66		0.47	0.47	0.71	J	0.68	0.38	0.57		19	0.44	0.67	
Perfluoropentanesulfonic acid	--	0.3	0.44	3.3	J	<	0.47	3.5	U	<	0.38	2.8	U	0.45	0.44	3.3	J
Perfluoropentanoic acid	--	0.48	0.44	0.66	J	<	0.47	0.71	U	<	0.38	0.57	U	0.52	0.44	0.67	J
AOI = Area of Interest.	--	<	0.44	0.66	U	<	0.47	0.71	U	<	0.38	0.57	U	0.6	0.44	0.67	J
mm = Millimeter(s).	--	<	0.44	0.66	U	<	0.47	0.71	U	<	0.38	0.57	U	0.27	0.44	0.67	J
µm = Micrometer(s).	--	0.56	0.44	0.66	J	<	0.47	0.71	U	0.27	0.38	0.57	J	0.81	0.44	0.67	

ft = Foot (feet).
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
% = Percent passing.
J+ = Estimated concentration, biased high.
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
Associated numerical value is approximate.
Values exceeding the Screening Level are shaded gray.
ft bgs = Feet below ground surface.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
µg/kg = Microgram(s) per kilogram.
< = Analyte not detected above the LOD.
-- = No screening criteria available.

	Location ID	SFAASF-02				SFAASF-02				SFAASF-03-PA			
	Sample Name	SFAASF-02-SB-0-2				SFAASF-02-SB-0-2-D				SFAASF-03-PA-SB-0-2			
	Parent Sample ID					SFAASF-02-SB-0-2							
	Sample Date	2/8/2022				2/8/2022				2/7/2022			
	Depth (ft bgs)	0-2				0-2				0-2			
Analyte[1]	Screening Level[1]	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)													
4:2 Fluorotelomer sulfonate	--	<	1.7	2.2	U	<	1.8	2.2	U	<	1.7	2.2	U
6:2 Fluorotelomer sulfonate	--	<	1.7	2.2	U	<	1.8	2.2	U	<	1.7	2.2	U
8:2 Fluorotelomer sulfonate	--	<	1.7	3.2	U	<	1.8	3.3	U	<	1.7	3.2	U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	12	0.43	2.2		9.8	0.44	2.2		<	0.43	2.2	UJ
N-methyl perfluorooctanesulfonamidoacetic acid	--	1.4	0.43	2.2	J	1.1	0.44	2.2	J+	<	0.43	2.2	UJ
Perfluorobutanesulfonic acid (PFBS)	1900	0.58	1.7	2.2	J	0.59	1.8	2.2	J	<	1.7	2.2	U
Perfluorobutanoic acid	--	<	1.7	2.2	U	<	1.8	2.2	U	<	1.7	2.2	U
Perfluorodecanesulfonic acid	--	13	0.43	0.65		9.5	0.44	0.67		<	0.43	0.65	U
Perfluorodecanoic acid	--	6.1	0.43	0.65		5.4	0.44	0.67		0.22	0.43	0.65	J
Perfluorododecanoic acid	--	2.3	0.43	0.65		2.1	0.44	0.67		<	0.43	0.65	U
Perfluoroheptanesulfonic acid	--	0.82	0.43	0.65		0.73	0.44	0.67		<	0.43	0.65	U
Perfluoroheptanoic acid	--	8.2	0.43	0.65		9.1	0.44	0.67		<	0.43	0.65	U
Perfluorohexanesulfonic acid (PFHxS)	130	4.5	0.43	0.65		4.7	0.44	0.67		<	0.43	0.65	U
Perfluorohexanoic acid	--	3.8	0.43	0.65		3.9	0.44	0.67		0.45	0.43	0.65	J
Perfluorononanesulfonic acid	--	<	0.43	0.65	U	<	0.44	0.67	U	<	0.43	0.65	U
Perfluorononanoic acid (PFNA)	19	2.9	0.43	0.65		2.9	0.44	0.67		<	0.43	0.65	U
Perfluorooctanesulfonamide	--	2.3	0.43	0.65		1.7	0.44	0.67		<	0.43	0.65	U
Perfluorooctanesulfonic acid (PFOS)	13	60	0.43	0.65		49	0.44	0.67		0.48	0.43	0.65	J
Perfluorooctanoic acid (PFOA)	19	30	0.43	0.65		33	0.44	0.67		0.53	0.43	0.65	J
Perfluoropentanesulfonic acid	--	0.64	0.43	3.2	J	0.74	0.44	3.3	J	<	0.43	3.2	U
Perfluoropentanoic acid	--	1.9	0.43	0.65		1.9	0.44	0.67		0.29	0.43	0.65	J
AOI = Area of Interest.	--	0.68	0.43	0.65		0.6	0.44	0.67	J	<	0.43	0.65	U
mm = Millimeter(s).	--	0.26	0.43	0.65	J	0.22	0.44	0.67	J	<	0.43	0.65	U
µm = Micrometer(s).	--	1.1	0.43	0.65		0.87	0.44	0.67		<	0.43	0.65	U

