



Naval Facilities Engineering Systems Command Mid-Atlantic
Norfolk, Virginia

Final

**Preliminary Assessment for
Per- and Polyfluoroalkyl Substances**

Naval Air Station Oceana
Virginia Beach, Virginia

March 2022



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Prepared for NAVFAC Mid-Atlantic
by CH2M HILL, Inc.
Virginia Beach, Virginia
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Acronyms and Abbreviations

°F	degree(s) Fahrenheit
AFFF	aqueous film-forming foam
AOC	area of concern
ASD	Assistant Secretary of Defense
AST	aboveground storage tank
bgs	below ground surface
CALA	Combat Aircraft Loading Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M	CH2M HILL, Inc.
CLEAN	Comprehensive Long-term Environmental Action—Navy
DASN	Deputy Assistant Secretary of the Navy
DoD	Department of Defense
EDR	Environmental Data Resources, Inc.
EE/CA	Engineering Evaluation/Cost Analysis
EI&E	Energy, Installations and Environment
ER, N	Environmental Restoration, Navy
ESV	ecological screening value
FSS	fire suppression system
HQ	hazard quotient
HRSD	Hampton Roads Sanitation District
IDW	investigation-derived waste
JP-	jet propellant
MILSPEC	military specification
MWR	morale, welfare, and recreation
NALF	Naval Auxiliary Landing Field
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Systems Command
Navy	Department of the Navy
NEPA	National Environmental Policy Act
NEX	Navy Exchange
NIRIS	Naval Installation Restoration Information Solution
NRMFES	Navy Region Mid-Atlantic Fire and Emergency Services
OEL	Other Environmental Liabilities
OWS	oil-water separator
PA	Preliminary Assessment
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutane sulfonate
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
POL	petroleum-oil-lubricant
ppt	part(s) per trillion
PWS	public water system

RCRA	Resource Conservation and Recovery Act
RfD	reference dose
RI	Remedial Investigation
RPM	Remedial Project Manager
SDS	safety data sheet
SI	Site Inspection
SL	screening level
SWMU	Solid Waste Management Unit
UCMR3	Third Unregulated Contaminant Monitoring Rule
UCMR4	Fourth Unregulated Contaminant Monitoring Rule
UCMR5	Fifth Unregulated Contaminant Monitoring Rule
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VAC	Virginia Administrative Code
VaFWIS	Virginia Fish and Wildlife Information Service
VBDPU	Virginia Beach Department of Public Utilities
VDEQ	Virginia Department of Environmental Quality
VSI	visual site inspection
WWTP	wastewater treatment plant

Introduction

This Preliminary Assessment (PA) of potential releases of per- and polyfluoroalkyl substances (PFAS) at Naval Air Station (NAS) Oceana, Virginia Beach, Virginia has been prepared by CH2M HILL, Inc. (CH2M) for the Department of the Navy (Navy), Naval Facilities Engineering Systems Command (NAVFAC) under Comprehensive Long-term Environmental Action—Navy (CLEAN) 9000 Contract N62470-16-D-9000, Contract Task Order 5452.

This PA focuses on identifying locations where PFAS-containing materials may have been released into the environment, provides an initial assessment of possible migration pathways and receptors of potential contamination, and recommends a path forward for sampling.

1.1 Preliminary Assessment Objectives

This installation-specific PA for PFAS is part of a Navy-wide installations assessment of potential historical sources of PFAS use. This PA was conducted in accordance with United States Environmental Protection Agency (USEPA) *Guidance for Performing Preliminary Assessments under CERCLA* (PA Guidance) (USEPA, 1991) with additional guidance from the Navy's *Interim Per-and Polyfluoroalkyl Substances (PFAS) Site Guidance for NAVFAC Remedial Project Managers (RPMs)/November 2020 Update* (Navy PFAS Guidance) (Navy, 2020).¹ The objectives of this PFAS PA for NAS Oceana are to:

- Identify and catalog all potential or actual PFAS sources (**Section 1.2.2**)
- Eliminate from further consideration those areas where there is no evidence of a PFAS release or suspected release and document the rationale for their elimination
- Identify areas requiring further PFAS investigation
- Identify receptors and migration pathways (both on and off the installation)
- Determine whether an expedited response effort is warranted because of current complete exposure pathways (for example, on-installation or off-installation drinking water source within 1 mile downgradient of a potential release area)

To accomplish these objectives, the following activities were completed:

- A review of existing information to identify and characterize potential PFAS releases
- A review of existing information to identify potential off-installation receptors within 1 mile of the installation boundary
- Interviews conducted with relevant site personnel to validate and verify data collected during the data review, and to provide supplemental information
- A site reconnaissance of the installation to identify any evidence of PFAS releases and potential receptors and migration pathways, to identify all areas of concern (AOCs), and to fill data gaps identified in the data review and interviews
- Identification of any need for initiation of an expedited response drinking water investigation in accordance with Deputy Assistant Secretary of the Navy Energy, Installations and Environment (DASN (EI&E)) June 2016 policy.

¹ This installation-specific PFAS PA does not include potential releases of PFAS at operational ranges during range activities. In accordance with the Chief of Naval Operations April 6, 2020 policy entitled Navy Policy Assessment of Potential PFAS Releases on Operational Ranges, operational ranges are not included in this PA and will be investigated separately.

1.2 PFAS Background

PFAS have been identified by the United States Department of Defense (DoD) as “emerging chemicals”². PFAS are of environmental concern because of their persistence in the environment and in organisms, their migration potential in aqueous systems (for example, groundwater), their historically widespread use in commercial products, and their possible health effects at low levels of exposure. PFAS are anthropogenic compounds with multiple strong carbon-fluorine bonds.

1.2.1 General Uses of PFAS

The chemical properties of PFAS make them useful for many commercial products because they are heat resistant and can repel oil, grease, and water. PFAS have been manufactured for use in a wide variety of products including firefighting foam, non-stick cookware, fiber and fabric stain protection, food packaging, and personal care products. The pervasive use of PFAS in commercial and industrial products has led to the discovery of PFAS in soil, air, and groundwater worldwide.

1.2.2 Key PFAS Sources at Naval Installations

PFAS have been used in a variety of military applications, including as a component of certain types of aqueous film-forming foam (AFFF), which was routinely used at firefighting training areas and firefighting equipment test areas.³ In addition, current and historical AFFF storage and transfer areas are of potential concern for release to the environment. As such, identification of areas where AFFF was released to the environment, either as repeated small releases or as a significant one-time release, is key to determining potential PFAS sources to environmental media.

PFAS from AFFF used in firefighting, firefighting training, and fire suppression systems are considered to have the greatest potential for release of PFAS to the environment in terms of mass and concentration at Navy installations. Other potential sources of PFAS to the environment include operations wastes (for example, from chromium electroplating), historical onsite land disposal areas and landfills of PFAS-containing materials, wastewater treatment sludges and effluents, etc. Areas of interest for this PFAS PA include those where AFFF may have been applied, released, or stored. These include current and former firefighting training areas, equipment test and cleanout areas, buildings with firefighting infrastructure (for example, hangars, AFFF storage/handling areas, pump houses), unplanned release areas (such as crash sites), and fire suppression systems located at fuel storage area(s).

For these operational and waste areas, it is important to develop a conceptual site model that considers the following to determine if a reasonable basis exists for PFAS use, and if there is potential for the PFAS to be released into the environment:

- Type of operations
- Timeline of operational activity
- Material/product development and usage
- Material storage and management practices
- Quantities of material used
- Historical information/data from similar operations in the assessment

² The most current version of Department of Defense Instruction 4715.18 (4 SEPT 2019) defines emerging chemicals as “Chemicals relevant to the DoD that are characterized by a perceived or real threat to human health or the environment and that have new or changing toxicity values or new or changing human health or environmental regulatory standards. Changes may be due to new science discoveries, detection capabilities, or exposure pathways.”

³ AFFF is a type of Class B fire-fighting foam but is not the only type of Class B fire-fighting foam available. While AFFF contains PFAS, not all Class B foams do (ITRC, 2020).

1.2.2.1 Aqueous Film Forming Foam in Firefighting Training and Fire Suppression

AFFF containing PFAS was developed in the 1960s for use on Class B fires (that is, fires in flammable liquids or vapors), and was put into routine use by the early 1970s. In November 1969, a military specification (MILSPEC) was issued that described characteristics that AFFF needed to demonstrate to be used by the military, including a requirement for formulations containing PFAS. Most AFFF used at military installations after the 1970s likely included some combination of PFAS.

Typically, AFFF concentrate was proportionally mixed into water lines using in-line eductors or other proportioning devices to create the necessary foam solution ranging from 3 to 6 percent of the concentrate. Class A firefighting foams were used to extinguish wood and grass fires, and do not contain PFAS. Therefore, Class A firefighting foams are not a concern for this PA.

1.2.2.2 Electroplating

Electroplating, specifically hard chromium plating, is an industrial activity where PFAS-containing mist suppressants may have been used. Electroplating consists of creating an electrolytic cell that enables a thin layer of metal to be deposited onto an electrically conductive metal surface. PFAS were sometimes used during the chromium electroplating process as a surfactant in chromic acid baths. As a surfactant, PFAS lowered the surface tension (adhesion of materials) by creating a thin, foamy layer on the surface of the chrome bath for mist suppression. This mist suppressant reduced the formation of airborne chromium aerosols during the plating process, which are known to be carcinogenic and allergenic. Areas where non-chromium electroplating operations were carried out would not be expected to have used PFAS-containing mist suppressants. Although fluorinated mist suppressants were available as early as the 1950s, they were not commonly used because of problems with porosity and cracking during the plating process. Technical improvements to fluorinated mist suppressants were made in the 1980s and 1990s, which made their use more common; therefore, operations that ceased before this time likely would not have included PFAS materials in plating bath solutions (USEPA, 1998, 2021).

1.2.2.3 Landfill Operations, Waste Disposal Areas, and Wastewater Treatment Plants

Historically, landfills received wastes generated from military installations, including waste streams from operational areas (such as machine shops and electroplating operations), housing areas, etc. These waste streams may contain industrial and/or consumer products that were either manufactured with PFAS or contain PFAS constituents. Additionally, for wastewater treatment plants (WWTPs) that received materials containing PFAS, waste material biosolids and sludge from WWTPs can contain PFAS.

1.2.2.4 Other Potential Sources

Because of the widespread use of PFAS, there may be activities other than the ones mentioned previously, where PFAS were used. PFAS have been included in some anti-fouling and stain-resistant paint formulations. It is possible that in significant amounts, these could be sources of PFAS to the environment.

1.2.3 PFAS in the Environment

PFAS are a class of anthropogenic compounds characterized by carbon chains of varying lengths containing carbon-fluorine bonds. The strong electronegative force of the carbon-fluorine bond requires a large amount of energy to break, which makes PFAS extremely resistant to biodegradation, photo-oxidation, direct photolysis, and hydrolysis. In addition to their environmental persistence, PFAS are readily soluble in aqueous solution and therefore have potential for migration to groundwater from soil and with groundwater flow to offsite locations. Because of their persistence and mobility, releases of PFAS to the environment present a unique set of challenges and concerns.

1.2.4 PFAS Potential Health Effects

Additional research is needed to more clearly understand the potential health effects that may be caused by exposure to PFAS. To date, there is limited information on only a few out of the thousands of total PFAS. Currently, there are no Tier 1 toxicity values for any PFAS. Tier 1 toxicity values are the preferred source for

toxicity factors in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) human health risk assessments.

USEPA's Superfund Health Risk Technical Support Center has estimated a Tier 2 noncarcinogenic toxicity value for perfluorobutane sulfonate (PFBS) (USEPA, 2014). The oral reference dose (RfD) is based on kidney effects observed in female rats. Because of a lack of information in the current literature, toxicity values for inhalation exposure and cancer endpoints could not be estimated for PFBS.

USEPA Office of Water developed an RfD for perfluorooctanoic acid (PFOA) that is based on a developmental toxicity study using mice. The critical effects included reduced ossification in parts of the hands and feet, and accelerated puberty in male rat pups following exposure during gestation and lactation (USEPA, 2016a). USEPA Office of Water also determined that PFOA should be classified as "suggestive evidence of carcinogenic potential" and estimated an oral cancer slope factor based on tumor development in rat testes.

USEPA Office of Water estimated an RfD for perfluorooctane sulfonate (PFOS) based on a developmental toxicity study in rats; the critical effect was decreased pup body weight following exposure during gestation and lactation (USEPA, 2016b).

PFOA and PFOS are known to be transmitted to the fetus in cord blood and to the newborn in breast milk. Because the developing fetus and newborn seem particularly sensitive to PFOA- and PFOS-induced toxicity, the RfDs based on developmental effects also are protective of adverse effects in adults.

1.3 Regulatory Background and History

1.3.1 PFOA Stewardship Program

In 2006, USEPA initiated the 2010/2015 PFOA Stewardship Program in which eight major companies in the United States committed to reduce facility emissions and product contents of PFOA and related chemicals on a global basis by 95 percent no later than 2010, and to work toward eliminating emissions and product content of these chemicals by 2015. All companies have met the program goals. To meet the program goals, most companies stopped the manufacture and import of long-chained PFAS, and then transitioned to alternative chemicals. On January 21, 2015, USEPA proposed a Significant New Use Rule under the Toxics Substances Control Act to require manufacturers (including importers) of PFOA- and PFOA-related chemicals to notify USEPA at least 90 days before starting or resuming new uses of these chemicals in any process. This rule was finalized on June 22, 2020.

1.3.2 Toxic Substances Control Act

On January 21, 2015, USEPA proposed a Significant New Use Rule (SNUR) under the Toxics Substances Control Act (TSCA) to require manufacturers (including importers) of PFOA- and PFOA-related chemicals to notify USEPA at least 90 days before starting or resuming new uses of these chemicals in any process. The effective date of the final SNUR was September 25, 2020. On June 3, 2021, USEPA published a final rule (effective January 1, 2021) to incorporate three additional PFAS into the Toxics Release Inventory (TRI). On June 10, 2021, USEPA withdrew some SNUR guidance and issued a proposed rule for new reporting requirements for manufacturers of PFAS.

1.3.3 Safe Drinking Water Act

The Safe Drinking Water Act authorizes the USEPA to set national health-based standards for drinking water to protect against both naturally-occurring and man-made chemicals that may be found in drinking water.

1.3.4 Unregulated Contaminant Monitoring Rule

The USEPA issued the Third Unregulated Contaminant Monitoring Rule (UCMR3)⁴ in May 2012. The UCMR3 required monitoring, between 2013 and 2015, for 30 substances at all large public water systems (PWSs) serving more than 10,000 people and 800 representative PWSs serving 10,000 or fewer people. Six PFAS compounds were included in the UCMR3 contaminant list. Of these 6 PFAS, USEPA issued health advisory levels for only two, PFOA and PFOS. The UCMR3 results found these two chemicals were each present above the health advisory in less than 1% of the nearly 5,000 public water systems that sampled under UCMR3 (USEPA, 2017).

In December 2016, the USEPA issued the fourth UCMR (UCMR4). UCMR4 required all large PWSs serving more than 10,000 people and 800 representative PWSs serving 10,000 or fewer people to sample for 30 chemicals between 2018 and 2020. No PFAS were included on the UCMR4 list of chemicals.

A fifth UCMR (UCMR5) went into effect on January 26, 2022. UCMR5 requires all PWSs serving more than 3,300 and a representative sample of 800 systems serving 3,300 or fewer people to sample for 30 chemicals (29 PFAS and lithium) between 2023 and 2025 (Federal Register Volume 86, Number 73131).

1.3.5 USEPA Lifetime Health Advisories

In May 2016, USEPA Office of Water issued a drinking water lifetime health advisory for PFOA and PFOS. Health advisories are not enforceable, regulatory levels; rather, they are levels that would provide Americans, including the most sensitive populations, with a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water. The health advisory is 70 ppt for PFOA and 70 ppt for PFOS. When both PFOA and PFOS are found in drinking water, the combined concentrations of PFOA and PFOS should be compared with the 70 ppt health advisory level.

1.3.6 Regulatory Determination

In March 2021, USEPA published the Fourth Regulatory Determinations, including a final determination to regulate PFOA and PFOS in drinking water. The Proposed National Primary Drinking Water Regulation for PFOA and PFOS in drinking water is expected in Fall 2022 and the Final Rule expected in Fall 2023 (EPA, 2021).

1.3.7 Strategic Planning

In February 2019, USEPA issued an action plan outlining the steps the agency is taking to address PFAS and to protect public health (USEPA, 2019c). The action plan identifies USEPA-led short-term actions, longer-term research, and potential regulatory approaches designed to reduce the risks associated with PFAS in the environment. The action plan notes that USEPA plans to propose a national drinking water regulatory determination for PFOA and PFOS and include PFAS analysis in the next UCMR monitoring cycle. Other steps include further research into improving analytical methods, understanding remediation options, and obtaining more information about the potential toxicity of a broader set of PFAS, along with numerous additional actions. An update to the action plan was issued in February 2020.

In October 2021, USEPA announced a new PFAS Strategic Roadmap describing ongoing and future agency actions, many of which were included in USEPA's 2019 PFAS Action Plan. The Roadmap provides information regarding the expected timing of regulatory actions from 2021 to 2024 (USEPA, 2021).

1.3.8 USEPA Groundwater Guidance, December 19, 2019

In December 2019, USEPA issued Interim Recommendations for Addressing Groundwater Contaminated with PFOA and PFOS under federal cleanup programs. The guidance recommends using a screening level (SL) of 40 ppt to determine if PFOA and/or PFOS is present at a site and may warrant further attention. The guidance also recommends using USEPA's PFOA and PFOS drinking water lifetime health advisory of 70 ppt as the preliminary

⁴ The 1996 Safe Drinking Water Act (SDWA) amendments require that once every five years EPA issue a new list of no more than 30 unregulated contaminants to be monitored by public water systems (PWSs).

remediation goal for contaminated groundwater that is a current or potential source of drinking water, where no state or tribal maximum contaminant level or other applicable or relevant and appropriate requirements are available or sufficiently protective.

