FINAL
Preliminary Assessment Report
Santa Fe Army Aviation Support Facility
Santa Fe, New Mexico

Perfluorooctane-Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites
ARNG Installations, Nationwide

August 2020

Prepared for:

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

UNCLASSIFIED

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Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
AOI	Area of Interest
ARNG	Army National Guard
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and LiabilityAct
CFR	Code of Federal Regulations
CSM	conceptual site model
EBTAG	Española Basin Technical Advisory Group
EDR™	Environmental Data Resources, Inc.™
°F	degrees Fahrenheit
FTA	Fire Training Areas
GIS	Geographic Information System
HA	Health Advisory
NMARNG	New Mexico Army National Guard
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
SAF	Santa Fe Regional Airport
SI	Site Inspection
UCMR3	Unregulated Contaminant Monitoring Rule 3
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

Executive Summary

The Army National Guard (ARNG) is performing *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide*. A PA for per- and polyfluoroalkyl substances (PFAS)-containing materials was completed for the Santa Fe Army Aviation Support Facility (AASF; also referred to as the "facility") in Santa Fe, New Mexico, to identify areas of known or suspected releases known as Areas of Interest (AOIs) and possible exposure pathways to receptors. The PA included the following tasks:

- Reviewed available administrative record documents and Environmental Data Resources, Inc. (EDR)™ report packages to obtain information relevant to potential PFAS releases, such as: drinking water well locations, historical aerial photographs, Sanborn maps, and environmental compliance actions in the area surrounding the facility;
- Conducted a 1-day PA site visit on 01 October 2019 and completed visual site inspections at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed current AASF New Mexico ARNG (NMARNG) personnel during the site visit and NMARNG environmental managers and operations staff.
- Identified Area(s) of Interest (AOIs) and developed a preliminary conceptual site model (CSM) to summarize potential source-pathway-receptor linkages of potential PFAS in soil, groundwater, surface water, and sediment for each AOI.

During the PA, one AOI related to potential PFAS release was identified at Santa Fe AASF based on PA data. The AOI is shown on **Figure ES-1** and described in **Table ES-1** below:

Table ES-1: AOIs at Santa Fe AASF

Area of Interest	Name	Used by	Potential Release Dates
AOI	Former Fire Truck Bay	NMARNG	Through the mid-2000s

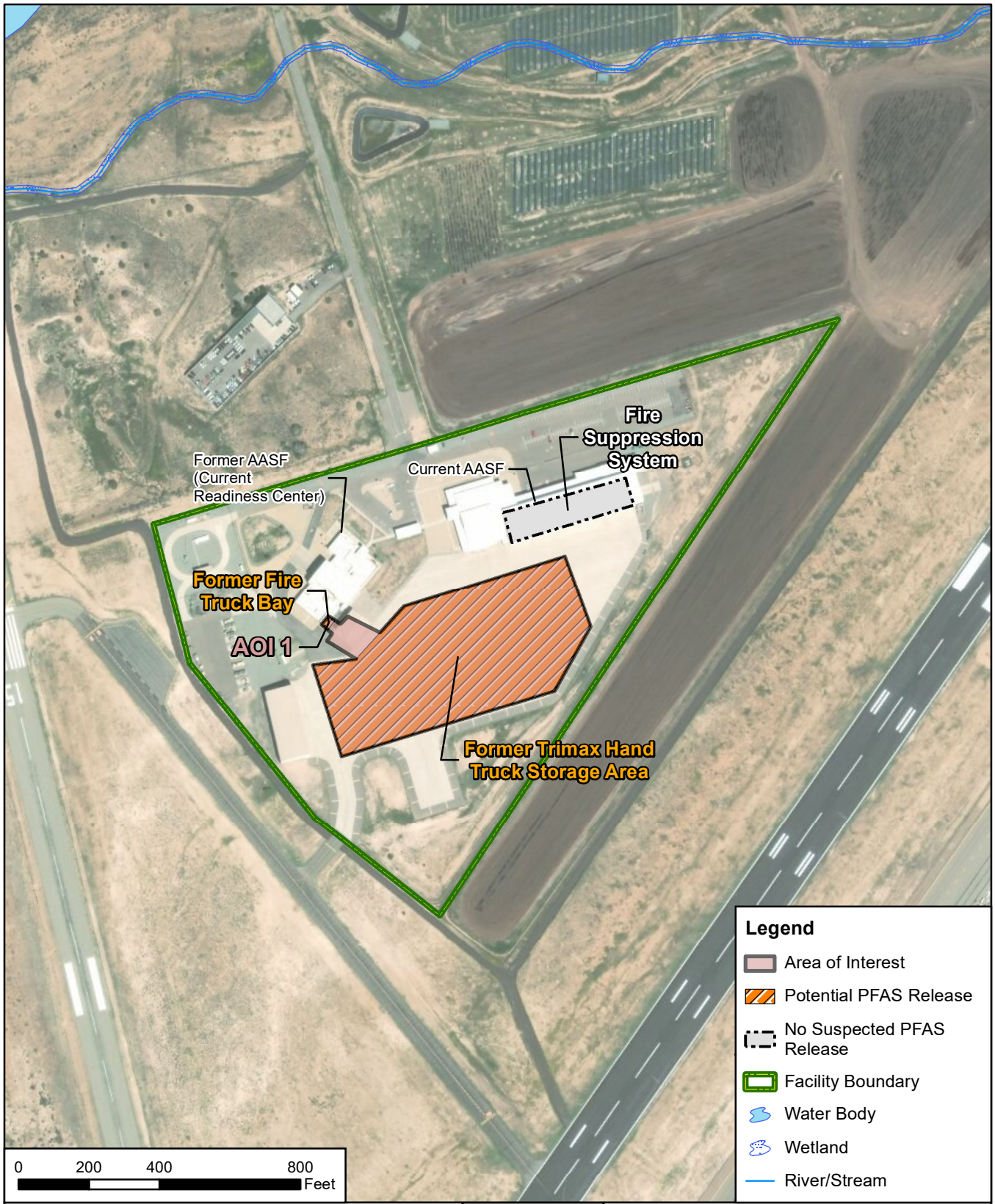
One adjacent off-facility potential PFAS release area was identified that includes an emergency response area from two plane crashes in 2018 and 2019. As a result of adjacent PFAS releases, it is possible PFAS contamination exists in site media surrounding the AASF.

Potential PFAS releases may have occurred at Santa Fe AASF based on the storage and potential use of AFFF at the facility. Based on the possible PFAS releases at the AOI, there is potential for exposure to PFAS contamination in media at or near of the facility. The preliminary CSM for Santa Fe AASF is shown on **Figure ES-2**.

Based on the United States (US) Environmental Protection Agency's (USEPA's) Unregulated Contaminant Monitoring Rule 3 (UCMR3) data, it was indicated that no PFAS were detected in a public water system above the USEPA lifetime Health Advisory (HA) within 20 miles of the facility. The HA is 70 parts per trillion for PFOA and PFOS, individually or combined. PFAS analyses performed in 2016 had method detection limits that were higher than currently achievable. Thus, it is possible that low concentrations of PFAS were not detected during the UCMR3 but might be detected if analyzed today. In addition to FTAs, the PA evaluated areas where PFAS-containing materials may have been broadly used, stored, or disposed. This may include buildings with fire suppression systems, paint booths, AFFF storage areas, and areas of compliance

demonstrations. Information on these features obtained during the PA are included in **Appendices A** and **B**. Data received from city of Santa Fe March 2020 groundwater data indicates no detections of PFAS related chemicals in the public water supply region where the AASF facility is located.

ARNG will evaluate the need for an SI at Santa Fe AASF based on the potential receptors, the potential migration of PFAS contamination off the facility, and the availability of resources.



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NOTES	Preliminary Assessment for PFAS at Santa Fe AASF, NM			
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SCALE	1:4,800	CHK BY	MW	1/27/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/27/2020