ft = Foot (feet).
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
% = Percent passing.
J+ = Estimated concentration, biased high.
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
Associated numerical value is approximate.
Values exceeding the Screening Level are shaded gray.
ft bgs = Feet below ground surface.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
µg/kg = Microgram(s) per kilogram.
< = Analyte not detected above the LOD.
-- = No screening criteria available.

	Location ID	SFAASF-03				SFAASF-04				SFAASF-05			
	Sample Name	SFAASF-03-SB-0-2				SFAASF-04-SB-0-2				SFAASF-05-SB-0-2			
	Parent Sample ID												
	Sample Date	5/7/2022				2/7/2022				2/7/2022			
	Depth (ft bgs)	0-2				0-2				0-2			
Analyte[1]	**Screening Level[1]**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)													
4:2 Fluorotelomer sulfonate	--	<	1.7	2.2	U	<	1.7	2.1	U	<	1.7	2.1	U
6:2 Fluorotelomer sulfonate	--	<	1.7	2.2	U	<	1.7	2.1	U	<	1.7	2.1	U
8:2 Fluorotelomer sulfonate	--	<	1.7	3.2	U	<	1.7	3.2	U	<	1.7	3.1	U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	<	0.43	2.2	UJ	<	0.43	2.1	UJ	0.48	0.42	2.1	J+
N-methyl perfluorooctanesulfonamidoacetic acid	--	<	0.43	2.2	UJ	<	0.43	2.1	UJ	<	0.42	2.1	UJ
Perfluorobutanesulfonic acid (PFBS)	1900	<	1.7	2.2	U	<	1.7	2.1	U	<	1.7	2.1	U
Perfluorobutanoic acid	--	<	1.7	2.2	U	<	1.7	2.1	U	<	1.7	2.1	U
Perfluorodecanesulfonic acid	--	<	0.43	0.65	U	0.37	0.43	0.64	J	0.28	0.42	0.63	J
Perfluorodecanoic acid	--	<	0.43	0.65	U	0.47	0.43	0.64	J	0.27	0.42	0.63	J
Perfluorododecanoic acid	--	<	0.43	0.65	U	0.22	0.43	0.64	J	<	0.42	0.63	U
Perfluoroheptanesulfonic acid	--	<	0.43	0.65	U	<	0.43	0.64	U	<	0.42	0.63	U
Perfluoroheptanoic acid	--	<	0.43	0.65	U	0.47	0.43	0.64	J	0.33	0.42	0.63	J
Perfluorohexanesulfonic acid (PFHxS)	130	<	0.43	0.65	U	<	0.43	0.64	U	<	0.42	0.63	U
Perfluorohexanoic acid	--	<	0.43	0.65	U	0.48	0.43	0.64	J	0.43	0.42	0.63	J
Perfluorononanesulfonic acid	--	<	0.43	0.65	U	<	0.43	0.64	U	<	0.42	0.63	U
Perfluorononanoic acid (PFNA)	19	<	0.43	0.65	U	<	0.43	0.64	U	<	0.42	0.63	U
Perfluorooctanesulfonamide	--	<	0.43	0.65	U	<	0.43	0.64	U	<	0.42	0.63	U
Perfluorooctanesulfonic acid (PFOS)	13	<	0.43	0.65	U	0.94	0.43	0.64		0.93	0.42	0.63	
Perfluorooctanoic acid (PFOA)	19	<	0.43	0.65	U	0.6	0.43	0.64	J	0.96	0.42	0.63	
Perfluoropentanesulfonic acid	--	<	0.43	3.2	U	<	0.43	3.2	U	<	0.42	3.1	U
Perfluoropentanoic acid	--	<	0.43	0.65	U	0.23	0.43	0.64	J	0.24	0.42	0.63	J
AOI = Area of Interest.	--	<	0.43	0.65	U	<	0.43	0.64	U	<	0.42	0.63	U
mm = Millimeter(s).	--	<	0.43	0.65	U	<	0.43	0.64	U	<	0.42	0.63	U
µm = Micrometer(s).	--	<	0.43	0.65	U	<	0.43	0.64	U	<	0.42	0.63	U

