

FINAL Preliminary Assessment Report AASF Byrd Field, Virginia Virginia Army National Guard

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

July 2020

Prepared for:



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

UNCLASSIFIED

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Acronyms and Abbreviations

°F	degrees Fahrenheit
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
amsl	above mean sea level
AOI	Area of Interest
ARNG	Army National Guard
AASF	Army Aviation Support Facility
ARFF	Aircraft Rescue Firefighting
BB&E	BB&E, Inc.
bgs	below ground surface
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CRAC	Capital Region Airport Commission
CSM	conceptual site model
EDR™	Environmental Data Resources, Inc.™
EEE	EEE Consulting, Inc.
FBI	Federal Bureau of Investigation
ft	Feet
feet per day	ft/day
FTA	fire training area
HA	Health Advisory
JP-4	Jet Propellant Type 4
NGWA	National Ground Water Association
NOAA	National Oceanic and Atmospheric Administration
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
SI	Site Inspection
UCMR3	Unregulated Contaminant Monitoring Rule 3
UPS	United Parcel Service
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VA	Virginia
VAANG	Virginia Air National Guard
VAARNG	Virginia Army National Guard
VSI	visual site inspection

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 Army Aviation Support Facility (AASF) Byrd Field in Sandston, Virginia (VA), to assess potential PFAS release areas and exposure pathways to receptors. AASF Byrd Field is constructed on a parcel of land owned by the Capital Region Airport Commission (CRAC) and has been leased to the Virginia Army National Guard (VAARNG) since 1964. The tasks performed in this PA include the following:

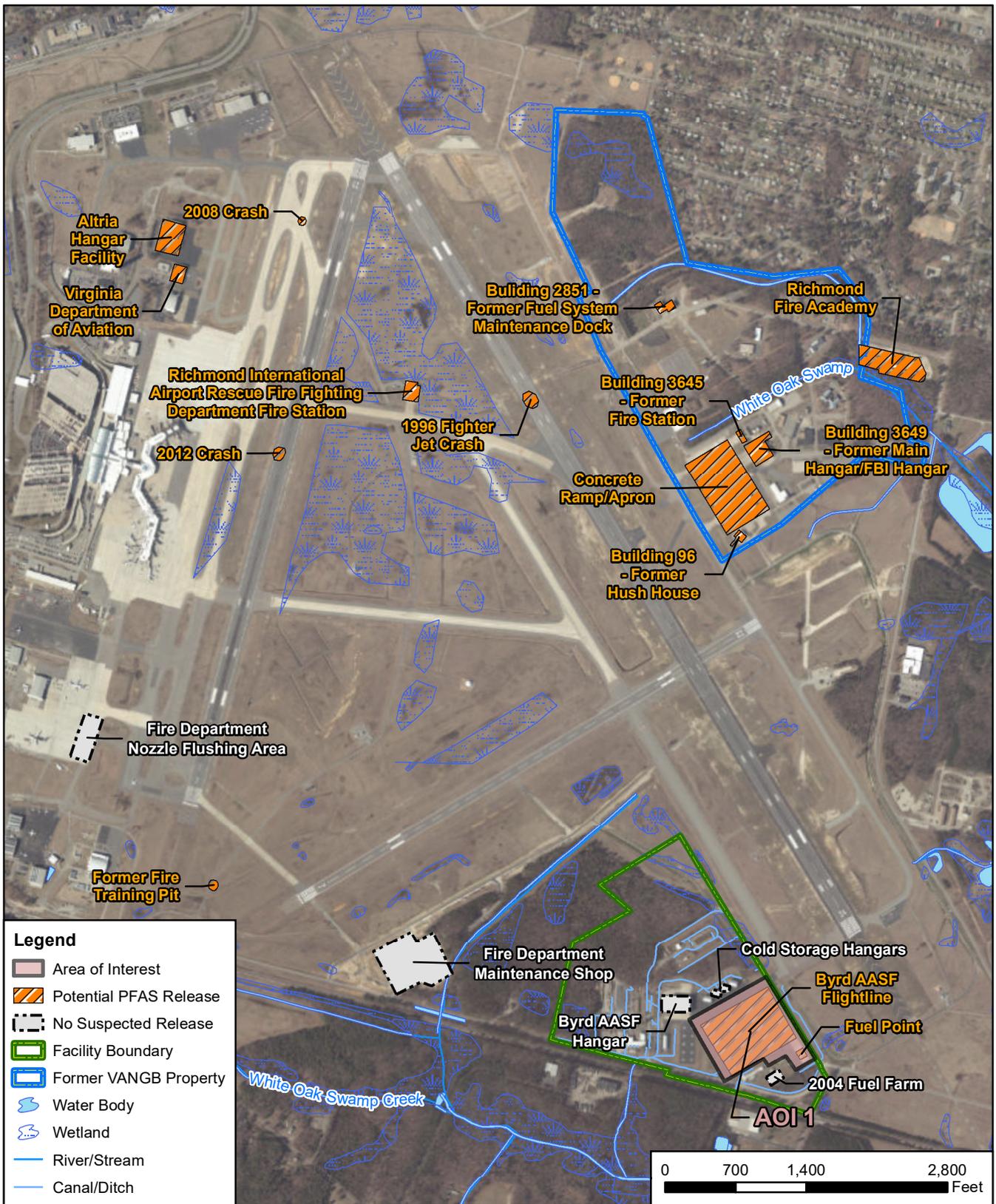
- Reviewed available administrative record documents and Environmental Data Resources, Inc. (EDR)TM report packages to obtain information relevant to potential PFAS releases, such as: drinking water well locations, historical aerial photographs, Sanborn maps, and environmental compliance actions in the area surrounding the facility;
- Conducted a site visit on 5 February 2019 and completed visual site inspections (VSIs) at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed personnel familiar or associated with AASF Byrd Field activities during the site visit, including the Facilities Safety Officer, the Buildings and Grounds Superintendent, and the Richmond International Airport Aircraft Rescue Firefighting (ARFF) Department Fire Chief; and
- 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.

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

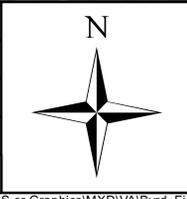
Table ES-1: AOIs at AASF Byrd Field

Area of Interest	Name	Used by	Potential Release Date
AOI 1	Flightline and Fuel Point	VAARNG	2010 to current

Based on a potential PFAS release at this AOI, there is potential for exposure to PFAS contamination in media at or near the facility. The preliminary CSM for AASF Byrd Field, which presents the potential receptors and media impacted, 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 Advisories (HAs) 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.

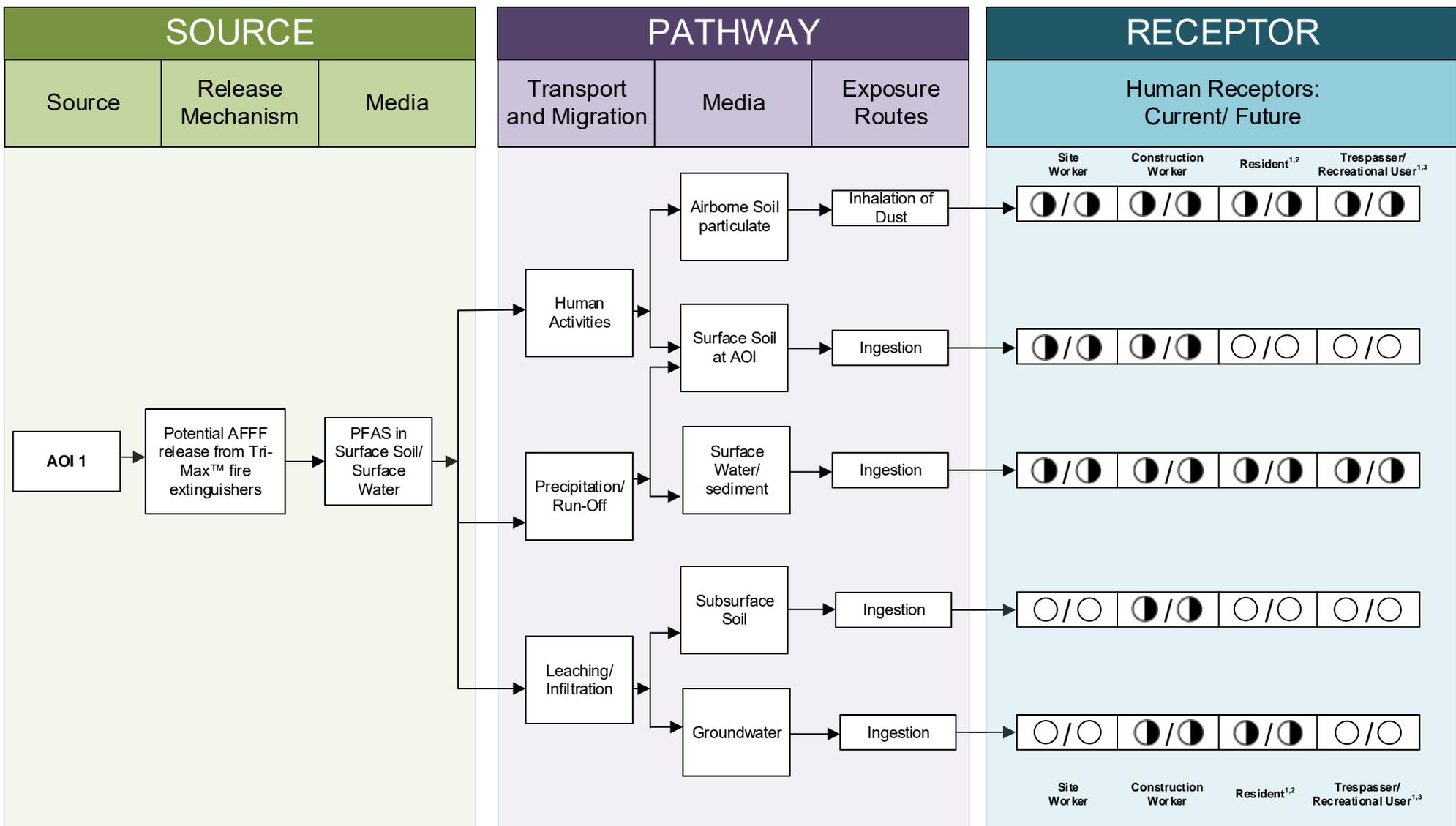


CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at AASF Byrd Field, VA			
REVISED	1/30/2020	GIS BY	MS	1/30/2020
SCALE	1:16,800	CHK BY	ST	1/30/2020
		PM	RG	1/30/2020



Summary of Findings	
AECOM	Figure ES-1
12420 Milestone Center Drive Germantown, MD 20876	

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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 users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.

Figure ES-2
Preliminary Conceptual Site Model
AASF Byrd Field, VA

1. Introduction

1.1 Authority and Purpose

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

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

PFAS are classified as emerging environmental contaminants that are garnering increasing regulatory interest due to their potential risks to human health and the environment. PFAS formulations contain highly diverse mixtures of compounds. Thus, the fate of PFAS compounds in the environment varies. The regulatory framework at both federal and state levels continues to evolve. The US Environmental Protection Agency (USEPA) issued 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 the findings of a PA for PFAS-containing materials at Army Aviation Support Facility (AASF) Byrd Field (also referred to as “the facility”) in VA, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations [CFR] Part 300), and Army requirements and guidance.

This PA documents the known fire training areas (FTAs) as well as other locations where PFAS may have been released into the environment at AASF Byrd Field. 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 site visit on 5 February 2019 and completed visual site inspections (VSIs) at known or suspected PFAS release locations and documented with photographs;
- Interviewed personnel familiar or associated with AASF Byrd Field activities during the site visit, including the Facilities Safety Officer, the Buildings and Grounds Superintendent, and the Richmond International Airport Aircraft Rescue Firefighting (ARFF) Department Fire Chief; and

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

1.3 Report Organization

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

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

1.4 Facility Location and Description

AASF Byrd Field is located on the southeast corner of the Richmond International Airport at 700 Portugee Road, Sandston, VA in Henrico County (**Figure 1-1**). The AASF Byrd Field property has been leased from the Capital Region Airport Commission (CRAC) by VAARNG since 1964. The property is about 94 acres and contains an airfield, fuel farm, hangars, hazardous materials storage areas, and aboveground storage tanks. A former munitions supply area was previously owned and occupied by the Virginia Air National Guard (VAANG) and is currently used by VAARNG for general industrial purposes (EEE Consulting, Inc. [EEE], 2008). Little information is available about the history of AASF Byrd Field; however, the facility is also referred to as the Former Richmond Army Airfield.

The AASF is bordered directly to the north by Richmond International Airport and to the south by Chesapeake & Ohio railroad. The facility and adjacent airport properties are generally characterized as light industrial areas. Residential areas exist approximately 1.5 miles north of the facility. The surrounding southern areas contain sparse rural residencies and wooded properties.

