FINAL
Preliminary Assessment Report
Army Aviation Support Facility
Reno, Nevada

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

July 2020

Prepared for:

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

UNCLASSIFIED

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Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
AOI	Area of Interest
ARNG	Army National Guard
ANG	Air National Guard
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and LiabilityAct
CFR	Code of Federal Regulations
CSM	conceptual site model
EDR™	Environmental Data Resources, Inc.™
°F	degrees Fahrenheit
FTA	Fire Training Area
HA	Health Advisory
NDEP	Nevada Department of Environmental Protection
NVARNG	Nevada Army National Guard
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
SI	Site Investigation
TMWA	Truckee Meadows Water Authority
UCMR3	Unregulated Contaminant Monitoring Rule
US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency

Executive Summary

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

- Reviewed available administrative record documents and Environmental Data Resources, Inc. (EDR)™ report packages to obtain information relevant to potential PFAS releases, such as: drinking water well locations, historical aerial photographs, Sanborn maps, and environmental compliance actions in the area surrounding the facility;
- Conducted a 1-day PA site visit on 18 September 2019 and completed visual site inspections at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed current AASF Nevada ARNG (NVARNG) personnel during the site visit including environmental managers and operations staff;
- 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.

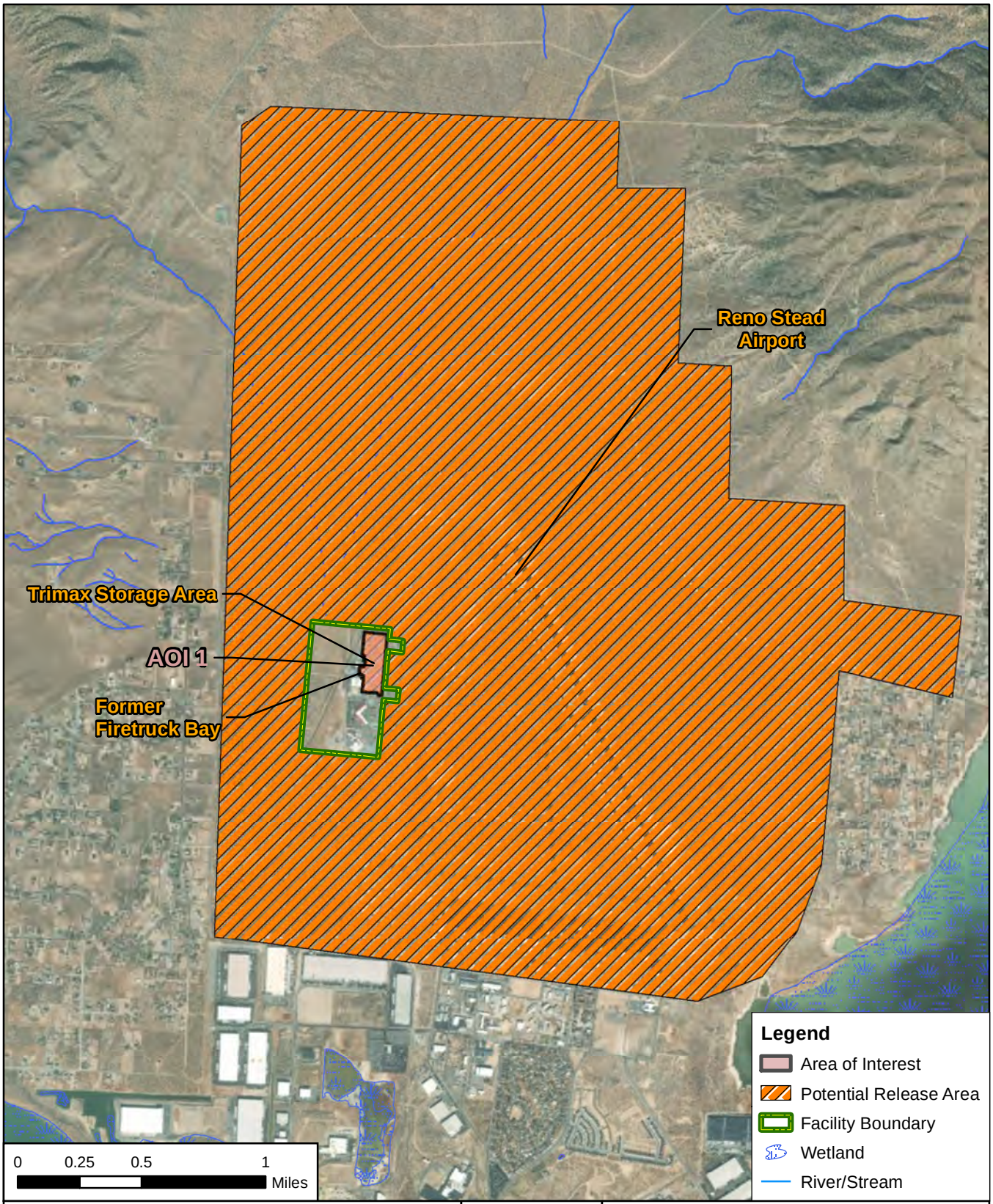
One AOI related to a potential PFAS release was identified at the Reno AASF based on PA data. The AOI is shown on **Figure ES-1** and described in the **Table ES-1** below:

Table ES-1: Areas of Interest

Area of Interest	Name	Used by	Potential Release Dates
AOI 1	Former Firetruck Bay and Rotary Wing Parking Area	NVARNG	1980s-mid 2000s

Based on the potential for AFFF releases and or leaks at this AOI, there is potential for exposure to PFAS contamination in airborne soil particulate and ingestion of surface soil to site and construction workers, and subsurface soils to construction workers via inhalation and ingestion. Given the relatively arid climate, surface water is not a likely exposure medium; however, any soil in drainage ditches (on- and off-facility) could contain residual PFAS. There are no drinking water wells located at the facility; therefore, groundwater is an incomplete pathway to site workers, construction workers, and trespassers. However, there is the potential for exposure to PFAS contamination migrating from AOI 1 in groundwater via ingestion for off-facility residents using private domestic and public wells. Based on the United States (US) Environmental Protection Agency (USEPA) Unregulated Contaminant Monitoring Rule 3 (UCMR3) data, it was indicated that no PFAS were detected in a public water system above the USEPA lifetime Health Advisory (HA) within 20 miles of the facility. The HA is 70 parts per trillion for PFOA and PFOS, individually or combined. PFAS analyses performed in 2016 had method detection limits that were higher than currently achievable. Thus, it is possible that low concentrations of PFAS were not detected during the UCMR3 but might be detected if analyzed today.

One adjacent off-facility potential PFAS release area was identified that includes a fire training area, flight line, hangars, and several other maintenance and storage areas. As a result of adjacent PFAS releases, it is possible PFAS is in site media surrounding the AASF. The preliminary CSM for the Reno AASF is shown on **Figure ES-2.**



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SCALE	1:36,000	CHK BY	LS	3/19/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	3/19/2020

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Summary of Findings

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12420 Milestone Center Drive
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Figure ES-1