ft = Foot (feet).
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
% = Percent passing.
J+ = Estimated concentration, biased high.
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
Associated numerical value is approximate.
Values exceeding the Screening Level are shaded gray.
ft bgs = Feet below ground surface.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
µg/kg = Microgram(s) per kilogram.
< = Analyte not detected above the LOD.
-- = No screening criteria available.

	Location ID	AOI01-01				AOI01-02				AOI01-03				AOI01-03			
	Sample Name	AOI01-01-SB-13-15				AOI01-02-SB-13-15				AOI01-03-SB-13-15				AOI01-03-SB-6-8			
	Parent Sample ID																
	Sample Date	4/25/2022				4/27/2022				5/4/2022				5/4/2022			
	Depth (ft bgs)	13-15				13-15				13-15				6-8			
Analyte	**Screening Level[1,2]**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
4:2 Fluorotelomer sulfonate	--	<	1.7	2.1	U	<	1.7	2.2	U	<	1.6	2	U	<	1.6	2	U
6:2 Fluorotelomer sulfonate	--	<	1.7	2.1	U	<	1.7	2.2	U	<	1.6	2	U	<	1.6	2	U
8:2 Fluorotelomer sulfonate	--	<	1.7	3.1	U	<	1.7	3.3	U	<	1.6	3	U	<	1.6	3.1	U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	<	0.41	2.1	U	<	0.43	2.2	U	<	0.4	2	U	<	0.41	2	U
N-methyl perfluorooctanesulfonamidoacetic acid	--	<	0.41	2.1	U	<	0.43	2.2	U	<	0.4	2	U	<	0.41	2	U
Perfluorobutanesulfonic acid (PFBS)	25000	<	1.7	2.1	U	<	1.7	2.2	U	<	1.6	2	U	<	1.6	2	U
Perfluorobutanoic acid	--	<	1.7	2.1	U	<	1.7	2.2	U	<	1.6	2	U	<	1.6	2	U
Perfluorodecanesulfonic acid	--	<	0.41	0.62	U	<	0.43	0.65	U	<	0.4	0.59	U	<	0.41	0.61	U
Perfluorodecanoic acid	--	<	0.41	0.62	U	<	0.43	0.65	U	<	0.4	0.59	U	<	0.41	0.61	U
Perfluorododecanoic acid	--	<	0.41	0.62	U	<	0.43	0.65	U	<	0.4	0.59	U	<	0.41	0.61	U
Perfluoroheptanesulfonic acid	--	<	0.41	0.62	U	0.48	0.43	0.65	J	<	0.4	0.59	U	<	0.41	0.61	U
Perfluoroheptanoic acid	--	<	0.41	0.62	U	<	0.43	0.65	U	<	0.4	0.59	U	<	0.41	0.61	U
Perfluorohexanesulfonic acid (PFHxS)	1600	<	0.41	0.62	U	3	0.43	0.65		0.27	0.4	0.59	J	0.23	0.41	0.61	J
Perfluorohexanoic acid	--	<	0.41	0.62	U	<	0.43	0.65	U	<	0.4	0.59	U	<	0.41	0.61	U
Perfluorononanesulfonic acid	--	<	0.41	0.62	U	<	0.43	0.65	U	<	0.4	0.59	U	<	0.41	0.61	U
Perfluorononanoic acid (PFNA)	250	<	0.41	0.62	U	<	0.43	0.65	U	<	0.4	0.59	U	<	0.41	0.61	U
Perfluorooctanesulfonamide	--	<	0.41	0.62	U	<	0.43	0.65	U	<	0.4	0.59	U	<	0.41	0.61	U
Perfluorooctanesulfonic acid (PFOS)	160	<	0.41	0.62	U	1.2	0.43	0.65		5.9	0.4	0.59		0.66	0.41	0.61	
Perfluorooctanoic acid (PFOA)	250	<	0.41	0.62	U	0.59	0.43	0.65	J	<	0.4	0.59	U	<	0.41	0.61	U
Perfluoropentanesulfonic acid	--	<	0.41	3.1	U	<	0.43	3.3	U	<	0.4	3	U	<	0.41	3.1	U
Perfluoropentanoic acid	--	<	0.41	0.62	U	<	0.43	0.65	U	<	0.4	0.59	U	<	0.41	0.61	U
AOI = Area of Interest.	--	<	0.41	0.62	U	<	0.43	0.65	U	<	0.4	0.59	U	<	0.41	0.61	U
mm = Millimeter(s).	--	<	0.41	0.62	U	<	0.43	0.65	U	<	0.4	0.59	U	<	0.41	0.61	U
µm = Micrometer(s).	--	<	0.41	0.62	U	<	0.43	0.65	U	<	0.4	0.59	U	<	0.41	0.61	U