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Summary of Findings

AECOM
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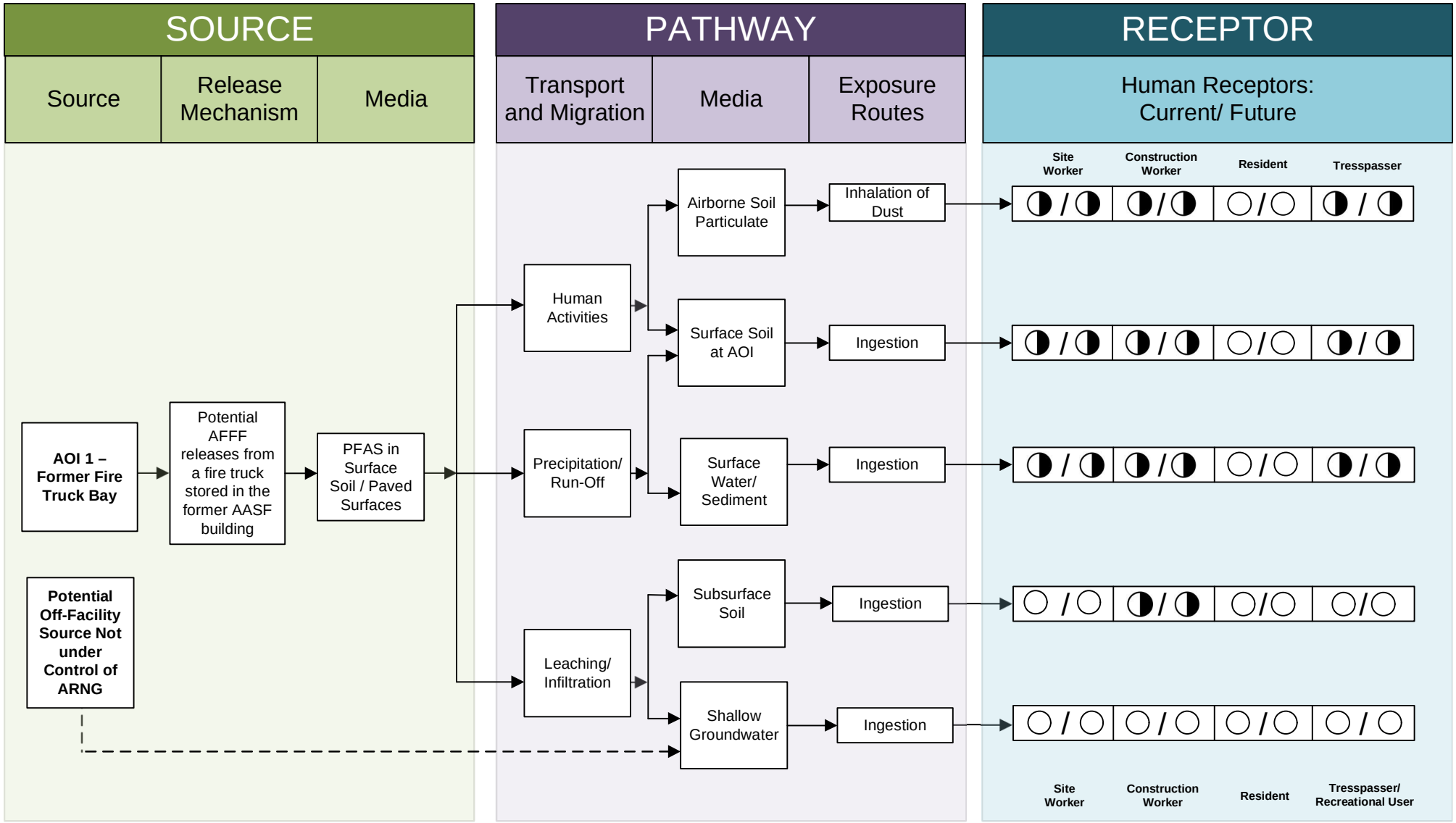
Figure ES-1



LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Complete Pathway

Notes:

1. The resident and recreational user receptors refer to an off-site resident and recreational user.
2. Dermal contact exposure pathway is incomplete for PFAS.

Figure ES-2
Preliminary Conceptual Site Model
Santa Fe AASF, NM

1. Introduction

1.1 Authority and Purpose

The Army National Guard (ARNG) G9 is the lead agency in performing *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) at Impacted Sites at ARNG Facilities Nationwide*. This work is supported by the United States (US) Army Corps of Engineers (USACE) Baltimore District and their contractor AECOM Technical Services, Inc. (AECOM) under Contract Number W912DR-12-D-0014, Task Order W912DR17F0192, issued 11 August 2017.

The ARNG is assessing potential effects on human health related to processes at facilities that used per- and poly-fluoroalkyl substances (PFAS) (a suite of related chemicals), primarily in the form of aqueous film forming foam (AFFF) released as part of firefighting activities, although other PFAS sources are possible. In addition, the ARNG is assessing businesses or operations adjacent to the ARNG facility (not under the control of ARNG) that could potentially be responsible for a PFAS release.

PFAS are classified as emerging environmental contaminants that are garnering increasing regulatory interest due to their potential risks to human health and the environment. PFAS formulations contain highly diverse mixtures of compounds. Thus, the fate of PFAS compounds in the environment varies. The regulatory framework at both federal and state levels continues to evolve. The US Environmental Protection Agency (USEPA) issued lifetime Drinking Water Health Advisories (HAs) for PFOA and PFOS in May 2016, but there are currently no promulgated national standards regulating PFAS in drinking water. The HA is 70 parts per trillion for PFOA and PFOS, individually or combined.

This document presents the findings of a PA for PFAS-containing materials at the Santa Fe Army Aviation Support Facility (AASF; also referred to as the “facility”), Santa Fe, New Mexico, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations [CFR] Part 300), and Army requirements and guidance.

This PA documents the known fire training areas (FTAs) as well as other locations where PFAS may have been released into the environment at the AASF. The term PFAS will be used throughout this report to encompass all PFAS chemicals being evaluated, including PFOS and PFOA, which are key components of AFFF.

1.2 Preliminary Assessment Methods

The following tasks were performed as part of this PA included the following tasks:

- Reviewed available administrative record documents and Environmental Data Resources, Inc. (EDR)™ report packages to obtain information relevant to potential PFAS releases, such as: drinking water well locations, historical aerial photographs, Sanborn maps, and environmental compliance actions in the area surrounding the facility;
- Conducted a 1-day PA site visit on 01 October 2019 and completed visual site inspections (VSIs) at locations where PFAS-containing materials were suspected of being stored, used, or disposed;

- Interviewed current AASF New Mexico ARNG (NMARNG) personnel during the site visit and NMARNG environmental managers and operations staff.
- Identified Area(s) of Interest (AOIs) and developed a preliminary conceptual site model (CSM) to summarize potential source-pathway-receptor linkages of potential PFAS in soil, groundwater, surface water, and sediment for each AOI.

1.3 Report Organization

This report has been prepared in accordance with the USEPA *Guidance for Performing Preliminary Assessments under CERCLA* (USEPA, 1991). The report sections and descriptions of each are:

- **Section 1 – Introduction:** identifies the project purpose and authority and describes the facility location, environmental setting, and methods used to complete the PA
- **Section 2 – Fire Training Areas:** describes the FTAs at the facility identified during the site visit
- **Section 3 – Non-Fire Training Areas:** describes other locations of suspected PFAS releases at the facility identified during the site visit
- **Section 4 – Emergency Response Areas:** describes areas of suspected AFFF discharge at the facility, specifically in response to emergency situations
- **Section 5 – Adjacent Sources:** describes sources of suspected PFAS release adjacent to the facility that are not under the control of ARNG
- **Section 6 – Preliminary Conceptual Site Model:** describes the pathways of suspected PFAS transport and receptors at the facility
- **Section 7 – Conclusions:** summarizes the data findings and presents the conclusions of the PA
- **Section 8 – References:** provides the references used to develop this document
- **Appendix A –** Data Resources
- **Appendix B –** Preliminary Assessment Documentation
- **Appendix C –** Photographic Log

1.4 Facility Location and Description

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 and is leased to the NMARNG by the City of Santa Fe. 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 site 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 (**Appendix A**).

The properties immediately surrounding the AASF are also owned by the City of Santa Fe, with the Santa Fe Waste Water Treatment Center to the north, and the Santa Fe Regional Airport immediately to the west, south, and east. (**Figure 1-1**).

1.5 Facility Environmental Setting

The AASF is approximately 6,330 feet above mean sea level. The facility is covered by the US Geological Survey (USGS) Turquoise Hill 7.5-minute quadrangle topographic map (**Appendix A**). 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, 3 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 NMARNG Readiness Center. The second building is the current AASF, which is comprised of a 75,000-sqaure-foot hangar/administration building. A 16,400-square-foot storage building; a guard house; fuel storage area; and a 455,000 square feet of concrete air field paving also exist on the property (PCL, 2019).

1.5.1 Geology

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 (Española Basin Technical Advisory Group [EBTAG], n.d.).

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 (Grauch and Hudson, 2007); basalt flows of Quaternary in the western Mesa; and basin fill sediments of the Santa Fe group in the intervening piedmont (Neogene to Quaternary) (Spiegel & Baldwin, 1963; Grauch and Hudson, 2007).

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 about 300 feet thick. This layer lies overtop of a bedrock floor that is made up of sedimentary and igneous rocks (**Figure 1-2**) (Spiegel & Baldwin, 1963).

1.5.2 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 feet thick south of Santa Fe to greater than 10,000 feet beneath the Pajarito Plateau west of Española (Land, 2016). The Tesuque Formation comprises the principal aquifer within the Santa Fe Group 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 (Land, 2016).

Groundwater flow in the area generally flows west towards the Santa Fe River. 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 (Spiegel and Baldwin, 1963). The city of Santa Fe'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 Field is mostly located in close proximity to the Santa Fe River and consists of seven active wells located within the City limits of Santa Fe. The Buckman Well Field consists of 13 wells located near the Rio Grande, approximately 15 miles northwest of Santa Fe (City of Santa Fe Water Division, 2017, **Appendix A**).

The percentage of water from any one source changes from month to month and year to year depending upon a number of factors including availability, status of infrastructure, water rights, turbidity in the Rio Grande, customer use, and engineering improvements (City of Santa Fe, 2019).

An EDR™ report conducted a well search for a 1-mile radius surrounding the facility (**Appendix A**). Using additional online resources, such as state and local Geographic Information System (GIS) databases, wells were researched to a 4-mile radius of the facility. One on-site unused well was identified and located at the AASF, which has been capped and is in progress of being plugged. Formerly, the AASF was allowed 3-acre feet of water to be used to domestic services. The location of this well on the facility is shown on **Figure 1-2**. The depth to groundwater on the base is approximately 50 to 800 feet below ground surface (bgs) (NMOSE, 2010).

1.5.3 Hydrology

The AASF is relatively flat and surface water generally drains towards the southwest. No lakes, ponds, retentions basins, or areas of standing water are located on or immediately adjacent to the facility, however, the Santa Fe River cuts through undeveloped land approximately 0.5 miles from the AASF. Water features near the facility are shown in **Figure 1-3**.

