FINAL
Preliminary Assessment Report
Rio Rancho
Rio Rancho, New Mexico

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

August 2020

Prepared for:

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

UNCLASSIFIED

Table of Contents

Executive Summary 1
1. Introduction 4
   1.1 Authority and Purpose 4
   1.2 Preliminary Assessment Methods 4
   1.3 Report Organization 5
   1.4 Facility Location and Description 5
   1.5 Facility Environmental Setting 6
      1.5.1 Geology 6
      1.5.2 Hydrogeology 6
      1.5.3 Hydrology 7
      1.5.4 Climate 7
      1.5.5 Current and Future Land Use 7
2. Fire Training Areas 11
3. Non-Fire Training Areas 12
   3.1 Hazardous Materials Storage Lockers 12
4. Emergency Response Areas 14
5. Adjacent Sources 15
6. Preliminary Conceptual Site Model 16
   6.1 AOI: Hazardous Materials Storage Lockers 1 and 2 16
7. Conclusions 20
   7.1 Findings 20
   7.2 Uncertainties 20
   7.3 Potential Future Actions 21
8. References 23

Figures

Figure ES-1 Summary of Findings
Figure ES-2 Preliminary Conceptual Site Model, Rio Rancho, New Mexico
Figure 1-1 Facility Location
Figure 1-2 Groundwater Features
Figure 1-3 Surface Water Features
Figure 3-1 Non-Fire Training Areas
Figure 6-1 Area of Interest
Figure 6-2 Preliminary Conceptual Site Model, Rio Rancho, New Mexico
Figure 7-1 Summary of Findings

Tables

Table ES-1 AOIs at Rio Rancho
Table 7-1 AOIs at Rio Rancho
Table 7-2 Sources of Uncertainties
Table 7-3 PA Findings Summary

Appendices

Appendix A Data Resources

Appendix B Preliminary Assessment Documentation

B.1 Interview Records

B.2 Visual Site Inspection Checklists

B.3 Conceptual Site Model Information

Appendix C Photographic Log

Acronyms and Abbreviations

ac-ft	acre-feet
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
AOI	Area of Interest
ARNG	Army National Guard
CERCLA	Comprehensive Environmental Response, Compensation, and LiabilityAct
CFR	Code of Federal Regulations
CSM	conceptual site model
CST	Civilian Support Team
DLA	Defense Logistics Agency
EDR™	Environmental Data Resources, Inc.™
°F	degrees Fahrenheit
FMS	Facility Maintenance Shop
FTA	Fire Training Areas
HA	Health Advisory
HDPE	high-density polyethylene
NMARNG	New Mexico Army National Guard
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
POD	Point of Diversion
RCRA	Resource Conservation and Recovery Act
SI	Site Inspection
UCMR3	Unregulated Contaminant Monitoring Rule 3
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
yr	year

Executive Summary

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

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

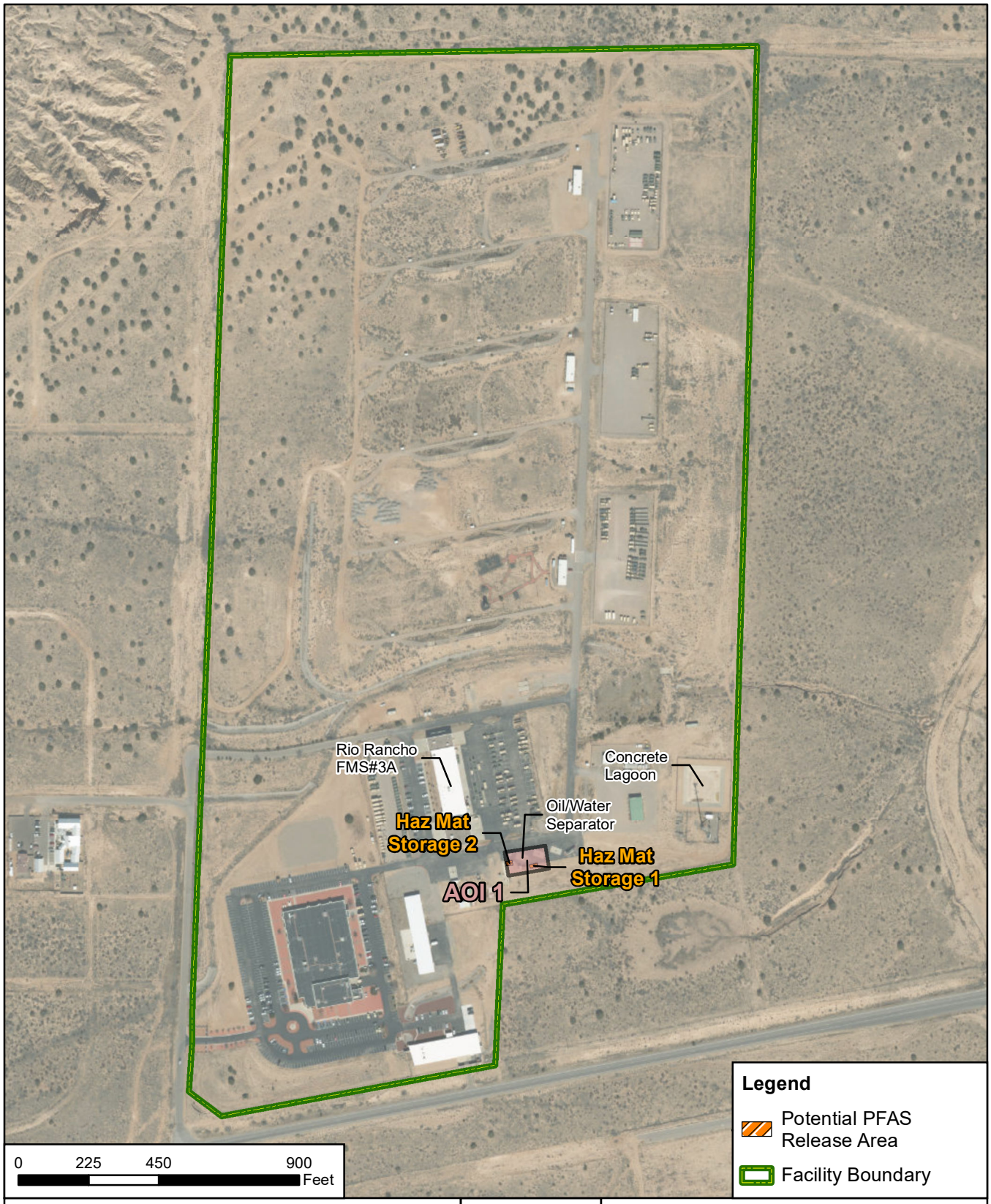
Based on the United States (US) Environmental Protection Agency (USEPA) Unregulated Contaminant Monitoring Rule 3 (UCMR3) data, it was indicated that no PFAS was detected in a public water system above the USEPA lifetime Health Advisory (HA) within 20 miles of the facility. The HA is 70 parts per trillion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

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

Table ES-1: AOIs at Rio Rancho

Area of Interest	Name	Used by	Potential Release Dates
AOI	Hazardous Materials Storage Lockers 1 & 2	NMARNG	Mid-2000s – present

Based on the PA findings, direct interviewee knowledge of releases at this facility, and a lack of robust institutional knowledge regarding historical activities concerning AFFF use and storage at the facility, there is potential for exposure to PFAS contamination in media at or near the facility. A summary of PA findings is shown on **Figure ES-1**, and the preliminary CSM for Rio Rancho is shown on **Figure ES-2**.



