FINAL
Preliminary Assessment Report
Camp Navajo
Bellemont, Arizona

Perfluorooctanesulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites
ARNG Installations, Nationwide

September 2020

Prepared for:

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

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Acronyms and Abbreviations

AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
AOI	Area of Interest
ARNG	Army National Guard
AZARNG	Arizona Army National Guard
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSM	Conceptual Site Model
DESCOM	Army Depot System Command's
EDR™	Environmental Data Resources, Inc.™
°F	Fahrenheit
FTA	Fire Training Areas
gpd	gallons per day
gpm	gallons per minute
N	North
NAAD	Navajo Army Depot
NADA	Navajo Army Depot Activity
NOD	Navajo Ordnance Depot
PA	Preliminary Assessment
PFAS	Per- and Poly-fluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
W	West
WWTP	Waste Water Treatment Plant

Executive Summary

The United States (US) Army Corps of Engineers Sacramento District on behalf of the Army National Guard (ARNG), Cleanup Branch contracted AECOM Technical Services, Inc. (AECOM) to perform *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide*. 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) discharged during firefighting activities or training, although other PFAS sources are possible.

AECOM completed a PA for PFAS at the Arizona ARNG (AZARNG) Camp Navajo in Bellemont, Arizona, to identify areas of known or suspected releases known as Areas of Interest (AOI) and exposure pathways to receptors. The performance of this PA included the following tasks:

- Reviewed available administrative record documents and Environmental Data Resources, Inc. report packages to obtain information relevant to potential PFAS releases
- Conducted a 2-day PA site visit on 5 and 6 November 2018
- Interviewed current Camp Navajo personnel during the PA site visit including the AZARNG cleanup support manager, Fire Department Captain, Site Utilities Manager, Programs and Projects Specialist, and Physical Plant Supervisor II
- Completed visual site inspections at known or suspected PFAS release locations and documented them in photographs
- Identified areas of interest (AOIs) and developed a conceptual site model (CSM) to summarize potential source-pathway-receptor linkages of potential PFAS in soil, groundwater, surface water, and sediment for each AOI

Six AOIs related to potential PFAS releases were identified at Camp Navajo during the PA. The AOIs are shown on **Figure ES-1** and described in **Table ES-1** below.

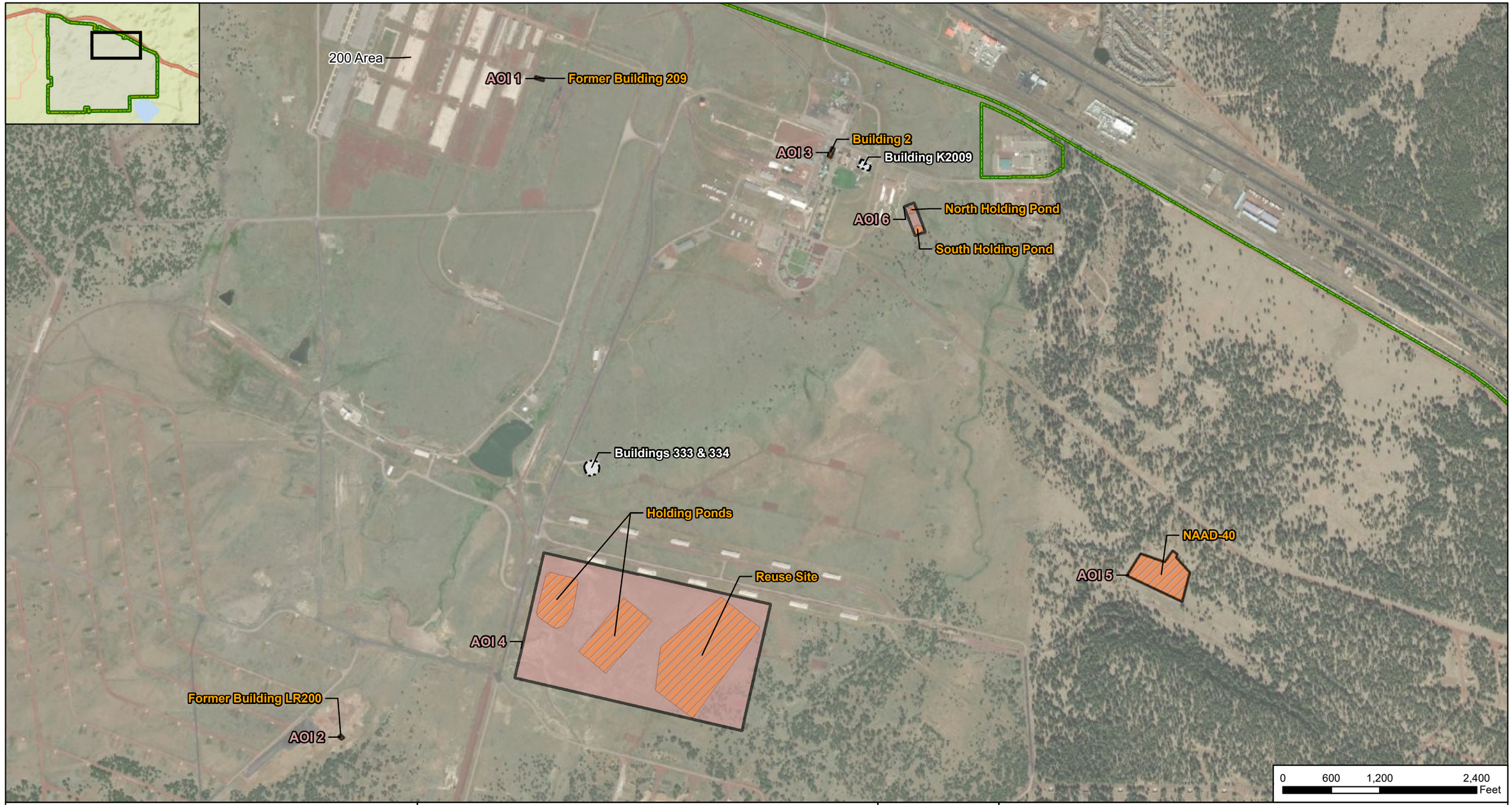
Table ES- 1: Camp Navajo PA AOIs

Area of Interest	Name	Used by
AOI 1	Former Building 209	ARNG/AZARNG
AOI 2	Former Building LR200	ARNG/AZARNG
AOI 3	Building 2	ARNG/AZARNG
AOI 4	Holding Ponds	ARNG/AZARNG
AOI 5	NAAD-40	ARNG/AZARNG
AOI 6	North and South Holding Ponds	ARNG/AZARNG

Based on the documented primary and secondary PFAS releases at these AOIs, there is potential for exposure to PFAS contamination in media at or near the facility. The preliminary CSM for Camp Navajo is shown on **Figure ES-2**, which presents the potential receptors and media impacted. Based on the US Environmental Protection Agency (USEPA) Unregulated Contaminant Monitoring Rule 3 data, it was indicated that no PFAS were detected in a public drinking water

system above the USEPA Health Advisory level (70 parts per trillion for PFOA and PFOS) within 20 miles of the facility.

ARNG will evaluate the need for an SI at AOIs 1, 2, 3, 4, 5, and 6 at Camp Navajo based on the potential receptors and the potential migration of PFAS contamination off the installation. ARNG sites will be prioritized for SIs based on funding.



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PROJECT	Preliminary Assessment for PFAS at Camp Navajo, AZ			
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SCALE	1:14,400	CHK BY	PD	9/17/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	9/17/2020

- Area of Interest
- Potential PFAS Release
- No Suspected Release
- Facility Boundary

N

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure ES-1

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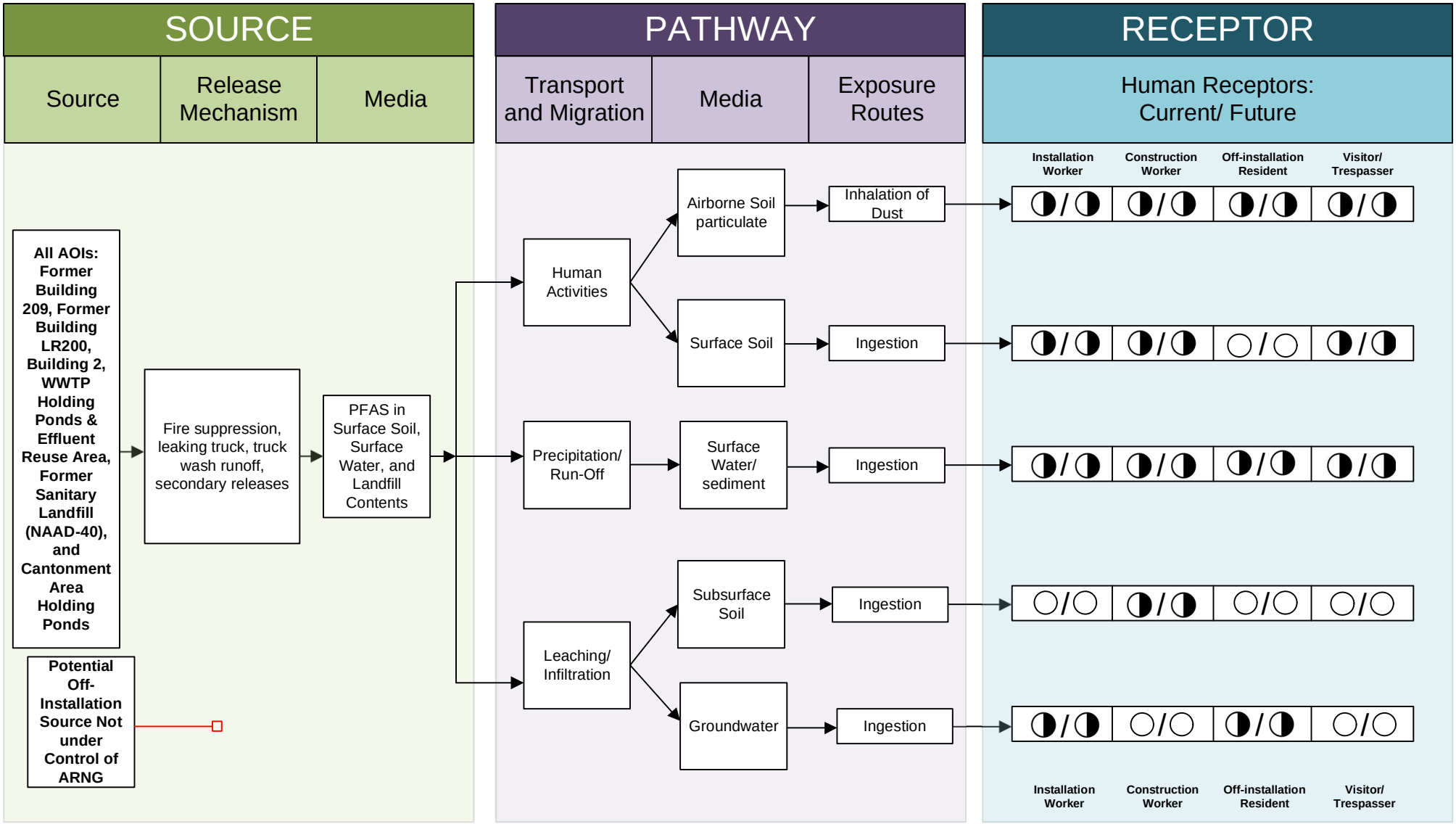


LEGEND

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

Notes: 1) 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 is sparse and continues to be the subject of PFAS toxicological study.

2) Deep groundwater (~1,500 to 1,700 feet below ground surface) and shallow perched groundwater (~10 to 20 feet below ground surface) are both used for potable purposes at Camp Navajo.

Figure ES-2
Preliminary Conceptual Site Model
Camp Navajo

1. Introduction

1.1 Authority and Purpose

The United States (US) Army Corps of Engineers (USACE) Sacramento District on behalf of the Army National Guard (ARNG) G9, Cleanup Branch contracted AECOM Technical Services, Inc. (AECOM) to perform *Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) Impacted Sites at ARNG Facilities Nationwide* under Contract Number W912DR-12-D-0014, Task Order W912DR17F0192, issued 11 August 2017. The ARNG is assessing potentially impacted facilities that used per- and poly-fluoroalkyl substances (PFAS) (a suite of related chemicals including PFOS and PFOA). PFAS are most commonly used in AFFF discharged as part of firefighting activities, fire training, and equipment testing or maintenance. Other sources of PFAS include, for example, metal plating and uniform weatherproofing. This PA also evaluates potential PFAS sources with a 1-mile radius of Camp Navajo that are not under the control of ARNG or AZARNG.

PFAS are classified as emerging environmental contaminants that are garnering increasing regulatory interest due to their potential risks to human health and the environment. The regulatory framework at both federal and state levels continues to evolve. The US Environmental Protection Agency (USEPA) issued Drinking Water Health Advisories for two PFAS, PFOA and PFOS, in May 2016 (70 parts per trillion), but there are currently no promulgated national standards regulating PFAS. In the absence of federal standards, some states have adopted their own standards. However, the State of Arizona does not currently have promulgated standards for PFAS.

This PA presents findings for PFAS presence and historical use at the Arizona Army National Guard (AZARNG) Camp Navajo in Bellemont, Arizona 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 Part 300), and USACE requirements and guidance.

This PA documents the known fire training areas (FTAs) as well as additional locations where PFAS may have been released to the environment at Camp Navajo (i.e., non-FTAs). The term PFAS, as used in this PA, refers to the entire suite of per- and polyfluoroalkyl substances, including PFOS and PFOA. PFOS and PFOA are the primary components of AFFF, which has been managed at Camp Navajo. If a known or suspected discharge of AFFF and, therefore, a known or suspected release of PFAS has occurred, that location is designated an Area of Interest (AOI). The process for conducting the PA is discussed in the next section.

1.2 Preliminary Assessment Methods

The following tasks were performed as part of this PA:

- Reviewed available administrative record documents and Environmental Data Resources, Inc.™ (EDR™) report package (**Appendix A**) to obtain information relevant to suspected PFAS releases;
- Conducted a PA site visit on 5 and 6 November 2018. All associated documentation is provided in **Appendix B**;
- Interviewed current Camp Navajo personnel including the AZARNG IED Cleanup Support Manager, Fire Department Captain, Site Utilities Manager, Programs and Projects Specialist, and Physical Plant Supervisor II;

- Completed visual site inspection at known or suspected AFFF discharge locations and documented them in photographs. A photo log is provided in **Appendix C**; and
- Developed a conceptual site model (CSM) describing the source, pathway, receptor links for each of the AOIs.

1.3 Report Organization

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

- **Section 1** – **Introduction** identifies the project purpose and authority and describes the installation location, environmental setting, and methods used to complete the PA;
- **Section 2** – **Fire Training Areas:** describes the FTAs at the installation identified during the site visit;
- **Section 3 – Non-Fire Training Areas:** describes other locations of potential or suspected PFAS releases at the installation identified during the site visit;
- **Section 4** – **Emergency Response Areas:** describes areas of suspected or potential PFAS release at the installation, specifically in response to emergency situations;
- **Section 5 – Adjacent Sources:** describes sources of PFAS release adjacent to the installation that are not under the control of ARNG or AZARNG;
- **Section 6** – **Conceptual Site Model** describes the pathways of PFAS transport and receptors at the installation;
- **Section 7** – **Conclusions** summarizes the 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 Installation Location, Description and Background

Camp Navajo is located in north-central Arizona, 12 miles west of Flagstaff, 17 miles east of Williams, and adjacent to the industrial community of Bellemont (approximate population 300) located along Interstate 40 (I-40) (**Figure 1-1**). The installation is located in a topographic basin of the San Francisco Plateau within south-central Coconino County, between the Coconino and Kaibab National Forests. The installation comprises 28,473 acres used to support the installation's munitions/missile storage mission and support of various training missions (AZARNG, 2014).

Prior to military use, the land currently occupied by Camp Navajo was used for homesteading, ranching, and logging. Lands for the installation were purchased from private landowners and lands that were transferred from the Kaibab and Coconino National Forests. These lands were combined to form the Navajo Ordnance Depot (NOD) in 1942. Initial construction at the installation was completed in 1943 (AZARNG, 2014).

In 1945, NOD's mission was expanded to include a prisoner-of-war camp that continued until the end of World War II. Storage of chemical warfare service ammunition, explosives, and other ammunition continued throughout this time. In 1967, the NOD was designated a Defense Supply Agency Depot. In 1971, it was renamed the Navajo Army Depot Activity (NADA) and placed under the command of the Pueblo Army Depot. In 1982, the AZARNG assumed operational control of NADA and performed the Army Depot System Command's (DESCOM) mission of receipt, storage, shipping, maintenance, and disposal of munitions to enhance the training of AZARNG units. In 1988, NADA was closed as a federally funded and controlled installation under the Base Realignment and Closure Act but continued through 1992 to store ammunition using funding provided by DESCOM, while the AZARNG used the installation as a training facility. In 1993, the installation was renamed Camp Navajo (AZARNG, 2014).