1.3.9 State-specific Action Levels

Virginia has not established any state-specific PFAS action levels.

1.4 Navy Policy

1.4.1 DASN (EI&E) Policy Memorandum, October 21, 2014

The Navy issued a policy in October 2014, requiring on-installation drinking water sampling for PFOA and PFOS for installations where groundwater was used as drinking water and PFAS could have been released nearby in the past. Installations that were not required to sample finished drinking water under UCMR3 that produce drinking water from on-installation groundwater sources and have an identified or suspected PFAS release within approximately 1-mile upgradient of the drinking water source were required to sample their finished drinking water by December 2015.

Since drinking water at NAS Oceana is supplied by the City of Virginia Beach, which was tested for PFAS under the UCMR3, no analysis of on-installation drinking water was warranted in response to this policy memorandum. No PFAS were detected during UCMR3 sampling of City of Virginia Beach drinking water (USEPA, 2017).

1.4.2 Chief of Naval Operations Policy Memorandum, September 14, 2015

This policy memorandum largely echoed the requirements laid out in the October 2014 DASN (E) policy memorandum. However, this memorandum specified that if levels of PFOS and/or PFOA in drinking water exceeded the current at-the-time USEPA health advisory (that is, the 2009 provisional short-term health advisories), then alternative drinking water must be supplied until the PFOA and/or PFOS levels were reduced to less than the USEPA health advisory.

1.4.3 DASN (EI&E) Policy Memorandum, June 14, 2016

This policy expanded the sampling of PFOA and PFOS at all Navy installations where such sampling was not previously completed under USEPA's UCMR3 or the Navy's October 2014 policy. This memorandum also specified that, for instance, where drinking water from an installation is purchased from a PWS but was not tested under UCMR3, the installation must sample the finished drinking water to comply with this policy. Additionally, this policy included reporting requirements to the DASN (E) office for all PFOA and/or PFOS in drinking water results.

1.4.4 DASN (EI&E) Policy Memorandum, June 17, 2016

This policy defines the Navy's intention to remove, dispose, and replace legacy AFFF that contains PFOS and/or PFOA, once environmentally suitable substitutes are identified and certified to meet MILSPEC requirements. This policy directs the following actions be taken until suitable replacements are certified:

- Immediately cease the uncontrolled environmental release of AFFF for shoreside installations, with the exception of emergency responses.
- Update and implement Navy and Marine Corps firefighting system requirements, as needed, to ensure fire and emergency service vehicles and equipment at Navy installations and facilities are tested and certified in a manner that does not allow the release of AFFF to the environment.
- By the end of Fiscal Year 2017, remove and dispose of uninstalled PFOS-containing AFFF in drums and cans from local stored supplies for shore installations and ships to prevent future environmental releases.

1.4.5 DASN (EI&E) Policy Memorandum, June 20, 2016

This policy required the Navy to identify and prioritize sites for investigation if drinking water resources, on- or off-installation, are thought to be vulnerable to PFAS contamination from past Navy and Marine Corps PFAS releases. Sites with drinking water sources within 1 mile downgradient of known or potential releases of PFAS were assigned the highest priority. This policy directed the sampling of off-installation drinking water at these high priority (Priority 1) sites within Fiscal Year 2017.

The primary mechanism to identify potential PFAS release areas and AOCs, was review of Environmental Restoration, Navy (ER, N) records. To ensure that all potential PFAS release mechanisms were identified, installations were directed to review installations to identify areas that were not already part of the ER, N program.

During the initial review, Solid Waste Management Unit (SWMU) 11 (Firefighting Training Area) and SWMU 26 were identified as potential PFAS release areas at NAS Oceana; however, at that time an installation-wide investigation for PFAS at NAS Oceana was already planned and potential drinking water receptors were identified following results of the on-installation investigation. The Navy has completed the sampling for all off-installation potentially impacted drinking water sources that were identified as a result of this investigation, and currently known exposures have been addressed as discussed in **Section 2.3.2**.

1.4.6 Chief of Naval Operations Policy Memo, April 6, 2020

This policy clarifies that operational ranges on Navy and Marine Corps installations will not be included in installation-wide PFAS PAs but will be investigated for PFAS releases separately.

1.5 Department of Defense Policy

1.5.1 Secretary of Defense Memorandum, July 23, 2019

This memorandum established a PFAS task force to ensure a coordinated, aggressive, and holistic approach to DoD-wide efforts to proactively address PFAS. The goals of the task force are mitigating and eliminating the use of the current AFFF, understanding the impacts of PFAS on human health, and fulfilling cleanup responsibility related to PFAS. The task force is coordinating and collaborating with other federal agencies to achieve these goals.

1.5.2 ASD Memorandum, October 23, 2019

This memorandum revised quarterly progress reporting requirements for installations with known or suspected PFAS releases.

1.5.3 ASD Guidance Memorandum, November 22, 2019

This memorandum established requirements for installation commanders to conduct community engagement with respect to PFAS issues, report on their progress in so doing, and to provide feedback on community questions and concerns.

1.5.4 ASD Guidance Memorandum, November 22, 2019

This memorandum established a consistent methodology for analysis of PFAS in media other than drinking water and requires DoD Components to use analytical methods meeting the DoD/Department of Energy Quality Systems Manual for Environmental Laboratories, Appendix B, Table B-15.

1.5.5 ASD Memorandum, January 13, 2020

This memo established annual reporting requirements for AFFF usage or spills (not associated with use) at all DoD installations.

1.5.6 ASD Policy Memorandum, March 2, 2020

This memorandum identifies requirements for PFAS drinking water sampling on DoD installations where DoD is the drinking water purveyor. The requirements include initial and routine monitoring, actions necessary if results exceed the USEPA lifetime health advisory, laboratory analysis and record keeping requirements, and notification of results.

1.5.7 ASD Policy Memorandum, July 23, 2020

This memo identifies requirements for drinking water testing for PFAS on DoD installations where DoD is not the drinking water purveyor. The requirements include coordination with the non-DoD drinking water purveyor, actions necessary if results exceed the lifetime health advisory, and notification of results.

1.5.8 ASD Policy Memorandum, September 18, 2020

This memo provides guidance for sharing drinking water monitoring data related to PFAS and other emerging contaminants between the DoD installations and municipalities or drinking water utilities that are one-mile downgradient of a release from a military installation where the release may migrate and impact the drinking water utility or municipality.

1.5.9 ASD Policy Memorandum, September 18, 2020

This memorandum prohibits testing and training with fluorinated AFFF on all DoD installations, with the exception of the five installations listed in the memo and the pier side testing of ship's AFFF systems.

1.5.10 ASD Guidance Memorandum, September 15, 2021

This guidance memo updates the 15 October 2019 ASD guidance memo by providing the updated PFBS screening values that can be used to estimate screening levels used in the CERCLA program to determine if further investigation is warranted in the Remedial Investigation (RI) or if a site can proceed to site closeout.

1.5.11 ASD Guidance Memorandum, December 7, 2021

This guidance memo updates the 22 November 2019 guidance memo by requiring the use of EPA's Draft Method 1633 "Analysis of PFAS in Aqueous, Solid, Biosolids, and Tissue Samples by LC-MS/MS" for analysis of PFAS in matrices other than drinking water for all new contracts and task orders issued after December 31, 2021. Existing projects are encouraged to use this method when ELAP-accredited laboratories become available.

1.5.12 ASD Guidance Memorandum, December 22, 2021

This memo provides clarifying guidance on what triggers the need for removal actions under CERCLA and how DoD should address properly promulgated State PFAS drinking water standards as part of a CERCLA removal action.

1.6 Report Organization

This NAS Oceana PFAS PA Report is organized in the following sections:

1. Introduction
2. Installation Background and Environmental Setting
3. Assessment Methodology
4. Findings and Recommendations
5. Conclusions
6. References

Installation Background and Environmental Setting

Installation information relevant to this PA, including installation background, regional and local environmental setting, and contaminant migration pathways and potential receptors, is presented in the following sections.

2.1 Installation Background

NAS Oceana is located approximately 3 miles southwest of the resort area of Virginia Beach in the eastern portion of the City of Virginia Beach, Virginia (**Figure 2-1**). NAS Oceana is bounded on the north by the Norfolk Southern Railroad tracks, on the south by Harper's Road, and on the west by London Bridge Road. The secured area of NAS Oceana is bounded by Oceana Boulevard to the east; however, the installation boundary extends to the east of Oceana Boulevard. **Figures 2-1** and **2-2** provide location and layout maps of NAS Oceana.

NAS Oceana was established in 1943 as a small auxiliary airfield. Since 1943, NAS Oceana has grown to more than 16 times its original size and is now a 6,000-acre master jet base supporting an installation population of 19,000 people. The primary mission of NAS Oceana is to provide the personnel, operations, maintenance, and training facilities to ensure that strike fighter squadrons on aircraft carriers of the U.S. Atlantic Fleet are ready for deployment.

More than 40 percent of NAS Oceana is urbanized including commercial, residential, and operations buildings and runways, hangars, and similar structures. The undeveloped areas of NAS Oceana consist of farmland, open land, forest, and wetlands. Approximately 646 acres of land are farmed by private producers under the Navy's agricultural outlease program (Navy, 2017a). The Navy is currently assessing whether parts of the installation can be leased to private companies; therefore, land use at NAS Oceana may change in the future.

2.2 Regional and Local Setting

NAS Oceana is located centrally in the City of Virginia Beach, which is in the southeastern corner of Virginia directly south of the Chesapeake Bay inlet to the Atlantic Ocean (**Figure 2-1**). It is accessible primarily via Interstate 264 East. Virginia Beach is bounded by the City of Norfolk to the northwest, the City of Chesapeake to the southwest, the Chesapeake Bay to the north, the Atlantic Ocean to the east, and Currituck County, North Carolina to the south.

The area surrounding NAS Oceana is densely developed with residential, commercial, industrial developments, and recreational facilities, in addition to some agricultural and wooded areas.

The topography of the installation is generally flat, with elevations ranging from 1 to 31 feet above mean sea level (Navy, 2017a). The highest elevations occur in the eastern portion of the installation along a relic sand dune, the Pungo Ridge. Elevations in the developed area of the installation range from 10 to 25 feet above mean sea level (RGH, 1984).

2.2.1 Climate

NAS Oceana is located in the Tidewater area of Virginia where the climate is humid and subtropical, and the temperature extremes are moderated by the Atlantic Ocean. The average yearly temperature is 60 degrees Fahrenheit (°F). January is the coldest month with an average low temperature of 32.6 °F, and July is the warmest month with an average high temperature of 87.4 °F. The average annual precipitation is approximately 45.7 inches with maximum monthly precipitation occurring in late summer (Navy, 2017a). During cool winter months, moderate snowfall occurs at an average of less than 6 inches annually (Weather Atlas, 2019). On average, winds blow from a northerly direction from January through March and again in September and October (Navy,

2017a). During the remaining months, winds generally blow from a southerly direction (Navy, 2017a). During hurricane season, torrential rainfall may accompany storms with winds greater than 75 miles per hour (Navy, 2017a).

2.2.2 Geologic Setting

NAS Oceana is located on the outer edge of the Atlantic Coastal Plain physiographic province. The Atlantic Coastal Plain is a broad wedge of unconsolidated sediments that dip and thicken to the east. In the vicinity of NAS Oceana, these sediments consist of several thousand feet of unconsolidated sand, clay, silt, and gravels, and are underlain by granite basement rock. The sediments range in age from late Cretaceous to Recent. From oldest to youngest, the five principal geologic units are the Potomac Formation, Unnamed Upper Cretaceous deposits, Pamunkey Group, Chesapeake Group, and Columbia Group. The Chesapeake Group has been differentiated further into five formations, which are, from oldest to youngest: the Calvert, Choptank, St. Marys, Eastover, and Yorktown Formations. The Columbia Group sediments overlie the Yorktown Formation.

The geologic units of concern in the environmental investigations at NAS Oceana are the Yorktown Formation and the Columbia Group. The Columbia Group is present at the ground surface in the vicinity of the installation and generally extends to approximately 20 feet below ground surface (bgs). The Yorktown Formation underlies the Columbia Group. The upper Yorktown Formation consists of interbedded layers of shelly, very fine to coarse sands, clayey sands and sandy clay of Tertiary age. Regionally, the uppermost of these silt and clay beds separates the Yorktown Formation from the sediments of the Columbia Group that overlie it. This uppermost bed consists of massive, well-bedded yellow-gray to greenish-gray clays and silty clays, commonly containing shells, fine sand, and mica. This unit is absent across much of NAS Oceana. The clay layers within the confining bed are generally extensive but are a series of coalescing clay beds rather than a single deposited unit. This unit was deposited in a shallow open-marine environment of broad lagoons and quiet bays (Meng and Harsh, 1984). The sediments of the Columbia Group consist of interbedded gravels, sands, silts, and clays of Pleistocene and Holocene age. The Pleistocene and Holocene sediments were deposited in fluvial-marine terrace and near-shore marine environments such as lagoons, beaches, tidal flats and barrier islands (CH2M, 1991).

2.2.3 Hydrogeologic Setting

The hydrogeologic units of concern in the environmental investigations at NAS Oceana are the Surficial/Columbia aquifer (previously referred to as the Columbia aquifer), Yorktown confining unit, and the Yorktown-Eastover aquifer (USGS, 2006). The uppermost portion of the Surficial/Columbia aquifer consists of fine to coarse silty-sand with some clay lenses and extends to a depth of approximately 30 feet bgs. The Yorktown confining unit consists of silt and clay layers, and typically underlies the Surficial/Columbia aquifer; however, this unit may be absent at NAS Oceana. The Yorktown aquifer is located directly beneath either the Surficial/Columbia aquifer or Yorktown confining unit (where present) and consists of gray fine silty-sand with shell fragments. Aquifer conditions are unconfined in the Columbia Group and unconfined to semiconfined within the upper Yorktown Formation. When the clay confining unit overlying the Yorktown aquifer is absent, the upper Yorktown and Columbia aquifers act as a single, unconfined, hydrogeologic unit.

No monitoring wells or water supply wells at the installation have been installed to the total depth of the Yorktown aquifer, but the approximate thickness of the unit is 100 feet based on *The Virginia Coastal Plain Hydrogeologic Framework* (USGS, 2006).

Groundwater at NAS Oceana is generally within 4 to 10 feet of the land surface. Groundwater flow direction in the shallow Surficial/Columbia aquifer is generally toward surface water bodies and drainage ditches. The complex drainage patterns result in highly variable flow directions. Groundwater generally flows to the northeast in the Surficial/Columbia aquifer with a component to the northwest in the Yorktown aquifer in the northern half of the installation, and to the south-southwest at the southern half of the installation (**Figure 2-2**).

2.2.4 Hydrologic Setting

Surface runoff from the installation is facilitated by a system of drainage ditches and surface canals that flow south and west to West Neck Creek, north to London Bridge and Great Neck Creek, and east to Owls Creek and Lake Rudee (**Figure 2-1**). The drainage ditches are engineered, maintained structures, and are cleaned periodically. Surface water bodies on the installation are limited to these drainage ditches and a number of manmade ponds. These ponds were formed as a result of borrow pit excavations (Navy, 2017a).

A channelized branch of Great Neck Creek is the primary drainage channel in the eastern area of NAS Oceana, whereas a series of agricultural and roadside ditches drain the airfield and western area. Stormwater runoff from the installation drains to West Neck, London Bridge, Great Neck, Owls, and Wolfsnare Creeks, and Lake Redwing, which ultimately drains to the North Bay via Canal No. 1 South (Navy, 2017a). The 100- and 500-year flood zones are shown on **Figure 2-3**, the majority of the installation does not fall within these flood zones.

2.3 Migration Pathways and Potential Receptors

This section discusses hypothetical exposure scenarios (that is, impacted environmental media, receptors, and exposure routes) if a PFAS release occurred.

2.3.1 Migration Pathways

Because of their chemical structure, PFAS are chemically and biologically stable, and resist typical degradation processes. As a result, PFAS persist in the environment. PFAS are water soluble and migrate readily from soil to groundwater where they can be transported long distances (USEPA, 2014). Additionally, although PFAS are water soluble and tend to be relatively mobile in groundwater, complex partitioning mechanisms influence fate and transport. For example, a tendency for PFAS to associate with organic carbon in soil and sediment can result in persistent concentrations in these media (Navy, 2020).

Potential migration pathways for PFAS at NAS Oceana include:

- Release of PFAS to surface and/or subsurface soil
- Overland flow of PFAS in runoff to downgradient areas including soil, drainage ditches, and nearby West Neck, London Bridge, Great Neck, Owls, and Wolfsnare Creeks, Lake Rudee, and Lake Redwing, which ultimately drains to the North Bay via Canal No. 1 South
- Direct release of PFAS to drainage ditches
- Leaching of PFAS from soil to groundwater
- Discharge of groundwater to surface water (drainage ditches, and nearby West Neck, London Bridge, Great Neck, Owls, and Wolfsnare Creeks, Lake Rudee, and Lake Redwing, which ultimately drains to the North Bay via Canal No. 1 South)
- Transport via advection in groundwater to downgradient areas
- Bioaccumulation in terrestrial and aquatic biota

2.3.2 Human Receptors

Current receptors (residents, maintenance workers, industrial workers, recreational users, and trespassers/visitors) as well as potential future receptors (residents, maintenance workers, industrial workers, construction workers, trespassers/visitors, and recreational users) could be exposed to PFAS, if present, in groundwater, soil, sediment, and/or surface water. Current and future recreational users could also be exposed to PFAS, if present, that have bioaccumulated in local fish, shellfish, and game.