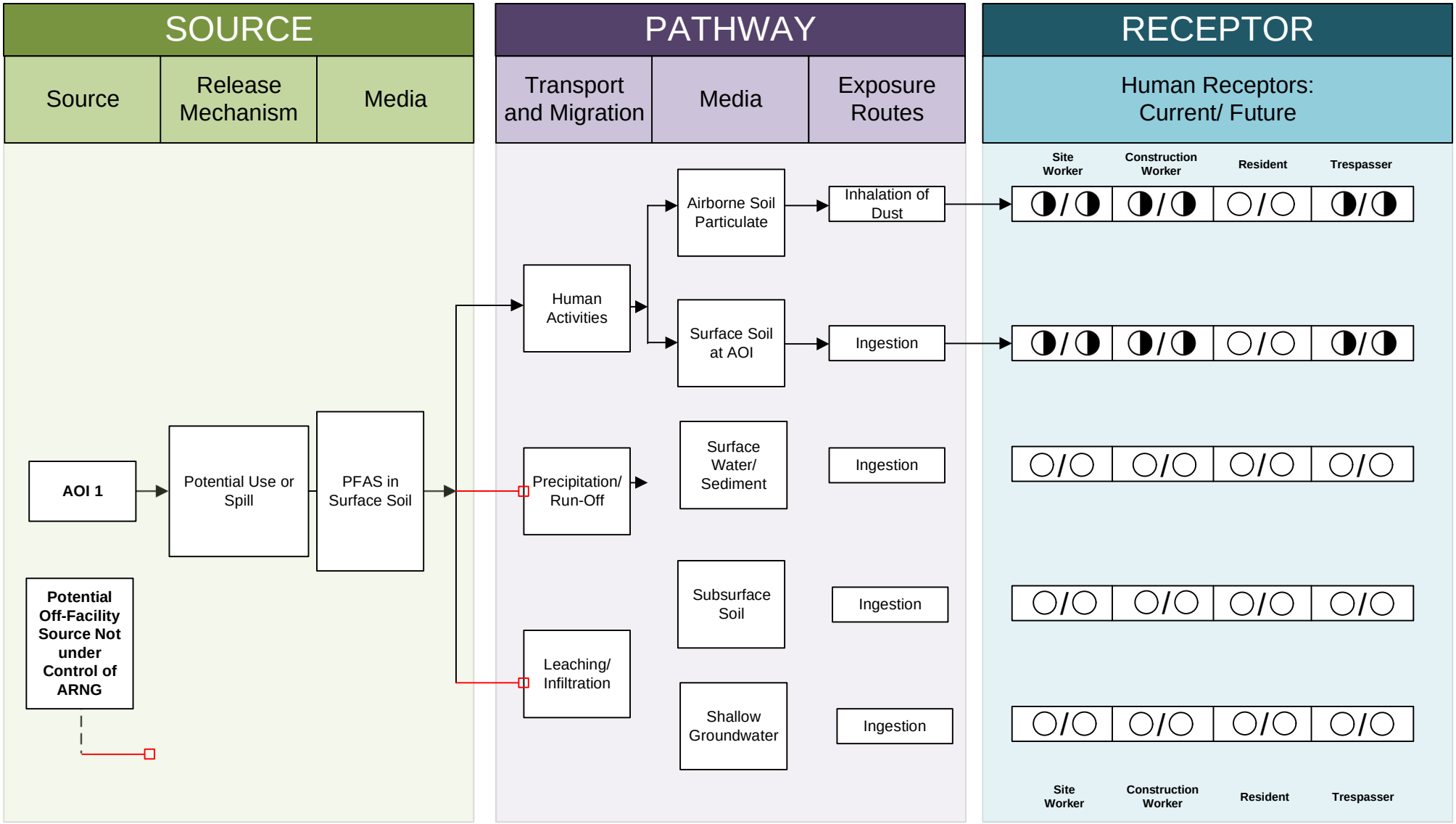
CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Rio Rancho, NM			
REVISED	4/10/2020	GIS BY	GC	4/10/2020
SCALE	1:5,400	CHK BY	MW	4/10/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	4/10/2020

N

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure ES-1



LEGEND

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

Notes:
1. The residential receptor refers to an off-facility receptor.
2. Human consumption of agricultural products potentially affected by PFAS is possible

Figure ES-2
Preliminary Conceptual Site Model
Rio Rancho, New Mexico

1. Introduction

1.1 Authority and Purpose

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

The ARNG is assessing suspected impacted facilities that used per- and poly-fluoroalkyl substances (PFAS). PFAS is most commonly used in aqueous film forming foam (AFFF) discharged as part of firefighting activities, although other sources of PFAS are possible. In addition, the ARNG is assessing businesses or operations adjacent to the ARNG facility (not under the control of ARNG) that could potentially be responsible for a PFAS release.

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

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

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

1.2 Preliminary Assessment Methods

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

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

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

1.3 Report Organization

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

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

1.4 Facility Location and Description

The NMARNG Rio Rancho facility is located in the north central portion of the Albuquerque New Mexico Metropolitan Statistical Area of New Mexico and currently resides on approximately 120 acres of land. The land is owned by the State of New Mexico and was acquired by the State Armory Board in 1987. The facility contains the Facility Maintenance Shop (FMS) #3, a readiness center, the 64th Civilian Support Team (CST), and areas used for tactical training (**Appendix A**).

The facility is located approximately 25 miles north of downtown Albuquerque, in Sandoval County, which is near the center of the New Mexico. The land was acquired in 1987 by the State Armory Board through a special warranty deed with the NMARNG as training site and Hawk Battalion between 1987 and 1995. Additional structures (the readiness Center and FMS-3 buildings) were constructed and opened in 1994, as the Hawk Missile System was phased out (**Figure 1-1**).

1.5 Facility Environmental Setting

Rio Rancho is approximately 5,300 feet above mean sea level. The approximate geographic coordinates for the center of the facility are 106°39'9.547"W; 35°22'19.323"N. The facility consists of three buildings, a readiness center, the FMS-3 building, a CST, a training area, and a ROPES obstacle course.

1.5.1 Geology

The facility lies in the Albuquerque Basin, one of the largest and deepest basins in the Rio Grande rift. The fill material in the Albuquerque Basin is mostly Cenozoic fill deposits of the Santa Fe Group. The Santa Fe Group was deposited during the middle Miocene to early Pleistocene epochs. During that time the Albuquerque Basin received alluvial sediment from the adjacent highlands and fluvial sediments from Northern New Mexico and southern Colorado (Fox et. Al., 1995). For the Albuquerque area, alluvial deposits came from the Sandia Mountains providing weathered granitic and limestone material. The fluvial deposits from the north consisted of volcanic rock fragments (Fox et. Al., 1995). Volcanic material was also deposited by wind and basalt flows from nearby volcanoes, just to the west of Albuquerque, in late the Pleistocene and Holocene eras (**Figure 1-2**) (Holliday et. al., 2006). These processes resulted in thousands of feet of sediment that lay under Albuquerque, providing a porous space for water to accumulate (Reardon, 2012).

1.5.2 Hydrogeology

Rio Rancho resides within the Santa Fe Group aquifer system of the Albuquerque Basin. The groundwater has been deposited in three main phases. The lower Santa Fe group was created by dune fields and small streams draining into playa lakes and mud flats. The sediments in this group yield low volumes of poor-quality water. Deposits in the upper Santa Fe group come from drainage of the ancestral Rio Grande and the tributaries of that river. Most of the potable water in the region comes from these later deposits, which lie 1.2 miles of the eastern boundary of the basin. Finally, the modern Rio Grande cut down into the Santa Fe group sediments to create the present river valley (Connell, 2012). Groundwater depth in the area is approximately 1000 feet below ground surface (Bartolino & Cole 2002). Groundwater flow direction is generally to the southeast (Stephens & Associates, 2017).

An EDR™ report conducted a well search for a 1-mile radius surrounding the facility (**Appendix A).** Using additional online resources, such as state and local Geographic Information System databases, wells were researched to a 4-mile radius of the facility. The City of Rio Rancho water supply consists entirely of groundwater withdrawn from the Santa Fe Group aquifer. Rio Rancho has 17 wells currently in operation and diverts about 13,000 acre-feet per year (ac-ft/yr). Three of these municipal wells are located within 1-mile west and upgradient of the facility. These wells are part of Point of Diversion ([POD] number 06745), with each well having the POD suffix POD38, POD39, and POD40, respectively. They are drilled into the Rio Grande POD Basin, and Middle Rio Grande POD Subbasin; no information about their total depths was available in the attached EDR™ report or the online well database (New Mexico Office of the State Engineer, 2020). The remaining city wells used for municipal water are located south of the facility, several miles away. Because Rio Rancho pulls the water from deep wells, the supply is not as susceptible to climate change, drought, or human-caused degradation as a surface water supply (Stephens & Associates, 2017). Rio Rancho has an emergency water shortage ordinance for times of drought or limited supply and can presently store up to 41 million gallons of water. The City of Rio Rancho has a 26,039 ac-ft/yr water rights diversion permit (Permit No. RG-6745 et.al., and Declaration

No. RG26259). As part of the pumping permit, Rio Rancho is required to purchase 728 ac-ft of water rights per 5-year period. To date, Rio Rancho has purchased more water rights than required for the current time frame.