1.5 Installation Environmental Setting

The installation is located near the southern edge of the Colorado Plateau physiographic province, at an elevation of approximately 7,050 feet. The southern Colorado Plateau is elevated relative to surrounding areas. The plateau surface regionally slopes gently upward to the southwest, reflecting the general dip of the carbonate strata. Twelve miles south of Bellemont, the plateau abruptly ends at the Mogollon Rim, a steep south-facing escarpment with up to 2,500 feet of relief (Wilkinson, 2000).

Bellemont lies within the northernmost extent of the Verde River watershed, which drains a portion of central Arizona. The Verde River lies below the Mogollon Rim in the Verde Valley. It is fed by tributaries whose canyons deeply incise the Rim, and whose sub-watersheds extend up on to the plateau. Oak Creek, West Fork, and Sycamore Canyons reach to within a few miles of the southern boundary of Camp Navajo. Perennial springs in the canyon bottoms drain the plateau subsurface, resulting in water levels as deep as 1,500 ft – 1,700 ft in the regional aquifers. The upper portions of the sub-watersheds are ephemeral and only flow in response to significant storm or snowmelt events (Wilkinson, 2000).

The seeps and springs in the town of Bellemont issue from volcanic rocks. The majority of them occur at the lithologic contact between the Wild Bill Hill basalt flow and the underlying Camp Navajo clay. Most springs are ephemeral, but a few are perennial during most years (Wilkinson, 2019). The springs and karst in the Bellemont area indicate a significant amount of precipitation infiltrates into the subsurface. The majority of terrain consists of permeable cinders, lava, and carbonate rocks, with only a thin residuum of unconsolidated sediments and poorly developed soil. However, only a small portion of the volcanic terrain has associated springs, and no springs issue from the carbonate rocks. This suggests that a significant amount of the infiltrate percolates downward to recharge the regional aquifers.

1.5.1 Geology

Camp Navajo is located along the southern edge of the Colorado Plateau, where volcanic units of the San Francisco volcanic field sit above sedimentary rock units of Paleozoic, Mesozoic, and Tertiary age. The Colorado Plateau is bordered by the Transition Zone to the south, separated by the physiographic boundary of the Mogollon Rim approximately six miles to the south of Camp Navajo. Multiple volcanic features are present in, and around, Camp Navajo. The majority of igneous units at Camp Navajo are basaltic flows that originated from the numerous vents distributed over most of the installation (Weston, 2018a).

A unit consisting of predominantly silt and clay with distinct sand layers has been mapped in the northern and central portions of Camp Navajo and is informally known as the Camp Navajo Clay.

Individual sand layers are present to a depth of approximately 20 feet below ground surface (bgs). The sand units are thin and yield limited amounts of water. Variable amounts of gravel or artificial material are present at the surface and shallow depths due to backfill and construction activities during the development of Camp Navajo. The Camp Navajo Clay extends to an approximate depth of 55 feet bgs and is underlain by gravel deposits and basalt flows (Weston, 2018a). In the northwestern side of Camp Navajo, Pleistocene basalt overlays the clay layer, creating natural springs further discussed in **Section 1.5.2**.

Structurally, the northeasterly-striking Bellemont Fault bisects Camp Navajo (**Figure 1-2**), and has been mapped as a single fault plane in much of this area (Wilkinson, 2000). Various other faults exist in the subsurface at Camp Navajo, including the Dunham Fault Zone which cuts east to west across the northern portion of Camp Navajo (Thorstenson & Beard, 1998).

1.5.2 Hydrogeology

The regional aquifer, composed of units including the Kaibab Formation, the Coconino Sandstone, and the Schnebly Hill/Supai Formations, has a highly variable water table ranging from 100 feet to over 2,000 feet bgs (Weston, 2018a).

In the Camp Navajo area, the depth to water in the regional aquifer is 1,500 to 1,700 feet bgs (USACE, 2015). Localized, shallow saturated zones of perched groundwater are found within the vicinity of Camp Navajo at typical depths of 10 to 20 feet bgs (Weston, 2018b). Regional groundwater in the vicinity of Camp Navajo flows to the north (Weston, 2018b).

According to data obtained directly from the Arizona Department of Emergency and Military Affairs Environmental Management Office, there are monitoring wells and potable water wells on the installation and to the north of Camp Navajo. According to the Arizona Department of Water Resources there are approximately 200 wells within one mile of the installation's boundary (ADWR, 2019). Well depths outside of the Camp Navajo boundary range from 12 feet bgs to 2,801 feet bgs, and pumping rates range from 3 gallons per minute (gpm) to 250 gpm. The majority of wells outside the Camp Navajo boundary are listed as exempt or non-exempt. The state of Arizona describes exempt wells as small non-irrigation wells typically used to provide water for domestic purposes, and non-exempt wells as a well drilled within an Active Management Area pursuant to different groundwater rights (**Figure 1-2)**.

Sources of potable water at Camp Navajo include the CN-2 well, Spring 1, Spring 2, Spring 3/3A, and Reservoir 1 which is fed by the springs. The springs are fed by shallow perched groundwater from the Wild Bill Hill basalt. This shallow groundwater generally recharges and flows from the north to the south and discharges at the springs. The installation has the ability to pull water from Reservoir 1. Water is stored primarily at the water tower with a capacity of 500,000 gallons, in addition to three man-made raw-water resources that can store an additional 20.8 million gallons (Jacobs, 2017). The maximum potable water available to the installation is 246,000 gallons per day (gpd). This includes domestic requirements of 150 gpd per person and enough to supply the fire sprinkler systems.

Based on the USEPA Unregulated Contaminant Monitoring Rule 3 data, it was indicated that no PFAS were detected in a public drinking water system above the USEPA Health Advisory level (70 parts per trillion for PFOA and PFOS) within 20 miles of the facility.

1.5.3 Hydrology

Camp Navajo is within the Verde River watershed, which consists of approximately 6,624 square miles of land (AZDEQ, 2019). Volunteer Wash is the main surface water drainage channel and

has incised Volunteer Canyon in the southern portion of Camp Navajo as it flows to the south and eventually intersects Sycamore Canyon (USACE, 2015). Volunteer Wash and its tributaries are intermittent and only flow following heavy rainstorms or periods of snowmelt. Regional watersheds and surface drainage features within the vicinity of Camp Navajo are presented in **Figure 1-3**.

Surface water on the installation is limited. There are no permanent, naturally occurring streams or lakes at Camp Navajo; however, there are several wetland areas, intermittent streams, natural springs, three perennially spring-fed man-made ponds, and earthen holding ponds. Most surface water does not leave the installation due to interruptions in surface flow such as water tanks and sinkholes that detain runoff (AZARNG, 2014).

Surface water runoff immediately west of the Bellemont Fault (**Figure 1-3**) drains toward the ephemeral Atherton Lake, which overflows into two adjacent sinkholes. Runoff in the 200 area flows north and discharges into a ditch adjacent to I-10. This ditch eventually flows to the east and drains to Volunteer Wash. Sheet runoff from other areas of the installation drains towards the southeastern corner of the installation and eventually into the Volunteer Wash channel, which follows the Bellemont Fault (Wilkinson, 2000). All surface drainage paths at Camp Navajo eventually lead to infiltration or exit towards Volunteer Canyon to the south.

1.5.3.1 Storm and Sewer Water Infrastructure

This section discusses areas of the Camp Navajo storm and sewer water infrastructure that represent possible pathways for potential AFFF discharges in certain areas of the installation. These potential discharges are discussed in detail in **Sections 2**, **3**, and **6**.

According to the 6 November 2018 interview with Camp Navajo's Utilities Manager, storm drains at Building 2 and the rest of the cantonment area drain to holding ponds to the east. During periods of high stormwater discharge, these holding ponds drain into an ephemeral creek further to the east, and eventually off-installation to the south. According to the Utilities Manager, the drains have not been reconfigured within the past 20 years.

Building 218, an auto maintenance facility, has drains and sumps that connected to the sewage system. Other buildings in the 200 Area, including Building 209, reportedly had a similar sewage connection. However, this sewer collection system was reportedly abandoned in 2008 (**Appendix B**). Camp Navajo personnel suspect that some runoff in the 200 Area drains to the WWTP and the associated WWTP holding pond. According to the 6 November 2018 interview with Camp Navajo's utilities manager, it is possible that old storm drains in the 200 Area are still tied into the WWTP, as observed flow rates into the plant are much higher than expected, especially during rain events. Surface water in the 200 Area runs off-installation to the north, however, surface water readily infiltrates into the underlying Wild Hill Basalt in this area (Wilkinson, 2000).

The Camp Navajo WWTP is capable of treating 60,000 gallons per day (Jacobs, 2017). Domestic and pre-treated industrial wastewater generated at Camp Navajo is discharged to the WWTP. The treated effluent is subsequently discharged to holding ponds for evaporation. Any effluent that is in excess of the capacity of the holding ponds can be applied to a permitted re-use site (**Figure 3-1**) which consists of 20-acres to the southeast of Reservoir 1 (Jacobs, 2017). Dried sewage sludge was disposed of at the Sanitary Landfill (**Figure 3-1**) at Camp Navajo from 1966 – 1981 (Weston, 2018b).

1.5.4 Climate

The climate of north-central Arizona is semiarid, and characterized by cold winters, mild summers, and low humidity. The majority of days and nights are clear to partly cloudy. Prevailing wind

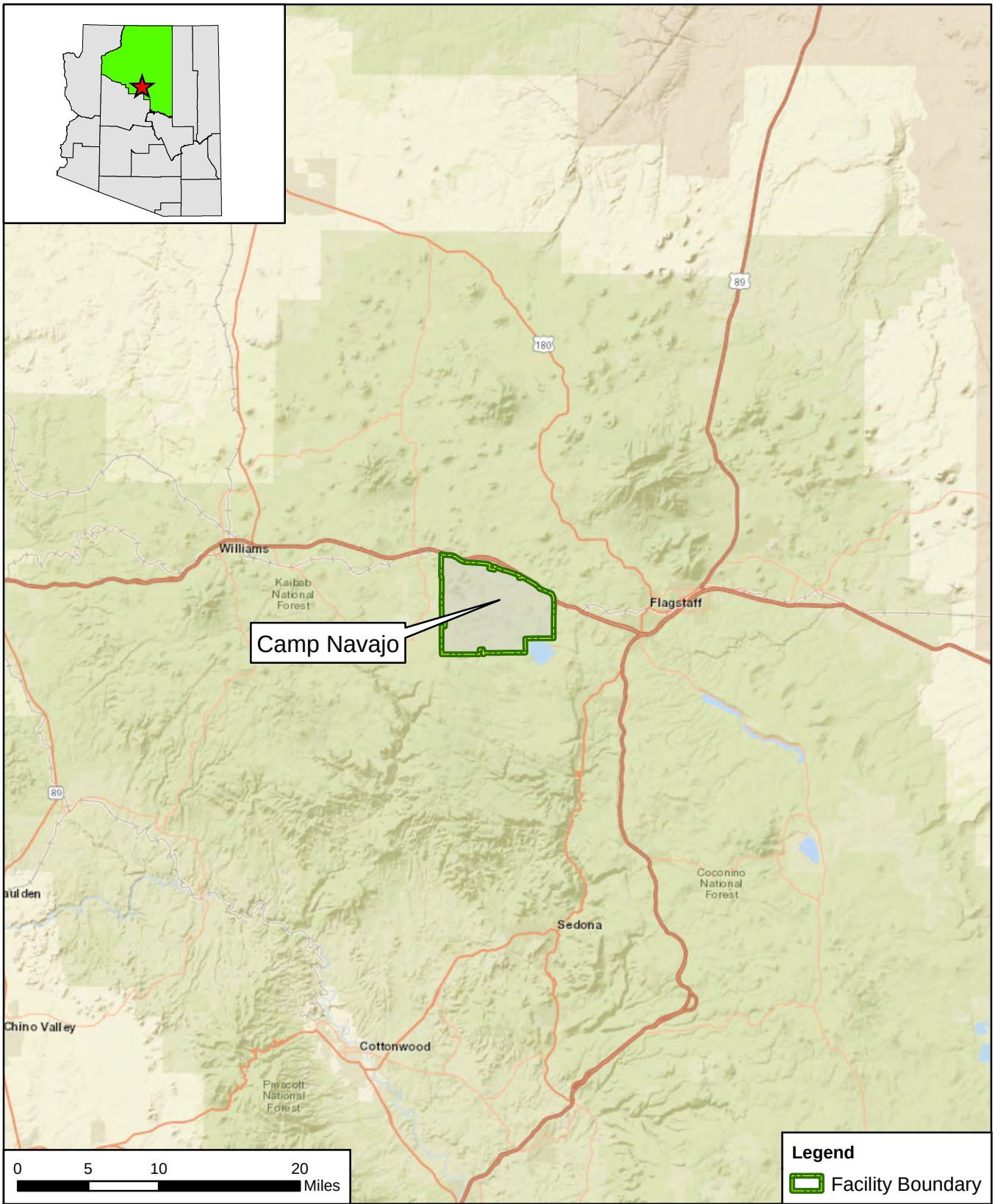
direction is south-southwest. The mean temperature is 45.6 degrees Fahrenheit (°F), with extreme temperatures up to at least 94 °F and down to at least -30 °F. Annual precipitation ranges between 18-22 inches, with the majority occurring from December to March and from July to September. Snowfall typically occurs between October and May, with average annual snowfalls of 97 inches. Some winters have recorded as little as 12 inches of total snow. Due to the dryness of the climate, evaporation causes a loss of 60 inches of water per year from exposed surfaces (AZARNG, 2014).

1.5.5 Current and Future Land Use

The Camp Navajo mission is “To operate a training site and storage facility at Bellemont, Arizona” (AZARNG, 2014). Camp Navajo supports this dual mission of training and storage and provides training to all military branches (training and reserve). Camp Navajo has 2.3 million square feet of storage and provides capacity to both the Navy and Air Force (Jacobs, 2017). Camp Navajo can be divided into four areas based on use:

1. The Cantonment Area includes headquarters, training sites, the Field Maintenance Shop, and a warehouse area.
2. The Limited Area stores various commodities, predominantly munitions and missile motors.
3. The historic Open Burn/Open Detonation Area, used for demilitarization of munitions, is now referred to as the Post-Closure Permit Area (PCPA).
4. The fourth area is the Buffer Area, which was designed to provide safe distances between storage facilities and off-post land and is now used primarily for training.

Camp Navajo is anticipated to remain used for military training and munitions storage in the future.