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 feet (combined) of Santa Fe River water in McClure and Nichols Reservoirs. Both municipal drinking water supply reservoirs are located east of Santa Fe (City of Santa Fe Water Division, 2017).

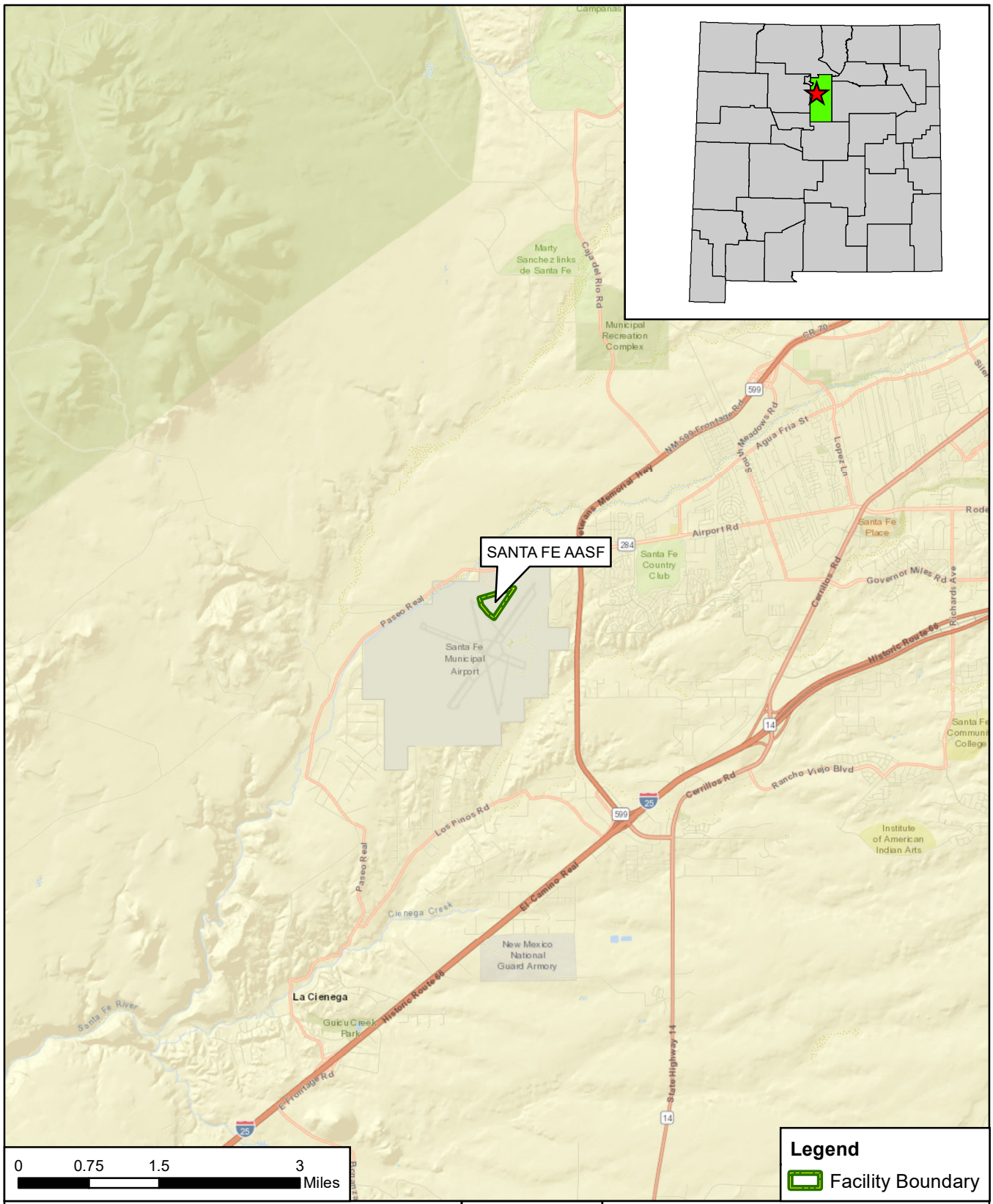
Based on the USEPA Unregulated Contaminant Monitoring Rule 3 (UMCR3) data, it was indicated that no PFAS were detected in a public water system above the HA within 20 miles of the facility (USEPA, 2017). The HA is 70 parts per trillion for PFOA and PFOS, individually or combined. PFAS analyses performed in 2016 had method detection limits that were higher than currently achievable. Thus, it is possible that low concentrations of PFAS were not detected during the UCMR3 but might be detected if analyzed today.

1.5.4 Current and Future Land Use

Presently, Santa Fe AASF resides on Santa Fe Regional Airport 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 (City of Santa Fe GIS, 2019).

1.5.5 Climate

Santa Fe is located in north central New Mexico at an elevation above 7000 feet (US Geological Survey [USGS], 2018). 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 70.1 (ºF) (NOAA, 2019). Santa Fe receives an average of 14.2 inches of precipitation annually, with 5.85 inches falling during summer months (National Oceanic and Atmospheric Administration [NOAA], 2019). The city receives an annual snowfall amount of 23 inches per year (NOAA).



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Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	RG	12/12/2019

Facility Location

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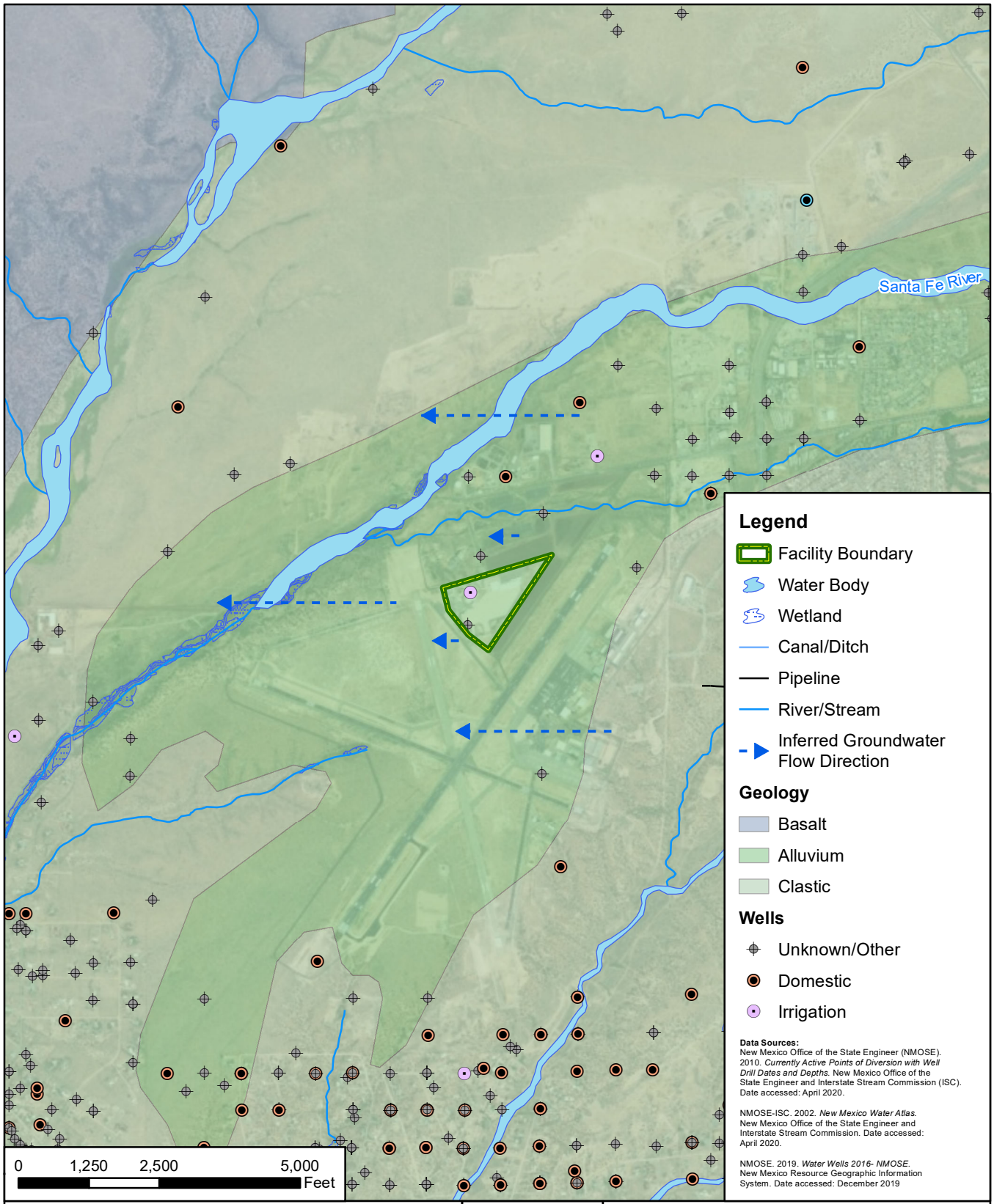
Germantown, MD 20876