1.5 Facility Environmental Setting

AASF Byrd Field is located just east of the Fall Line, which separates the Coastal Plain physiographic province (east) and the Piedmont physiographic province (west). The terrain is relatively flat, with the surface elevation of AASF Byrd Field at approximately 158 feet (ft) above mean sea level (amsl). The topography gradually slopes downgradient to White Oak Swamp Creek, which is located approximately 2,000 ft south of the facility (EEE, 2008).

1.5.1 Soil

As indicated in the 2019 EDR™ report (**Appendix A**), there are eight major soil components found at the AASF Byrd Field property. These soils are derived primarily from loamy marine deposits or alluvium and are poorly-drained to moderately well-drained with intermediate layers that impede downward movement of water. Soil types are primarily silty and fine sandy loams.

1.5.2 Geology

AASF Byrd Field is located in the Coastal Plain physiographic province. The Virginia Coastal Plain is underlain by a thick wedge of sediments that increase in thickness from the Fall Zone to the continental shelf, where it exceeds 4,000 meters in depth. These sediments rest on an eroded surface of Precambrian to early Mesozoic rock. Two-thirds of this wedge are comprised of late Jurassic and Cretaceous clay, sand, and gravel that were stripped from the Appalachian Mountains, carried eastward by rivers, and deposited in deltas in the newly formed Atlantic Ocean basin (Meng and Harsh, 1988). The uppermost geologic unit at AASF Byrd Field is the Bacons Castle Formation which directly overlies unconsolidated sand and gravel deposits (**Figure 1-2**).

1.5.3 Hydrogeology

The facility aquifer (Yorktown aquifer) is a shallow water table aquifer comprising fine-grained quartz sand interbedded with silt and clay laminae. Data from the previous investigations at the adjacent former VAANG Base indicate that the aquifer is semi-confined due to the generally impermeable nature of the 20 ft of overlying soil. The base of the aquifer has been identified locally at depths of approximately 47 to 48 ft below ground surface (bgs). There are two distinct portions of the aquifer referred to as the upper surficial and lower surficial aquifer. The mean hydraulic conductivity of the upper surficial aquifer is approximately 2.41 feet per day (ft/day), while the mean hydraulic conductivity of the lower surficial aquifer is approximately 9.65 ft/day (AECOM, 2018).

The groundwater flow direction is assumed southerly towards the White Oak Swamp Creek. The depth to groundwater at AASF Byrd Field is assumed to be similar to that measured at the nearby former VAANG Base, about 9.2 to 17.8 ft bgs (AECOM, 2018). Groundwater features are presented on **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. A public water supply well is located approximately 0.25 miles southeast of the facility but is listed in the EDR™ report as having a closed status (**Appendix A**). In addition, three water wells exist within a mile radius of the facility including one public/municipal/government well, one industrial well, and one domestic well (Virginia Department of Mines, Minerals, and Energy, 2018). 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 HAs 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.

1.5.4 Hydrology

AASF Byrd Field is located within the White Oak Swamp Watershed. The western portion of the property is a wooded, predominately wetland area. Surface water is conveyed via reinforced channels in the southern portion of the facility, which then lead south to an off-facility rip-rap channel. All surface drainage from the facility eventually discharges to White Oak Swamp, which is located approximately 0.15 miles south of the facility. Surface water features are presented on **Figure 1-3**.

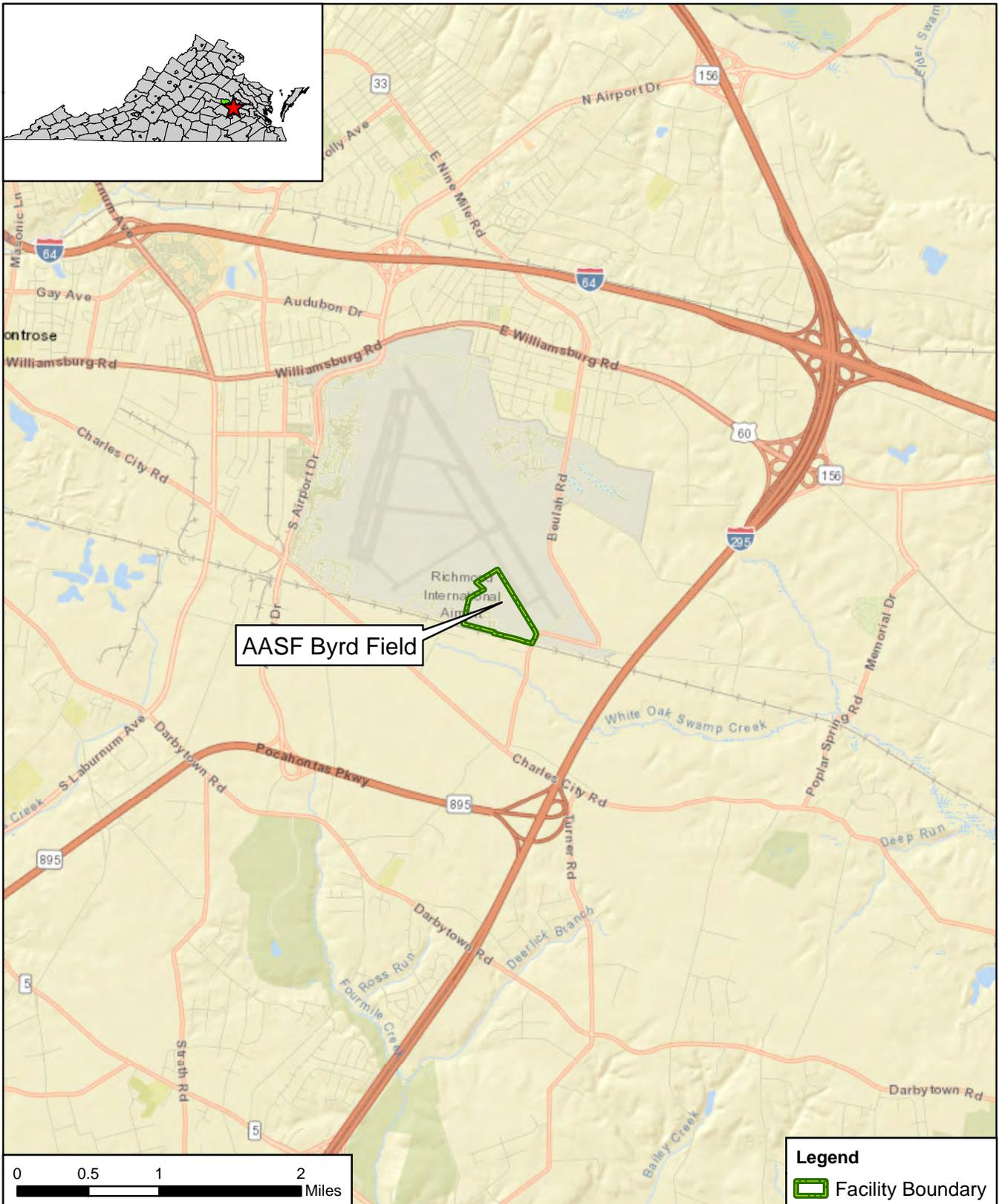
1.5.5 Climate

The climate of Richmond, Virginia is characterized as humid sub-tropical. Frequent short cold spells occur in winter, with temperatures in the low teens. The summer season experiences normal maximum and minimum temperatures of 88 degrees Fahrenheit (°F) and 67 °F, respectively. The winter season experiences normal maximum and minimum temperatures of 50 °F and 30 °F, respectively (National Oceanic and Atmospheric Administration [NOAA], 2019).

Annual precipitation is fairly well-distributed throughout the year, with an average annual precipitation of 43.60 inches. On average, the most precipitation occurs in the month of August, with an average total accumulation of 4.7 inches, and the least precipitation occurs in the month of February, with an average total accumulation of 2.8 inches (NOAA, 2019).

1.5.6 Current and Future Land Use

AASF Byrd Field is used by VAARNG for the maintenance and repair of military aircraft, military training, and hazardous materials storage. The current lease will expire in 2032. Plans for the construction of a new AASF facility are being developed but will not take place until the culmination of the current lease (NGVA-FMO-ENV, 2017). Leasing documents are available in **Appendix A**.

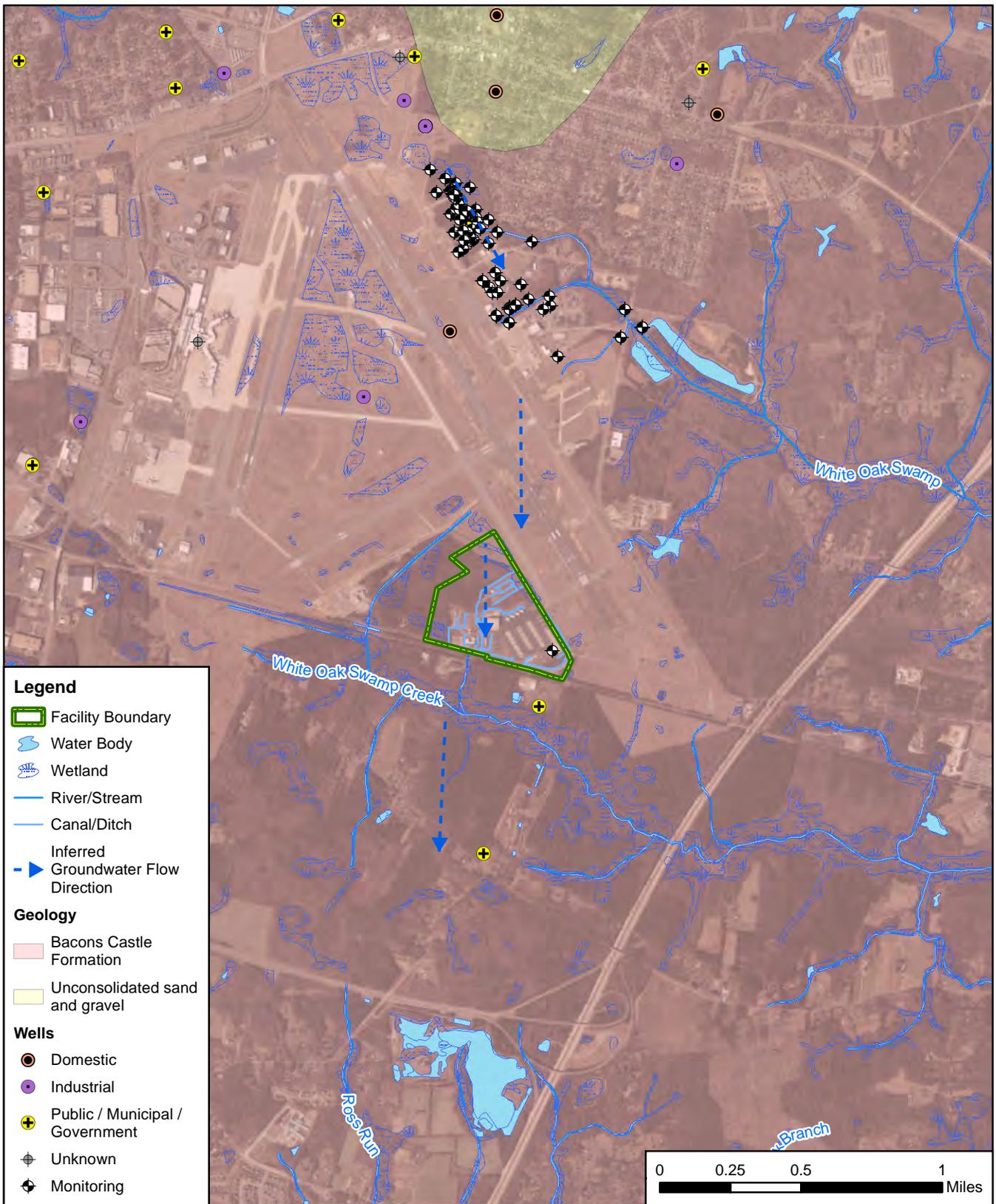


CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at AASF Byrd Field, VA			
REVISED	4/4/2019	GIS BY	MS	4/4/2019
SCALE	1:63,360	CHK BY	BN	4/4/2019
Base Map: Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI,	PM	RG		4/4/2019



Facility Location	
AECOM 12420 Milestone Center Drive Germantown, MD 20876	Figure 1-1

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Legend

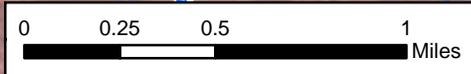
- Facility Boundary
- Water Body
- Wetland
- River/Stream
- Canal/Ditch
- Inferred Groundwater Flow Direction