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Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	RG	9/3/2019

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-1

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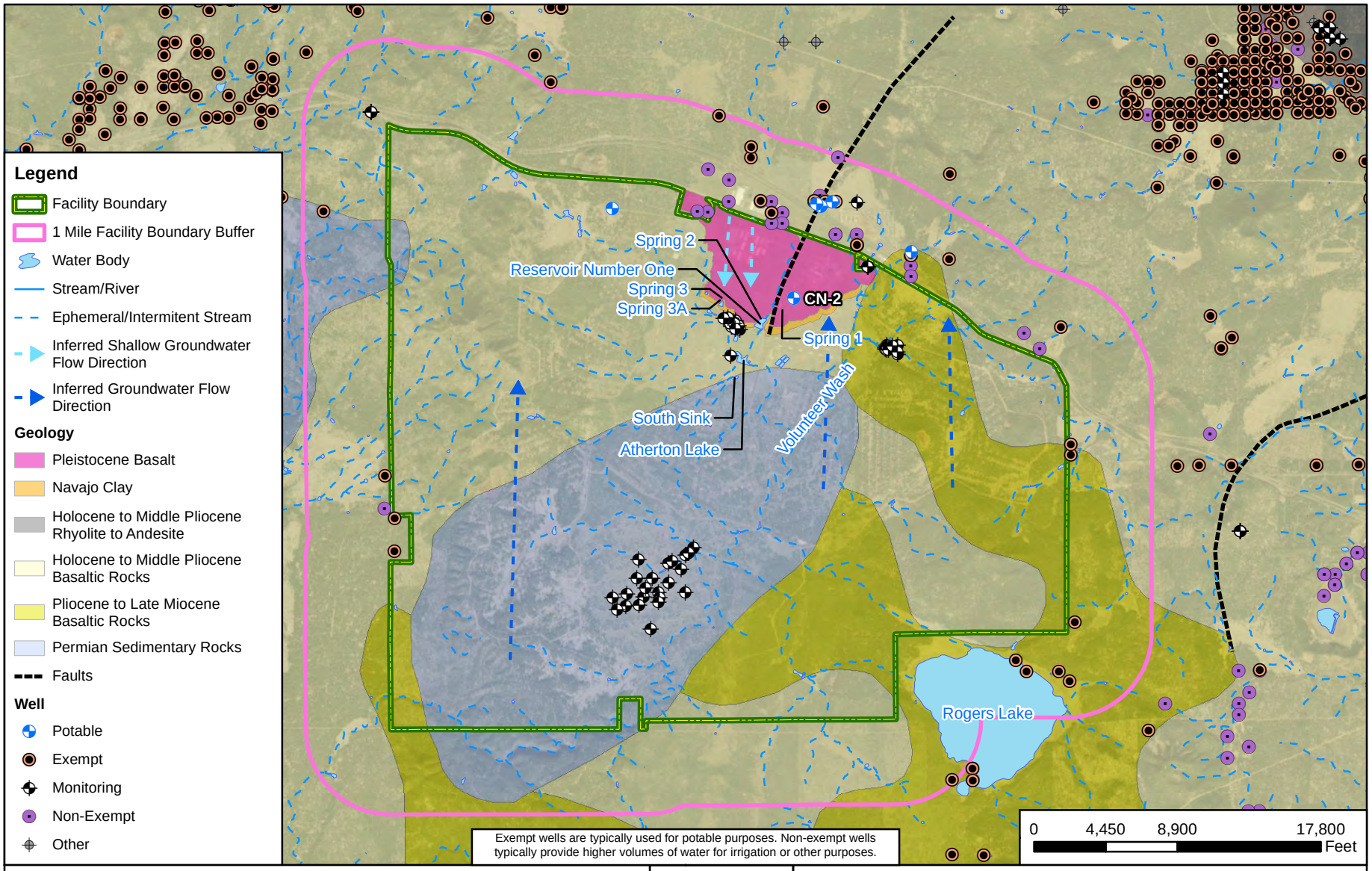

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Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	10/24/2019

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Groundwater Features

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Figure 1-2

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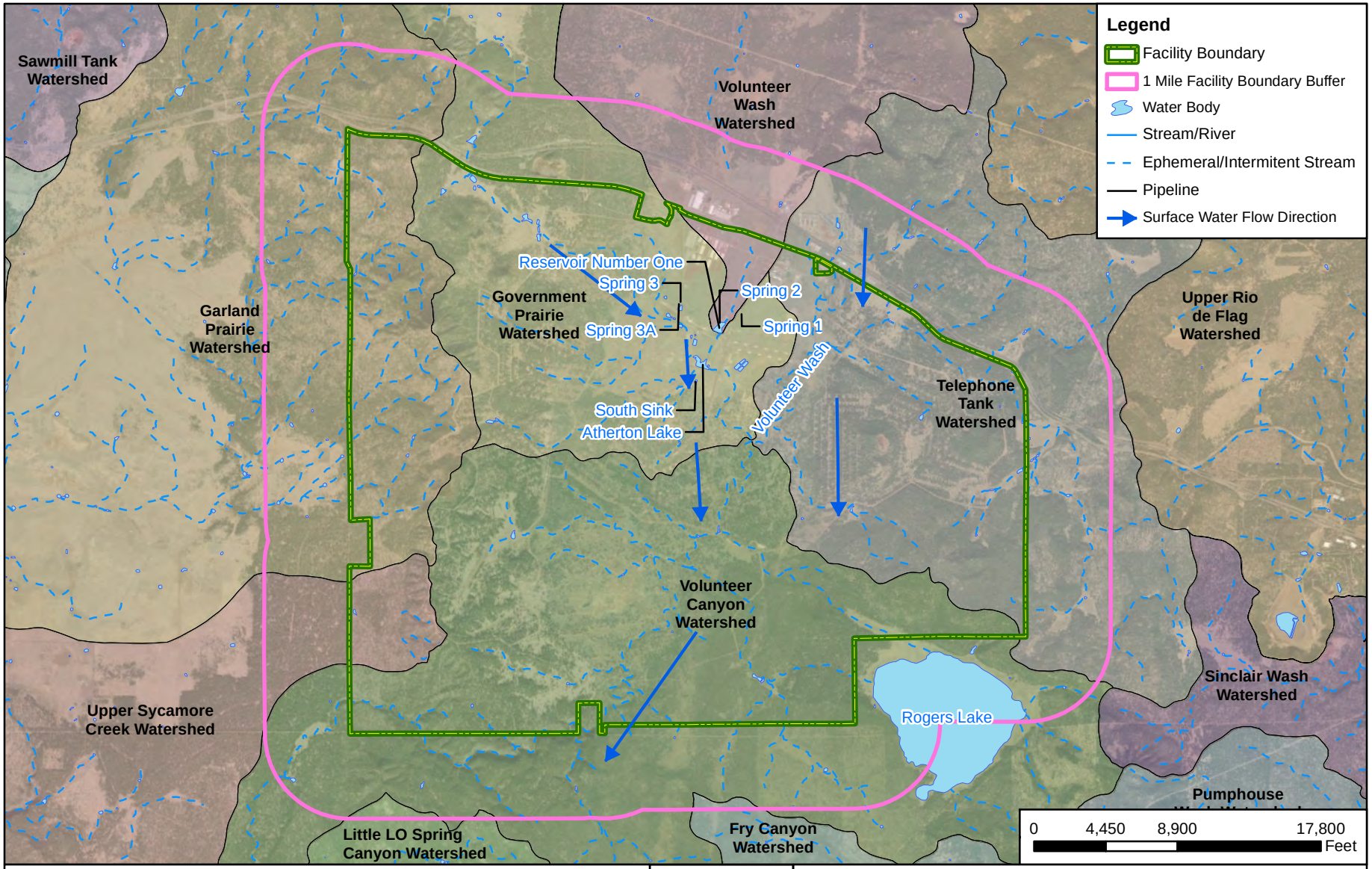

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Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	10/24/2019

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Surface Water Features

AECOM
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Figure 1-3

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2. Fire Training Areas

FTAs are considered areas where intentional discharges of AFFF or other firefighting materials is performed for purposes of training personnel. Two FTAs were identified during the PA (**Figure 2-1**). These include a former fire station (former Building 209), and a former lunch room building (former LR 200). Both of these former structures were intentionally burned during fire training exercises.

2.1 Former Building 209

The Former Building 209, former fire station, is located in the 200 Area (**Figure 2-1**). The geographic coordinates of the approximate center of the former building are 35°13'50.6'' North (N), 111°50'03.2'' West (W). According to interviews conducted during the PA site visit and aerial photographs, Building 209 was demolished between 2000 – 2003 (**Appendix A** & **Appendix B**). No information was obtained about the operations of the fire station at Building 209; however, it is likely that similar operations took place at Building 209 that had taken place at Building 2 during its operation as a fire station. As discussed in **Section 3.1**, these activities may have included washing firetrucks that carried AFFF, flushing out lines used for AFFF discharge at other locations, and storage of AFFF. It was reported that AFFF was most likely used during the intentional burn of Building 209. The amount of AFFF used during this training exercise is unknown. The Macy truck was used for installation firefighting activities and was likely used to extinguish the Building 209 fire. Camp Navajo's Macy truck had a 600-gallon water tank and a 60-gallon foam tank.

According to aerial photographs and the site visit, the 200 Area is mostly bare earth, with the exception of concrete foundations of former buildings (**Appendix A**). The area around Former Building 209 is bare earth, and the roads are unpaved. According to PA site visit documentation, a storm drain exists to the west of the Former Building 209 area. The storm drain may lead to an outfall to the east, which potentially enters the ephemeral drainage ditch that feeds to Reservoir 1. A separate drainage ditch to the south of Former Building 209 runs immediately toward the east, and then ultimately to the north, where it appears runoff would pond and infiltrate.

Due to the abundance of bare earth in the vicinity of Former Building 209, it is likely that AFFF used during the intentional burn of Building 209 would have infiltrated into the subsurface. The 200 Area has a high rate of surface water infiltration, which recharges the natural springs to the south. The Camp Navajo Utilities Manager suspects that stormwater in the 200 Area may also enter the abandoned sewer system, or old storm drains, and eventually reach the WWTP.

2.2 Former Building LR200

Former Building LR200, former lunch room, is located on the southern end of the installation in the storage area (**Figure 2-1**). The geographic coordinates at the approximate center of the former building are 35°12'32.1" N, 111°50'34.0'' W. Building LR200 was used as a lunch room and was demolished by intentional burn. An unknown quantity of AFFF was likely used to suppress the fire (**Appendix B**). The exact date of the fire training exercise that demolished the building is not known; however, the physical plant supervisor, who was with the fire department at Camp Navajo from 1994 – 1999, recalls the training exercise. The Former Building LR200 area is currently used as a storage field for construction materials.

The area where Building LR200 stood is currently a patch of exposed earth. According to observations made during the PA site visit, a drainage ditch is located along the western side of the Former Building LR200 footprint. The drainage ditch runs north-south and likely flows towards

the south end of the installation, consistent with regional drainage patterns. There is a sinkhole on the eastern side of the Former Building LR200 area with an escarpment consistent with the north-south orientation of the Bellemont Fault. Water that enters this sinkhole is likely in communication with the regional aquifer. It is likely that AFFF was used during this training activity and it infiltrated to the subsurface. Water and AFFF infiltrating at the surface have the potential to eventually leach to the regional aquifer.

CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Camp Navajo, AZ			
REVISED	10/25/2019	GIS BY	MS	10/25/2019
SCALE	1:2,400	CHK BY	PD	10/25/2019
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	RG	10/25/2019

Fire Training Areas

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-1

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3. Non-Fire Training Areas

Locations that are considered non-FTAs include but are not limited to, hangars, fire stations, emergency response, and other locations where AFFF was discharged or had potential to be discharged to the environment. AFFF may have been discharged to the environment in these areas via leaks, maintenance and testing, disposal of product, non-training related firefighting activities, and migration through the environment.

The PA site visit identified six non-FTAs. Each non-FTA is shown on **Figure 3-1**. Available photographs of each non-FTA visited during the PA are presented in **Appendix C** and a description of each non-FTA is presented below.

3.1 Building 2

Building 2, former fire station, is located in the cantonment area at the northern end of the installation (**Figure 3-1**). The geographic coordinates at the approximate center of the building are 35°13'41.7'' N, 111°49'19.6'' W. Building 2 was constructed in 1942 (Tetra Tech, 1997) and was used as a fire station after Building 209 was destroyed until approximately 2012 when the new fire station was constructed (**Appendix B**). The type and frequency of firetruck maintenance activities performed in this area are unknown. No staining or residue were observed within the Building 2 area during the PA site visit. According to interviews, AFFF was stored inside the fire station and was used in a Macy Firetruck, which was parked at the station (**Appendix B**).

Firetrucks and hose lines were flushed, rinsed, and washed outside of Building 2 in the parking lot. It is likely that residual AFFF entered two storm drains in the parking lot. According to aerial imagery, in 2007 Building 2 had about 50-foot wide swaths of bare earth along the southern and eastern edges of its footprint (**Appendix A**). Those areas of bare earth were located directly adjacent to paved roads and the parking lot. It is possible that wash water and residual AFFF reached the swaths of bare earth. During the PA site visit, a paved parking area was observed off the northeast corner of the building. The parking lot has two storm drains which direct runoff to the east into two holding ponds. These storm drains are shown on Photograph No. 2 in **Appendix C** and the holding ponds are discussed further in **Section 3.5**.

3.2 Buildings 333 & 334 – WWTP

The Waste Water Treatment Plant (WWTP), which is labeled as Buildings 333 & 334 on the attached figures, is located to the south of the cantonment and 200 Areas at 35°13'03.3'' N, 111°49'54.4'' W. A former WWTP was historically located in the same area. The WWTP can treat up to 60,000 gpd. Domestic and pre-treated industrial wastewater generated at Camp Navajo is discharged to the WWTP; however, The Utilities Manager suspects that stormwater in the 200 Area may reach the WWTP via pathways in the abandoned sewer system, or old storm drains. There is the potential for stormwater from the 200 Area to reach the WWTP. Given the potential for AFFF discharge to have occurred in the 200 Area, there is the potential for PFAS contaminated water to have reached the WWTP. Treatment processes at the WWTP do not remove PFAS; therefore, PFAS contaminated water would have been discharged to the holding ponds after the treatment process. The stormwater discharge lines from the 200 Area to the WWTP are included in the consideration of this non-FTA. Sludge from both WWTPs has been disposed of in the Former Sanitary Landfill (NAAD-40).

3.3 Holding Ponds

The Holding Ponds, refers specifically to the WWTP Holding Ponds and Effluent Reuse Area. Stormwater runoff from the 200 Area is suspected to enter abandoned storm drains and sewer lines leading to the WWTP. Therefore, PFAS-contaminated WWTP effluent may be discharged to the WWTP Holding Ponds. The currently used WWTP Holding Pond is located to the south of the WWTP at 35°12'46.4'' N, 111°49'59.7'' W. The formerly used WWTP Holding Ponds are located immediately to the east at 35°12'42.1'' N, 111°49'51.5'' W. Aerial imagery suggests the old ponds were in use through 2007 and that the new pond was constructed between 1992 – 2003. Aerial imagery suggests the new pond began to receive effluent at least as early as 2005. The holding ponds are earthen areas at which water is held to infiltrate and evaporate. An effluent reuse area is connected to the new pond, and water in excess of the pond's capacity can be diverted to the reuse area (**Figure 3-1**). Until 1981, sludge from the WWTPs was removed and disposed of at the Former Sanitary Landfill (NAAD-40).

3.4 NAAD-40

NAAD-40, also known as the Former Sanitary Landfill, is located on the eastern side of the installation at 35°12'50.5'' N, 111°48'30.2'' and takes up about 6-acres. NAAD-40 received household and various other wastes from the 1940s until 1966. Dried sewage effluent sludge was disposed of at NAAD-40 between 1966 and 1981. The landfill has been inactive since 1981 and an engineered cap was constructed in 2001 (Weston, 2018b). NAAD-40 is an unlined landfill, and six groundwater and four vapor monitoring wells are monitored as part of the Department of Defense's Installation Restoration Program. There are two access points to the landfill: one by locked gate on the western side and another from the northern side of NAAD-40. Due to the rugged terrain, no vehicular traffic is permitted beyond the western boundary of the landfill cap (Weston, 2018b).

According to interviews with Camp Navajo personnel, there is a possible stormwater pathway from the 200 Area to the WWTP. There has been documented use of AFFF in the 200 Area during the intentional burn of Former Building 209, former fire station, between 2000 – 2005, which occurred after the Sanitary Landfill stopped receiving WWTP sludge. However, while Building 2 was in operation as a firehouse prior to 2000, it is likely that operations mimicked the documented operations at Building 2, former fire station. In this case, truck washing and line flushing activities may have released PFAS to the stormwater system in the 200 Area, which would have traveled to the WWTP Pond and ended up in the sludge disposed of at the Former Sanitary Landfill.

3.5 North and South Holding Ponds

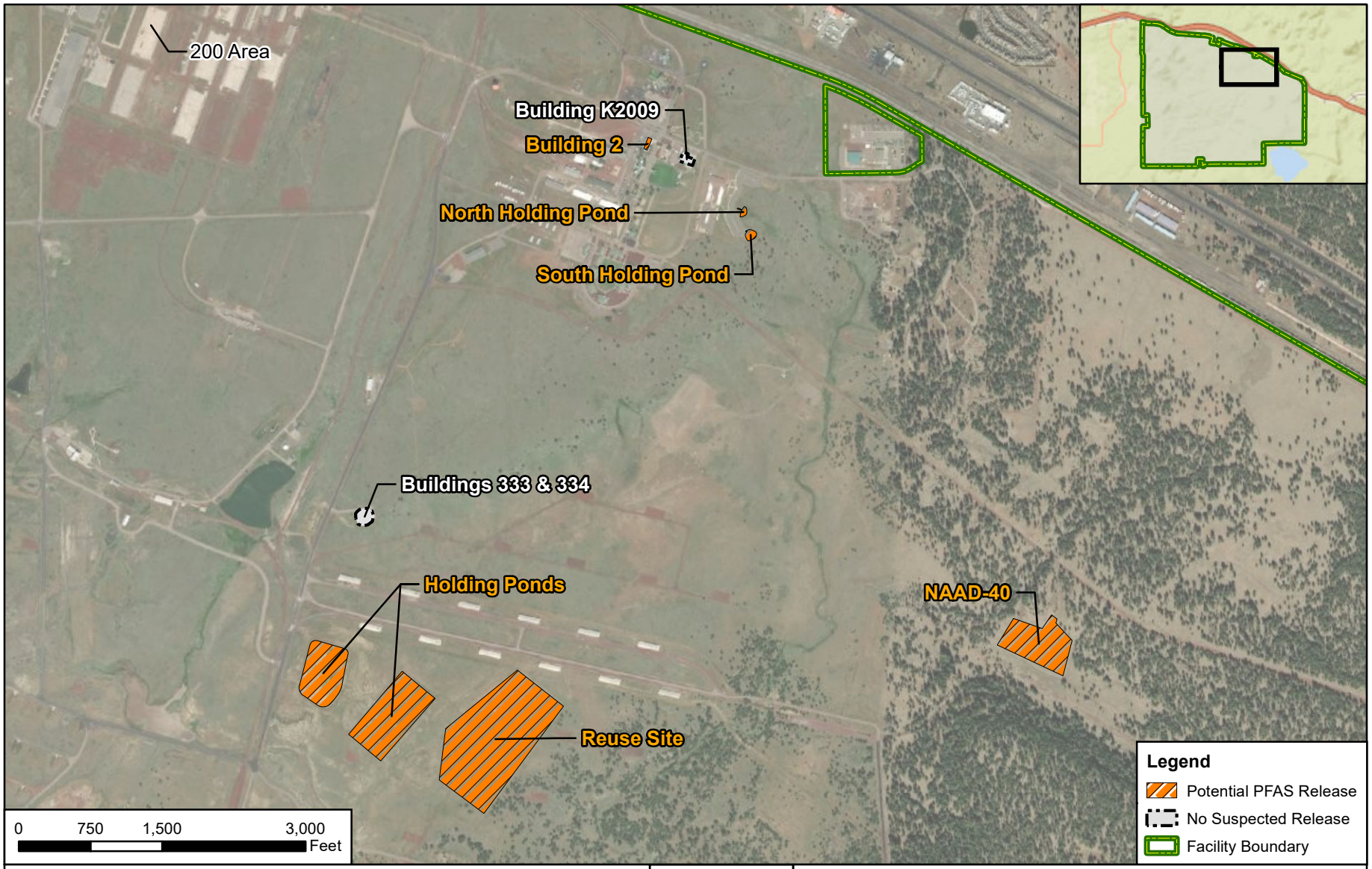
The North and South Holding Ponds refers specifically to the Cantonment Area Holding Ponds. There are two Cantonment Area Holding Ponds which are ephemeral and are located to the east of the Cantonment Area. They receive storm water runoff from the Cantonment Area, specifically Building 2, where AFFF discharges have occurred. The center of the northernmost pond is located at approximately 35°13'34.8" N, 111°49'07.3'' W. The center of the southernmost pond is located at approximately 35°13'32.4" N, 111°49'06.4'' W.