Figure 1-1



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Groundwater Features

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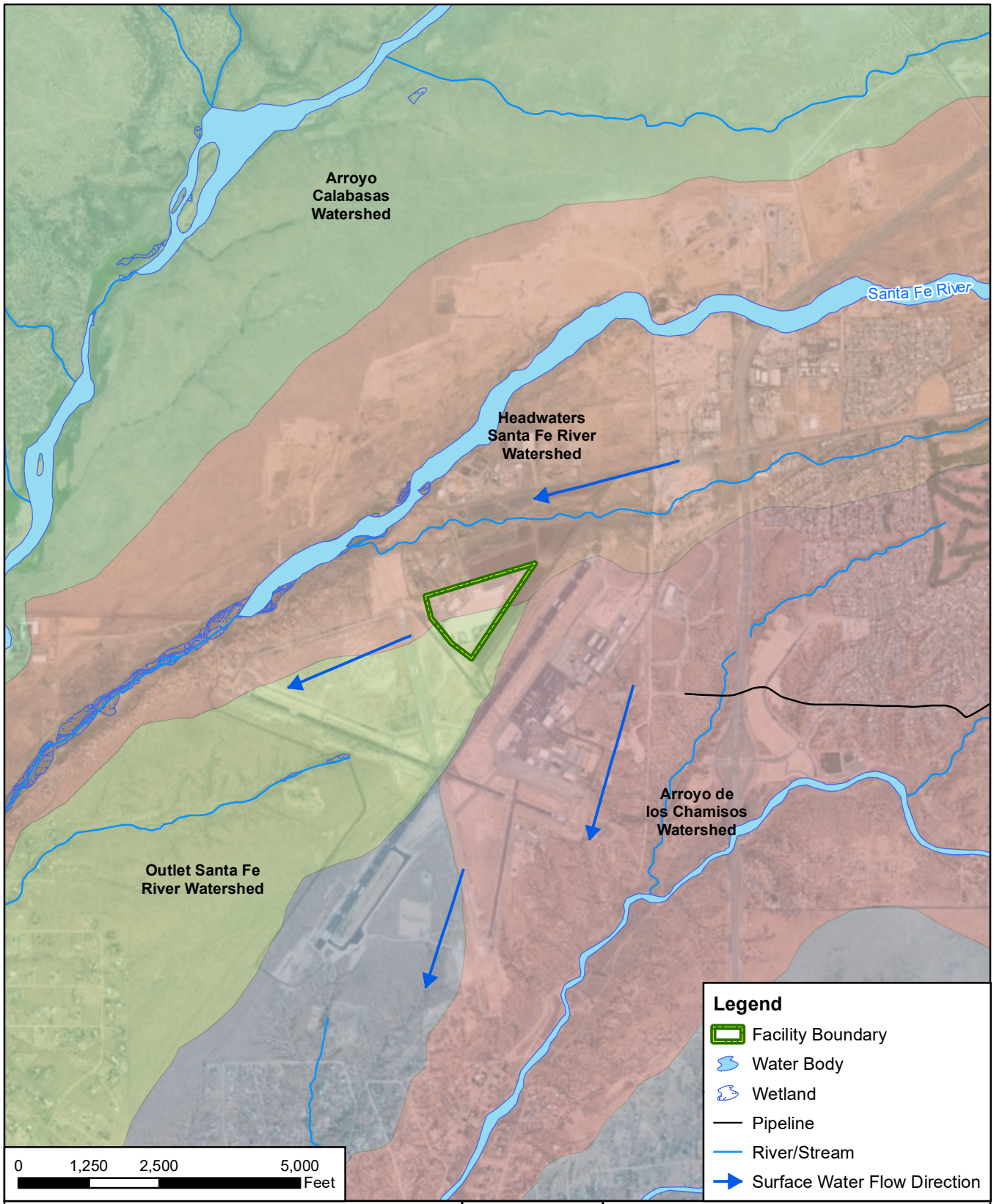
Figure 1-2



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Surface Water Features

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Figure 1-3

2. Fire Training Areas

No FTAs were identified during the PA. According to interviews conducted with facility personnel and historical research, fire training unlikely occurred on site, and there are not personnel professionally trained for fire emergencies at the facility. In the event of an emergency, 911 is called and the Santa Fe Fire Department will respond. Any fire suppressant training was classroom based or used soap. Personnel interviewed also stated that the Santa Fe Fire Department at one point may have trained at the AASF, but it would have been done with soap only and it is unknown when or how often this training would have happened if it did occur. Interview records appear in **Appendix B**.

3. Non-Fire Training Areas

In addition to FTAs, the PA evaluated areas where PFAS-containing materials may have been broadly used, stored, or disposed. This may include buildings with fire suppression systems, paint booths, AFFF storage areas, and areas of compliance demonstrations. Information on these features obtained during the PA are included in **Appendices A** and **B**. Three non-FTAs where AFFF was or is currently being stored were identified during the PA (**Appendix B**). A description of the non-FTAs is presented below, and the non-FTAs are shown on **Figure 3-1**. Interview records with are provided in **Appendix B**, and photographs are provided in **Appendix C**.

3.1 Former AASF Building

The former AASF building, which is now the current NMARNG Readiness center, is located on the western portion of the facility and formerly housed a single firetruck within a bay (**Figure 3-1**). It is unknown for how long the firetruck was stored in this bay, 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 nobody on-site was qualified to use it. There are no records or recollection of the any use or spill 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. The current NMARNG Readiness Center building does not currently house any materials containing AFFF. Interview records and a site map with the former fire truck location noted by interviewees is available in **Appendix B**.

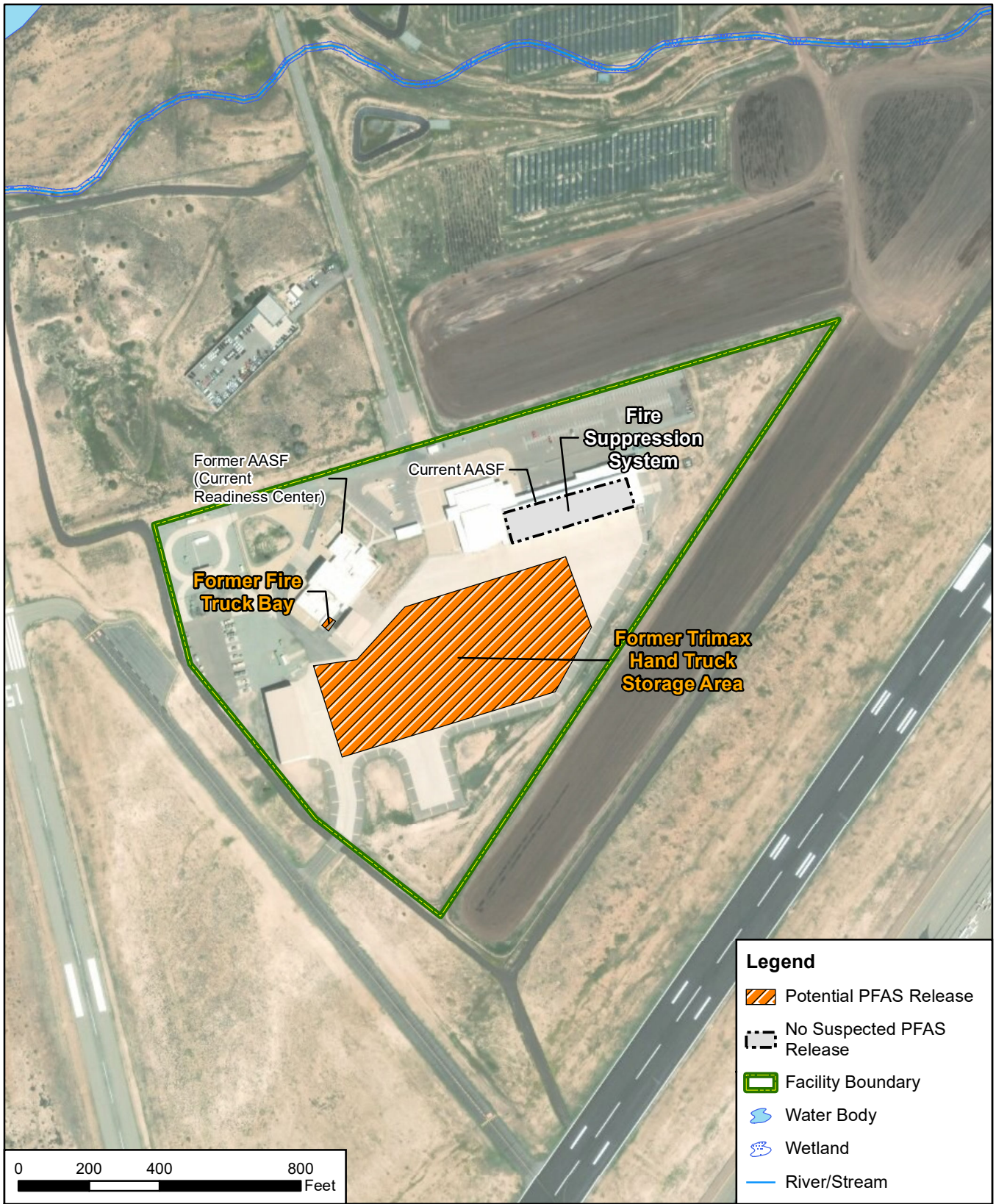
3.2 Current AASF Building

The current AASF building, located on the eastern portion of the facility, was built in 2012. This building features an AFFF fire suppression system in the hangar. Interviewees indicated that this fire suppression system was tested when it was first installed in 2012. Personnel confirmed that while the fire suppression system was tested, it was completely controlled and confined to the hangar and drain system. The drains in the hangar of the current AASF building all travel towards a switchbox in the drain system that is designed to flip on when it detects foam, then travels west southwest to an oil/water separator before continuing to the wastewater treatment plant across the street from the facility. While personnel believe that the switchbox may not have been functioning properly at the time, they are confident that the foam was entirely confined to the hangar and drains. The area where the fire suppression system was tested is shown on **Figure 3-1.** The tank for the fire suppression system features a bladder and shows no signs of leakage.