ft = Foot (feet).
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
% = Percent passing.
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
Associated numerical value is approximate.
Values exceeding the Screening Level are shaded gray.
ft bgs = Feet below ground surface.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
µg/kg = Microgram(s) per kilogram.
< = Analyte not detected above the LOD.
-- = No screening criteria available.

	Location ID	AOI01-04				AOI01-05				AOI01-05				AOI01-06B			
	Sample Name	AOI01-04-SB-13-15				AOI01-05-SB-13-15				AOI01-05-SB-6-8				AOI01-06B-SB-13-15			
	Parent Sample ID																
	Sample Date	5/3/2022				5/4/2022				5/4/2022				5/4/2022			
	Depth (ft bgs)	13-15				13-15				6-8				13-15			
Analyte	**Screening Level[1,2]**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
4:2 Fluorotelomer sulfonate	--	<	1.8	2.3	U	<	1.8	2.2	U	<	1.7	2.2	U	<	1.5	1.9	U
6:2 Fluorotelomer sulfonate	--	<	1.8	2.3	U	<	1.8	2.2	U	<	1.7	2.2	U	<	1.5	1.9	U
8:2 Fluorotelomer sulfonate	--	<	1.8	3.4	U	<	1.8	3.4	U	<	1.7	3.2	U	<	1.5	2.9	U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	<	0.45	2.3	U	<	0.45	2.2	U	<	0.43	2.2	U	<	0.39	1.9	U
N-methyl perfluorooctanesulfonamidoacetic acid	--	<	0.45	2.3	U	<	0.45	2.2	U	<	0.43	2.2	U	<	0.39	1.9	U
Perfluorobutanesulfonic acid (PFBS)	25000	<	1.8	2.3	U	<	1.8	2.2	U	<	1.7	2.2	U	<	1.5	1.9	U
Perfluorobutanoic acid	--	<	1.8	2.3	U	<	1.8	2.2	U	<	1.7	2.2	U	<	1.5	1.9	U
Perfluorodecanesulfonic acid	--	0.29	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
Perfluorodecanoic acid	--	0.3	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
Perfluorododecanoic acid	--	0.34	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
Perfluoroheptanesulfonic acid	--	0.33	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
Perfluoroheptanoic acid	--	0.4	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
Perfluorohexanesulfonic acid (PFHxS)	1600	1.2	0.45	0.68		<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
Perfluorohexanoic acid	--	0.63	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
Perfluorononanesulfonic acid	--	0.28	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
Perfluorononanoic acid (PFNA)	250	0.37	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
Perfluorooctanesulfonamide	--	0.35	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
Perfluorooctanesulfonic acid (PFOS)	160	3.2	0.45	0.68		<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
Perfluorooctanoic acid (PFOA)	250	0.52	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
Perfluoropentanesulfonic acid	--	0.34	0.45	3.4	J	<	0.45	3.4	U	<	0.43	3.2	U	<	0.39	2.9	U
Perfluoropentanoic acid	--	0.33	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
AOI = Area of Interest.	--	0.33	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
mm = Millimeter(s).	--	0.3	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U
µm = Micrometer(s).	--	0.31	0.45	0.68	J	<	0.45	0.67	U	<	0.43	0.65	U	<	0.39	0.58	U

