FINAL
Preliminary Assessment Report
Fort Ruger, O‘ahu, Hawai‘i

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

September 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
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSM	conceptual site model
EDR ™	Environmental Data Resource, Inc. ™
FTA	fire training area
HA	Health Advisory
HIARNG	Hawai'i Army National Guard
mg/L Cl-	milligrams of chloride per liter
NRCS	Natural Resources Connservation Service
PA	Preliminary Assessment
PFAS	per- and poly-fluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
SI	Site Inspection
UCMR3	Unregulated Contaminant Monitoring Rule 3
UIC	underground injection control
US	United States
USACE	United States Army Corps of Engineers
USACHPPM	United States Army Center for Health Promotion and Preventative Medicine
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
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 Fort Ruger (also referred to as the "facility") in Honolulu, O'ahu, Hawai'i, to assess potential PFAS release areas and exposure pathways to receptors. Occupation of the property by Hawai'i ARNG (HIARNG) began in 1948. 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 1 May 2019 and completed visual site inspections at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed former Fort Ruger personnel on 30 April 2019, including former mechanics and electronics personnel.

No known or documented releases of PFAS to the environment were identified at the facility during the preparation of this PA report.

Based on the PA findings regarding historical activities concerning aqueous film forming foam use and storage at the facility, there is no potential for exposure to PFAS contamination in soil, groundwater, surface water, and sediment (**Figure ES-1**). 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) 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			
Preliminary Assessment for PFAS at Fort Ruger, HI				
REVISED	9/10/2020	GIS BY	MS	9/10/2020
SCALE	1:12,000	CHK BY	ST	9/10/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	9/10/2020

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Summary of Findings

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure ES-1

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1. Introduction

1.1 Authority and Purpose

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

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

PFAS are classified as emerging environmental contaminants that are garnering increasing regulatory interest due to their potential risks to human health and the environment. PFAS formulations contain highly diverse mixtures of compounds. Thus, the fate of these 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 a lifetime Drinking Water Health Advisory (HA) 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 Fort Ruger (also referred to as the "facility") in Honolulu, O'ahu, Hawai'i 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 locations where PFAS may have been released into the environment at Fort Ruger. 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 1 May 2019 and completed visual site inspections (VSIs) at locations where PFAS-containing materials were suspected of being stored, used, or disposed;
- Interviewed former Fort Ruger personnel on 30 April 2019, including former mechanics and electronics personnel.

1.3 Report Organization

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

- **Section 1** – **Introduction:** identifies the project purpose and authority and describes the facility location, environmental setting, and methods used to complete the PA.
- **Section 2** – **Fire Training Areas:** describes the fire training areas (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 potential PFAS transport and receptors at the facility.
- **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

Fort Ruger lies on 325 acres that include an area in the interior of Diamond Head Crater and two small administration annexes with a parking lot in Kahala to the east. The two annexes and parking lot are located off Diamond Head Road. Fort Ruger proper is located on the east slopes within the crater. The interior of the crater is also part of the Diamond Head State Monument.

The current Fort Ruger occupied by the Hawai'i ARNG (HIARNG) is a portion of the land originally purchased and acquired by the US government in 1904-1906. The original lands were established as the Fort Ruger Military Reservation (later shortened to "Fort Ruger") and were occupied by the US Army between 1909 to approximately 1955. In 1948, the US Army began transferring land to the Territory of Hawai'i and gave verbal permission for the Hawai'i National Guard to occupy 10 acres of land. The agreement to transfer the Fort Ruger land to the Hawai'i National Guard was not finalized until 1955, and portions of the land also went to other State of Hawai'i and federal agencies. The buildings associated with Fort Ruger were built between 1942 and 1978. HIARNG was home to the motor maintenance and regiment combat team from the 1950s until 2015. Fort Ruger consisted of tunnels, above-ground offices, armories, and maintenance shops (Historic American Buildings Survey, n.d; **Appendix A**). The buildings within the crater were demolished in 2015. **Figure 1-1** illustrates the location of Fort Ruger.

1.5 Facility Environmental Setting

Fort Ruger is primarily located within the Diamond Head Crater, which is located on the southeast extension of O'ahu. Diamond Head is a tuff cone that was formed in one single volcanic event. The highest point of the cone is at an elevation of 761 feet above mean sea level (amsl). Elevation at Fort Ruger is approximately 200 feet amsl within the crater, and 90 feet amsl outside the crater (US Geological Survey [USGS], 2017).