3.3 Flight Line and Paved Parking Apron

The flight line and paved parking apron at the facility 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. 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. 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. The primary area where the hand trucks were stored is presented in **Figure 3-**1.



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Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/27/2020

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Non-Fire Training Areas

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Figure 3-1

4. Emergency Response Areas

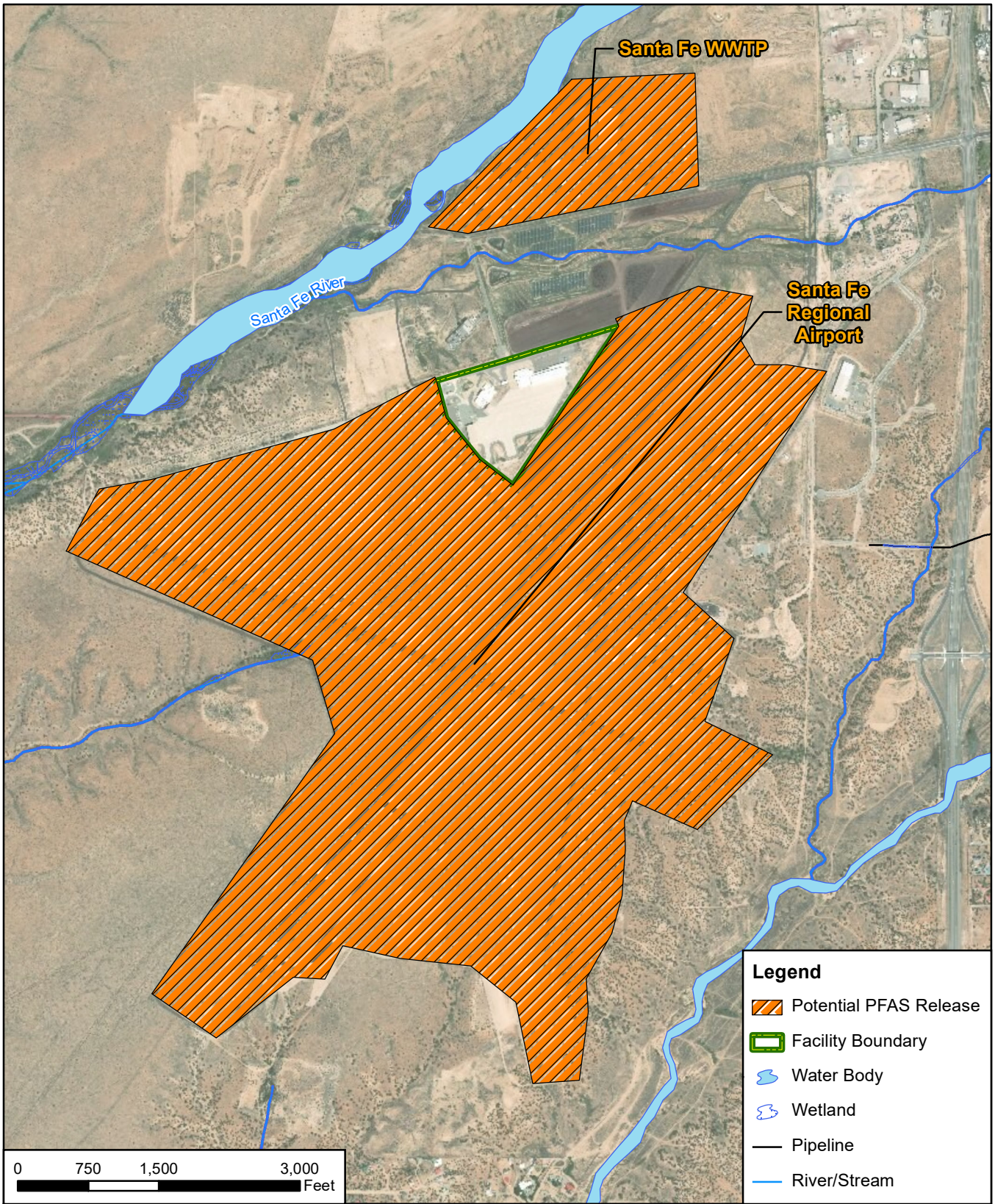
No emergency response areas were identified within the boundaries of the AASF facility during the PA through interviews, previous investigations, online research, and the EDR™ report (**Appendix A**). Personnel interviewed during the PA site visit stated that no incidents that required fire suppression have occurred on site (**Appendix B**), and the City of Santa Fe Fire Department provides emergency response to Santa Fe AASF. Interviews were conducted with personnel whose firsthand knowledge of events dates from 1999 through present. A data gap exists for Santa Fe AASF information between 1979 and 1999 due to records not typically kept by the facility or available during the PA on the use of PFAS in training, firefighting, other non-traditional activities, or on its disposition. keeping and lack of personnel with direct recollection of events during that timeframe.

5. Adjacent Sources

One off-facility site was identified as a possible PFAS source adjacent to Santa Fe AASF during the PA and is discussed below. **Figure 5-1** presents the location of the suspected adjacent PFAS sources.

5.1 Santa Fe Regional Airport

The Santa Fe Regional Airport (SAF) is a public airport that opened in 1941 and covers 2,128 acres. SAF has three active asphalt runways (GCR, 2019). Interviews with NMARNG facility staff and a historical records search provided little information regarding use of AFFF at Santa Fe Regional Airport; however, the records search detailed two emergency incidents that happened on or near the runway – one on 27 November 2018, and another 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 (Edge, 2018). The second crash happened several months after, when a two-seater aircraft crashed and burst into flames at the airport on a secondary runway just south of the AASF facility (Mullan, 2019). It is unknown if AFFF were used as part of the emergency response to either of these incidents. This possible adjacent source is presented on **Figure 5-1**.



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Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	4/10/2020

Adjacent Sources

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Figure 5-1

6. Preliminary Conceptual Site Model

Based on the PA findings, one potential release area was identified at Santa Fe AASF as a result of NMARNG actions and will be considered an AOI. The AOI location is shown on **Figure 6-1**. The following sections describe the CSM components and the specific preliminary CSM developed for the AOI. The CSM identifies the three components necessary for a potentially complete exposure pathway: (1) source, (2) pathway, and (3) receptor. If any of these elements are missing, the pathway is considered incomplete.

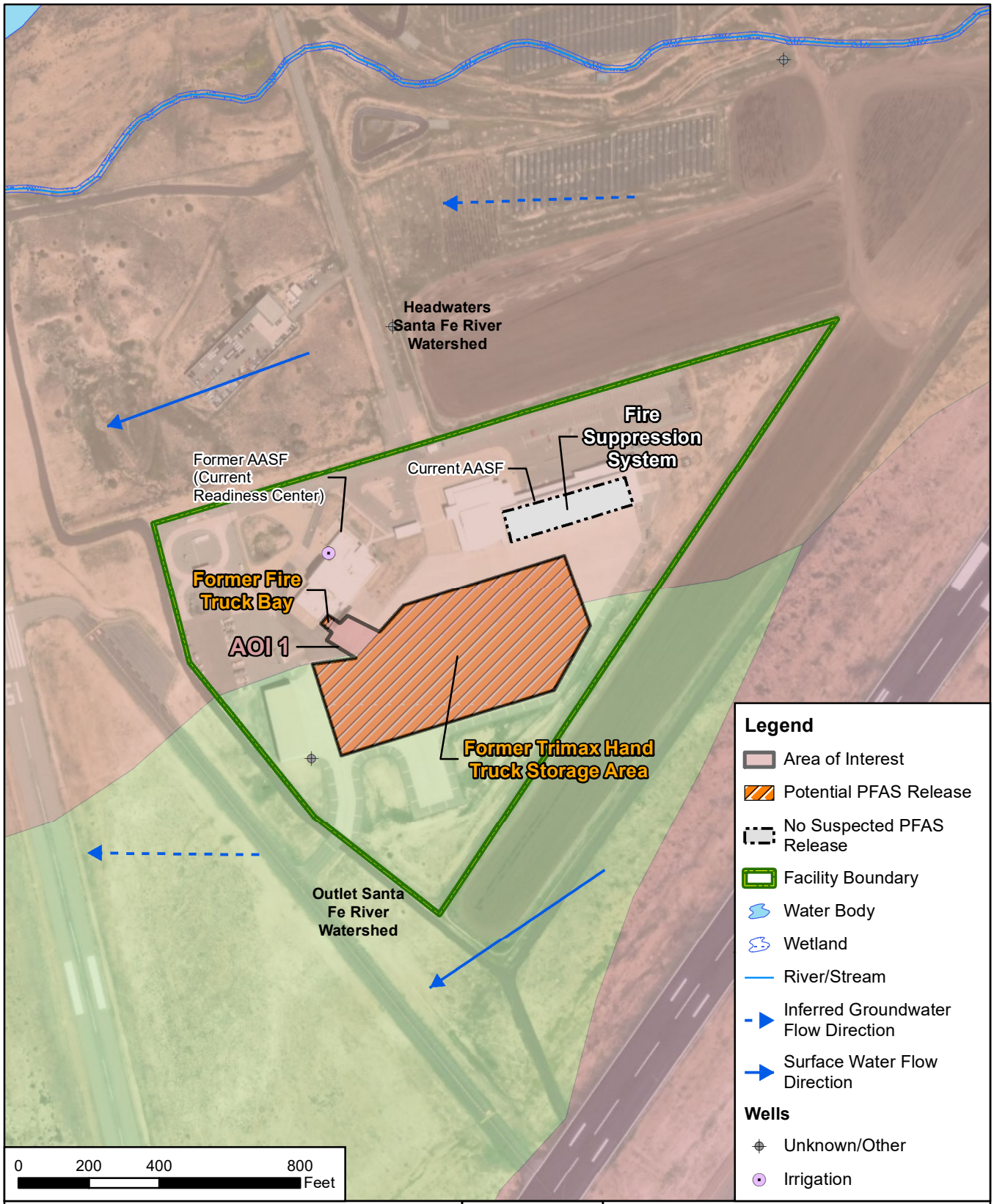
In general, the potential PFAS exposure pathways are ingestion and inhalation. Human exposure via the dermal contact pathway may occur, and current risk practice suggests it is a negligible pathway compared to ingestion; however, exposure data for dermal pathways is sparse and continues to be the subject of PFAS toxicological study. Receptors for Santa Fe AASF include site workers, construction workers, and trespassers. The CSM indicates which specific receptors could potentially be exposed to PFAS.