The Cantonment Area Holding Ponds are located at a lower elevation than the Cantonment Area, and they drain further east toward a creek and eventually south, off the installation, toward Volunteer Wash. Due to the documented presence and discharge of AFFF at Building 2, there is a possible PFAS pathway from the storm drains at Building 2 to the Cantonment Area Holding

Ponds, and subsequently off the installation. The stormwater discharge lines from the Building 2 drains to the ponds are included in the consideration of this non-FTA.

3.6 Building K2009

Building K2009, current fire station, was constructed as a replacement for the Building 2 fire station in 2009, and is located in the Cantonment Area. The coordinates at the center of the building are 35°13’40.2’’ N, 111°49’14.7” W. Building K2009 only uses Class A foam (**Appendix B**); however, a misshipment of AFFF was sent to the station, and during the PA site visit two 5-gallon buckets of 6% AFFF were being stored in the station on Engine 911. No discharges of AFFF at Building K2009 have occurred.



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Camp Navajo, AZ			
REVISED	9/17/2020	GIS BY	MS	9/17/2020
SCALE	1:18,000	CHK BY	PD	9/17/2020
Base Map: National Agricultural Imagery Program, 2017.		PM	RG	9/17/2020

N

Non-Fire Training Areas

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 3-1

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4. Emergency Response and Other PFAS Uses

No emergency responses or other PFAS uses were identified during the PA site visit.

5. Adjacent Sources

According to the EDR™ report, there are no properties within a 1-mile radius, hydraulically up-gradient of the installation where there is potential for PFAS releases to the environment. The surrounding land uses are residential and commercial.

6. Preliminary Conceptual Site Model

Based on the PA, six AOIs have been identified at Camp Navajo: AOI 1 Former Building 209, AOI 2 Former Building LR200, AOI 3 Building 2, AOI 4 Holding Ponds, AOI 5 NAAD-40, and AOI 6 North and South Holding Ponds. The AOI locations are shown on **Figure 6-1**. The following sections describe the CSM components and the specific CSMs developed for each AOI. The CSM includes 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 evaluation practice suggests it is an insignificant pathway compared to ingestion; however, exposure data for dermal pathways is sparse and continues to be the subject of PFAS toxicological study. Potential PFAS receptors at Camp Navajo include installation workers, construction workers, off-installation residents, and visitors/trespassers. The CSMs for each AOI indicate which specific receptors could potentially be exposed to PFAS.

6.1 AOI 1 Former Building 209

AOI 1 is Former Building 209, former fire station. Between 2000 and 2003, AFFF was used to extinguish an intentional burn of Building 209. No information was obtained about the operations of the fire station at Building 209; however, it is likely that similar operations took place at Building 209 that took place at Building 2 during its operation as a fire station. These activities may have included washing firetrucks that carried AFFF, flushing out lines used for AFFF discharge at other locations, and storage of AFFF. No remediation activities have occurred at AOI 1.

PFAS are water soluble and migrate readily to groundwater. A shallow perched aquifer underlies the 200 Area at a depth of less than 30 feet. This shallow aquifer is hydraulically connected to the springs (Springs 1, 2, and 3/3A) which feed the on-site ponds and are used as a potable source of water for Camp Navajo personnel. Migration of PFAS to the regional aquifer in this area is unlikely due to the presence of the regional aquifer and the Camp Navajo Clay confining unit. The surface water runoff from this area enters either a series of drainage ditches that eventually discharges off base to the north, or the stormwater system that potentially discharges to the WWTP.

Ground-disturbing activities to surface soil at AOI 1 may result in installation worker, site worker, off-installation residents (about 1-mile away), and visitor/trespasser exposure to potential PFAS contamination via ingestion or inhalation of airborne particulates. Ground-disturbing activities to subsurface soil could result in construction worker exposure to PFAS contamination via ingestion or inhalation of airborne particulates. AOI 1 is located in the recharge area of a perched aquifer that sits above the Navajo Clay. This clay acts as a confining unit and separates the shallow groundwater from the deep, regional groundwater. This perched aquifer feeds springs used for potable water at Camp Navajo. There are also domestic drinking water/public supply wells screened at shallow depths to the north of the installation boundary. These wells are potentially screened in the same perched aquifer. Therefore, there is a potentially complete exposure pathway for shallow groundwater to site workers and off-installation residents. There is also the potential for the perched aquifer to be in communication with the regional aquifer. Given the likelihood that some surface water runoff at AOI 1 enters the stormwater system and discharges to the WWTP holding pond, there is a potentially complete exposure pathway for surface water

and sediment to site workers, construction workers, and visitors/trespassers. The CSM for AOI 1 is shown on **Figure 6-2**.

6.2 AOI 2 Former Building LR200

AOI 2 is Former Building LR200, former lunch room. Between 1994 – 1999, AFFF was used to extinguish an intentional burn of Building LR200. No remediation activities have occurred at AOI 2.

PFAS are water soluble and readily migrate to groundwater. In addition to natural springs, drinking water at Camp Navajo is obtained from well CN-2 which is screened in the regional aquifer about 1.25-miles to the northeast (downgradient) of AOI 2 (Jacobs, 2017). An ephemeral drainage ditch adjacent to AOI 2 drains surface water to the south.

Ground-disturbing activities to surface soil at AOI 2 may result in installation worker, site worker, off-installation residents (about 2-miles away), and visitor/trespasser exposure to potential PFAS contamination via ingestion or inhalation of airborne particulates. Ground-disturbing activities to subsurface soil could result in construction worker exposure to PFAS contamination via ingestion or inhalation of airborne particulates. Surface water at AOI 2 enters drainageways which eventually flow to South Sink, which is believed to be a pathway to the regional aquifer (~1,500 ft bgs). Based on the location of well CN-2, which supplies the installation with potable water, downgradient of AOI 2 in the regional aquifer, there is a potentially complete exposure pathway from deep groundwater to installation workers. Based on the presence of deep public supply wells within 2-miles to the north of AOI 2, there is a potentially complete exposure pathway from deep groundwater to off-installation residents. Based on the presence of an ephemeral drainage ditch adjacent to AOI 2, there is a potentially complete exposure pathway from surface water and sediment to installation workers, construction workers, and visitors/trespassers. The CSM for AOI 2 is shown on **Figure 6-3**.

6.3 AOI 3 Building 2

AOI 3 is Building 2, former fire station. AFFF was discharged to the environment at the former fire station. Fire trucks and hoses were washed and flushed out in the parking lot on the north and west sides of the building. While no specific information indicated nozzle testing at Building 2, this was a common practice for foam-carrying trucks and possibly occurred at this location. No remediation activities have occurred at Building 2.

PFAS are water soluble and migrate readily to groundwater. A perched aquifer underlies Building 2. This shallow aquifer is hydraulically connected to the springs (Springs 1, 2, and 3/3A) which feed the on-site ponds and are used as a potable source of water for Camp Navajo personnel. Migration of PFAS to the regional aquifer in this area is unlikely due to the presence of the regional aquifer and the Camp Navajo Clay confining unit. The surface water runoff in this area enters storm drains which flow into enclosed pipes, and eventually exit through culverts into holding ponds. Water fed to the holding ponds generally infiltrates or overflows into ephemeral drainage ditches which flow to the south. The holding ponds are discussed further in **Section 6.4**.

Ground-disturbing activities to surface soil at AOI 3 and the holding ponds may result in installation worker, construction worker, off-installation residents (about 3/4-mile away), and visitor/trespasser exposure to potential PFAS contamination via ingestion or inhalation of airborne particulates. Ground-disturbing activities to subsurface soil could result in construction worker exposure to PFAS contamination via ingestion or inhalation of airborne particulates. Given the location of Building 2 above the Camp Navajo Clay unit (USGS, 1987), there is the potential for PFAS

contamination in the shallow perched aquifer, which is in communication with the potable springs and potentially shallow aquifers off-installation, via infiltration at Building 2, or at the Cantonment Area Holding Ponds. Therefore, there is a potentially complete exposure pathway from shallow groundwater to installation workers and off-installation residents. There is also the potential for the perched aquifer to be in communication with the regional aquifer. Based on the stormwater pathway to the Cantonment Area Holding Ponds, which occasionally overflow to Volunteer Wash, there is a potentially complete exposure pathway from surface water and sediment to installation workers, construction workers, off-installation residents, and visitors/trespassers. The CSM for AOI 3 is shown on **Figure 6-4**.

6.4 AOI 4 Holding Ponds

AOI 4 is the WWTP Holding Ponds & Effluent Reuse Area. The old holding ponds are located just to the east of the current pond. Potential secondary PFAS releases from impacted water received at the WWTP may have occurred as a result of AFFF usage in the 200 Area. No remediation activities have occurred at the WWTP Holding Ponds & Effluent Reuse Area.

PFAS are water soluble and migrate readily to groundwater. Since PFAS containing water from the 200 Area may have entered the WWTP Holding Ponds & Effluent Reuse Area, PFAS may have migrated from the surface water and sediment in the ponds to the regional aquifer.

Ground-disturbing activities to surface soil at AOI 4 may result in installation worker, construction worker, off-installation resident (1.65-miles to the north-northeast), and visitor/trespasser exposure to potential PFAS contamination via ingestion or inhalation of airborne soil particulates. Ground-disturbing activities to subsurface soil could result in construction worker exposure to potential PFAS contamination via ingestion or inhalation of airborne soil particulates. Based on the potential for water to infiltrate to the regional aquifer, and given the presence of potable well CN-2 downgradient, and deep public supply wells (1.5-miles to the north), there is a potentially complete exposure pathway for groundwater to installation workers and off-installation residential receptors. Based on the potential for PFAS to be present in the holding pond water, and for the holding pond water to be discharged to the effluent reuse area (**Figure 3-1**), there is a potentially complete exposure pathway for surface water and sediment to installation workers, construction workers, and trespassers. The CSM for AOI 4 is shown on **Figure 6-5**.

6.5 AOI 5 NAAD-40

AOI 5 is the Former Sanitary Landfill (NAAD-40). Potential secondary PFAS releases from impacted sludge brought to AOI 5 from the WWTP may have occurred. AFFF usage in the 200 Area likely resulted in flow of PFAS impacted water to the WWTP and could have led to PFAS contamination in the WWTP sludge. No remediation activities for PFAS have occurred at NAAD-40.

PFAS are water soluble and can migrate readily to groundwater. The NAAD-40 landfill is unlined; therefore, leaching of PFAS material from WWTP sludge in the landfill to the water table may have occurred. The 2015 Five Year Review identifies a perched water table below AOI 5 (USACE, 2015). This shallow aquifer is potentially hydraulically connected to shallow aquifers off the installation which feed private potable wells. To take a conservative approach, this shallow aquifer may also be in communication with the deep regional aquifer.

Ground-disturbing activities to surface soil and subsurface soil at AOI 5 will not occur given current land use restrictions at the AOI (USACE, 2015). Therefore, there are no complete exposure pathways for PFAS contamination in surface soil and subsurface soil. Given the potential for PFAS

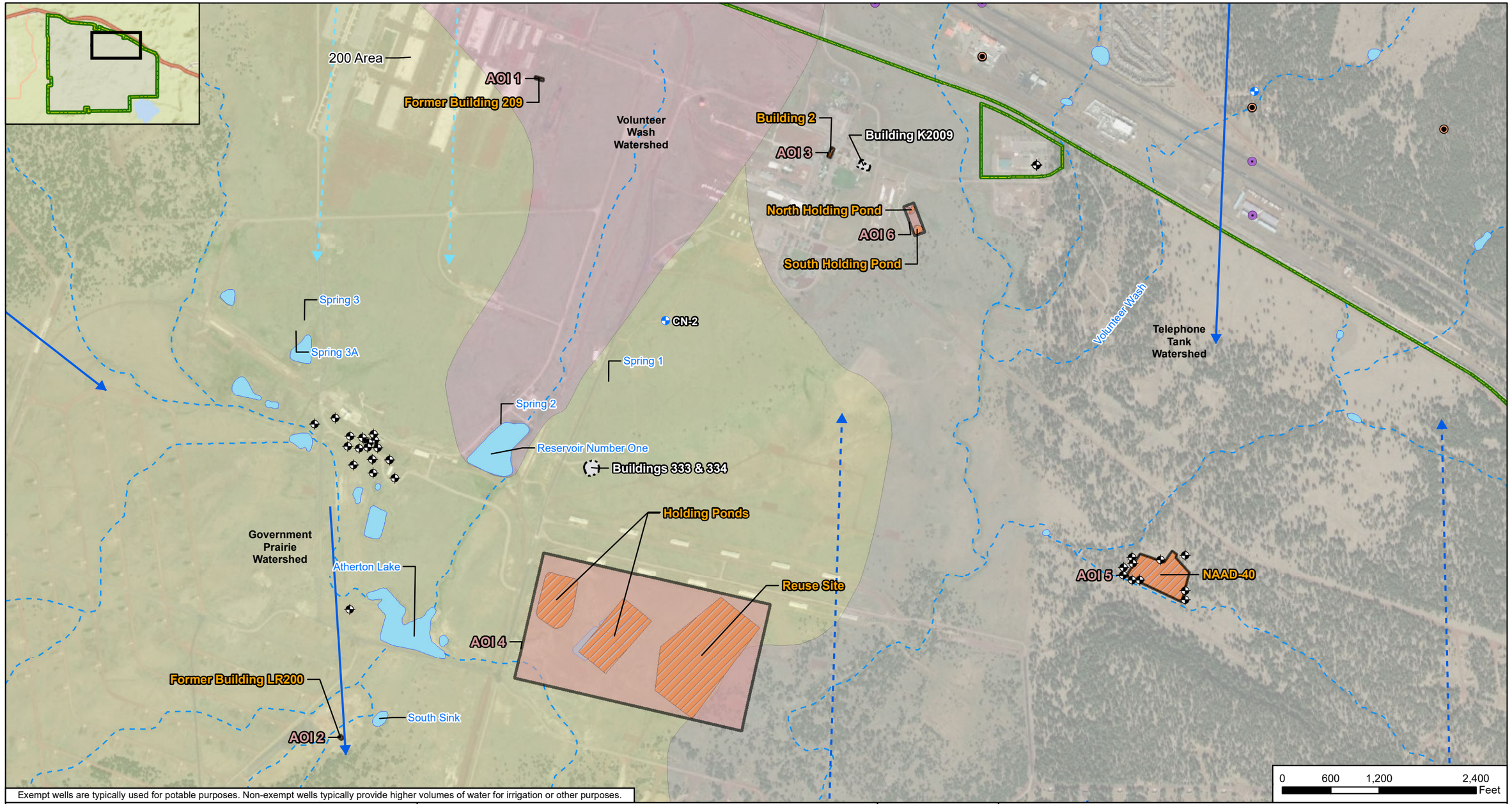
to have leached to the perched water table or the regional aquifer, there is the potential for multiple residential wells off the installation which are screened in shallow and regional aquifers to be hydraulically connected to the aquifer at NAAD-40. Therefore, there is a potentially complete exposure pathway from groundwater to off-installation residential receptors. The landfill soil cap keeps surface water from coming into contact with potential PFAS-containing materials; therefore, there is no complete exposure pathway from surface water and sediment to any receptor. The CSM for AOI 5 is shown on **Figure 6-6**.

