Final
Preliminary Assessment Report
Salisbury Army Aviation Support Facility #2, North Carolina

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

August 2020

Prepared for:

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

UNCLASSIFIED

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Acronyms and Abbreviations

°F	degrees Fahrenheit
AASF	Army Aviation Support Facility
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
AOI	area of interest
ARFF	Airecraft Rescue and Firefighting
ARNG	Army National Guard
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSM	conceptual site model
EDR™	Environmental Data Resources, Inc.™
FTA	fire training area
HA	Health Advisory
HART	Helicopter and Aquatic Rescue Team
NC	North Carolina
NCARNG	North Carolina Army National Guard
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
SI	Site Inspection
SWPPP	Stormwater Pollution Prevention Plan
TFFT	tactical firefighting truck
UCMR3	Unregulated Contaminant Monitoring Rule 3
US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WWTP	Wastewater Treatment Plant

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 Army Aviation Support Facility (AASF) #2 (also referred to as the "facility") in Salisbury, North Carolina (NC) to assess potential PFAS release areas and exposure pathways to receptors. The performance 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 site visit on 23 October 2019 and completed visual site inspections at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed Salisbury AASF #2 personnel during the site visit, including North Carolina ARNG (NCARNG) environmental managers, past and current AASF firefighters, and Salisbury AASF #2 operations staff;
- Identified Area(s) of Interest (AOIs) and developed a preliminary conceptual site model (CSM) to summarize potential source-pathway-receptor linkages of potential PFAS in soil, groundwater, surface water, and sediment for each AOI.

Four Areas of Interest (AOI) related to PFAS releases were identified at the Salisbury AASF #2 during the PA. The AOIs are shown on **Figure ES-1** and described in **Table ES-1** below:

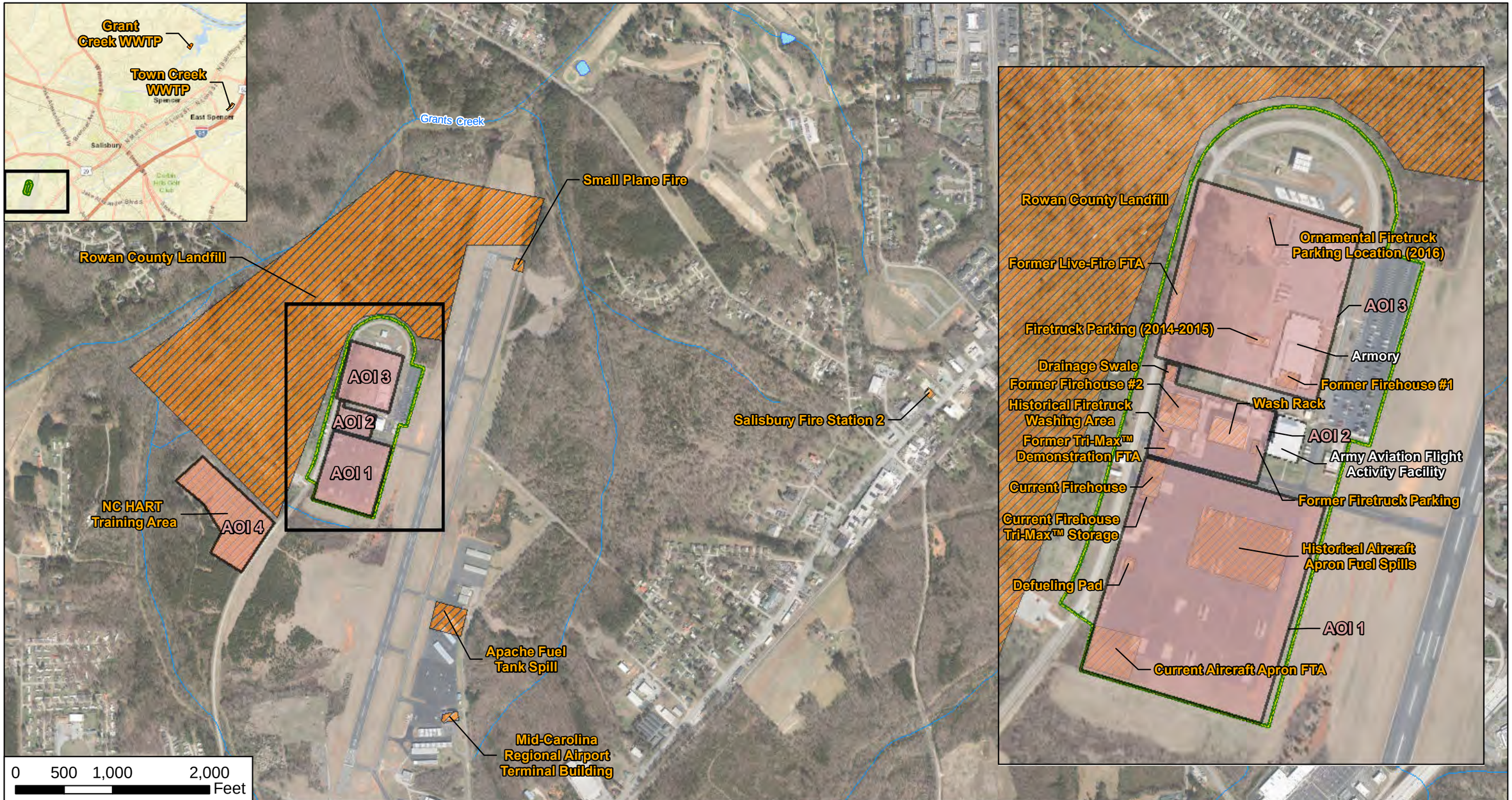
Table ES-1 AOIs at Salisbury AASF #2

Area of Interest	Name	Used by	Release Date
AOI 1	Southern Portion of Salisbury AASF #2	NCARNG	Unknown (1979-present)
AOI 2	Central Portion of Salisbury AASF #2	NCARNG	Unknown (1979-present)
AOI 3	Northern Portion of Salisbury AASF #2	NCARNG	Unknown (1979-present)
AOI 4	NC Helicopter and Aquatic Rescue Team (HART) FTA	NCARNG	2005-present

Based on the potential PFAS releases at the AOIs, there is potential for exposure to PFAS contamination in environmental media at the facility to site workers, construction workers, and off-facility residents using domestic or public supply wells, and off-facility recreational users of the surrounding water bodies. Potential off-facility PFAS release areas also exist adjacent to the Salisbury AASF #2 on Mid-Carolina Regional Airport property. Because these areas include property potentially upgradient of the facility, it is unknown whether off-facility sources affect the Salisbury AASF #2. The preliminary CSM for the Salisbury AASF #2 is shown on **Figure ES-2**.

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's lifetime Health Advisory (HA) level within 20 miles of the

facility. The HA is 70 parts per trillion for PFOS and PFOA, 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.



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PROJECT	Preliminary Assessment for PFAS at Salisbury AASF #2, NC			
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SCALE	1:12,000	CHK BY	ZN	7/23/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	7/23/2020

Area of Interest
Potential PFAS Release
No Suspected Release
Facility Boundary
Water Body
River/Stream

N

Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure ES-1

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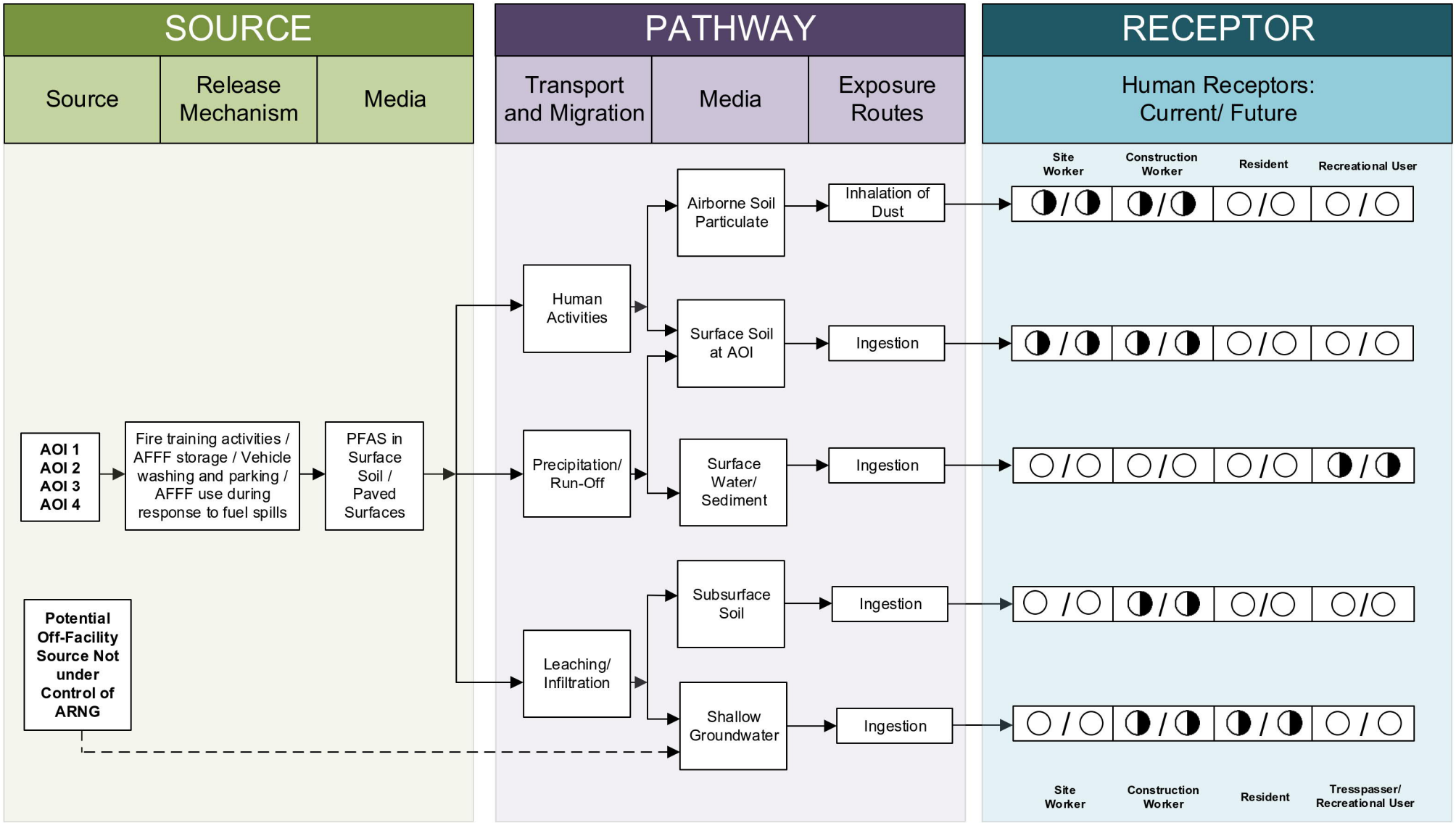


LEGEND

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

Notes:

1. The resident and recreational user receptors refer to an off-site resident and recreational user.
2. The site worker and construction worker receptors refer only to Salisbury AASF #2 site and construction workers.
3. Dermal contact exposure pathway is incomplete for PFAS.

Figure ES-2
Preliminary Conceptual Site Model
Salisbury AASF #2

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 their facilities that used per- and polyfluoroalkyl substances (PFAS) (a suite of related chemicals), primarily releases of aqueous film forming foam (AFFF) 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 these PFAS compounds in the environment will vary. 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 PFOS and PFOA, individually or combined.

This report presents findings of a PA for PFAS-containing materials at the Salisbury Army Aviation Support Facility (AASF) #2 (also referred to as the “facility”) in Salisbury, North Carolina (NC), in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations Part 300), and Army requirements and guidance.

This PA documents the known fire training areas (FTAs) as well as additional locations where PFAS may have been released into the environment at the Salisbury AASF #2. 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 performance 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 site visit on 23 October 2019 and completed visual site inspections at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed Salisbury AASF #2 personnel during the site visit, including North Carolina ARNG (NCARNG) environmental managers, past and current AASF firefighters, and Salisbury AASF #2 operations staff;

- Identified Area(s) of Interest (AOIs) and developed a preliminary conceptual site model (CSM) to summarize potential source-pathway-receptor linkages of potential PFAS in soil, groundwater, surface water, and sediment for each AOI.

1.3 Report Organization

This report has been prepared in accordance with 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 PFAS releases at the facility identified during the site visit.
- **Section 4** – **Emergency Response Areas:** describes areas of AFFF release at the facility, specifically in response to emergency situations.
- **Section 5** – **Adjacent Sources:** describes sources of 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 each area of interest (AOI).
- **Section 7** – **Conclusions:** summarizes the data findings and presents the conclusions and uncertainties 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 Salisbury AASF #2 is on the western side of the runway at the Mid-Carolina Regional Airport (Rowan County Airport). The facility is in Rowan County, North Carolina, roughly 40 miles northeast of Charlotte, North Carolina. Rowan County is bordered by Cabarrus County to the south, Davidson County to the east, Davie County to the north, Iredell County to the west, and Stanly County to the southeast.

Salisbury AASF #2 was constructed in 1975. The facility includes hangar space, a parking apron, flight ramp, wash rack, firehouse, armory building, operations and maintenance support buildings, a fuel farm, and taxiway connecting to the airport runway. The facility parking apron is 32,500 square yards and accommodates NCARNG aircraft. Salisbury AASF #2 is primarily used for the performance of aircraft and equipment maintenance, aircraft refueling, hazardous material storage, aircraft painting, and vehicle and equipment refueling. The 430th Engineer Firefighting Team, stationed at the facility, provides fire service to the airport Monday through Friday (Talbert & Bright, 2011). Additionally, NCARNG has an informal mutual aid agreement for emergency response services with Rowan County, the City of Salisbury, and Locke Township, although the details of the agreement are unknown. The current property lease issues the facility property to

the State of North Carolina from Rowan County for National Guard use from 2002 to 2099. The lease is included in **Appendix A**.

1.5 Facility Environmental Setting

Salisbury AASF #2 is in the Piedmont Region of North Carolina, which is characterized by small rolling hills. The facility sits at 734 feet above mean sea level surrounded by wooded areas (EDR™, 2019). Topography across the southern portion of the facility is generally flat but slopes downward to the south and southwest along the southern boundary. In the northern portion of the facility, topography slopes downward towards the northwest.

Roughly 10 percent of the greater airport property is impervious, as it is covered by buildings and paved areas such as runways, taxiways, aircraft parking aprons, roadways, and parking lots. Unpaved areas across the Salisbury AASF #2 are covered by vegetative surfaces, primarily mowed grass (Talbert & Bright, 2011). There are no water bodies within the NCARNG property boundary.