6.1 AOI: Former Firetruck Bay, Flight Line and Parking Apron

The former firetruck bay existed in what is now the former AASF building. The former AASF building, located on the western portion of the facility, had housed a single firetruck within a bay (**Figure 6-1**). It is unknown how long the firetruck was stored for in this bay, 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 nobody on-site was qualified to use it. There are no records or recollection of the AFFF stored on this firetruck being used or spilled. Interview records and a site map with the former fire truck location noted by interviewees is available in **Appendix B**.

In 2012, the former AASF building, including the firetruck bay, was completely renovated and no longer exists as an AASF building. It is unknown if any drains existed in the former firetruck bay, and if they did, where those drains may have led. Personnel interviews and records research indicate that the drains on site currently flow directly through an oil/water separator and then to the city's wastewater treatment plant across the street.

The AOI encompasses the building that is the former AASF. There is a possibility that the firetruck stored inside the may have leaked AFFF or may have had its AFFF tank flushed out during maintenance. If a release occurred, ground disturbing activities in this area could result in construction worker, site worker, and trespasser exposure to suspected PFAS contamination via inhalation of dust of ingestion of surface soil. A construction worker could also be exposed to subsurface soil affected by AFFF. PFAS are water soluble and can migrate readily from soil to groundwater or surface water via leaching and run-off. However, groundwater beneath the facility ranges from 900 to 1200 feet bgs, and the city sources roughly half of its drinking water from both the Santa Fe and Buckman Well Fields approximately 12 miles northwest and northeast of the facility. Groundwater flows generally southwest and away from the well fields. There are no known drinking water sources downgradient of the facility; therefore, groundwater does not appear to be a likely exposure pathway. Due to the arid desert climate, the pathway for surface water is considered incomplete; however, it is possible that historic deposition of AFFF could occur during rain events carrying into nearby ditches or recessed areas off-site. Given the high rates of evapotranspiration, any such event would result in a quick evaporation of water, leaving the AFFF on the surface soil and possibly sediment. Thus, soil and sediment pathways to site worker, construction worker, and trespasser receptors are potentially complete. The preliminary CSM for the AOI is shown on **Figure 6-2**.



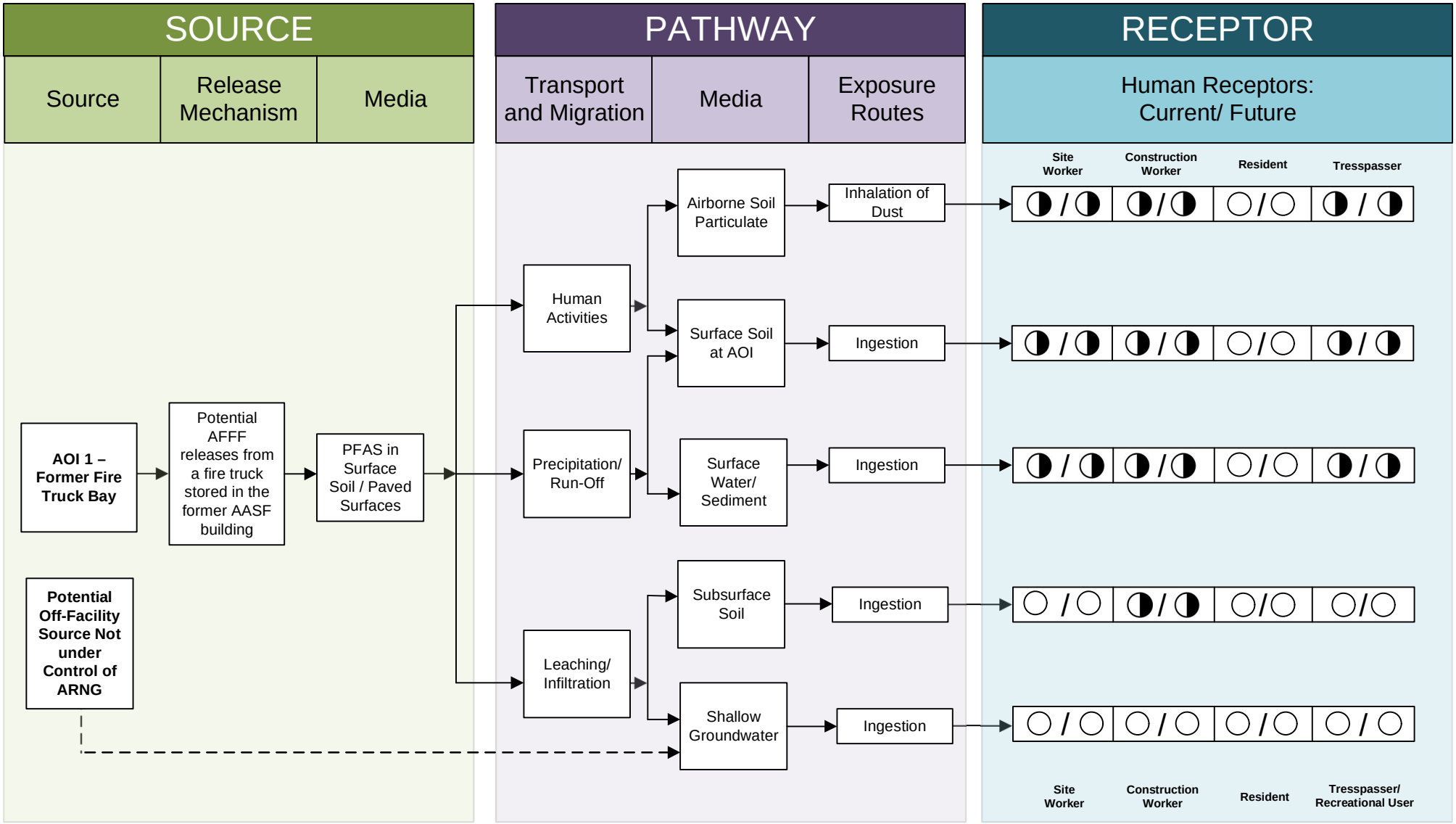
CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Santa Fe AASF, NM			
REVISED	1/27/2020	GIS BY	GC	1/27/2020
SCALE	1:4,800	CHK BY	MW	1/27/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/27/2020

N

Areas of Interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-1



LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Complete Pathway

Notes:

1. The resident and recreational user receptors refer to an off-site resident and recreational user.
2. Dermal contact exposure pathway is incomplete for PFAS.

Figure 6-2
Preliminary Conceptual Site Model
AOI 1 – Santa Fe AASF, NM

7. Conclusions

This document presents a summary of available information gathered during the PA on the use and storage of AFFF at Santa Fe AASF. The PA findings are based on in the information presented in **Appendix A**, **Appendix B**, and **Appendix C**.

7.1 Findings

One AOI related to suspected PFAS release was identified at Santa Fe AASF during the PA (**Figure 7-1**) and is described in **Table 7-1** below:

Table 7-1: AOIs at Santa Fe AASF

Area of Interest	Name	Used by	Potential Release Dates	Determination
AOI	Former Fire Truck Bay	NMARNG	Through the mid-2000s	Suspected PFAS release

An adjacent potential PFAS release area was identified within the vicinity of the NMARNG facility. Santa Fe Regional Airport had two plane crashes on the runway in 2018 and 2019, though it is unknown whether AFFF were used to respond to these situations.

Based on documented potential PFAS release at the AOI, there is potential for exposure to PFAS contamination in media at or near the facility. The preliminary CSM for Santa Fe AASF is shown on **Figure 6-2**, which presents the potential receptors and media impacted. A summary of PA findings is presented in **Figure 7-1**.

7.2 Uncertainties

A number of information sources were investigated during this PA to determine the potential for PFAS-containing materials to have been present, used, or released at the facility. Historically, documentation of PFAS use was not required because PFAS were considered benign. Therefore, records were not typically kept by the facility or available during the PA on the use of PFAS in training, firefighting, other non-traditional activities, or on its disposition. There is no historically documented use of PFAS-containing materials at the Santa Fe AASF by NMARNG staff.