ft = Foot (feet).
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
% = Percent passing.
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
Associated numerical value is approximate.
Values exceeding the Screening Level are shaded gray.
ft bgs = Feet below ground surface.
LOD = Limit of Detection. µg/kg = Microgram(s) per kilogram.
LOQ = Limit of Quantitation. < = Analyte not detected above the LOD.
Qual = Qualifier. -- = No screening criteria available.

Location ID		AOI01-06B				AOI01-09				SFAASF-03-PA				SFAASF-04			
Sample Name		AOI01-06B-SB-6-8				AOI01-09-SB-13-15				SFAASF-03-PA-SB-13-15				SFAASF-04-SB-13-15			
Parent Sample ID																	
Sample Date		5/4/2022				5/5/2022				5/1/2022				4/28/2022			
Depth (ft bgs)		6-8				13-15				13-15				13-15			
Analyte	**Screening Level[1,2]**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																	
4:2 Fluorotelomer sulfonate	--	<	1.5	1.9	U	<	1.6	2.1	U	<	1.5	1.8	U	<	1.6	2	U
6:2 Fluorotelomer sulfonate	--	<	1.5	1.9	U	<	1.6	2.1	U	<	1.5	1.8	U	<	1.6	2	U
8:2 Fluorotelomer sulfonate	--	<	1.5	2.8	U	<	1.6	3.1	U	<	1.5	2.8	U	<	1.6	2.9	U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	<	0.38	1.9	U	<	0.41	2.1	U	<	0.37	1.8	U	<	0.39	2	U
N-methyl perfluorooctanesulfonamidoacetic acid	--	<	0.38	1.9	U	<	0.41	2.1	U	<	0.37	1.8	U	<	0.39	2	U
Perfluorobutanesulfonic acid (PFBS)	25000	<	1.5	1.9	U	<	1.6	2.1	U	<	1.5	1.8	U	<	1.6	2	U
Perfluorobutanoic acid	--	<	1.5	1.9	U	<	1.6	2.1	U	<	1.5	1.8	U	<	1.6	2	U
Perfluorodecanesulfonic acid	--	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
Perfluorodecanoic acid	--	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
Perfluorododecanoic acid	--	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
Perfluoroheptanesulfonic acid	--	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
Perfluoroheptanoic acid	--	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
Perfluorohexanesulfonic acid (PFHxS)	1600	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
Perfluorohexanoic acid	--	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
Perfluorononanesulfonic acid	--	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
Perfluorononanoic acid (PFNA)	250	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
Perfluorooctanesulfonamide	--	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
Perfluorooctanesulfonic acid (PFOS)	160	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
Perfluorooctanoic acid (PFOA)	250	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
Perfluoropentanesulfonic acid	--	<	0.38	2.8	U	<	0.41	3.1	U	<	0.37	2.8	U	<	0.39	2.9	U
Perfluoropentanoic acid	--	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
AOI = Area of Interest.	--	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
mm = Millimeter(s).	--	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U
µm = Micrometer(s).	--	<	0.38	0.57	U	<	0.41	0.62	U	<	0.37	0.55	U	<	0.39	0.59	U