1.5.1 Geology

Metamorphic, igneous, and sedimentary rock are found in the Piedmont region of North Carolina, with metamorphic rock being the most prevalent (Charles, 1989). They range in composition from felsic to ultramafic. The metamorphic rocks here have been folded and refolded during multiple metamorphic and orogenic events. The rocks have also been broken and displaced by numerous faults and shearing, which can reach up to miles in length. There are many joints where there are rock fractures without displacement; they tend to cluster in groups oriented about one or more preferred directions (Charles, 1989).

Salisbury AASF #2 is on the Charlotte Belt geologic feature. The oldest rocks in this area commonly are mafic gneisses, amphibolites, metagabbros, and metavolcanic rocks (Horton & Zullo, 1991). These features contain largely plutonic rocks that range in age from Late Proterozoic to late Paleozoic. This plutonic complex contains enclaves of metasedimentary and metavolcanic rocks that are most abundant toward the flanks (Gair, J.E. et. al., 1986). The older plutonic complex is intruded by middle Paleozoic plutons that range from gabbro and syenite to granite and granodiorite and by late Paleozoic plutons that are typically porphyritic granite (Gair, J.E. et. al, 1986). The soil in this area is categorized as Cecil-Pacolet, gently sloping to steep, well-drained upland soils that have a loamy surface layer and a predominantly clayey subsoil (US Department of Agriculture [USDA], 1995).

1.5.2 Hydrogeology

In the Piedmont region of North Carolina, there is a three-stage system of earth-materials that includes a regolith zone at the top, transition zone in the middle, and underlying fractured crystalline bedrock beneath (Harned, 1989). The regolith unsaturated zone extends from the surface down to the water table and consists of air, water filled pores and sand. Water infiltrates the zone by intergranular flow through the larger pore spaces and passages (Harned, 1989). The saturated regolith zone provides the bulk of the water storage in the Piedmont groundwater system (Heath, 1980). At the base of the regolith zone lies the transition zone filled with weathered rock, boulders, and saprolite. This area has a high permeability due to incomplete weathering in the upper regolith (Harned, 1989). In the bedrock, all rocks have been subject to uplift, weathering, and erosion that have resulted in the widening of fractures and the formation of new openings. These breaks in the solid rock are the conduits for groundwater flow (Charles, 1989).

Based on groundwater sampling data from monitoring wells at the closed Rowan County Landfill, adjacent to the east of Salisbury AASF #2, groundwater depths in the vicinity of the facility range from approximately 4 to 24 feet below ground surface (Golder Associates NC, Inc., 2018). It is presumed that groundwater depths beneath the facility are similar, but groundwater flow direction at the Salisbury AASF #2 remains unknown. The nearest US Geological Survey (USGS) groundwater information site is an inactive well (USGS 353819080291701 RO-057) located approximately 2 miles southeast of the facility. Groundwater at this location was measured at 40 feet below ground surface in 1954 (USGS, 2020). Groundwater is inferred to follow local topography and flow northeast towards Grants Creek (**Figure 1-2**).

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. There are no drinking water wells at Rowan County Airport or the Salisbury AASF #2; drinking water is provided by Salisbury-Rowan Utilities. Salisbury-Rowan Utilities sources its water from intakes at the confluence of the South Yadkin River and the Yadkin River, located approximately 8 miles northeast of the facility (Salisbury-Rowan Utilities, 2019). Multiple public water system wells were also indicated to lie within a 4-mile radius of the facility in all directions, as shown on **Figure 1-2**. 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 Salisbury AASF #2. The HA is 70 parts per trillion for PFOS and PFOA, 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.

1.5.3 Hydrology

The Yadkin River is the major water body that flows through Rowan County and makes up the border between Rowan, Davie, and Davidson Counties. The river flows in a northwest to southeast direction passing to the north and east of the site. The river is dammed 12 miles east of the facility and forms High Rock Lake.

The Rowan County Airport has multiple drainage outfalls. Outfalls that receive runoff from areas where industrial activities have direct discharges to the stormwater system require visual inspection and qualitative monitoring by the Airport. There are three such outfalls and they all discharge to a channel east of the airfield and Airport Loop Road. This channel flows northward feeding into Grants Creek which eventually discharges to Yadkin River (Talbert & Bright, 2011). The Yadkin River is the main source of drinking water to the facility (**Figure 1-3**).

There are no surface water bodies located within the Salisbury AASF #2 property, but two concrete drainage structures, running south to north and east to west, are located within the facility property and receive drainage from paved areas north of the aircraft apron. The concrete drainage structures lead into a wooded, drainage swale that flows north before presumably connecting with a tributary of Grants Creek or infiltrating into the ground. Another small stream/drainage swale flows west away from the runway adjacent to the south of the facility, which discharges to Grants Creek (US Fish and Wildlife Service, 2020). Grants Creek is a tributary of the Yadkin River. The small stream/drainage swale receives drainage from the facility's aircraft apron and the western side of the runway.

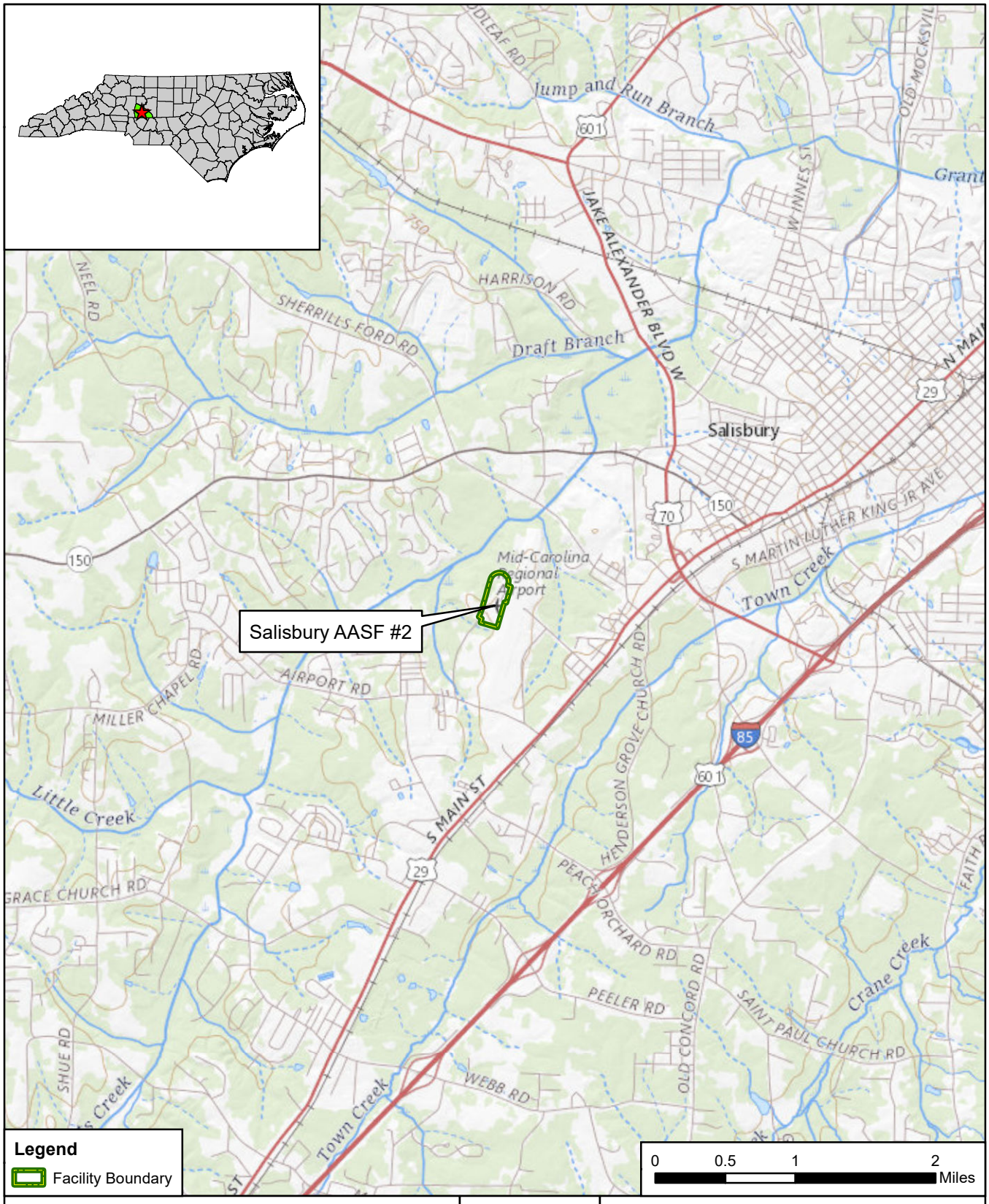
1.5.4 Climate

The climate of Salisbury, North Carolina is humid subtropical characterized by cool to mild winters and hot humid summers with evenly distributed precipitation throughout the year. July is the

warmest month with an average max daily temperature of 89.4 degrees Fahrenheit (°F) and an average daily low of 68.8°F. January is the coldest month with an average daily max temperature of 50.4°F and an average daily low of 27.7°F. Salisbury receives an annual precipitation amount of 42.03 inches. June is the wettest month accumulating 4.19 inches, while November is the driest month, receiving 3.07 inches. On average, Salisbury, North Carolina receives 9.9 inches of snowfall a year. Only one season, 2011-2012, had no measurable snowfall (National Oceanic and Atmospheric Administration, 2020).

1.5.5 Current and Future Land Use

The Salisbury AASF #2 is currently a controlled access facility and is adjacent to the Mid-Carolina Regional Airport, also referred to as Rowan County Airport. The AASF supports rotary aircraft operations for the NCARNG. The facility is currently leased by the state of North Carolina from the Rowan County Airport for the years of 2002 to 2099. The airport is owned and operated by Rowan County and provides commercial and general air service to the Carolinas. Reasonably anticipated future land use is not expected to change from the current land use described here.



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SCALE	1:63,360	CHK BY	ZN	7/13/2020
Base Map: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program,		PM	RG	7/13/2020

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-1

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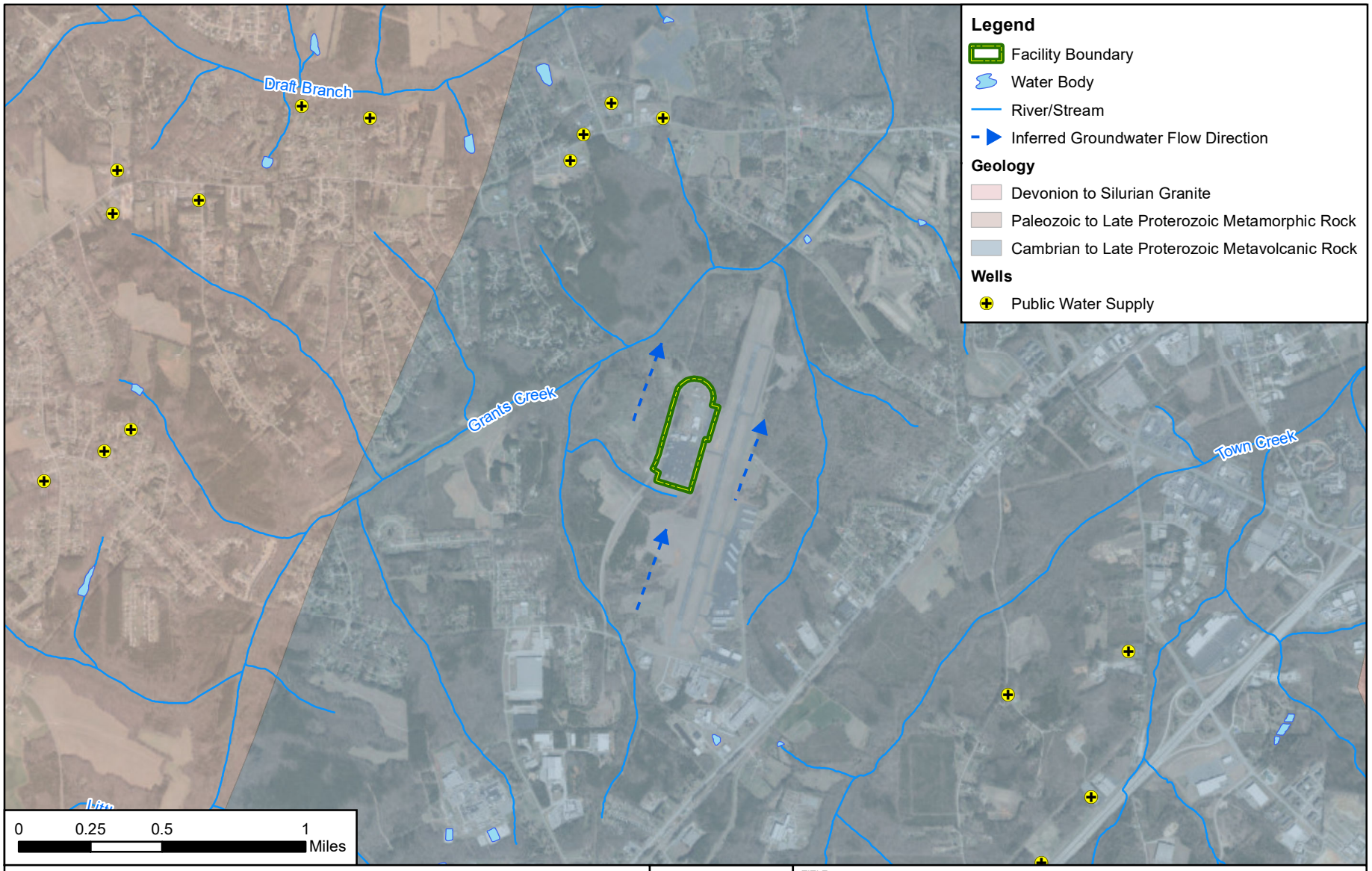

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PROJECT	Preliminary Assessment for PFAS at Salisbury AASF #2, NC			
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Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	6/26/2020