1.5.3 Hydrology

The Rio Grande River is the largest water body in the region and is approximately 8 miles east of the facility. The inner valley of the Rio Grande contains a complex network of irrigation canals, ditches, and drains. In general, the Rio Grande flows from north to south through Sandoval County. The cities of Bernalillo, Rio Rancho, Albuquerque, Los Lunas, and Belen discharge treated effluent directly into the river (Bartolino & Cole 2002). Water features near the facility are shown in **Figure 1-3**.

Since 2001, the City of Rio Rancho has been working to expand its water resources. The Aquifer Injection Project, the first of its kind in New Mexico, allows Rio Rancho to inject purified water back into the aquifer and store it for future use. This water recharges the aquifer to maintain it as a drinking water source now and for future generations (Rio Rancho, 2019).

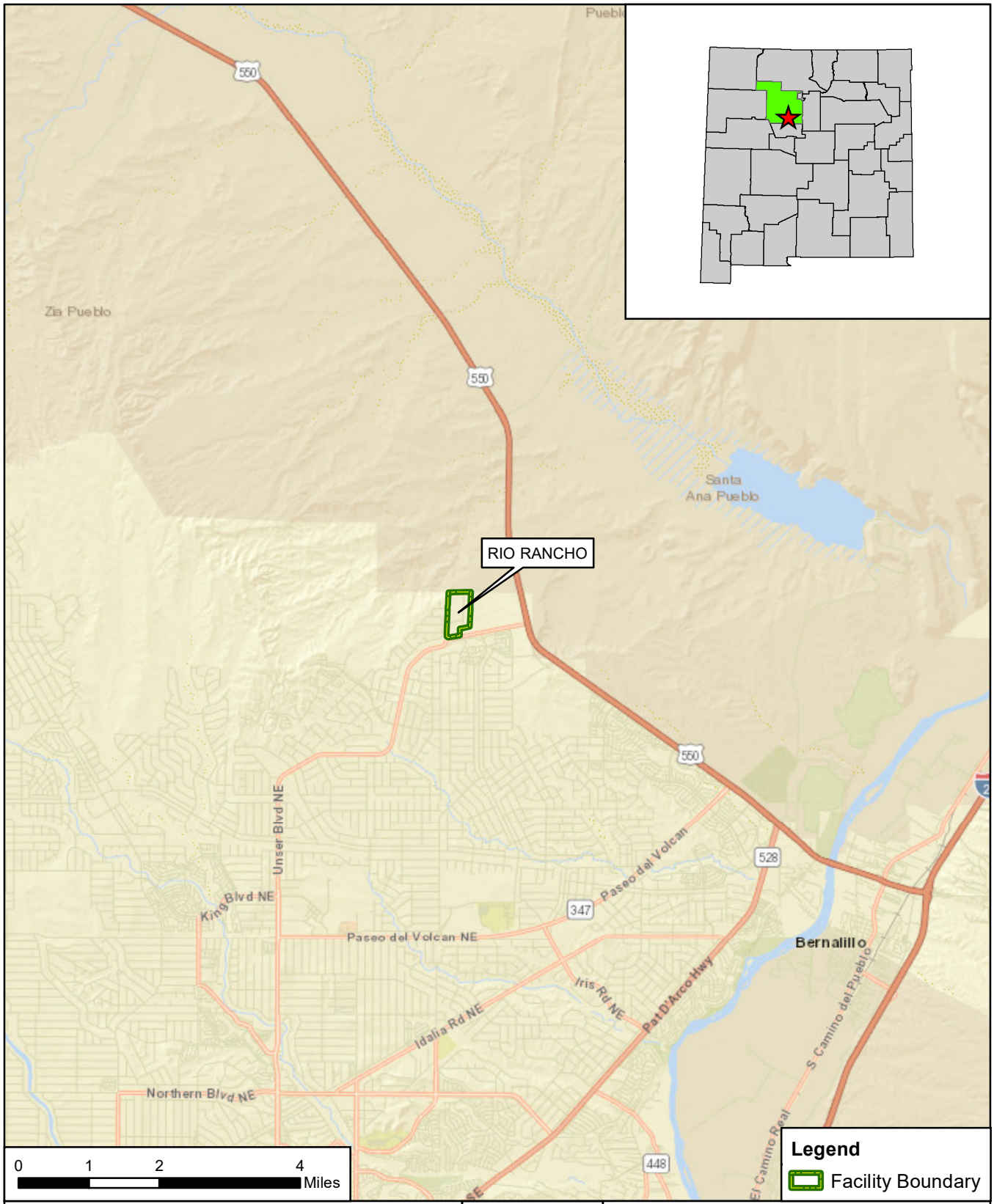
Based on the USEPA Unregulated Contaminant Monitoring Rule 3 (UCMR3) data, it was indicated that no PFAS were detected in a public water system above the HA within 20 miles of the facility. The HA is 70 parts per trillion for PFOA and PFOS, individually or combined. PFAS analyses performed in 2016 had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

1.5.4 Climate

The climate in north-central New Mexico is categorized as semi-arid (Us Geological Survey [USGS], 2002) receiving about 12 inches of precipitation per year. Highest rainfall (about 2 inches per month) usually occurs in August (National Oceanic Atmospheric Administration [NOAA], 2019). Most of the moisture that Rio Rancho receives comes from the Gulf of Mexico during the North American Monsoon season. (USGS, 2002). July is the hottest month averaging 78.1 degrees Fahrenheit (°F), while January is the coldest month, averaging 34.3 °F (NOAA, 2019). There is a diurnal temperature difference greater than 25 °F for every month of the year. The immediate Albuquerque metro area receives an average of 9.6 inches of snowfall per winter, which can increase considerably in surrounding higher elevations (NOAA, 2019).

1.5.5 Current and Future Land Use

Presently, Rio Rancho consists of three buildings: a readiness center, the FMS-3 building, and CST, as wells as a training area. Future land use is not anticipated to change.