A total of 11,057 parcels are within the 1-mile boundary of NAS Oceana. Land use of these parcels includes commercial, residential, industrial, agricultural, and wildlife refuges/park use (CH2M, 2020c). Daycares, schools,

and hospitals/urgent care facilities within 1 mile of the boundary of NAS Oceana (**Figure 2-4**) were identified in the Environmental Data Resources (EDR) Offsite Receptor Report (EDR, 2019a), and are summarized in **Table 2-1**. An in-home daycare, Parish Day School, Childtime Learning Center of Virginia Beach, and New Hope Baptist Church Preschool and Childcare Center are located hydraulically downgradient of the installation. Additionally, the Sharon A. Peterson Child Development Center and the NAS Oceana Youth Center are located on-installation.

Table 2-1. Daycares, Schools, and Hospitals/Urgent Care Facilities within 1 Mile of Installation Boundary

Facility Type	Facility Name	Facility Address	Orientation to Installation
Daycare	Heavenly Sent Child Care Inc.	1640 Michigan Avenue, Virginia Beach, VA 23454	North (downgradient)
	In-Home Daycare	2313 Enchanted Forest Lane, Virginia Beach, VA 23453	South (downgradient)
	Parish Day School	2020 Laskin Road, Virginia Beach, VA 23454	North (downgradient)
	Seatack Community Recreation Center	141 South Birdneck Road, Virginia Beach, VA 23451	Northeast (downgradient)
	Harbour Tugboats Day Care	2801 Virginia Beach Boulevard, Virginia Beach 23452	Northwest
Daycare/ School	Early Discoveries - Birdneck Elementary	957 South Birdneck Road, Virginia Beach, VA 23451	East
	Childtime Learning Center of Virginia Beach	1841 London Bridge Road, Virginia Beach, VA 23453	South (downgradient)
	New Hope Baptist Church Preschool and Childcare Center	395 Old Great Neck Road, Virginia Beach, VA 23454	Northwest (downgradient)
	Children's Learning Paradise	612 Fremac Drive, Virginia Beach, VA 23451	North (downgradient)
School	Seatack Elementary	912 South Birdneck Road, Virginia Beach, VA 23451	East
	Corporate Landing Elementary	1590 Corporate Landing Parkway, Virginia Beach, VA 23454	South
	Corporate Landing Middle School	1597 Corporate Landing Parkway, Virginia Beach, VA 23454	South
	Beach Montessori Christian Academy	1101 Eaglewood Drive, Virginia Beach, VA 23454	Southeast
	Centura College	2697 Dean Drive, Virginia Beach, VA 23452	Northwest
	Birdneck Elementary	957 S Birdneck Road, Virginia Beach, VA 23462	East
	Pocahontas Preschool LLC	3152 Magic Hollow Boulevard, Virginia Beach, VA 23453	West
	Virginia Beach Friends School	1537 Laskin Road, Virginia Beach, VA 23451	North (downgradient)
	Virginia Beach City Public Schools Preschool Assessment Center	1413 Laskin Road, Virginia Beach, VA 23451	North (downgradient)
Hospital/Urgent Care Facilities ^a	Patient First - General Booth	1605 General Booth Boulevard, Virginia Beach, VA 23454	Southeast

^a The EDR listed the Podiatry Associates of Virginia, Virginia Beach Eye Center, Family Physicians, The Doctor's In, and the Virginia Beach Family Medical Center as hospitals but they are doctor's offices and were not included in the table.

2.3.2.1 Groundwater

Groundwater is not currently used or planned for future use as a potable water supply on NAS Oceana. The installation uses water provided by the City of Virginia Beach and most private properties surrounding the installation have access to water provided by the City of Virginia Beach through the Virginia Beach Department of Public Utilities (VBDPU). A 76-mile-long pipeline supplies water from Lake Gaston in Brunswick County to Lake Prince, a reservoir of Suffolk County that is owned and operated by the City of Norfolk. The reservoir water is pumped to the Moore's Bridges Water Treatment Plant where it undergoes an extensive filtering and disinfection process to remove any particles, bacteria, algae, and other impurities (VBDPU, 2019) prior to being provided for potable use.

Based on utility records provided by the City of Virginia Beach, some private properties surrounding the installation (such as private residences and businesses) do not consume municipal water and use groundwater as a potable water source. Sixteen potable wells on 15 properties were confirmed by property owners within the entire 1-mile boundary of confirmed PFAS release areas during the PFAS Site Inspection (SI) and SI Addendum, which are further discussed in **Section 2.4**. Residents of these properties may be exposed to PFAS, if present in groundwater, through ingestion and dermal contact. Non-potable wells, such as irrigation wells, are also present in some private properties surrounding NAS Oceana.

Several non-potable supply wells are located throughout the installation (**Figure 2-4**). Multiple irrigation wells are present at the installation Golf Course. Based on conversations with NAS Oceana personnel, only one irrigation well located at the golf course extracts groundwater and the other extraction points referred to as "wells" are suspected to pump water from irrigation ponds. Two wells, which have since been abandoned, were located in the northern portion of the installation and pumped water for use in a concrete batch plant as part of a runway construction project. In addition, there are two non-potable supply wells: one on the eastern side of the installation at the Natural Resources Building and another in the northern portion of the installation at the Skeet and Trap Range club house. Current and future installation residents, workers, and visitors can potentially be exposed to PFAS, if present in groundwater, through dermal contact.

In areas where groundwater is within the potential depth of construction activities (within about 10 to 15 feet bgs) construction workers could be exposed to PFAS in groundwater, if present, through dermal contact during excavation activities. Ingestion-based SLs are available for groundwater exposure to some PFAS. SLs for PFOA and PFOS are based on a hazard quotient (HQ) of 0.1 and were generated using the USEPA RSL calculator as described in the ASD October 15, 2019 memorandum, "Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program" (DoD, 2019). SLs for PFBS were generated similarly, but values were updated to be consistent with the May 2021 USEPA RSL table. As discussed in **Section 1.3.2**, the USEPA lifetime health advisory for PFOA and PFOS is used as an action level for groundwater used as drinking water. Screening levels for dermal exposure to PFBS is calculated using the USEPA RSL calculator though there are currently no SLs for other PFAS.

2.3.2.2 Soil

Current and future residents, maintenance workers, industrial workers, construction workers, trespassers/visitors, and/or recreational users could be exposed to PFAS, if present in soil, through incidental ingestion of soil and dermal contact with soil. Dermal and ingestion-based toxicity values are available for soil exposure to some PFAS. There are currently no risk-based SLs for exposure to PFAS through inhalation of particulate emissions from surface and subsurface soil.

2.3.2.3 Sediment

Current and future residents, maintenance workers, industrial workers, construction workers, trespassers/visitors, and/or recreational users could be exposed to PFAS, if present in sediment in drainage ditches onsite. Current and future recreational users could also be exposed to PFAS, if present in sediment in the nearby West Neck, London Bridge, Great Neck, Owls, and Wolfsnare Creeks, Lake Rudee, and Lake Redwing, which ultimately drains to the North Bay via Canal No. 1 South, through incidental ingestion and dermal contact with sediment. Dermal and ingestion-based toxicity values are available for sediment exposure to some PFAS.

2.3.2.4 Surface Water

Current and future residents, maintenance workers, industrial workers, construction workers, trespassers/visitors, and/or recreational users could be exposed to PFAS, if present in surface water in drainage ditches onsite, through incidental ingestion or dermal contact. Current and future recreational users could also be exposed to PFAS, if present in surface water in the nearby West Neck, London Bridge, Great Neck, Owls, and Wolfsnare Creeks, Lake Rudee, and Lake Redwing, which ultimately drains to the North Bay via Canal No. 1 South, through incidental ingestion of and dermal contact with surface water. Currently, there are no regulatory risk-based SLs or other criteria for dermal contact with PFAS in surface water. Currently, there are no risk-based SLs or other criteria for dermal contact with PFAS in surface water. Ingestion-based toxicity values are available for some PFAS.

2.3.2.5 Biota and Agriculture

PFAS have the potential to bioaccumulate. PFAS, if present in fish and shellfish from Oceana Pond on-installation or nearby Lake Redwing, which ultimately drains to the North Bay via Canal No. 1 South, Lake Rudee, and West Neck, London Bridge, Great Neck, Owls, and Wolfsnare Creeks, may be ingested by recreational users. PFAS, if present in deer and other local game on-installation and off-installation that are recreationally hunted, may be ingested by hunters and their families. Additionally, humans may be exposed to PFAS through consumption of food produced in the vicinity of the installation if these food sources contain PFAS because of root uptake, ingestion of PFAS-containing water, or ingestion of PFAS-containing plants and animals. Ingestion-based toxicity values are available for some PFAS.

PFAS toxicology is a very active field of research and additional data are likely to become available in the future. Any PFAS data collected for a specific site at NAS Oceana will be evaluated using the best toxicological information available at the time the data are evaluated, within the Navy policy framework in place at the time, for the human health receptors appropriate for the particular site.

2.3.3 Ecological Receptors

A wide variety of terrestrial and wetland/aquatic ecological receptors may reside at NAS Oceana. In terrestrial habitats, these receptors include terrestrial plants, soil invertebrates, amphibians, reptiles, birds, and mammals. Further, some areas within NAS Oceana are located adjacent to wetland and aquatic habitats. In these wetland and aquatic habitats, receptors include aquatic and wetland plants, aquatic and benthic invertebrates, reptiles, amphibians, fish, birds, and/or mammals.

Lower trophic level terrestrial ecological receptors (such as terrestrial plants and soil invertebrates) could be exposed to PFAS compounds released to surface soils through root uptake, direct contact, and/or direct ingestion. Because there is some evidence that PFAS compounds may bioaccumulate in terrestrial food items (such as plants), there is the potential that upper trophic level receptors (such as birds and mammals) could be exposed to these substances via the food web, as well as through incidental ingestion of soil and direct ingestion of drinking water.

Lower trophic level wetland/aquatic ecological receptors (such as wetland/aquatic plants, aquatic and benthic invertebrates, fish, reptiles, and amphibians) could be exposed to PFAS compounds released to surface water and/or sediment (either directly, or indirectly via surface runoff from terrestrial areas or through groundwater discharge) through root uptake, direct contact, and/or direct ingestion. Because there is evidence that PFAS compounds may bioaccumulate in aquatic food items (such as fish), there is the potential that upper trophic level receptors (such as birds and mammals) could be exposed to these substances (if present) via the food web, as well as through incidental ingestion of sediment and direct ingestion of drinking water.

EDR National Environmental Policy Act (NEPA) Search was used to search for federal and state threatened and endangered species or critical habitat within the study area boundary. The search did not indicate the presence of any federal or state threatened and/or endangered species (EDR, 2019b). A search of the Virginia Fish and Wildlife Information Service (VaFWIS) geographic database (VaFWIS, 2019) and the Integrated Natural Resources

Management Plan for NAS Oceana (Navy, 2017a) indicated the following species may be present within 1 mile of the study area boundary:

- Federally listed endangered species: shortnose sturgeon, Kemp's ridley sea turtle, Atlantic sturgeon, leatherback sea turtle, hawksbill sea turtle, and roseate tern
- Federally listed threatened species: loggerhead sea turtle, red knot, northern long-eared bat, green sea turtle, piping plover, and the west Indian manatee
- State-listed endangered species: shortnose sturgeon, Kemp's ridley sea turtle, Atlantic sturgeon, leatherback sea turtle, hawksbill sea turtle, roseate tern, west Indian manatee, eastern chicken turtle, Wilson's plover, eastern black rail, Rafinesque's eastern big-eared bat, tri-colored bat, little brown bat, and canebrake rattlesnake
- State-listed threatened species: loggerhead sea turtle, red knot, northern long-eared bat, green sea turtle, piping plover, peregrine falcon, loggerhead shrike, Henslow's sparrow, gull-billed tern, barking treefrog, eastern glass lizard, Arctic peregrine falcon, upland sandpiper, and migrant loggerhead shrike
- State-listed endangered plants under Virginia Administrative Code (VAC) Title 2 2 VAC 5-320-10: valley doll's-daisy, small-anthered bittercress, juniper sedge, Bentley's coralroot, Harper's fimbristylis, Virginia sneezeweed, swamp-pink, long-stalked holly, Peter's Mountain mallow, Virginia quillwort, small whorled pogonia, harperella, Northeastern bulrush, and Virginia spiraea
- State-listed threatened plants: sensitive-joint vetch, seabeach amaranth, shale barren rockcress, Millboro leatherflower, smooth coneflower, New Jersey rush, Northern prostrate clubmoss, narrow-leaved spatterdock, Eastern prairie fringed orchid, Michaux's sumac, and reclining bulrush

Currently, no promulgated ecological screening values (ESVs) have been released by USEPA for PFAS. However, some literature-based ESVs are available for some PFAS (such as PFOA, PFOS, and PFBS) for soil, sediment, and/or surface water exposures. PFAS ecotoxicology is a very active field of research and additional data are likely to become available in the future. PFAS data collected for a specific site at NAS Oceana will be evaluated using vetted toxicology information from USEPA, for the ecological pathways appropriate for the particular site.

2.4 Other PFAS Investigations

2.4.1 PFAS Site Inspection and Site Inspection Addendum

From October 2016 to May 2017, groundwater samples from potential PFAS release areas throughout NAS Oceana were analyzed for PFAS during two separate mobilizations as part of the installation-wide PFAS SI (CH2M, 2018).⁵ The PFAS SI evaluated concentrations of PFAS in groundwater at the following potential release areas:

- Firefighting Training Area
- SWMU 26 – Fire Station Burn Pit
- Aircraft Hangars and Maintenance Buildings
- 1996 F-14 Crash
- 1972 A-6 Crash (August)
- 2007 Civilian Plane Crash
- Jet Test Cell Area
- Fuel Tank Farm (New)

⁵ The installation-wide PFAS SI SAP was initiated before the June 20, 2016 Navy policy instructing that an evaluation of all potential release areas be completed. The potential release areas investigated as part of the PFAS SI were identified through limited document review and interviews.

Additional sampling for PFAS was completed during the PFAS SI Addendum (CH2M, forthcoming) that was initiated in June 2019. All locations investigated in the PFAS SI and SI Addendum are discussed in **Section 4**. In addition to the previously mentioned release areas, concentrations of PFAS in groundwater were evaluated at the following additional potential release areas:

- 1986 Crash Site⁶
- Fifth Green Landfill
- North Station Landfill
- Navy Exchange (NEX) Gas Station, Auto Hobby Shop, Car Wash (Buildings 543 and 546)
- Building 830
- 4051 Leyte Court
- Vehicle Crash Area
- Petroleum-Oil-Lubricant (POL) Sites (F8/F9, T-Line, FITWING, Fuel Tank Farm [Old])

Soil sampling was also completed at all potential release areas and sediment and surface water were sampled throughout the installation.

Results from these investigations indicated concentrations of PFOA and/or PFOS exceeded the SLs⁷ in groundwater at the Firefighting Training Area, SWMU 26, the aircraft hangar and maintenance building area, Jet Test Cell Area, North Station Landfill, NEX Gas Station, Auto Hobby Shop, Car Wash, Vehicle Crash Area, and all POL sites. PFBS also exceeded the SLs at the Firefighting Training Area and SWMU 26 (CH2M, 2018, forthcoming).

Monitoring wells at the Fifth Green Landfill and 1986 Crash Site (Original and Revised Locations) were sampled for PFAS and all PFOA, PFOS, and PFBS results were less than the respective SLs (CH2M, 2018, forthcoming).

Due to flightline activities, no monitoring wells were installed at the location of the 2007 Civilian Plane Crash; however, both PFOA and PFOS were detected in groundwater at concentrations exceeding the respective SLs at monitoring well FTWG-MW-02, which is cross-gradient to the 2007 Civilian Plane Crash (CH2M, 2018, forthcoming).

Because of access issues, no monitoring wells were installed at the location of the 1996 F-14 Crash; however, both PFOA and PFOS were detected in groundwater at concentrations exceeding the respective SLs at monitoring well OC-MW19, which is cross-gradient to the 1996 F-14 Crash (CH2M, 2018, forthcoming).

Potential and confirmed PFAS release areas that were previously investigated during the PFAS SI and SI Addendum are included in **Section 4** for completeness; however, they are not further evaluated in **Section 4** as the site-specific information can be found in the PFAS SI and SI Addendum Reports (CH2M, 2018, forthcoming).

2.4.2 Waste Characterization Results

Because of widespread PFAS in groundwater throughout all of NAS Oceana, all investigation-derived waste (IDW) samples have been analyzed for PFAS as part of the waste characterization since early 2017. The following subsections discuss all results of PFAS sampling of IDW during site-specific investigations for constituents other than PFAS.

2.4.2.1 North Station Landfill

An SI, including groundwater and soil sampling, was completed at the North Station Landfill in 2019. A composite aqueous IDW sample, which included development and purge water from new monitoring wells as well as decontamination fluids, and a soil IDW sample were analyzed for PFAS. PFOA and PFOS were both detected in the

⁶ The 1986 Crash Site was originally investigated during the PFAS SI; however, that location was later deemed incorrect. The revised location was subsequently investigated in the SI Addendum.