ft = Foot (feet).
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
% = Percent passing.
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
Associated numerical value is approximate.
Values exceeding the Screening Level are shaded gray.
ft bgs = Feet below ground surface.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
µg/kg = Microgram(s) per kilogram.
< = Analyte not detected above the LOD.
-- = No screening criteria available.

	Location ID	SFAASF-05				SFAASF-05				SFAASF-05			
	Sample Name	SFAASF-05-SB-13-15				SFAASF-05-SB-13-15-DUP				SFAASF-05-SB-6-8			
	Parent Sample ID					SFAASF-05-SB-13-15							
	Sample Date	5/4/2022				5/4/2022				5/4/2022			
	Depth (ft bgs)	13-15				13-15				6-8			
Analyte	**Screening Level[1,2]**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)													
4:2 Fluorotelomer sulfonate	--	<	1.5	1.8	U	<	1.5	1.9	U	<	1.7	2.1	U
6:2 Fluorotelomer sulfonate	--	<	1.5	1.8	U	<	1.5	1.9	U	<	1.7	2.1	U
8:2 Fluorotelomer sulfonate	--	<	1.5	2.8	U	<	1.5	2.9	U	<	1.7	3.1	U
N-ethyl perfluorooctanesulfonamidoacetic acid	--	<	0.37	1.8	U	<	0.39	1.9	U	<	0.41	2.1	UJ
N-methyl perfluorooctanesulfonamidoacetic acid	--	<	0.37	1.8	U	<	0.39	1.9	U	<	0.41	2.1	UJ
Perfluorobutanesulfonic acid (PFBS)	25000	<	1.5	1.8	U	<	1.5	1.9	U	<	1.7	2.1	U
Perfluorobutanoic acid	--	<	1.5	1.8	U	<	1.5	1.9	U	<	1.7	2.1	U
Perfluorodecanesulfonic acid	--	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
Perfluorodecanoic acid	--	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
Perfluorododecanoic acid	--	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
Perfluoroheptanesulfonic acid	--	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
Perfluoroheptanoic acid	--	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
Perfluorohexanesulfonic acid (PFHxS)	1600	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
Perfluorohexanoic acid	--	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
Perfluorononanesulfonic acid	--	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
Perfluorononanoic acid (PFNA)	250	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
Perfluorooctanesulfonamide	--	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
Perfluorooctanesulfonic acid (PFOS)	160	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
Perfluorooctanoic acid (PFOA)	250	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
Perfluoropentanesulfonic acid	--	<	0.37	2.8	U	<	0.39	2.9	U	<	0.41	3.1	U
Perfluoropentanoic acid	--	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
AOI = Area of Interest.	--	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
mm = Millimeter(s).	--	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U
µm = Micrometer(s).	--	<	0.37	0.55	U	<	0.39	0.58	U	<	0.41	0.62	U

ft = Foot (feet).
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
% = Percent passing.
UJ = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
Associated numerical value is approximate.
Values exceeding the Screening Level are shaded gray.
ft bgs = Feet below ground surface.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
µg/kg = Microgram(s) per kilogram.
< = Analyte not detected above the LOD.
-- = No screening criteria available.