1.5.1 Geology

The topography at Fort Ruger is quite diverse. The area within the crater is relatively flat, with sloping at the northern edge of the crater near the crater wall. Elevation along the crater wall increases from 200 to 761 feet amsl. The soil consists of mostly weathered volcanic tuff, with drainage ranging from very well drained to poorly drained, depending on the clay content. The water table is approximately 200 feet below ground surface.

Diamond Head was formed during a period of volcanic activity known as the Honolulu Volcanic Series, characterized by discrete, sporadic events that occurred long after the Waianae and Ko'olau ranges were formed (AMEC, 2004). The geology of the crater consists of seven principal rock formations, the oldest of which is Ko'olau Basalt, followed by a series of calcareous sandstones, conglomerates, and calcareous aeolian sandstones, then by Kaimuki basalt, Kupikopiko basalt, Kupikopiko black ash, modern alluvium and talus (**Figure 1-2**) (US Army Center for Health Promotion and Preventative Medicine [USACPPH], 1998).

Based on the US Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) *Web Soil Survey*, the facility is underlain by Makalapa clay and fill (USDA NRCS, 2014). The Makalapa clay underlies the facility on the west and northwest half, and fill underlies the facility's southeast half. However, field observations for a 2004 AMEC comprehensive site assessment suggested that the land classified by the USDA as fill was regraded Makalapa clay (AMEC, 2014). Makalapa clay is characterized as having very slow permeability. The fill is composed of marine and terrestrial sediments.

1.5.2 Hydrogeology

The aquifers below the subject parcel as part of Honolulu aquifer sector within the Pālolo and Wai'alae aquifer systems. The boundary between the two systems effectively bisects Diamond Head crater from the northeast to the southwest, with the Pālolo system to the west, and the Wai'alae system to the east. The facility is above the Wai'alae system. The groundwater system beneath the Pālolo aquifer system consists of an upper and lower aquifer. The upper aquifer is described as an unconfined basal type occurring in nonvolcanic, sedimentary lithology. This aquifer is described as having potential use, though neither for drinking nor ecological utility. The upper aquifer has moderate salinity (1,000-5,000 milligrams of chloride per liter (mg/L Cl^-) of water, and it is considered replaceable and highly vulnerable to contamination. The lower aquifer beneath the Pālolo system is a confined basal aquifer occurring in flank lithology. This aquifer is currently used for drinking water, is considered fresh (<250 mg/L Cl^-), and highly vulnerable to contamination.

The groundwater beneath the Wai'alae aquifer system also consists of an upper and lower aquifer. The upper aquifer is similar to the upper aquifer found in the Pālolo system, with the only difference being in salinity (High, >5,000 mg/L Cl^-). Likewise, the lower aquifer is similar to the lower aquifer found in the Pālolo system. The Wai'alae lower aquifer is not being used, though it may potentially be tapped in the future (Mink and Lau, 1990).

Fort Ruger is located oceanside of the Hawai‘i Department of Health defined Underground Injection Control (UIC) line. Areas above the UIC line denote potential underground drinking water sources. Areas below the UIC line generally denote groundwater that is unsuitable for drinking water purposes. Consequently, the groundwater below the subject parcel is considered a non-drinking water source.

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. Multiple domestic, industrial, agricultural, irrigation, municipal water supply, and other wells are located upgradient or cross-gradient to the facility. Only one well classified as “other” is located potentially downgradient from the facility. Groundwater features are shown in **Figure 1-2**.

The USEPA Unregulated Contaminant Monitoring Rule 3 (UCMR3) data indicate that PFOS/PFOA were not detected in a public water system above the USEPA HA within a 20-mile radius 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. 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

No perennial streams exist on Fort Ruger. The crater rim walls prevent runoff from flowing through the crater. Stormwater runoff within the crater follows the topography until it reaches openings that enter into the City and County of Honolulu’s stormwater drainage system (**Figure 1-3**). The City and County of Honolulu’s stormwater drainage system discharges untreated water into natural waterways and the ocean (City and County of Honolulu, 2020).