Geology

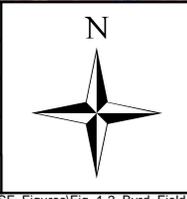
- Bacons Castle Formation
- Unconsolidated sand and gravel

Wells

- Domestic
- Industrial
- Public / Municipal / Government
- Unknown
- Monitoring



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at AASF Byrd Field, VA			
REVISED	4/4/2019	GIS BY	MS	4/4/2019
SCALE	1:31,680	CHK BY	ST	4/4/2019
		PM	RG	4/4/2019

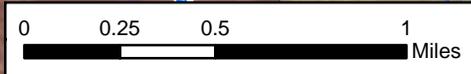
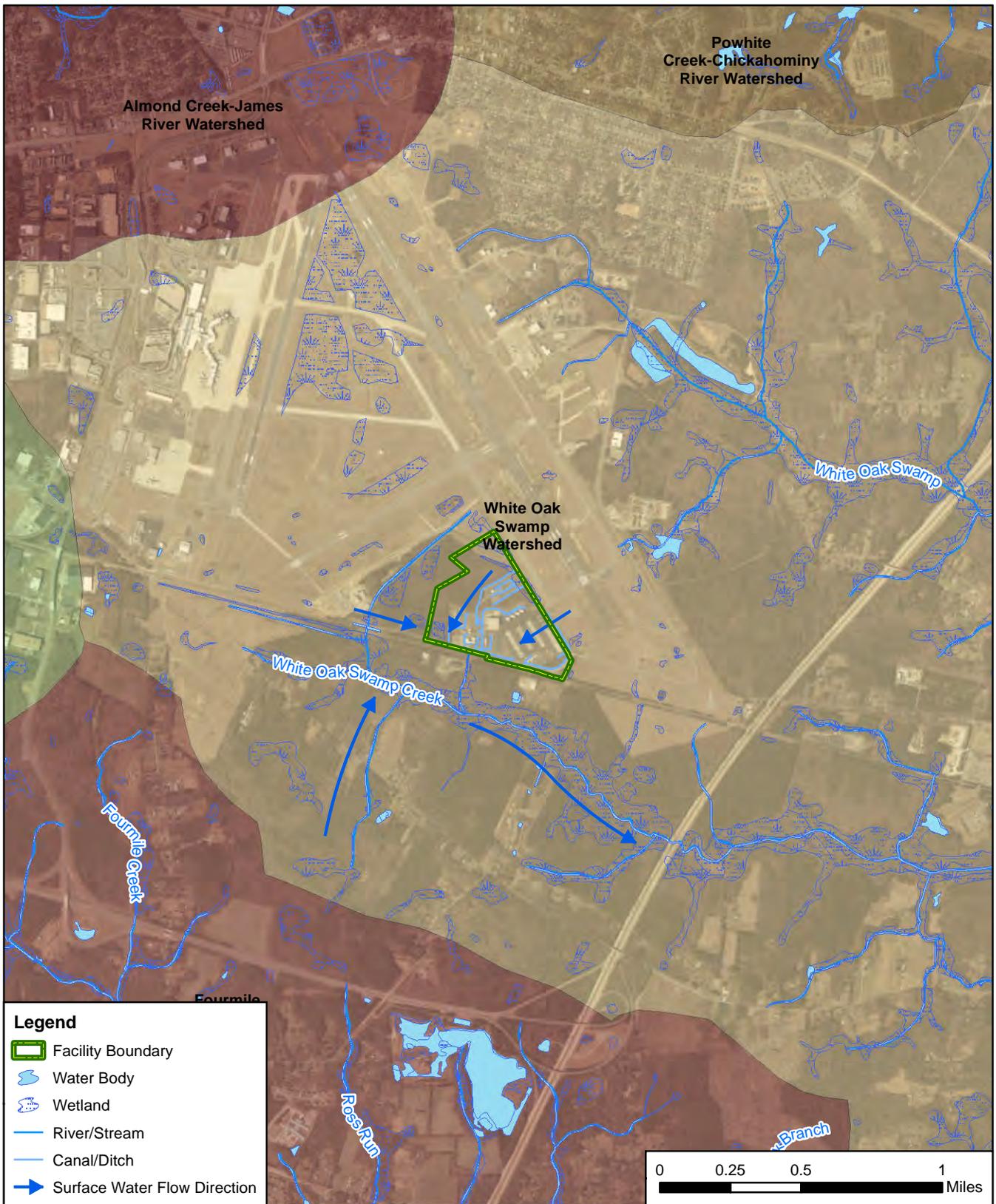


Groundwater Features

12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-2

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Legend				
	Facility Boundary			
	Water Body			
	Wetland			
	River/Stream			
	Canal/Ditch			
	Surface Water Flow Direction			

CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at AASF Byrd Field, VA			
REVISED	4/4/2019	GIS BY	MS	4/4/2019
SCALE	1:31,680	CHK BY	BN	4/4/2019
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	4/4/2019



Surface Water Features	
AECOM	Figure 1-3
12420 Milestone Center Drive Germantown, MD 20876	

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2. Fire Training Areas

Potential FTAs were investigated as part of the PA for possible releases of AFFF during training activities. No FTAs were identified within the current AASF facility during the PA through interviews or EDR™ reports. According to a VAARNG Facilities Safety Officer whose tenure extends 27 years, VAARNG personnel do not currently conduct fire training either on-post or off-post. The Safety Officer additionally stated that he spoke to retired VAARNG personnel with prior institutional knowledge who could not recall any incidences of AFFF release at AASF Byrd Field; however, those retired personnel could not be reached for an interview.

3. Non-Fire Training Areas

In addition to FTAs, the PA evaluated areas where PFAS-containing materials may have been broadly used, stored, or disposed. This may include buildings with fire suppression systems, paint booths, AFFF storage areas, and areas of compliance demonstrations. Information on these features obtained during the PA are included in **Appendices A** and **B**. Three non-FTAs where AFFF was stored and/or potentially 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**.

3.1 Flightline and Fuel Point

The approximately 10-acre flightline is located on the southeastern portion of the Byrd AASF property (center point coordinates 37°29'34.9"N; 77°18'37.5"W). The area is used for aircraft parking and refueling; a fuel point was observed in the eastern corner lot adjacent to the flightline.

AFFF is stored in ten Tri-Max™ 30 Fire Extinguishers staged across the flightline and fuel point. According to airport and VAARNG staff, there is no known history of the Tri-Max™ extinguishers being used or replaced after the Tri-Max™ extinguishers were acquired in 2010. Inspection tags on each of the Tri-Max™ extinguishers appear to indicate that the Tri-Maxes are inspected by VAARNG staff on a monthly basis. The Tri-Max™ extinguishers are currently planned for removal and replacement with Purple K extinguishers.

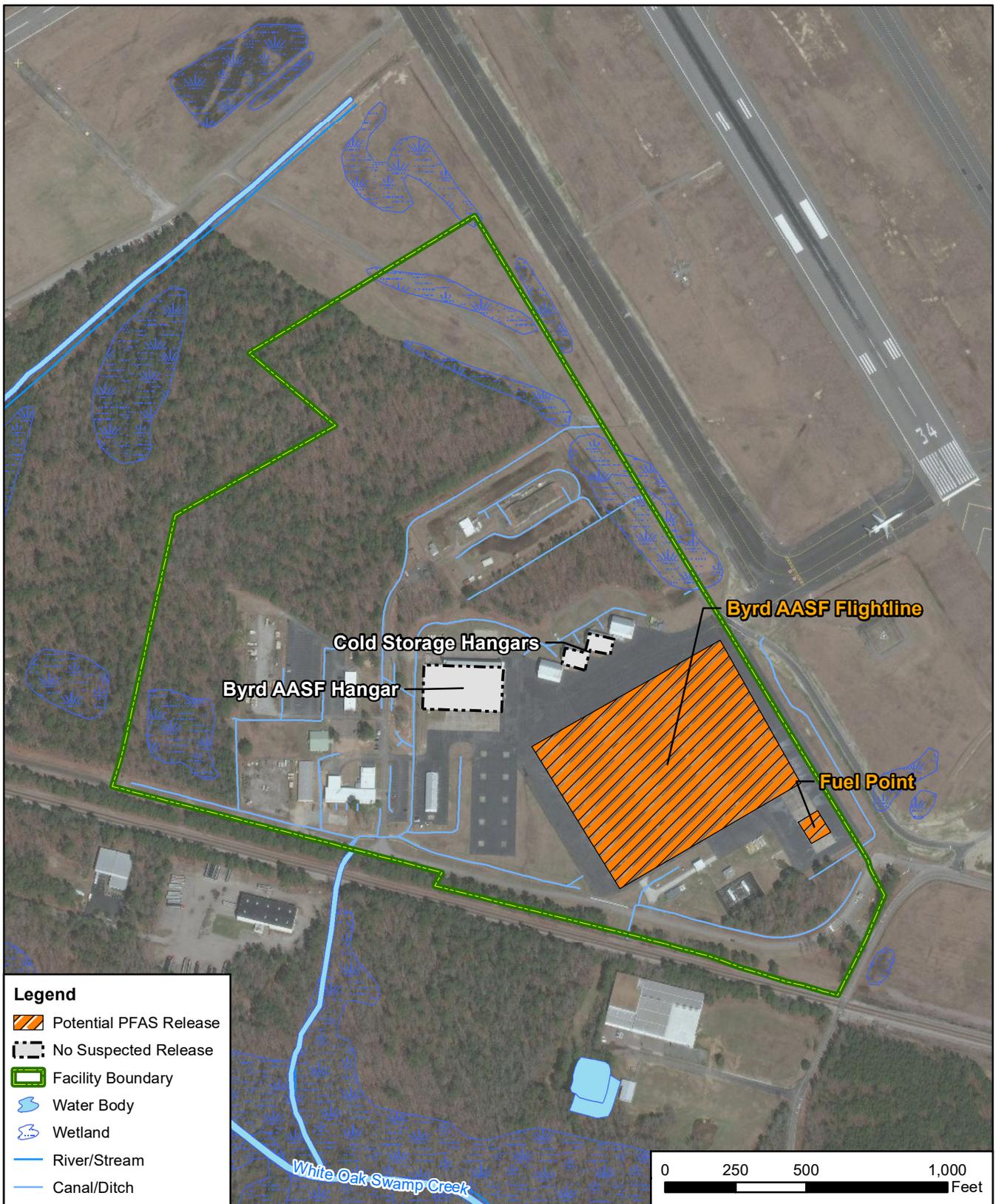
3.2 AASF Byrd Hangar

The AASF Byrd Hangar is located adjacent to the flightline and covers about 1 acre. The area's geographic coordinates are 37°29'37.6"N; 77°18'46.1"W. The hangar is used for the support of AASF Byrd operations.

The VSI did not find any evidence of AFFF in the hangar. Only ABC fire extinguishers were present within the facility, and there was no fire suppression system. VAARNG personnel additionally confirmed that no AFFF fire suppression system has ever been present in the hangar.

3.3 Cold Storage Hangars

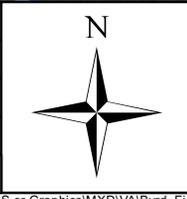
There are four cold storage hangars aligned next to each other and are located to the east of the AASF Byrd Hangar. The area's geographic center is located at 37°29'38.9"N; 77°18'41.1"W. The cold storage hangars store various maintenance-related chemicals and solvents. According to interviews with AASF personnel, Tri-Max™ 30 Fire Extinguishers containing AFFF were temporarily stored in the center two cold storage hangars after being acquired in 2010; however, there is no known history of AFFF release at these two hangars. The Tri-Max™ extinguishers were not present in the cold storage hangars at the time of the VSI.



Legend

- Potential PFAS Release
- No Suspected Release
- Facility Boundary
- Water Body
- Wetland
- River/Stream
- Canal/Ditch

CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at AASF Byrd Field, VA			
REVISED	1/30/2020	GIS BY	MS	1/30/2020
SCALE	1:6,000	CHK BY	ST	1/30/2020
		PM	RG	1/30/2020



Non-Fire Training Area

12420 Milestone Center Drive
Germantown, MD 20876

Figure 3-1

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4. Emergency Response Areas

Emergency responses to crashes sometimes require flame suppression, which may result in the release of PFAS to the environment in the form of AFFF. One emergency response area was identified within the current AASF facility during the PA. A description of the emergency response area is presented below, and the emergency response area is shown on **Figure 4-1**.

4.1 2004 Fuel Farm Fire

In 2004, a fuel truck parked on the AASF Byrd fuel farm caught fire. The incident was responded to by the Richmond International Airport ARFF Department. According to the Fire Department Chief, who was present at the scene, only the fuel truck's cab and engine compartment caught on fire. There was no fuel fire, so the response team used only water to extinguish the fire. There is no suspected release of AFFF from this incident.