TITLE

Groundwater Features

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-2

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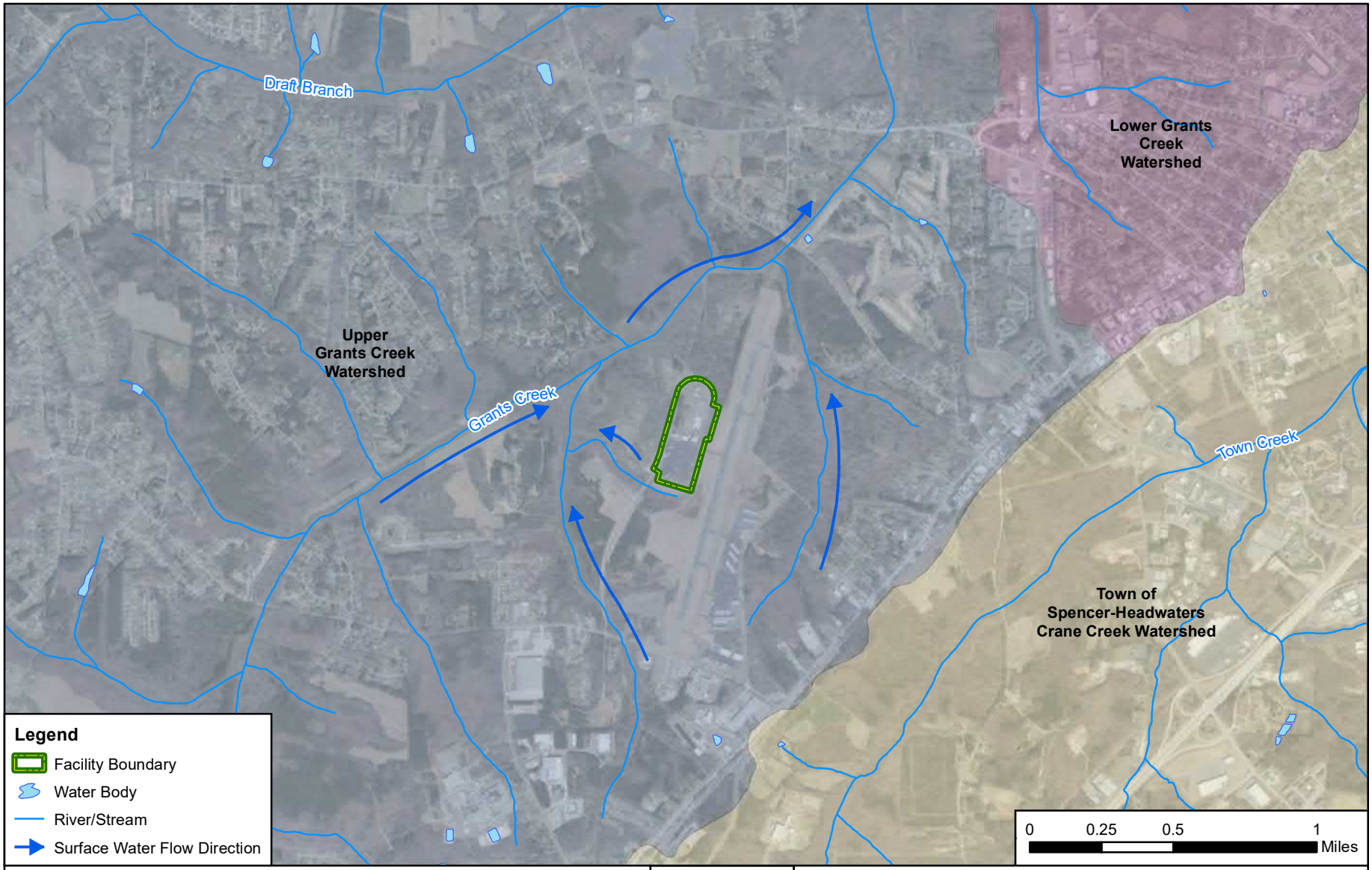

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Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	6/25/2020

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TITLE

Surface Water Features

AECOM

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Figure 1-3

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2. Fire Training Areas

Three FTAs were identified at the Salisbury AASF #2 during the PA. A description of each FTA is presented below, and their locations are shown on **Figure 2-1**. Photographs of the FTAs appear in **Appendix C**.

Salisbury AASF #2 houses the 430th Engineer Firefighting Team, which responds to emergencies at the facility, with additional support at the Rowan County Airport depending on the severity of the emergency. As such, NCARNG firefighters have historically trained in several areas at the facility, and off-facility at several locations, including a fire training academy in Charlotte, at the Guilford Technical Community, and at a facility in Albemarle, North Carolina.

2.1 Current Aircraft Apron FTA

Based on PA interviews, the southwestern corner of the aircraft apron is used as an FTA. The training in this area involves using a firetruck to spray water from the southwestern corner of the apron toward the south, into the grassy vegetated area. It is unknown whether the same firetruck is used for each training event. Although the 430th Engineer Firefighting Team trains with only water in this location, both firetrucks used by the 430th Engineer Firefighting Team also store AFFF. It is possible that AFFF contained within the truck has migrated into other lines due to the corrosive nature of PFAS. As such, it is possible that water sprayed may contain PFAS. Water sprayed during training is aimed towards a drainage swale off-facility that flows downslope to the west towards Grants Creek. This FTA is considered a potential PFAS release area.

2.2 Former Tri-Max™ 30 Demonstration FTA

Based on PA interviews, local schools coordinated field trips to the Salisbury AASF #2 to observe Tri-Max™ 30 wheeled fire extinguisher fire training exercises performed by the previous fire unit at the facility in the 1990s. Students attending the field trips would observe firefighters spraying AFFF from a Tri-Max™ 30 fire extinguisher at a stationary, non-ignited target. No live fires were used during these demonstrations, and according to interviewees, students were not exposed to the AFFF. The demonstration included a quick spray of AFFF from the nozzle of the Tri-Max™ 30 extinguisher. These demonstrations took place on an asphalt-paved area between the current and Former Firehouse #2. Interviewees estimated that these Tri-Max™ 30 demonstrations occurred at least six times; however, the exact timeframe when demonstrations occurred is unknown. The type of AFFF sprayed during training events is also unknown, but Ansulite Light Water™ 3% AFFF concentrate was observed during the site visit. Interviewees estimated that the volume of AFFF sprayed during each demonstration was a few gallons; however, the cumulative volume of AFFF sprayed is unknown. The FTA where these demonstrations were performed is considered a potential PFAS release area. Following the demonstrations, the discharged AFFF was allowed to drain naturally into the concrete drainage structure located west of the FTA.

2.3 Former Live-Fire FTA

Based on PA interviews, an area near the northwestern boundary of the facility was also used as an FTA in the 1990s. Fire training was performed on a gravel area located where National Guard Road is currently paved. During training, a fuel pan was burned so that the former fire unit could train with various materials to extinguish the flames. On most occasions, water, Purple K and other dry chemical agents were used to extinguish the fire. On one occasion, a Tri-Max™ 30 wheeled fire extinguisher containing AFFF was used, however, the type and concentration of AFFF used is unknown and undocumented. The volume of AFFF sprayed is also unknown. A concrete drainage structure near the FTA conveys surface runoff to the north, into the wooded

area northwest of the facility. Based on the known release of AFFF during a training event at the Former Live-Fire FTA, the area is considered a potential PFAS release area.

CLIENT	ARNG			
Preliminary Assessment for PFAS at Salisbury AASF #2, NC				
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SCALE	1:3,600	CHK BY	ZN	5/13/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	5/13/2020

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Fire Training Areas

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12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-1

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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**. Several non-FTAs where AFFF may have been released were identified during the PA. A description of each non-FTA is presented below, and the non-FTAs are shown on **Figure 3-1**. Photographs of the non-FTAs appear in **Appendix C**. Current and former personnel interviewed for this PA have first-hand knowledge of activities at Salisbury AASF #2 from 1979 to 1999 and 2005 to present.

3.1 Current Firehouse

Based on PA interviews, the Current Firehouse was constructed circa 2005, which is corroborated by historical aerial imagery. The firehouse is located towards the northwestern end of the paved aircraft parking apron along National Guard Road. The 430th Engineer Firefighting Team was stationed at the Salisbury AASF #2 with the construction of the Current Firehouse. This team replaced the previous firefighting unit and is not a continuation of the previous unit.

The 430th Engineer Firefighting Team received two firetrucks coinciding with the construction of the current firehouse: one tactical firefighting truck (TFFT) and one tanker truck. Both trucks are stored at the current firehouse. The TFFT contains two 60-gallon AFFF tanks onboard, and the tanker truck includes storage for between 50 to 60 gallons of AFFF. Both firefighting vehicles are regularly inspected and checked for leaks. During interviews, it was noted that the TFFT has needed to have AFFF added to the tank twice for unknown reasons, indicating a potential leak. No known spraying of AFFF occurred to have caused the volume of AFFF in the TFFT to decrease, and no AFFF was seen leaking from the vehicle. Approximately 2 gallons of AFFF were used to top off the AFFF tank in the firehouse vehicle bay following the decrease in volume. The problem did not persist, and no repairs were performed. Both vehicles are washed behind the firehouse to the west.

Interviewees estimate that 100 gallons of AFFF concentrate were previously stored in 5-gallon buckets in the firehouse office space adjacent to the vehicle bay. No AFFF was present in buckets during the site visit in October 2019. It is unknown how and when the buckets of AFFF concentrate were disposed of. The buckets of AFFF were not delivered with the two firefighting vehicles circa 2005; it is possible that the buckets were present at the facility prior to the construction.

Currently, eight Tri-Max™ 30 wheeled fire extinguishers are stored outside the southern wall of the firehouse. It is unknown when the extinguishers were acquired. Based on information provided during interviews, Tri-Max™ 30 units have also been stored on the helicopter parking pads and in the grassy areas on the eastern and western edges of the aircraft parking apron. There have been no known leaks from the Tri-Max™ 30 units during the tenure of AASF interviewees. Additionally, one portable extinguisher charged with AFFF is stored in the same location as the Tri-Max™ carts and is anticipated to have the same usage and storage location history. The type and concentration of AFFF stored within the Tri-Max™ 30 wheeled fire extinguishers as well as the non- Tri-Max™ extinguisher is unknown.

Based on the storage of AFFF concentrate at the current firehouse, the potential leak of AFFF from the TFFT, the washing of firetrucks, the unknown disposal of previously stored AFFF concentrate from the firehouse, and the storage of Tri-Max™ 30 units at the firehouse, the area is considered a potential PFAS release area.

3.2 Former Firehouse #1

The Former Firehouse #1 was the original firehouse from 1979 to 1989 and was located near the facility parking lot. According to interviewees, a Class 530 firetruck was acquired in 1979, stored at Former Firehouse #1, and equipped with a 40 gallon foam tank that contained “protein foam.” Eventually, three firetrucks were stored at the former firehouse in the 1980s, two of which had foam tanks containing protein foam, and one that carried AFFF. The ingredients of the protein foam are unknown. One of these firetrucks is currently parked near the fueling station and is inactive. Based on aerial imagery, the firetruck was moved to this location circa 2016. Prior to 2016, the firetruck was parked on the northern end of a parking lot in the northern portion of the facility. It is unclear if this firetruck is currently equipped with AFFF or has ever contained AFFF. Firetrucks were stored outside of the firehouse during use, but AFFF was also stored inside the fire station.

According to interviewees, firefighting materials were transitioned to AFFF following the arrival of the Class 530 firetruck. In 1979, the facility received 100 gallons of 6% AFFF concentrate from Fort Bragg and continued to receive increments of 100 gallons of AFFF concentrate until the firehouse had approximately 300-400 gallons of AFFF concentrate in addition to the AFFF stored on firetrucks. The Former Firehouse #1 is no longer present at the facility, and based on aerial imagery, it was demolished prior to 1993. The armory was constructed partially on the location of the former firehouse. Based on the known storage of AFFF and AFFF-capable firetrucks at Former Firehouse #1, the area is considered a potential PFAS release area. The parking locations of firetrucks are also considered potential PFAS release areas.

3.3 Former Firehouse #2

The Former Firehouse #2 is adjacent to the Current Firehouse to the north on the western boundary of the facility along National Guard Road. Former Firehouse #2 is on the northwest corner of the aircraft apron. Use of the Former Firehouse #2 began in 1989, and firefighting materials were transferred from the Former Firehouse #1. The three previously mentioned firetrucks were typically stored outside the firehouse, and AFFF was typically stored inside the firehouse. The Allied storage area adjacent to Former Firehouse #2 also stored Tri-Max™ units and buckets of AFFF concentrates. Former Firehouse #2 was used until the mid-2000s, when the Current Firehouse was constructed.

Additionally, firetrucks were routinely washed on the paved surface directly south of Former Firehouse #2. A concrete drainage structure here conveys water away from the firehouse into the wooded area to the north during firetruck washing.

Former Firehouse #2 is still present at the facility; however, it is currently used to store Ground Support Equipment. Based on the known storage of AFFF and AFFF-capable firetrucks as well as the washing of those firetrucks, this area is considered a potential PFAS release area.

3.4 Historical Aircraft Apron Fuel Spills

The Aircraft Apron occupies the majority of the southern half of the Salisbury AASF #2. It includes several helicopter parking pads and connects to the Rowan County Airport via taxiway. According to interviewees, Tri-Max™ 30 fire extinguishers have been historically stored on the helicopter parking pads and in the grass along the east and west edge of the Aircraft Apron. Currently, the Tri-Max™ 30 fire extinguishers are charged with AFFF and are stored outside the southern wall of the fire house. Two different types of Amerex extinguishers were observed on the flight line during the site visit. One type was charged with Purple K dry chemical extinguishant, while the other type was charged with film forming fluoroprotein foam. The contents of the fluoroprotein foam are

unknown, but other fluoroprotein foams available include a blend of fluorinated surfactants and hydrolyzed proteins. It is conservatively assumed that the fluoroprotein Amerex fire extinguishers at the facility contain PFAS.

Historical fuel spills have occurred on the Aircraft Apron as well as the Defueling Pad located on the western edge of the apron. Interviewees stated that AFFF was used in response to fuel spills across the Aircraft Apron, including the defueling pad as a preventative measure to combat potential fires.

A former firetruck parking area was also described by interviewees on the paved area just north of the Aircraft Apron adjacent to the flight operations building. It is possible that firetrucks parked here contained AFFF and had the potential to leak.

As a result of the known storage of Tri-Max™ 30 units across the Aircraft Apron, the use of AFFF in response to fuel spills, and the parking of AFFF-containing firetrucks, the areas on the Aircraft Apron where these events and practices have occurred are identified as potential PFAS release areas.

3.5 Army Aviation Flight Activity Facility

The Army Aviation Flight Activity Facility, also referred to as the Hangar or Flight Operations Building, is located at the northeast corner of the Aircraft Apron. The Hangar includes space for aircraft maintenance, as well as office space and storage rooms. The building does not have a fire suppression system. According to interviewees, the Hangar has never been used for the storage of AFFF or fire training equipment. Based on the lack of known historical use of the Hangar for the storage of firefighting equipment, the lack of a fire suppression system, and the absence of known emergencies at the Hangar, the area is not considered a potential PFAS release area.

3.6 Armory

The Armory is in the center of the facility and was constructed partially on the footprint of Former Firehouse #1. The Armory does not have an AFFF fire suppression system and has no known historical use as a storage location for AFFF. Based on aerial imagery, the Armory was constructed prior to 1993 but would have been constructed after 1989 due to the known use of Former Firehouse #1 until 1989. Based on the lack of evidence indicating that AFFF has been stored or used at the Armory, the area is not considered a potential PFAS release area; however, the portion of the armory that overlies the Former Firehouse #1 footprint is considered a potential PFAS release area.