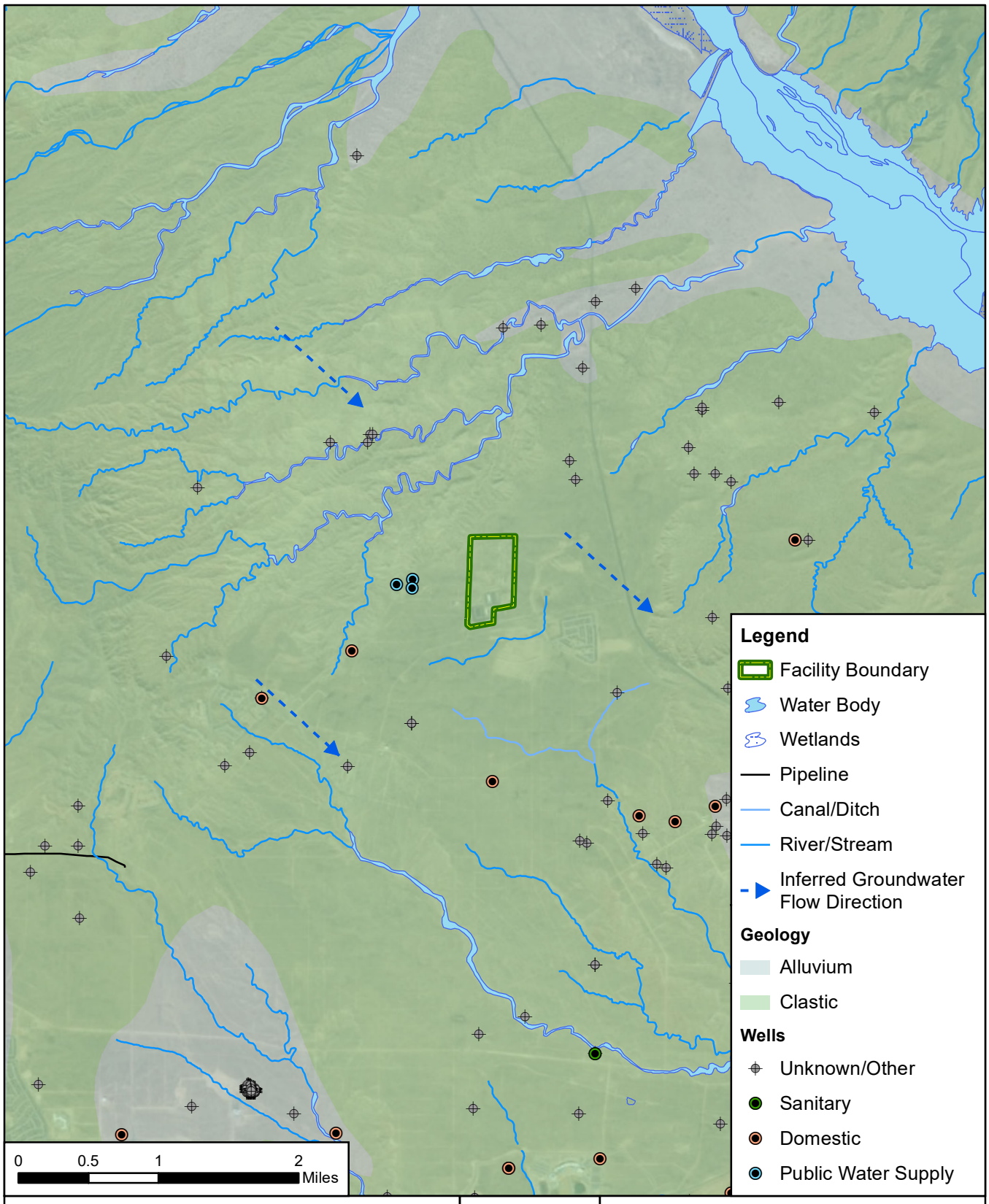


CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Rio Rancho, NM			
REVISED	1/13/2020	GIS BY	GC	1/13/2020
SCALE	1:126,720	CHK BY	MW	1/13/2020
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	RG	1/13/2020

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-1

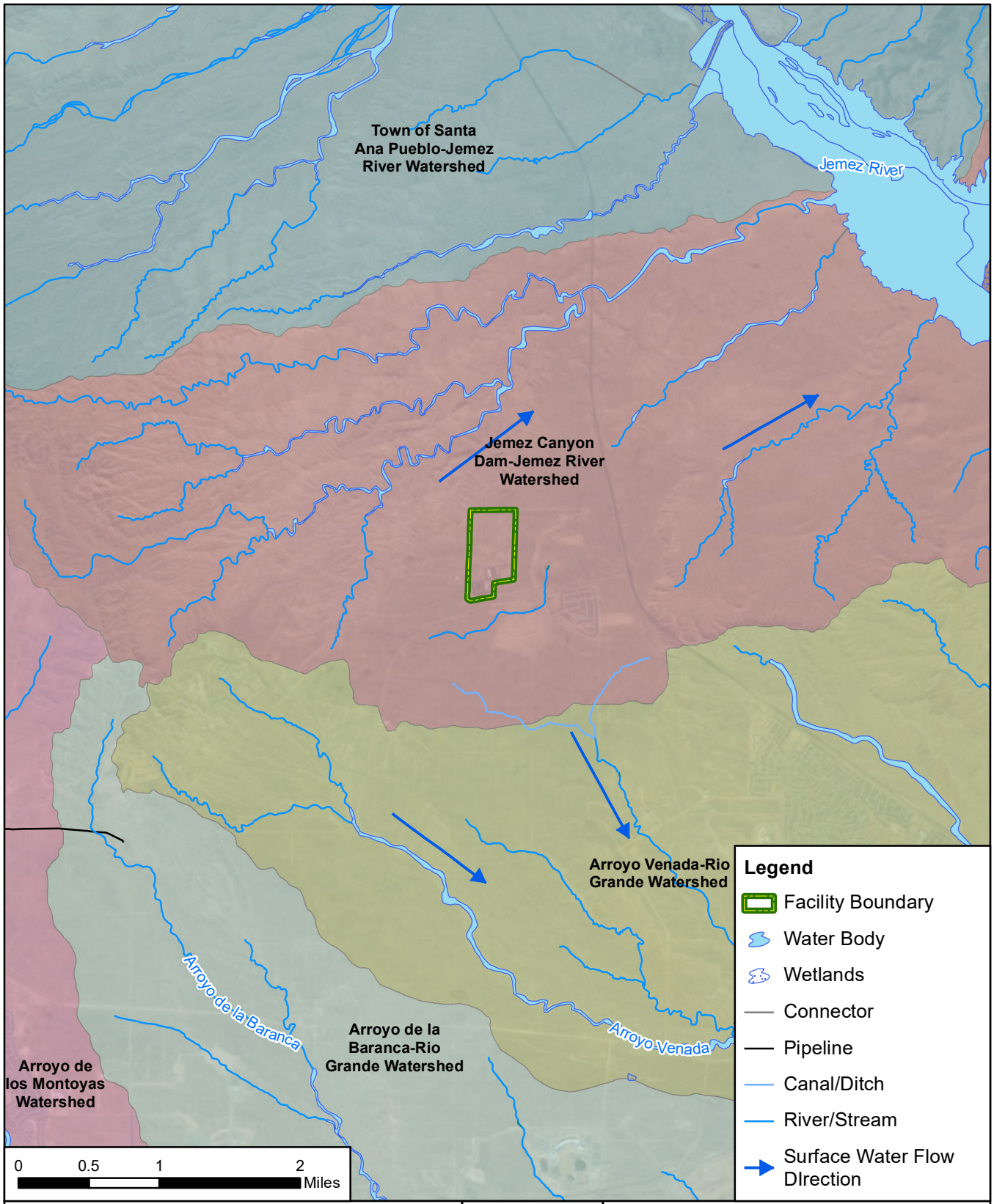


CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Rio Rancho, NM			
REVISED	1/14/2020	GIS BY	GC	1/14/2020
SCALE	1:63,360	CHK BY	MW	1/14/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/14/2020

Groundwater Features

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-2



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Rio Rancho, NM			
REVISED	1/13/2020	GIS BY	GC	1/13/2020
SCALE	1:63,360	CHK BY	MW	1/13/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/13/2020

N

Surface Water Features

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-3

2. Fire Training Areas

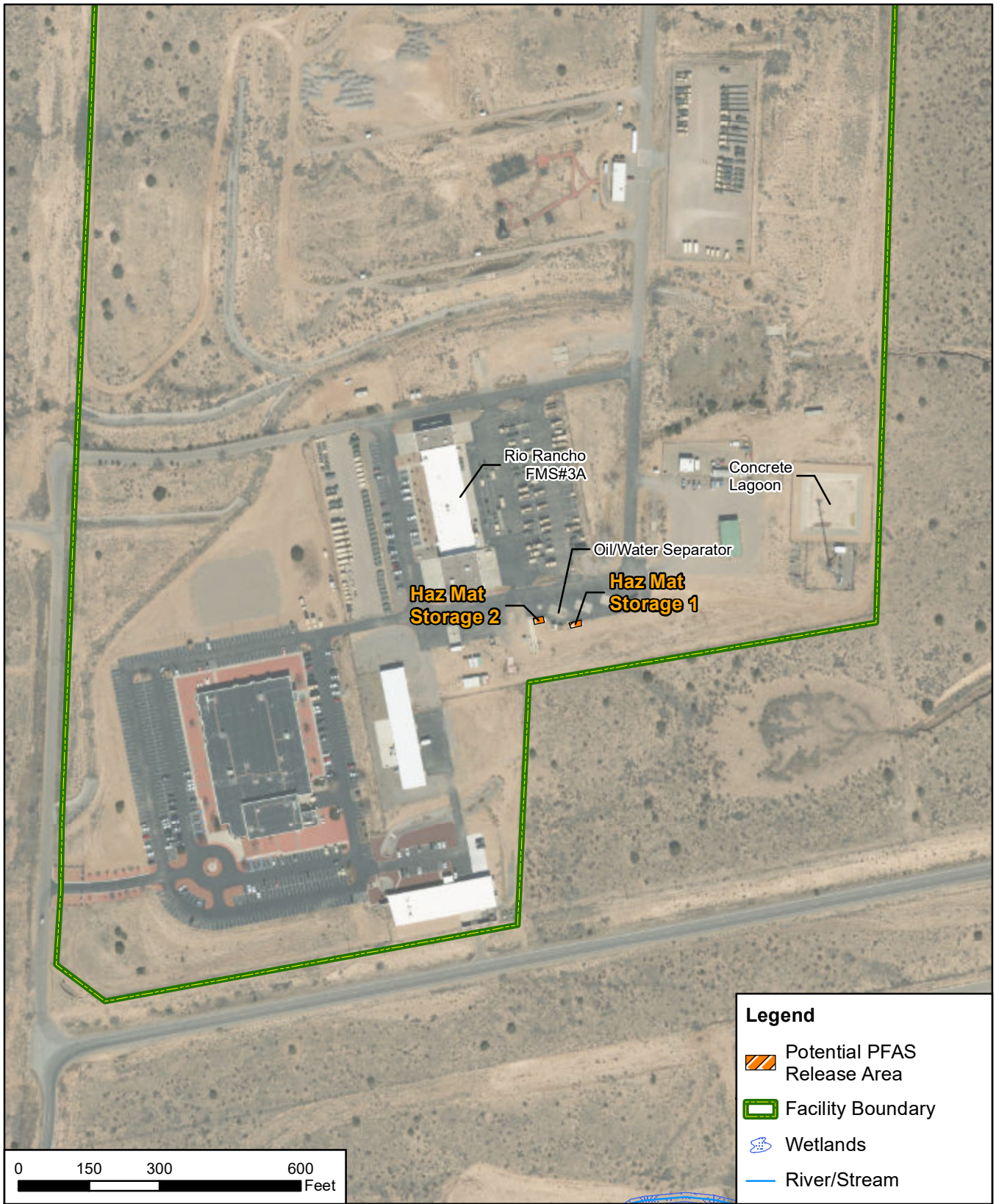
No FTAs were identified within or around the Rio Rancho facility during the PA through interviews or EDR™ reports. Interviews with personnel who had less than 10 years of recollection of activities at Rio Rancho and online researched yielded little information regarding possible fire training activities at Rio Rancho. There is little to no information on activities during the timeframe in which the Rio Rancho facility was a Hawk missile site. The Rio Rancho Fire and Rescue Department provides emergency services to the facility. Interview records appear in **Appendix B**.