⁷ SLs for PFOA and PFOS are based on an HQ of 0.1 and were generated using the USEPA RSL calculator as described in the Assistant Secretary of Defense October 15, 2019 memorandum, "Investigating Per- and Polyfluoroalkyl Substances within the Department of Defense Cleanup Program" (DoD, 2019). SLs for PFBS were generated similarly, but values were updated to those in the May 2021 USEPA RSL table.

composite aqueous IDW samples. PFOA was detected at concentrations exceeding the USEPA lifetime health advisory of 70 ppt (used to determine disposal requirements) and corresponding SL (40 ppt for PFOA) in the composite aqueous IDW sample. PFOS was also detected in the composite soil IDW sample (**Appendix A**).

2.4.2.2 West Side Landfill

An SI, including groundwater and soil sampling, was completed at the West Side Landfill in 2019. A composite aqueous IDW sample that included development and purge water from new monitoring wells, decontamination fluids, and a soil IDW sample were analyzed for PFAS. PFOA and PFOS were not detected at concentrations exceeding the USEPA lifetime health advisory of 70 ppt (used to determine disposal requirements) and corresponding SLs (40 ppt for PFOA and 40 ppt for PFOS) in the composite aqueous IDW sample, and PFOA and PFOS were not detected in the composite soil IDW sample (**Appendix A**).

2.4.2.3 Fifth Green Landfill

An SI, including groundwater and soil sampling, was completed at the Fifth Green Landfill in 2019. A composite aqueous IDW sample, which included development and purge water from new monitoring wells as well as decontamination fluids, and a soil IDW sample were analyzed for PFAS. PFOA and PFOS were not detected at concentrations exceeding the USEPA lifetime health advisory of 70 ppt (used to determine disposal requirements) and corresponding SLs (40 ppt for PFOA and 40 ppt for PFOS) in the composite aqueous IDW sample, and PFOA and PFOS were not detected in the composite soil IDW sample (**Appendix A**).

2.4.2.4 Petroleum-Oil-Lubricant Sites

Quarterly monitoring for free product in groundwater wells was completed in 2019 at the following POL sites at NAS Oceana:

- FITWING
- Day Tank
- NEX Gas Station
- Fuel Farm
- Jet Test Cell
- SWMU 2E
- SWMU 1

A composite aqueous IDW sample, which included purge water from existing monitoring wells, was analyzed for PFAS from each of the sites. PFOA and PFOS were detected at concentrations exceeding the USEPA lifetime health advisory of 70 ppt and corresponding SLs (40 ppt for PFOA and 40 ppt for PFOS) in the aqueous IDW samples from all active POL sites (**Appendix A**).

2.4.3 Oceana Salvage Yard

Groundwater at Oceana Salvage Yard was also previously investigated. Six monitoring wells on Navy property were sampled for PFAS during the RI in 2019 and concentrations of PFOA and PFOS exceeded the SLs at three of these locations.

2.4.4 Construction Related PFAS Sampling

In addition to the investigations discussed in **Sections 2.4.1** through **2.4.3**, a groundwater sample collected from an existing concrete pavement area on 1st Street between Hangars 111 and 122 was analyzed during a construction project (GET Solutions, Inc., 2019a). PFOS was detected in groundwater below the site in sample B-4 at 100 ppt (**Appendix A**), which exceeds the SL of 40 ppt (GET Solutions, Inc., 2019b).

2.4.5 Expedited Response Actions

Because analytical results during the PFAS SI and SI Addendum indicated PFOA and PFOS were present in groundwater beneath the Firefighting Training Area at concentrations exceeding the USEPA's lifetime health

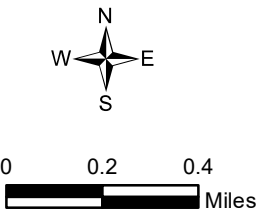
advisory for drinking water, an expedited investigation of drinking water was conducted for properties within a 1-mile radius of any groundwater exceedance of the USEPA lifetime health advisory. A total of 16 wells on 15 properties have been sampled for PFAS. PFOS was detected above the lifetime health advisory at one property; this property has been receiving bottled water since October 2018.

In March 2020, a non-time-critical removal action engineering evaluation/cost analysis (EE/CA) was finalized and recommended connection to City of Virginia Beach water for the one affected property to protect current and future human health receptors from ingestion of PFOA and PFOS at levels exceeding the USEPA lifetime health advisory (CH2M, 2020d). In April 2020, an action memorandum was finalized to document approval for the non-time-critical removal action to provide an alternate drinking water supply of a private water supply well at the one affected property (CH2M, 2020d).





- Legend**
- Groundwater Flow Direction - Columbia
 - Anticipated Groundwater Flow Direction - Columbia
 - Anticipated Overland Flow Direction
 - Water Centerline
 - Water Body
 - Wetland
 - Installation Boundary



Imagery: Esri, 2019

Figure 2-2
NAS Oceana Layout
NAS Oceana
Virginia Beach, Virginia



- Legend**
- Groundwater Flow Direction - Columbia
 - Anticipated Groundwater Flow Direction - Columbia
 - Anticipated Overland Flow Direction
 - Water Centerline
 - 100-Year Flood Zone
 - 500-Year Flood Zone
 - Water Body
 - Wetland
 - Installation Boundary

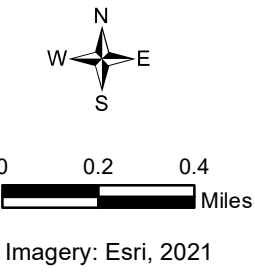


Figure 2-3
Flood Zones
NAS Oceana
Virginia Beach, Virginia



- Legend**
- School Location
 - Daycare
 - Hospitals/Urgent Care Facilities
 - Non-potable Water Supply Well Location
 - Groundwater Flow Direction - Columbia
 - Anticipated Groundwater Flow Direction - Columbia
 - Anticipated Overland Flow Direction

- Water Body
- Wetland
- 1 Mile Zone
- Installation Boundary



0 0.3 0.6
Miles

Imagery: Esri, 2021

Figure 2-4
Water Use and Offsite Receptors
NAS Oceana
Virginia Beach, Virginia

Assessment Methodology

The following activities were performed in support of this PA:

- Reviewed of existing data to identify and characterize potential PFAS releases and to identify potential off-installation receptors
- Conducted interviews with relevant site personnel to validate and verify data collected during the data review, and to provide supplemental information
- Performed a site reconnaissance of the installation to identify any evidence of PFAS releases and potential receptors and migration pathways to identify all AOCs and to fill data gaps identified in the data review and interviews

Each activity is described in the following subsections.

3.1 Data Review

Existing information was gathered and reviewed to identify and characterize locations of potential PFAS use or disposal, and to focus the activities to be conducted during the site reconnaissance. A summary of information reviewed is provided as **Appendix B**. The document types discussed in this subsection were evaluated during the preliminary review.

3.1.1 Internet Records

Internet search engines were utilized in an attempt to find historical information on fires and use of AFFF at NAS Oceana. Limited information relevant to this PA was located during the internet record search. Newspaper articles discussing various crashes on or near the installation were found during the searches (*The Virginian Pilot*, 2012). Crashes that may have resulted in fires and/or the use of AFFF were discussed during the onsite interviews (**Appendix C**). Where relevant to this investigation, results of searches were included in **Section 4** of this report.

3.1.2 Installation Operations Records

Additional information pertaining to installation operations, such as building inventory/installation master plans (historical), spill reports/databases, explosion/accident reports, safety data sheet (SDS) inventory, Site Compliance Evaluation reports, Stormwater Pollution Prevention Plan, Spill Prevention Control and Countermeasure Plans, waste disposal records/waste management plans (specifically for paints and AFFF), emergency management/response plans (specifically for an explanation of how explosives fires are to be fought), and hazardous waste inventory sheets, were obtained by reviewing archived installation records (**Appendix B**). SDSs pertaining to Chemguard 3% AFFF (2011), which was used historically and currently, were also provided. A search of the Naval Facilities Assets Data Store Other Environmental Liabilities (OEL) database was performed on January 8, 2019 (Navy, 2019a). Information obtained from the OEL database regarding building use is used throughout this document. A Freedom of Information Act request was submitted to the Virginia Department of Environmental Quality (VDEQ) on February 22, 2019 (Request #19-464) for any information on NAS Oceana's Water Permitting and Compliance files. In the weeks following the request, VDEQ provided the following information related to NAS Oceana:

- Hazardous Waste Reports and Inventories of Federal Hazardous Waste Activities
- Contingency Plan (specifically for spills, explosions, or fires associated with hazardous waste)
- Hazardous Waste Manifests
- Spill Logs and Incident Reports
- Discharge Monitoring Reports
- National Pollutant Discharge Elimination System Stormwater Permits

3.1.3 Environmental Restoration Program Records

The ER, N Program technical data (analytical and spatial), documents, and records (including the Administrative Record files) are maintained by the Navy in the Naval Installation Restoration Information Solution (NIRIS) information management system. NIRIS documents were searched for key terms⁸ to identify potential PFAS release areas and to obtain information on physical investigations and identification of potential pathways and receptors at those areas. Documents from the Administrative Record were reviewed for information relating to PFAS-containing material storage, use, or disposal at NAS Oceana. Relevant information is included in **Section 4** and a summary of information relating to PFAS-containing material storage, use, or disposal at NAS Oceana is provided as **Appendix B**.

3.1.4 Environmental Data Resources Reports

The following EDR reports were reviewed for NAS Oceana and the surrounding area:

- Geocheck Report (EDR, 2016)
- EDR Offsite Receptor Report (EDR, 2019a)
- NEPA Search May Report (EDR, 2019b)

Additionally, topographic maps from years, 1944, 1948, 1955, 1965, 1970, 1973, 1979, 1980, 1986, 1989, and 2013 (EDR, 2019c) (**Appendix B**) were obtained and reviewed for NAS Oceana and the surrounding area. Sensitive receptor, flood hazard, and wildlife area information was obtained from these reports and is included in **Section 2.3.3**. No information relating to PFAS storage, use, or disposal at NAS Oceana was identified in these records.

3.1.5 National Archives and Naval Heritage and History Command Records

Aerial photographs of potential fire training sites and photographs of emergency response vehicles at NAS Oceana were pulled from the National Archives database. In March 2019, a research team visited the Naval Heritage Command to review Command operation reports for NAS Oceana. Command histories and Command operation reports for NAS Oceana were reviewed during this visit. Relevant information is included in **Section 4** and a summary of information relating to PFAS-containing material storage, use, and/or disposal at NAS Oceana is provided in **Appendix B**.

3.1.6 Maps, Diagrams, and Photographs

Aerial imagery covering the period from 1937 through 2016 was reviewed and analyzed in an attempt to identify evidence of fires and the use of AFFF at NAS Oceana. Acquired imagery was obtained from NAS Oceana, EDR, the GeoReadiness Center, the National Archives, and the National Agricultural Imagery Program, which is administered through the United States Department of Agriculture's Farm Service Agency (CH2M, 2020a). No information relating to PFAS containing-material storage, use, or disposal at NAS Oceana was identified in these photographs.

3.2 Interviews

The installation was provided with a list of employees to interview based on Navy guidance; the installation identified individuals to interview based on that list and availability. From November 2018 to December 2019, CH2M conducted interviews with current and former personnel associated with NAS Oceana, to validate and verify data collected during document and records reviews; identify additional information related to PFAS not

⁸ The following key terms were included in the query: plating, firefighting, fire-fighting, foam, fire, training, fire station, AFFF, light water, PFC, PFAS, crash, pesticide, paint, cleaning, wastewater, WWTP, IWTP, landfill, Teflon, car wash, hobby, sanitary sewer.

previously found in historical documents; and to confirm and select additional locations to observe during site reconnaissance.

The interviews were conducted in person with the exception of follow-up clarification emails. Each interview session was logged using standardized questionnaires along with supporting notes and maps. While interviews were conducted simultaneously for NAS Oceana, Naval Auxiliary Landing Field (NALF) Fentress, and Dam Neck Annex information related to the other two installations was removed from the interview forms for this report for the purpose of clarity since PFAS investigations are being conducted separately for these installations.

CH2M interviewed the following personnel:

- Former NAS Oceana Lead Environmental Protection Specialist – November 16, 2018
- Navy Region Mid-Atlantic Fire and Emergency Services District Chief – May 6, 2019, follow-up email on July 29, 2019 and March 24, 2020
- Former NAS Oceana Media Manager – June 18, 2019
- Former NAS Oceana Environmental Protection Specialist – August 6, 2019
- NAS Oceana Hangar Manager – August 8, 2019
- Former NAS Oceana Water Program Manager – September 10, 2019
- Environmental Services Supervisor and NAS Oceana Tier II Representative for Environmental Services – September 26, 2019
- NAS Oceana Electrician – October 10, 2019
- NAS Oceana Media Manager – October 23, 2019
- Navy Region Mid-Atlantic Fire and Emergency Services Supervisory Chief – October 14, 2019
- Navy Region Mid-Atlantic Fire and Emergency Services Chief – November 8, 2019
- NAS Oceana Airfield Operations Manager – November 15, 2019
- NAS Oceana Lead Environmental Protection Specialist – August 11, 2020

Information relating to fires, crashes, and PFAS storage, use, and disposal at NAS Oceana was identified in these interviews. Relevant information is included in **Section 4** and additional details of the listed interviews are presented in **Appendix C**.

3.3 Site Reconnaissance

Site reconnaissance was completed in October and November of 2019. During the site reconnaissance, accessible areas were visited to identify any evidence of PFAS use and/or disposal, to fill data gaps identified in the document review and interviews, and to document physical site characteristics (such as surface flow and drainage conditions) for areas with potential PFAS releases. Photographs from the site visits are included in **Appendix D**.

Findings and Recommendations

Section 4.1 provides an assessment of NAS Oceana and off-installation drinking water sources and determines whether a potential exposure pathway exists. Due to the number of release areas, some release areas were grouped geographically into AOCs. The AOCs at NAS Oceana include the following areas (**Figure 4-1**):

- AOC 1 – Fire Training Area and Northwestern Runway Area
- AOC 2 – Northeastern Runway Area
- AOC 3 – Aircraft Maintenance Area

Tables 4-1a through **4-1d** provide a list of typical PFAS release areas at Navy facilities, summarizes whether those areas are present at the AOC, and for those that are present, identifies whether evidence suggests the area is a potential PFAS release area that warrants additional consideration. **Tables 4-1a** through **4-1c** correspond to AOCs 1 through 3 and the remaining standalone sites that do not fall within an AOC are evaluated within **Table 4-1d**. Areas evaluated in this PA are shown on **Figure 4-1**. Each area in the AOC, that has not been evaluated in the PFAS SI or SI Addendum, is discussed individually in **Sections 4.2.1** through **4.2.3**. Standalone release areas are discussed in **Section 4.2.4**. Area-specific information including migration pathways and exposure assessment is also provided.

Areas evaluated in the PA at unknown locations are included in **Appendix E**.

4.1 Off-installation Drinking Water Exposure Assessment

An evaluation of drinking water was conducted to determine whether drinking water at NAS Oceana and off-installation properties could have been impacted by any of the potential PFAS release areas identified in **Tables 4-1a** through **4-1d** and **Figure 4-1**. As discussed in **Section 2.3.2**, NAS Oceana and the majority of parcels downgradient of NAS Oceana use City of Virginia Beach drinking water; however, at least 15 properties use groundwater as a drinking water source. Sixteen wells located on 15 properties were previously sampled for PFAS as part of the PFAS SI and SI Addendum; however, additional private potable wells may exist within 1 mile downgradient of the potential PFAS release areas identified in this PA. One drinking water well had exceedances of the USEPA lifetime health advisory, and an expedited response action was implemented. Under the expedited response action, bottled water was provided to the property that exceeds the USEPA lifetime health advisory. An EE/CA recommended establishing connection to City water as the preferred alternative to allow for a permanent solution to provide PFAS-free drinking water to affected residents (CH2M, 2020d). All property owners within 1 mile of on-installation exceedances of the USEPA lifetime health advisory have been notified and asked to contact the Navy for sampling if they have a private drinking water well on their property; however, no additional wells have been located at this time.

As shown on **Figure 2-3**, groundwater in the Surficial/Columbia aquifer appears to flow off-installation. As discussed in **Section 2.4.2**, complete exposure pathways have been identified for off-installation drinking water and an expedited response action was completed (NAVFAC, 2019). However, if additional sampling on-installation identifies a new exposure pathway, additional off-installation drinking water sampling will be initiated.