3.7 Wash Rack

The Wash Rack is on the north end of the Aircraft Apron to the immediate east of Former Firehouse #2. Interviewee-provided information and aerial imagery indicate that the Wash Rack was constructed circa 2005; however, as-built drawings indicate that a “wash area” was planned as early as 1988. According to interviewees, neither AFFF nor fluoroprotein foam have ever been used or stored at the Wash Rack, and the Wash Rack is not used for the washing firefighting vehicles. It is unclear whether a wash area was used in the same location, as indicated by the as-built drawings, for washing other vehicles and equipment prior to the construction of the Wash Rack. Because potential PFAS releases are suspected to have occurred on the adjacent Aircraft Apron, it is possible that AFFF and fluoroprotein foam may have been rinsed from vehicles and equipment from the wash area pre-dating the current Wash Rack. Based on uncertainty surrounding the use of the wash area where the current Wash Rack exists and the known PFAS

releases occurring nearby that may have resulted in equipment rinsing, the Wash Rack area is considered a potential PFAS release area.

3.8 Drainage Swale

The Drainage Swale is a depressed, wooded area at the corner of two concrete drainage structures running south to north and east to west, adjacent to the Former Firehouse #2. The concrete ditch that runs south to north has received firetruck wash water from the Former Firehouse #2 and discharged AFFF from the Former Tri-Max™ 30 Demonstration FTA; this drainage then flowed north before overflowing into the Drainage Swale area. The as-built drawings appear to indicate the presence of a catch basin south of the Former Firehouse #2 that also drains into the concrete ditch via a 15-inch reinforced concrete pipe. In addition, a “brush barrier” is labeled at the approximate location of the Drainage Swale. The drainage pattern from the Drainage Swale is unknown but is presumed to flow north along National Guard Road before infiltrating into the ground or draining into a tributary of Grants Creek. The Drainage Swale is considered a potential PFAS release area, because the area has received drainage from other potential PFAS release areas.

CLIENT	ARNG			
Preliminary Assessment for PFAS at Salisbury AASF #2, NC				
REVISED	7/17/2020	GIS BY	MS	7/17/2020
SCALE	1:3,600	CHK BY	ZN	7/17/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	7/17/2020

Non-Fire Training Areas

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 3-1

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4. Emergency Response Areas

Emergency services for the facility are provided by the 430th Engineer Firefighting Team stationed at the Current Firehouse. No emergency response areas or incidents were identified within the facility during the PA through interviews. The NCARNG also has an informal mutual aid agreement for emergency response services with Rowan County, the City of Salisbury, and Locke Township, although the details of the agreement are unknown. Additionally, the 430th Engineer Firefighting Team provides fire service to Rowan County Airport Monday through Friday (Talbert & Bright, 2011). The Rowan County Airport has one firetruck for emergency response. The 430th Engineer Firefighting Team responded to an incident at the Rowan County Airport in 1997 and dispensed approximately 15-20 gallons of AFFF. The details of the emergency response are presented in **Section 5.1**.

5. Adjacent Sources

Six potential off-facility PFAS sources were identified adjacent to the Salisbury AASF #2 during the PA. These sources also present the potential for co-contaminant plumes to intersect the Salisbury AASF #2. The locations of potential off-facility source areas are shown on **Figure 5-1**.

5.1 Mid-Carolina Regional Airport

Salisbury AASF #2 is within the greater Mid-Carolina Regional Airport property, also referred to as Rowan County Airport. Rowan County Airport is a public airport owned by Rowan County, located in Salisbury, North Carolina, that includes a 5,500-foot by 100-foot runway (Runway 2/20) that is positioned nearly north/south. The airport provides general aviation services and aircraft fueling, maintenance, tie-downs, and a variety of hangar storage operations to numerous tenants, including the NCARNG. Based on their tendency to store and use AFFF, as well as the potential for fueling and aircraft incidents, airports can be locations for potential PFAS releases.

According to interviewees, several incidents were identified at Rowan County Airport requiring emergency response. An incident in 1997 was described in which an Apache fuel tank ruptured approximately 0.25 miles southeast from the Salisbury AASF #2, across the runway, on a paved surface near the SouthTecAviation Hangar. During the incident, the seam on the forward tank ruptured and fuel ran through the fuselage. The remaining fuel in the billy tank also drained. The previous fire unit at the Salisbury AASF #2 responded by dispensing approximately 15-20 gallons of AFFF on the fuel spill. The type of AFFF used is unknown and undocumented. The expended foam and fuel were rinsed into the nearby storm drain. The area where this incident occurred is considered a potential PFAS release area.

Another incident occurred in which a small plane burned to the ground on the northeast end of Runway 2/20, approximately 0.3 miles northeast of the Salisbury AASF #2. According to interviewees, airport personnel dispensed approximately 30 gallons of AFFF on the fire in response. The Salisbury AASF #2 previous fire unit did not respond to the incident. The year this incident occurred is unknown. The type and concentration of AFFF used during the emergency response is unknown.

Rowan County Airport includes an Aircraft Rescue and Firefighting (ARFF) building and fire department for responding to emergencies at the airport. The Stormwater Pollution Prevention Plan (SWPPP) for the airport describes the ARFF building as being located south of the main terminal building (Talbert & Bright, 2011). The airport ARFF building was not observed during the site visit, and its exact location is unknown. According to the SWPPP, the Airport fire department stores one firetruck for emergency response.

The areas described where AFFF was used during emergency responses, or areas where AFFF may be potentially stored, are considered potential PFAS release areas.

5.2 NC Helicopter and Aquatic Rescue Team (HART) FTA

The 430th Engineer Firefighting Team performs fire training exercises in an open field located off-facility and adjacent to the southwestern portion of the facility. The training involves fire department staff approaching the area in a firetruck and dispensing water from the vehicle forward-mounted nozzle while simultaneously driving the truck. This approach training simulates the necessary response to brush fire conditions. No live fires are ignited for the purpose of this training. Although this training uses only water, the firetruck used also stores AFFF. It is possible that AFFF contained within the truck has migrated via backflow into other lines due to the corrosive nature of PFAS. As such, it is possible that this water is contaminated with PFAS. According to

interviewees, this type of training occurs commonly on weekends and was estimated to have occurred approximately 50 times since 2005. The volume of water sprayed during event is unknown, and the type of AFFF stored on the vehicles used is unknown. Runoff from the training exercises likely flows into the small stream/drainage swale, bordering the FTA to the north, that drains west into Grants Creek. The NC HART FTA is considered a potential PFAS release area.

5.3 Salisbury Fire Station 2

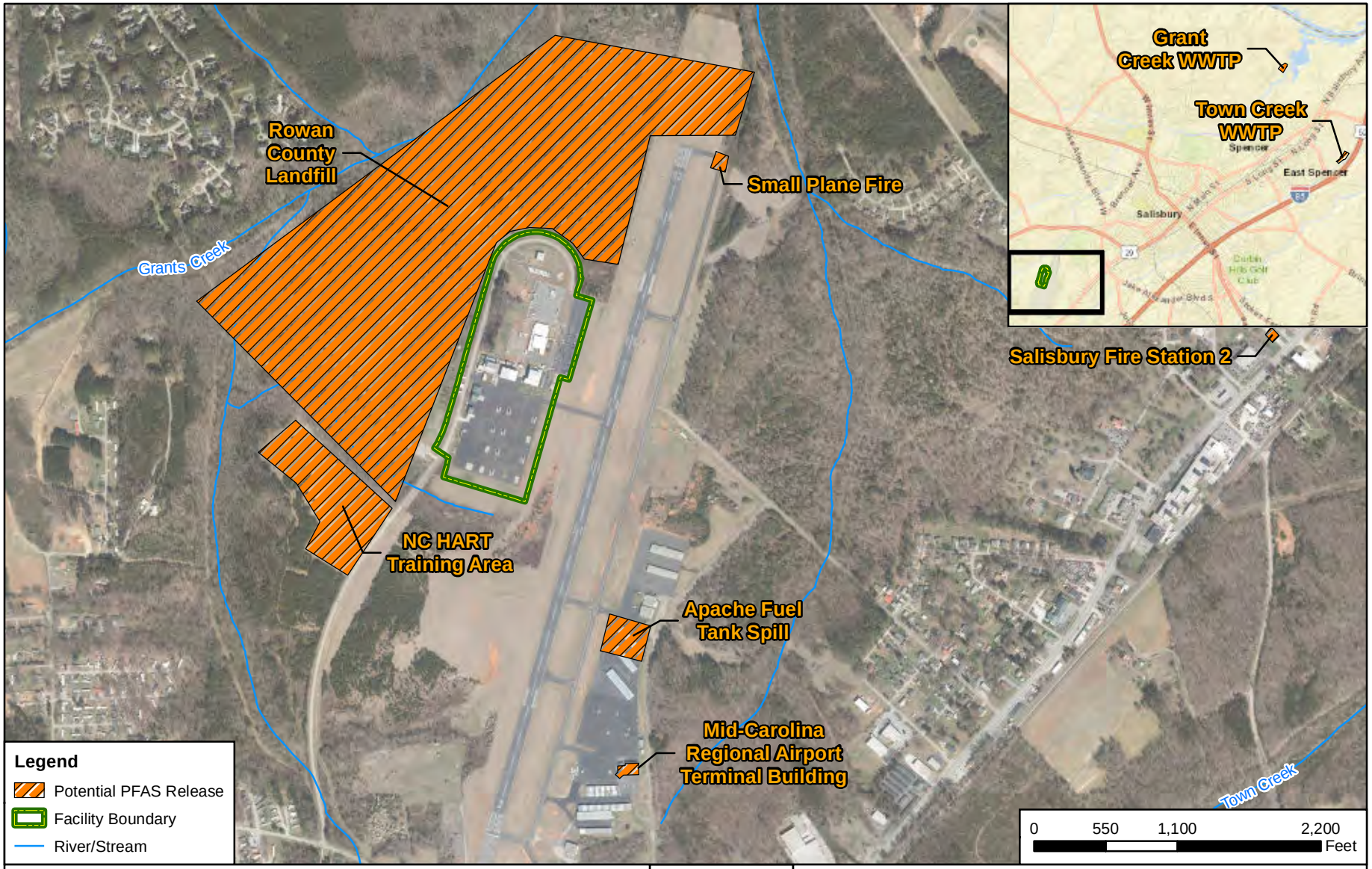
The City of Salisbury Fire Department Fire Station 2 is on South Main Street in Salisbury, approximately 1 mile east of Salisbury AASF #2, and the Rowan County Airport runway. Fire Station 2 was constructed in 1980 and serves the southwest portion of Salisbury. The station serves a mixture of residential property, numerous industries and business, and schools in the city, but does not typically respond to emergencies at Rowan County Airport. At least one vehicle stored at Salisbury Fire Station 2 has the capacity to store Class B foam, which may include AFFF. Due to the tendency for fire stations to store and use AFFF, and the known capacity to store Class B foam by a firefighting vehicle, Salisbury Fire Station 2 is considered a potential PFAS release area.

5.4 Rowan County Landfill

Rowan County Landfill is located adjacent to the west of the facility, along National Guard Road. The landfill is a 222-acre parcel owned by Rowan County and operated from the early 1960's until 1980. Detailed maps of the landfill were not available during this PA, but interviewees identified locations where dumping took place during the site visit. Landfills are not usually a primary potential release area of PFAS, but materials disposed of in landfills may create a secondary source of contamination. Such materials may include used AFFF storage containers or products associated with waterproofing uniforms or boots. As such, the Rowan County Landfill is considered a potential PFAS release area.

5.5 Wastewater Treatment Plants

There is no WWTP located at Salisbury AASF #2. WWTPs are not usually a primary potential release area of PFAS, but PFAS-containing liquids and sludges processed at a WWTP could create a secondary source of contamination. Salisbury Rowan Utilities operates two WWTPs in the city of Salisbury: The Grant Creek and Town Creek WWTPs. The Grant Creek WWTP is located approximately 6.5 miles northeast of the Salisbury AASF #2, and the Town Creek WWTP is located approximately 6.5 miles east/northeast of the facility. Both WWTPs discharge treated wastewater to the Yadkin River. Additionally, biosolids generated at the WWTPs are applied to animal agricultural land (City of Salisbury, 2020). The locations where biosolids have been applied to agricultural lands is unknown. Based on the potential release of PFAS in areas at Salisbury AASF #2 that discharge to sanitary sewers, as well as other adjacent sources of potential PFAS release, the WWTPs are considered potential PFAS release areas. The two WWTPs are not shown on Figure 5-1, however, due to their distance from the facility.



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Salisbury AASF #2, NC			
REVISED	7/23/2020	GIS BY	MS	7/23/2020
SCALE	1:13,200	CHK BY	ZN	7/23/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	7/23/2020

TITLE

Adjacent Sources

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-1

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6. Preliminary Conceptual Site Model

Based on the PA findings, four AOIs were identified at the facility that encompass the numerous areas where PFAS-containing materials have been stored or used:

- AOI 1 Southern Portion of Salisbury AASF #2
- AOI 2 Central Portion of Salisbury AASF #2
- AOI 3 Northern Portion of Salisbury AASF #2.
- AOI 4 NC HART FTA

Locations of the AOIs are shown on **Figure 6-1**. Except for AOI 4, all AOIs were located on land licensed to NCARNG. AOI 4 is located on off-facility, adjacent property but is solely used by NCARNG for fire training purposes. The following sections describe the CSM components and the specific preliminary CSMs developed for each AOI. The CSM identifies the three components necessary for a potentially complete exposure pathway: (1) source, (2) pathway, (3) receptor. If any of these elements are missing, the pathway is considered incomplete.

6.1 Pathways

In general, the potential PFAS exposure pathways are ingestion and inhalation. Human exposure via the dermal contact pathway may occur, and current risk practice suggests it is an insignificant pathway compared to ingestion; however, exposure data for dermal pathways are sparse and continue to be the subject of PFAS toxicological study (National Ground Water Association, 2018).

Known and potential AFFF releases identified at the facility occurred on both surface soil and paved surfaces. Releases to the paved surfaces could have migrated a short distance onto the surrounding surface soil. Activities, including ground-disturbing construction, in these grassy areas may result in potential exposure to PFAS in surface soils via ingestion and inhalation of dust particles. AFFF releases to the paved surfaces could have infiltrated the subsurface via cracks in the pavement or joints between areas that are paved with different materials and may have infiltrated subsurface soil in the grassy areas. As such, ground-disturbing activities may result in potential exposure to PFAS in subsurface soils. Because depth to groundwater beneath the adjacent closed landfill can be relatively shallow, it is possible that ground-disturbing activities at Salisbury AASF #2 could also result in exposure to PFAS in groundwater via ingestion.