1.5.4 Climate

O‘ahu is located in the tropics, with a climate characterized by mild temperatures, northeasterly trade winds year-round, and moderate humidity. Hawai‘i has two seasons: summer (between May and October) and winter (between October and April). The average coastal temperature is approximately 79 degrees Fahrenheit (°F), with temperatures decreasing at higher elevations. The coldest temperatures are in January (72°F), and the warmest temperatures are in August (89°F). Humidity on O‘ahu ranges from approximately 30 to 90 percent. Precipitation predominantly occurs when the island’s mountain masses capture and cool the rising, warm, moist ocean air, producing higher rainfall in the windward and mountain areas and lower rainfall in the leeward and coastal zones. Annual rainfall ranges from 20 inches in the leeward coastal areas to 250 inches on the Ko‘olau mountain peaks (Macdonald, Abbott, and Peterson 1983). Fort Ruger annual rainfall is 20 inches (National Oceanic and Atmospheric Administration, 2019).

1.5.5 Current and Future Land Use

There are currently no HIARNG operations occurring at Fort Ruger. The administration buildings on the outside of the crater were transferred to private and state entities for other uses. Within the crater, state and federal agencies such as Federal Aviation Administration, Diamond Head State Monument, etc., have operations in the area. Buildings not in use were demolished. Due to the location of Fort Ruger within the crater, it is reasonably anticipated future land use is not expected to change from the current land use described above.

Legend

Facility Boundary

0 0.5 1 2 Miles

CLIENT	ARNG			
Preliminary Assessment for PFAS at Fort Ruger, HI				
REVISED	8/7/2020	GIS BY	MS	8/7/2020
SCALE	1:63,360	CHK BY	ST	8/7/2020
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	RG	8/7/2020

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Facility Location

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12420 Milestone Center Drive
Germantown, MD 20876

Figure 1-1

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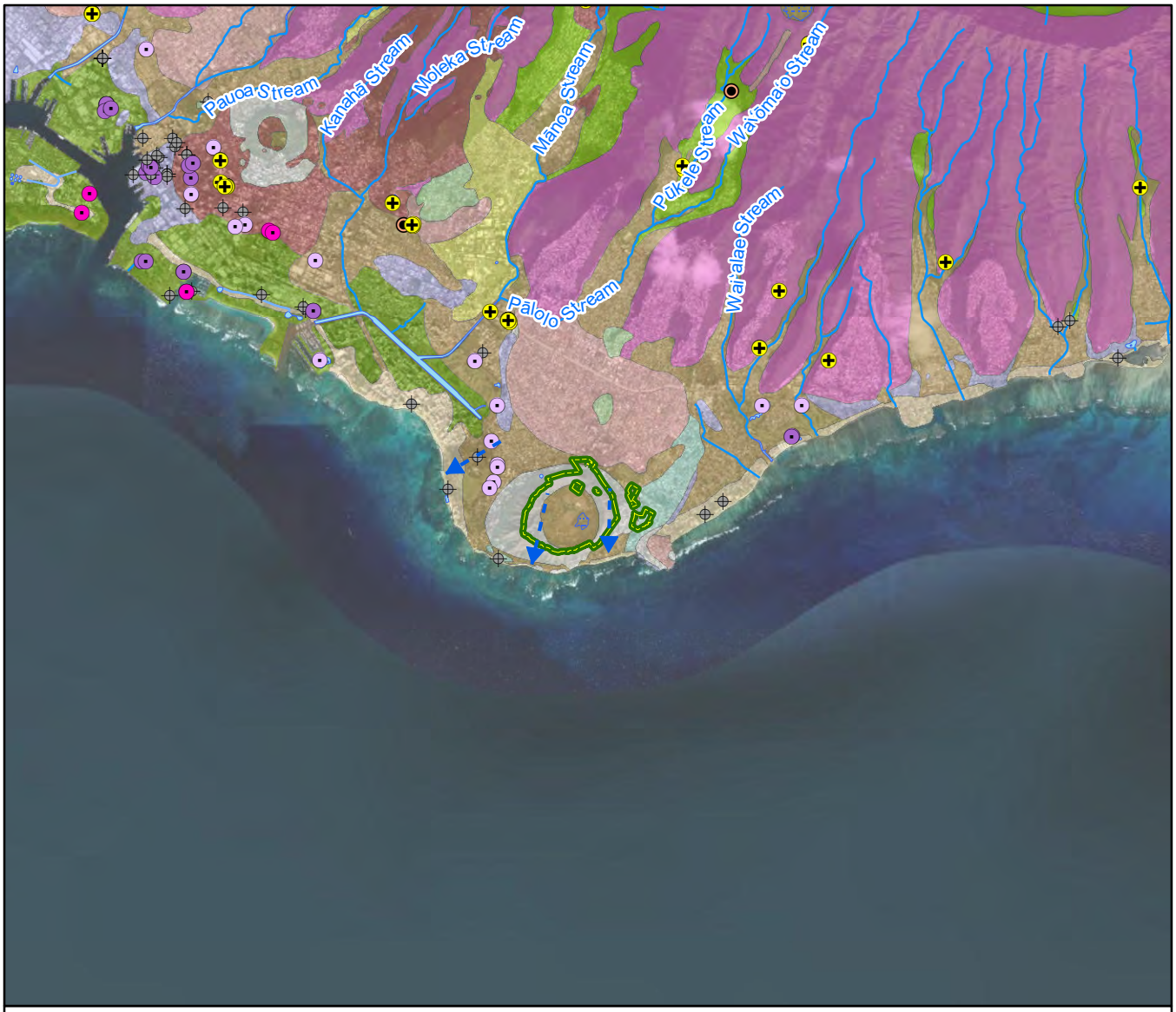