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Table 4-1a. Areas Evaluated for Potential PFAS Release in the Fire Training Area and Northwestern Runway Area (AOC 1)

Building/Site/Area	Potential or Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
Firefighting Training Areas and Spray Test Areas			
Firefighting Training Area (Figure 4-1)	Yes	Yes	<p>The Firefighting Training Area, which includes an abandoned runway used for firefighting training activities (SWMU 11, historically known as Site 11), two former firefighting training rings, a jet mockup training device, and a firefighting training facility (Facility 3007), is located on the west side of the runways. Firefighting training activities in this area were originally conducted on abandoned Runway 18-36 beginning in the early 1960s and continuing into the 1990s.</p> <ul style="list-style-type: none">• Prior to the mid-1970s, fires were set and extinguished weekly by pouring approximately 7,500 gallons per year of waste fuels in the center of the runway (RGH, 1984).• After the construction of a bermed firefighting training ring in the mid-1970s, approximately 300 to 500 gallons of waste fuel per exercise, amounting to approximately 50,000 gallons annually, were placed in the bermed ring for burning (RGH, 1984).• From 1969 to 1984, the Fire Prevention Branch used approximately 2,000 gallons of AFFF per year, mainly in its training exercises at the bermed firefighting training ring (RGH, 1984).• Multiple undated (pre-1983) incidents occurred of overflow of firefighting training waste and jet propellant-5 (JP-5) fuel from the bermed firefighting training ring, near the crash firefighting school (NAVFAC, 1983). In 1984, a new propane firefighting training ring was installed (RGH, 1984) with a large oil-water separator (OWS) but no holding tank (Navy, 1994a). In 1994, it was reported that 6,000 gallons of AFFF were potentially discharged to the storm sewer annually (NAVFAC, 1995) during weekly equipment testing conducted by the Oceana Fire Department (Navy, 1994a). <p>In the early 1990s, the Navy constructed a jet mockup training device that used propane as fuel for firefighting exercises (CH2M, 2001). Facility 3007, located on the northwestern side of the runway, was constructed in 1994 as a light petroleum gas crash firefighting training facility equipped with a firefighting training ring (Navy, 1995). Historical documentation does not indicate that AFFF was used at the jet mockup; however, according to a former NAS Oceana Environmental Protection Specialist, firefighters would actively spray AFFF during firefighting training exercises at the jet mockup and in the Firefighting Training Area (Former NAS Oceana EPS, pers. comm., 2019). This area was investigated during the PFAS SI and SI Addendum and concentrations of PFOA, PFOS, and PFBS in groundwater exceed the SLs. Details of releases in this area, including migration pathways and potential receptors are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).</p>
Runways			
Runway 14L-32R/Runway 14R-32L West (Figure 4-3)	Yes	No	<p>Runway 14L-32R/Runway 14R-32L West is located on the northwest section of the base. Numerous incidents have occurred on these runways, although the exact locations of some of the incidents are unknown:</p> <ul style="list-style-type: none">• In September 1965, a Phantom II jet crashed at the end of a runway at NAS Oceana. Flaming debris from the crash was spread over several hundred yards and Navy firefighters extinguished the fire using crash trucks (<i>The Virginia Beach Sun</i>, 1965). The exact location of this crash is unknown.• Based on fire department records (NRMFES District Chief, pers. Comm., 2019), on August 28, 1971, an A-4 aircraft crashed during take-off. The exact location of this fire is unknown.• In August 1979, an A-7 jet returning to an aircraft carrier was forced to make an emergency landing at NAS Oceana when the landing gear would not lower. Reports indicate that the crash crew foamed the runway to prepare for the landing (<i>The Virginian Pilot</i>, 1979). The exact location of this fire is unknown.• According to the Naval Safety Center Database (Navy, 2019b), on March 15, 1981, a F-14 aircraft had an emergency landing on a foamed runway; however, the specific runway was not identified.• On May 8, 1990, an F-14 aircraft caught fire on take-off which was subsequently aborted. The exact location of this fire is unknown.• On November 18, 1993, an F-14 aircraft caught fire, resulting in an out-of-control flight. The exact location of this fire is unknown (Navy, 2019b).• On September 12, 2001, a F/A-18C aircraft had a right engine fire on takeoff (Navy, 2019b). The crash crew reportedly sprayed an unspecified fire extinguishing agent in engine intake and bay (Navy, 2019b). The exact location is unknown.• On October 26, 2007, a C002A aircraft had electrical fire and failure with smoke coming from cabin upon landing (Navy, 2019b). The exact location of the fire is unknown.• On July 21, 1988, the left engine of a F-14 aircraft had an explosive failure, which resulted in damage and an engine bay fire (Navy, 2019b). The exact location of the fire is unknown.• On June 7, 1999, the brakes of an F/A-18C aircraft caught fire and the fire was extinguished by a crash crew. The exact location of this fire is unknown.• On September 11, 2012, the brakes of a F/A-18F aircraft parked at VFA-32 line caught fire post landing during maintenance. Records indicate the fire was extinguished by the NAS Oceana Fire Department; however, the exact location of this incident was not available. The Navy Region Mid-Atlantic Fire and Emergency Services (NRMFES) District Chief confirmed that only water was used in this incident (NRMFES District Chief, pers. comm., 2020).• On August 11, 2015, an F/A-18C aircraft caught fire during hot-refueling and was extinguished by NAS Oceana Fire Department (Navy, 2019). Irreparable damage incurred to aircraft fuselage, cockpit, engine nacelles, and external fuel tank (Navy, 2019b). <p>Because of the uncertainty of potential AFFF releases along portions of the runway and the nature of activities on runways, Runway 14L-32R/14R-32L West a potential PFAS release area and is further evaluated in Section 4.2.2.</p>
Industrial/Sanitary Wastewater Treatment Plants			
WWTP 1 (Figure 4-1)	No	No	WWTP 1 was located in the northwestern portion of NAS Oceana and was used from the early 1940s until 1951, at which time the plant was replaced with a new facility (WWTP 2). Because the use of this treatment plant predates the development of PFAS, no further action is recommended.
WWTP 2 (Figure 4-1)	No	Yes	Until the mid-1970s, sanitary sewage generated on-installation was treated at the Navy-owned WWTP 2, located in the northwestern corner of the station (Buildings SD1-1 and SD-0) (RGH, 1984). This plant was put into operation in 1951 and replaced WWTP 1 (RGH, 1984). Treated effluent from the WWTP 2 was discharged to a drainage ditch that leaves the installation on its western edge (RGH, 1984). Before 1982, most aqueous hazardous wastes were disposed of by rinsing them into the sanitary sewer (RGH, 1984); therefore, these wastes were likely discharged to WWTP 2. Sludge was routinely disposed of by land spreading on the western sides of the installation, giving it away as fertilizer, and landfilling. In 1983 and 1984, the inactive sewage treatment plant was demolished, and the debris carried off-installation for disposal (RGH, 1984). Residual sludge in the tanks was trucked to the main pumping station (SD-600), where it was added to the influent (RGH, 1984). Monitoring well OC-MW13, located within the area of WWTP 2, was sampled for PFAS during the PFAS SI Addendum and all PFOA and PFOS results were less than the respective SLs (CH2M, forthcoming). Therefore, no further action is recommended.

Table 4-1a. Areas Evaluated for Potential PFAS Release in the Fire Training Area and Northwestern Runway Area (AOC 1)

Building/Site/Area	Potential or Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
Landfill and Waste Disposal Areas			
Inert Landfill (Figure 4-3)	Yes	No	The Inert Landfill, located north of Potters Road, was an unlined landfill used as a borrow pit for soil during the construction of Interstate 44, which is now known as Interstate 264 (A.T. Kearney, 1989). The landfill encompasses approximately 26 acres (A.T. Kearney, 1989). Based on interviews with installation personnel, this area was used for disposal of soil and concrete during runway construction activities (NAS Oceana Electrician, pers. comm., 2019). Due to the numerous documented releases of AFFF near the runway, the Inert Landfill likely received construction debris and soil from the runway that contained residual PFAS; therefore, further evaluation of the Inert Landfill is provided in Section 4.2.1 .
West Side Landfill (Figure 4-1)	No	No	The West Side Landfill, located on the western portion of NAS Oceana, was used during the initial construction period of the installation and contains construction debris, such as concrete and metal (A.T. Kearney, 1989). Installation personnel indicated that the West Side Landfill began accepting waste in 1941, and waste was no longer placed at the landfill in 1945 (A.T. Kearney, 1989). During the site-specific SI in 2019, aqueous IDW was sampled for PFAS, and PFOA and PFOS were detected at concentrations less than the SLs (Appendix A). Because IDW results indicated PFAS concentrations less than the SLs and landfill activities predate use of PFAS-containing materials, no additional action is recommended for West Side Landfill.
Emergency Response Area			
1981 F-14 Crash (unknown date) (Figure 4-1)	No	Yes	According to documents provided by the NRMFES District Chief, an F-14 aircraft crashed on an unknown date in 1981 (NRMFES District Chief, pers. comm., 2019) in the northwestern corner of the installation. No records of the emergency response related to this crash or of a resulting fire were identified during PFAS PA activities. There is no indication of a fire occurring during this incident and no evidence of known usage or releases of AFFF was identified. Because the crash was identified as a potential PFAS release area during PFAS SI activities, groundwater near the 1981 F-14 Crash site was sampled to determine if AFFF was used during the emergency response. Monitoring wells near the reported 1981 F-14 Crash site were sampled for PFAS during the PFAS SI Addendum and all PFOA and PFOS results were less than the respective SLs (CH2M, forthcoming); therefore, no additional action is recommended for the 1981 F-14 crash.
Areas with AFFF Fire Suppression Systems			
No current or historical areas with AFFF Fire Suppression Systems were identified within AOC 1.			
Hangars			
No current or historical areas with Hangars were identified within AOC 1.			
Chromium Plating Shops			
No current or historical areas with Chromium Plating Shops were identified within AOC 1.			
Fire Station			
No current or historical areas with Fire Stations were identified within AOC 1.			
Car Washes, Auto Hobby Shops, and Vehicle Maintenance Shops			
No current or historical areas with Car Washes, Auto Hobby Shops, and Maintenance Shops were identified within AOC 1.			
Wash Racks			
No current or historical areas with Wash Racks were identified within AOC 1.			
Specialty Paint, Cleaner, or Pesticide Use or Release			
No current or historical areas with Specialty Paint, Cleaner, or Pesticide Use or Release were identified within AOC 1.			
Potential PFAS Storage Areas			
No current or historical areas with Potential PFAS Storage Areas were identified within AOC 1.			
Hazardous Waste Storage Areas			
No current or historical areas with Hazardous Waste Storage Areas were identified within AOC 1.			
Other Notable Locations			
No other current or historical notable areas were identified within AOC 1.			

Table 4-1b. Areas Evaluated for Potential PFAS Releases in the Northeastern Runway Area (AOC 2)

Building/Site/Area	Potential/ Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
Firefighting Training Areas and Spray Test Areas			
No current or historical areas with Firefighting Training Areas and Spray Test Areas were identified within AOC 2.			
Runways			
Runway 5L-23R/Runway 5R-23L North (Figure 4-1)	Yes	Yes	<p>Runway 5L-23R/Runway 5R-23L North is located in the northeast section of the base (Figure 4-1). Numerous incidents have occurred on these runways:</p> <ul style="list-style-type: none">In July 1965, a Grumman Tracker plane made an emergency landing at NAS Oceana after the landing gear would not descend. To prepare for the landing, the installation covered 2,000 feet of the 12,000 feet runway (Runway 5R-23L) with firefighting foam (<i>The Ledger-Star</i>, 1965); however, the exact location along the runway is unknown.On February 28, 1972, a TA-4 Skyhawk trainer aircraft experienced difficulty during takeoff and crashed 100 yards short of departure end of Runway 23L (NRMFES District Chief, pers. comm., 2019). No records of the emergency response related to this crash were identified during PFAS PA activities. There is no indication of a fire occurring during this incident and no evidence of known usage or releases of AFFF was identified.On May 24, 1972, an A-6 Intruder aircraft crashed on Runway 23L while landing (NRMFES District Chief, pers. comm., 2019). No records of the emergency response related to this crash or of a resulting fire were identified during PFAS PA activities. There is no indication of a fire occurring during this incident and no evidence of know usage or releases of AFFF was identified.On August 9, 1972, an A-6 Intruder aircraft crashed on Runway 23R after performing field carrier landing practice at NALF Fentress (NRMFES District Chief, pers. comm., 2019). No records of the emergency response related to this crash or of a resulting fire were identified during PFAS PA activities. There is no indication of a fire occurring during this incident and no evidence of known usage or releases of AFFF was identified.On July 20, 2011, the landing gear wheels of a F/A-18E aircraft were emitting smoke after high speed abort on Runway 5R-23L. Records indicate the fire department applied coolant to the tires; however, the exact location of this incident was not provided. The NRMFES District Chief confirmed that only water was used in this incident (NRMFES District Chief, pers. comm., 2020). On July 3, 2013, the brakes of a F/A-18F aircraft caught fire after landing on Runway 23R. The fire was sprayed by emergency vehicles; however, the exact location of this incident was not provided. The NRMFES District Chief confirmed that only water was used in this incident (NRMFES District Chief, pers. comm., 2020). <p>Additionally, as indicated in the runway entry within Table 4-1a, numerous incidents, which may have resulted in the use of AFFF, have occurred at unknown locations along the runways at NAS Oceana. This runway was investigated during the SI and SI Addendum and PFOA and PFOS were detected in groundwater above SLs adjacent to the runway. Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).</p>
Runway 14L-32R/Runway 14R-32L East (Figure 4-5)	Yes	No	<p>Runway 14L-32R/Runway 14R-32L East is located to the north of the flightline. Numerous incidents have occurred on these runways, although the exact locations of some of the incidents are unknown:</p> <ul style="list-style-type: none">In September 1965, a Phantom II jet crashed at the end of a runway at NAS Oceana. Flaming debris from the crash was spread over several hundred yards and Navy firefighters extinguished the fire using crash trucks (<i>The Virginia Beach Sun</i>, 1965). The exact location of this crash is unknown.Based on fire department records (NRMFES District Chief, pers. comm., 2019), on August 28, 1971, an A-4 aircraft crashed during take-off. The exact location of this fire is unknown.In August 1979, an A-7 jet returning to an aircraft carrier was forced to make an emergency landing at NAS Oceana when the landing gear would not lower. Reports indicate that the crash crew foamed the runway to prepare for the landing (<i>The Virginian Pilot</i>, 1979). The exact location of this fire is unknown.According to the Naval Safety Center Database (Appendix B), on March 15, 1981, a F-14 aircraft had an emergency landing on a foamed runway; however, the specific runway was not identified.On May 8, 1990, an F-14 aircraft caught fire on take-off which was subsequently aborted (Navy, 2019b). The exact location of this fire is unknown.On November 18, 1993, an F-14 aircraft caught fire next to, resulting in an out-of-control flight (Navy, 2019b). The exact location of this fire is unknown.On September 12, 2001, a F/A-18C aircraft had a right engine fire on takeoff (Navy, 2019b). The crash crew reportedly sprayed an unspecified fire extinguishing agent in engine intake and bay (Navy, 2019b). The exact location is unknown.On October 26, 2007, a C002A aircraft had electrical fire and failure with smoke coming from cabin upon landing (Navy, 2019b). The exact location of the fire is unknown.On July 21, 1988, the left engine of a F-14 aircraft had an explosive failure, which resulted in damage and an engine bay fire (Navy, 2019b). The exact location of the fire is unknown.On June 7, 1999, the brakes of an F/A-18C aircraft caught fire and the fire was extinguished by a crash crew. The exact location of this fire is unknown.On September 11, 2012, the brakes of a F/A-18F aircraft parked at VFA-32 line caught fire post landing during maintenance. Records indicate the fire was extinguished by the NAS Oceana Fire Department; however, the exact location of this incident was not available. The NRMFES District Chief confirmed that only water was used in this incident (NRMFES District Chief, pers. comm., 2020).On August 11, 2015, an F/A-18C aircraft caught fire during hot-refueling and was extinguished by NAS Oceana Fire Department (Navy, 2019). Irreparable damage incurred to aircraft fuselage, cockpit, engine nacelles, and external fuel tank (Navy, 2019b). <p>Because of the uncertainty of potential AFFF releases along portions of the runway and the nature of activities on runways, Runway 14L-32R/Runway 14R-32L East is a potential PFAS release area. Therefore, further evaluation of Runway 14L-32R/Runway 14R-32L East is provided in Section 4.2.2.</p>
Industrial/Sanitary Wastewater Treatment Plants			
No current or historical areas with Industrial/Sanitary Wastewater Treatment Plants were identified within AOC 2.			
Landfill and Waste Disposal Areas			
Construction Debris Landfill (Figure 4-3)	Yes	No	<p>The Construction Debris Landfill, located in the northeastern portion of NAS Oceana, is an unlined landfill, approximately ½-acre in size, that was used for disposal of construction debris, furniture, empty paint and paint thinner cans, tires, and scrap metal. Although the site was designated as a construction debris landfill, controls on the type of waste disposed of at this landfill did not prevent other wastes from being disposed of at the site (A.T. Kearney, 1989). An empty AFFF drum was present during the 2020 test pitting investigations; therefore, further evaluation of the Construction Debris Landfill is provided in Section 4.2.2.</p>

Table 4-1b. Areas Evaluated for Potential PFAS Releases in the Northeastern Runway Area (AOC 2)

Building/Site/Area	Potential/ Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
Emergency Response Area			
Crash Truck Waiting Area (Figure 4-1)	No	No	According to the NRMFES District Chief, crash trucks are staged at the south corner of the flightline during aircraft flying events in case of an emergency (NRMFES District Chief, pers. comm., 2020). Fire department personnel did not indicate spray testing is done at the Crash Truck Waiting Area. No reports of potential AFFF releases at this site were identified during PFAS PA activities; therefore, no further action is recommended.
1986 Oceana Boulevard Crash (Figure 4-1)	Yes	Yes	On May 22, 1986, an A-6 Intruder aircraft crashed on Oceana Boulevard (NRMFES District Chief, pers. comm., 2019). According to a WAVY TV broadcast on May 22, 1986, when the jet went down, it sprayed a civilian’s car with fuel and ignited (<i>WAVY Archive</i> , 2019). During the broadcast, fire trucks were visible at the scene of the crash, however, the use of AFFF was not apparent. No records of AFFF use for the emergency response related to this crash were identified during PFAS PA activities; however, due to the fire that occurred, the use of AFFF for emergency response at the site of this crash could not be ruled out. During the SI and SI Addendum fieldwork, no monitoring wells could be installed at the location of this crash or immediately downgradient due to access issues. Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).
1998 Saab 35 Draken Crash (Figure 4-1)	No	No	On June 26, 1998, a Saab 35 Draken aircraft crashed when approaching Runway 23L (Navy, 2019b). According to a <i>Daily Press</i> article from April 18, 1996 (<i>Daily Press</i> , 1998), the plane skidded to a stop in the field with landing gear up after the pilot ejected because it was out of fuel, and the pilot was standing by the plane when the emergency responders arrived. Because there was no fire as a result of the crash and because the plane was out of fuel, it is unlikely that any AFFF would have been used for emergency response at this potential release area. No further action is recommended for the 1998 Saab 35 Draken Crash.
Areas with AFFF Fire Suppression Systems			
Site 15 (Figure 4-1)	No	No	Site 15, also known as the Abandoned Tank Farm, is located in the northern portion of the installation and consisted of two 50,000-gallon concrete tanks that were formerly used to store aviation gas (RGH, 1984). The abandoned tank farm served as a primary fueling location in the 1950s (CH2M, 2001) There is no indication this Tank Farm had an AFFF fire suppression system (FSS) or that any emergencies resulting in potential AFFF releases occurred at the site. Therefore, no further action is recommended for the Site 15 Abandoned Tank Farm.
Hangars			
Hangar 3025 (Figure 4-1)	No	No	Hangar 3025, which was constructed in 2003, has a water FSS (Navy, 2019a). No evidence of AFFF storage, hazardous waste storage, or known usage of AFFF or other PFAS-containing materials was identified at this building during PFAS PA activities. Therefore, no further action is recommended for Hangar 3025.
Chromium Plating Shops			
No current or historical areas with Chromium Plating Shops were identified within AOC 2.			
Fire Station			
No current or historical areas with Fire Stations were identified within AOC 2.			
Car Washes, Auto Hobby Shops, and Vehicle Maintenance Shops			
No current or historical areas with Car Washes, Auto Hobby Shops, and Maintenance Shops were identified within AOC 2.			
Wash Racks			
No current or historical areas with Wash Racks were identified within AOC 2.			
Specialty Paint, Cleaner, or Pesticide Use or Release			
No current or historical areas with Specialty Paint, Cleaner, or Pesticide Use or Release were identified within AOC 2.			
Potential PFAS Storage Areas			
No current or historical areas with Potential PFAS Storage Areas were identified within AOC 2.			
Hazardous Waste Storage Areas			
No current or historical areas with Hazardous Waste Storage Areas were identified within AOC 2.			
Other Notable Locations			
No other current or historical notable areas were identified within AOC 2.			