Legend

- No Suspected Release
- Facility Boundary
- Water Body
- Wetland
- River/Stream
- Canal/Ditch

CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at AASF Byrd Field, VA			
REVISED	4/4/2019	GIS BY	MS	4/4/2019
SCALE	1:6,000	CHK BY	ST	4/4/2019
		PM	RG	4/4/2019



Emergency Response Area

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

Figure 4-1

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5. Adjacent Sources

Numerous potential off-facility sources of PFAS adjacent to the current AASF, not under the control of the VAARNG, were identified during the PA. A description of each adjacent source is presented below, and the adjacent sources are shown on **Figure 5-1**.

5.1 Former Virginia Air National Guard Base

The former VAANG Base is located north of AASF Byrd, adjacent to the Richmond International Airport runway. During its operational history, the facility occupied 143 acres and housed the 192nd Fighter Wing, which was active beginning in 1947 and serviced a variety of military aircraft. VAANG operations at the former Base ceased in December 2008 as part of the Base Realignment and Closure (BRAC) program and formally closed in 2011. The CRAC took control of the property and is currently redeveloping this site for future aviation-related businesses. According to the 2016 PA report for PFAS by BB&E, Inc. (BB&E), five potential non-FTA PFAS sources were identified at the former VAANG Base as described below (BB&E, 2016).

Building 3649 was the former Main Hangar constructed in 1958. It is unknown whether AFFF was stored or used within the hangar; however, based on the timeline and operational use, it is possible AFFF could have been released.

Building 3645 was the former Fire Station and housed four ARFF vehicles. It is unknown whether AFFF was stored or used within the Fire Station; however, based on the timeline and operational use, it is possible AFFF could have been released.

Building 2851 was the former Fuel System Maintenance Dock constructed in 1977 and located on the northwestern portion of the former VAANG Base property. During a 2015 site visit by BB&E, the building was found to have an AFFF fire suppression system with four turrets and a 150-gallon Ansul AFFF tank. It is unknown whether the system was ever triggered or leaked; however, based on the timeline and operational use, it is possible AFFF could have been released.

Building 96 was the former Hush House (also known as the Jet Engine Test Cell) located on the southern portion of the former VAANG Base property. The Hush House was an enclosed aircraft jet engine testing facility built in 1992. It is unknown whether AFFF was stored or used within the Hush House; however, based on the timeline and operational use, it is possible AFFF could have been released.

A concrete ramp/ apron area was located on the southwestern portion of the former VAANG Base property and was used for aircraft de-icing operations. The concrete ramp included a wash rack with a drain on the southern portion of the apron. According to the interviewees, the concrete ramp/ apron area was identified as a former FTA for VAANG. Annual training with Class B foam was performed until 2016. Approximately 5-gallons of AFFF product was used during each annual event.

5.2 Former Fire Training Pit

According to the 2016 PA report for PFAS at the former VAANG Base (BB&E, 2016), a former fire training pit was located in the southwest portion of the Richmond International Airport, near what is now Triangle Road. This fire training pit was owned and operated by CRAC but formerly used as a fire training area by VAANG and the Richmond International Airport ARFF Department. A mockup aircraft was stationed at the fire pit where Jet Propellant Type 4 (JP-4) fuel was poured and then ignited. It is possible that AFFF might have been used during the fire training exercises conducted by VAANG. The area has since been remediated and has not been used since 1991.

5.3 Richmond Fire Academy

The Richmond Fire Academy is located at 5600 Beulah Road. The academy was rebuilt in 1988 and is currently used for training municipal firefighters. According to the 2016 PA report for PFAS (BB&E, 2016) the Fire Training Academy burns a mixture of #2 fuel oil and water approximately once per year for fire training purposes. It is possible that AFFF might have been used historically during the fire training exercises, and may be used currently.

5.4 Richmond International Airport Aircraft Rescue Firefighting Department

The Richmond International Airport ARFF Department has a fire station between Runways 20 and 16. Approximately 4,000 gallons of AFFF are stored in totes at the fire station. Three firetrucks (two Rosenbauer trucks and one Oshkosh Striker) containing AFFF are additionally stored at the station. The trucks are approximately five years old and have no history of leaking AFFF. All AFFF used by the fire department is a 3% concentrated solution of varying brands such as National Foam, Chemguard, and Ansul. In the event of an emergency response, AFFF buckets are taken onto the firetrucks and then mixed at the location of the incident. The firetrucks/AFFF tanks are cleaned at the fire station after use. Runoff at the fire station is directed towards stormwater drains on site.

The Fire Department Maintenance Shop is located along Portugee Road to the west of AASF Byrd Field. The three firetrucks containing AFFF receive regular maintenance at the shop. However, there is no indication that AFFF has been released at this location.

The Richmond International Airport ARFF Department has a nozzle testing area outside the United Parcel Service (UPS) hangar area of the airport. The fire department performs nozzle testing every day with water. No AFFF is used during the nozzle testing.

5.5 Altria Group, Inc.

Altria Group, Inc. maintains a hangar on a parcel of land to the west of Runway 20. The hangar is known to contain AFFF storage; however, it is unknown whether AFFF was ever used, tested, or accidentally released at the Altria Group, Inc. facility.

5.6 Virginia Department of Aviation

The Virginia Department of Aviation maintains a hangar on a parcel of land to the west of Runway 20 and adjacent to south of the Altria Group, Inc. facility. The hangar is known to contain AFFF storage; however, it is unknown whether AFFF was ever used, tested, or accidentally released at this facility.

5.7 Federal Bureau of Investigation

The Federal Bureau of Investigation (FBI) has a hangar located in a secured area to the east of Runway 16. The hangar contains an AFFF fire suppression system. It is unknown if the AFFF fire suppression system was ever used, tested, or accidentally released.

5.8 1996 Aircraft Crash

In 1996, a fighter jet crashed onto Runway 16, adjacent to the former VAANG Base. According to an interview with the Fire Department Chief, the Richmond International Airport ARFF Department

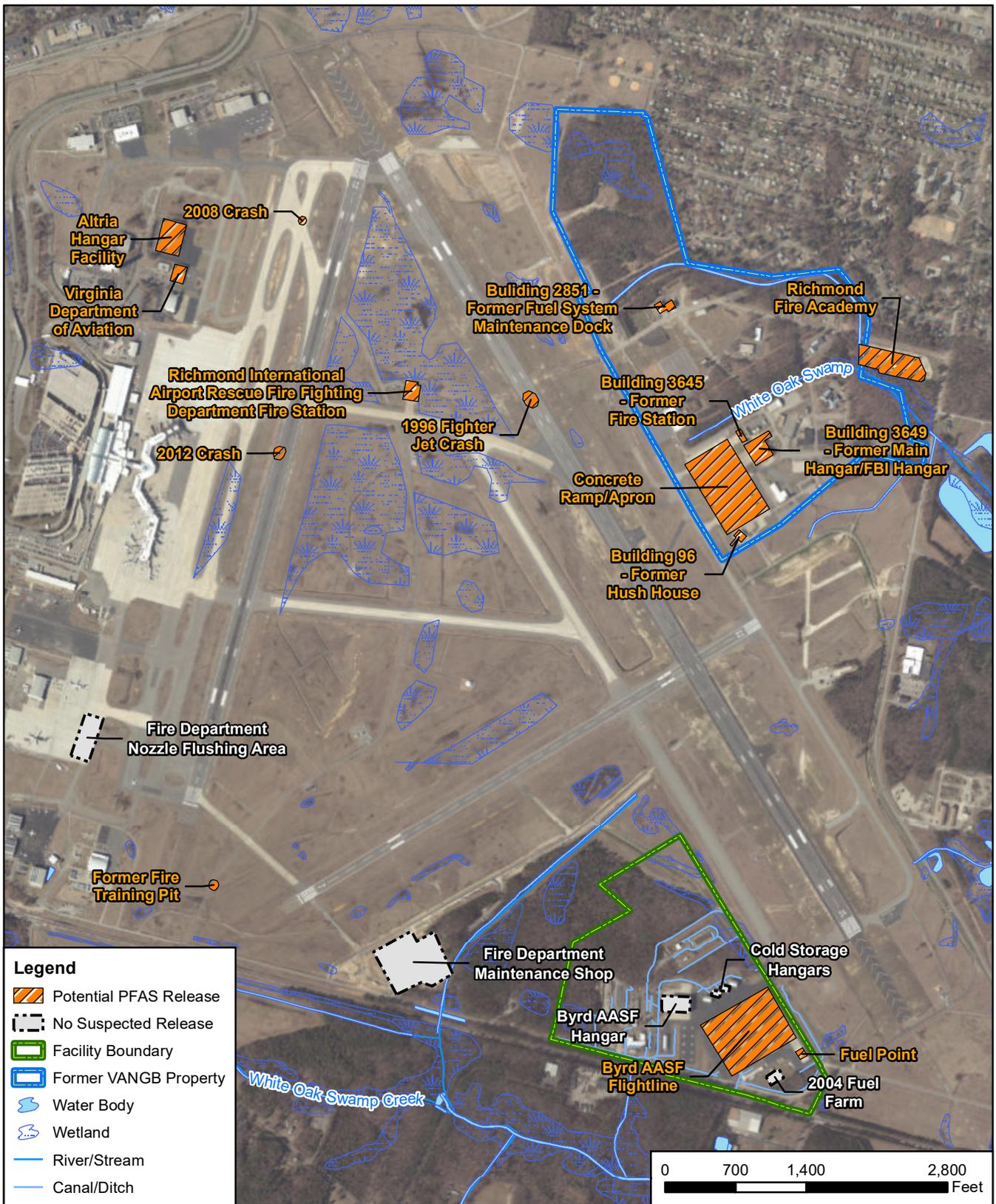
responded to the incident. An unknown concentration and amount of AFFF was used in response to the incident. The foam was cleaned from the location after the incident site was declared safe and secure; however, it is unknown how the AFFF used in the response was disposed of and cleaned from the area. A crash report and additional information for the incident were not made available.

5.9 2008 Aircraft Crash

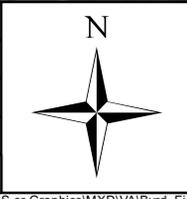
In 2008, a private aircraft crashed just west of Runway 20. According to an interview with the Fire Department Chief, the Richmond International Airport ARFF Department responded to the incident. An unknown concentration and amount of AFFF was used in response to the incident. The foam was cleaned from the location after the incident site was declared safe and secure; however, it is unknown how the AFFF used in the response was disposed of and cleaned from the area. A crash report and additional information for the incident were not made available.

5.10 2012 Aircraft Crash

In 2012, an aircraft crashed onto Runway 20, adjacent to the Richmond International Airport terminals. According to an interview with the Fire Department Chief, the Richmond International Airport ARFF Department responded to the incident. An unknown concentration and amount of AFFF was used in response to the incident. The foam was cleaned from the location after the incident site was declared safe and secure; however, it is unknown how the AFFF used in the response was disposed of and cleaned from the area. A crash report and additional information for the incident were not made available.



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at AASF Byrd Field, VA			
REVISED	1/30/2020	GIS BY	MS	1/30/2020
SCALE	1:16,800	CHK BY	ST	1/30/2020
Base Map: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/30/2020



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, one area was identified at the facility where AFFF may have been potentially released: AOI 1 Flightline and Fuel Point. As such, this area is determined to be an AOI and may be a potential PFAS source area. The AOI location is shown in **Figure 6-1**. Based on the temporary storage of AFFF within the Cold Storage Hangars, and the covered nature of the storage, the Cold Storage Hangars are not considered a potential PFAS release area.

The following section describe the CSM components and the specific preliminary CSM developed for AOI 1. 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. The preliminary CSM for AOI I is shown in **Figure 6-2**.

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). Receptors at the facility include site workers, construction workers, residents, recreational users, and trespassers. The preliminary CSM for the facility indicates which specific receptors could potentially be exposed to PFAS.