3. Non-Fire Training Areas

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

3.1 Hazardous Materials Storage Lockers

The hazardous materials storage lockers, located in the southern portion of the facility, housed two containers of AFFF for an unknown period of time (**Figure 3-1**). The lockers are located in the segment of the facility designated as the FMS-3. According to personnel interviews, two 10-gallon containers of AFFF were found in hazardous waste storage locker 1 sometime in early 2019. Both containers, which are classified as Fiberboard or plastic drums, barrels, or kegs (DF) in the Uniform Hazardous Waste Manifest (**Appendix A**), were found half empty with evidence of a small amount of product around the cap. There is no evidence or recollection of these containers being used or transported to the site, and no leaks or spills have been reported. The containers were described as small high-density polyethylene (HDPE) “poly” 10-gallon closed head drums by interviewed personnel and were stored in a hazmat storage locker that was in good condition, with no evidence or corrosion or damage that would compromise the integrity of the locker. Once these containers were discovered, they were moved to an adjacent hazmat storage locker (hazardous waste storage locker 2) designated for transport through the Defense Logistics Agency (DLA) as non- Resource Conservation and Recovery Act (RCRA) non-hazardous waste. This secondary storage locker was also in good condition, with no evidence of corrosion or damage that would compromise the integrity of the locker. The containers of AFFF were dispatched via a third-party carrier (Envirokleen – EPA ID Number: TXR000084068), with the waste code N/H Out54091, on 08 April 2019. The weight of the product listed on the Uniform Hazardous Waste Manifest is 60 pounds. There was no evidence of PFAS-containing substances ever having been stored or used within the FMS-3 building itself, and the fire sprinkler system within the FMS uses water only as seen in the attached photo log (**Appendix C**).



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Rio Rancho, NM			
REVISED	4/10/2020	GIS BY	GC	4/10/2020
SCALE	1:3,600	CHK BY	MW	4/10/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	4/10/2020

N

Non-Fire Training Areas

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 3-1

4. Emergency Response Areas

No emergency response areas were identified within the boundaries of the facility during the PA through interviews, previous investigations, online research, and the EDR™ report (**Appendix A**). Personnel Interviewed during the PA site visit stated that no incidents have occurred on site that required fire suppression within their scope of recollection and knowledge of about 10 years (**Appendix B**), and the City of Rio Rancho Fire & Rescue Department provides emergency response to the facility. Interviews were conducted with personnel whose firsthand knowledge of events dates from 2014 through present day. It is unknown if emergency responses occurred prior to 2014.

5. Adjacent Sources

Information acquired during PA interviews (**Appendix B**), internet research, and data presented in the EDR™ report (**Appendix A**) indicated that no adjacent off-facility sources of PFAS exist near Rio Rancho. The surrounding area is primarily rural residential land.

6. Preliminary Conceptual Site Model

Based on the PA findings, one potential release area was identified at Rio Rancho or adjacent areas as a result of NMARNG actions and will be considered an AOI. The AOI location is shown on **Figure 6-1**. A CSM includes three components necessary for potentially complete exposure pathways related to a site: (1) source, (2) pathway, and (3) receptor. If any of these elements are missing, the pathway is considered incomplete.

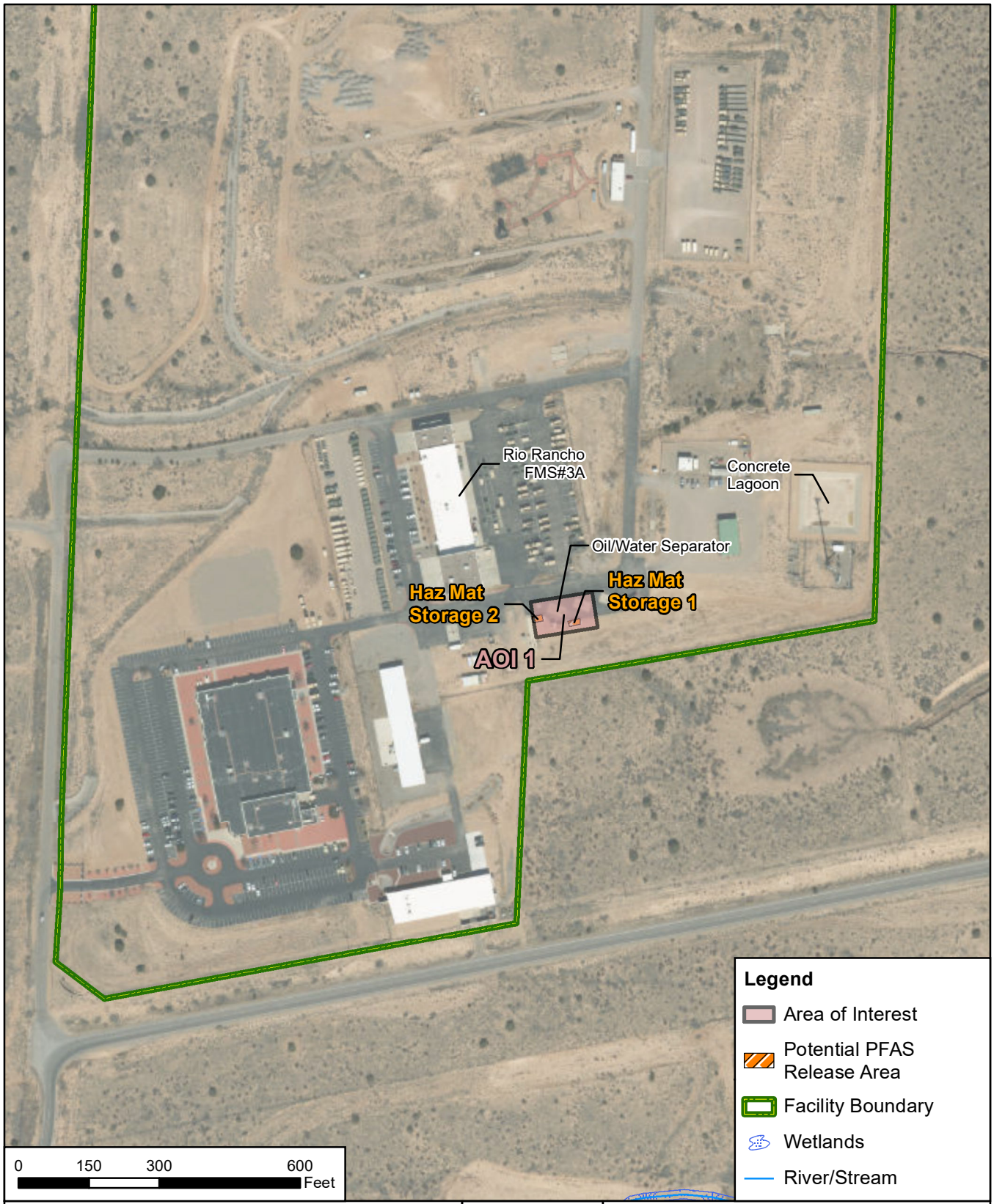
In general, the potential PFAS exposure pathways are ingestion and inhalation. Human exposure via the dermal contact pathway may occur, and current risk practice suggests it is a negligible pathway compared to ingestion; however, exposure data for dermal pathways are sparse and continue to be the subject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