6.6 AOI 6 North and South Holding Ponds

AOI 6 is the North and South Cantonment Area Holding Ponds. Potential secondary PFAS releases from impacted surface water and sediment may have occurred at the ponds. No remediation activities have occurred at the Cantonment Area Holding Ponds.

PFAS are water soluble and readily migrate to groundwater. Since PFAS containing surface water and sediment likely entered AOI 6 through the stormwater drains at Building 2, PFAS may have migrated from surface water and sediment to soil and groundwater. A perched water table sits below the Cantonment Area Holding Ponds. This shallow aquifer is potentially hydraulically connected to the springs (Springs 1, 2, and 3/3A) which feed the on-site ponds and are used as a potable source of water for Camp Navajo personnel.

Ground-disturbing activities to surface soil and subsurface soil at AOI 6 may result in installation worker, construction worker, off-installation residents (0.55-miles to the north-northeast), and visitor/trespasser exposure to potential PFAS contamination via ingestion or inhalation of airborne soil particulates. Ground-disturbing activities to subsurface soil could result in construction worker exposure to potential PFAS contamination via ingestion or inhalation of airborne soil particulates. AOI 6 is located above the Camp Navajo Clay atop which sits a perched aquifer. There is the potential for PFAS to have leached to the shallow aquifer. The shallow residential wells within 0.6-miles to the north, and the natural springs at Camp Navajo use water from this perched aquifer for potable purposes. Therefore, there is a potentially complete exposure pathway from shallow groundwater to off-installation residents and installation workers. There is also the potential for the perched aquifer to be in communication with the regional aquifer. The Cantonment Area Holding Ponds may overflow into Volunteer Wash and eventually off-site during periods of abnormally high surface water discharge. Therefore, there is a potentially complete exposure pathway for surface water and sediment to all receptors. The CSM for AOI 6 is shown on **Figure 6-7**.



Exempt wells are typically used for potable purposes. Non-exempt wells typically provide higher volumes of water for irrigation or other purposes.

CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Camp Navajo, AZ			
REVISED	9/17/2020	GIS BY	MS	9/17/2020
SCALE	1:14,400	CHK BY	PD	9/17/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	9/17/2020

- Area of Interest
- Potential PFAS Release
- No Suspected Release
- Facility Boundary
- Water Body
- Ephemeral/Intermitent Stream
- Surface Water Flow Direction
- Inferred Shallow Groundwater Flow Direction
- Inferred Groundwater Flow Direction
- Exempt Well
- Monitoring Well
- Non-Exempt Well
- Potable Well

N

Areas of Interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-1

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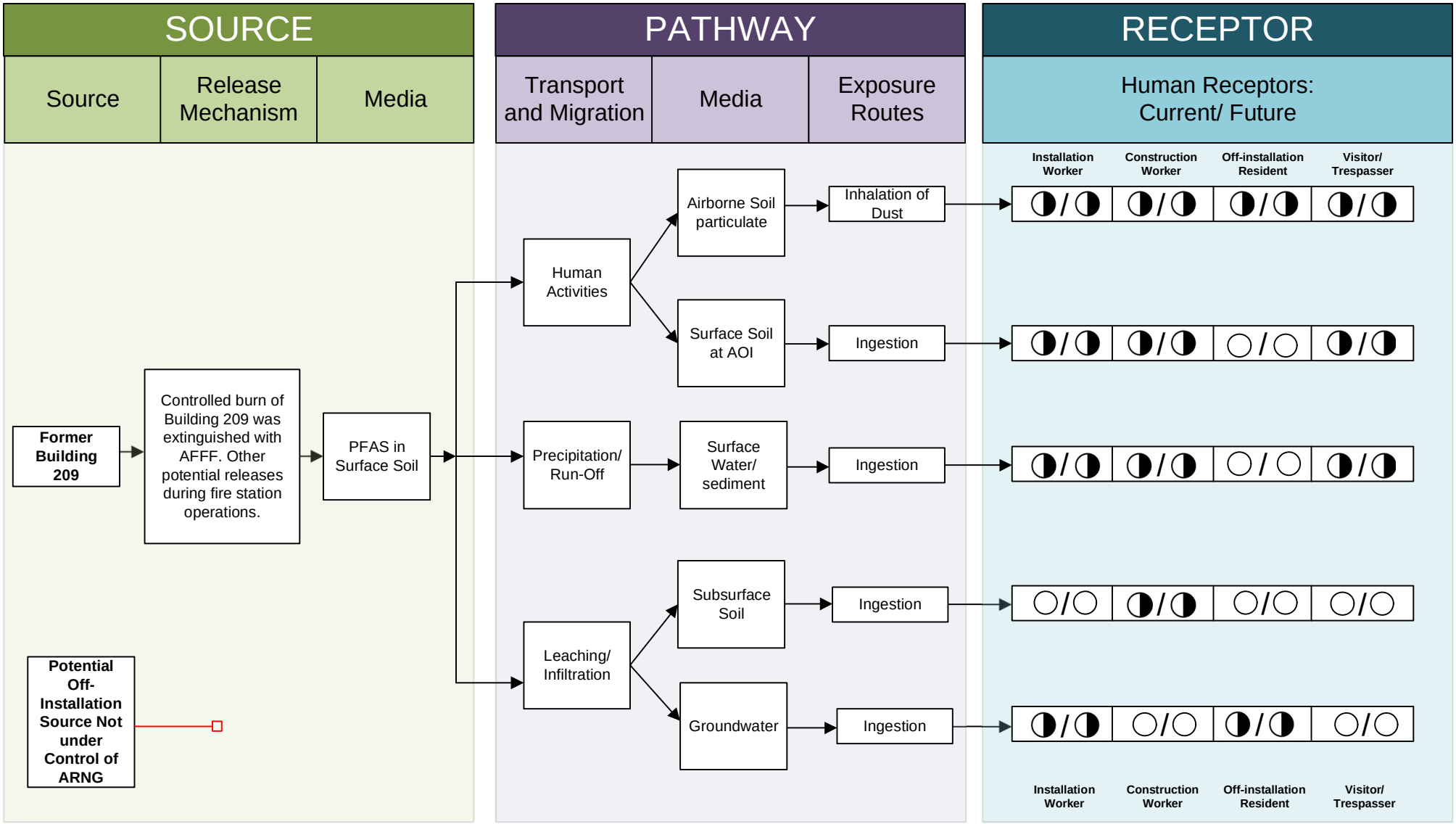
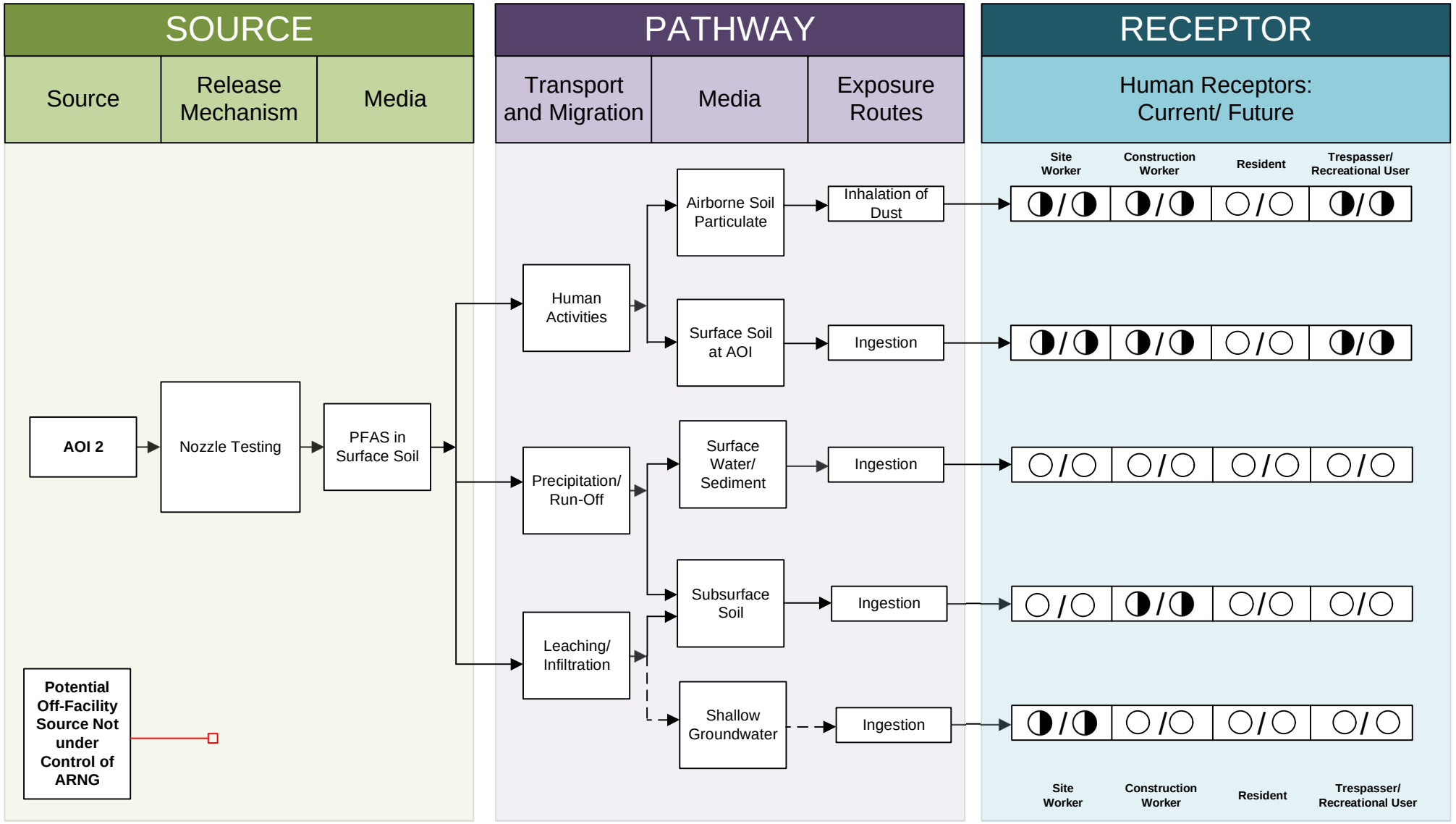


LEGEND

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

Note: 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 is sparse and continues to be the subject of PFAS toxicological study.

Figure 6-2
Preliminary Conceptual Site Model – AOI 1 Former Building 209
Camp Navajo

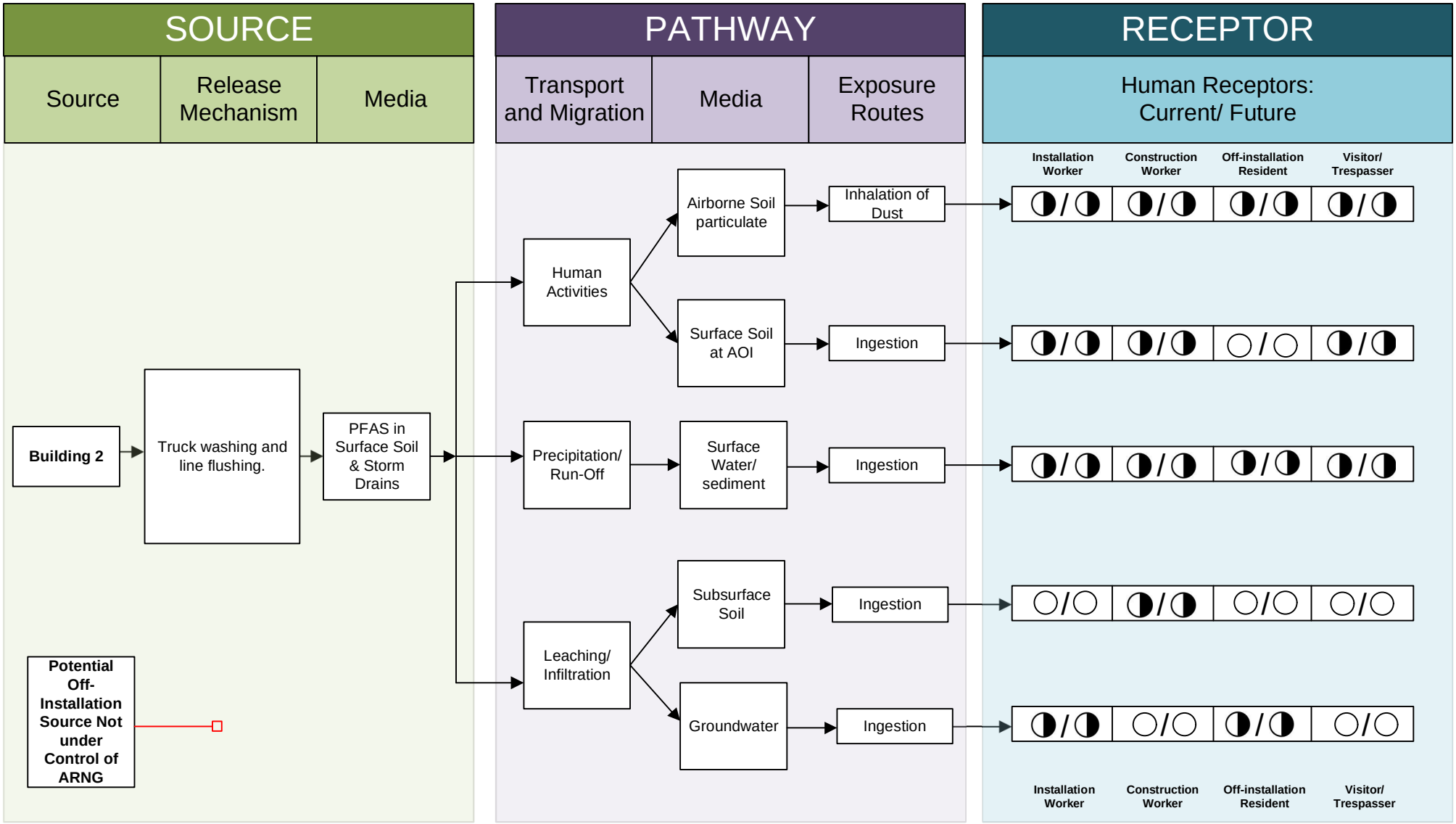


Note: The residential receptor refers to an off-facility receptor.

LEGEND

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

Figure 6-3
Preliminary Conceptual Site Model
AOI 2 – OCTC Fire Station

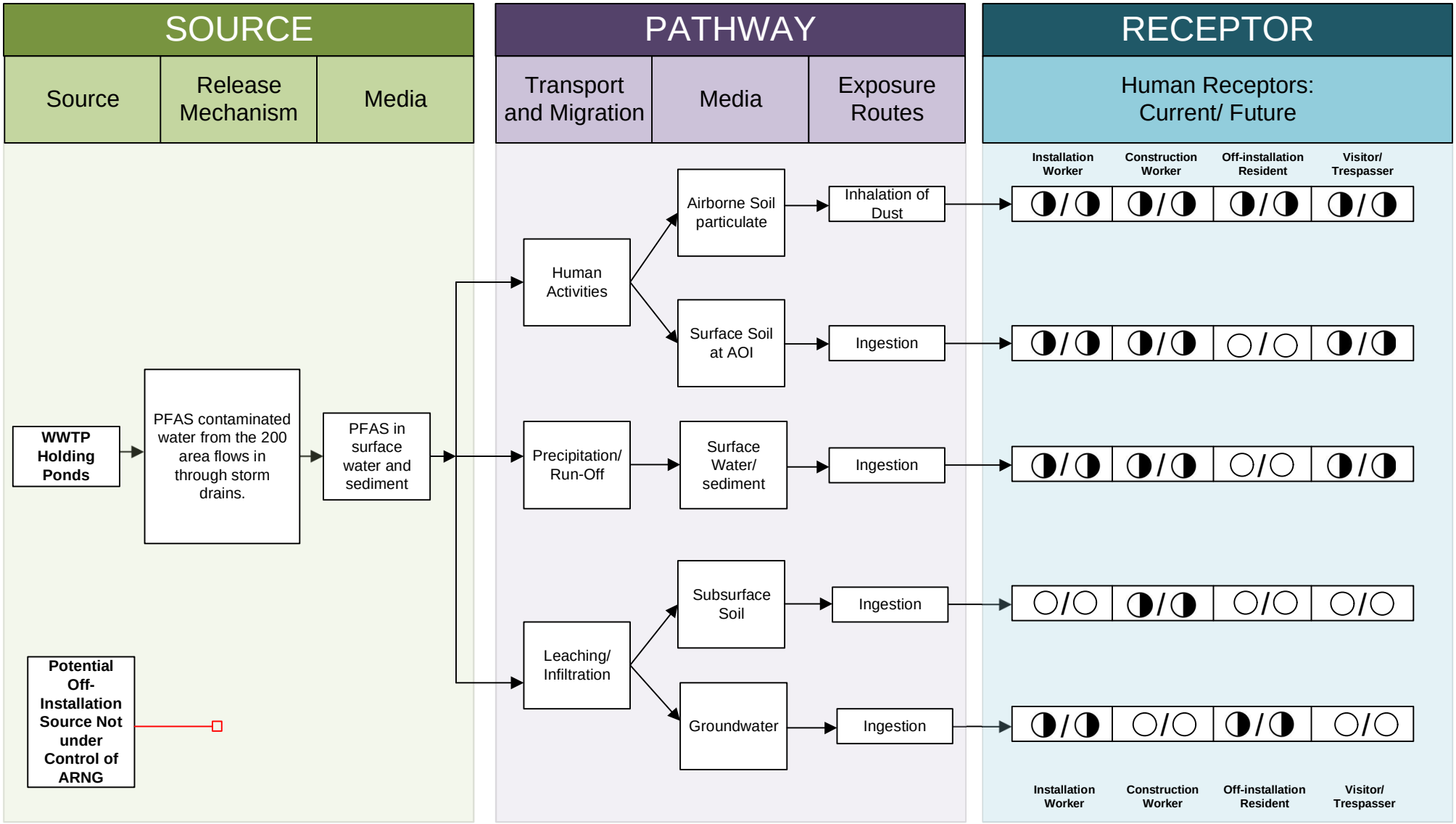


LEGEND

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

Note: 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 is sparse and continues to be the subject of PFAS toxicological study.