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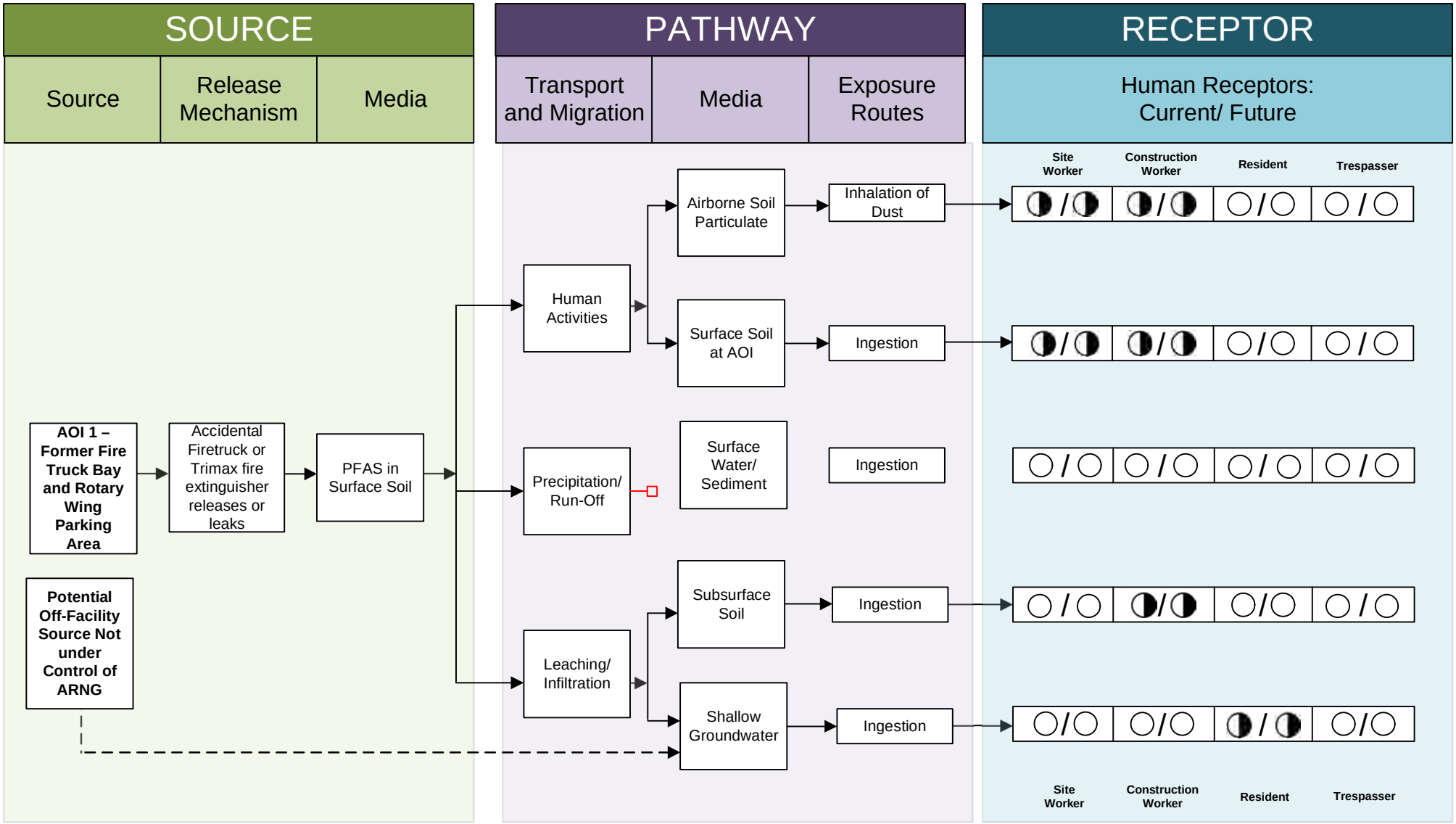


LEGEND

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

Notes:

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

Figure ES-2
Preliminary Conceptual Site Model
Reno AASF, Reno, NV

1. Introduction

1.1 Authority and Purpose

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

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

PFAS are classified as emerging environmental contaminants that are garnering increasing regulatory interest due to their potential risks to human health and the environment. 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. 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 current Army Aviation Support Facility Reno (AASF; also referred to as the “facility”), Nevada, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations [CFR] Part 300), and Army requirements and guidance.

This PA documents the known fire training areas (FTAs) as well as other locations where PFAS may have been released into the environment at the AASF. The term PFAS will be used throughout this report to encompass all PFAS chemicals being evaluated, including PFOS and PFOA, which are key components of AFFF. If a known or suspected discharge of AFFF or other PFAS-containing material has occurred, that location is designated an Area of Interest (AOI).

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 18 September 2019 and completed visual site inspections at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed current AASF Nevada ARNG (NVARNG) personnel during the site visit including environmental managers and operations staff;

- 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.

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 suspected PFAS releases at the facility identified during the site visit;
- **Section 4 – Emergency Response Areas:** describes areas of suspected AFFF discharge at the facility, specifically in response to emergency situations;
- **Section 5 – Adjacent Sources:** describes sources of suspected PFAS release adjacent to the facility that are not under the control of ARNG;
- **Section 6 – Preliminary Conceptual Site Model:** describes the pathways of suspected PFAS transport and receptors at the facility;
- **Section 7 – Conclusions:** summarizes the data findings and presents the conclusions of the PA;
- **Section 8 – References:** provides the references used to develop this document.
- **Appendix A –** Data Resources
- **Appendix B –** Preliminary Assessment Documentation
- **Appendix C –** Photographic Log

1.4 Facility Location and Description

Reno AASF is located at the Harry Reid Readiness Training Center and occupies approximately 63 acres in the southwest portion of Washoe County, Nevada, about 13 miles northwest of downtown Reno, and is directly adjacent to Reno-Stead Airport (**Figure 1-1**). The facility and properties immediately surrounding the AASF are owned by the Reno-Tahoe Airport Authority, with Army Aviation Drive to the west, and Reno-Stead Airport to the south and east of the facility (Broadbent & Associates, 2014).

NVARNG rented hangars and operated helicopters from 1972 to 1984 at the former Stead Air Force Base, which is now the Reno-Stead Airport. In 1984, the NVARNG facility was constructed on land leased to the NVARNG by the Reno Tahoe Airport Authority and currently exists and operates as part of the Harry Reid Readiness Training Center. The lease agreement can be found in **Appendix A**. The facility includes multiple buildings, parking lots, and a rotary wing parking apron.

1.5 Facility Environmental Setting

The AASF is located in the southwestern portion of Washoe County, Nevada and is approximately 4,987 feet above mean sea level. The approximate geographic coordinates for the center of the property are 39°40'22.10"N; 119°53'29.52"W. The majority of the facility is developed with buildings, concrete, and asphalt features.

The facility and neighboring City of Reno is located within the Truckee Meadows, which is a basin bounded by the Sierra Nevada on the western edge of the Great Basin. Truckee Meadows covers approximately 94 square miles in western Nevada and is bounded on the west by the Carson Range, on the east by the Virginia Range and Pine Nut Mountains, and on the south by the Steamboat hills and Peavine Peak (Cohen 2016).

Based on the soil survey maps published by the US Department of Agriculture (USDA) Soil Conservation Service, the facility is predominately mapped as "Greenbrae", which is sandy loam. The facility soil hydrologic group classification is Class C – Slow infiltration rates. Class C soils are described as, "soils with layers impeding downward movement of water, or soils with moderately fine or fine textures." (Broadbent & Associates, 2014). According to information found in the EDR™ Radius Map Report (**Appendix A**), soils on the property are listed as Doten silty clay with very slow infiltration rates and moderately well drained textures (AMEC, 2010).

1.5.1 Geology

Reno AASF is located in the northern portion of the Lemmon Valley. The primary structural indicators in the Lemmon Valley area are north-to-northeast-trending valleys between mountain ranges. A major fault in the area, the Airport fault, divides the valley into two structural areas. The fault also approximates the divide between two hydrologic subareas in the valley: the East Lemmon subarea is in the eastern section of the valley, and the Silver Lake subarea is to the west (Schaefer 1981). The USGS describes the shallow geological deposits of this region as stratified sequences of quaternary alluvium.

1.5.2 Hydrogeology

The AASF is located within the Lemmon Valley Hydrographic Basin. These two hydrographic basins that comprise Lemmon Valley represent two separate groundwater reservoirs. In each basin, groundwater resources exist in both fractured consolidated rocks in the uplands adjacent to and at depth beneath valley fill and in valley-fill alluvium that partly fills the structural depression underlying Lemmon Valley. The valley-fill alluvium represents the more productive and most important aquifers in both hydrographic basins due to its overall transmissivity, permeability, and extent. The thickness of the alluvial deposits is roughly 200 to 400 feet thick before bedrock is encountered. According to the Nevada Division of Water Resources online database, groundwater flow in the region flows southwest and the groundwater depth is approximately 30 to 50 feet below ground surface (bgs) (Nevada Department of Environmental Protection [NDEP] 2015).

Groundwater sources and storage provide between 5 and 15% of the Truckee Meadows Water Authority (TMWA) water supply. TMWA owns 33 production wells that have a combined capacity of 63 million gallons per day. The wells are used for summer peak times and provide off-river reliability. In winter months, the wells are used to recharge treated water (TMWA, 2016). TMWA operates an aquifer storage and recovery program in Lemmon Valley – Western Part (Basin 092A). This project is associated with Nevada State Engineer's Recharge Permit R15. The

recharge permit was issued on November 19, 2008 and allows for the recharge of up to 1,000 acre-feet annually of Truckee River surface water imported to Lemmon Valley from Truckee Meadows (Hydrographic Basin 6-087). Permit R-15 also provides for four injection/recovery wells in the system located near the former Stead Air Force Base (NDEP 2015).

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. According to data received from the EDR™ report for the facility, three monitoring wells were located on site, and several dozen are located within a 1-mile radius of the facility. A large number of wells are also classified as either domestic, public water supply, or unspecified wells (**Figure 1-2**). Information regarding the general depth of the public supply wells was not available in either the EDR™ or state well database. Three monitoring wells located on the facility were part of a previous remedial investigation that concluded in 2018 and were abandoned on 5 September 2018 (driller's abandonment logs appear in **Appendix A**).

1.5.3 Hydrology

The AASF has an approximate elevation of 5,000 feet above mean sea level. The area is relatively flat, and the immediate vicinity has a shallow slope to the southeast. Surface water runoff from the facility drains to the west. Storm water runoff is generated by snow melt and rainfall. Stormwater is channeled from the pavement surfaces of the facility into two underground stormwater interceptors that discharge to open flow channels on the west side of Army Aviation drive. Other drainage features located on the facility include open swales, gutters in the parking lot, gutters on the helicopter tarmac on the east side of the AASF, and drop inlets (Broadbent & Associates, 2014). Surface water within the basin in which the facility is located generally flows in a southern direction towards nearby playas.