6.1 AOI: Hazardous Materials Storage Lockers 1 and 2

The hazardous materials storage lockers, located in the southern portion of the facility, near the FMS-3 building, housed two containers of a PFAS-containing substance for an unknown period of time (**Figure 6-1**). Personnel indicated that two 10-gallon HDPE “poly” drums of PFAS-containing substance were found in hazardous waste storage locker 1 sometime in early 2019. Both of these containers, which are classified as Fiberboard or plastic drums, barrels, or kegs (DF) in the Uniform Hazardous Waste Manifest (**Appendix A**), were found half empty, with evidence of a small amount of product around the cap. Interview information can be found in **Appendix** B. There are no records indicating when or from whom these containers of AFFF product were acquired. Additionally, there is no evidence or recollection of these containers being used or transported to the site, and no leads as to the extent of the use of this product. No leaks or spills concerning AFFF have been reported at the facility. The containers were stored in a hazmat storage locker that was in good condition, with no evidence or corrosion or damage that would compromise the integrity of the locker. Once these containers were discovered, they were moved to an adjacent hazmat storage locker (hazardous waste storage locker 2) designated for transport through DLA as non-RCRA non-hazardous waste. This secondary storage locker was also in good condition, with no evidence of corrosion or damage that would compromise the integrity of the locker. The containers of AFFF were dispatched via a third-party carrier (Envirokleen – EPA ID Number: TXR000084068), with the waste code N/H Out54091, on 08 April 2019. The weight of the product listed on the Uniform Hazardous Waste Manifest is 60 pounds.

The AOI encompasses the hazardous materials lockers, which are within close proximity to one another, and the immediate area in between and surrounding these two lockers. If AFFF were used or spilled within the containers, the spill would have been considered entirely contained, as both hazardous materials storage lockers are in good condition, with no signs of leaks or damage. If the AFFF containers were used or spilled outside of the hazardous materials storage lockers, then the product may have traveled to an oil water separator, which leads to the concrete lagoon located on the southeast corner of the facility, and evaporated. If there were any leakage in this chain of transport, ground disturbing activities in this area could result in construction worker, site worker, and trespasser exposure to potential PFAS contamination via inhalation of dust of ingestion of surface soil. PFAS are water soluble and can migrate readily from soil to groundwater or surface water via leaching and run-off. Groundwater depth in the area is approximately 1000 feet below ground surface (Bartolino & Cole 2002). The city of Rio Rancho currently sources its water supply entirely from groundwater and the Aquifer Injection Project and has 17 wells currently in operation. Groundwater flows southeast, and surface water flows generally east-northeast.

There are no known drinking water sources downgradient of the facility. The preliminary CSM for the AOI is shown on **Figure 6-2**.

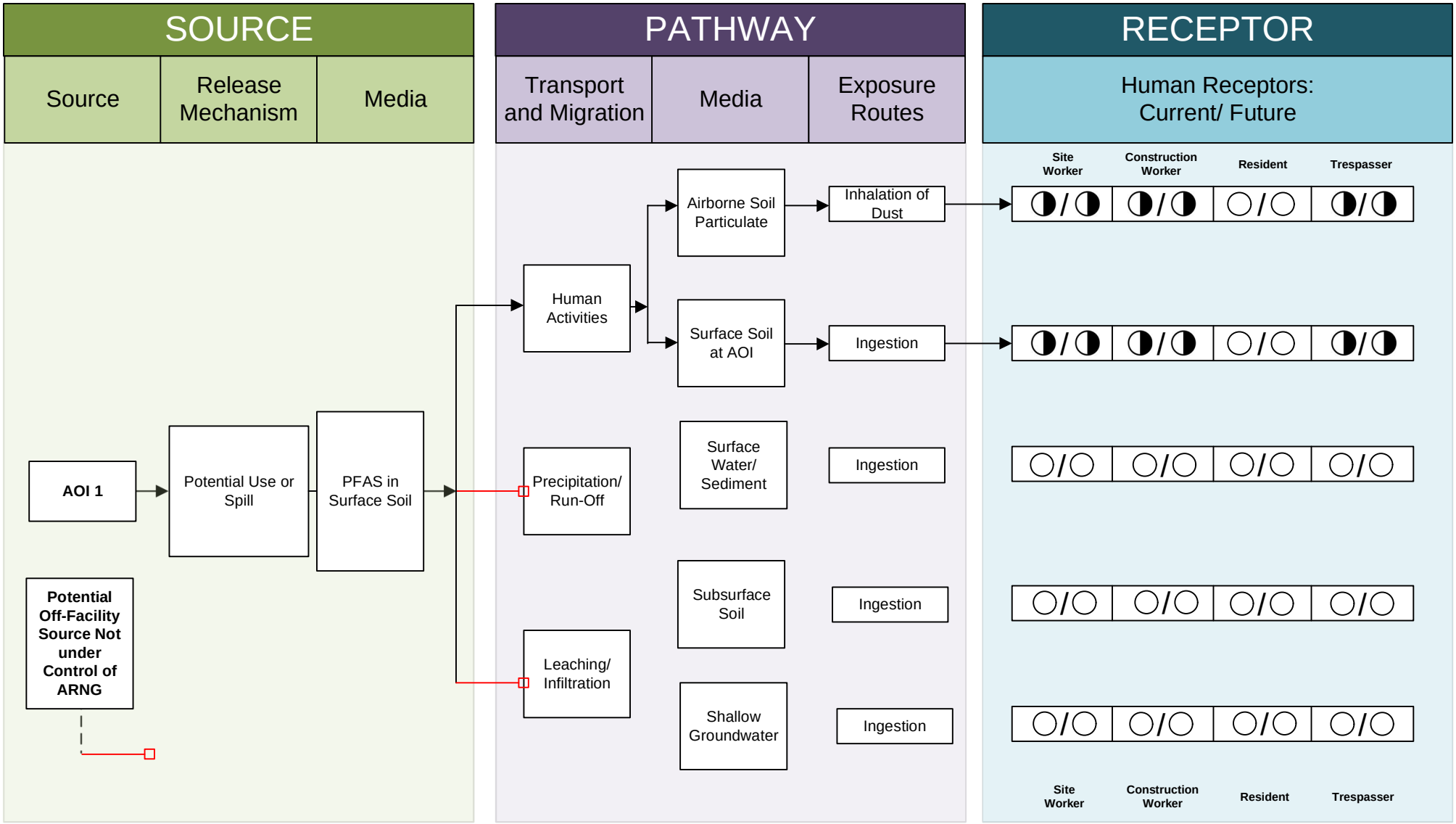


CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Rio Rancho, NM			
REVISED	4/10/2020	GIS BY	GC	4/10/2020
SCALE	1:3,600	CHK BY	MW	4/10/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	4/10/2020

Area of interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-1



LEGEND

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

Notes:
1. The residential receptor refers to an off-facility receptor.
2. Human consumption of agricultural products potentially affected by PFAS is possible

Figure 6-2
Preliminary Conceptual Site Model
Rio Rancho, New Mexico

7. Conclusions

This report presents a summary of available information gathered during the PA on the use and storage of AFFF and other PFAS-related activities at Rio Rancho. The PA findings are based on the information presented in **Appendix A**, **Appendix B**, and **Appendix C**.