The conclusions of this PA are based on all available information, including: previous environmental reports, EDRs™, observations made during the VSI, and interviews. Interviews of personnel with direct knowledge of a facility generally provided the most useful insights regarding a facility's historical and current PFAS-containing materials. Sometimes, the provided information was vague. Gathered information has a degree of uncertainty due to the absence of written documentation, the limited number of personnel with direct knowledge due to staffing changes, the time passed since AFFF were first used, and a reliance on personal recollection. Inaccuracies may arise in suspected AFFF discharge locations, discharge dates, discharge volumes, and PFAS concentration. There is also a possibility the PA has missed a source of PFAS, as the science of how PFAS may enter the environment continually evolves.

In order to minimize the level of uncertainty, readily available data regarding the use and storage of PFAS were reviewed, multiple personnel were interviewed, multiple persons were interviewed for the same suspected source area, and suspected source areas were visually inspected. **Table 7-2** summarizes the uncertainties associated with the PA.

Table 7-2: Sources of Uncertainty

Location	Source of Uncertainty
Former Firetruck Bay	The specific dates in which the firetruck was stored, and whether any leaks or spills occurred during this timeframe is unknown.
Flight Line and Parking Apron	It is uncertain if any fire training or leaks using AFFF happened historically on the flight line and parking apron and where/when the TriMax™ units were dispatched.

7.3 Potential Future Actions

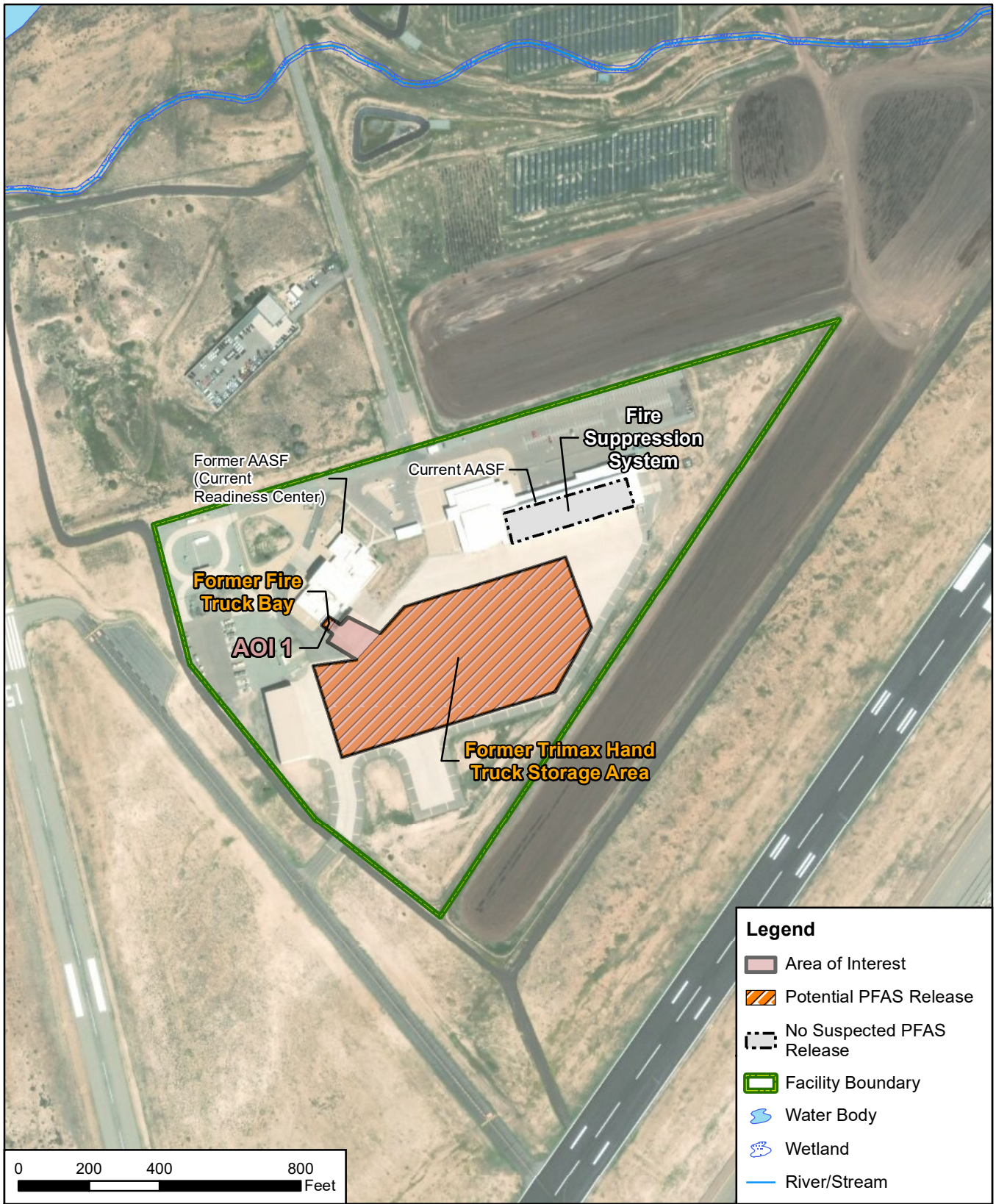
Interviews with NMARNG facility staff indicate that past ARNG activities might have contributed PFAS contamination to soil, surface water, or sediment at the facility or adjacent areas.

Records review and interviews with NMARNG facility staff indicate that current or former ARNG activities may have resulted in PFAS releases at the AOI at Santa Fe AASF. PFAS have the potential to be present in the soil and surface water pathways. Based on the preliminary CSM developed for the AOI, there is potential for receptors to be exposed to PFAS contamination in soil and sediment. **Table 7-3** summarizes the rationale used to determine if the AOI should be considered for further investigation under the CERCLA process and undergo an SI.

Table 7-3: PA Findings Summary

Area of Interest	AOI Location	Rationale	Potential Future Action
Former Firetruck Bay	35°37'27.66"N; 106°05'18.35"W	Potential release from a former fire truck that carried AFFF	Proceed to an SI focusing on soil, and potentially water/sediment

ARNG will evaluate the need for an SI at Santa Fe AASF based on the potential receptors, the potential migration of PFAS contamination off the facility, and the availability of resources.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Santa Fe AASF, NM			
REVISED	1/27/2020	GIS BY	GC	1/27/2020
SCALE	1:4,800	CHK BY	MW	1/27/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/27/2020

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 7-1

8. References

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Appendix A
Data Resources

Data Resources will be provided separately on CD. Data Resources for the facility include:

Santa Fe AASF Previous Investigations

- 2016 Official ARNG Email RE: Perfluorinated Compound (PFC) Contamination Assessment

Santa Fe AASF Facility Information

- 2014 NMARNG Installation Atlas

Santa Fe AASF EDR™ Report

- 2019 Santa Fe FMS Environmental Data Resources, Inc.™ Report

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire - Other

Facility: Santa Fe AASF
Interviewer: [redacted]
Date/Time: 10/01/19 0900

Interviewee: Various **Title:** **Phone Number:** **Email:**	Can your name/role be used in the PA Report? Y or N Can you recommend anyone we can interview? Y or N

Roles or activities with the Facility/Years working at the Facility:

1SG [redacted] → Aviation Maintenance Supervisor [redacted]

PFAS Use: Identify accidental/intentional release locations, time frame of release, frequency of releases, storage container size (maintenance, fire training, firefighting, buildings with suppression systems (as builts), fueling stations, crash sites, pest management, recreational, dining facilities, metals plating, or waterproofing). How are materials ordered/purchased/disposed/shared with others?

- Facility was refurbished in 2014 (readiness center)
  - used to be the AASF in 70's (constructed in 1978)
  - is now the readiness center
  - Current AASF built in 2012
    - this building has AFFF fire suppression system
      - ↳ foam WAS tested
      - completely controlled & contained to building & piping system
      - since 1999 no firefighting or foam use
      - *old building didn't have capabilities.
- Handheld systems - Currently NO AFFF
  - Trimax 70/30 used at old building prior to 2017
  - regularly serviced, stored on flight line.
- Firetruck parked @ old site → donated in 2005 → to Santa Fe FD
  - had AFFF foam but was never used
  - nobody was qualified to use it.
- Any Training done w/ scars

went to o/w separator [see other side] →

Known Uses
Use
Procurement
Disposition
Storage (Mixed)
Storage (Solution)
Inventory, Off-Spec
Containment
SOP on Filling
Leaking Vehicles
Nozzle and Suppression System Testing
Dining Facilities
Vehicle Washing
Ramp Washing
Fuel Spill Washing and Fueling Stations
Chrome Plating or Waterproofing

PA Interview Questionnaire - Other

Facility:_____
Interviewer:_____
Date/Time:_____

- O/W separaters checked/serviced annually
  - MSGD4 permit ↳ discharged to city water sanitary system across street.
- Stormwater drains into Arroyo

- Unsure how fire suppression system test was preformed
  - was managed by COE
    - contractor was in Colorado
  - NO leakes
  - All drains led to O/W separater
  - Fire Marshall does inspections
- Current Emergency situations handled by Santa Fe FD
- NO crashes
- city FD trained here but did not use AFFF
- Water supply is from city
- One water well on site - CAPPED - in process of being plugged
  - 3 acre ft of water to be used for domestic services
  - Not being used currently
- No known adjacent ~~services~~ sources
  - bambi buckets only use H_2O
- Trimax used for only 4-5 years in mid 2000's
  - to expensive to maintain
- Switch box in drain system where it flips on when it detects foam.
  - was NOT functioning properly
- Fire suppression tank has bladder
- NO AFFF stored in cold storage area.

- Fire suppresant training classroom only - NO actual discharge

- No designated fire training area.