Since 1944, surface water from the Truckee River has been imported from the TMWA through a pipeline to serve the former Stead Air Force Base. In the 1960s, importation of Truckee River water into Lemmon Valley was expanded to serve the area of Raleigh Heights in the southern part of the Lemmon Valley. Currently, TMWA continues to import Truckee River water into Lemmon Valley each year, a portion of which serves their customers directly, with the remainder being stored in the groundwater aquifer in Lemmon Valley – Western Part (NDEP 2015). While the TMWA obtains its water supply from both surface water and groundwater, surface water sources and storage provide between 85 and 95 percent of the TMWA water supply. Surface water is treated at Chalk Bluff and Glendale Treatment Plants before distribution into the system, and the groundwater is pumped from wells throughout the service territory (TMWA, 2016).

The City of Reno operates a wastewater treatment plant in Lemmon Valley – Eastern Part, southeast of the Reno-Stead Airport, near Swan Lake. The Reno-Stead Water Reclamation Facility is located adjacent to the basin boundary with Lemmon Valley – Western Part and treats wastewater received primarily from residential properties, along with some commercial and industrial properties, and the AASF. The plant has a treatment capacity up to 2 million gallons per day, with planned improvements to accommodate up to 4 million gallons per day. Treated effluent is pumped from the treatment plant to various locations for reuse within Lemmon Valley. Reuse of effluent from the Reno Stead Water Reclamation Facility is authorized by the Nevada State Engineer under Permit 4541S05 and by the Nevada Division of Environmental Protection under Permit NS2008500. Permitted use of the treated effluent includes irrigation of Sierra Sage Golf Course, North Valleys Sports Complex, and Mayors Park. On-site reuse of effluent at the Reno-Stead Water Reclamation Facility is also permitted for landscape irrigation and for an onsite

effluent truck fill station for construction water. Delivery of effluent is also permitted to nearby Swan Lake to support wildlife habitat under an agreement with the US Bureau of Land Management. Washoe County also operates a smaller capacity wastewater treatment plant in Lemmon Valley – Eastern Part. The Lemmon Valley Wastewater Reclamation Facility operates at approximately 300,000 gallons per day, and effluent reuse from this facility does not occur. Several times per year, polished effluent is discharged to Lemmon Lake Playa (Swan Lake), where it rapidly evaporates (NDEP 2015). Surface water features in the region are shown in **Figure 1-3**.

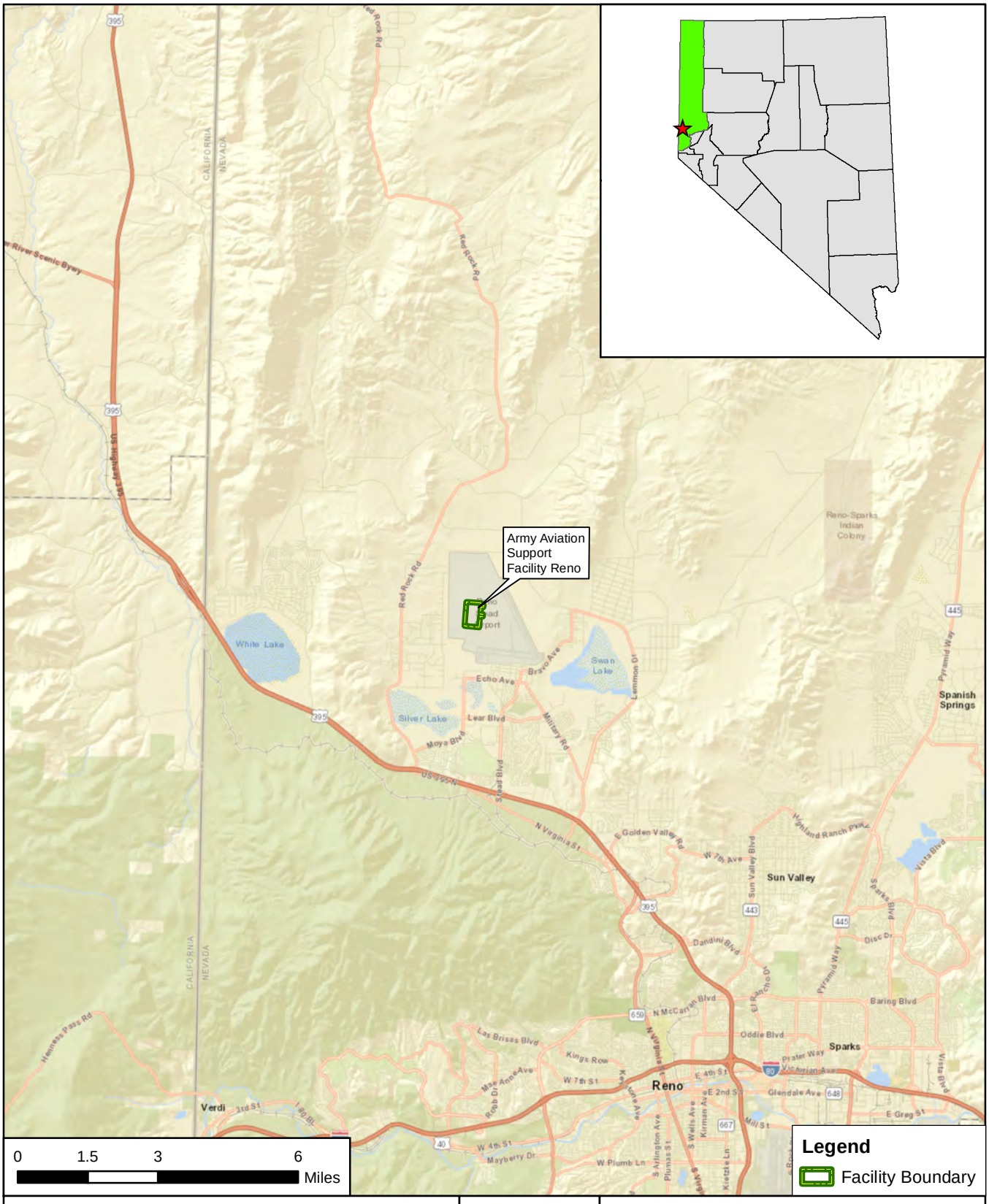
Based on the USEPA UCMR3 data, it was indicated that no PFAS were detected in a public water system above the HA within 20 miles of the facility. The HA is 70 parts per trillion for PFOA and PFOS, individually or combined. PFAS analyses performed in 2016 had method detection limits that were higher than 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 Current and Future Land Use

Presently, the AASF is a fully developed NVARNG active military training facility comprised of three large structures, four small structures, a helicopter landing pad, a large paved parking area west of the armory, and a large gravel lot to the east of the armory building used for equipment parking and storage. Building structures on the facility include an Armory Building, AASF, Field Maintenance Shop, Operational Support Airlift, Hazardous Materials Storage Building, Fire Pump House, and Gymnasium. The current land use is listed as General Industrial. Future land use is not anticipated to change (Broadbent & Associates, 2014).

1.5.5 Climate

Reno AASF is situated in western Nevada and in the rain shadow of the Sierra Nevada mountain range (O'Hara, 2006). Being in the high desert of the Great Basin, the area experiences large temperature ranges on both a diurnal and annual scale. During the summer, afternoon highs are often above 90 degrees Fahrenheit (°F), but at night, the air mass can cool down to about 50 °F. This area experiences a typical four seasons, though spring and fall can be short, as is common for mid-latitude dry climates. Reno receives an average of 11.12 inches of precipitation per calendar year, which primarily occurs between the months of November and March. The warm half of the year is relatively dry, with a secondary precipitation maximum in May. An average of 23.5 inches of snow falls in Reno annually, also occurring primarily between November and March (National Oceanic and Atmospheric Administration [NOAA], 2019).