PFAS are water soluble and can migrate readily from soil to groundwater via leaching; however, drinking water at the Salisbury AASF #2 is provided by Salisbury-Rowan Utilities. Salisbury-Rowan Utilities sources its water from intakes at the confluence of the South Yadkin River and the Yadkin River, located approximately 8 miles northeast of the facility. Although no drinking water wells exist at the Salisbury AASF #2, numerous public supply wells exist within 4 miles of the facility in all directions, which may result in potential exposure via ingestion of groundwater.

Surface water runoff across Rowan County Airport entering the airport stormwater sewer system directs flow towards a channel that flows northward feeding into Grants Creek, which eventually flows into the Yadkin River. General surface runoff across the southern portion of Salisbury AASF #2 may also flow towards a drainage swale off-facility that flows downslope to the west, towards Grants Creek. In the northern portion of the facility, topography and a concrete drainage structure conveys surface water runoff to the north into the wooded area northwest of the facility. Runoff to the north also drains to Grants Creek. It is possible PFAS could migrate via runoff to the nearby creek and larger bodies of water, including the Yadkin River, which may result in potential exposure via ingestion of surface water and sediment.

6.2 Receptors

Receptors at the Salisbury AASF #2 facility include site workers, construction workers, off-facility recreational users of the surround creeks and waterways, and off-facility residents. These receptors, as they pertain to the facility, are described below:

- Site workers typically work at or use the site and may come into contact with the surface soils.
- Construction workers are considered workers who represent a utility worker or other worker who would be exposed to surface and/or subsurface conditions through ground-disturbing activities.
- Off-facility recreational users typically identify a person who may recreationally use an off-facility area that may be affected by a PFAS release from the facility. Off-facility recreational users could be exposed to sediment and surface water during recreational use.
- Off-facility residents identify receptors who occupy properties outside of the Salisbury AASF #2. Off-facility residents may come into contact with groundwater using unregistered, private, domestic wells, or public supply wells.

The preliminary CSMs for the Salisbury AASF #2 indicate which specific receptors could potentially be exposed to PFAS. The preliminary CSM is shown on **Figure 6-2**.

6.3 AOI #1 Southern Portion of the Salisbury AASF #2

AOI 1 encompasses the Current Aircraft Apron FTA, Aircraft Apron Fuel Spills, Defueling Pad, Current Firehouse, and the grassy areas surrounding the potential release areas. Based on PA findings, these are areas of known or suspected AFFF use and storage.

Potentially PFAS-laden water was dispensed at FTA during training events towards the grassy area at the southwest corner of the apron and may migrate via runoff towards a drainage swale that flows downslope to the west, towards Grants Creek. AFFF has been used in response to historical fuel spills as a preventative measure to combat potential fires across the Aircraft Apron and Defueling Pad. Tri-Max™ 30 fire extinguishers have also been stored on the apron at various times. The Current Firehouse stores AFFF on firefighting vehicles and previously stored AFFF in 5-gallon buckets. Tri-Max™ 30 fire extinguishers are also stored outside on the southern side of the current fire house. Additionally, the firefighting vehicles are washed outside the firehouse.

Surface runoff across these areas generally flows west via sheet flow or the drainage swale at the southern boundary of the facility to the west towards Grants Creek. Potential PFAS exposure pathways resulting from releases at AOI 1 are described in **Table 6-1**.

Table 6-1: Exposure Pathways at the AOIs

Pathway	Receptor
Surface Soil	Considered a potentially complete pathway to site workers, and construction workers via ingestion or inhalation of dust
Subsurface Soil	Considered a potentially complete pathway to construction workers via ingestion or inhalation of dust
Surface Water and Sediment	Considered a potentially complete pathway to off-facility recreational users via ingestion
Groundwater	Considered a potentially complete pathway to construction workers and off-facility residents via ingestion

6.4 AOI #2: Central Portion of Salisbury AASF #2

AOI 2 encompasses the Former Firehouse #2, Historical Firetruck Washing Area, Former Tri-Max™ Demonstration FTA, Wash Rack, Former Firetruck Parking Area, Drainage Swale, and grassy areas surrounding the potential release areas. Based on PA findings, these are areas of known or suspected AFFF use and storage.

Firetrucks containing AFFF and "protein foam" were historically stored at the Former Firehouse #2 and washed in the adjacent areas. AFFF concentrate in buckets and Tri-Max™ units were also stored in the Allied storage area adjacent to Former Firehouse #2. Although no known PFAS releases have occurred at the Wash Rack, its previous uncertain use as a wash area may have resulted in PFAS being rinsed from vehicles and equipment. Tri-Max™ units were discharged on the asphalt-paved area between the Current Firehouse and Former Firehouse #2 as a part of firefighting demonstrations at the former FTA. Demonstrations took place in the 1990s, but the exact timeframe of use and the total volume of AFFF released during demonstration events is unknown. AFFF, protein-based foam, or PFAS-laden water may have been released from the vehicles to the pavement and nearby grassy areas at the Former Firetruck Parking area.

Surface runoff across areas are anticipated to generally flow west, via sheet flow, towards Grants Creek. Surface flow reaching National Guard Road may be conveyed to the north along the road surface. A concrete drainage structure on the north side of the AOI also conveys water away from the firehouse into the Drainage Swale, located in a wooded area to the north. Potential PFAS exposure pathways resulting from releases at AOI 2 are described in **Table 6-1**.

6.5 AOI #3: Northern Portion of Salisbury AASF #2

AOI 3 encompasses the Former Firehouse #1, Firetruck Parking (2014-2015), Ornamental Firetruck Parking Location (2016), Former Live Fire FTA, and the grassy and paved areas surrounding the potential release areas. Based on PA findings, these are areas of known or suspected AFFF use and storage.

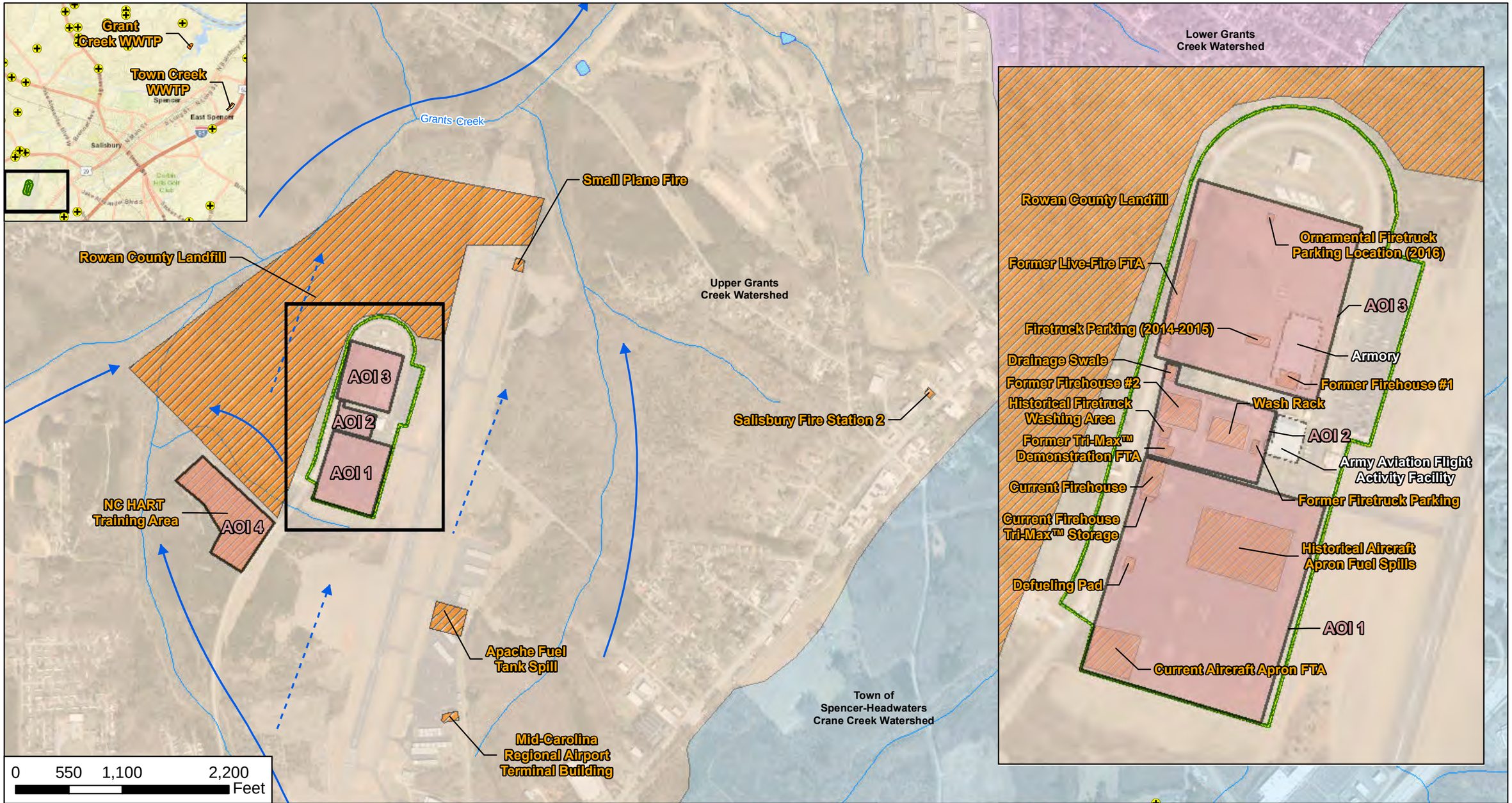
Firetrucks containing AFFF and "protein foam" were historically stored, as well as AFFF concentrate in 5-gallon buckets at the Former Firehouse #1. AFFF was dispensed from a Tri-Max™ 30 fire extinguisher at the FTA at least once. AFFF sprayed in this area would have been released to the gravel ground surface in the 1990s, but the exact timeframe and the total volume, type, and concentration of AFFF released during training are unknown. AFFF, protein-based foam, or PFAS-laden water may have been released from the vehicles to the pavement and nearby grassy areas at the Firetruck Parking (2014-2015) and, Ornamental Firetruck Parking Location (2016).

Surface runoff across the areas are anticipated to generally flow north and west via sheet flow towards Grants Creek, via National Guard Road, and via the concrete drainage structure on the west side of the AOI. Potential PFAS exposure pathways resulting from releases at AOI 3 are described in **Table 6-1**.

6.6 AOI #4: NC HART FTA

AOI 4 encompasses the open field located off-facility and adjacent to the southwestern portion of the facility where the 430th Engineer Firefighting Team performs fire training exercises. Although this training uses only water, the firetruck used also stores AFFF. It is possible that AFFF contained within the truck has migrated via backflow into other lines due to the corrosive nature of PFAS. As such, it is possible that this water is contaminated with PFAS.

Runoff from the training exercises likely flows into the small stream/drainage swale, bordering the FTA to the north, that drains west into Grants Creek. Potential PFAS exposure pathways resulting from releases at AOI 4 are described in **Table 6-1**.



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Salisbury AASF #2, NC			
REVISED	7/23/2020	GIS BY	MS	7/23/2020
SCALE	1:12,000	CHK BY	ZN	7/23/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	7/23/2020

- Area of Interest
- Potential PFAS Release
- No Suspected Release
- Facility Boundary
- Water Body
- River/Stream
- Surface Water Flow Direction
- Inferred Groundwater Flow Direction
- Public Water Supply

N

Areas of Interest

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 6-1

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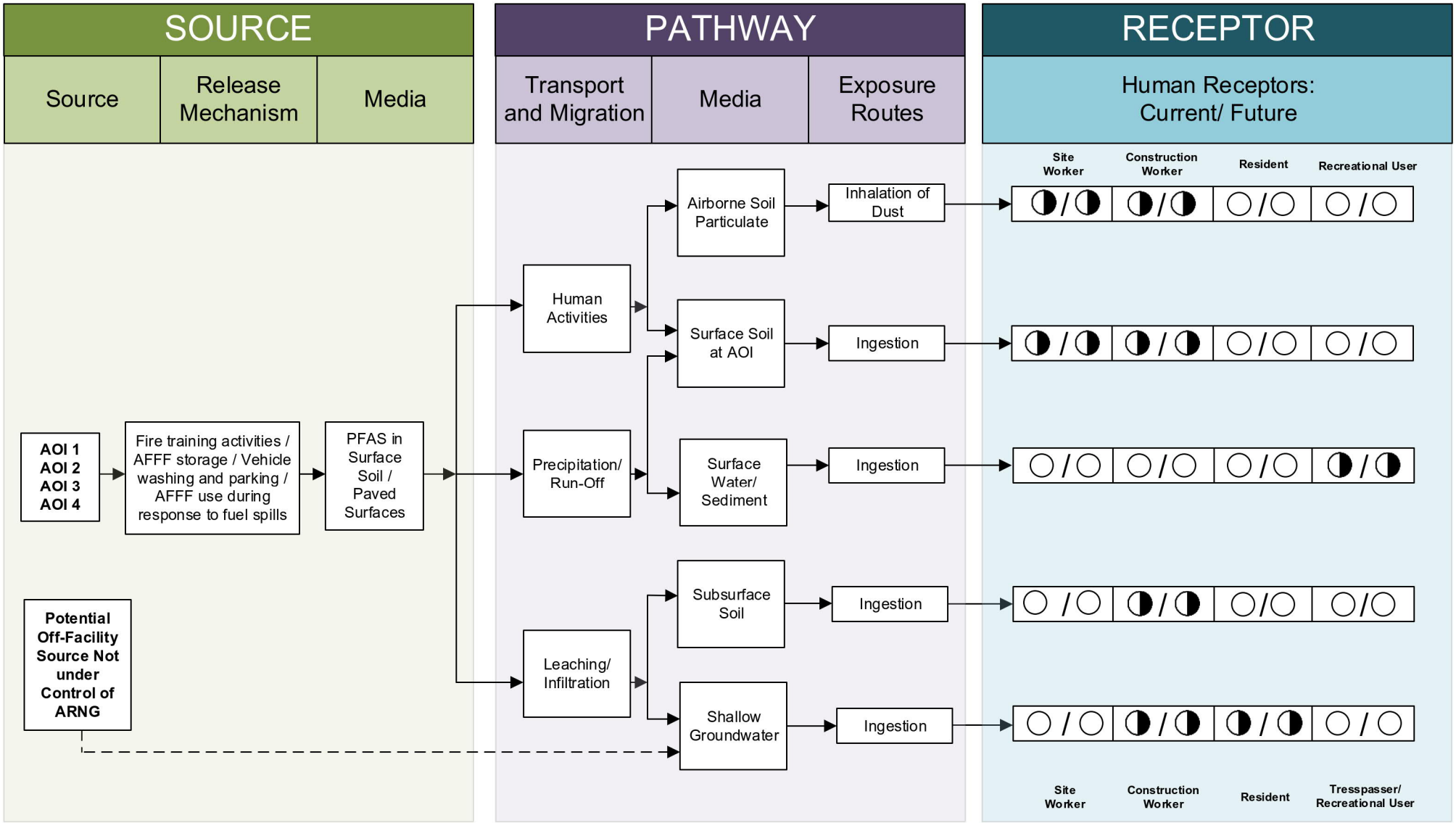


LEGEND

- 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. The site worker and construction worker receptors refer only to Salisbury AASF #2 site and construction workers.
3. Dermal contact exposure pathway is incomplete for PFAS.