6.1 AOI 1: Flightline and Fuel Point

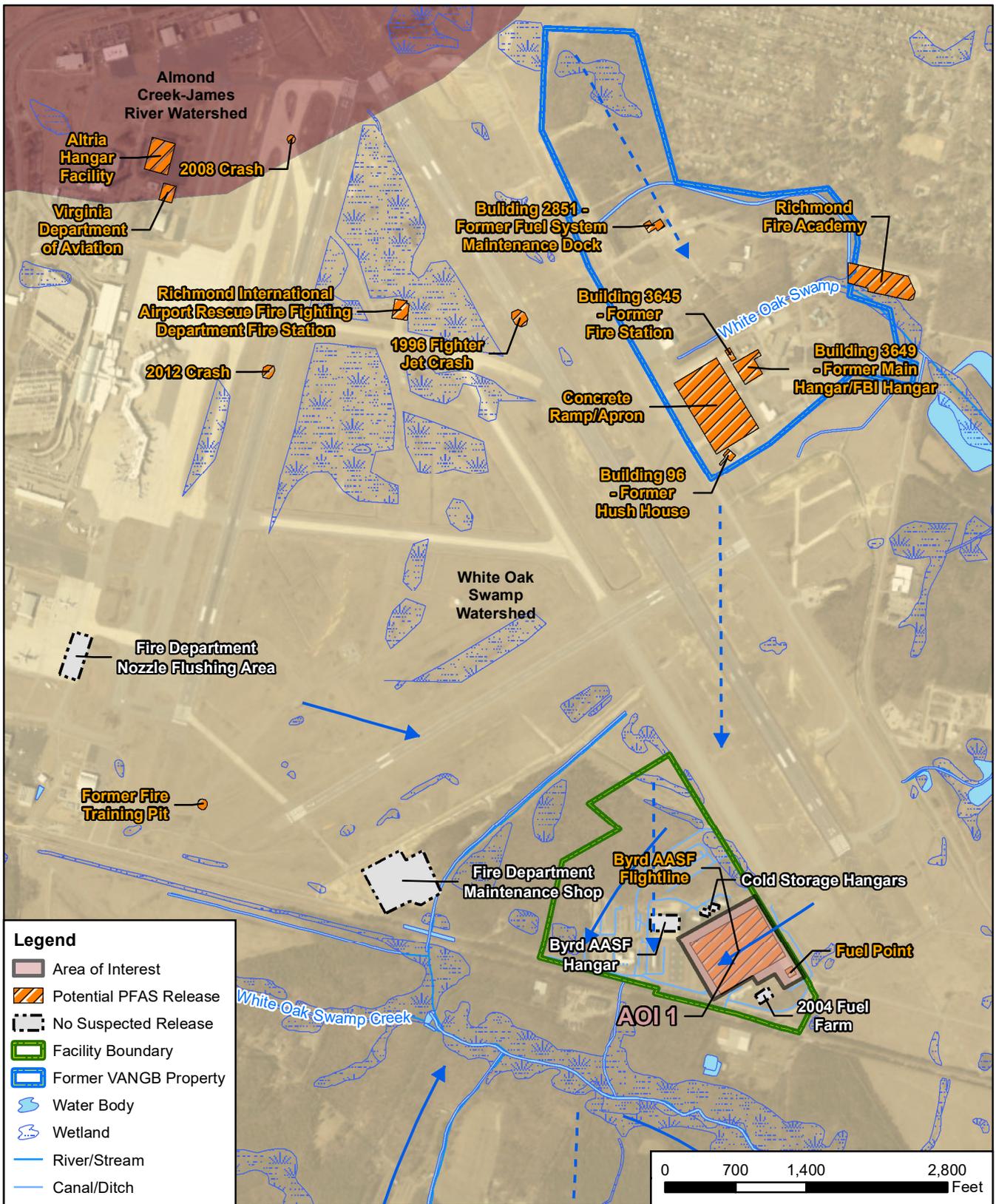
AOI 1 includes one non-FTA: the flightline and fuel point. AFFF is stored in ten Tri-Max™ 30 Fire Extinguishers staged across the flightline and fuel point. Based on the corrosive nature of AFFF, and the Tri-Max™ 30 Fire Extinguishers exposure to the elements while staged at the AOI, it is possible that AFFF has leaked from the extinguishers.

Potential AFFF releases on the flightline and fuel point would have occurred primarily on paved surfaces but may run-off into unpaved surfaces. PFAS releases carried by run-off into surface soil may have infiltrated the subsurface soil. PFAS releases may have also infiltrated the subsurface soil via cracks in the pavement or in joints between areas that are paved with different materials. Ground-disturbing activities to soil at AOI 1 could result in construction worker exposure to potential PFAS contamination via inhalation of dust or ingestion of surface and subsurface soil. Inhalation of dust or ingestion of surface soil may also occur during the routine activities of site workers. Therefore, the inhalation and ingestion pathways for these receptors are considered potentially complete.

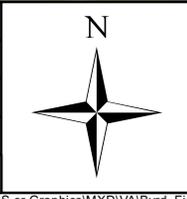
PFAS releases carried by run-off likely drain downslope into the White Oak Swamp Creek. Off-facility receptors such as residents and recreational users may be exposed to PFAS via ingestion of surface water and sediment in White Oak Swamp Creek or via the ingestion of fish affected by PFAS. The on-facility presence of drainage swales presents a potentially complete exposure pathway to site workers and construction workers via ingestion of surface water and sediment.

PFAS are water soluble and can migrate readily from soil to groundwater via leaching. No groundwater wells exist at the facility, and the facility is on municipal water provided by Henrico County Department of Public Utilities, which sources its water from commercial wells screened in the confined Potomac aquifer and from the James River located approximately eight miles away (BB&E, 2016). The facility's potable water is unlikely impacted by potential PFAS releases. However, a public water supply well is located approximately 0.25 miles southeast of the facility and may be impacted by PFAS in groundwater. Groundwater at the facility is present at shallow occurrences (less than 15 ft bgs), and it is possible there are groundwater-surface water interactions at White Oak Swamp Creek. Therefore, the groundwater ingestion pathways are potentially complete for construction workers and off-facility residents, and the pathways are

potentially complete for surface water ingestion to recreational users where groundwater is discharging as surface water. The preliminary CSM for AOI 1 is shown on **Figure 6-2**.

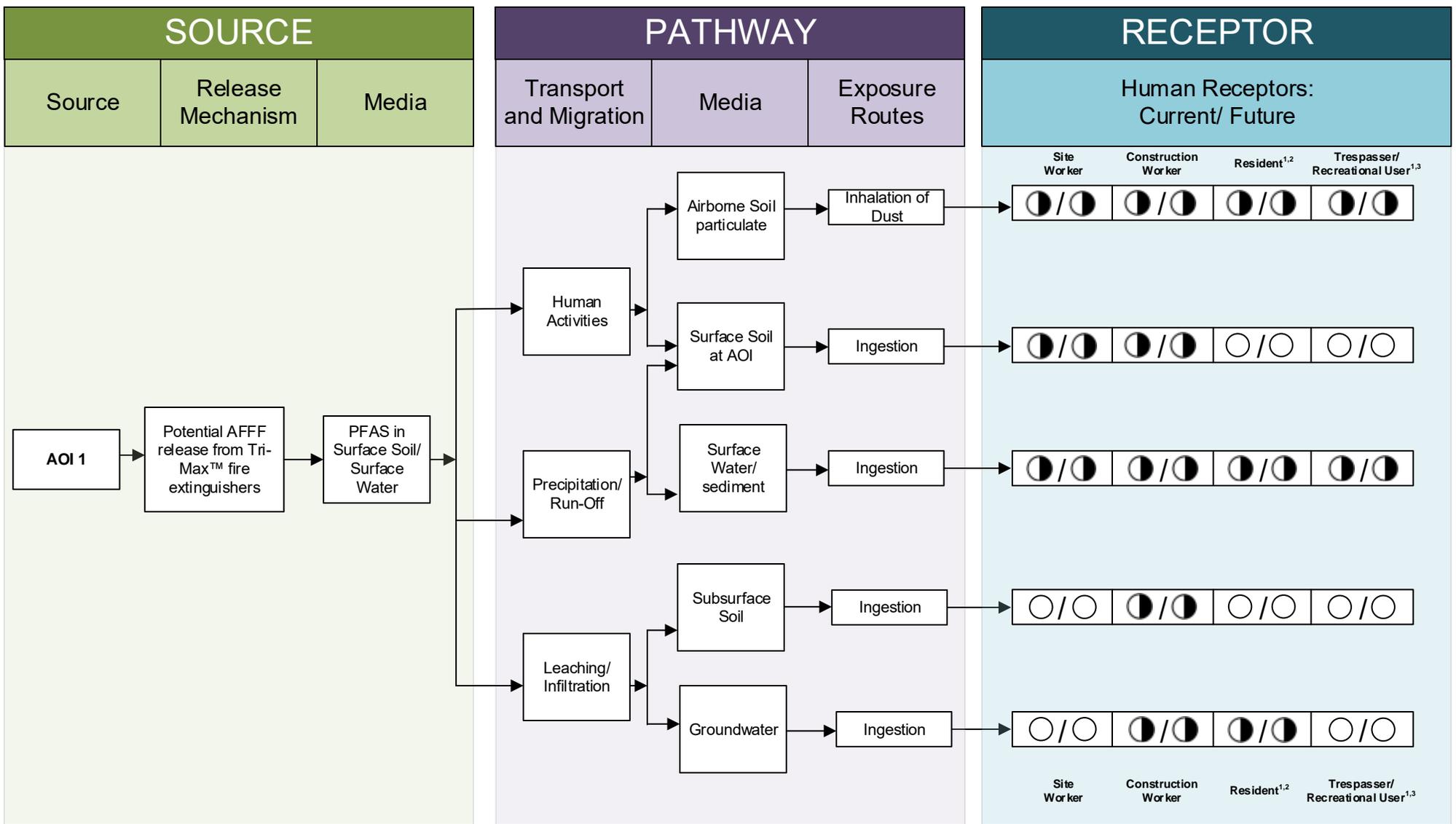


CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at AASF Byrd Field, VA			
REVISED	1/30/2020	GIS BY	MS	1/30/2020
SCALE	1:16,800	CHK BY	ST	1/30/2020
		PM	RG	1/30/2020



Areas of Interest	
AECOM	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 users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.

Figure 6-2
Preliminary Conceptual Site Model
AASF Byrd Field, VA

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 AASF Byrd Field (**Figure 7-1**). The PA findings are based on the information presented in **Appendix A** and **Appendix B**.

7.1 Findings

One AOI related to potential PFAS release was identified (**Table 7-1**) at the facility during the PA (**Figure 7-1**):

Table 7-1: AOIs at AASF Byrd Field

Area of Interest	Name	Used by	Potential Release Date
AOI 1	Flightline and Fuel Point	VAARNG	2010 to current

Based on potential PFAS releases at the AOI, there is potential for exposure to PFAS contamination in media at or near the facility. The preliminary CSM for the facility is shown on **Figure 6-2**, which presents the potential receptors and media impacted.

Several potential sources of PFAS were identified in the local area surrounding AASF Byrd Field through interviews or review of previous environmental investigations, including the former VAANG Base, where PFAS has already been investigated in a PA.

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. 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 were 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, retired and current personnel were interviewed, multiple persons were interviewed for the same potential source area, and potential source areas were visually inspected.

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

Table 7-2: Summary of Uncertainties

Location	Source of Uncertainty
AOI 1: Flightline and Fuel Point	The VAARNG Facilities Safety Officer stated with first-hand knowledge that no fire training activities or other potential releases of AFFF had occurred during his tenure (27 years) and since the Tri-Max™ extinguishers containing AFFF were first acquired in 2010. The Safety Officer additionally stated that he spoke with retired VAARNG personnel with prior institutional knowledge who could not recall any incidences of AFFF release at AASF Byrd Field; however, those retired personnel could not be reached for an interview.

Potential off-facility PFAS release areas exist adjacent to AASF Byrd Field. Because these areas include property inferred to be hydraulically upgradient of the facility, it is possible that these releases could affect AASF Byrd Field.