Figure 6-4
Preliminary Conceptual Site Model – AOI 3 Building 2
Camp Navajo

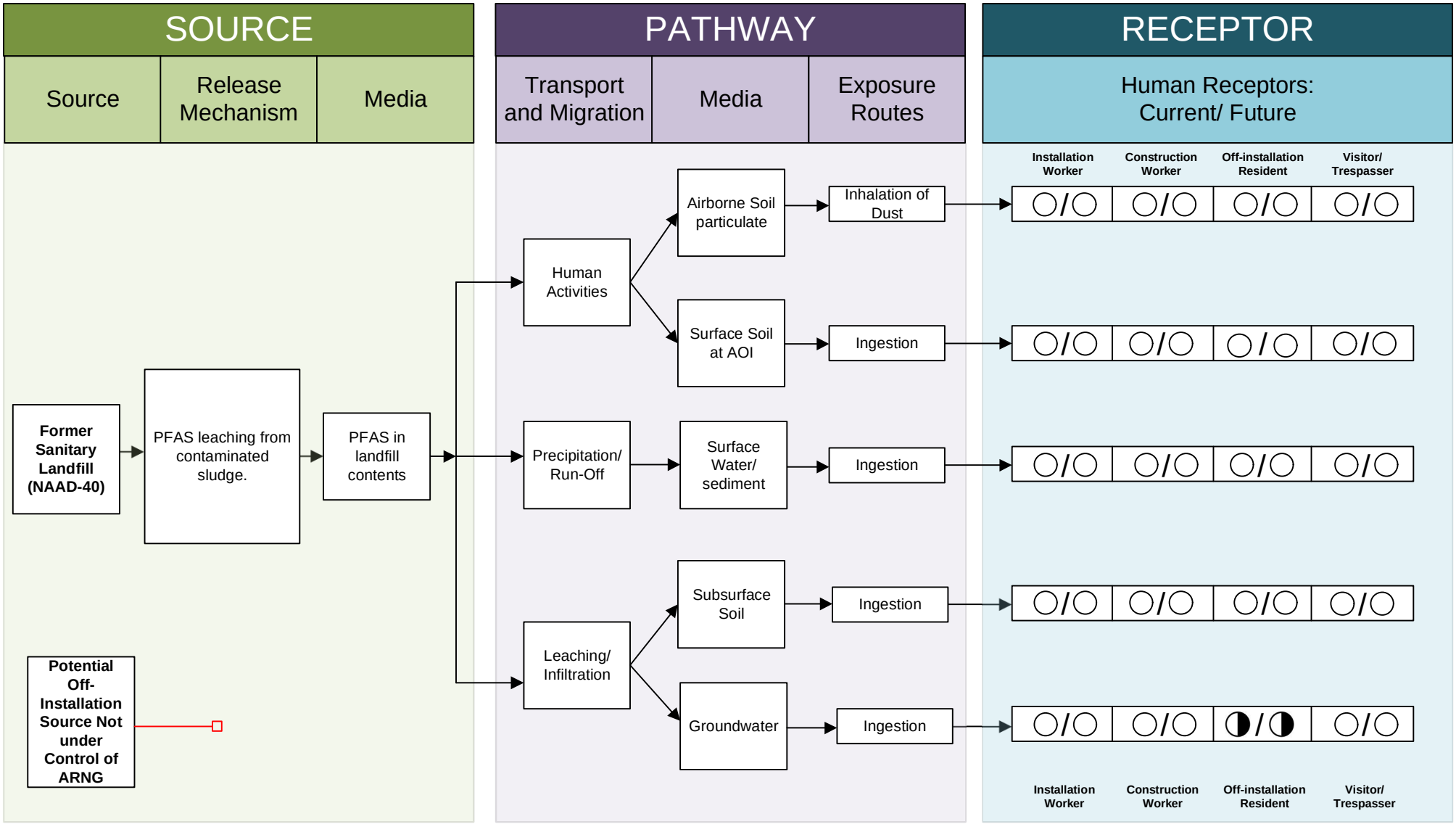


LEGEND

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

Note: 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 is sparse and continues to be the subject of PFAS toxicological study.

Figure 6-5
Preliminary Conceptual Site Model – AOI 4 WWTP Holding Ponds
Camp Navajo

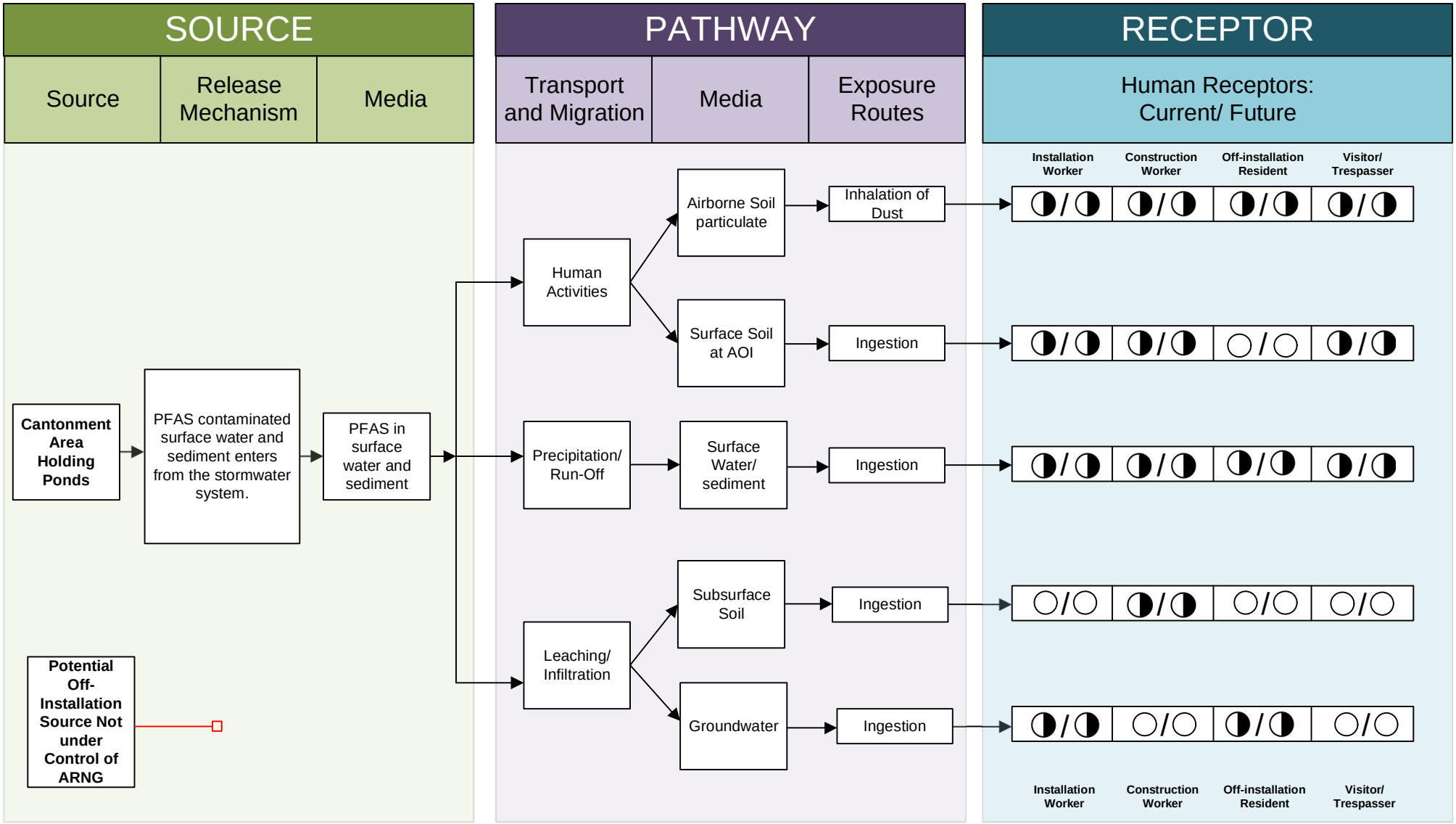


LEGEND

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

Note: 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 is sparse and continues to be the subject of PFAS toxicological study.

Figure 6-6
Preliminary Conceptual Site Model – AOI 5 Former Sanitary Landfill (NAAD-40)
Camp Navajo



LEGEND

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

Note: 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 is sparse and continues to be the subject of PFAS toxicological study.

Figure 6-7
Preliminary Conceptual Site Model – AOI 6 Cantonment Area Holding Ponds
Camp Navajo

7. Conclusions

This PA report presents a summary of information on known or suspected PFAS releases via management and use of AFFF at Camp Navajo. The findings presented below are based on a site visit, interviews with Camp Navajo personnel, and records search presented in **Appendix A** and **Appendix B**.

7.1 Findings

Six PFAS-related AOIs were identified at Camp Navajo during the PA. Section 2 and 3 discuss areas at which suspected management and discharge of AFFF occurred. **Table 7-1** summarizes these areas and presents the rationale for their consideration as viable sources of PFAS contamination.

Table 7-1: Camp Navajo PA AOIs

Potential Release Area	Used by	Determination	Rationale
(AOI 1) Former Building 209	ARNG/AZARNG	One suspected release	A suspected discharge of AFFF was reported during fire training activity between 2000 and 2003. Potential release related to firetruck washing and hose flushing activities may have occurred prior to this time period while Building 209 operated as a fire station.
(AOI 2) Former Building LR200	ARNG/AZARNG	One suspected release	One suspected discharge of AFFF was reported during fire training activity between 1994 and 1999.
(AOI 3) Building 2	ARNG/AZARNG	Multiple suspected releases	Non-fire training activities (washing of fire trucks, flushing of hose lines, etc) occurred outside of Building 2 from 2000 – 2012/2013.
(AOI 4) Holding Ponds	ARNG/AZARNG	Suspected secondary releases	Secondary releases of PFAS related to discharges of AFFF in the 200 Area may have occurred.
(AOI 5) NAAD-40	ARNG/AZARNG	Suspected secondary releases	Secondary releases of PFAS related to WWTP sludge that was put in the landfill may have occurred.
(AOI 6) North and South Holding Ponds	ARNG/AZARNG	Suspected secondary releases	Secondary releases of PFAS related to discharges of AFFF at Building 2 may have occurred.

A summary of findings for this PA is shown on **Figure 7-1**.

Based on the documented primary and secondary PFAS releases at these AOIs, there is potential for exposure to PFAS contamination in media at or near the facility. The preliminary CSMs for the

installation are shown on **Figures 6-2** through **6-7**, which present the potential receptors and media impacted.

One other non-FTA area, which is not considered an AOI, was identified:

- Current Fire Station: The current fire station does not use AFFF. Only Class A foam is used. A misshipment of AFFF resulted in 10-gallons being stored at the station during the PA site visit; however, there have been no documented releases of AFFF at the station.

7.2 Uncertainties

Interviews, aerial imagery, historical records, and other information sources were evaluated during this PA to determine the potential for PFAS-containing materials to have been present, used, or released at the installation.

Table 7-2 summarizes the uncertainties associated with the PA:

Table 7-2: Uncertainties within the PA

Area Evaluated	Source of Uncertainty
Holding Ponds	Camp Navajo personnel indicated that they suspect communication between the 200 Area stormwater system and the WWTP. Although this communication has not been confirmed, an increase in the WWTP's influent has been correlated to periods of heavy precipitation.
North and South Holding Ponds	The amount of AFFF and concentration of PFAS in the AFFF entering the north and south cantonment holding ponds from the storm drains near Building 2, and subsequently draining to the Holding Ponds is unknown; the number of times the holding ponds overflowed is unknown.
Former Building LR200	Dates, durations, and volume of AFFF discharged during fire training; concentration of PFAS in the AFFF discharged.
Former Building 209	Dates, durations, and volume of AFFF discharged during fire training; concentration of PFAS in the AFFF discharged.
Building 2	The number of truck washing/hose flushing events is unknown; Maintenance program for the vehicle-mounted AFFF discharge systems is unknown; Potential storage of AFFF at this former fire station is unknown.
200 Area	Vague and uncertain information was obtained from interviewees regarding other potential fire training areas near Building 209. Very little to no information is available on these potential activities.
Current and Former Fire Stations	The volume of AFFF managed at Camp Navajo throughout the installation's history is unknown.

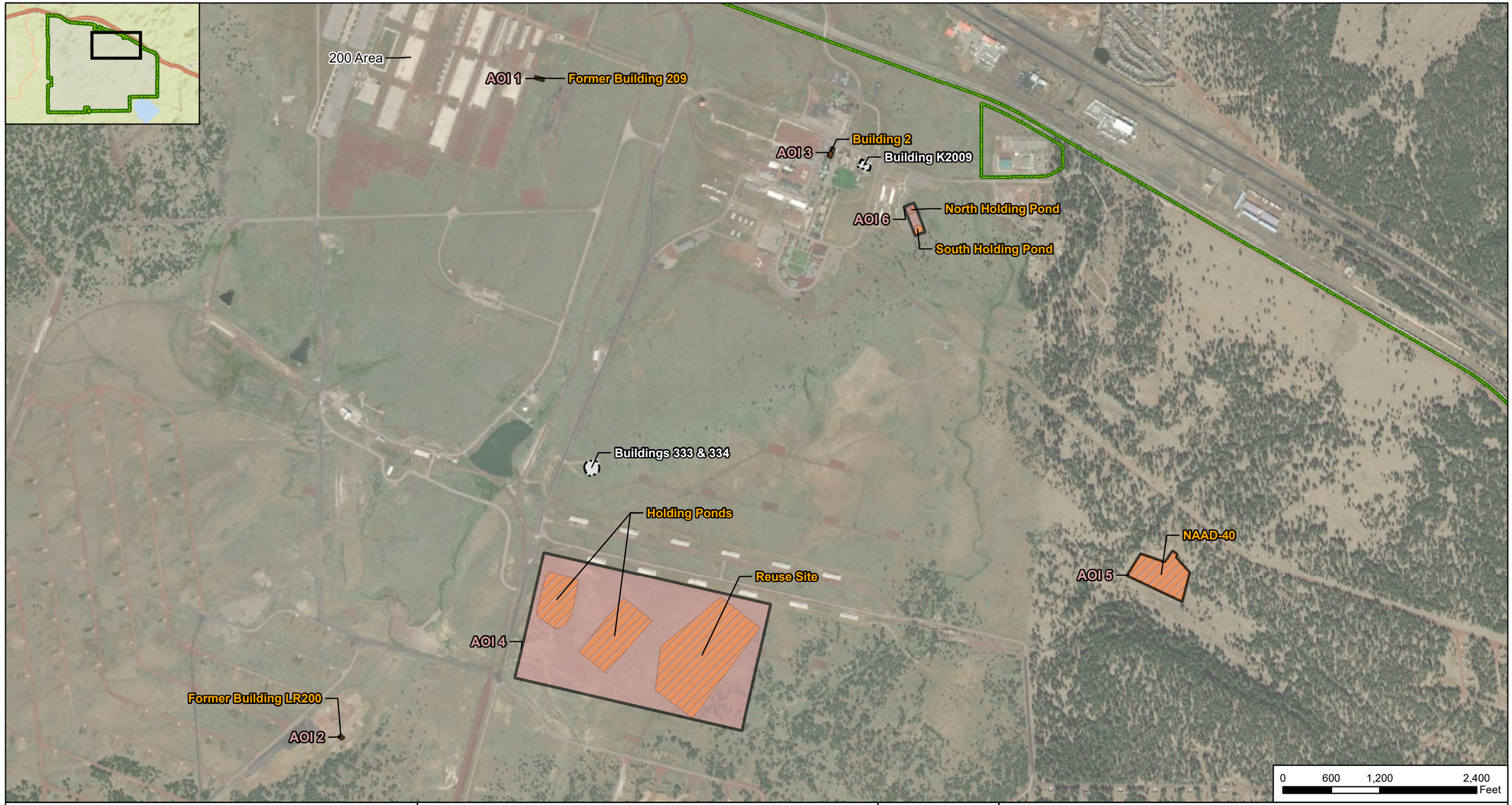
7.3 Potential Future Actions

Interviews and records (covering 1990s to present) indicate that current or former ARNG/AZARNG activities may have resulted in AFFF discharges or secondary PFAS releases at the AOIs identified during the PA. Based on the CSMs developed for the AOIs, receptors have been potentially exposed to PFAS in airborne particulates, surface and subsurface soil, surface water, sediment, and groundwater. **Table 7-3** summarizes the rationale used to determine if the AOI should be considered for further investigation under the CERCLA process and undergo a SI.