Table 4-1c. Areas Evaluated for Potential PFAS Releases in the Aircraft Maintenance Area (AOC 3)

Building/Site/Area	Potential/ Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
Firefighting Training Areas and Spray Test Areas			
Combat Aircraft Loading Area (CALA) (Figure 4-1)	Yes	Yes	According to an NAS Oceana electrician, the CALA is an area that firefighters would drive trucks around and practice spraying, but it is unknown whether they were spraying water or AFFF (NAS Oceana Electrician, pers. comm., 2019). However, these activities were not corroborated by any of the firefighters interviewed during the PFAS PA. A historical photograph also showed an overturned fuel truck at the weapons pad in 1987. According to the NRMFES District Chief and based on the photograph, AFFF was used in response to this overturned fuel truck (NRMFES District Chief, pers. comm., 2019). This area was investigated during the SI Addendum and PFOS was detected in groundwater at concentrations exceeding the SLs. Details of releases in this area, including migration pathways and potential receptors, are provided in the forthcoming PFAS SI Addendum Report (CH2M, forthcoming).
Runways			
Runway 5L-23R/Runway 5R-23L South (Figure 4-1)	Yes	Yes	<p>Runway 5L-23R/Runway 5R-23L South is located to the in the southwestern portion of the base (Figure 4-1). Numerous incidents have occurred on these runways, although the exact locations of some of the incidents are unknown:</p> <ul style="list-style-type: none">• In July 1965, a Grumman Tracker plane made an emergency landing at NAS Oceana after the landing gear would not descend. To prepare for the landing, the installation covered 2,000 feet of the 12,000 feet runway (Runway 5R-23L) with firefighting foam (<i>The Ledger-Star</i>, 1965); however, the exact location along the runway is unknown. On October 25, 1967, an A-4 Skyhawk crashed on Runway 23L (NRMFES District Chief, pers. comm., 2019). No records of the emergency response related to this crash were identified during PA activities.• According to a location marked on the aircraft incident map, an F-8 Crusader had a mishap inboard of the tow way resulting in a crash (NRMFES District Chief, pers. comm., 2019). No records of the emergency response related to this crash or of a resulting fire were identified during PFAS PA activities. There is no indication of a fire occurring during this incident and no evidence of known usage or releases of AFFF was identified.• On April 24, 1981, an F-14 aircraft attempted takeoff with a dragging starboard wing (NRMFES District Chief, pers. comm., 2019). It rose 20 feet into the air then fell in flames onto Runway 5L/23R. There is no documentation of the emergency response to this incident; however, because the fire likely involved jet fuel, which is a Class B fire, use of AFFF cannot be ruled out.• On December 8, 1981, an F-14 Tomcat aircraft experienced a gear problem and crashed on approach to Runway 5R/23L (NRMFES District Chief, pers. comm., 2019). No records of the emergency response related to this crash or of a resulting fire were identified during PFAS PA activities. There is no indication of a fire occurring during this incident and no evidence of know usage or releases of AFFF was identified.• On July 23, 1994 a T-2 aircraft crashed upon take-off. According to correspondence between the Navy and VDEQ on July 23, 1994 (Navy, 1994c), the emergency response included the use of 30 gallons of AFFF.• In September 2007, an acrobatic pilot crashed a vintage, WWII-era plane while practicing before the installation's annual air show. The plane plunged into a grass strip near the departure end of Runway 5R/23L and burst into flames (Navy, 2019b). According to the NRMFES District Chief, two fire trucks equipped with AFFF were used to extinguish the fire resulting from the civilian plane crash (NRMFES District Chief, pers. comm., 2020).• According to the NAS Oceana Airfield Operations Manager, a Jeep Cherokee vehicle caught fire on the runway just northwest of Building 900 in 2007 (NAS Oceana Airfield Operations Manager, pers. comm., 2019). Wreckage was taken offsite by a contractor. No evidence of known usage or releases of AFFF or PFAS-containing materials was identified at this site.• On July 20, 2011, the landing gear wheels of a F/A-18E aircraft were emitting smoke after high speed abort on Runway 5R-23L. Records indicate the fire department applied coolant to the tires; however, the exact location of this incident was not provided. The NRMFES District Chief confirmed that only water was used in this incident (NRMFES District Chief, pers. comm., 2020).• On July 3, 2013, the brakes of a F/A-18F aircraft caught fire after landing on Runway 23R. The fire was sprayed by emergency vehicles; however, the exact location of this incident was not provided. The NRMFES District Chief confirmed that only water was used in this incident (NRMFES District Chief, pers. comm., 2020). <p>Additionally, as indicated in the runway entry within Table 4-1a, numerous incidents, which may have resulted in the use of AFFF, have occurred at unknown locations along the runways at NAS Oceana. This runway was investigated during the SI and SI Addendum and PFOA and PFOS were detected in groundwater adjacent to the runway at concentrations above the SLs. Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).</p>
Industrial/Sanitary Wastewater Treatment Plants			
No current or historical areas with Industrial/Sanitary Wastewater Treatment Plants were identified within AOC 3.			
Landfill and Waste Disposal Areas			
D Avenue Landfill/Sanitary Landfill (Figure 4-8)	Yes	No	The Sanitary Landfill, also known as D Avenue Landfill, is an 11-acre, unlined landfill that was used for the disposal of solvents, pesticides, mixed municipal wastes, construction debris, electrical conductors, transformers, sanitary refuse, photofinishing, and laboratory/hospital wastes (A.T. Kearney, 1989). The landfill was closed prior to 1996, when groundwater monitoring was implemented to comply with post closure care requirements. Approximately 30 tons of domestic waste per day were placed in the landfill in 1989 (A.T. Kearney, 1989). Concrete rubble that is removed from old aircraft runways and JP-5 jet fuel filters were also disposed of in the Sanitary Landfill (RGH, 1984). Solid waste from NALF Fentress was delivered to D Avenue Landfill/Sanitary Landfill from 1970 to at least 1984 (RGH, 1984). During the years that NALF Fentress brought solid waste to the D Avenue Landfill, there was no other operational landfill at Fentress; therefore, it is likely that wastes containing AFFF and other PFAS-containing materials from NALF Fentress were disposed of at the D Avenue Landfill/Sanitary Landfill. Further evaluation of D Avenue Landfill/Sanitary Landfill is provided in Section 4.2.3 .

Table 4-1c. Areas Evaluated for Potential PFAS Releases in the Aircraft Maintenance Area (AOC 3)

Building/Site/Area	Potential/ Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
Emergency Response Areas			
Crash Truck Waiting Area (Figure 4-1)	No	No	According to the NRMFES District Chief, crash trucks are staged at the south corner of the flightline during aircraft flying events in case of an emergency (NRMFES District Chief, pers. comm., 2020). Fire department personnel did not indicate spray testing is done at the Crash Truck Waiting Area. No reports of potential AFFF releases at this site were identified during PFAS PA activities; therefore, no further action is recommended.
Fuel Pit #10 (Figure 4-4)	Yes	No	According to the NAS Oceana Command History of 1985, on November 16, 1985, a potential disaster was averted when the crew of an MB-1 crash truck rapidly extinguished a fire involving an A-6 aircraft refueling in Fuel Pit #10 (Commander, NAS Oceana, 1986). Because MB-1 crash trucks were equipped with AFFF and the fire involved burning fuel, which would be classified as a Class B fire, it is likely that AFFF was used for emergency response at this potential release area; therefore, further evaluation of Fuel Pit #10 is provided in Section 4.2.3 .
1972 A-4 Crash (August) (Figure 4-1)	No	No	On August 29, 1972 an A-4 Skyhawk reportedly crashed into the back of an administrative building (Commander, NAS Oceana, 1973). The location of this crash was identified based upon NAS Oceana Fire Department records; however, in 1972, no building was constructed in the vicinity of this location. No records of the emergency response related to this crash were identified during PFAS PA activities. Because the crash was identified as a potential PFAS release area during PFAS SI activities, groundwater near the August 1972 A-4 Crash site was sampled to determine if AFFF was used during the emergency response. Monitoring well OW2B-MW49 was sampled at the reported location of the 1972 A-4 Crash during the PFAS SI Addendum and PFOA and PFOS results were less than the respective SLs (CH2M, forthcoming); therefore, no further action is recommended for the August 1972 A-4 Crash.
1977 A-6 Crash (Figure 4-1)	Yes	Yes	Based on Fire Department records (NRMFES District Chief, pers. comm., 2019), on August 5, 1977, an A-6 aircraft crashed when returning from NALF Fentress. News reports indicate that a fire occurred at the crash site and was extinguished (<i>The Virginian Pilot</i> , 1977) but no other information regarding the means of extinguishing the fire were identified during PFAS PA activities. Because the fire was a Class B fire likely involving jet fuel, the use of AFFF cannot be ruled out. Due to access concerns, no monitoring wells were installed within this source area during the SI and SI Addendum; however, the release and migration pathways and recommended path forward are provided in the forthcoming PFAS SI Addendum Report (CH2M, forthcoming).
1996 F-14 Crash (Figure 4-1)	Yes	Yes	In 1996, an F-14 aircraft crashed near the airfield (Navy, 1997). According to a <i>Daily Press</i> article from April 18, 1996 (<i>Daily Press</i> , 1996), the aircraft broke apart on impact, and ignited some small fires in the woods that were quickly extinguished. Due to access concerns, no monitoring wells were installed within this source area during the SI and SI Addendum; however, the release and migration pathways and recommended path forward are provided in the forthcoming PFAS SI Addendum Report (CH2M, forthcoming).
2013 F/A-18E Brake Fire (Figure 4-7)	Yes	No	On August 20, 2013, the brakes of an F/A-18E aircraft caught fire after landing at the squadron aircraft parking line. The fire was extinguished by NAS Oceana Fire Department and it is unknown if AFFF was used to extinguish this fire. The NRMFES District Fire Chief confirmed that a firefighting agent was used in this incident but could not recall if AFFF was the agent that was used (NRMFES District Chief, pers. comm., 2020). Since AFFF may have been used for emergency response at the site, further evaluation of the 2018 F/A-18E Brake Fire is provided in Section 4.2.4 .
Areas with AFFF Fire Suppression Systems			
Jet Test Cell Area (Figure 4-1)	Yes	Yes	<p>The Jet Test Cell Area, which includes the Hush House, includes Building 1100, constructed in 1971, and Building 1116, constructed in 2002 (Navy, 2019a). The area is used for testing jet engines in an enclosed area for the purpose of noise control (CH2M, 2018). From 2013 to 2017, four documented releases of AFFF from the fire suppression system occurred at the Jet Test Cell Area:</p> <ul style="list-style-type: none">On October 29, 2013, approximately 300 gallons of AFFF were spilled onto the pavement of the Jet Test Cell Area when an engine operator activated the wrong switch. Additional information regarding migration and/or cleanup of this spill was not identified during PFAS PA activities.On June 28, 2014, an accidental discharge of 5 gallons of AFFF and 111 gallons of water was released from a fire truck during training at Building 1116. The entire release was recovered using absorbent materials.On September 7, 2016, approximately 2 gallons of AFFF concentrate were accidentally discharged at Building 1116 and recovered. Additional information regarding migration and/or cleanup of this spill was not identified during PFAS PA activities.On May 16, 2017, approximately 1 gallon of AFFF was spilled at Building 1100 from a fire truck that malfunctioned during training. Additional information regarding migration and/or cleanup of this spill was not identified during PFAS PA activities. <p>Building 1116 was storing 14,678 pounds of AFFF in plastic or nonmetallic drums in 2016 (Navy, 2017b). During the 2019 PFAS PA site visits, it was noted that Building 1100 has been empty for 2 years, and that two AFFF tanks were located in the pump room of Building 1116, which had been tested twice in the last 5 years. Results from the PFAS SI indicate concentrations of PFOS exceed the SL in monitoring well JTC-MW-B sampled at the Jet Test Cell (CH2M, 2018). Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).</p>
Hangars			
Hangar 23 (Figure 4-1)	No	No	Hangar 23, which was constructed in 1982, is an aircraft maintenance hangar equipped with a water sprinkler system (Navy, 2019a). According to a Hampton Roads Sanitation District (HRSD) Permit Application from an unknown year (HRSD, n.d.), wash water from the hangar is collected by machines and discharged to an aircraft wash rack drain that would discharge to an OWS prior to entering the sanitary sewer system. This hangar was identified as a potential Teflon-coating area by an NAS Oceana electrician (NAS Oceana Electrician, pers. comm., 2019). No evidence of known usage or releases of AFFF or other PFAS-containing materials was identified during PFAS PA activities. No further action is recommended for Hangar 23.
Hangar 56 (Figure 4-1)	Yes	Yes	Hangar 56, which was constructed in 2012, is a C40 Aircraft Maintenance hangar that is equipped with an AFFF FSS (Navy, 2019a). According to the Hampton Roads Navy spill log (Navy, 2019c), 39,000 gallons of AFFF were spilled and released to the sanitary sewer system from an AFFF holding tank at Hangar 56 on October 12, 2018 due to mechanical failure. It is unclear from interviews and available reports whether any discharges to the environment occurred as a result of this spill and what the volume of those discharges were, but a groundwater sample was collected during the PFAS SI Addendum in 2019 from monitoring well OW2E-MW26 located at the eastern corner of the hangar, and the concentrations of PFOA and PFOS exceeded the corresponding SLs (CH2M, forthcoming). Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).