Figure 6-2
Preliminary Conceptual Site Model
AOI 1 – AOI 4

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 the Salisbury AASF #2. The PA findings are based on the information presented in **Appendix A**, **Appendix B** and **Appendix C**.

7.1 Findings

Four AOIs related to potential PFAS releases were identified (**Table 7-1**) at the Salisbury AASF #2 during the PA (**Figure 7-1**):

Table 7-1. AOIs at Salisbury AASF #2

Area of Interest	Name	Used by	Release Date
AOI 1	Southern Portion of the Salisbury AASF#2	NCARNG	Unknown (1979-present)
AOI 2	Central Portion of the Salisbury AASF#2	NCARNG	Unknown (1979-present)
AOI 3	Northern Portion of the Salisbury AASF#2	NCARNG	Unknown (1979-present)
AOI 4	NC HART FTA	NCARNG	2005-present

Based on potential PFAS release at these AOIs, there is potential for exposure to PFAS contamination in media at or near the facility. Potential off-facility PFAS release areas also exist adjacent to the Salisbury AASF #2 on Mid-Carolina Regional Airport property. Because these areas include property potentially upgradient of the facility, it is unknown whether off-facility sources affect the Salisbury AASF #2. The preliminary CSM for the Salisbury AASF #2 is shown on **Figure 6-2**.

The following areas at the Salisbury AASF #2 discussed in **Section 2** through **Section 4** were determined to have no suspected release:

Table 7-2. Determinations of No Suspected Release

No Suspected Release Area	Used by	Rationale for No Suspected Release Determination
Army Aviation Flight Activity Facility	NCARNG	Based on interviewee-provided information and site visit observations, the Hangar has never been used to store AFFF or other PFAS-containing firefighting materials, does not have an AFFF fire suppression system, and has not been the location of any emergencies requiring AFFF response.
Armory	NCARNG	Readily available information indicates no evidence of AFFF stored or use at this location since the construction of the Armory. The footprint of Former Firehouse #1, which is adjacent to the current Armory location, is included as a potential PFAS release area.

7.2 Uncertainties

A number of information sources were investigated during this PA to determine the potential for PFAS-containing materials to have been present, used, or released at the facility. Historically,

documentation of PFAS use was not required because PFAS were considered benign. Therefore, records were not typically kept by the facility or available during the PA on the use of PFAS in training, firefighting, or other non-traditional activities, or on its disposition.

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 or conflicted with other sources. 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 PFAS was first used (1969 to present), and a reliance on personal recollection. Inaccuracies may arise in potential PFAS release locations, dates of release, volume of releases, and the concentration of AFFF used. 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 persons were interviewed for the same potential source area, and potential source areas were visually inspected. **Table 7-3** summarizes the uncertainties associated with the PA:

Table 7-3. Uncertainties

Area of Interest	Source of Uncertainty
Current Aircraft Apron FTA	The frequency of training events and timeframe in which use of this FTA began is unknown. It is unclear whether water sprayed at this location contained PFAS. Because the FTA is only bound generally, it is unclear exactly how runoff flows from the FTA.
Former Tri-Max™ Demonstration FTA	The frequency of demonstration events and exact timeframe of use is unknown. The total volume, type, and concentration of AFFF released during the demonstration events is unknown.
Former Live-Fire FTA	The frequency of demonstration events and exact timeframe of use of the FTA is unknown. Only one known training event used AFFF. The total volume type, and concentration of AFFF released during the training event using AFFF is unknown.
Current Firehouse	It is unknown how and when the 100 gallons AFFF concentrate previously stored in 5-gallon buckets at the Former Firehouse #2 were disposed of. It is also unclear why the volume of AFFF stored in the TFFT decreased on two separate occasions. If leaks occurred, it is unknown where the vehicle was stored during the leak. It is unknown whether floor drains connect to sanitary system sewers.
Former Firehouse #1	The brand and contents of the “protein foam” stored on firefighting vehicles are unknown but conservatively assumed to potentially contain PFAS. It is unknown whether floor drains connect to sanitary system sewers.
Former Firehouse #2	The frequency and the methods for washing firetrucks are unknown. It is also unknown whether floor drains connect to sanitary system sewers.
Aircraft Apron	The total number of fuel spills requiring AFFF response across the apron is unknown. The volume, type, and concentration of AFFF used during spill responses are unknown. The locations where Tri-Max™

	units have been stored on the apron, as well as the components of the "fluoroprotein" contained in them, are also unknown.
Wash Rack	Use of the wash area before the construction of the Wash Rack is unclear. It is possible that vehicles and equipment exposed to PFAS were rinsed at this location prior to the construction of the Wash Rack.
Armory	The extent to which the current Armory footprint and the Former Firehouse #1 overlap is unclear. It is also unknown if any remnant infrastructure were used for the construction of the Armory.
Drainage Swale	The drainage pattern from the Drainage Swale is unknown but is presumed to flow north along National Guard Road before infiltrating into the ground or draining into a tributary of Grants Creek.

Potential off-facility PFAS release areas exist adjacent to the Salisbury AASF #2. Because these areas include property upgradient of the facility, it is unknown whether or not potential PFAS contamination from adjacent off-facility sources have migrated towards Salisbury AASF #2 via groundwater or surface water flow.

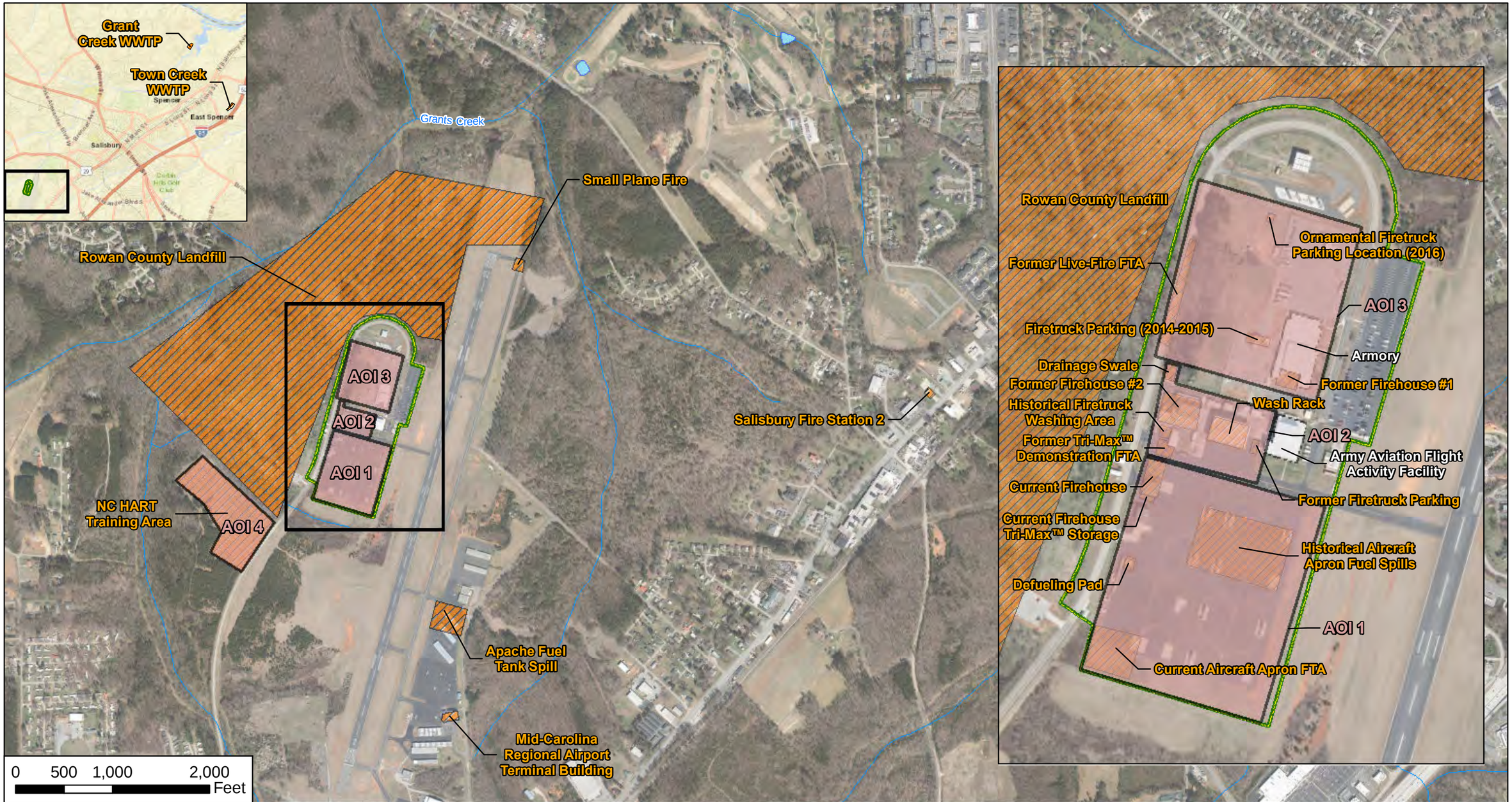
7.3 Potential Future Actions

Interviews with personnel whose knowledge of the facility date from 1979 to 1999, and 2005 to present indicate that NCARNG activity may have resulted in potential PFAS releases at the facility. Based on the preliminary CSM developed for the AOIs, there is potential for receptors to be exposed to PFAS contamination in soil, groundwater, surface water, and sediment at these AOIs. **Table 7-4** summarizes the rationale used to determine if the AOIs should be considered for further investigation under the CERCLA process and undergo an SI.

ARNG evaluates the need for an SI at the Salisbury AASF #2 based on the presence of PFAS releases, possible receptors, and the migration potential of PFAS contamination to receptors.

Table 7-4. PA Findings Summary

Area of Interest	AOI Location	Rationale	Potential Future Action
AOI 1 Southern Portion of Salisbury AASF #2	35°38'48.89"N; 80°31'21.72"W	AOI 1 includes known AFFF storage and release locations.	Proceed to an SI, focus on soil, sediment, groundwater, and surface water
AOI 2 Central Portion of Salisbury AASF #2	35°38'53.74"N; 80°31'21.08"W	AOI 2 includes known AFFF storage and release locations.	Proceed to an SI, focus on soil, sediment, groundwater, and surface water
AOI 3 Northern Portion of Salisbury AASF #2	35°38'58.18"N; 80°31'18.18"W	AOI 3 includes known AFFF storage and release locations.	Proceed to an SI, focus on soil, sediment, groundwater, and surface water
AOI 4 NC HART FTA	35°38'44.78"N; 80°31'37.51"W	AOI 4 was used by NCARNG as an FTA involving AFFF-containing firetrucks.	Proceed to an SI, focus on soil, sediment, groundwater, and surface water



CLIENT	ARNG			
PROJECT	Preliminary Assessment for PFAS at Salisbury AASF #2, NC			
REVISED	7/23/2020	GIS BY	SK	7/23/2020
SCALE	1:12,000	CHK BY	ZN	7/23/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community		PM	RG	7/23/2020

- Area of Interest
- Potential PFAS Release
- No Suspected Release
- Facility Boundary
- Water Body
- River/Stream

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 the Salisbury AASF #2 include:

Salisbury AASF #2 Leases, Licenses, and Permits

- Memorandum of Lease between State of North Carolina and Rowan County from 2002 to 2099

Salisbury AASF #2 Engineering As-Built Drawings

- Relevant as-built drawings for fire suppression system, sewer connections, and site drainage.

Salisbury AASF #2 Facility Background Information

- 2008 Rowan County Airport Master Plan
- 2011 Stormwater Pollution Prevention Plan for Rowan County Airport

Salisbury AASF #2 EDR Report

- 2019 Salisbury AASF #2 EDR Report

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

AECOM Imagine it. Delivered.

JOB TITLE Salisbury

PROJECT/JOB NO. _____ CALCULATION NO. _____

COMPUTED BY _____ DATE _____

VERIFIED BY _____ DATE _____

SCALE _____ SHEET NO. _____ OF _____

SGT [redacted] - calling the chief

Chief here since 2005 [redacted]

Green jugs (Ansulite?) stored in corner of office/storage area

Firehouse constructed 2006-2007

2 ~~#~~ 60 GAL tanks
60 gal

TFT 2 60 gal tanks

Tanker 50-60 gal

Burn pit at Charlotte - used their facilities

Blew foam out of line after it leaked

Vehicles had issues of leaking into tank (Bayless Mooresville leak)

Repair went to FinF6 - Also used Atlantic
Concord, NC
45 min down 85

Flushed tanks after leaking bc it is so corrosive

Opportunistic training, any live burns 2 wk annual training
Albemarle

Guilford Technical Community College (Greensboro) has actual training facility

Mutual Aid Agreement - Through Rowan County (Crystal Pearce Acting Fire Chief)

Responded to several crashes never applied "agent"

NO live burning here at AASF, local college built burn building about 2 miles away

Washed trucks behind the building, but never did live foam training

structures where foam was used inadvertently

- GTCC may have been released

Truck check - see map

[redacted]

POC for [redacted]

Got trucks ~~#~~ around 2006

Functionally started FD around then, this unit

Truck "belonging" to [redacted] was Purple in and Foam

10x10 = 1 in

AECOM Imagine it. Delivered.

JOB TITLE _____

PROJECT/JOB NO. _____ CALCULATION NO. _____

COMPUTED BY _____ DATE _____

VERIFIED BY _____ DATE _____

SCALE _____ SHEET NO. _____ OF _____

Crystal's truck has been here for quite a while, at least does 2 Trucks - only 2 they've ever had (2006-) in building

Foam cans w/ trucks, other foam buckets here prior
No foam checks w/ nozzles
Topped off foam in trucks previously - maybe leak - 2 gallons
only had to top it off twice - done in the bay
Check for leaks prior to every drill
Maintenance is very well kept on trucks
Electronic gauges on tankers, visual verification

↑ lcf trivax stored along grass and near each helo
never saw any leaks

Training done by Great Lakes only classroom

Fuel farm may have foam

[redacted] will know how many Trivaxs

FD doesn't really deal w/ Trivaxs or other carts
No concentrate stored in building - Crystal turned in, not sure how
Not aware of any discharges of expired foam or otherwise
Fires all the time, no knowledge of foam use "hear the
They have a truck at the regional APT, not sure what's with" ca it
Is one guy here full time?