Table 7-3: PA Findings Summary

Area of Interest	AOI Location	Rational	Potential Future Action
AOI 1 Former Building 209	35°13'50.6''N, 111°50'03.2''W	The building was intentionally burned between 2000 – 2003 and AFFF was most likely used to put out the fire.	Proceed to an SI.
AOI 2 Former Building LR200	35°12'32.1''N, 111°50'34.0''W	The building was intentionally burned between 1994 – 1999 and AFFF was most likely used to put out the fire.	Proceed to an SI.
AOI 3 Building 2	35°13'41.7''N, 111°49'19.6''W	A leaking truck which held AFFF was parked here. The truck was washed and hose lines were flushed out in the parking lot.	Proceed to an SI.
AOI 4 Holding Ponds	35°12'46.4''N, 111°49'59.7''W & 35°12'42.1''N, 111°49'51.5''W	PFAS contaminated stormwater from the 200 Area may have entered the WWTP system, and discharged as effluent to the holding ponds and effluent reuse area.	Proceed to an SI.
AOI 5 NAAD-40	35°12'50.5''N, 111°48'30.2''W	PFAS contaminated sludge from the WWTP may have been disposed of at the NAAD-40 landfill.	Proceed to an SI.
AOI 6 North and South Holding Ponds	35°13'34.8''N, 111°49'07.3''W & 35°13'32.4''N, 111°49'06.4'' W	PFAS contaminated stormwater from Building 2 may have discharged to the north and south cantonment holding ponds.	Proceed to an SI.

ARNG will evaluate the need for an SI at AOIs 1, 2, 3, 4, 5, and 6 at Camp Navajo based on the potential receptors and the potential migration of PFAS contamination off the installation. ARNG sites will be prioritized for SIs based on funding.



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Camp Navajo, AZ			
REVISED	9/17/2020	GIS BY	MS	9/17/2020
SCALE	1:14,400	CHK BY	PD	9/17/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	9/17/2020

- Area of Interest
- Potential PFAS Release
- No Suspected Release
- Facility Boundary

N

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 7-1

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Appendix A
Data Resources

Data Resources will be provided separately on CD. Data Resources for Camp Navajo include:

Previous Investigations Completed at Camp Navajo and Surrounding Area

- 1997 Final Site Closure Report, Building 2 – Fire Station
- 2013 Camp Navajo Integrated Natural Resources Management Plan (Revision), Bellemont, Arizona
- 2018 Final Long-Term Management Groundwater Monitoring and Land-Use Control Report For NAAD Sites 11B, 40, 43, 01, and 20 at Camp Navajo, Coconino County, Arizona
- 2018 Final Annual 2017 Post Closure Care Report For NAAD-02 and Regional Aquifer Wells at Camp Navajo, Coconino County, Arizona
- 2000 Water Resources of Bellemont Park, Coconino County, Arizona
- 2015 Five Year Review Report – U.S. Army Corps of Engineers

Camp Navajo EDR™ Report

- 2019 Camp Navajo Environmental Data Resources, Inc.™ Report

Additional Resources

- 1987 Geologic Map of the Central Part of the San Francisco Volcanic Field, North-Central Arizona – USGS
- 1998 Geology and Fracture Analysis of Camp Navajo, Arizona Army National Guard – US Geological Survey
- Arizona Wells Registry – Arizona Department of Water Resources

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire - Environmental Manager

Facility: Alaska
Interviewer: [redacted]
Date/Time: 11/6/18

Interviewee: [redacted] **Title:** ~~ANG~~ Directorate Env. Cleanup Mgr **Phone Number:** [redacted] **Email:** [redacted]	Can your name/role be used in the PA Report? (Y) or N Can you recommend anyone we can interview? (Y) or N [redacted] & [redacted]

1. Roles or activities with the Facility/years working at the Facility.

   ~20 yrs
   - Environmental Cleanup Mgr. w/ NGB.

2. Where can I find previous facility ownership information?

   Forest Service Land & ranchers

3. What can you tell us about the history of PFAS including aqueous film forming foam (AFFF) at the Facility? Was it used for any of the following activities, circle all that apply and indicate years of active use, if known? Identify these locations on a facility map. No info

   Maintenance
   Fire Training Areas
   Firefighting (Active Fire)
   Crash
   Fire Suppression Systems (Hangers/Dining Facilities)
   Fire Protection at Fueling Stations
   Non-Technical/Recreational/ Pest Management
   Metals Plating Facility
   Waterproofing Uniforms (Laundry Facilities)
   Other

4. Fill out CSM Information worksheet with the Environmental Manager.

5. Are any current buildings constructed with AFFF dispensing systems or fire suppression systems? What are the AFFF/suppression system test requirements? What is the frequency of testing the AFFF/suppression system? Do you have "As Built" drawings for the buildings? No

Notes:
- Sludge used to be disposed of at sanitary landfill. Landfill is capped, but not lined.
- Old post office & commissary burned in early 2000s. Next to Bldg 2.
- Area of LR200 is lower elevation & not the same aquifer as Springs. Springs have a very small recharge area.
- Read [redacted] thesis for onsite geology info.
- Drains from WWTP from 200 area?
- OWS were at 200 bldgs. Some were taken out. Still one at train main. Bldg.

PA Interview Questionnaire - Environmental Manager

Facility: Navajo
Interviewer: [redacted]
Date/Time: 11/16/18

6. Are fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam? If retrofitted, when was that done? NO

7. How is AFFF procured? Do you have an inventory/procurement system that tracks use?

Unknown

8. What type of AFFF has been/is being used (3%, 6%, Mil Spec Mil-F-24385, High Expansion)? Manufacturer (3M, Dupont, Ansul, National Foam, Angus, Chemguard, Buckeye, Fire Service Plus)?

Unk

9. Where is the AFFF stored? How is it stored (tanks, 55-gallon drums, 5-gallon buckets)? What size are the storage tanks? Is the AFFF stored as a mixed solution (3% or 6%) or concentrated material?

Unk

10. How many FTAs are/were on this facility and where are they? Locate on a map. How many FTAs are active and inactive? For inactive FTAs, when was the last time that fire training using AFFF was conducted at them?

No info

PA Interview Questionnaire - Environmental Manager

Facility: Alaska
Interviewer [redacted]
Date/Time: 11/2/18

11. When a release of AFFF occurs during a fire training exercise, now and in the past, how is the AFFF cleaned and disposed of? Were retention ponds built to store discharged AFFF? Was the AFFF trickled to the sanitary sewer or left in the pond to infiltrate?

Unk

12. Can you recall specific times when city, county, and/or state personnel came on-post for training? If so, please state which state/county agency or military entity? Do you have any records, including photographs to share with us?

Unk

13. Did military routinely or occasionally fire train off-post? List the units that you can recall used/trained at various areas.

Unk

14. Did individual units come with their own safety personnel, did they also bring their own AFFF? Was training with AFFF part of these exercises? How were emergencies handled under these circumstances?

Unk

15. Are there specific emergency response incident reports (i.e., aircraft or vehicle crash sites and fires)? If so, may we please copy these reports? Who (entity) was the responder?

No

PA Interview Questionnaire - Environmental Manager

Facility: Navajo
Interviewer: [redacted]
Date/Time: 4/6/18

16. Do you have records of fuel spill logs? Was it common practice to wash away fuel spills with AFFF? Is/was AFFF used as a precaution in response to fuel releases or emergency runway landings to prevent fires?

No

17. Was AFFF used for forest fires or fire management on-post/off-post? If so, please describe what happened and who was involved?

Unk

18. Are there mutual aid/use agreements between county, city, and local fire department? Please list, even if informal. If formalized, may we have a copy of the agreement?

Unk

19. Can you provide any other locations where AFFF has been stored, released, or used (i.e. hangars, buildings, fire stations, firefighting equipment testing and maintenance areas, emergency response sites, storm water/surface water, waste treatment plants, and AFFF ponds)?

Unk

20. Are you aware of any other creative uses of AFFF? If so, how was AFFF used? What entities were involved?

Unk

PA Interview Questionnaire - Environmental Manager

Facility: Nawaio
Interviewer: [redacted]
Date/Time: 11/6/18

21. Are there past studies you are aware of with environmental information on plants/animals/ groundwater/soil types, etc., such as Integrated Cultural Resources Management Plans or Integrated Natural Resources Management Plans?

- provided
- Tetra Tech SI needed

22. What other records might be helpful to us (environmental compliance, investigation records, admin record) and where can we find them?

See uploaded files

23. Do you have or did you have a chrome plating shop on base? What were/are the years of operation of that chrome plating shop?

No

24. Do you know whether the shop has/had a foam blanket mist suppression system or used a fume hood for emissions control? If foam blanket mist suppression was used, where was the foam stored, mixed, applied, etc.?

No.

25. How is off-spec AFFF disposed (used for training, turned in, or given to a local Fire Station)? If applicable, do you know the name of the vendor that removes off-spec AFFF? Do you have copies of the manifest or B/L?

Unk

PA Interview Questionnaire - Environmental Manager

Facility: Navajo
Interviewer: [redacted]
Date/Time: 11/6/18

26. Do you recommend anyone else we can interview? If so, do you have contact information for them?

[redacted] & [redacted]

Notes cont:
- No groundwater connectivity at TNT Area. Stringers.
- 200 Area Sits on seeps recharge area (a basalt flow)
- TetraTech did a site inspection of Bldg 2 in '95. Available online or electronically from [redacted].
- Bldg 218 auto maintenance w/ drains & Sumps that connected to sewage system. Other Bldgs in area probably had similar setup.
- 1940s-1966 = Sanitary landfill in use.
- Until 1981 sludge placed in landfill.

Large storm drain by Bldg 209

Nearby sites = Doubts steel plant does plating
- Interstate & rail line. No haz waste spills that he knows of.

- Flooding in low areas. if culverts not maintained.
- Large Bodies of waters far away. Effimeral.
- Surface water not major drinking water source.
- NPDES is N/A
- off post wells being sampled as part of RCRA permit.
- WWTP used to have trickling water System. Current system unknown. Sludge from which system at landfill unknown.

have him send RPDP section discussing drinking water

PA Interview Questionnaire – Fire Station

Facility: Camp Navajo
Interviewer: [redacted]
Date/Time: ~~11/7~~ 11/5/18

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

1. Roles or activities with the Facility/years working at the Facility.

   Captain of FD, training officer
   10 yrs.

   * Training records for past couple of years.*

2. What can you tell us about the history of AFFF at the Facility? Was it used for any of the following activities, circle all that apply and indicate years of active use, if known? Identify these locations on a facility map.

   Maintenance (e.g., ramp washing) No
   Fire Training Areas possible (Macy truck). 10 gals at Station (wrong shipment)
   Firefighting (Active Fire) No
   Crash No
   Fire Suppression Systems (Hangers/Dining Facilities) Not aware of.
   Fire Protection at Fueling Stations run by DLA. AFFF unknown.
   Non-Technical/Recreational/ Pest Management Unknown. Fire Chief may know.

3. Are any current buildings constructed with AFFF dispensing systems or fire suppression systems? What are the AFFF/suppression system test requirements? What is the frequency of testing at the AFFF/suppression systems? Not aware of.

4. Are fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam? N/A

5. How is AFFF procured? Do you have an inventory/procurement system that tracks use?

   Misshipment. Took 2-5 gal buckets State of AZ may have. Buckets on Silverbell tracking.
   - only ~~Co~~ carry Class A Foam

   No procurement people on base. Goes through Phx.

PA Interview Questionnaire – Fire Station

Facility: Camo Navajo
Interviewer: [redacted]
Date/Time: 11/5/18

6. What type of AFFF has been/is being used (3%, 6%, Mil Spec Mil-F-24385, High Expansion)? Manufacturer (3M, Dupont, Ansul, National Foam, Angus, Chemguard, Buckeye, Fire Service Plus)?

7. Is AFFF formulated on base? If so, where is the solution mixed, contained, transferred, etc.?
No

8. Where is the AFFF stored? How is it stored (tanks, 55-gallon drums, 5-gallon buckets)? What size are the storage tanks? Is the AFFF stored as a mixed solution (3% or 6%) or concentrated material?
- on Engine 911. Going to be moved to a spill pallet.
- 5 gal buckets

9. How is the AFFF transferred to emergency response vehicles, suppression systems, flightline extinguishers? Is/was there a specified area on the facility where vehicles are filled with AFFF and does this area have secondary containment in case of spills? How and where are vehicles storing AFFF cleaned/decontaminated? ⇒ Cleaned at site of fire. If not, in front of fire house.
- Proportioning valve. Also, can dump straight into water tank on truck.
- only in an emergency. No specified areas. Instructed personnel not to use. Never batched mixed.

10. Provide a list of vehicles that carried AFFF, now and in the past, and where are/were they located?
- Engine 911 & 913 (can use, but don't)

11. Any vehicles have a history of leaking AFFF? Do you/did you test the vehicles spray patterns to make sure equipment is working properly? How often are/were these spray tests performed and can you provide the locations of these tests now and in the past? Not done regularly. Only show new hires. Do at station or on fire.
No
Yes, not w/ AFFF. Class A Foam.

PA Interview Questionnaire – Fire Station

Facility: Camp Navajo
Interviewer: [redacted]
Date/Time: 11/5/18

12. How many FTAs are/were on this facility and where are they? Locate on a map. How many FTAs are active and inactive? For inactive FTAs, when was the last time that fire training using AFFF was conducted at them?

- 200 Area (former). 3 yrs ago.
- Current at Fire House

- New fire station is 6-7 yrs. & Before that Bldg #2.

13. What types of fuels/flammables were used at the FTAs?

- Wood, Class A materials, no accelerants. Hay.

14. What was the frequency of AFFF use at each location? When a release of AFFF occurs during a fire training exercise, now and in the past, how is/was the AFFF cleaned and disposed of? Were retention ponds built to store discharged AFFF? Was the AFFF trickled to the sanitary sewer or left in the pond to infiltrate?

- pond by Bldg 375 may have been used for training. (Pond # 1)
- pond #2 used for WWTP. Final destination unknown. (infiltrating/sewer)

15. Are there mutual aid/use agreements between county, city, local fire department? Please list, even if informal. If formalized, may we have a copy of the agreement? Can you recall specific times when city, county, state personnel came on-post for training? If so, please state which state/county agency, military entity? Do you have any records, including photographs to share with us?

Never

- ~~Kaibab~~ PFAC & Wfac
- have a contingency plan that spells out ([redacted] the keeper of)

16. Did individual units come on-post with their own safety personnel, did they also bring their own AFFF? Was training with AFFF part of these exercises? How were emergencies handled under these circumstances?

NO

PA Interview Questionnaire – Fire Station

Facility: Camp Navajo
Interviewer: [redacted]
Date/Time: 6/5/18

17. Did military routinely or occasionally fire train off-post? List units that you can recall used/trained at various areas. - yes, but not for AFFF.
- Part of GFR. Go dy train w/ others in area.

18. Are there specific emergency response incident reports (i.e., aircraft or vehicle crash sites and fires)? If so, may we please copy these reports? Who (entity) was the responder?
- Not in last 10 yrs.

19. Do you have records of fuel spill logs? Was it common practice to wash away fuel spills with AFFF? Is/was AFFF used as a precaution in response to fuel releases or emergency runway landings to prevent fires?
- [redacted] would.
- Not aware of spills.

20. Was AFFF used for forest fires or fire management on-post/off-post? If so, please describe what happened and who was involved?
- Everyone in area uses Class A foam.

21. Can you provide any other locations where AFFF has been stored, released, or used (i.e. hangars, buildings, fire stations, firefighting equipment testing and maintenance areas, emergency response sites, storm water/surface water, waste water treatment plants, and AFFF ponds)?
- Fire house

None w/in last 10 yrs. Many may have had it. Last used ~11-12 yrs ago.