7.1 Findings

One AOI related to potential PFAS release was identified at Rio Rancho during the PA (**Figure 7-1**) and is described in **Table 7-1** below:

Table 7-1: AOIs at Rio Rancho

Area of Interest	Name	Used by	Potential Release Dates	Determination
AOI	Hazardous Materials Storage Lockers 1 & 2	NMARNG	Mid-2000s to present	Potential PFAS release

The AOI is the hazardous materials storage lockers 1 & 2, where NMARNG discovered two previously opened 10-gallon containers of PFAS-containing substance were found in hazardous waste storage locker 1 sometime in early 2019 and then moved to hazardous waste storage locker 2 to be transported. Both of these containers, which are classified as Fiberboard or plastic drums, barrels, or kegs (DF) in the Uniform Hazardous Waste Manifest, were found half empty, with evidence of a small amount of product around the cap. Based on the PA findings and interviews with employees whose knowledge spans from 2014 to present, data gaps exist regarding historical activities concerning AFFF use and storage at the facility from when the facility opened to 2014. As such, there is potential for exposure to PFAS contamination in soil and airborne soil particulate in the event that releases occurred.

The summary of findings is presented in **Figure 7-1**.

7.2 Uncertainties

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

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

In order to minimize the level of uncertainty, readily available data regarding the use and storage of PFAS were reviewed, multiple personnel were interviewed, multiple persons were interviewed for the same potential source area, and potential source areas were visually inspected.

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

Table 7-2: Sources of Uncertainties

Location	Source of Uncertainty
AOI 1 Hazardous Materials Storage Locker 1 and 2	It is uncertain if PFAS were used or leaked from the two half-filled containers found in the hazardous materials building. There are no records or recollection of these containers being acquired or used, as direct interviewee knowledge only spans from 2014 to present day, but when they were found by facility personnel, each 10-gallon container was only approximately half full.

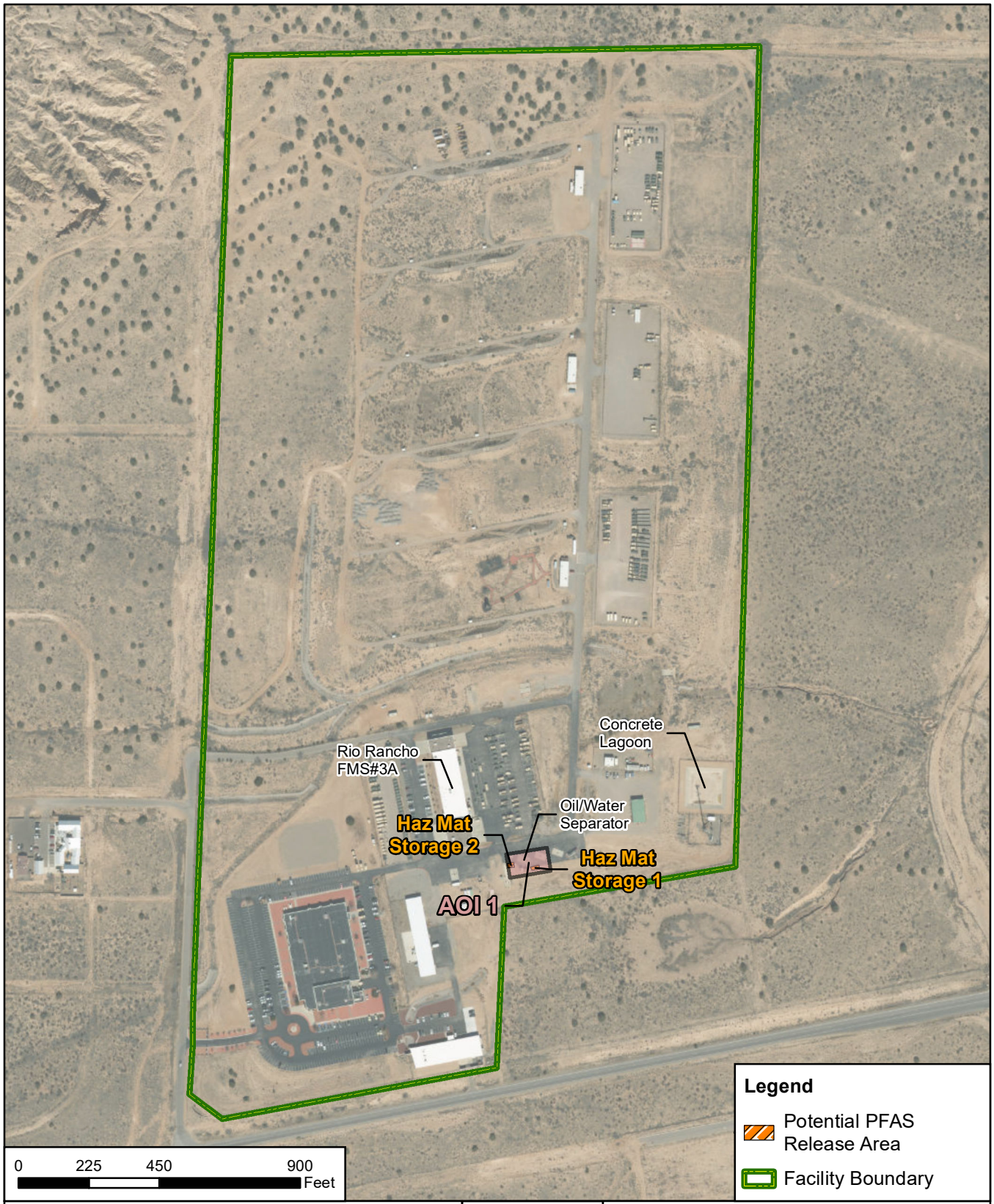
7.3 Potential Future Actions

Table 7-3 summarizes the rationale used to determine if the AOI should be considered for further investigation under the CERCLA process and undergo an SI.

Table 7-3: PA Findings Summary

Area of Interest	AOI Location	Rationale	Potential Future Action
AOI 1 Hazardous Materials Storage Lockers 1 & 2	35°22'14.00"N; 106°39'04.49"W	Potential release from two 10-gallon containers of AFFF discovered half full, with product on around the cap.	Proceed to an SI focusing on soil.

ARNG will evaluate the need for an SI at AOI 1 at the Rio Rancho based on the potential receptors, the potential migration of PFAS contamination off the facility, and the availability of resources.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Rio Rancho, NM			
REVISED	4/10/2020	GIS BY	GC	4/10/2020
SCALE	1:5,400	CHK BY	MW	4/10/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	4/10/2020

N

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 7-1

8. References

Bartolino, James R., and Cole, James C. 2002. *Ground-Water Resources of the Middle Rio Grande Basin, New Mexico*. United States Geological Survey (USGS). https://pdfs.semanticscholar.org/6959/518ed9078c7d63d9f2847e6a2496b930d940.pdf?_ga=2.130037127.987026424.1576024007-899776365.1576024007

Connell, Sean D. 2012. *GEOLOGY, GROUNDWATER, AND GEOLOGIC HAZARDS IN THE ALBUQUERQUE BASIN, NEW MEXICO*. New Mexico Bureau of Geology and Mineral Resources – Albuquerque Office. http://www.agiweb.org/environment/publications/mapping/graphics/newmexico.pdf

Fox, Douglas G. et. al. 1995. *Ecology, Diversity, and Sustainability of the Middle Rio Grande Basin*. United States Department of Agriculture. Chapter 4, 52-79

Holliday et. al. 2006. *Geoarchaeology of the Boca Negra Wash Area, Albuquerque Basin, New Mexico, USA*. Geoarchaeology: 765-802.

National Oceanic and Atmospheric Administration (NOAA). 2019. *Climate Data Online Database*. https://www.ncdc.noaa.gov/cdo-web/datatools/normals

National Oceanic and Atmospheric Administration (NOAA). 2019. NowData – *NOAA Online Weather Data*. https://www.nws.noaa.gov/climate/xmacis.php?wfo=abq.

New Mexico Office of the State Engineer. 2020. *OSE Points of Diversion*. http://geospatialdata-ose.opendata.arcgis.com/datasets/ose-points-of-diversion

Reardon, Molly. 2012. *The Rio Grande Rift: Albuquerque Basin.* http://academic.emporia.edu/aberjame/student/reardon3/RIFT%20NEW2.html. ES 767 Global Tectonics Emporia State University.