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Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	RG	11/4/2019

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-1

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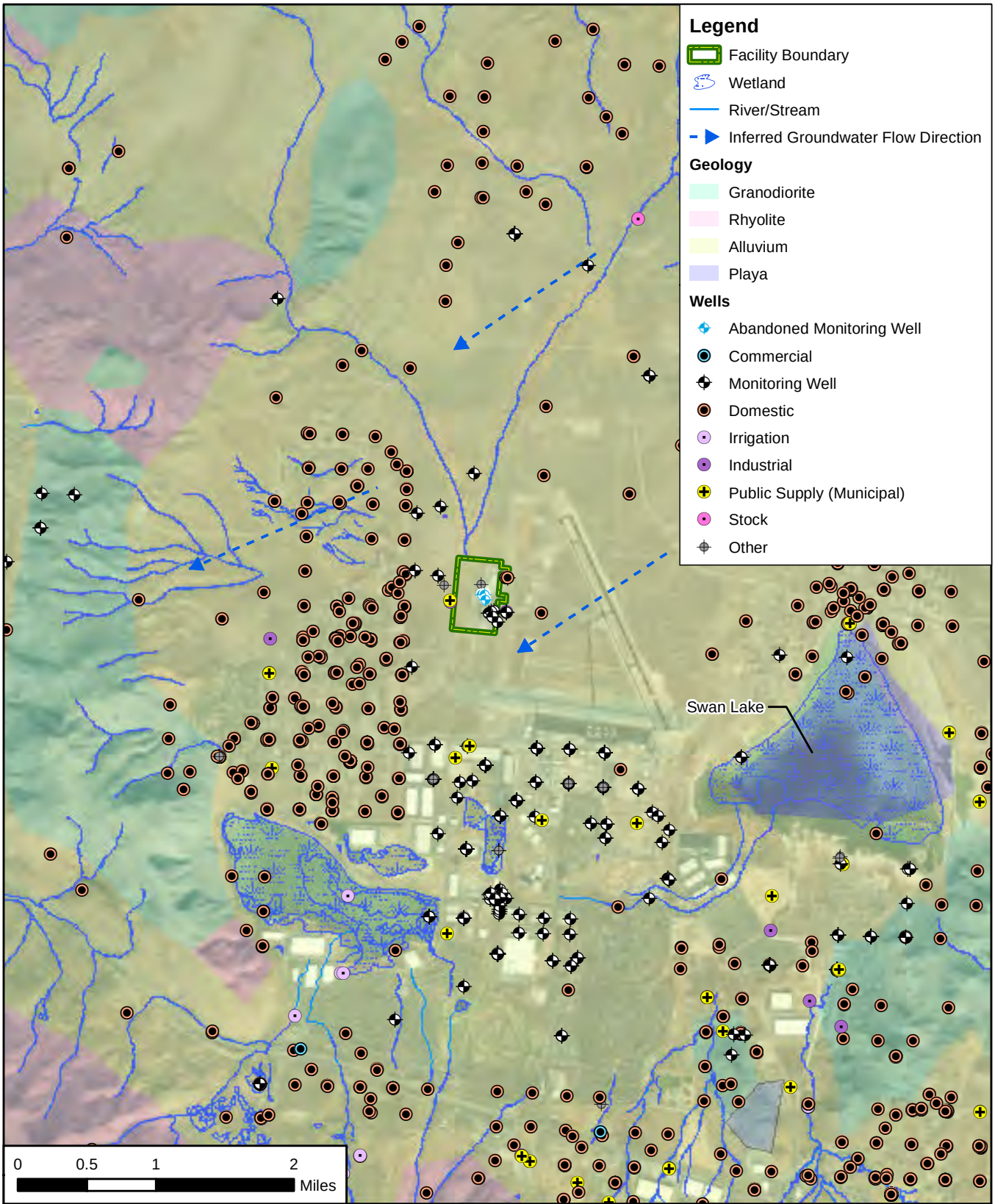

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Groundwater Features

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Figure 1-2

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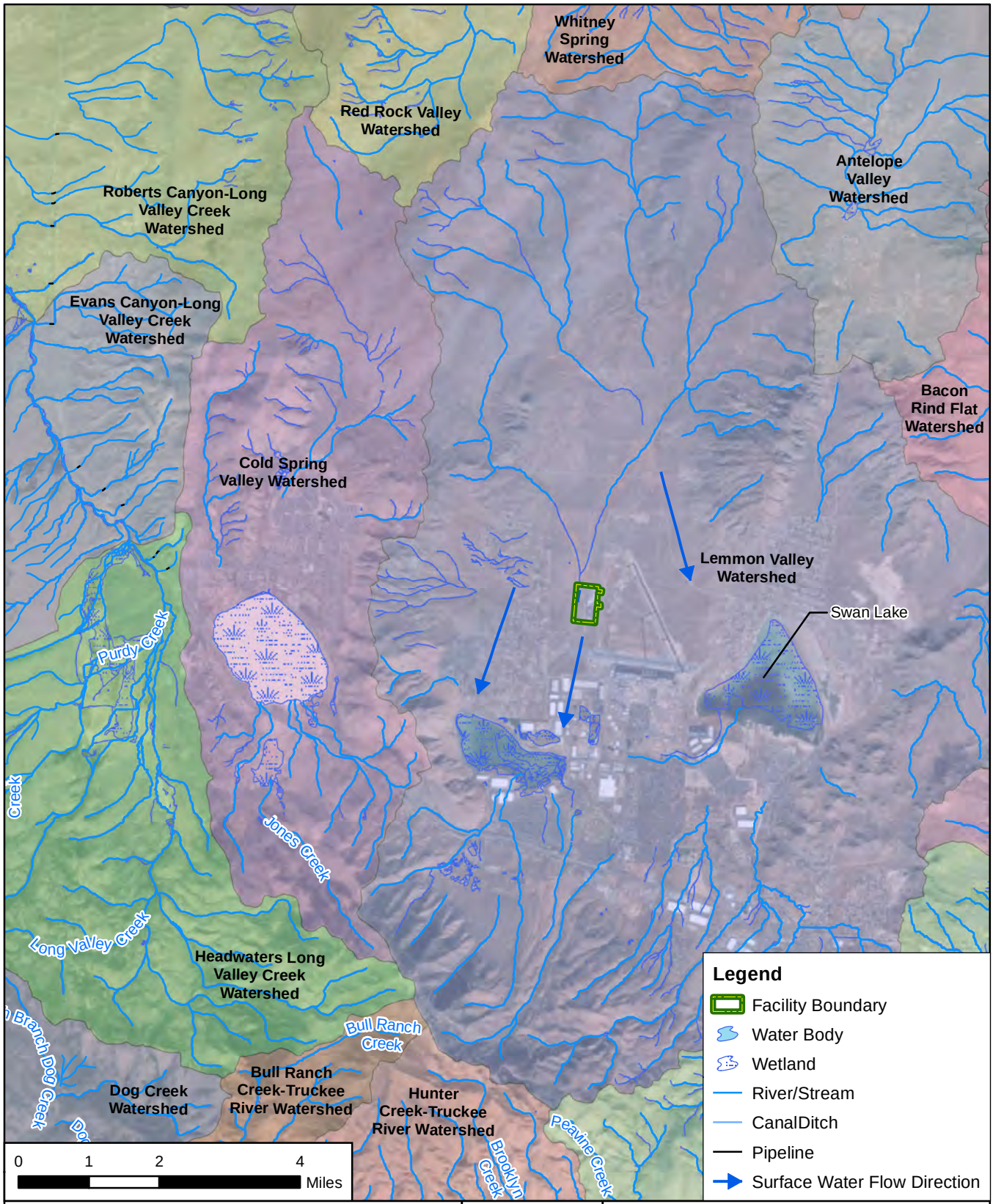

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Surface Water Features

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Figure 1-3

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2. Fire Training Areas

No FTAs were identified during the PA. According to historical research and interviews conducted with facility personnel, any fire training completed on base was over 20 years ago with dish soap on the parking apron near the drain racks. Personnel indicated that any fire training activities historically and presently occur at the former Stead Air Force Base, currently the Reno-Stead Airport adjacent to the AASF facility. The City of Reno Fire Department handles aviation emergencies. 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**. Two non-FTAs where AFFF was stored were identified during the PA. A description of each non-FTA is presented below, and the non-FTAs are shown on **Figure 3-1**. Interview records with relevant information appear in **Appendix B**, and photographs appear in **Appendix C**.