Appendix B.2
Visual Site Inspection Checklists

Facility ST
Visual Survey Inspection Log

Recorded by [redacted]
ARNG Contact: NM/SANTA FE
Date: 10/1/19

Site Name / Area Name / Unique ID: SANTA FE AASF
Site / Area Acreage: ~16 acres
Historic Site Use (Brief Description): AASF / Readiness Center.

Current Site Use (Brief Description):

1. Was AFFF used at the site/area? (Y) / N
   3a. If yes, document how AFFF was used and usage time (e.g., *fire fighting training 2001 to 2014*) fire suppression system test
2. Has usage been documented? Y / (N)
   2a. If yes, keep a record (place electronic files on a disk)

Significant Topographical Features:

1. Has the infrastructure changed at the site/area? (Y) / N
   1a. If so, please describe change: (*ex. Structures structures longer exist.*) OLD AASF REFURBISHED / TURNED INTO READINESS CENTER / NEW BLDG (2012) IS NOW CURRENT AASF
2. Is the site/area vegetated? Y / (N)
   2a. If not vegetated, briefly describe the site/area composition: Dry land, sparse vegetation
3. Does the site or area exhibit evidence of erosion? Y / (N)
   3a. If yes, describe the location and extent of the erosion : Arroyo nearby
4. Does the site/area exhibit any areas of ponding or standing water? Y / (N)
   4a. If yes, describe the location and extent of the ponding :

Migration Potential:

1. Does site/area drainage flow off installation? (Y) / N
   1a. If so, please note observation and location: To O/W Separator & wastewater treatment Plant across Street
2. Is there standing water or drainage issues within the site/area? Y / (N)
   2a. If so, please note observation and location:
3. Is there channelized flow within the site/area? (Y) / N
   3a. If so, please note observation and location: Arroyo to Santa Fe river
4. Have man-made drainage channels been constructed within the site/area? Y / (N)
   4a. If so, please note the location of the channel:

Additional Notes

Facility ST
Visual Survey Inspection Log

Photographic Log

Photo ID/Name	Date & Location	Description	Photograph

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: Santa Fe AASF

Why has this location been identified as a site?

Former storage of AFFF

Are there any other activities nearby that could also impact this location?

NO

Training Events

Have any training events with AFFF occurred at this site? Fire suppression test ao

If so, how often? ONCE

How much material was used? Is it documented? UNKNOWN

Identify Potential Pathways: Do we have enough information to fully understand over land surface water flow, groundwater flow, and geological formations on and around the facility? Any direct pathways to larger water bodies?

Surface Water:

Surface water flow direction? SE

Average rainfall? ~14 inches

Any flooding during rainy season? yes

Direct or indirect pathway to ditches? yes

Direct or indirect pathway to larger bodies of water? NO

Does surface water pond any place on site? NO

Any impoundment areas or retention ponds? NO

Any NPDES location points near the site? NO

How does surface water drain on and around the flight line? drain on flight line, Arroyo for stormwater runoff.

Santa Fe River is nearby

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction?

Depth to groundwater? 900 – 1200 ft

Uses (agricultural, drinking water, irrigation)?

Any groundwater treatment systems?

Any groundwater monitoring well locations near the site?

Is groundwater used for drinking water? yes

Are there drinking water supply wells on installation?

Do they serve off-post populations?

Are there off-post drinking water wells downgradient

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? No

If so, do we understand the process and which water is/was treated at the plant? N/A

Do we understand the fate of sludge waste? N/A

Is surface water from potential contaminated sites treated? N/A

Equipment Rinse Water

1. Is firefighting equipment washed? Where does the rinse water go? NO

2. Are nozzles tested? How often are nozzles tested? Where are nozzles tested? Are nozzles cleaned after use? Where does the rinse water flow after cleaning nozzles?

3. Other?

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker NONE

Construction Worker None

Recreational User

Residential

Child

Ecological

Note what is located near by the site (e.g. daycare, schools, hospitals, churches, agricultural, livestock)?

Documentation

Ask for Engineering drawings (if applicable).

Has there been a reconstruction or changes to the drainage system? When did that occur?

Appendix C
Photographic Log

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Santa Fe Army Aviation Support Facility	Santa Fe, New Mexico

Photograph No. 1

Description:

Facing North. Drains in new AASF hangar through which AFFF drained during test of fire suppression system.

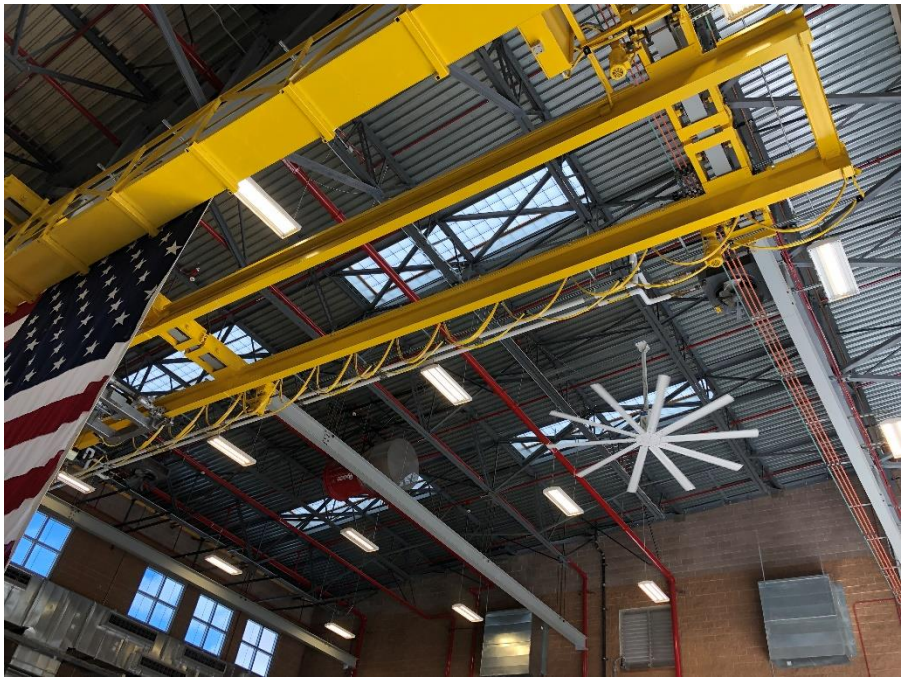
Photo Date: 10/01/2019 0949

Photograph No. 2

Description:

Facing Northeast. Fire suppression system in new AASF hangar.

Photo Date: 10/01/2019 0950



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Santa Fe Army Aviation Support Facility	Santa Fe, New Mexico

Photograph No. 3

Description:

Facing Southeast. Fire Suppression System tank in new AASF building.

Callouts contain detailed information on specs.

Photo Date: 10/01/2019 0954

Photograph No. 4

Description:

Facing South. Where drain meets switchbox. Flows WSW towards O/W separator.

Photo Date: 10/01/2019 0957

APPENDIX C – Photographic Log

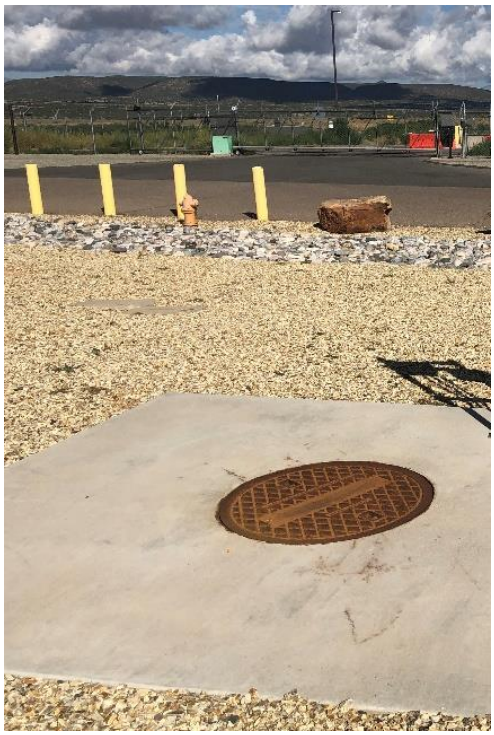
Army National Guard, Preliminary Assessment for PFAS	Santa Fe Army Aviation Support Facility	Santa Fe, New Mexico

Photograph No. 5

Description:

Facing Northwest. O/W Separator. Flows west through pipes to city sanitation center across the street.

Photo Date: 10/01/2019 1000



Photograph No. 6

Description:

Facing Southwest. Former wash rack and drain near former AASF building.

Photo Date: 10/01/2019 1009

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Santa Fe Army Aviation Support Facility	Santa Fe, New Mexico

Photograph No. 7

Description:

Facing Southwest. Former O/W separator near former AASF building.

Photo Date: 09/18/2019 1011

Photograph No. 8

Description:

Facing East. New fire extinguishers which do not contain AFFF.

Photo Date: 10/01/2019 1012

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Santa Fe Army Aviation Support Facility	Santa Fe, New Mexico

Photograph No. 9

Description:

Facing Northwest. 5000 gallon O/W separator as safety feature safeguard for stormwater.

Photo Date: 10/01/2019 1018

Photograph No. 10

Description:

Facing East. Groundwater well on site that is no longer being used.

Photo Date: 10/01/2019 1022

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Santa Fe Army Aviation Support Facility	Santa Fe, New Mexico

Photograph No. 11

Description:

Facing East. Shutoff valve for groundwater well on site that is no longer being used.

Photo Date: 10/01/2019 1023