Legend

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

Geology

- Manmade Fill
- Beach Deposits
- Alluvium
- Older Alluvium
- Older Dune Deposits
- Lagoon and Reef Deposits
- Honolulu Volcanics; Tantalus vent
- Honolulu Volcanics, Tantalus Flow; Lava Flows
- Honolulu Volcanics, Black Point and Kaimuki; Lava Flows
- Honolulu Volcanics, Diamond Head; Tuff
- Honolulu Volcanics, Kaimuki; Vent Deposits
- Koolau Basalts

Wells

- Domestic Well
- Industrial Well
- Agricultural Well
- Irrigation Well
- Municipal Water Supply Well
- Other Well

0 0.75 1.5 3 Miles

CLIENT	ARNG			
Preliminary Assessment for PFAS at Fort Ruger, HI				
REVISED	8/10/2020	GIS BY	MS	8/10/2020
SCALE	1:95,040	CHK BY	ST	8/10/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	8/10/2020

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Groundwater Features

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Figure 1-2

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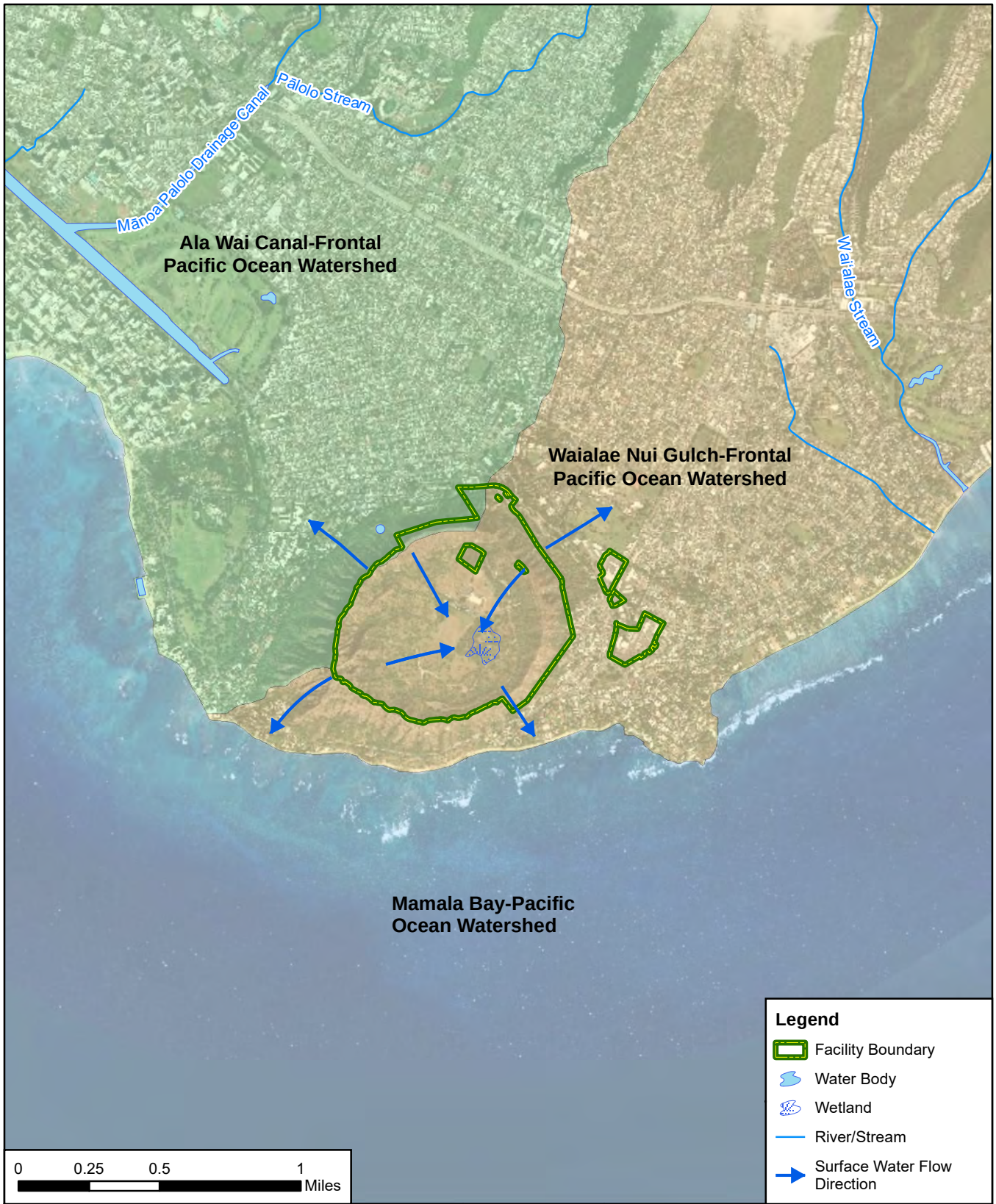