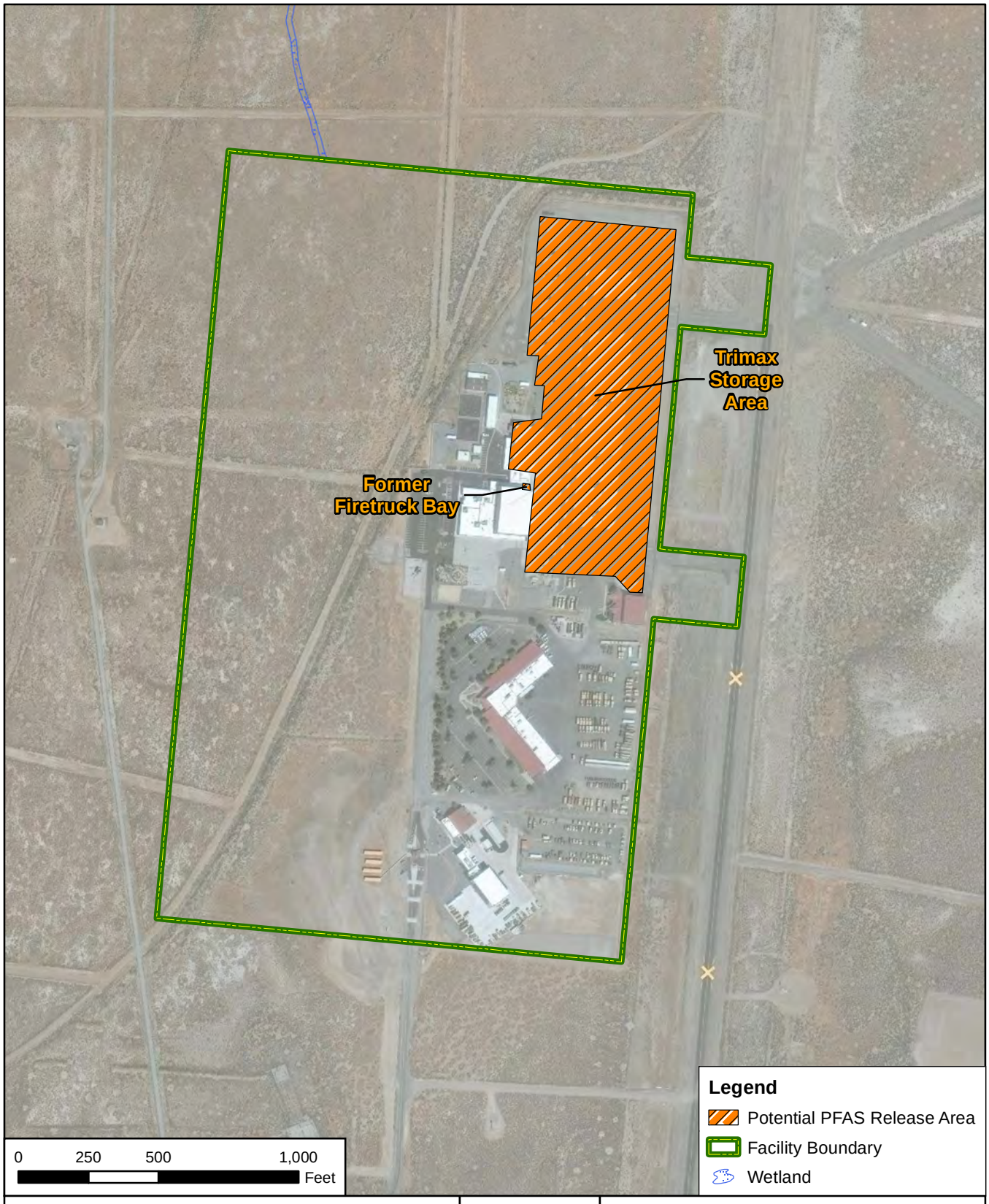
3.1 Former Firetruck Bay

The South Hangar, located centrally on site, formerly housed a single standard crash fire rescue truck and related equipment until the late 1980s, when the truck was returned or sold due to the lack of trained personnel to operate the truck. Since AFFF use was not recorded on site, it is unclear if AFFF was ever stored on the truck. There are no records or recollection of the truck ever being used for fire training or emergency response.

Presently, the South Hangar is fitted with an AFFF foam deluge fire protection system, which features a fire suppression system throughout the hangar, and a large AFFF storage tank housed where the firetruck formerly sat. The large fire suppression tank, according to the label found on said tank, is a model CCS3-704VA tank built in 1990 by Arrow Tank & Engineering Company. The tank is good condition, has a rubber diaphragm, and shows no signs of past or present leakage (**Appendix C**). There are no drains in the room that houses the AFFF storage tank; however, drains do exist in the main portion of the South Hangar, which leads to a sand and oil separator on site. All drains within the facility at the AASF are routed to the local water treatment plant, Stead Treatment Plant, located approximately 5 miles southeast of the facility. There are no records or recollection from interviewees of any incident in which the fire suppression system was used or tested.

3.2 Rotary Wing Parking Apron Area

Portable Tri-Max™ hand-truck fire extinguishers containing AFFF were previously stored in various places on and near the parking apron from approximately the mid-1990s through the early 2000s. These extinguishers were serviced regularly by ABC Fire and turned into the Carson City Warehouse Defense Reutilization and Marketing Office in the early 2000s. There is no record of these hand-trucks being used in training or emergency situations. The Tri-Max™ units were replaced with two different types of extinguishers, one that contains AFFF, and one that does not contain AFFF. Only one unit containing AFFF exists on base and is located in the C12 hangar immediately adjacent to the Rotary Wing Parking Apron (**Figure 3-1**). The remaining fire extinguishers, which do not contain AFFF, continue to be moved around various places on the Rotary Wing Parking Apron Area. Photos and additional information on the types of fire extinguishers that currently exist on the facility can be found in **Appendix C**.



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SCALE	1:6,000	CHK BY	LS	3/19/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	3/19/2020

Non-Fire Training Areas

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Figure 3-1

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4. Emergency Response Areas

No emergency response areas were identified within the boundaries of the AASF facility during the PA through interviews, previous investigations, online research, and the EDR™ report (**Appendix A**). Personnel interviewed during the PA site visit stated that no incidents have occurred on site that required fire suppression (**Appendix B**), though it was noted that plane crashes have occurred in areas adjacent to the facility. Interviewee knowledge dates from 1987 to present. The City of Reno Fire Department provides emergency response to Reno AASF.

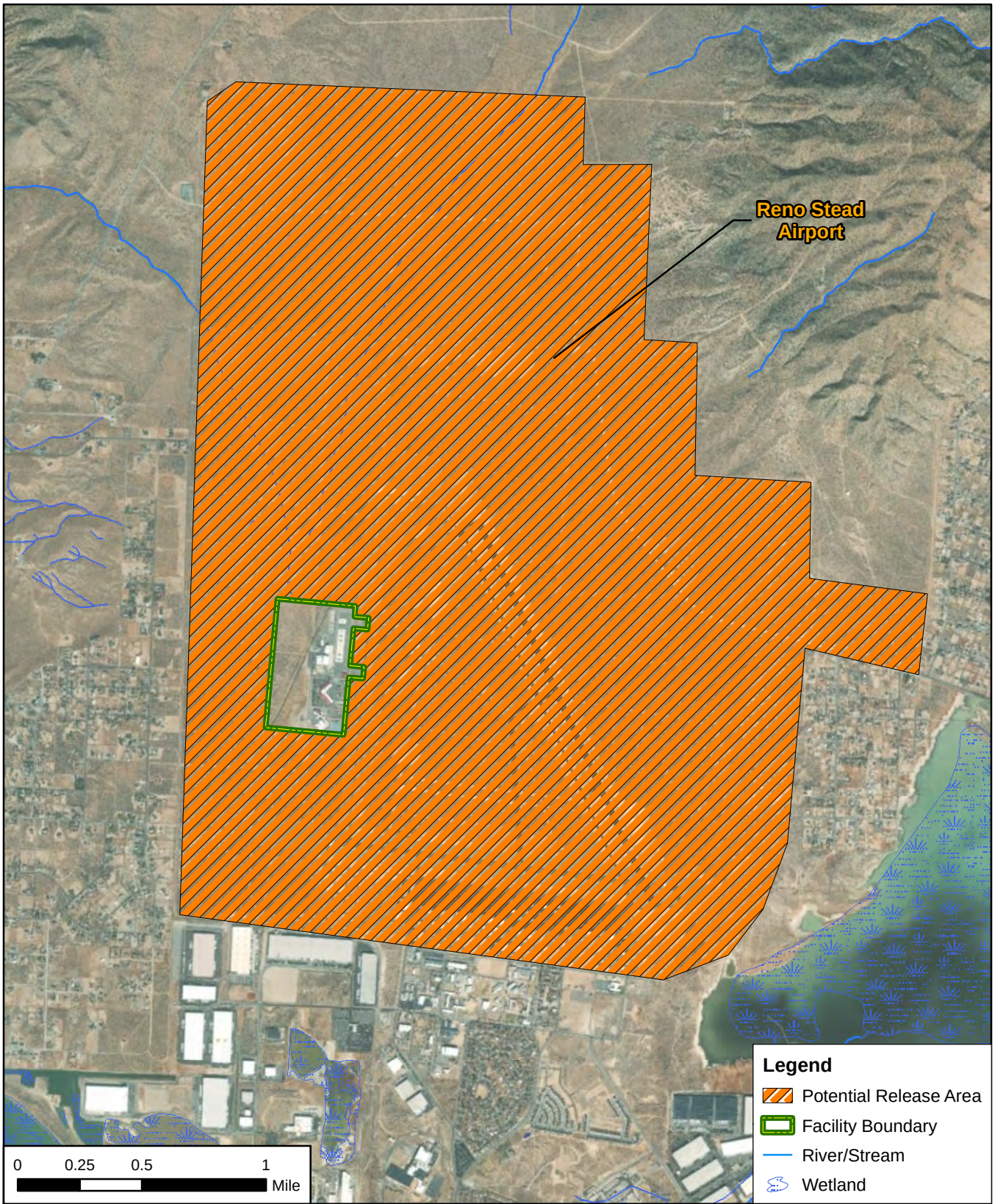
5. Adjacent Sources

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

5.1 Former Stead Air Force Base (Currently Reno-Stead Airport)

Reno-Stead Airport began in 1942 as the Reno Army Airport, an air base built by the Army Air Corps. In 1951, the air base was renamed Stead Army Airbase. From 1954 to1964, the air base served as a training center for Army, Navy, Marine, Air Force, and foreign officers, as well as most of the pre-1965 astronauts. In 1966, the Stead Army Airbase was transferred to the City of Reno, and in June 1966, it began operating as Reno-Stead Airport (Reno Tahoe Airport Authority, 2019). Reno-Stead Airport currently covers an area of 5,000 acres and has two asphalt paved runways.