Location ID	AOI01-01				AOI01-02				AOI01-02				AOI01-04				AOI01-04				AOI01-09				SFAASF-03-PA				SFAASF-04			
Sample Name	AOI01-01-SB-181-182				AOI01-02-SB-113-115				AOI01-02-SB-113-115-DUP				AOI01-04-SB-109-110				AOI01-04-SB-109-110-DUP				AOI01-09-SB-111-112				SFAASF-03-PA-SB-183-184				SFAASF-04-SB-180-181			
Parent Sample ID									AOI01-02-SB-113-115								AOI01-04-SB-109-110															
Sample Date	4/26/2022				4/28/2022				4/28/2022				5/4/2022				5/4/2022				5/6/2022				5/2/2022				4/30/2022			
Depth (ft bgs)	181-182				113-115				113-115				109-110				109-110				111-112				183-184				180-181			
Analyte[1]	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual	Result	LOD	LOQ	Qual
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																																
4:2 Fluorotelomer sulfonate	<	1.6	2	U	<	1.7	2.2	U	<	1.8	2.3	U	<	1.7	2.1	U	<	1.6	1.9	U	<	2.1	2.6	U	<	1.6	2	U	<	1.6	2	U
6:2 Fluorotelomer sulfonate	<	1.6	2	U	<	1.7	2.2	U	<	1.8	2.3	U	<	1.7	2.1	U	<	1.6	1.9	U	<	2.1	2.6	U	<	1.6	2	U	<	1.6	2	U
8:2 Fluorotelomer sulfonate	<	1.6	3	U	<	1.7	3.2	U	<	1.8	3.5	U	<	1.7	3.1	U	<	1.6	2.9	U	<	2.1	3.9	U	<	1.6	3	U	<	1.6	3	U
N-ethyl perfluorooctanesulfonamidoacetic acid	<	0.4	2	U	<	0.43	2.2	U	<	0.46	2.3	U	0.28	0.41	2.1	J	<	0.39	1.9	U	<	0.52	2.6	UJ	<	0.4	2	U	<	0.4	2	U
N-methyl perfluorooctanesulfonamidoacetic acid	<	0.4	2	U	<	0.43	2.2	U	<	0.46	2.3	U	<	0.41	2.1	UJ	<	0.39	1.9	U	<	0.52	2.6	UJ	<	0.4	2	U	<	0.4	2	U
Perfluorobutanesulfonic acid (PFBS)	<	1.6	2	U	<	1.7	2.2	U	<	1.8	2.3	U	<	1.7	2.1	U	<	1.6	1.9	U	<	2.1	2.6	U	<	1.6	2	U	<	1.6	2	U
Perfluorobutanoic acid	<	1.6	2	U	<	1.7	2.2	U	<	1.8	2.3	U	<	1.7	2.1	U	<	1.6	1.9	U	<	2.1	2.6	U	<	1.6	2	U	<	1.6	2	U
Perfluorodecanesulfonic acid	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.3	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
Perfluorodecanoic acid	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.3	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
Perfluorododecanoic acid	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.32	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
Perfluoroheptanesulfonic acid	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.34	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
Perfluoroheptanoic acid	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.44	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
Perfluorohexanesulfonic acid (PFHxS)	<	0.4	0.6	U	0.32	0.43	0.65	J	<	0.46	0.69	U	1.1	0.41	0.62	J	<	0.39	0.58	UJ	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
Perfluorohexanoic acid	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.7	0.41	0.62		<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
Perfluorononanesulfonic acid	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.28	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
Perfluorononanoic acid (PFNA)	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.32	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
Perfluorooctanesulfonamide (PFOSA)	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.34	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
Perfluorooctanesulfonic acid (PFOS)	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	2.2	0.41	0.62	J+	<	0.39	0.58	UJ	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
Perfluorooctanoic acid (PFOA)	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.48	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
Perfluoropentanesulfonic acid	<	0.4	3	U	<	0.43	3.2	U	<	0.46	3.5	U	0.38	0.41	3.1	J	<	0.39	2.9	U	<	0.52	3.9	U	<	0.4	3	U	<	0.4	3	U
Perfluoropentanoic acid	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.37	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
AOI = Area of Interest.	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.33	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
mm = Millimeter(s).	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.31	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U
µm = Micrometer(s).	<	0.4	0.6	U	<	0.43	0.65	U	<	0.46	0.69	U	0.3	0.41	0.62	J	<	0.39	0.58	U	<	0.52	0.78	U	<	0.4	0.6	U	<	0.4	0.6	U