FTAs? Leaking truck? 41 TFFT

Salisbury and Loch respond, Rowan rescue respond
Crashes occurred when AASF staff were not around, mutual Aid would have responded
should talk to local FD - Loch / Salisbury
Ext on flightline not AFFF - PR

Floor drains

Armory side Theirs - not sure what's in storage shed
Have not procured AFFF since 2006
Have 3-4 times a month, floor drain in bay
No foam training, pulling hose through building

Funding here is very tight

AECOM Imagine it. Delivered.

JOB TITLE

PROJECT/JOB NO. CALCULATION NO.

COMPUTED BY DATE

VERIFIED BY DATE

SCALE SHEET NO. OF

Joint training units would bring their trucks here during charlotte training
May

Turnouts street ~ 150' 50-60 ft back on Asphalt

Landfill (maybe?) across the street, near the gate

Possible retention pond or swale near the spray point

Merrisville unit came out, may have sprayed from leachate system

Ephemeral stream maybe down slope from spray

Grass field would go out and train on drill weekend
lay master stream out 40-50 times

· No other units except merrisville merrisville not involved out here

· SGT [redacted]

~100 gallons
in office building

Supply SGT [redacted]

10x10 = 1 in

PA Interview Questionnaire – Fire Station

Facility: Salisbury AASF
Interviewer: ZN
Date/Time: 10/23/2019 0900

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

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

[redacted] has been fire chief at the AASF since 2005. The current firehouse was constructed in 2006, which is also when the ARFF fire unit was functionally established.

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

Maintenance (e.g., ramp washing) – Firetruck repairs performed off-site.
Fire Training Areas – FTA with water only at southwestern corner of aircraft apron, and in grassy field adjacent to the facility.
Firefighting (Active Fire) - None
Crash - None
Fire Suppression Systems (Hangers/Dining Facilities) - None
Fire Protection at Fueling Stations - None
Non-Technical/Recreational/ Pest Management - None

3. Are any current buildings constructed with AFFF dispensing systems or fire suppression systems? What are the AFFF/suppression system test requirements? What is the frequency of testing at the AFFF/suppression systems?

No.

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

N/A

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

Cannot recall the last procurement of AFFF. Have not gotten rid of any yet, but plan to get rid of the old Tri-Max carts. Supply SGT may know more. AFFF in buckets was here when he started, but it is no longer stored at the firehouse. Unclear where it went.

PA Interview Questionnaire – Fire Station

Facility: Salisbury AASF
Interviewer: ZN
Date/Time: 10/23/2019 0900

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

3% AFFF, unsure of brand.

7. Is AFFF formulated on base? If so, where is the solution mixed, contained, transferred, etc.?

Not formulated/mixed. It was transferred to the trucks inside the firehouse vehicle bay.

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

AFFF was formerly stored in the firehouse office. It is no longer there and they are unsure where it went. No new AFFF has been procured or otherwise stored on site to his knowledge.

9. How is the AFFF transferred to emergency response vehicles, suppression systems, flightline extinguishers? Is/was there a specified area on the facility where vehicles are filled with AFFF and does this area have secondary containment in case of spills? How and where are vehicles storing AFFF cleaned/decontaminated?

During his tenure, AFFF has been transferred only to the trucks in the vehicle bay.

10. Provide a list of vehicles that carried AFFF, now and in the past, and where are/were they located?

Two firetrucks:

- TFFT (primary firetruck), carries 120 gallons of 3% AFFF
- Tanker. Carries 50-60 gallons of 3% AFFF

They are typically parked in the firehouse vehicle bay. These are the only firetrucks they have had since the ARFF unit was established. There is one old truck that has not been used by this unit, it is still parked on site near the fuel point. Unsure if it is still operable.

11. Any vehicles have a history of leaking AFFF? Do you/did you test the vehicles spray patterns to make sure equipment is working properly? How often are/were these spray tests performed and can you provide the locations of these tests, now and in the past?

To his knowledge neither of the trucks had developed any leaks. However, the TFFT AFFF tank had to be "topped" off twice with no more than 2 gallons of 3% AFFF total even though the foam had not been discharged. It is possible that this discrepancy was caused by an internal backflow leak in the truck. The issue did not persist and no repairs were made.

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

Two FTAs exist at the site (see map) and are actively used, but only with water. No training with AFFF has been performed at the site during SGT Groat's tenure.

FTA#1 at the southwestern corner of the aircraft apron where water is sprayed from the turret into the grassy/vegetated area south of the asphalt while the truck is parked on the asphalt 50-60' away from the grass. Spray distance is up to 150'. AFFF was never used in these excercises.

FTA#2 in the grassy field southwest from the AASF. The ARFF unit uses this field during drill weekends to practice their active approaches, spraying water from the forward mounted turrets while moving. AFFF has never been used during this training.

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

None.

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

FTA#1 at the Aircraft Apron is used on most drill weekends to test the truck's water spray. FTA#2 in the grassy field was also used on most drill weekends. SGT [redacted] estimates training excercises were performed up to 50 times since 2005. AFFF was not used in any of the training exercises at either FTA.

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

Mutual aid with Rowan County, includes City of Salisbury and Locke Township. RUQ reportedly has a firetruck and could respond to emergencies at the airport.

PA Interview Questionnaire – Fire Station

Facility: Salisbury AASF
Interviewer: ZN
Date/Time: 10/23/2019 0900

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

No units came on-post with AFFF. No training conducted at the AASF with external entities.

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

There is a big academy in Charlotte, which Salisbury AASF personnel go to. Morrisville also goes, and this may have been when Morrisville came on to the Salisbury AASF facility due to its proximity to the Charlotte academy. AFFF was often used here, but not with NCARNG equipment.

They also train at the Guilford Technical Community College (GTCC). No AFFF training for them there.

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

No emergency response with AFFF from the AASF ARFF unit.

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

No fuel spills were washed with AFFF during his tenure.

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

No.

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

Only aware of it being stored at the firehouse. Currently 8 Tri-Max carts stored outside the firehouse which have not been used to his knowledge.

PA Interview Questionnaire – Fire Station

Facility: Salisbury AASF
Interviewer: ZN
Date/Time: 10/23/2019 0900

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

No creative uses.

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

Unclear, they have not had to dispose of any or turn it in yet.

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

[redacted] may have more information about procurement of AFFF (984-661-6520). Also the former fire chief prior to 2005, [redacted], could have more information about past use of AFFF. Her contact information is not readily available.

PA Interview Questionnaire – Fire Station (Retired)

Facility: Salisbury AASF
Interviewer: ZN
Date/Time: 10/23/2019 1200

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

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

[redacted] was a firefighter at the Salisbury AASF from 1979 to 1999. He is currently retired.

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

Maintenance (e.g., ramp washing) – Firetruck washing performed outside the former firehouse.
Fire Training Areas – FTA on National Guard Rd and another on northeast corner of aircraft apron.
Firefighting (Active Fire) – Offsite only.
Crash - None
Fire Suppression Systems (Hangers/Dining Facilities) - None
Fire Protection at Fueling Stations - None
Non-Technical/Recreational/ Pest Management - None

3. Are any current buildings constructed with AFFF dispensing systems or fire suppression systems? What are the AFFF/suppression system test requirements? What is the frequency of testing at the AFFF/suppression systems?

No buildings have been constructed with AFFF dispensing systems.

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

N/A

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

Historically it was procured through Fort Bragg. [redacted] procured the first AFFF at the site through a Fort Bragg colonel starting around 1979.

PA Interview Questionnaire – Fire Station (Retired)

Facility: Salisbury AASF
Interviewer: ZN
Date/Time: 10/23/2019 1200

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

The first batch of AFFF procured around 1979 was 6% AFFF. Sometime later they transitioned to 3%, unsure of the manufacturer and time of transition.

7. Is AFFF formulated on base? If so, where is the solution mixed, contained, transferred, etc.?

Not formulated/mixed on base.

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

AFFF was always stored in 5 gallon buckets plus whatever was in the trucks and Tri-Maxes. From 1979-1989 the firehouse was located on the northern end of the AASF facility, near where the Armory is located today. AFFF and three firetrucks were stored inside the firehouse during that time. The second firehouse (1989-2000s) had a storage facility next to it, known as Allied Storage, which housed the AFFF. Firetrucks were parked in the vehicle bay and outside near the flight ops building.
During his tenure, they maintained an inventory of 300-400 gallons of AFFF on site plus whatever was stored in the firetrucks.
Tri-Maxes were stored inside the first firehouse (1979-1989) and outside the second firehouse (1989-2000s) or in the allied storage building.

9. How is the AFFF transferred to emergency response vehicles, suppression systems, flightline extinguishers? Is/was there a specified area on the facility where vehicles are filled with AFFF and does this area have secondary containment in case of spills? How and where are vehicles storing AFFF cleaned/decontaminated?

Transferred near the storage locations, outside of the original firehouse and outside of the Allied storage building. There was no specific designated area or secondary containment. The vehicles were typically cleaned in/near the firetruck parking areas. Most frequently outside of the second firehouse (1989-2000s).

10. Provide a list of vehicles that carried AFFF, now and in the past, and where are/were they located?

Had a total of three firetrucks by some point in the 1980s:

- First truck (1979) was a 530C truck with 40 gallon foam capacity. It only carried Protein Foam
- Two other trucks, one additional 530C with dual agent AFFF and dry chemical, and another unknown model of firetruck that came from Morrisville and carried "National Protein Blood Foam". One of these trucks is the one that is parked at the fuel point and is considered inoperable.

These trucks were parked in/near the two former firehouses, and sometimes parked outside the Flight Ops building. They also had 12-18 Tri-Max carts, obtained in the early to mid 1990s.

PA Interview Questionnaire – Fire Station (Retired)

Facility: Salisbury AASF
Interviewer: ZN
Date/Time: 10/23/2019 1200

11. Any vehicles have a history of leaking AFFF? Do you/did you test the vehicles spray patterns to make sure equipment is working properly? How often are/were these spray tests performed and can you provide the locations of these tests, now and in the past?

No recollection of leaks from the firetrucks, but small spills likely occurred during AFFF filling. Nozzle testing was not performed with AFFF. but

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

Two FTAs existed at the site during his tenure.
Tri-Maxes were discharged at the National Guard Rd FTA and the demonstration area FTA near the second firehouse (1989-2000s). AFFF was only used at the National Guard Rd FTA (via Tri-Max) once during fire training in the 1990s. The current road did not exist at that time, but it was done in the same approximate area (see map). A 4'x4' pan was filled with fuel and ignited before being extinguished with AFFF in the training exercise. This one-time event with AFFF may have resulted in up to 30 gallons of AFFF being released. All other live-fire training events at this FTA were done with Purple K and dry chemical agents.
The second FTA was located near the second firehouse, where training/demonstrations were performed for students visiting the AASF on field trips. Live fire was not used. The exercise consisted of a firefighter briefly discharging foam from a Tri-Max cart at a target. No more than a few gallons were discharged during each event. This activity occurred about six times in total, all during the 1990s.

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

Fuel (likely gasoline) was used at the National Guard Rd FTA.

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

AFFF was only used once at the National Guard Rd FTA, a total discharge of up to 30 gallons of AFFF which was allowed to drain/infiltrate in the FTA.
AFFF was used about six times at the demonstration FTA near the former firehouse, each time only a few gallons of AFFF were discharged. The AFFF was allowed to drain naturally, into the cement stormwater drainage swale into the vegetated area north of the former firehouse.

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

Mutual aid with Rowan County and RUQ. RUQ fire station responded to events at the airport. NCARNG firefighters have responded to at least one emergency at the airport (fuel spill) and one offsite fire at a chemical plant in the 1980s.

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

No units came on-post with AFFF. No training conducted at the AASF with external entities.

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

Live drills were done at the Rowan County College/Technical Institute and Fort Bragg.

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

Never had a major incident requiring AFFF that he recalls at the AASF. Several fuel spills responded to with AFFF.

(Offsite)In 1997, RUQ airport apache fuel tank ruptured. A seam on the forward tank busted and fuel ran through the fuselage. The remaining fuel in the billy tank was also drained. AASF brought two trucks over to the spill and got AFFF on the fuel. They used about 15-20 gallons of AFFF, and rinsed it all down the storm drain (see KMZ) with 10-12 tankers worth of water.

(Offsite) Adjacent source. Small plane burnt to the ground at RUQ airport (see map/KMZ). Airport dumped 30 gallons of AFFF. AASF did not respond to the fire. Not sure what year this was.

(Offsite) Chemical plant fire in the 1980s near Salisbury, NC. Approximately 240 gallons of AFFF were applied here by the AASF fire unit.

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

AFFF was applied to several fuel spills on the aircraft apron during his tenure. He recalls a few bad ones, where they also sprayed down the pilot/refueler because they were covered in JP-4 (see map). The defueling pad was also an area where AFFF was applied to several fuel spills (see map). Sand was also used to retain and capture spilled fuel near the defueling pad.

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

No.

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

Tri-Max carts were placed all throughout the aircraft apron at one time or another, at the parking pads and in the grass on the eastern and western sides of the apron.
There is a historical landfill bordering the facility to the northwest, may be a superfund cleanup site, which has had issues with groundwater contamination. Unknown whether PFAS containing materials/substances were disposed there.

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

No creative uses.

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

Unsure of how they got rid of it.

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

AECOM Imagine it. Delivered.

JOB TITLE ______
PROJECT/JOB NO. ______ CALCULATION NO. ______
COMPUTED BY ______ DATE ______
VERIFIED BY ______ DATE ______
SCALE ______ SHEET NO. ______ OF ______

Retired Officer, Staff SGT
1979 – 1999
Fire Service over 40 years on/off site
State training / County service ~10 years
When hired here he acquired 530C ~~[illegible]~~ 40 gal foam tank
"Can opener" transfer
(Always carried 100 gal extra foam
Had protein foam at that time
Was flight activity facility, not support at time
*Acquired another truck from Morrisville "national" protein blend foam
NSN was all they would send, couldn't get AFFF through Raleigh
Fort Bragg Army - Crash station was contacted about getting AFFF at the AASF
FB showed him how much they keep on hand, at that time 6%
Could get 100 gal in 5 gal buckets, FB was not hindered by that limit they had 600-700 gal
Colonel got him 100 gal initially - (1979)
kept 300-400 gal on-site, plus whats in the trucks
*1-2 times used on really bad fuel spills
Live drills done at Person C.C. / Tech Institute Training grounds
Also used Fort Bragg (Different from GTCC)
Landfill across entire vegetated area to east of AASF
Had a well on the AASF
Dog pound relocated due to well contamination
✓* Landfill caught fire once
Was getting gas readings from the trench (dangerous levels)
County aware of issues w/ landfill
* welding and metal shop?
Wonder if the issues got captured in the ECCP

*where stored? until 1999?
Allied storage
Next to FH

Trucks
Had 3 Trucks — 3rd one belonged to the battalion, kept it here
Timeline? — Equipment was never down
No leaks on trucks — Trucks parked outside flight ops - see map
UST next to building stored JP-4
Fuel Spill - Delivery went to Raleigh, overflowed from UST - No foam used then, night
Several spills at defueling pad, used foam several times
Spills [illegible]

10x10 = 1 in

AECOM Imagine it. Delivered.