There have been several crashes at Reno-Stead airport throughout its long history, though it is unknown whether AFFF were used as an emergency response measure for these incidents. A fire academy exists at Reno-Stead Airport where, according to interviewee knowledge, fire training has historically and currently occurred on base using AFFF foam. Before Reno AASF was constructed, hangars located on Stead Air Force Base were used by the ARNG to store helicopters from 1972-1984, and any firefighting activities that occurred during this time were via airport firefighters (**Appendix A**).



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Reno AASF, NV			
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Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	2/17/2020

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Adjacent Sources

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Germantown, MD 20876

Figure 5-1

\\URSgermantown.us.ie.urs\Germantown\Projects\ENV\GEARS\GEO\ARNG PFAS\900-CAD-GIS\920-GIS or Graphics\MXD\NV\RenoAASF\Fig5-1_RenoAASF_AdjacentSources.mxd

6. Preliminary Conceptual Site Model

Based on the PA findings, one potential release area was identified at Reno AASF and is considered an AOI. The AOI location is shown on **Figure 6-1**. The following section describes the CSM components and the specific preliminary CSM developed for the AOI. 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 Reno AASF include site workers, construction workers, and off-site residents. Trespassers are not anticipated at this facility as the perimeter is secured with a fence. The CSM indicates which specific receptors could potentially be exposed to PFAS.

6.1 AOI 1: Former Firetruck Bay and Rotary Wing Parking Apron Area

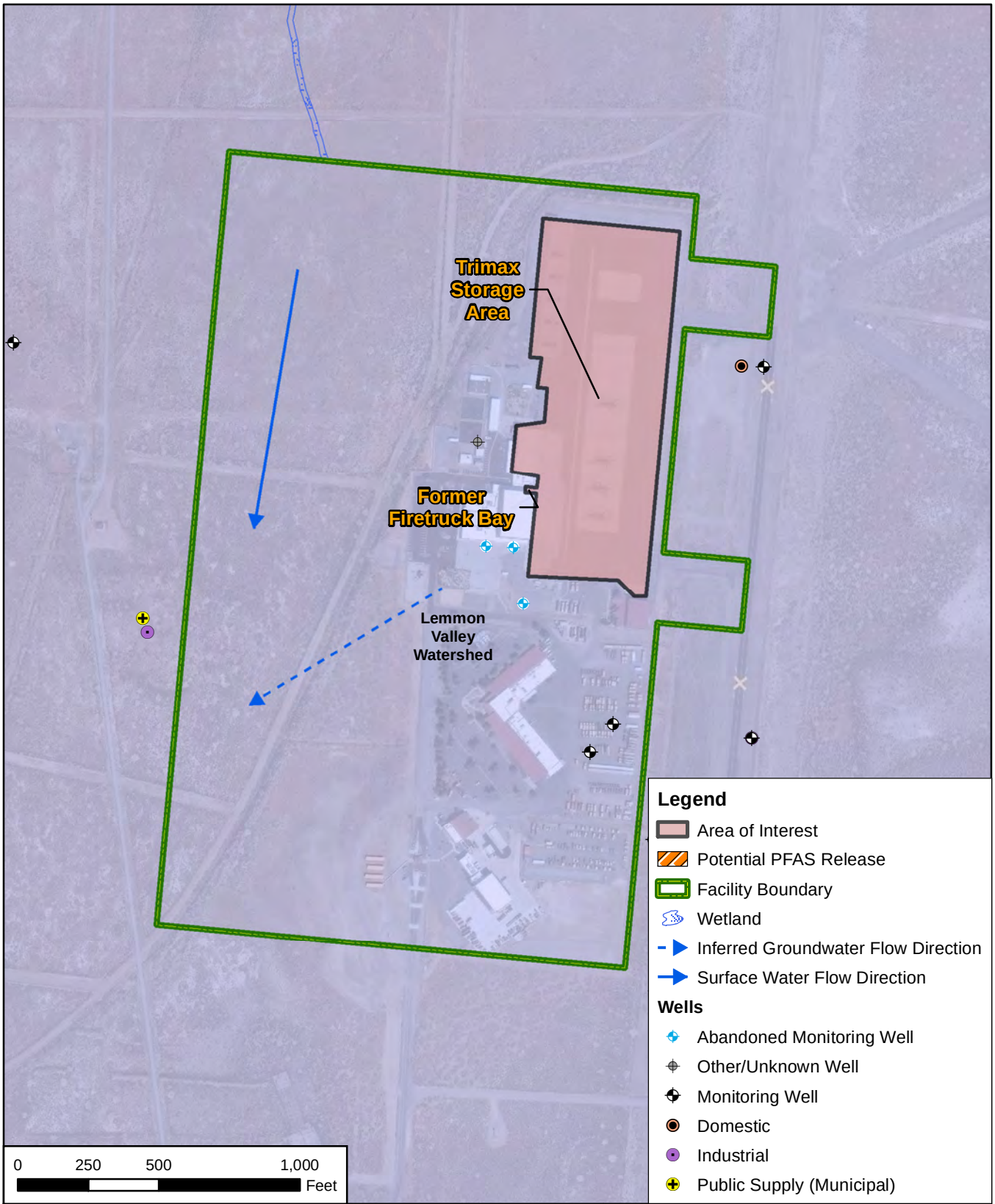
AOI 1 encompasses the South Hangar and surrounding parking apron. The former firetruck bay, located in the South Hangar, previously housed a standard crash fire rescue truck and related equipment until the late 1980s. It is unknown exactly how long the firetruck was stored in the firetruck bay and if AFFF were ever stored on the truck or used in an emergency response. The former firetruck bay does not contain any drains and presently houses an AFFF storage tank for the fire suppression system for the South Hangar. Portable Tri-Max™ hand-truck fire extinguishers containing AFFF had been stored on the adjoining parking apron and moved to various places on and near the apron from about the mid-1990s through the early 2000s. There are no records or recollection of these hand-trucks leaking or being used in training or emergency situations.

On the parking apron, AFFF from a Tri-Max™ release or flowing out of the hangar could be washed into surrounding soil and infiltrate the subsurface via cracks or joint in the pavement. If AFFF were released from the storage tank or suppression system, it is possible that the material could have flowed out of the hangar doors or into the hangar floor drains that connect to the local wastewater treatment plant. A visual summary of the AOI is shown on **Figure 6-1**. Photographs of points of interest at the AOI appear in **Appendix C**.

Ground disturbing activities in the area could result in construction worker and site worker exposure to possible PFAS contamination via inhalation of dust or ingestion of surface soil, and subsurface soil exposure for the construction worker. Given the relatively arid climate, surface water is not a likely exposure medium; however, any soil within drainage ditches (on- and off-facility) could contain residual PFAS.

PFAS are water soluble and can migrate readily from soil to groundwater. Groundwater beneath the facility ranges from 30 to 50 feet bgs. While the city sources 85 to 95% of its drinking water from surface water, the remaining 5 to 15% comes from groundwater. There are no drinking water wells located at the facility; therefore, groundwater is an incomplete pathway to site workers, construction workers, and trespassers. There are several public and domestic water wells listed in the Nevada database within a 1-mile radius of the facility, with many of these wells located downgradient of the facility, which could provide drinking water to the surrounding areas (**Figure 1-2**). As such, the pathway for off-facility resident exposure to PFAS in groundwater is considered

potentially complete for residents depending on where the wells are screened. The preliminary CSM for AOI 1 is shown on **Figure 6-2**.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Reno AASF, NV			
REVISED	3/19/2020	GIS BY	SK	3/19/2020
SCALE	1:6,000	CHK BY	LS	3/19/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	3/19/2020