PA Interview Questionnaire – Fire Station

Facility: Camp Navajo
Interviewer: [redacted]
Date/Time: 11/5/18

22. Are you aware of any other creative uses of AFFF? If so, how was AFFF used? What entities were involved? No

23. How is off-spec AFFF disposed (used for training, turned in, or given to a local Fire Station)? If applicable, do you know the name of the vendor that removes off-spec AFFF? Do you have copies of the manifest or B/L?
- Going to be disposed of properly. Vendor unknown. TBD

24. Do you recommend anyone else we can interview? If so, do you have contact information for them?
- [redacted] (former chief)
- Chief [redacted] Entinedes
- [redacted]. (acting chief)
- Mechanics in Maintenace (Bldg 23)
  ↳ [redacted]

PA Interview Questionnaire - Other

Facility: Navajo
Interviewer: [redacted]
Date/Time: 11/6/18

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

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

Utilities manager, been w/ Base 19 years. Helps w/ wildlife fires.

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?

	Known Uses
All Unknown	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: Navajo
Interviewer: [redacted]
Date/Time: 11/2/16

- Bldg 209 was burned in 2004-2005.
- use by CBs. In poor condition.
- Does not recall floor drains in Bldg 2 or 209.
- Recalls an abandoned sewer collection system at area 200. System abandoned 10 years ago. Tied into main system & not used in past 20 yrs.
- There was a big infiltration problem w/ sewer system.
- Suspects older storm drains in 200 Area are tied into WWTP. Not sure, but flow rates are too high and water is coming from somewhere.
- There are 2 old holding ponds east of the new one for the WWTP. Sludge drying beds.
- During burn of 209 the fire got away from them & FD ran. Does not recall foam being used.
- He can get locations of where drinking water samples are being pulled. Knows they are sampling at faucet & springs.

  * Need to Talk w/ [redacted] *
- Storm drains outside of Bldg 2 feed to holding pond by rediment Center. Drains have not been reconfigured in past 20 yrs. Contonment area stormdrains all drain to eastern pond.
- Fire department consistently washes vehicles outside & not in bays. Have always done so.

PA Interview Questionnaire - Other

Facility: Camp Navajo
Interviewer: [redacted]
Date/Time: 11/5/18

Interviewee: [redacted] **Title:** Programs & Projects Specialist **Phone Number:** [redacted] **Email:** [redacted]	Can your name/role be used in the PA Report? (Y) or N Can you recommend anyone we can interview? (Y) or N Tony B.

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

- August 1994 - present
- Was w/ Fire department in August 1994. Also ran the WWTP. Was w/ Fire department from 1994-1999.

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?

See Notes

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: Camp Navajo
Interviewer: [redacted]
Date/Time: 11/5/18

- There was an onsite Macy for fire fighting. Macy had a 600 gallon tank & 60 gal foam tank.
- Trained w/ foam. Probably at area 200.
- Fire Dept. couldn't get the foam to work. There was more liquid than foam. May have been due to elevation?
- Yes, Afff was onsite.
- Years of training ~1995-1996.
- Trucks were numatic & connections did leak.
- Didn't fight Structure fires. Mostly wildfires.
- No info about the burning of Bldg 209.
- They may have tried to make foam once.
- Afff was stored in Bays in 5 gal buckets (3%). More was probably stored in Store Room of Bldg 2. All Stored in Bldg 2. (along north wall)
- Lines were rinsed out at Station.
- Trucks set up to do pump on the roll.
- Doesn't remember floor drains in Bldg 2 bays.
- May have as-builts of Bldg 2.
- Does not think Afff was brought in from outside organizations.
- Afff is expensive so they didn't want to use.
- Means of disposal unknown.
- Bldg 209 was the former fire Station.
- City of Williams was onsite for the burning of LR200. and Bldg 209.
- Air NG came onsite for 2 weeks of training at some point. (161st out of Papago).
- LR200 was an old Lunchroom bldg. (T-550)

PA Interview Questionnaire - Other

Facility: Camp Navajo
Interviewer: [redacted]
Date/Time: 11/5/18

Interviewee: [redacted] **Title:** Physical Plant Supervisor II **Phone Number:** [redacted] **Email** [redacted]	Can your name/role be used in the PA Report? (Y) or N Can you recommend anyone we can interview? (Y) or N [redacted]

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

- Started on Base in 1993
- w/ Fire dept from 1994-1999.

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?

	Known Uses
	Use
	Procurement
	Disposition
See	Storage (Mixed)
	Storage (Solution)
Notes	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: Navajo
Interviewer: [redacted]
Date/Time: 11/5/18

- [redacted] was chief.
- Didn't use AFFF in any systems onsite. If they had it, but doesn't recall...
- Tried not to use foam because it would clog pumps.
- Recalls training opportunity w/ other units in area where they burned down.
- Structures due to asbestos in buildings burned down.
- other units may have brought in AFFF during training.
- Remembers building burned down in the area south of Stan's Pond. (Excercise LR200).
- The buildings used to be in the area of current road millings.
- Everything including foundations removed.

Appendix B.2
Visual Site Inspection Checklists

Facility ST
Visual Survey Inspection Log

Recorded by: [redacted]
ARNG Contact: [redacted]
Date: 11/5/18

Site Name / Area Name / Unique ID: Bldg 2
Site / Area Acreage: unknown
Historic Site Use (Brief Description): Former Fire House

Current Site Use (Brief Description): Multi-use

1. Was AFFF used at the site/area? Y / N (unk)
   3a. If yes, document how AFFF was used and usage time (e.g., *fire fighting training 2001 to 2014*) Former Macy
   Parked along N & E side. Test in parking. Storm drain in area. Lines flushed.
2. Has usage been documented? (Y) / N
   2a. If yes, keep a record (place electronic files on a disk)
   Ask Randy. moved 2012.

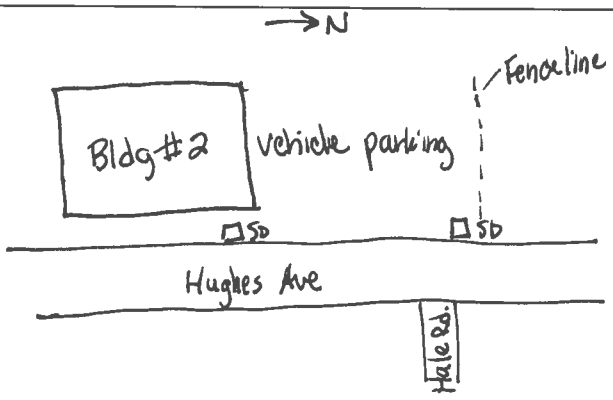
Significant Topographical Features:

1. Has the infrastructure changed at the site/area? (Y) / N
   1a. If so, please describe change: (*ex. Structures structures longer exist.*) Same Bldg, but diff. use
2. Is the site/area vegetated? (Y) / N
   2a. If not vegetated, briefly describe the site/area composition: Paved W/E & N sides. veg. at SE Corner & South side
3. Does the site or area exhibit evidence of erosion? Y / (N)
   3a. If yes, describe the location and extent of the erosion:
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:
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:
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
Storm drains in area. Asphalt direct toward drains
Former garage converted to office / kitchen area. If drains were there, they are covered up



Facility ST
Visual Survey Inspection Log

Photographic Log

Photo ID/Name	Date & Location	Description	Photograph
1	11/5/18 Bldg 2	Looking W	Former Fire house
2	" "	Looking SW	Former Fire house w/drain
3	" "	Looking S	Former Fire house w/ drains
4	" "	Looking SE	Back side of FH

Facility ST
Visual Survey Inspection Log

Recorded by: [redacted]
ARNG Contact: [redacted]
Date: 4/5/18

Site Name / Area Name / Unique ID: Bldg 209
Site / Area Acreage: Unknown
Historic Site Use (Brief Description): Fire Station

Current Site Use (Brief Description): undeveloped

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*) Training excercise
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.*) *
2. Is the site/area vegetated? Y / N
   2a. If not vegetated, briefly describe the site/area composition: *
3. Does the site or area exhibit evidence of erosion? Y / N
   3a. If yes, describe the location and extent of the erosion : *
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: *
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: *
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

* Area inaccessible (locked gate.

Large storm drain to west of former Bldg area. Drainage ditch to the south which drains east & then ultimately north. Deadends at RR. No outfall found appears to pond & infiltrate.

Facility ST
Visual Survey Inspection Log

Photographic Log

Photo ID/Name	Date & Location	Description	Photograph
7([redacted])	11/5/18	Area 209	looking South from Road

Facility ST
Visual Survey Inspection Log

Recorded by: [redacted]
ARNG Contact:
Date: 11/5/18

Site Name / Area Name / Unique ID: Containment Area Holding Ponds
Site / Area Acreage:
Historic Site Use (Brief Description): Holding pond
Current Site Use (Brief Description): Holding pond

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*)
   Drains at Bldg 2 go to pond
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.*)
2. Is the site/area vegetated? (Y) / N
   2a. If not vegetated, briefly describe the site/area composition:
3. Does the site or area exhibit evidence of erosion? Y / (N)
   3a. If yes, describe the location and extent of the erosion :
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 : water in southernmost pond & northern pond

Migration Potential:

1. Does site/area drainage flow off installation? (Y) N
   1a. If so, please note observation and location: Volunteer Canyon
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:
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

Southern most pond has out fall which goes to Volunteer Canyon & eventually offsite. No outfall in northernmost pond.

Facility ST
Visual Survey Inspection Log

Photographic Log

Photo ID/Name	Date & Location	Description	Photograph

Facility ST
Visual Survey Inspection Log

Recorded by: [redacted]
ARNG Contact: [redacted]
Date: 11/5/18

Site Name / Area Name / Unique ID: LR200
Site / Area Acreage: 1/2 - 1 ac.
Historic Site Use (Brief Description): Lunchroom Bldg (demo'd & burned in training). No a debris storage field for construction materials.
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*)
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.*)
2. Is the site/area vegetated? Y / (N)
   2a. If not vegetated, briefly describe the site/area composition: Cleared land
3. Does the site or area exhibit evidence of erosion? Y / (N)
   3a. If yes, describe the location and extent of the erosion:
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:
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:
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
Ditch along W. boundary runs N-S. Sinkhole on eastern side w/ escarpment due to Belmont fault. Sinkhole goes to regional aq.

Facility ST
Visual Survey Inspection Log

Photographic Log

Photo ID/Name	Date & Location	Description	Photograph
4[redacted]		LR200 area	looking East

Facility ST
Visual Survey Inspection Log

Recorded by: [redacted]
ARNG Contact:
Date: 11/5/18

Site Name / Area Name / Unique ID: Sanitary Landfill
Site / Area Acreage: Unknown
Historic Site Use (Brief Description): Landfill

Current Site Use (Brief Description): Landfill (household trash)

1. Was AFFF used at the site/area? Y / N (unk)
   3a. If yes, document how AFFF was used and usage time (e.g., *fire fighting training 2001 to 2014*)
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.*)
2. Is the site/area vegetated? (Y) / N
   2a. If not vegetated, briefly describe the site/area composition:
3. Does the site or area exhibit evidence of erosion? Y / (N)
   3a. If yes, describe the location and extent of the erosion :
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:
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) (X)
   3a. If so, please note observation and location: Look at report (Kim to get copy of 2018 LTM)
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

Sludge from WWTP disposed of at landfill. Closed in 2001. Capped w/ 3' of clay & 2' of soil. Trash sometimes burned.

Facility ST
Visual Survey Inspection Log

Photographic Log

Photo ID/Name	Date & Location	Description	Photograph
6 ([redacted])	11/5/18	Capped landfill	Looking NE

Facility ST
Visual Survey Inspection Log

Recorded by: [redacted]
ARNG Contact:
Date: 11/3/18

Site Name / Area Name / Unique ID: WWTP Holding Pond
Site / Area Acreage: unknown
Historic Site Use (Brief Description):

Current Site Use (Brief Description): Holding Pond

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

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.)*
2. Is the site/area vegetated? (Y) N
   2a. If not vegetated, briefly describe the site/area composition:
3. Does the site or area exhibit evidence of erosion? Y / (N)
   3a. If yes, describe the location and extent of the erosion :
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:
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:
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
Never overflows. Lined. No storm discharge.

Facility ST
Visual Survey Inspection Log

Photographic Log

Photo ID/Name	Date & Location	Description	Photograph
5[redacted]			

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: Camp Navajo

Why has this location been identified as a site?

Documented releases of AFFF

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

None identified

Training Events

Have any training events with AFFF occurred at this site? Yes

If so, how often? A few instances of controlled structure burns using AFFF

How much material was used? Is it documented? Not sure how much used. Not documented.

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? Varies across the site. Watershed drains to the south.

Average rainfall? 20.16''

Any flooding during rainy season? No

Direct or indirect pathway to ditches? Yes

Direct or indirect pathway to larger bodies of water? Yes. Eventual drainage to Volunteer Wash.

Does surface water pond any place on site? No natural ponding.

Any impoundment areas or retention ponds? Yes. Near the springs, WWTP, and Cantonment Area.

Any NPDES location points near the site? No

How does surface water drain on and around the flight line? N/A

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? Variable. Regional flow toward north.

Depth to groundwater? Variable. Perched aquifers and regional aquifer. Varies 100 ft – 1,700 ft bgs.

Uses (agricultural, drinking water, irrigation)? One drinking water well on-site.

Any groundwater treatment systems? No.

Any groundwater monitoring well locations near the site? Yes, many monitoring wells on-site.

Is groundwater used for drinking water? Yes

Are there drinking water supply wells on installation? Yes

Do they serve off-post populations? No

Are there off-post drinking water wells downgradient ?

Exempt wells down-gradient of assumed regional GW flow to the north of the base. Exempt wells down gradient of surface water flow to the south of the base.

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? Yes, currently.

If so, do we understand the process and which water is/was treated at the plant? Unsure whether water from the 200 area drains to WWTP or not.

Do we understand the fate of sludge waste? Sent to on-site landfill from 1966-1981

Is surface water from potential contaminated sites treated?

Domestic and industrial wastewater generated at Camp Navajo is treated there.

Equipment Rinse Water

1. Is firefighting equipment washed? Where does the rinse water go?

Truck and hose lines containing AFFF were washed in parking lot of Bldg 2 – Former Fire Station. Water likely went into storm drain which empty into Cantonment Area holding ponds.

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?

N/A

3. Other?

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker Yes

Construction Worker Yes

Recreational User N/A

Residential Yes

Child Residential

Ecological Yes. Surface water.

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

Large residential neighborhood to the north. Shuff Steel Co to the north. Some residences and business to the west and east of site boundaries.

Documentation

Ask for Engineering drawings (if applicable).

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

None reported

Appendix C
Photographic Log

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Navajo	Bellemont, Arizona

Photograph No. 1

Description:

Building 2 east elevation

(view to W)

Photograph No. 2

Description:

Building 2 and storm drain

(view to S)

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Navajo	Bellemont, Arizona

Photograph No. 3

Description:

Building 2 west elevation

(view to SE)

Photograph No. 4

Description:

AFFF (6%) in storage in current Fire Station

(view is S)

APPENDIX C – Photographic Log

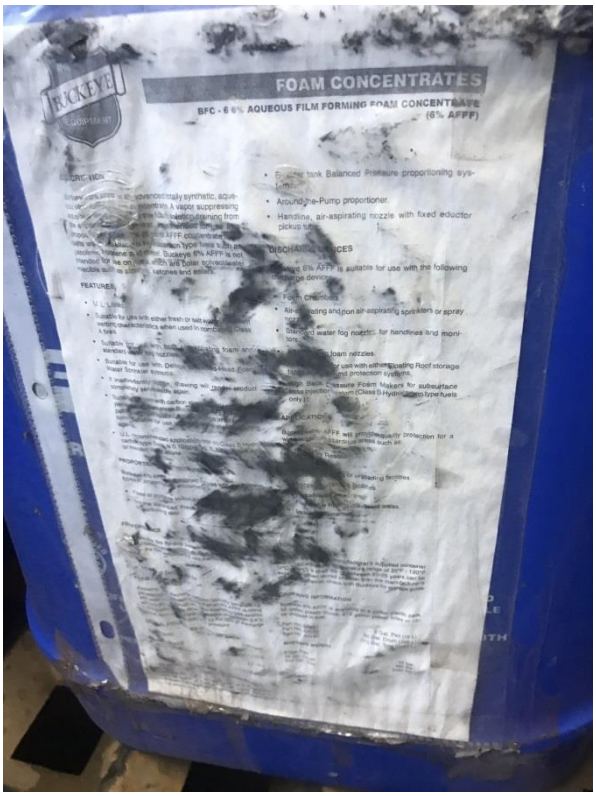
Army National Guard, Preliminary Assessment for PFAS	Camp Navajo	Bellemont, Arizona

Photograph No. 5

Description:

Label for AFFF

(view to S)



Photograph No. 6

Description:

Eastern holding ponds (southern-most)

(view to SE)

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Navajo	Bellemont, Arizona

Photograph No. 7

Description:

Eastern holding ponds (northern-most)

(view to NE)

Photograph No. 8

Description:

200 Area

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Navajo	Bellemont, Arizona

Photograph No. 9

Description:

Area of Springs

Photograph No. 10

Description:

Landfill

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Camp Navajo	Bellemont, Arizona

Photograph No. 11

Description:

LR200

Photograph No. 12

Description:

Road to 200 Area