Rio Rancho. 2019. *Rio Rancho Pure – New Mexico's First Aquifer Injection Project*. City of Rio Rancho, New Mexico. https://rrnm.gov/4024/Rio-Rancho-Pure

Stephens & Associates, Inc. 2017. *City of Rio Rancho Source Water Protection Plan Public Water System #NM3537326*. City of Rio Rancho. https://rrnm.gov/DocumentCenter/View/71938/City-of-Rio-Rancho-SWPP_2-22-2017?bidId=

US Environmental Protection Agency (USEPA), 1991. *Guidance for Performing Preliminary Assessments under CERCLA*. EPA/540/G91/013.

United States Geological Survey (USGS). 2002. *Ground-Water Resources of the Middle Rio Grande Basin, New Mexico*. United States Geological Survey. Page 9.

Appendix A
Data Resources

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

Rio Rancho Online Research

- 1956 Rosenweig, A., New Mexico Geological Society, Southeastern Sangre de Cristo Mountains
- 1994 Keller, G. Randy and Cather, Steven M, Basins of the Rio Grande Rift: Structure, Stratigraphy, and Tectonic Setting. Geological Society of America, Inc.
- 1995 United States Department of Agriculture Forest Service, Ecology Diversity and Sustainability of the Middle Rio Grande Basin
- 2012 Connel, Sean D., Geology, Groundwater, and Geologic Hazards in the Albuquerque Basin, New Mexico
- 2012 Reardon, Molly., The Rio Grande Lift: Albuquerque Basin
- 2017 City of Rio Rancho Source Water Protection Plan Public Water System #NM3537326
- 2018 City of Rio Rancho Land Ownership Map
- 2019 City of Rio Rancho, Rio Rancho Pure – New Mexico's First Aquifer Injection Project
- N.d. USGS Bernalillo NW 7.5-minute Quadrangle

Rio Rancho Facility Information

- 2014 NMARNG Installation Atlas

Rio Rancho EDR™ Report

- 2019 Rio Rancho FMS Environmental Data Resources, Inc.™ Report

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire - Other

Facility: RIO RANCHO
Interviewer: [redacted]
Date/Time: 10/1/19 1053

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

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

CW2 [redacted] - Started Oct 2014 @ Rio Rancho

Mechanic/Envt'l Manager: [redacted] - 2 yrs. in this role

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 fire extinguishers non AFFF	Use
- ABC fire extinguishers.	Procurement
• water only sprinklers in base	Disposition
• [redacted] found containers of AFFF	Storage (Mixed)
- in storage shelving area w/ oil, etc.	Storage (Solution)
- placed in turn in shed until DLA	Inventory, Off-Spec
- Non RCRA no-Haz waste area	Containment
- manifest given - item highlighted	SOP on Filling
- 2 smaller 10-gal drums.	Leaking Vehicles
- both gallons only half full.	Nozzle and Suppression System Testing
- No knowledge of application of foam.	Dining Facilities
- small leakage visable around cap, nothing left the drum.	Vehicle Washing
• No known training with AFFF	Ramp Washing
- just use ABC fire extinguishers.	Fuel Spill Washing and Fueling Stations
	Chrome Plating or Waterproofing

(margin note: found // disposed [illegible])

PA Interview Questionnaire - Other

Facility:_____
Interviewer:_____
Date/Time:_____

- Area was formerly HAWK missile site: closed 90's
  - training site for HAWK missiles
  - NO known LIVE use

Appendix B.2
Visual Site Inspection Checklists

Facility ST
Visual Survey Inspection Log

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

Site Name / Area Name / Unique ID: RIO RANCHO FMS #3A
Site / Area Acreage: 120 acres
Historic Site Use (Brief Description): Former HAWK MISSILE SITE

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:
3. Does the site or area exhibit evidence of erosion? (Y) N
   3a. If yes, describe the location and extent of the erosion : common desert 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 NA
   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 UNKNOWN
   3a. If so, please note observation and location:
4. Have man-made drainage channels been constructed within the site/area? Y / N UNKNOWN
   4a. If so, please note the location of the channel:

Additional Notes

Retention pond SE of site

Facility ST
Visual Survey Inspection Log

Photographic Log

Photo ID/Name	Date & Location	Description	Photograph

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: Rio Rancho

Why has this location been identified as a site?

PFAS containers found

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

NO - former Hawk missile site

Training Events

Have any training events with AFFF occurred at this site? NO/ Unknown

If so, how often?

How much material was used? Is it documented? N/A

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? ENE

Average rainfall? little

Any flooding during rainy season? NO

Direct or indirect pathway to ditches? small ditch on edge of installation

Direct or indirect pathway to larger bodies of water? NO

Does surface water pond any place on site? NO

Any impoundment areas or retention ponds? NO

Any NPDES location points near the site? NO

How does surface water drain on and around the flight line? no flight line

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? SE

Depth to groundwater? ~ 1000 ft

Uses (agricultural, drinking water, irrigation)? drinking

Any groundwater treatment systems? unknown

Any groundwater monitoring well locations near the site? unknown

Is groundwater used for drinking water? yes

Are there drinking water supply wells on installation? ~~unknown~~ No

Do they serve off-post populations? N/A

Are there off-post drinking water wells downgradient unknown

Waste Water Treatment Plant:

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

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

Do we understand the fate of sludge waste?

Is surface water from potential contaminated sites treated?

Equipment Rinse Water

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

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 X

Construction Worker X

Recreational User

Residential

Child

Ecological

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

Documentation

Ask for Engineering drawings (if applicable).

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

Appendix C
Photographic Log

APPENDIX C – Photographic Log

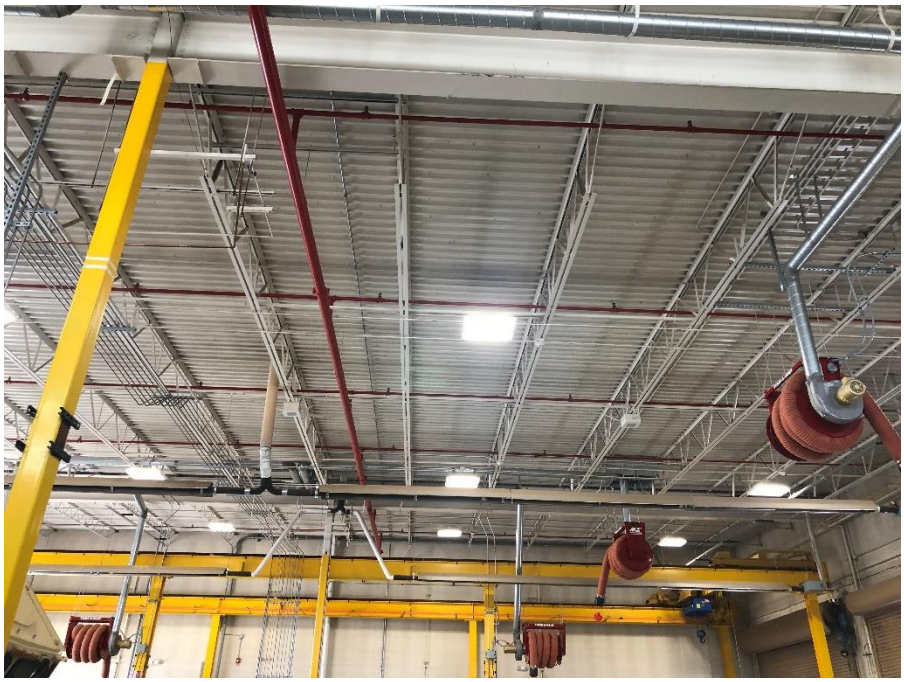
Army National Guard, Preliminary Assessment for PFAS	Rio Rancho Facility Maintenance Shop	Rio Rancho, New Mexico

Photograph No. 1

Description:

Facing South. Water sprinkler system in FMS.

Photo Date: 10/01/2019 1323



Photograph No. 2

Description:

Facing South. Hazmat Storage Locker 1 where PFAS containers were found.

Photo Date: 10/01/2019 1325

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Rio Rancho Facility Maintenance Shop	Rio Rancho, New Mexico

Photograph No. 3

Description:

Facing Southeast. Hazmat Storage Locker 2 where PFAS containers were moved to be picked up by Envirokleen.

Photo Date: 10/01/2019 1324

Photograph No. 4

Description:

Facing Southeast. Inside of Hazmat Storage Locker 2.

Photo Date: 10/01/2019 1325