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SCALE	1:31,680	CHK BY	ST	8/7/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	8/7/2020

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Surface Water Features

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Figure 1-3

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2. Fire Training Areas

No FTAs were identified within the facility during the PA through interviews (**Appendix B**), EDR™ reports (**Appendix A**), or from observations made during the VSI. The personnel interviewed had institutional knowledge spanning from 1989 to present.

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**. Based on the interviewees' knowledge of the facility, no non-FTAs are known or suspected at the facility. The personnel interviewed had institutional knowledge spanning from 1989 to present. The maintenance buildings were equipped with a water sprinkler system. AFFF is not currently or historically stored at the facility; as such, no leaks or releases have been documented. The former maintenance buildings were equipped with water systems prior to their demolishion. Photographs of the area where the maintenance buildings once stood are included in the Photographic Log (**Appendix C**).

4. Emergency Response Areas

No instances of emergency response were identified at Fort Ruger during the PA based on interviews, and online research. The facility has always relied on the local fire department for emergency needs. There has been no need for response as of the date of the PA interviews (**Appendix B.1**). The personnel interviewed had institutional knowledge spanning from 1989 to present.

5. Adjacent Sources

There were no off-facility sources of PFAS identified during the PA. The portion of Fort Ruger within the interior of the Diamond Head Crater is also collocated with the Diamond Head State Monument. Diamond Head State Monument is considered an adjacent property (not under ARNG control) and has frequent brush fires due to the dry conditions within the crater. According to the interviewee's knowledge of the firefighting efforts, the fires are put out with water. No AFFF was used to put the brush fires.

6. Preliminary Conceptual Site Model

Based on the PA findings, no release areas were identified as areas of interest (AOIs); therefore, a preliminary conceptual site model (CSM) is not required for the facility. A CSM identifies three components necessary for potentially complete exposure pathways: (1) source, (2) pathway, and (3) receptor. If any of these elements are missing, the pathway is considered incomplete. Based on the findings of this PA, there are no PFAS sources at Fort Ruger; thus, there is no complete exposure pathway to potential receptors from ARNG use of the facility.

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 Fort Ruger. The PA findings are based on the information presented in **Appendix A** and **Appendix B**.