N

Areas of Interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-1

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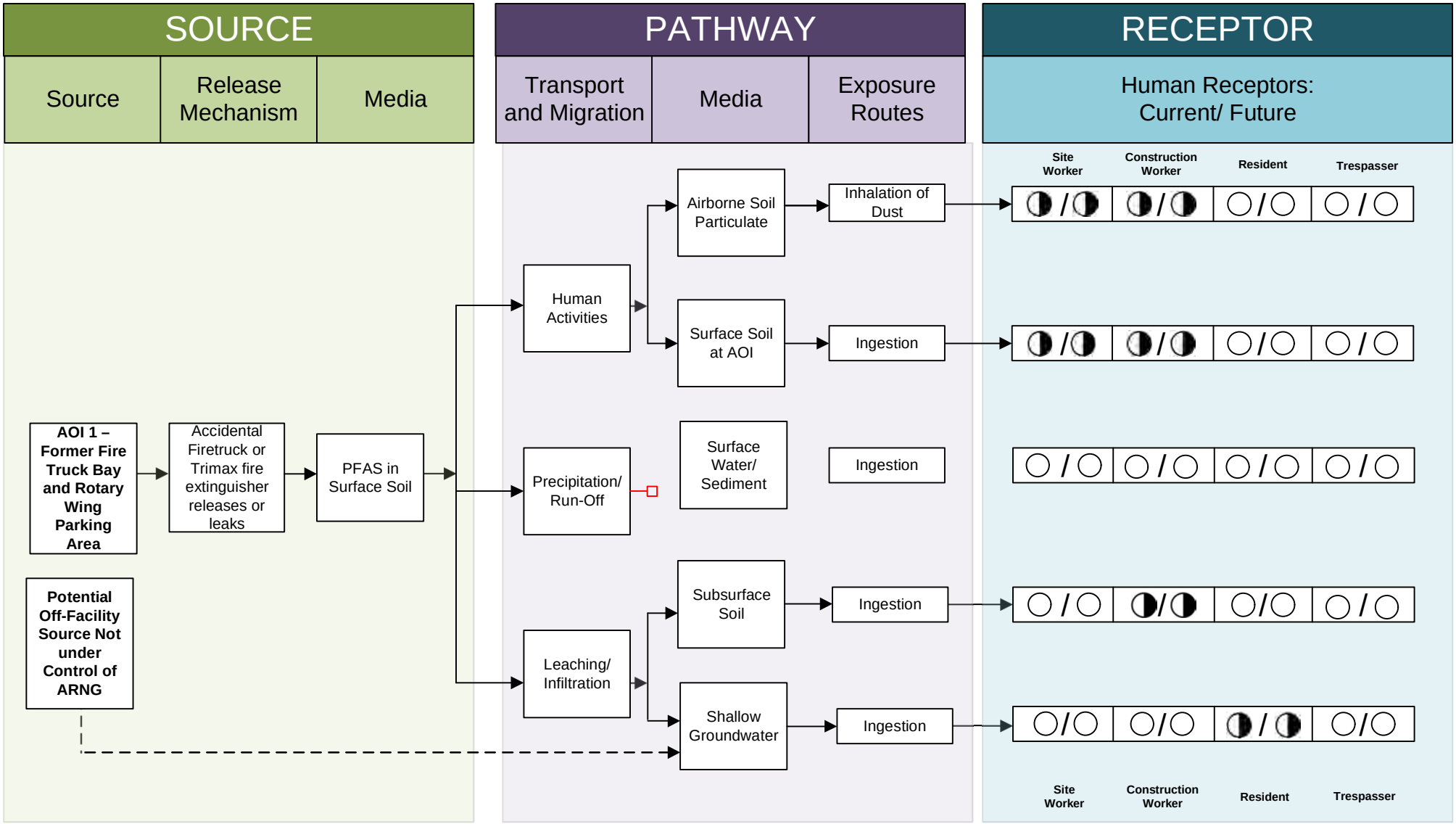


LEGEND

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

Notes:

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

Figure 6-2
Preliminary Conceptual Site Model
Reno AASF, Reno, NV

7. Conclusions

This document presents a summary of information on known or suspected management of AFFF at Reno AASF. The PA findings are based on personnel interviews, environmental investigations and reports, historical documents, and the VSI. 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 the Reno AASF based on PA data (**Figure 7-1**) and is described in **Table 7-1** below:

Table 7-1: Areas of Interest

Area of Interest	Name	Used by	Potential Release Dates
AOI 1	Former Firetruck Bay and Rotary Wing Parking Apron	NVARNG	1980s-mid 2000s

Because there is some uncertainty regarding possible AFFF releases, there is potential for exposure to PFAS contamination in media at or near the facility. The preliminary CSM for Reno AASF is shown on **Figure 6-2**, which presents the potential receptors and media impacted.

An adjacent potential PFAS release area was also identified. The Reno-Stead Airport, formerly Stead Air Force Base, includes a fire academy that hosts regular fire training activities using AFFF. Additionally, several aviation incidents have occurred on the site throughout its long history, though it is unknown whether AFFF were used in response.

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 Reno AASF by NVARNG staff.

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

In order to minimize the level of uncertainty, readily available data regarding the use and storage of PFAS were reviewed, current personnel were interviewed from NVARNG and NVANG, 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

Area of Interest	Source of Uncertainty
AOI 1 Former Firetruck Bay and Rotary Wing Parking Area	It is unknown if the firetruck previously stored in the former firetruck bay held AFFF and for how long. If the firetruck did store AFFF, it is uncertain if any releases or leaks occurred. If a leak or release did occur, the timeframe and volume released is unknown. There are no records of the Tri-Max™ hand-truck units previously stored on the rotary wing parking apron being used, tested or leaking. If a leak or release did occur, the timeframe and volume released is unknown.
Fire Suppression System in South Hangar	It is unknown if the fire suppression system were tested when first installed in 1984. Direct knowledge from interviewees spans from 1987 to present, and fire suppression system was likely installed in 1984, when the building was constructed.

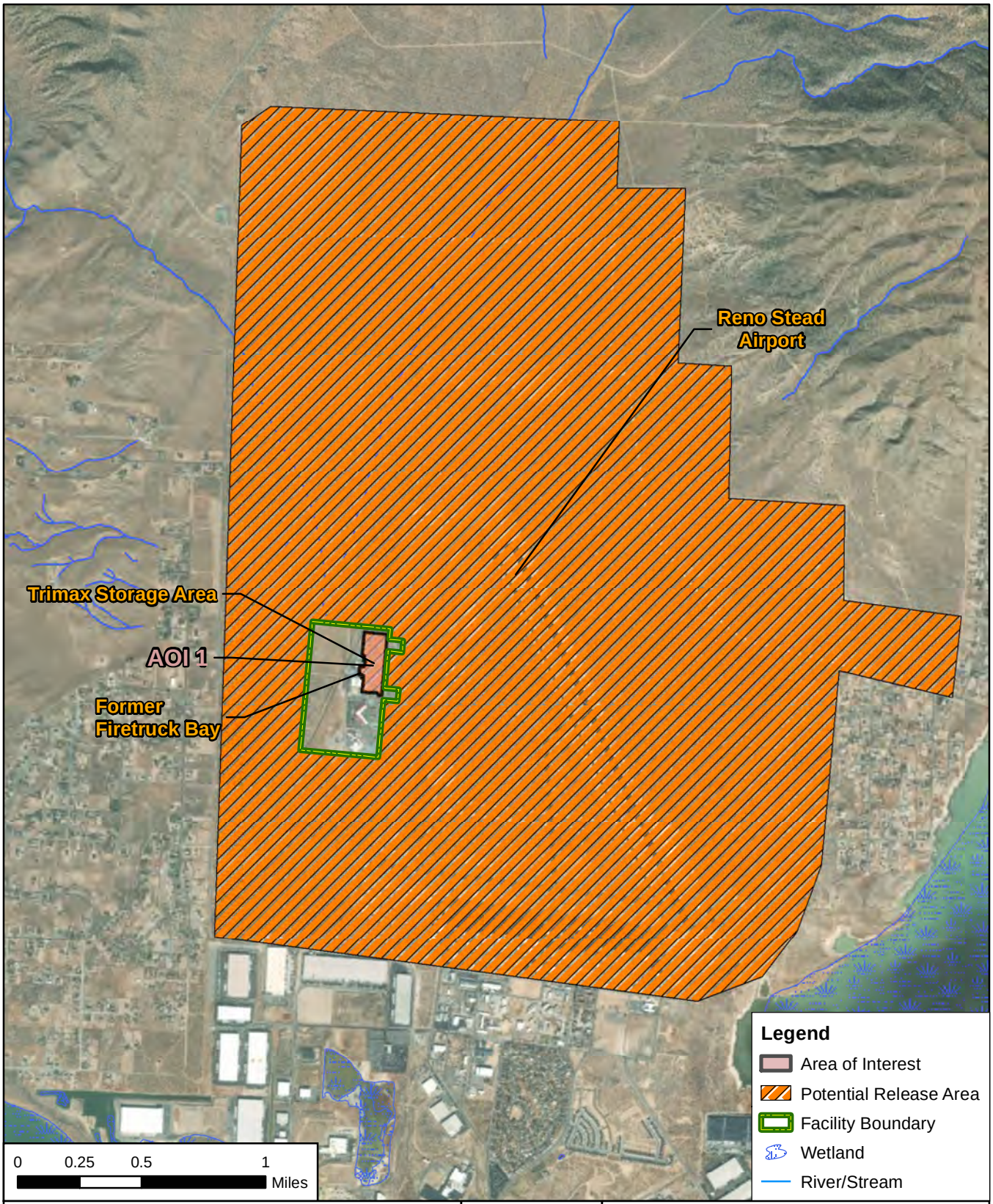
7.3 Potential Future Actions

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

Table 7-3: PA Findings Summary

Area of Interest	AOI Location	Rationale	Potential Future Action
AOI 1 Former Firetruck Bay and Rotary Wing Parking Area	39°40'31.02"N; 119°53'31.81"W	Potential AFFF release / leak from firetruck, fire suppression system and Tri-Max™ hand trucks	Proceed to an SI, focus on soil and groundwater