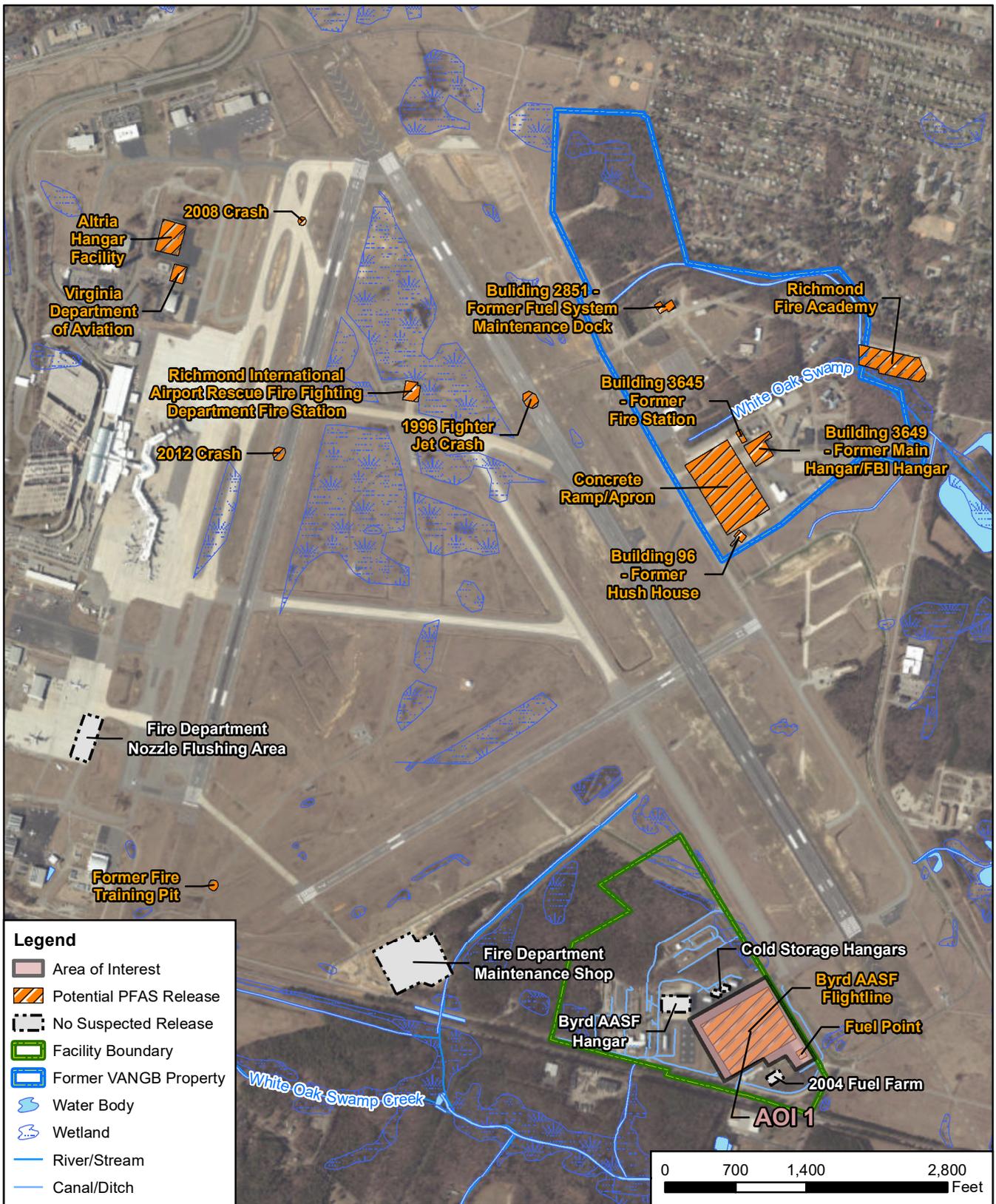
7.3 Potential Future Actions

Interviews and records (covering 1992 to present) indicate that current or former ARNG activities may have resulted in potential PFAS releases at one AOI identified during the PA. Based on the preliminary CSM developed for the AOI, there is potential for receptors to be exposed to PFAS contamination in soil, groundwater, surface water, and sediment at the AOI. **Table 7-3** summarizes the rationale used to determine if the AOI should be considered for further investigation under the CERCLA process and undergo an SI.

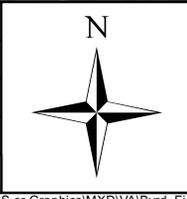
Table 7-3: PA Findings Summary

Area of Interest	AOI Location	Rationale	Potential Future Action
AOI 1: Flightline and Fuel Point	37°29'34.8"N; 77°18'36.9"W	AFFF is stored in ten Tri-Max™ 30 Fire Extinguishers staged across the flightline and fuel point.	Proceed to an SI, focus on soil, groundwater, surface water, sediment

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



CLIENT	ARNG			
NOTES	Preliminary Assessment for PFAS at AASF Byrd Field, VA			
REVISED	1/30/2020	GIS BY	MS	1/30/2020
SCALE	1:16,800	CHK BY	ST	1/30/2020
		PM	RG	1/30/2020



Summary of Findings	
AECOM 12420 Milestone Center Drive Germantown, MD 20876	Figure 7-1

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8. References

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- Virginia Department of Mines, Minerals, and Energy. 2018. *Division of Geology and Mineral Resources DQO Data Information System*.

Appendix A

Data Resources

Data resources will be provided separately on CD. Data resources for AASF Byrd Field include:

Environmental Data Resources, Inc.™ Geocheck Report

- 2019 Environmental Data Resources, Inc.™ Geocheck Report for AASF Byrd Field, VA

Real Property Information

- 2002 Deed and Agreement of Lease By and Between Capital Region Airport Commission and the United States of America, Army Guard Property at Richmond International Airport, Lease No. DACA65-5-03-0045
- 2006 Supplemental Agreement No. 1 to Army Guard Lease, Lease No. DACA65-5-03-0045
- 2011 Supplemental Agreement No. 2, Lease No. DACA65-5-03-0045
- 2013 Memorandum for ARNG-ILI-R, Review of Environmental Documentation for the Proposed Lease Amendment for Army Aviation Support Facility (AASF) at Richmond International Airport, Sandston, Virginia
- 2013 Memorandum for ARNG-ILI-R, Request for DA License, Richmond International Airport, Sandston, Virginia
- 2014 Memorandum for ARNG-ILI-R, Revision of the 20 September 2013 Memorandum – Review of Environmental Documentation for the Proposed Lease Amendment for Army Aviation Support Facility (AASF) at Richmond International Airport, Sandston, Virginia
- 2014 Memorandum for the U.S. Army Corps of Engineers Norfolk District, Direct to Add 6.326 Acres and 6,707 Square Feet to Lease DACA65-5-03-0045 and Issue License to the Virginia Army National Guard (VAARNG) for the Entire Leased Property for Use as an Army Aviation Support Facility at Richmond International Airport, Sandston, Virginia

Miscellaneous Data Resources

- 2008 Phase I Environmental Site Assessment, Air Guard Munitions Facility, Beulah Road, Sandston, Virginia 23250
- 2013 Memorandum for Record, Environmental Condition of Property Evaluation, Army Aviation Support Facility (AASF), Sandston, Virginia
- 2016 Final Perfluorinated Compounds Preliminary Assessment Site Visit Report, Former Richmond Air National Guard Base, Richmond, Virginia
- 2017 Memorandum for Record, Environmental Condition of Property Evaluation, Army Aviation Support Facility (AASF), Sandston, Virginia
- 2018 Final Groundwater Monitoring Report, Site 1 Basewide Groundwater Operable Unit (OU1), Former Virginia Air National Guard Base, Sandston, Virginia

Appendix B

Preliminary Assessment Documentation

Appendix B.1

Interview Records

PA Interview Questionnaire

Facility: AASF Byrd
 Interviewer: [REDACTED]
 Date/Time: 2-5-2019

<p>Interviewees: <u>See below</u> Title: <u>See below</u> Phone Number: <u>See below</u> Email: <u>See below</u></p>	<p>Can your name/role be used in the PA Report? Y or N Can you recommend anyone we can interview? Y or N Col. [REDACTED] & Col. [REDACTED] (retired)</p>
<p>1. Roles or activities with the Facility/years working at the Facility.</p> <p>[REDACTED] – VAARNG Facilities Safety Officer: 1992-Present; [REDACTED] [REDACTED] – Airport Fire Chief: 1990-2019; 8 [REDACTED] (office), [REDACTED] (cell); [REDACTED] – Building and Grounds Superintendent: 2002-2019; [REDACTED] (cell);</p>	
<p>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.</p> <p>Maintenance (e.g., ramp washing) – No AFFF releases from maintenance Fire Training Areas – None at Byrd AASF; VAANG has an FTA on east side of runway Firefighting (Active Fire) – No use at Byrd AASF by FD, but FD has used it at the airport Crash – No crashes at the AASF, but several crashes at the airport Fire Suppression Systems (Hangers/Dining Facilities) – None at AASF use AFFF. AFFF in commercial buildings at airport Fire Protection at Fueling Stations – Yes, Tri-Maxes are staged on the flightline and at the fueling station Non-Technical/Recreational/ Pest Management - None</p>	
<p>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?</p> <p>No buildings are constructed with AFFF suppression systems. The kitchen in the mess hall uses a dry chemical fire suppression system. No AFFF is in the hangar suppression system, only</p>	
<p>4. Are fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam?</p> <p>No, AFFF is only present in Tri-Maxes stored on the flightline and in the cold storage hangars. The two center cold storage hangars may have been used for Tri-Max storage.</p> <p>4 thousand gallons of AFFF is stored at the airport fire station (off-post); 3 trucks store AFFF there also</p>	
<p>5. How is AFFF procured? Do you have an inventory/procurement system that tracks use?</p> <p>The Tri-Maxes have never been replaced, they were acquired in 2010. They are currently planned for removal and replacement with Purple K extinguishers. The airport fire station has always stored AFFF; constructed in 1985-1986.</p>	

PA Interview Questionnaire

Facility: AASF Byrd

Interviewer: [REDACTED]

Date/Time: 2-5-2019

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)?

All AFFF used by the FD is 3%, varying brands. Currently storing National Foam, Chemguard, and Ansul brands (at least).

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

Solution is mixed in AFFF-capable fire trucks when needed.

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 is stored in Tri-Maxes staged at the flightline. Approximately 10 Tri-Maxes are staged across the flightline and fuel point. Tri-Maxes may have also been stored in the two center cold storage hangars (one of which is Bldg. 3993). At the fire station AFFF is stored in totes and on 3 fire trucks (2 Rosenbauer trucks and 1 Osh Kosh Striker). The trucks are 5 years old or less, maintained at the fire station auto shop, and have no history of leaking AFFF. Nozzle testing is performed every day with water only, at the UPS hangar area of the airport.

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?

AFFF buckets are taken onto fire trucks and mixed at the location of emergency response when necessary. Fire trucks/AFFF tanks are cleaned at the Fire Station after use. Runoff at the fire station is directed towards stormwater drains.

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

No AASF Byrd vehicles carry AFFF; fire trucks at the fire station are the only vehicles carrying AFFF currently.

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 vehicles at AASF Byrd have a history of leaking. No fire trucks at the fire station have a history of leaking. One truck had an incident where it was leaking Halon, but the Halon never escaped the truck apparatus.

PA Interview Questionnaire

Facility: AASF Byrd
Interviewer: [REDACTED]
Date/Time: 2-5-2019

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?

No FTAs exist at AASF Byrd. VAANG has an FTA on the east side of the runway/ Regular testing occurs at the FTA, most often with water. Approximately 5 gallons of AFFF is used in training annually between May and June.

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

Unknown

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?

No known AFFF use at AASF Byrd. Unknown volume of AFFF used at crash locations at airport, or at the FTA on east side of the runway.

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?

The airport fire department responds to emergencies at the airport and AASF Byrd. Henrico County FD comes to the airport to train with the airport FD occasionally, using only water.

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?

See previous response.

Virginia ANG used to occupy space at AASF Byrd. They moved across to a property east of the runway in the late 1960's. They moved from the munitions area of AASF Byrd circa 2009 (need clarification on this).

PA Interview Questionnaire

Facility: AASF Byrd

Interviewer: [REDACTED]

Date/Time: 2-5-2019

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

No, VAARNG has never trained with AFFF, off-post or otherwise. Dire Department has trained in the adjacent airport areas.

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?

Crash records have been requested for a fighter jet crash (1996), a 2007-2008 crash, and 2012 crash; all occurred at the Richmond International Airport and were responded to with AFFF.

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 spill logs exist

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, AFFF has not been used for forest fires by VAARNG or the Fire Department.

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)?

See response above.

AFFF at AASF Byrd is staged on flightline and stored in the two center cold storage hangars.. AFFF is present at the Fire Department, Altria hangar (airport), VA Dept of Aviation building (airport), potentially at the VAANG property, and potentially at the FBI hangar (airport). AFFF has been used at the aforementioned crash locations.

PA Interview Questionnaire

Facility: AASF Byrd
Interviewer: ██████████
Date/Time: 2-5-2019

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

No creative/non-technical/etc. uses known. Tri-maxes on the flightline have never been used.

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?

Unknown, will inquire

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

Col. ██████████ (retired; 1970s-1997) & Col. ██████████ (retired in 2008)

CHEMGUARD C306-MS-C 3% AFFF Concentrate

Description

CHEMGUARD C306-MS-C 3% AFFF (Aqueous Film-Forming Foam) Concentrate combines fluoro- and hydrocarbon-surfactant technologies to provide superior fire and vapor suppression for Class B hydrocarbon fuel fires. This synthetic foam concentrate is intended for firefighting applications at 3% solution in fresh, salt, or hard water.

CHEMGUARD C306-MS-C foam solution utilizes three suppression mechanisms for rapid fire knockdown and enhanced burn-back resistance:

- The foam blanket blocks oxygen supply to the fuel.
- Liquid drains from the foam blanket and forms an aqueous film that suppresses fuel vapor and seals the fuel surface.
- The water content of the foam solution produces a cooling effect for additional fire suppression.