7.1 Findings

No AOIs related to PFAS releases to the environment were identified at Fort Ruger based on PA data. Interviewees with knowledge dating back to 1989 confirmed that AFFF has never been used or stored at Fort Ruger. The VSI also verified that AFFF is currently not stored at the facility, and emergency fire suppression is provided by the municipal fire department. **Figure 7-1** presents a summary of the PA findings.

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 PFAS-containing materials. 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, current personnel were interviewed, and potential source areas were visually inspected.

The following table (**Table 7-1**) summarizes the uncertainties associated with the PA:

Table 7-1: Summary of Uncertainties

Location	Source of Uncertainty
Fort Ruger	During the interview process, a limited number of personnel were available to be interviewed. Additionally, their tenure at the Fort Ruger dates back to 1989. The use and storage of AFFF at Fort Ruger between 1960 and 1989 are unknown.
Diamond Head State Monument (Adjacent Source)	The use and storage of AFFF at the Diamond Head State Monument are unknown. No interviews were conducted for the adjacent area.

7.3 Potential Future Actions

Based on the documented absence (1989 to present) of the use or release of PFAS-containing materials at Fort Ruger, no AOIs were identified during the PA. Evidence does not indicate that current or former ARNG activities contributed to PFAS contamination in soil, groundwater, surface water, or sediment at the facility or adjacent areas. Fort Ruger will not move forward in the CERCLA process.

CLIENT	ARNG			
Preliminary Assessment for PFAS at Fort Ruger, HI				
REVISED	9/10/2020	GIS BY	MS	9/10/2020
SCALE	1:12,000	CHK BY	ST	9/10/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	9/10/2020

Summary of Findings

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Figure 7-1

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8. References

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United States Environmental Protection Agency (USEPA). 1991. *Guidance for Performing Preliminary Assessments under CERCLA*. EPA/540/G-91/013. September 1991

United State Geological Survey (USGS). 2017. *USGS US Topo 7.5-minute map for Honolulu, HI.* September.

Appendix A
Data Resources

Data Resources will be provided separately on CD. Data Resources for Fort Ruger, Hawai'i include:

Fort Ruger EDR™ Report

- 2019 EDR™ Aerial Photo Decade Package
- 2019 EDR™ Radius Map Report with GeoCheck
- 2019 Certified Sanborn Map Report

Fort Ruger Historical Record

- Fort Ruger Military Reservation Historic American Buildings Survey, HABS No. HI-581

Fort Ruger Underground Injection Control Line

- UIC Line for Fort Ruger

Appendix B
Preliminary Assessment Documentation

Appendix B.1
Interview Records

PA Interview Questionnaire - Other

Facility: Ft. Ruger
Interviewer: [redacted]
Date/Time: _____

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

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

Janitor III warehouse repair parts
1987 - 2000 → ft. Ruger, Issuing/Recieving automotive parts

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

	Known Uses
→ cut fire breaks when brush fires occurred or used air drops.	Use
→ Ordered break-free in small quantities	Procurement
→ Automotive shop had water standpipes + 2 fire hoses	Disposition
→ Brave company had dining/defac (tent) no fire suppression system	Storage (Mixed)
→ Waiawa UTES did maintenance on fire trucks	Storage (Solution)
	Inventory, Off-Spec
	Containment
	SOP on Filling
	Leaking Vehicles
	Nozzle and Suppression System Testing
	Dining Facilities
	Vehicle Washing
	Ramp Washing
	Fuel Spill Washing and Fueling Stations
	Chrome Plating or Waterproofing

PA Interview Questionnaire - Other

Facility: Ft Ruger/Waiawa UTES
Interviewer: [redacted] Kalaeloa
Date/Time: 30 Apr 2019 0900

Interviewee: [redacted]	Can your name/role be used in the PA Report? Y or (N)
Title: CW3, Surface Maint Mech	Can you recommend anyone we can interview?
Phone Number: [redacted]	Y or (N) _____
Email: [redacted]	

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

1989-2000 Ft. Ruger
2000-2004 Waiawa UTES
2004-2014 Diamond Head / Ft Ruger
2014-Present Kalaeloa