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



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at Reno AASF, NV			
REVISED	3/19/2020	GIS BY	HO	3/19/2020
SCALE	1:36,000	CHK BY	LS	3/19/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	3/19/2020

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 Reno AASF facility include:

Reno AASF Previous Investigations

- 2010 AMEC. Final Phase 1 Site Assessment for the NVARNG Harry Reid Training Center
- 2014 Broadbent. Phase 1 Environmental Site Assessment. NVARNG Harry Reid Training Center

Reno AASF Facility Information

- 2008 State of Nevada – Office of the Military Nevada National Guard. Senator Harry Reid Readiness and Training Center Facility Condition Analysis Site Number: 9920. State of Nevada Public Works Board
- 2014 Airport Joint Use Agreement
- 2014 Reno Tahoe Airport Authority Land Lease Agreement Nevada State Lands NVARNG.
- 2018 Nevada Division of Environmental Protection. NVARNG Well Closure Packet. State of Nevada Department of Conservation & Natural Resources.
- 2018 Nevada Division of Environmental Protection. NVARNG Well Closure NFA – Groundwater Exemption, PCE in Groundwater. State of Nevada Department of Conservation & Natural Resources.

Reno AASF EDR™ Report

- 2019 Reno AASF Environmental Data Resource Report

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire - Other

Facility: Reno NASF
Interviewer: [redacted]
Date/Time: 9/18/19 0906

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:

[redacted] - Logistic Maintenance Officer - April 2018
Soule - Aviation Maintenance Supervisor - 32 yrs
[redacted] -

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

	Known Uses
• Trimax hand trucks on site (see map) from mid 90's - Early 2000s - turned into Carson City Warehouse DRMO	Use
	Procurement
• NO 5-gal buckets on site.	Disposition
• Fire extinguishers/AFFF system serviced by ABC fire regularly	Storage (Mixed)
	Storage (Solution)
• Dawn dishsoap used for any FTA	Inventory, Off-Spec
• City FD handles aviation emergencies • Has been 20-25 years since base handled fires	Containment
	SOP on Filling
	Leaking Vehicles
• Fire truck onsite until late 80's - unsure if AFFF was on board - truck housed in hanger where AFFF tank currently is located.	Nozzle and Suppression System Testing
	Dining Facilities
	Vehicle Washing
	Ramp Washing
• Fire Academy located on Sted AFB - Guard did NOT train @ this	Fuel Spill Washing and Fueling Stations
	Chrome Plating or Waterproofing

PA Interview Questionnaire - Other

Facility:_____
Interviewer:_____
Date/Time:_____

- Fire suppression system ~~built in~~ located in ~~North~~ South hangar
  - Bldg built 1984
  - Has AFFF foam system → Not used in 32 years
  - unaware if system was tested after installation.
  - if it was released, went into floor drain → O/W separator → WWTP
- C12 hangar does not have fire suppression system
  - only water deluge system
- Water well on-site from 1984 - recently switched to City water in the 90s

- New fuel farm & ramp system
  - ramp replaced in 2017
  - open area → No fire suppression
- No water provided to anyone else

- Adjacent Source: Stead AFB
  - Reno/Tahoe airport now owns it/this
    - No longer DoD
    - Hangars on Sted AFB used by Guard for a short time: 1972-84
      - before blg was built
      - stored helicopters.
      - any firefighting activities ~~used~~ during that time were via airport firefighters.

☆ Fire suppression tank is full/has bladder w/no sign of leakage.

Appendix B.2
Visual Site Inspection Checklists

Facility ST
Visual Survey Inspection Log

Recorded by: [redacted]
ARNG Contact:
Date: 09/18/2019

Site Name / Area Name / Unique ID: Reno AASF
Site / Area Acreage: 103
Historic Site Use (Brief Description): Formerly part of Stead AFB

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.*) New Runway/Rotacy Wing Parking Area in 2017
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

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: RENO AASF

Why has this location been identified as a site?

FORMERLY PART OF STEAD AFB

CURRENTLY STORES PFAS CONTAINING FIRE EXTINGUISHERS/FIRE SUPPRESSION SYSTEM

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

FIRE TRAINING @ STEAD AFB

Training Events

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

If so, how often? —

How much material was used? Is it 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? WEST

Average rainfall? 11 inches (approx)

Any flooding during rainy season? NO, most precipitation in form of snow

Direct or indirect pathway to ditches? NO

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? UNKNOWN

How does surface water drain on and around the flight line? into drains which lead to City of Reno Wastewater treatment Plant

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? SSW

Depth to groundwater? 30-50ft

Uses (agricultural, drinking water, irrigation)? Former MW / Current NP well

Any groundwater treatment systems?

Any groundwater monitoring well locations near the site? Formerly 3 on site - closed 2018

Is groundwater used for drinking water? Yes

Are there drinking water supply wells on installation? No

Do they serve off-post populations? —

Are there off-post drinking water wells downgradient No

Waste Water Treatment Plant:

Has the installation ever had a WWTP, past or present? NO - ONE NEARBY

If so, do we understand the process and which water is/was treated at the plant? NO

Do we understand the fate of sludge waste? NO

Is surface water from potential contaminated sites treated? UNSURE

Equipment Rinse Water

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

NO

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

NO

3. Other?

—

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker

Construction Worker

Recreational User

Residential NONE

Child

Ecological

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

AIRPORT / COMMUNITY / VACANT LAND

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

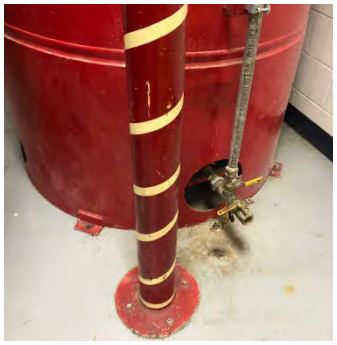
Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility Reno	Reno, Nevada

Photograph No. 1

Description:

Facing West. Fire suppression tank in South Hangar.

Photo Date: 09/18/2019 0945

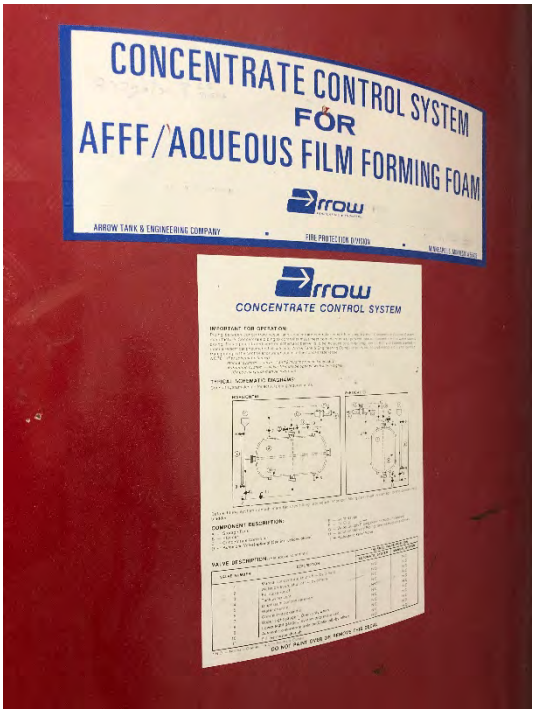


Photograph No. 2

Description:

Facing West. Fire suppression tank in South Hangar.

Photo Date: 09/18/2019 0945



APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility Reno	Reno, Nevada

Photograph No. 3

Description:

Facing South. Drain line direction through the flight line and ramps.

Photo Date: 09/18/2019 0951

Photograph No. 4

Description:

Facing North. Oil/sand separator and drain line.

Photo Date: 09/18/2019 0953

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Army Aviation Support Facility Reno	Reno, Nevada

Photograph No. 5

Description:

Facing North. New fire extinguishers on flight line.

Photo Date: 09/18/2019 0956

Photograph No. 6

Description:

Facing North. New fire extinguishers which have AFFF.

Callouts contain detailed information on specs.

Photo Date: 09/18/2019 1001