Table 4-1c. Areas Evaluated for Potential PFAS Releases in the Aircraft Maintenance Area (AOC 3)

Building/Site/Area	Potential/ Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
Hangar 111 (Figure 4-1)	Yes	Yes	Hangar 111, which was constructed in 1988, is a hangar that is equipped with an AFFF FSS (Navy, 2019a). As of 1994, AFFF FSSs in hangar bays were tested every 3 years, releasing anywhere from 1,000 to 6,000 gallons of AFFF/water mixture (Navy, 1994a). While there is no specific mention of testing the FSS in Hangar 111, it is likely it was tested because the hangar was in use at this time. From 1994 to 2003, six documented releases of AFFF occurred at Hangar 111. This area was investigated during the SI and SI Addendum and PFOA and PFOS were detected in groundwater above the SLs. Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).
Hangar 122 (Figure 4-1)	Yes	Yes	Hangar 122, which was constructed in 1957, is a hangar that is equipped with an AFFF FSS (Navy, 2019a). As of 1994, AFFF FSSs in hangar bays were being tested every 3 years, releasing anywhere from 1,000 to 6,000 gallons of AFFF/water mixture (Navy, 1994a). While there is no specific mention of testing the FSS in Hangar 122, it is likely it was tested because the hangar was in use at this time. From 1994 to 2014, seven documented releases of AFFF occurred at Hangar 122. Hangar 122 was storing 20,850 pounds of AFFF in an aboveground storage tank (AST) in 2016 (Navy, 2017b). As of December 2019, the AFFF FSS at Hangar 122 was out of service. This area was investigated during the SI and SI Addendum and PFOA and PFOS were detected in groundwater above the SL. Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).
Hangar 137 (Figure 4-1)	Yes	Yes	Hangar 137, which was constructed in 1993, is a hangar (Navy, 2019a). As of 1994, AFFF FSSs in hangar bays were being tested every 3 years, releasing anywhere from 1,000 to 6,000 gallons of AFFF/water mixture (Navy, 1994a). While there is no specific mention of testing the FSS in Hangar 137, it is likely it was tested because the hangar was in use at this time. This area was investigated during the SI and SI Addendum and PFOA and PFOS were detected in groundwater above the SL. Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).
Hangar 139 (Figure 4-1)	Yes	Yes	<p>Hangar 139, which was constructed in 2000, is a Corrosion Control hangar equipped with an AFFF FSS (Navy, 2019a). Seven documented releases of AFFF occurred at Hangar 139 from 2000 to 2016.</p> <ul style="list-style-type: none">On October 10, 2000, 1,000 gallons of AFFF were spilled at Hangar 139 (NAVFAC, 2006).On September 29, 2006, 600 gallons of AFFF were spilled at Hangar 139 due to mechanical failure (Navy, 2019c).On July 8, 2009, 1 gallon of AFFF and water mixture spilled due to mechanical failure (Navy, 2019c).On August 28, 2009, 425 gallons of AFFF were spilled due to an error in the fire suppression system (Navy, 2019c)On September 4, 2015, 20 gallons of AFFF were spilled due to a failed seal on a riser (Navy, 2019c).On June 28, 2016, 20 gallons of AFFF were released due to valves leaking on a riser (Navy, 2019c). <p>The exact dates and quantities of AFFF spilled are unknown for the other documented releases. This area was investigated during the SI and SI Addendum and PFOA and PFOS were detected in groundwater near Hangar 139 above the SL. Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).</p>
Hangar 145 (Figure 4-1)	Yes	Yes	<p>Hangar 145, which was constructed in 2003, is a hangar that is equipped with an AFFF FSS (Navy, 2019a). Eight documented releases of AFFF occurred at Hangar 145 from 2005 to 2015:</p> <ul style="list-style-type: none">On January 24, 2005, 400 gallons of AFFF were spilled at Hangar 145 due to a frozen water line (Navy, 2006). Additional information regarding migration and/or cleanup of this spill was not identified during PFAS PA activities.On February 14, 2005, 450 gallons of AFFF were spilled at Hangar 145 due to an operator error (Navy, 2008). Additional information regarding migration and/or cleanup of this spill was not identified during PFAS PA activities.On December 16, 2006, 400 pounds of AFFF were spilled at Hangar 145 due to an unknown cause (Navy, 2007). Additional information regarding migration and/or cleanup of this spill was not identified during PFAS PA activities.On December 19, 2006, 50 gallons of AFFF were spilled in Hangar 145 due to a mechanical failure. All 50 gallons of spilled AFFF were received by the sanitary sewer system.On November 18, 2008, diluted AFFF, believed to be less than 30 gallons, was released at Hangar 145. The release was caused by an AFFF fire protection system valve handle that was unintentionally bumped into a partially open position. An unknown quantity of AFFF was released to the sanitary sewer system.On March 30, 2010, 150 gallons of AFFF were spilled at Hangar 145 due to an unknown mechanical failure (Navy, 2014a). The spilled AFFF flowed or was washed to hangar trench drains leading to an AFFF containment tank.On January 7, 2014, 20,000 gallons of AFFF were spilled at Hangar 145, due to a pump malfunction. The spill was cleaned using tanker trucks with 99.9% recovery.On April 22, 2015, approximately 18 gallons of a mixture of AFFF and water were spilled at Hangar 145 due to an operator error during fire alarm maintenance. The spill was cleaned with pump trucks, and approximately 15 gallons of the spilled AFFF water mixture was released to the sanitary sewer system. <p>Hangar 145 was storing 30,024 pounds of AFFF in an AST in 2016 (Navy, 2017b). This hangar was identified as a fire truck washing area by the former fire chief (NRMFES Supervisory Chief, pers. comm., 2019). Results from the PFAS SI indicate concentrations of PFOA and PFOS exceed the SLs in monitoring well OW2B-MW41 sampled northwest of Hangar 145 (CH2M, 2018). Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).</p>

Table 4-1c. Areas Evaluated for Potential PFAS Releases in the Aircraft Maintenance Area (AOC 3)

Building/Site/Area	Potential/ Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
Hangar 200 (Figure 4-1)	Yes	Yes	<p>Hangar 200, which was constructed in 1954, is a hangar that equipped with an AFFF FSS (Navy, 2019a). In 1994, AFFF FSSs in hangar bays were being tested every 3 years, releasing anywhere from 1,000 to 6,000 gallons of AFFF/water mixture (Navy, 1994a). While there is no specific mention of testing the FSS in Hangar 200, it is likely it was tested because the hangar was in use at this time. From 2006 to 2015, four documented releases occurred at Hangar 200:</p> <ul style="list-style-type: none">On November 16, 2006, 700 gallons of AFFF were spilled at Hangar 200 due to an unknown cause and entered the sanitary sewer system (Navy, 2008).On March 15, 2007, 3 gallons of AFFF were spilled at Hangar 200 due to mechanical failure, and as part of the cleanup, the released AFFF was pumped out of the receiving OWS.On February 18, 2008, 507 gallons of AFFF were spilled at Hangar 200 due to mechanical failure and were cleaned up by pump trucks.On December 2, 2010, 250 gallons of AFFF were spilled from the AFFF FFS at Hangar 200 due to a mechanical failure and released to the sanitary sewer system (Navy, 2014a). The affected area was rinsed; however, it is unknown what the affected area was rinsed with or where the rinsate was collected. <p>Hangar 200 was storing 14,178 pounds of AFFF in an AST in 2016 (Navy, 2017b). During the 2019 PFAS PA site visits, a 6,050-gallon AFFF tank was located in the pump room. Results from the PFAS SI indicated concentrations of PFOA and PFOS exceed the SLs in monitoring well OW2E-MW19 sampled at the northeastern corner of Hangar 200 (CH2M, 2018). This area was investigated during the SI and PFOA and PFOS were detected in groundwater above the SLs. Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).</p>
Hangar 223 (Figure 4-1)	Yes	Yes	<p>Hangar 223, which was constructed in 1982, is the Center for Naval Aviation Technical Training Unit hangar (Navy, 2019a). According to Aviation Safety Council Minutes from June 1994 (Aviation Safety Council, 1994), in 1994, Hangar 223 was equipped with an AFFF sprinkler system with a 3,000-gallon tank and a total of 6,000 gallons of 3M Lightwater stored at the hangar. Additionally, from 1994 to 2009, six documented releases of AFFF occurred at Hangar 223:</p> <ul style="list-style-type: none">On March 31, 1994, 25 gallons of AFFF were spilled at Hangar 223 when fire drill personnel inadvertently pulled the AFFF system lever. Additional information regarding migration and/or cleanup of this spill was not identified during PFAS PA activities.On August 30, 1994, 500 gallons of a mixture of AFFF and water were spilled at Hangar 223 during testing of the AFFF system and entered the storm drain. Additional information regarding cleanup of this spill was not identified during PFAS PA activities.On February 8, 1995, 18 gallons of AFFF were spilled at Hangar 223 due to a solenoid malfunction. Additional information regarding migration and/or cleanup of this spill was not identified during PFAS PA activities.On July 25, 1996, 100 gallons of AFFF were spilled at Hangar 223 due to a faulty heat detector. Additional information regarding migration and/or cleanup of this spill was not identified during PA activities.On July 24, 1996, 100 gallons of 3% AFFF solution was released at Hangar 223 due to a faulty heat detector and cleaned up. Additional information regarding migration and/or cleanup of this spill was not identified during PFAS PA activities.On March 9, 2009, 5 gallons of AFFF were spilled in the pump room of Hangar 223 and fully recovered. <p>Hangar 223 was storing 33,360 pounds of AFFF in an AST in 2016 (Navy, 2017b). As of December 2019, the AFFF FSS at Hangar 223 was out of service; however, two 55-gallon barrels of AFFF were observed in the pump room during the 2019 PFAS PA site visits. During the 2019 PFAS PA site visits, it was also noted that Hangar 223 is now used for events rather than for hangar activities. This area was investigated during the SI Addendum and PFOA and PFOS were detected in groundwater above the SLs. Details of releases in this area, including migration pathways and potential receptors, are provided in the forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).</p>
Hangar 404 (Figure 4-1)	Yes	Yes	<p>Hangar 404, which was constructed in 1974, is a hangar that is equipped with an AFFF FSS (Navy, 2019a). In 1994, AFFF FSSs in hangar bays were being tested every 3 years, releasing anywhere from 1,000 to 6,000 gallons of AFFF/water mixture (Navy, 1994a). While there is no specific mention of testing the FSS in Hangar 404, it is likely it was tested because the hangar was in use at this time. From 1992 to 2002, three documented releases of AFFF occurred at Hangar 404:</p> <ul style="list-style-type: none">On July 11, 1992, approximately 2,500 gallons of a mixture of AFFF and water were spilled at Hangar 404 due to an AFFF FSS failure, and 1,000 gallons were released to the storm drain system. Additional information regarding cleanup of this spill was not identified during PFAS PA activities.On May 17, 1996, 550 gallons of AFFF were spilled at Hangar 404 while a contractor was working on the AFFF FSS. Additional information regarding migration and/or cleanup of this spill was not identified during PFAS PA activities.On May 15, 2002, 2,505 gallons of AFFF were spilled at Hangar 404 (NAVFAC, 2006). Additional information regarding migration and/or cleanup of this spill was not identified during PFAS PA activities. <p>According to the Aviation Safety Council Minutes from June 1994 (Aviation Safety Council, 1994), in 1994, Hangar 404 was equipped with an AFFF sprinkler system with a 3,000-gallon tank and a total of 6,000 gallons of 3M Lightwater stored at the hangar; however, as much as 66,720 pounds of AFFF were being stored in an AST at Hangar 404 by 2016 (Navy, 2017b). As of December 2019, the AFFF FSS at Hangar 404 was out of service. Results from the PFAS SI indicate concentrations of PFOA and PFOS exceed the SLs in monitoring well OW2C-MW25 sampled northeast of Hangar 404 (CH2M, 2018). Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).</p>
Hangar 500 (Figure 4-1)	Yes	Yes	<p>Hangar 500, which was constructed in 1968, is a hangar that is equipped with an AFFF FSS (Navy, 2019a). This hangar was identified as a fire truck washing area by the former fire chief (NRMFES Supervisory Chief, pers. comm., 2019). From 2005 to 2017, eight documented releases of AFFF occurred at Hangar 500. Results from the PFAS SI indicate concentrations of PFOA and PFOS exceed the SLs in monitoring well OW2C-MW19 sampled southeast of Hangar 500 (CH2M, 2018). Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).</p>

Table 4-1c. Areas Evaluated for Potential PFAS Releases in the Aircraft Maintenance Area (AOC 3)

Building/Site/Area	Potential/ Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
Chromium Plating Shops			
No current or historical areas with Chromium Plating Shops were identified within AOC 3.			
Fire Station			
Building 220 Fire Station Area (Figure 4-1)	Yes	Yes	The Building 220 Fire Station Area, which includes the NAS Oceana Fire Station (Building 220), the Fire Department storage building (Building 118), a former AFFF storage building (Building 222), and the former Fire Station Burn Pit (SWMU 26), is located near the flightline. Building 220, which was constructed in 1956, is the current NAS Oceana Fire Station. In 2016, Building 220 reportedly stored 10,300 pounds of AFFF (Navy, 2017b). One spill of AFFF was documented at Building 220 in July 2018 when 0.5 gallon of AFFF were released due to a malfunctioning valve (Navy, 2018). During the 2019 PFAS PA site visits, a fire truck washing area was observed north of Building 220 and vehicle bays for parking fire engines were located within Building 220. Building 118, which was constructed in 2005, is the Fire Department storage building that has been used to store AFFF and was storing up to 38,531 pounds of AFFF as recently as 2016 (Navy, 2017b). According to the NRMFES District Chief, empty AFFF drums are currently stored at Building 118, which serves as a warehouse and storage for the Fire Department (NRMFES District Chief, pers. comm., 2019). According to the current NRMFES Fire Chief at Dam Neck Annex, firefighting gear used at Dam Neck Annex is taken to Building 118 to be washed in a special machine (DNA Fire Chief, pers. comm., 2019). During the 2019 PFAS PA site visits, AFFF drum storage, parked fire trucks, and a parking lot for hazmat response trailers were observed at Building 118. Building 222 is a fire station storage shed constructed in 1972 (Navy, 2019a). According to the NRMFES Supervisory Chief, AFFF was stored at Building 222 approximately 20 years ago (NRMFES, Supervisory Chief, pers. comm., 2019); however, no documentation of AFFF storage was identified during document review. SWMU 26, the former Fire Station Burn Pit, consisted of a partially buried drum or small tank with the top removed, that formed a burn pit used for fire extinguisher training southeast of Building 220 (CH2M, 2001). Burn residue and water were periodically pumped out of the tank to the adjacent mowed depression or swale (CH2M, 2001). The pit was filled and returned to grade sometime prior to 1990 (CH2M, 1993). In 2001, SWMU 26 was closed with no further action (CH2M, 2001). Results from the PFAS SI and the SI Addendum indicated concentrations of PFOA, PFOS, and PFBS exceed the SLs in monitoring well OW26-MW1 sampled at the Building 220 Fire Station Area (CH2M, 2018, forthcoming). Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).
Car Washes, Auto Hobby Shops, and Vehicle Maintenance Shops			
Building 401 (Figure 4-1)	No	No	Building 401, the Ground Support Equipment Maintenance Facility, was located at the intersection of 4th Street and Hornet Drive and was constructed in 1966 (Navy, 2019a). An equipment wash rack, also constructed in 1966, was located on the south side of the building and was used for washing of military vehicles (Navy, 2019a). Wash rack operations ceased on March 2, 1990 (Navy, 1990). There are no indications that fire trucks were washed at this facility. While cleaners and waxes may contain PFAS, at the time of this report, cleaners and waxes are not being used to characterize PFAS sites for further investigation. The Navy recognizes that some cleaners and waxes have been manufactured utilizing PFAS; however, information regarding cleaners and waxes that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy; therefore, no additional action is recommended.
Building 528A (Figure 4-1)	No	No	Building 528A, which was constructed in 1955, is located on the intersection of 5th Street and D Avenue, and housed a Morale, Welfare, and Recreation (MWR) wash rack that was used until March 2, 1990 (Navy, 1990). While cleaners and waxes may contain PFAS, at the time of this report, cleaners and waxes are not being used to characterize PFAS sites for further investigation. The Navy recognizes that some cleaners and waxes have been manufactured utilizing PFAS; however, information regarding cleaners and waxes that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy; therefore, no additional action is recommended.
Building 543/546 Area (Figure 4-1)	Yes	Yes	The Building 543/546 Area, located in the southeastern portion of the installation, includes Building 543, an Auto Hobby Shop built in 1976, and Building 546, an MWR Car Wash Facility built in 1993 (Navy, 2019a). Building 543 has been used since 1976 as a self-help automotive garage where Navy personnel can work on their cars while off duty (CH2M, 1994). Runoff from the shop trench drain is routed to an OWS then to sanitary sewer (Navy, 2008). Since 1993, wash water from Building 546 has drained to an OWS that discharges to sanitary sewer (Navy, 2008). Since personnel are allowed to use their own materials at this area, it is possible that PFAS-containing products have been used at this potential release area. Monitoring wells near these buildings were sampled for PFAS during the PFAS SI Addendum and concentrations of PFOA and PFOS were detected exceeding the SLs (CH2M, forthcoming). Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).
Building 830 (Figure 4-1)	Yes	Yes	<p>Building 830, located on D Avenue, is a vehicle repair shop that was constructed in 1954 and formerly contained a paint room (Navy, 2019a). The shop floor drains discharge through an OWS prior to entering the sanitary sewer system (Navy, 2008). Wash water is collected by machines and discharged to an aircraft wash rack drain that discharges to an OWS prior to entering sanitary sewer. Building 830A is an auto vehicle maintenance facility wash rack near Building 830 for which used ceased on March 2, 1990 because of noncompliance with permit regulations (Navy, 1990). From 1994 to 2002, three documented releases of AFFF occurred at Building 830:</p> <ul style="list-style-type: none">On February 23, 1994, 130 gallons of AFFF were spilled at Building 830 during truck maintenance activities. Additional information regarding migration and/or cleanup of these spills was not identified during PFAS PA activities.On March 13, 1995, 10 gallons of AFFF were spilled in the Building 830 parking compound during truck maintenance activities. Additional information regarding migration and/or cleanup of these spills was not identified during PFAS PA activities.On April 19, 2000, 5 gallons of AFFF were spilled at the Building 830 compound, and on March 1, 2002, another 5 gallons of AFFF were spilled at the Building 830 compound (NAVFAC, 2006). Additional information regarding migration and/or cleanup of these spills was not identified during PFAS PA activities. <p>Monitoring wells at Building 830 were sampled for PFAS during the PFAS SI Addendum, and concentrations of PFOA and PFOS in monitoring well OC-MW19 exceeded the SLs (CH2M, forthcoming). Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).</p>
Building 833 (Figure 4-1)	No	No	Building 833, which was constructed in 1995 and is located on D Avenue, is a fuel truck repair shop with floor drains that discharge to an OWS (Navy, 2019a). There is no documentation indicating PFAS-containing materials have been used or released at Building 833; therefore, no further action is recommended.