JOB TITLE _____

PROJECT/JOB NO. _____ CALCULATION NO. _____

COMPUTED BY _____ DATE _____

VERIFIED BY _____ DATE _____

SCALE _____ SHEET NO. _____ OF _____

Historically, fuel unit everywhere AFFF was not always used

Par/Extinguisher training water in pan/fuel on top 4' x 4' pans

Only used purple K dry chem during training

Safety conference alt. btw Raleigh + here

Apaches where circle on map/T hangers 3P-4

Forward tank ruptured on seam, ran thru fuselage ~~Rocket~~

* Brought 2 tracks over to the spill, got foam on the fuel

How much? Defueled apache (billy tank)

When? Drained to SW drain on asphalt

Around 97 10-12 tankers of water used to rinse pavement

Outfall possibly to Town Creek from drain

Never had a big crash needing foam, no foam used on crashed

Occured 1997, used about 15 gallons - 20 gallons

May have another defueling pad, used sand to clean up fuel

* Washed trucks right outside the old fire house

Year of op.? Ready to make foam, but never used to clean up

Built as part of allied shops 1989 the defueling spills

Other than the apache spill, foam was only used on live fires and training.

Lead chopper outside * Were these water extinguishers? - on flightline they had extinguishers used all over the pads

Trimax

Who?! - 6 carts came from Fort Bragg

Trimax training/demo in front of fire house

Not much used, enter area of nozzle

Done 6 times or more

Demonstrations for the kids

Estimate of how many? Got trimaxs around the time halon was turned in

Early to mid 90s, can Raleigh verify #?

Shed next to the station

Back in corner of original fire station - VSI

10x10 = 1 in

AECOM Imagine it. Delivered.

JOB TITLE _____

PROJECT/JOB NO. _____ CALCULATION NO. _____

COMPUTED BY _____ DATE _____

VERIFIED BY _____ DATE _____

SCALE _____ SHEET NO. _____ OF _____

Chemical plant fire - requested foam, sent 1 truck and additional 2cc gal plus 4C or truck
When? 1980s
- most foam used - max of 240 gal
- sprayed on guys w/ chemical burns
- 2 x 2½ wide open 500 gpm

~~Trucks stored~~ Fire station originally ~~behind~~ North side, see map
3 trucks stored inside 1979-1989
Carts stored in there as well
Used to flush lines at AP hill

- Landfill fire, no foam used

Filling in the Gaps

- No foam used in metal shop, didn't have them all over the facility
- Mostly PW, halon, water
- At least 6 from FB, about 12-18 total
  - only used for demonstration for kids and training
- Fuel cut, fiber pearl used, then flushed down completely with water
- Annual training (pan) on road each time would be a demo with foam once

- Plane burnt to the ground at airport (red circle)
  Airport dumped 3cc gal of foam there
  Guard didn't respond

- 3 Trucks Twin Agent
  2 x 530C
  Late 1970s - early 80s

10x10 = 1 in

Appendix B.2
Visual Site Inspection Checklists

Visual Site Inspection Checklist

Names(s) of people performing VSI: [redacted]

Recorded by: [redacted]

ARNG Contact: [redacted]

Date and Time: 10/23/2019 9:00

Method of visit (walking, driving, adjacent): Walking

Source/Release Information

Site Name / Area Name / Unique ID: Salisbury AASF

Site / Area Acreage: Site: Approx 37 acres

Historic Site Use (Brief Description): Part of RUQ Mid-Carolina airport. Site use has not changed since 1975. Adjacent to a historical landfill, surrounded by residential and light commercial land use.

Current Site Use (Brief Description): The current AASF was constructed in 1975 and services/maintains military helicopters

Physical barriers or access restrictions: Access to the area is restricted to AASF personnel. Access gates and fences

1. Was PFAS used (or spilled) at the site/area? **Y / N**

1a. If yes, document how PFAS was used and usage time (e.g., fire fighting training 2001 to 2014):

Yes. Two FTAs used from 1980s-1990s for Tri-Max training. Several fuel spills responded to with AFFF on aircraft apron from 1979-2000s.

2. Has usage been documented? **Y / N**

2a. If yes, keep a record (place electronic files on a disk):

No documented usage.

3. What types of businesses are located near the site? **Industrial / Commercial / Plating / Waterproofing / Residential**

3a. Indicate what businesses are located near the site

RUQ Airport, Commercial and Industrial facilities, Residential areas

4. Is this site located at an airport/flightline? **Y / N**

4a. If yes, provide a description of the airport/flightline tenants:

Mid-Carolina Regional Airport (RUQ)

Visual Survey Inspection Log

Other Significant Site Features:

1. Does the facility have a fire suppression system? **Y / N**

1a. If yes, indicate which type of AFFF has been used:
N/A

1b. If yes, describe maintenance schedule/leaks:
N/A

1c. If yes, how often is the AFFF replaced:
N/A

1d. If yes, does the facility have floor drains and where do they lead? Can we obtain an as built drawing?
N/A

Transport / Pathway Information

Migration Potential:

1. Does site/area drainage flow off installation? **Y** / N

1a. If so, note observation and location:
Site drainage is directed into two drainage ditches, one north of the aircraft apron and one south. Both ditches drain toward Grants Creek

2. Is there channelized flow within the site/area? **Y** / N

2a. If so, please note observation and location:

Only for stormwater; drainage ditches around aircraft apron

3. Are monitoring or drinking water wells located near the site? Y / **N**

3a. If so, please note the location:

4. Are surface water intakes located near the site? Y / **N**

4a. If so, please note the location:

5. Can wind dispersion information be obtained? **Y** / N

5a. If so, please note and observe the location.
RUQ Airport may be able to provide this information

6. Does an adjacent non-ARNG PFAS source exist? **Y** / N

6a. If so, please note the source and location.
AFFF was used to respond to at least two incidents at the RUQ airport

6b. Will off-site reconnaissance be conducted? **Y** / N

Visual Survey Inspection Log

Significant Topographical Features:

1. Has the infrastructure changed at the site/area? **Y / N**

1a. If so, please describe change (ex. Structures no longer exist):

The original firehouse used from 1979-1989 no longer exists. The Armory was built near the same location as the original firehouse. The aircraft apron had been expanded greatly over the years. The current firehouse was built in 2006.

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:

Some erosion can be seen at the end of the drainage swale located in the northwest portion of the facility.

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:

Receptor Information

1. Is access to the site restricted? **Y / N**

1a. If so, please note to what extent:

The site is fenced in, separately from the RUQ airport, and has a controlled access point.

2. Who can access the site? **Site Workers / Construction Workers / Trespassers / Residential / Recreational Users / Ecological**

2a. Circle all that apply, note any not covered above:

3. Are residential areas located near the site? **Y / N**

3a. If so, please note the location/distance:

Most of the area near the AASF is residential and commercial.

4. Are any schools/day care centers located near the site? **Y / N**

4a. If so, please note the location/distance/type:

5. Are any wetlands located near the site? **Y / N**

5a. If so, please note the location/distance/type:

Visual Survey Inspection Log

Additional Notes

A historical landfill borders the site to the northwest and is a known source of chemical contamination. It is unknown whether PFAS containing materials/substances were disposed there.

Photographic Log

Photo ID/Name	Date & Location	Photograph Description

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: Salisbury AASF

Why has this location been identified as a site?

Past AFFF use during fire training, including the use of Tri-Max units at the facility. The firehouse at the facility currently has AFFF-equipped trucks.

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

Yes, Mid-Carolina Regional Airport

Training Events

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

If so, how often? A total of seven times between the two FTAs

How much material was used? Is it documented? One Tri-Max 30 (30 gallons) near National Guard Road and an indeterminate volume at the demonstration area (estimate of only a few gallons at each event)

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? South and West

Average rainfall? 57 inches per year

Any flooding during rainy season? No

Direct or indirect pathway to ditches? Direct

Direct or indirect pathway to larger bodies of water? Indirect pathway to Grant's Creek

Does surface water pond any place on site? Not onsite.

Any impoundment areas or retention ponds? No.

Any NPDES location points near the site? Three visual monitoring outfalls that drain east of the site.

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

Drainage from the northern portion of the aircraft apron and northern portion of the facility drain through cement swales to a ditch that drains to the west towards Grant's Creek. Drainage in the center and southern portions of the aircraft apron drain south into a vegetated ditch that flows west to Grant's Creek.

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? South and West

Depth to groundwater? 4 to 24 feet

Uses (agricultural, drinking water, irrigation)? Several PWS wells within 4 miles of the facility; all are upgradient or cross-gradient in relation to the facility groundwater

Any groundwater treatment systems? No known treatment systems.

Any groundwater monitoring well locations near the site? No monitoring wells identified.

Is groundwater used for drinking water? No

Are there drinking water supply wells on installation? No

Do they serve off-post populations? No

Are there off-post drinking water wells downgradient? No

Waste Water Treatment Plant:

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

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

Do we understand the fate of sludge waste? No biosolids identified at city WWTP.

Is surface water from potential contaminated sites treated? No. Floor drains in the firehouse are connected to the sanitary sewer.

Equipment Rinse Water

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

It is washed on the western side of the firehouse. Rinse water is allowed to drain naturally toward the drainage ditch south of the aircraft apron.

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?

Nozzle testing is not performed at the AASF.

3. Other? N/A

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker: Y

Construction Worker : Y

Recreational User: Y (offsite surface water/sediment)

Residential: Y (for surface water only)

Child: N

Ecological: N

Note what is located near by the site (e.g. daycare, schools, hospitals, churches, agricultural, livestock)?
RUQ Airport and several commercial establishments.

Documentation

Ask for Engineering drawings (if applicable).

Has there been a reconstruction or changes to the drainage system? When did that occur?
Changes to the drainage system were not provided in the as-built drawings.

Appendix C
Photographic Log

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Salisbury AASF	Salisbury, North Carolina

Photograph No. 1

Description:

Eight Tri-Max 30™ extinguishers stored along the southern wall of the firehouse.

Date Taken:

23 October 2019

Photograph No. 2

Description:

An additional AFFF extinguisher stored with the Tri-Max 30™extinguishers. This unit is also assumed to contain PFAS agents.

Date Taken:

23 October 2019

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Salisbury AASF	Salisbury, North Carolina

Photograph No. 3

Description:

Current Aircraft Apron FTA taken from the southwest corner of the apron looking southwest.

Date Taken:

23 October 2019

Photograph No. 4

Description:

Front view of the TFFT parked in the firehouse vehicle bay.

Date Taken:

23 October 2019

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Salisbury AASF	Salisbury, North Carolina

Photograph No. 5

Description:

The second firetruck parked inside the firehouse, known as the tanker.

Date Taken:

23 October 2019

Photograph No. 6

Description:

The former firetruck parking area outside the Flight Ops Building, taken from the northern end of the aircraft apron looking east.

Date Taken:

23 October 2019

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Salisbury AASF	Salisbury, North Carolina

Photograph No. 7

Description:

The former Tri-Max demonstration area. The northern wall of the current firehouse is visible to the right. The vantage point was located near the former firehouse looking toward the southeast.

Date Taken:

23 October 2019

Photograph No. 8

Description:

The former firehouse (1989-2000s), looking north. This building was repurposed as a GSE storage and maintenance building.

Date Taken:

23 October 2019

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Salisbury AASF	Salisbury, North Carolina

Photograph No. 9

Description:

The drainage swale located adjacent to the former firehouse (1989-2000s). Taken looking to the north in the same direction as drainage flow.

Date Taken:

23 October 2019

Photograph No. 10

Description:

Looking north at the Armory. This building stands in the approximate area where the first firehouse had once existed (1979-1989).

Date Taken:

23 October 2019

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Salisbury AASF	Salisbury, North Carolina

Photograph No. 11

Description:

Various images taken of a film forming fluoroprotein (FFFP) foam extinguisher located near the center of the flightline. The labels indicate the presence of fluorinated compounds in a mixture of hydrolyzed proteins. These extinguishers are found throughout the aircraft apron.

Date Taken:

23 October 2019

Photograph No. 12

Description:

Located next to the FFFP extinguisher, this Amerex extinguisher is visibly smaller and is charged with Purple K. These extinguishers are found throughout the aircraft apron.

Date Taken:

23 October 2019

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Salisbury AASF	Salisbury, North Carolina

Photograph No. 13

Description:

Looking east to the parking area adjacent to the fuel point at the former firetruck.

Date Taken:

23 October 2019

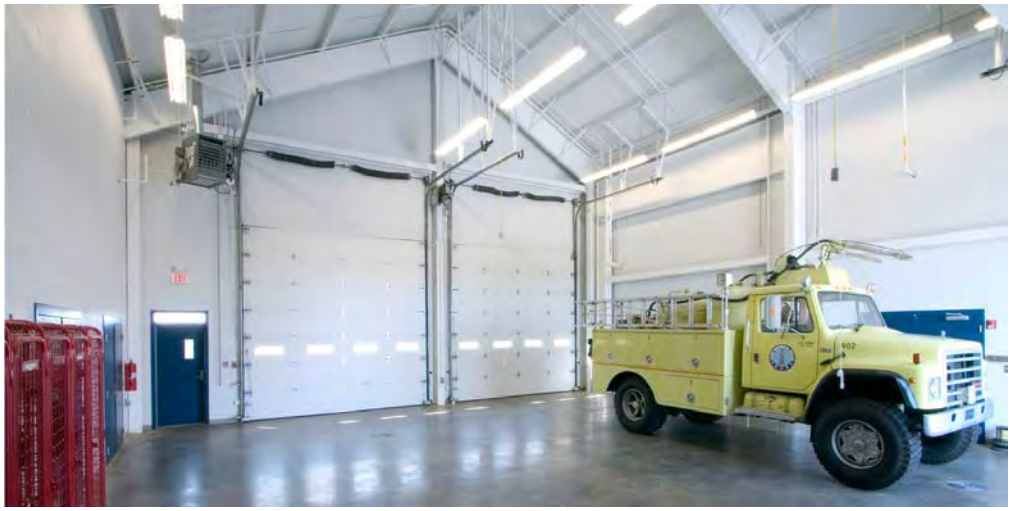
Photograph No. 14

Description:

Photograph accessed from the architect's website after construction of the current firehouse showing the former firetruck in the vehicle bay.

Date Taken:

2006



https://fire-station.com/portfolio/nc-national-guard-arff-station/

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Salisbury AASF	Salisbury, North Carolina

Photograph No. 15

Description:

Photograph accessed from the architect's website after construction of the current firehouse showing AFFF stored in 5-gallon buckets inside the office room.

Date Taken:

2006

https://fire-station.com/portfolio/nc-national-guard-arff-station/