TYPICAL PHYSIOCHEMICAL PROPERTIES AT 77 °F (25 °C)

Appearance	Pale yellow liquid
Density	1.02 ± 0.02 g/ml
pH	7.0 – 8.5
Refractive Index	1.3655 ± 0.0020
Viscosity	3.25 ± 1.0 cSt*
Spreading Coefficient	3 dynes/cm minimum at 3% dilution
Pour Point	27 °F (-3 °C)
Freeze Point	27 °F (-3 °C)

*Cannon-Fenske viscometer

Application

CHEMGUARD C306-MS-C 3% AFFF Concentrate is intended for use on Class B hydrocarbon fuel fires with low water solubility such as crude oils, gasolines, diesel fuels, and aviation fuels. It is not suitable for use on polar fuels with appreciable water solubility, such as methyl and ethyl alcohol, acetone, and methyl ethyl ketone.

The concentrate has excellent wetting properties that can effectively combat Class A fires as well. It may also be used in conjunction with dry chemical agents to provide even greater fire suppression performance.

CHEMGUARD C306-MS-C Concentrate can be ideal for fixed and emergency response firefighting systems designed to protect naval and aviation assets. Typical applications include:

- Military and civilian aircraft facilities
- Crash fire rescue (per US DOT FAA AC No. 150/5210-6D)
- On-board marine/naval fire suppression systems
- Storage tanks
- Docks/marine tankers



009787

Approvals, Listings, and Standards

CHEMGUARD C306-MS-C 3% AFFF Concentrate is approved, listed, qualified under, or meets the requirements of the following specifications and standards:

- US Department of Defense Military Specification
 - MIL-F-24385F: Fire Extinguishing Agent, Aqueous Film-Forming Foam (AFFF) Liquid Concentrate for Fresh and Sea Water.
- Underwriters Laboratories Inc. (UL)
 - UL Standard 162, Foam Liquid Concentrates
 - Fresh and Sea Water
- National Fire Protection Association (NFPA)
 - NFPA 403, Standard for Aircraft Rescue and Fire-Fighting Services at Airports
 - NFPA 409, Standard on Aircraft Hangars
 - NFPA 412, Standard for Evaluating Aircraft Rescue and Fire-Fighting Foam Fire Equipment
 - NFPA 414, Standard for Aircraft Rescue and Fire-Fighting Vehicles
 - NFPA 418, Standard for Heliports

Contact Johnson Controls Technical Services and/or refer to listing agency for current product and compatible hardware listings.

The environmentally-mindful CHEMGUARD C306-MS-C Concentrate formulation contains short-chain, C-6 fluorochemicals manufactured using a telomer-based process. The telomer process produces no PFOS, and these C-6 materials do not breakdown to yield PFOA. The fluorochemicals used in the concentrate meet the goals of the U.S. Environmental Protection Agency 2010/15 PFOA Stewardship Program and the current ECHA Directive (EU) 2017/1000.



Foaming Properties

CHEMGUARD C306-MS-C 3% AFFF Concentrate may be effectively applied using most conventional foam discharge equipment at 3% dilution with fresh, salt, or hard water. For optimum performance, water hardness should not exceed 500 ppm expressed as calcium and magnesium.

CHEMGUARD C306-MS-C Concentrate requires low energy to foam and the foam solution may be applied with aspirating and non-aspirating discharge devices. Non-aspirating discharge devices, such as handline water fog/stream nozzles or standard sprinkler heads, typically produce expansion ratios from 2:1 to 4:1. Aspirating low-expansion discharge devices typically produce expansion ratios from 3.5:1 to 10:1, depending on the type of device and the flow rate. Medium-expansion discharge devices typically produce expansion ratios from 20:1 to 60:1.

TYPICAL FOAM CHARACTERISTICS** (Fresh and Sea Water)

Proportioning Rate	3%
Expansion Ratio	9.5
25% Drain Time (min:sec)	3:30
50% Drain Time (min:sec)	5:45

**per EN 1568-3, 2008 protocol

Proportioning

The recommended operational temperature range for CHEMGUARD C306-MS-C 3% AFFF Concentrate is 35 °F to 120 °F (2 °C to 49 °C) per UL-162. This foam concentrate can be correctly proportioned using most conventional, properly calibrated, in-line proportioning equipment such as:

- Balanced and in-line balanced pressure pump proportioners
- Balanced pressure bladder tanks and ratio flow controllers
- Around-the-pump type proportioners
- Fixed or portable in-line venturi type proportioners
- Handline nozzles with fixed eductor/pick-up tubes

For immediate use: The concentrate may also be diluted with fresh or sea water to a 3% pre-mix solution.

For delayed use: Consult Technical Services for guidance regarding suitability of a stored pre-mix solution (fresh water only).

Storage and Handling

CHEMGUARD C306-MS 3% AFFF Concentrate should be stored in the original supplied package (HDPE totes, drums, or pails) or in the recommended foam system equipment as outlined in Johnson Controls Technical Bulletin "Storage of Foam Concentrates". The product should be maintained within the recommended temperature range. If the concentrate freezes during transport or storage, full product serviceability can be restored upon thaw with gentle re-mixing.

Factors affecting the foam concentrate long-term effectiveness include temperature exposure and cycling, storage container, air exposure, evaporation, dilution, and contamination. The effective life of CHEMGUARD C306-MS-C Concentrate can be maximized through optimal storage conditions and proper handling. CHEMGUARD concentrates have demonstrated effective firefighting performance with contents stored in the original package under proper conditions for more than 10 years.

CHEMGUARD C306-MS-C Concentrate has been successfully evaluated by the US Naval Sea Systems Command for prolonged compatibility with other 3% AFFF concentrates qualified under MIL-F-24385F specification.

- Mixing with foam concentrates not vetted by MIL-F-24385F is not recommended.
- For immediate incident response, it is appropriate to use the concentrate in conjunction with comparable 3% AFFF products.

Materials of Construction Compatibility

CHEMGUARD C306-MS-C 3% AFFF Concentrate compatibility with HDPE has been successfully evaluated using ASTM D1693-70 protocol under UL-162 standard. Concentrate corrosion studies with cold-rolled carbon steel (UNS G10100), 90-10 copper-nickel (UNS C70600), 70-30 nickel-copper (UNC N04400), bronze (UNS C90500), and CRES steel (UNS S30400) have been successfully completed per ASTM E527 protocol under MIL-F-24385F specification.

To help avoid corrosion, galvanized pipe and fittings should never be used in contact with undiluted CHEMGUARD C306-MS-C concentrate. Refer to Johnson Controls Technical Bulletin "Acceptable Materials of Construction" for recommendations and guidance regarding compatibility of CHEMGUARD concentrates with common materials of construction in the firefighting foam industry.

Inspection

CHEMGUARD C306-MS 3% AFFF Concentrate should be inspected periodically per NFPA 11, EN 13565-2, or other relevant standard. A representative concentrate sample should be sent to Johnson Controls Foam Analytical Services or other qualified laboratory for quality analysis per the applicable standard. An annual inspection and sample analysis is typically sufficient, unless the product has been exposed to unusual conditions.

Ordering Information

Concentrate is available in commercial packaging only under CHEMGUARD C306-MS-C product designation and is not available for direct, contract government acquisition (per MIL-F-24385F packaging provision). Concentrate is available in pails, drums, totes or bulk shipment.

Part No.	Description	Shipping Weight	Cube
770809	Pail 5 gal (19 L)	45 lb (20.4 kg)	1.25 ft ³ (0.0353 m ³)
770810	Drum 55 gal (208 L)	495 lb (224.5 kg)	11.83 ft ³ (0.3350 m ³)
770811*	Tote 265 gal (1,000 L)	2,463 lb (1,117 kg)	50.05 ft ³ (1.42 m ³)

For bulk orders, consult an account representative

*Totes are not UL approved packaging.

Safety Data Sheets (SDS) are available at www.chemguard.com

Note: The converted metric values in this document are provided for dimensional reference only and do not reflect an actual measurement.

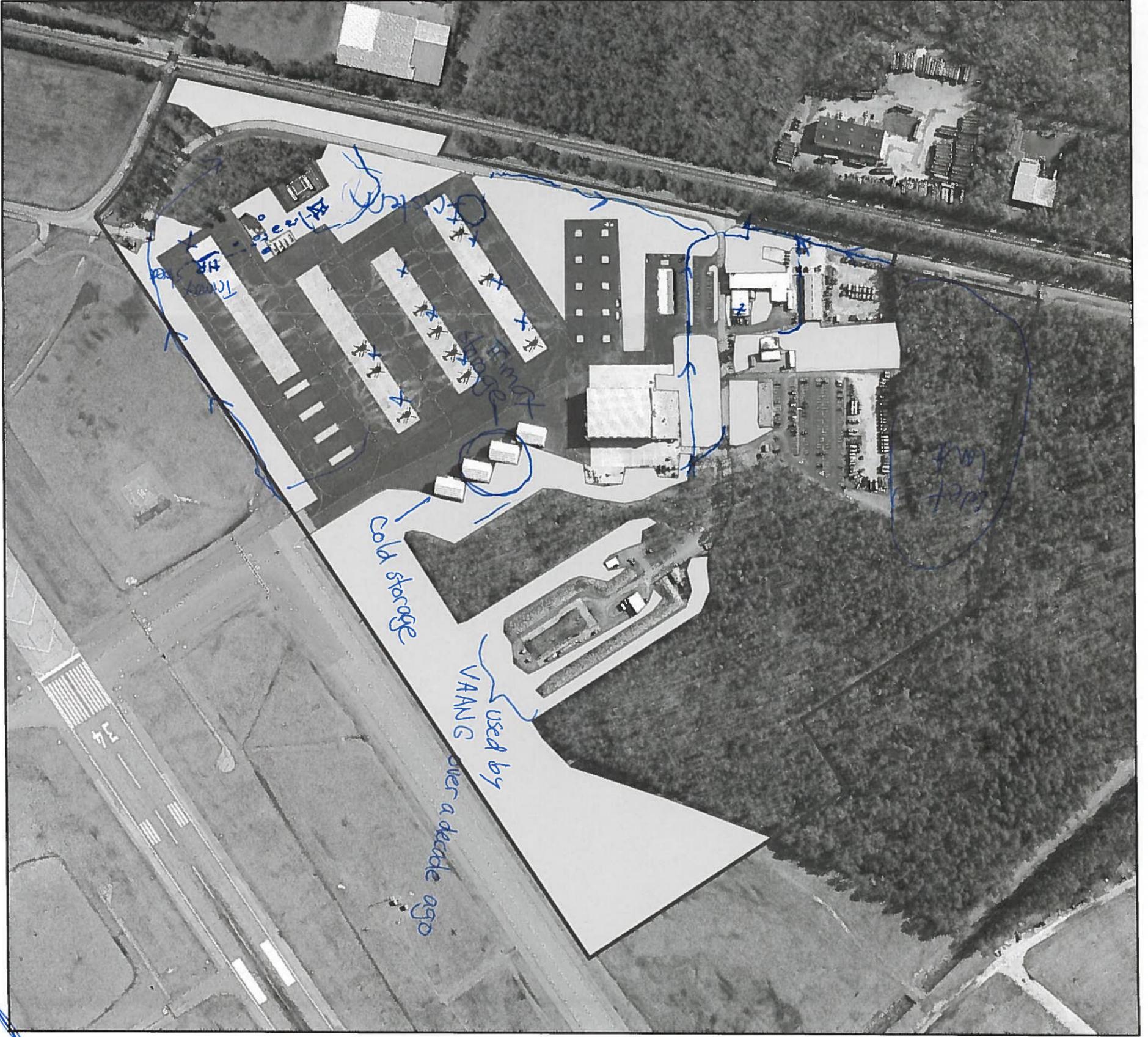
CHEMGUARD, and the product names listed in this material are marks and/or registered marks. Unauthorized use is strictly prohibited.