ft = Foot (feet).
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
% = Percent passing.
ft bgs = Feet below ground surface.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
µg/kg = Microgram(s) per kilogram.
< = Analyte not detected above the LOD.

Location ID	AOI01-01				AOI01-02			
Sample Name	AOI01-01-SB-135-136				AOI01-02-SB-119-120			
Parent Sample ID								
Sample Date	4/25/2022				4/28/2022			
Depth (bgs ft)	135-136				119-120			
Analyte	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
Grain Size (D422) (%)								
Sieve, 50000 microns (50mm)	100	1	1		100	1	1	
Sieve, 37500 microns (37.5 mm)	100	1	1		100	1	1	
Sieve, 25000 microns (25mm)	100	1	1		100	1	1	
Sieve, 19000 microns (19mm)	100	1	1		100	1	1	
Sieve, 9510 microns (9.51mm)	100	1	1		100	1	1	
No. 4 sieve (4.75 mm)	100	1	1		98.4	1	1	
No. 10 sieve (2.00mm)	95.4	1	1		96.3	1	1	
No. 20 sieve(0.85mm)	91	1	1		90.6	1	1	
No. 40 sieve (0.425 mm)	84.8	1	1		82	1	1	
No. 60 sieve (0.25 mm)	79.9	1	1		75.1	1	1	
No. 80 sieve (0.177 mm)	76.9	1	1		61.6	1	1	
No. 100 sieve (0.15 mm)	75.3	1	1		59.2	1	1	
No. 200 sieve (0.075 mm)	69.5	1	1		48.1	1	1	
36.1um (Hydrometer)	23.4	1	1		17.1	1	1	
22.9um (Hydrometer)	20.6	1	1		12.7	1	1	
13.4um (Hydrometer)	16.4	1	1		9.8	1	1	
9.8um (Hydrometer)	15	1	1		9.8	1	1	
6.7um (Hydrometer)	12.2	1	1		6.9	1	1	
3.3um (Hydrometer)	9.4	1	1		6.9	1	1	
1.4um (Hydrometer)	9.4	1	1		6.9	1	1	

Notes:
AOI = Area of Interest.
mm = Millimeter(s).
µm = Micrometer(s).
ft = Foot (feet).
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
% = Percent passing.

Location ID	AOI01-03				AOI01-03				SFAASF-03-PA			
Sample Name	AOI01-03-SB-0-2				AOI01-03-SB-0-2-D				SFAASF-03-PA-SB-0-2			
Parent Sample ID					AOI01-03-SB-0-2							
Sample Date	2/7/2022				2/7/2022				2/7/2022			
Depth (bgs ft)	0-2				0-2				0-2			
Analyte	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**	**Result**	**LOD**	**LOQ**	**Qual**
pH (SW9045D) (SU)	8.9	0.01	0.01		8.8	0.01	0.01		8.7	0.01	0.01	
Temperature (SW9045D) (deg C)	19.9	0.01	0.01		19.9	0.01	0.01		20.7	0.01	0.01	
Total Organic Carbon (SW9060) (mg/kg)	2400	240	360		3300	220	330		4600	230	350	

Notes:
SU= Standard unit.
°C = Degrees Celsius.
mg/kg= Milligram(s) per kilogram.
ft = Foot (feet).
bgs = Below ground surface.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.

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Appendix G

Laboratory Reports

Due to file size, laboratory reports are provided electronically (CD) or can be requested.

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