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

	Known Uses
- Fire truck stored at Kalaeloa + at Waiawa UTES	Use
- Fire Truck at Waiawa UTES shot foam on SW Corner of Bldg 22 in early 2000s	Procurement
- AT Waiawa UTES was parked either Bldg 231 or 23317(inside), or outside on grassy area 2000-present waiawa UTES	Disposition
- Old junkyard adjacent to property caught fire, specifically settling tanks caught fire + some tanks wound up on DOD property; Municiple fire called out multiple times	Storage (Mixed)
- Waiawa UTES property was Navy Property until 1960s	Storage (Solution)
- Chem storage near Bldg 22A at Waiawa UTES	Inventory, Off-Spec
- [redacted] was prior fire chief at Waiawa UTES	Containment
	SOP on Filling
	Leaking Vehicles
	Nozzle and Suppression System Testing
	Dining Facilities
	Vehicle Washing
	Ramp Washing
	Fuel Spill Washing and Fueling Stations
	Chrome Plating or Waterproofing

PA Interview Questionnaire - Other

Facility: Ft. Ruger/(Kalaeloa) Waianae w/ a UTES
Interviewer: [redacted]
Date/Time: 30 Apr 2019; 0900

Ft Ruger → Diamond Head Traingng facility North of Bldg 303, Bldgs. Demoed
→ No known foam releases, fires mostly brush fires on state lands, just watched it burn; Municiple fire responded
→ Helipad had no fire extinguisher as the location not used for refueling

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: May 1, 209; 1000

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

Source/Release Information

Site Name / Area Name / Unique ID: Rt Ruger

Site / Area Acreage:

Historic Site Use (Brief Description): HI ARNG

Current Site Use (Brief Description): Field

Physical barriers or access restrictions: Fencing

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):

2. Has usage been documented? Y / (N)

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

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

3a. Indicate what businesses are located near the site Historic Park

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

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

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: Water Sprinklers

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

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

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

Transport / Pathway Information

Migration Potential:

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

1a. If so, note observation and location:

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

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

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.

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

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

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): Structures no longer exist

2. Is the site/area vegetated? **Y / N**

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

3. Does the site or area exhibit evidence of erosion? **Y / N**

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

4. Does the site/area exhibit any areas of ponding or standing water? **Y / N**

4a. If yes, describe the location and extent of the ponding:

Receptor Information

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

1a. If so, please note to what extent: Fence w/ sign

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:

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

Photographic Log

Photo ID/Name	Date & Location	Photograph Description

Appendix B.3
Conceptual Site Model Information

Preliminary Assessment – Conceptual Site Model Information

Site Name: Ft. Ruger, Hawai'i

Why has this location been identified as a site?

No AFFF at the base, no known releases

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

No

Training Events

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

If so, how often?

How much material was used? Is it documented?

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

Surface Water:

Surface water flow direction? towards crater rim

Average rainfall? 20 inches

Any flooding during rainy season? No

Direct or indirect pathway to ditches? ~~No~~ Yes, connects to city & county

Direct or indirect pathway to larger bodies of water? Pacific ocean/ Yes

Does surface water pond any place on site? No

Any impoundment areas or retention ponds? No

Any NPDES location points near the site? No

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

Preliminary Assessment – Conceptual Site Model Information

Groundwater:

Groundwater flow direction? South

Depth to groundwater? ~250ft

Uses (agricultural, drinking water, irrigation)? None

Any groundwater treatment systems? No

Any groundwater monitoring well locations near the site? No

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?

Do we understand the fate of sludge waste?

Is surface water from potential contaminated sites treated?

Equipment Rinse Water

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

No, only municipal fire

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?

3. Other?

Identify Potential Receptors:

Site Worker X

Construction Worker X

Recreational User X

Residential

Child

Preliminary Assessment – Conceptual Site Model Information

Ecological X

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

Documentation

Ask for Engineering drawings (if applicable).

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

Appendix C
Photographic Log

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Fort Ruger	Hawai'i

Photograph No. 1

Description:

Area where ARNG buildings once stood within Diamond Head Crater

Date Taken:

01 May 2019

Photograph No. 2

Description:

Area where ARNG buildings once stood within Diamond Head Crater.

Date Taken:

01 May 2019

APPENDIX C – Photographic Log

Army National Guard, Preliminary Assessment for PFAS	Fort Ruger	Hawai'i

Photograph No. 3

Description:

Area where ARNG buildings once stood within Diamond Head Crater.

Date Taken:

01 May 2019

Photograph No. 4

Description:

Honolulu Fire Department firetruck stationed outside the facility fence line during the site visit.

Date Taken:

01 May 2019