Total Area: 28.25 Acres

1:5,000

AASF Improved Grounds



Water & Class A
trained, AFF annually
(May-June)
used
Airport FD
used
AFF
same

TELEPHONE: 804-236-7322
FAX: 804-236-7322
E-mail: allen.w.liszeski.rif@mail.mil
(804) 314-3246



ALLEN LISZESKI
BUILDING AND GROUNDS SUPERINTENDENT

COMMONWEALTH OF VIRGINIA
AASF (PRN-190)
700 PORTUGEE ROAD
SANDSTON, VA 23150-5050



Shannon Winebarger
Airport Fire Chief
swinebarger@flyrichmond.com
Capital Region Airport Commission
1 Richard E. Byrd Terminal Drive
Richmond International Airport, VA 23250-2400
p: 804.226.8557 | f: 804.226.8560
c: 804.393.1713
flyrichmond.com



Appendix B.2

Visual Site Inspection Checklists

Visual Site Inspection Checklist

Names(s) of people performing VSI: _____

Recorded by: _____

ARNG Contact: _____

Date and Time: February 5, 2019

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

Source/Release Information

Site Name / Area Name / Unique ID: Richmond International Airport Aircraft Rescue Fire Department

Site / Area Acreage: Approximately 0.64 acres

Historic Site Use (Brief Description): Fire Station

Current Site Use (Brief Description): Fire Station

Physical barriers or access restrictions: Airport security, runway fences. Fire Station is located on the runway

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):

AFFF is stored at the station, and has been used in response to crashes in the surrounding runway areas

2. Has usage been documented?

Y / N

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

Unknown, reports requested

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

3a. Indicate what businesses are located near the site

AASF Byrd operations, Richmond airport operations (Altria and VA Dept. of Aviation known to store AFFF), Environmental Supply Co and East End Metals Recycling located south of Portugee Rd/train tracks

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

Y / N

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

Yes, located on Richmond International Airport

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:

No AFFF suppression system exists at the Fire Station but AFFF is stored on trucks and in totes

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

Truck nozzles are maintained daily at UPS hangar area, and at the auto shop northwest of AASF Byrd as needed

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

AFFF replacement is unknown

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

Area drains to stormwater retention basin east of airport at Lafrance Rd and Beulah Rd intersection

Transport / Pathway Information

Migration Potential:

1. Does site/area drainage flow off installation?

Y / N

1a. If so, note observation and location:

Area drains to stormwater retention basin east of airport at Lafrance Rd and Beulah Rd intersection

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

Y / N

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

Channelized flow is unknown but NWI indicates wetlands are present surrounding fire station

3. Are monitoring or drinking water wells located near the site?

Y / N

3a. If so, please note the location:

No known monitoring wells on the airport property

4. Are surface water intakes located near the site?

Y / N

4a. If so, please note the location:

See previous answer

5. Can wind dispersion information be obtained?

Y / N

5a. If so, please note and observe the location.

No

6. Does an adjacent non-ARNG PFAS source exist?

Y / N

6a. If so, please note the source and location.

Other airport facilities do have AFFF (Altria, VA Dept. of Aviation, and potentially the FBI hangar

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):

No changes known, fire station built in
1985-1986

2. Is the site/area vegetated?

Y / N

2a. If not vegetated, briefly describe the site/area composition:

Runway grasses surround the fire station

3. Does the site or area exhibit evidence of erosion?

Y / N

3a. If yes, describe the location and extent of the erosion:

None observed

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:

See previous answer

Receptor Information

1. Is access to the site restricted?

Y / N

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

Yes, restricted via airport fences, runway fences

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:

Fire station staff, special airport staff

3. Are residential areas located near the site?

Y / N

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

Residences located approximately 0.5 miles northeast of the fire station

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

Y / N

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

Closest daycare ~0.95 miles northeast.

5. Are any wetlands located near the site?

Y / N

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

See previous responses

Visual Site Inspection Checklist

Names(s) of people performing VSI: _____

Recorded by: _____

ARNG Contact: _____

Date and Time: February 5, 2019

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

Source/Release Information

Site Name / Area Name / Unique ID: AASF Flightline

Site / Area Acreage: Approximately 10 acres

Historic Site Use (Brief Description): Flightline

Current Site Use (Brief Description): Flightline

Physical barriers or access restrictions: AASF perimeter fence

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):

No known AFFF use at the flightline; however, approximately 10 Tri-Maxes are staged on the flightline.

2. Has usage been documented?

Y / N

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

No

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

3a. Indicate what businesses are located near the site

NA, AASF Byrd operations. Off-facility airport operations. Environmental Supply Co and East End Metals Recycling located south of Portugee Rd/train tracks

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

Y / N

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

Yes, located adjacent to Richmond International Airport

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:

Tri-Maxes are staged on the flightline but have no history of being used

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

None

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

Tri-Maxes have never been replaced

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

Area drains to a cistern on the southwestern corner of the flightline, which drains to White Oak Swamp

Transport / Pathway Information

Migration Potential:

1. Does site/area drainage flow off installation?

Y / N

1a. If so, note observation and location:

Drainage at the AASF Byrd facility drains east/south. The 1 stormwater exit for the facility drains south to White Oak Swamp

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

Y / N

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

Channelized flow surrounding the flightline ultimately flows south

3. Are monitoring or drinking water wells located near the site?

Y / N

3a. If so, please note the location:

Monitoring wells are located near the fueling station on the flightline

4. Are surface water intakes located near the site?

Y / N

4a. If so, please note the location:

White Oak Swamp located approximately 0.15 miles south of the hangar

5. Can wind dispersion information be obtained?

Y / N

5a. If so, please note and observe the location.

No

6. Does an adjacent non-ARNG PFAS source exist?

Y / N

6a. If so, please note the source and location.

Fire Station and other airport facilities do have AFFF

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):

No changes known

2. Is the site/area vegetated?

Y / N

2a. If not vegetated, briefly describe the site/area composition:

Area to the northwest is wooded

3. Does the site or area exhibit evidence of erosion?

Y / N

3a. If yes, describe the location and extent of the erosion:

None observed

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:

No natural standing water observed, but there is channelized flow to the south. NWI indicates a wetland located on the runway immediately east of the flightline

Receptor Information

1. Is access to the site restricted?

Y / N

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

Yes, restricted via AASF perimeter fence

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:

AASF Byrd VAARNG staff

3. Are residential areas located near the site?

Y / N

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

Residences located approximately 0.5 miles south of the AASF Byrd Facility

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

Y / N

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

No, closest daycare ~1.6 miles north. Second Baptist Church is ~0.7 miles southwest

5. Are any wetlands located near the site?

Y / N

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

Yes, White Oak Swamp to the south, wetlands on runway to the east

Visual Site Inspection Checklist

Names(s) of people performing VSI: _____

Recorded by: _____

ARNG Contact: _____

Date and Time: February 5, 2019

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

Source/Release Information

Site Name / Area Name / Unique ID: AASF Byrd Hangar

Site / Area Acreage: Approximately 1 acre

Historic Site Use (Brief Description): Hangar

Current Site Use (Brief Description): Hangar

Physical barriers or access restrictions: AASF perimeter fence

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):

No known AFFF use at the hangar. No fire suppression system.

2. Has usage been documented?

Y / N

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

NA

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

3a. Indicate what businesses are located near the site

NA, AASF Byrd operations. Off-facility airport operations. Environmental Supply Co and East End Metals Recycling located south of Portugee Rd/train tracks

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

Y / N

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

Yes, located adjacent to Richmond International Airport

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:

No. Only ABC fire extinguishers present.

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

NA

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

NA

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

Floor drains unknown

Transport / Pathway Information

Migration Potential:

1. Does site/area drainage flow off installation?

Y / N

1a. If so, note observation and location:

Drainage at the AASF Byrd facility drains east/south. The 1 stormwater exit for the facility drains south to White Oak Swamp

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

Y / N

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

Channelized flow west of the hangar flows south

3. Are monitoring or drinking water wells located near the site?

Y / N

3a. If so, please note the location:

Monitoring wells are located near the fueling station on the flightline

4. Are surface water intakes located near the site?

Y / N

4a. If so, please note the location:

White Oak Swamp located approximately 0.15 miles south of the hangar

5. Can wind dispersion information be obtained?

Y / N

5a. If so, please note and observe the location.

No

6. Does an adjacent non-ARNG PFAS source exist?

Y / N

6a. If so, please note the source and location.

Fire Station and other airport facilities do have AFFF

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):

No changes known

2. Is the site/area vegetated?

Y / N

2a. If not vegetated, briefly describe the site/area composition:

Area to the northwest is wooded

3. Does the site or area exhibit evidence of erosion?

Y / N

3a. If yes, describe the location and extent of the erosion:

None observed

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:

No natural standing water observed, but there is channelized flow to the south

Receptor Information

1. Is access to the site restricted?

Y / N

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

Yes, restricted via AASF perimeter fence

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:

AASF Byrd VAARNG staff

3. Are residential areas located near the site?

Y / N

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

Residences located approximately 0.5 miles south of the hangar

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

Y / N

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

No, closest daycare ~1.6 miles north. Second Baptist Church is ~0.7 miles southwest

5. Are any wetlands located near the site?

Y / N

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

Yes, White Oak Swamp to the south.

Appendix B.3

Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: AASF Byrd Field, VA

Why has this location been identified as a site?

This is an ARNG AASF located adjacent to a public airport. The facility is used for maintenance of aircraft, military training, and HAZMAT storage.

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

AASF is located near numerous aviation industries at the airport and near the former VANG base

Training Events

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

If so, how often? N/A

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

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

Surface Water:

Surface water flow direction? directed to reinforced channels which then lead south

Average rainfall? 44.85 inches per year

Any flooding during rainy season? no

Direct or indirect pathway to ditches? direct to on-site reinforced channels which lead to White oak Swamp

Direct or indirect pathway to larger bodies of water? indirect to White Oak Swamp

Does surface water pond any place on site? no

Any impoundment areas or retention ponds? no

Any NPDES location points near the site? unknown

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

on-site features in southern portion of site drain to White Oak Swamp via reinforced channels, off-site rip-rap channel

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? Southwardly towards White Oak Swamp (assumed)

Depth to groundwater? > 5 ft bgs

Uses (agricultural, drinking water, irrigation)? none

Any groundwater treatment systems? no

Any groundwater monitoring well locations near the site? yes at former VANGB and fueling station at flightline

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

one PWS well 1/4-1/2 mile SE of site

Waste Water Treatment Plant:

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

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

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

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

Equipment Rinse Water

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

Airport FD washes trucks / AFFF tanks at fire station and rinse water is directed towards stormwater drains

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?

Airport FD tests nozzles outside of UPS hangar area of airport but only use water

3. Other?

Preliminary Assessment – Conceptual Site Model Information

Identify Potential Receptors:

Site Worker Yes

Construction Worker Yes

Recreational User No

Residential Yes, off-facility users of drinking water from PWS well

Child Yes, off-facility users of drinking water from PWS well

Ecological Yes, eco-receptors in wetland

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

Light industrial area, Seven Pines Elementary School ~ 1.5 miles north, residential areas primarily to the north, some agriculture and wooded areas to the south

Documentation

Ask for Engineering drawings (if applicable).

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

Ammo bunker underwent many changes to infrastructure, suspected to be a former military airport in some capacity and was formerly owned by VANGB

Appendix C Photographic Log

Appendix C - Photographic Log

Army National Guard, Preliminary
Assessment for PFAS

AASF Byrd

Richmond, Virginia

Photograph No. 1

Date 2/5/2019

Time 10:11

Description:

AFFF storage totes at the off-
facility Richmond
International Airport Aircraft
Rescue Fire Fighting
Department



Orientation:

Northeast

Photograph No. 2

Date 2/5/2019

Time 10:11

Description:

National Foam Aer-O-Water
3% AFFF stored at the
Richmond International
Airport Aircraft Rescue Fire
Fighting Department



Orientation:

North

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	AASF Byrd	Richmond, Virginia
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Photograph No. 3	
Date 2/5/2019 Time 10:15	
Description: Two Rosenbauer rescue trucks capable of AFFF use stored at the Richmond International Airport Aircraft Rescue Fire Fighting Department	
Orientation: East	

Photograph No. 4	
Date 2/5/2019 Time 10:37	
Description: The off-facility Virginia Department of Aviation hangar (left) and Altria hangar (right) located at the Richmond International Airport; both have AFFF suppression systems	
Orientation: Northwest	

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	AASF Byrd	Richmond, Virginia
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Photograph No. 5	
Date 2/5/2019 Time 10:55	
Description: The AASF Byrd VAARNG hangar; no AFFF system present	
Orientation: West	

Photograph No. 6	
Date 2/5/2019 Time 10:56	
Description: Cold storage hangars at AASF Byrd; two have potentially been used to store AFFF Tri-Max mobile fire extinguishers	
Orientation: Northeast	

Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	AASF Byrd	Richmond, Virginia
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Photograph No. 7

Date 2/5/2019
Time 10:57

Description:
 Tri-Max 30 mobile fire extinguisher staged on the AASF Byrd flightline; approximately 10 total are stored across the flightline

Orientation:
 Northwest



Photograph No. 8

Date 2/5/2019
Time 11:04

Description:
 Tri-Max 30 mobile fire extinguishers visible on the AASF Byrd flightline; approximately 10 total are stored across the flightline

Orientation:
 Northeast



Appendix C - Photographic Log

Army National Guard, Preliminary Assessment for PFAS	AASF Byrd	Richmond, Virginia
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Photograph No. 9	
Date 2/5/2019 Time 11:18	
Description: Dry chemical fire extinguisher staged in the AASF Byrd VAARNG hangar; no AFFF suppression system exists at the hangar	
Orientation: East	