Table 4-1c. Areas Evaluated for Potential PFAS Releases in the Aircraft Maintenance Area (AOC 3)

Building/Site/Area	Potential/ Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
Wash Racks			
Building 840 (Figure 4-1)	No	No	Building 840, located on 7th Street, was used for Construction Battalion Unit Storage and Maintenance. The wash rack at Building 840 was constructed in 1972 (Navy, 2019a). Wash rack use at Building 840 ceased on March 2, 1990 (Navy, 1990). Based on aerial imagery, it appears the building was demolished between 2010 and 2011 (EDR, 2019c). Detergents and solvents were reportedly not used at this wash rack. There is no documentation indicating PFAS-containing materials have been used or released at Building 840; therefore, no further action is recommended.
Building 932 (Figure 4-1)	No	No	Building 932, which was constructed in 1964 and is located on D Avenue, housed the wash rack for the D Avenue/Sanitary Landfill (Navy, 2019a). Wash water drained to a sediment trap and OWS prior to entering the storm drain. According to the NAS Oceana Lead Environmental Protection Services, the wash rack at Building 932 was a standalone vehicle wash rack in the vicinity of the D Avenue/Sanitary landfill; however, no information was known about the specific use of the wash rack (NAS Oceana Lead EPS, pers. comm., 2020). The NAS Oceana Lead Environmental Protection Specialist also indicated that the wash rack and associated OWS at Building 932 were abandoned prior to the late 1990s. During the PFAS PA site visits, a landfill worker reported that there is a clogged drain underwater and that the site is no longer used as wash rack. There is no evidence of usage or releases of AFFF or other PFAS-containing materials at the Building 932 wash rack; therefore, no further action is recommended.
Facility Number WR138 (Figure 4-1)	No	No	Facility Number WR138 was a wash rack for Building 138, located on the flightline in the northern portion of the installation. According to correspondence between the Navy in February 1990 (Navy, 1990), in 1990, the aircraft wash rack at Building 138 was discharging to OWSs that have influent chambers with outlets to both the OWS and storm drain. The wash rack was not located during the 2019 PFAS PA site visits. There is no evidence of usage or releases of AFFF or other PFAS-containing materials at the Building 138 wash rack; therefore, no further action is recommended.
Facility Number WR504 (Figure 4-1)	No	No	According to the NAS Oceana Lead Environmental Protection Specialist, Facility Number WR504 is a wash rack located at the west end of the airfield (NAS Oceana Lead EPS, pers. comm., 2020). According to a NAS Oceana Spill Report (NAS Oceana, 2009), 159 gallons of wash water were spilled at the Facility Number WR504 and reached the waterway on June 3, 2009. There is no documentation showing there was a release of vehicle-washing materials containing PFAS, or that fire trucks are washed at Facility Number WR504. There is no evidence of usage or releases of AFFF or other PFAS-containing materials at Facility Number WR504; therefore, no further action is recommended.
Specialty Paint, Cleaner, or Pesticide Use or Release			
Building 513D (Figure 4-1)	No	No	Building 513D, located on the southeastern side of Building 513, is a paint storage shed built on July 1, 1974. Since its construction, the building has been used to store paints used in maintenance activities in nearby hangars. During the 2019 PFAS PA site visits, the building remains in place and no evidence of a release of any type of paint was observed. While paints may contain PFAS, at the time of this report, paints are not being used to characterize PFAS sites for further investigation. The Navy recognizes that some paints have been manufactured utilizing PFAS; however, information regarding paints that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy. Additionally, there is no documentation indicating specialty paints containing PFAS are handled or were released near this building; therefore, no further action is recommended for Building 513D.
Building 844 (Figure 4-1)	No	No	Building 844, located on the south side of former Building 840, was a paint shop with paint storage that was reportedly built in 1970 and used in support of activities in the Construction Battalion Maintenance. This building remains in place but is currently vacant. While paints may contain PFAS, at the time of this report, paints are not being used to characterize PFAS sites for further investigation. The Navy recognizes that some paints have been manufactured utilizing PFAS; however, information regarding paints that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy. There is no documentation indicating the Construction Battalion used any specialty paints containing PFAS and there is no evidence of a release of any type of paint at this building; therefore, no further action is recommended for Building 844.
Building 2028 (Figure 4-1)	No	No	According to the Environmental Services Supervisor and NAS Oceana Tier II Representative for Environmental Services, Building 2028 is a pesticide storage facility near the hazardous waste storage area (NAS Oceana ES Supervisor and NAS Oceana Tier II Representative for ES, pers. comm., 2019). However, current installation personnel indicated that pesticides are not stored at this location and indicated that the main pesticide storage area is located at Dam Neck Annex (NAS Oceana Media Manager, pers. comm., 2019); therefore, no further action is recommended for Building 2028.
Building 1115A (Figure 4-1)	No	No	Building 1115A was identified as a potential pesticide storage area. This building is located near the flightline southeast of the Jet Test Cell Area. While pesticides may contain PFAS, at the time of this report, pesticides are not being used to characterize PFAS sites for further investigation. The Navy recognizes that some pesticides have been manufactured utilizing PFAS; however, information regarding pesticides that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy; therefore, no further action is recommended for Building 1115A.
Potential PFAS Storage Areas			
Building 120 (Figure 4-1)	No	No	Building 120, located on 1st Street and D Avenue, was constructed in 2003 and is a fire protection building that was storing 7,798 pounds of AFFF in plastic or nonmetallic drums in 2016 (Navy, 2017b). Based on documentation and records, it appears this building was only used for AFFF storage, and no evidence of transfer or release of AFFF or other PFAS-containing materials was identified at this potential release area. No further action is recommended.
Building 400 (Figure 4-1)	No	No	Building 400, which was constructed in 1963, is a Squadron Line Maintenance Building located near the flightline in the northwestern portion of the installation (Navy, 2019a). In 2006, Building 400 had two 4,000-gallon containers of AFFF on site (Navy, 2006). During the 2019 PFAS PA site visits, it was observed that AFFF was no longer stored onsite. No evidence of transfer or release of AFFF or other PFAS-containing materials was identified at this site; therefore, no further action is recommended.
Building 403 (Figure 4-1)	No	No	Building 403, which was constructed in 1971, is a Public Works Department Maintenance Storage Building/Ground Support Equipment Storage Facility located on 4th Street (Navy, 2019a). According to a Building Plan from 1971 (Navy, 1971), in 1971, Building 403 contained a sprinkler alarm valve system with a 6-inch supply line from the sprinkler system to the fire main, and wall hydrants on the sides of the building; however, no documentation indicated the presence of an AFFF fire suppression system at this building. Additionally, no evidence of known usage or releases of AFFF or PFAS-containing materials was identified at this site; therefore, no further action is recommended.
Building 721 (Figure 4-1)	No	No	Building 721 is a Public Works administrative office and shop located on Hornet Drive that was constructed in 1957 and is still operational. According to the Aviation Safety Council Minutes from June 1994 (Aviation Safety Council, 1994), in 1994, Building 721 was storing 290 gallons of AFFF. However, during the 2019 PFAS PA site visits, employees at the office indicated that they had no knowledge of AFFF ever being stored at Building 721. No evidence of known usage or releases of AFFF or other PFAS-containing materials was identified; therefore, no further action is recommended for Building 721.

Table 4-1c. Areas Evaluated for Potential PFAS Releases in the Aircraft Maintenance Area (AOC 3)

Building/Site/Area	Potential/ Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
Building 820 (Figure 4-1)	No	No	Building 820, located on Hornet Drive, houses the Public Works maintenance shop, which is still active, and was used as a paint shop from 1957 to at least 1984 (RGH, 1984). According to the NAS Oceana Lead Environmental Protection Specialist, lacquer spray paint, interior and exterior latex, acrylic non-skid paints were historically stored at Building 820; however, no paint is currently stored at the building (NAS Oceana Lead EPS, pers. comm., 2020). While paints may contain PFAS, at the time of this report, paints are not being used to characterize PFAS sites for further investigation. The Navy recognizes that some paints have been manufactured utilizing PFAS; however, information regarding paints that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy. No specialty paints containing PFAS, such as fouling-release paints, were documented as having been used at Building 820. No evidence of known usage or releases of AFFF or PFAS-containing materials was identified; therefore, no further action is recommended.
Building 513 (Figure 4-1)	No	No	Building 513 is an Aviation Maintenance Facility/Avionics Shop located on Hornet Drive. Building 513 was also identified as a potential Teflon-coating or chrome-plating shop by installation personnel (NAS Oceana Air Ops Manager, pers. comm., 2019; NAS Oceana Electrician, pers. comm., 2019). According to a building map from 1972 (Navy, 1972), in 1972, Building 513 contained 6-inch fire line and an alarm check valve that were routed to a sprinkler system in the supply room. In 2006, AFFF, oil, and bilge water were reportedly being stored at Building 513 (Navy, 2007). During a RCRA Hazardous Waste Compliance Evaluation Inspection conducted at Building 513 by VDEQ on October 27, 2016 (VDEQ, 2016), in 2016, it was noted that Building 513 housed a paint shop with a paint spray booth. While paints may contain PFAS, at the time of this report, paints are not being used to characterize PFAS sites for further investigation. The Navy recognizes that some paints have been manufactured utilizing PFAS; however, information regarding paints that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy. During the 2019 PFAS PA site visits, a paint locker was observed where the paint booth is located with no PFAS-containing paint within it. No evidence of known usage or releases of AFFF or PFAS-containing materials was identified at this site; therefore, no further action is recommended.
Hazardous Waste Storage Areas			
Building 204 (Site 18) (Figure 4-1)	No	No	Site 18 consists of two hazardous waste storage areas near Hangar 200 and includes Building 204, a Hazardous Waste Transfer Facility built in 1945 (CH2M, 1994). It was noted that materials typically stored at Building 204 may include any of the following: Double-bagged empty oil and paint cans, double-bagged oily rags, drums of oil, paint thinner, paint remover, jet fuel, solvents, asbestos, PD 680 (degreasing solvent), hydraulic fluid, freon, neutralized battery acid, and electric coolant oil (CH2M, 1994). Soil staining was historically observed at this site (CH2M, 1994). No evidence of use or release of AFFF or other PFAS-containing materials was identified at this site, therefore, no further action is recommended.
Building 404C (Figure 4-1)	No	No	Building 404C, located on the southeast side of Hangar 404, was built in 1974 and was used for hazardous material storage (Navy, 2019a). According to the NAS Oceana Lead Environmental Protection Specialist, Building 404C is a hazardous material storage unit that is used to store hazardous material required for aircraft maintenance which include but are not limited to: polyurethane paint, solvents, corrosion preventative compounds, aircraft spray paint, sealants and adhesives, synthetic aircraft engine oil, synthetic aircraft hydraulic fluid, and greases (NAS Oceana Lead EPS, pers. comm., 2020). During the 2019 PFAS PA site visits, Building 404C was observed to be a storage shed without the presence of an AFFF FSS. While paints may contain PFAS, at the time of this report, paints are not being used to characterize PFAS sites for further investigation. The Navy recognizes that some paints have been manufactured utilizing PFAS; however, information regarding paints that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy. No evidence of known usage or releases of AFFF or other PFAS-containing materials was identified at this site; therefore, no further action is recommended.
Building 826 (Figure 4-1)	No	No	Building 826, located on 7th Street, is a hazardous/flammable material warehouse with an FSS built in 1988 (Navy, 2019a). It appears that the Building 826 is used for storage of drums of various chemicals including fire resistant hydraulic fluid, but during the 2019 PFAS PA site visits, the stored materials appeared to be in good condition with no leaks or spills. While hydraulic fluid may contain PFAS, at the time of this report, hydraulic fluid is not being used to characterize PFAS sites for further investigation. The Navy recognizes that some hydraulic fluids have been manufactured utilizing PFAS; however, information regarding hydraulic fluids that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy. No evidence of known usage or releases of AFFF or PFAS-containing materials was identified at this site; therefore, no further action is recommended.
Building 1110 and 1112 (Figure 4-1)	No	No	The Hazardous Waste Facility is located in the southern portion of NAS Oceana along Hornet Drive. The facility includes Building 1112, a hazardous waste accumulation area that was constructed in 1990 and decommissioned in 2007, and Building 1110, the hazardous waste transfer facility that was constructed in 1991. In 1994, the facility was reportedly equipped with portable fire extinguishers, fire control equipment, decontamination equipment, and AFFF producing equipment (VDEQ, 1994). According to correspondence between the Navy and VDEQ in April 1999 (Navy, 1999), on April 9, 1999, environmental personnel discovered evidence of fire in the NAS Oceana hazardous waste permitted facility compound. The remains of the fire were found away from all hazardous waste storage areas. One pallet and a small drum used for storing nonregulated waste appeared to have been involved. It was also noted that the fire was a small, self-contained fire that burned itself out, for which the cause was unknown. During the 2019 PFAS PA site visit, installation personnel indicated that a 5-gallon drum of AFFF was previously stored at Building 1112; however, no AFFF was present during the 2019 PFAS PA site visit. No evidence of known usage, transfer, or releases of AFFF or PFAS-containing materials was identified at this site. Two monitoring wells hydraulically downgradient of Buildings 1112 and 1110 (MW-BG11 and OC-MW04) were sampled for PFAS during the PFAS SI and all PFOA and PFOS results were less than the respective SLs (CH2M, 2018). This further supports the lack of PFAS presence in this area. Therefore, no further action is recommended.
Other Notable Locations			
Building 301 (Figure 4-1)	No	No	Building 301 is a Jet Engine Maintenance Facility/Non-Destructive Testing Facility located on Hornet Drive that was built in 2002 (Navy, 2019a). No chemicals containing PFAS were identified in the hazmat locker at Building 301 during the 2019 PFAS PA site visits. No evidence of known usage or releases of AFFF or PFAS-containing materials was identified at this site; therefore, no further action is recommended.
Building 321 (Figure 4-1)	No	No	Building 321, located on D Avenue and Tomcat Boulevard, was a former Photographic Laboratory and Hobby Shop (previously Building 292, Fleet Imaging Center), built in 1959. Wastewater from operations discharges to sanitary sewer. There is no indication this building had an AFFF FSS. During the 2019 PFAS PA site visits, Building 321 was observed to no longer be a photographic laboratory and no longer stored chemicals other than common cleaners and spray paint. While paints may contain PFAS, at the time of this report, paints are not being used to characterize PFAS sites for further investigation. The Navy recognizes that some paints have been manufactured utilizing PFAS; however, information regarding paints that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy. No evidence of use or release of AFFF or other PFAS-containing materials was identified at this site; therefore, no further action is recommended.
FITWING (Figure 4-1)	No	Yes	The FITWING site lies just to the south of Runway 23L. It includes six pits for refueling various aircraft. In response to reported fuel line leaks, investigations identified two distinct fuel free product plumes. IDW was sampled from the fuel investigation, and concentrations of PFOA and PFAS exceeded the SLs (Appendix A). Details of releases in this area, including migration pathways and potential receptors, are provided in the forthcoming PFAS SI Addendum Report (CH2M, forthcoming).

Table 4-1d. Areas Evaluated for Potential PFAS Releases for Stand Alone Sites

Building/Site/Area	Potential/ Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
Firefighting Training Areas and Spray Test Areas			
Fuel Tank Farm (Old) (Figure 4-1)	Yes	Yes	The Old Fuel Tank Farm, located on the western portion of NAS Oceana, had underground storage tank (USTs) installed in the early 1950s to store aviation gasoline, JP-3, and JP-5 (R.E. Wright Associates, Inc., 1983). No evidence of an AFFF FSS at the Old Fuel Tank Farm was identified during document review; however, according to email correspondence between the Navy on December 20, 1994 (NAVFAC, 1994), in 1994, the NAS Oceana Fire Department was testing AFFF at the Tank F-17A area (rail spill containment area) on a weekly basis. During testing, AFFF was released from fire trucks into the containment area and then allowed to flow into Tank F-17A, which was immediately pumped out by Public Works Center. In 1994, Tank F-17A failed a tank tightness test and could no longer be used to catch AFFF during testing (Navy, 1994b). The USTs were taken out of service and closed in place in 1997 (Meadows CMPG, Inc., 2019). Monitoring wells at the Old Fuel Tank Farm were sampled for PFAS during the PFAS SI Addendum and PFOA and PFOS results in monitoring well OCPOL-MW31 exceeded the respective SLs (CH2M, forthcoming). Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).
Runways			
No current or historical areas with Runways were identified within Stand-Alone Sites.			
Industrial/Sanitary Wastewater Treatment Plants			
No current or historical areas with Industrial/Sanitary Wastewater Treatment Plants were identified within Stand-Alone Sites.			
Landfill and Waste Disposal Area			
North Station Landfill (Figure 4-1)	Yes	Yes	The North Station Landfill was a 4-acre unlined borrow pit located in the eastern portion of NAS Oceana, reportedly used from the early 1950s to 1954 for solid wastes generated on-installation. Results from the PFAS SI Addendum indicated concentrations of PFOA and PFOS exceed the SLs in three of six monitoring wells sampled at the North Station Landfill (CH2M, forthcoming). Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).
Fifth Green Landfill (Figure 4-1)	No	Yes	The Fifth Green Landfill is an unlined 4-acre landfill that was used for the disposal of solvents, pesticides, mixed municipal wastes, construction debris, electrical conductors, and transformers from 1954 to 1961 (A.T. Kearney, 1989). Monitoring wells at the Fifth Green Landfill were sampled for PFAS during the PFAS SI Addendum and all PFOA and PFOS results were below the respective SLs (CH2M, forthcoming). Additionally, the dates of use of the landfill predate use of AFFF and most other PFAS-containing materials; therefore, no further action is recommended for Fifth Green Landfill.
Oceana Pond (Figure 4-1)	No	No	Oceana Pond is a recreation area located east of Oceana Boulevard. The parcel was acquired by the Navy in 1986. Photographic analysis of Oceana Pond indicated that borrow pit operations likely started around 1963 north and south of the access road, and by 1981 the area north of the access road had been backfilled entirely (CH2M, 2020b). A test pitting investigation completed in 2019 indicated that construction debris, including concrete, wood, and floor tiles was disposed of in the borrow pit. No evidence of usage or release of AFFF or other PFAS-containing materials was identified during document review and the 2019 PFAS PA site visits; therefore, no further action is recommended for Oceana Pond.
Emergency Response Areas			
Oceana Salvage Yard (Figure 4-1)	Yes	Yes	The Oceana Salvage Yard is a privately-owned salvage yard adjacent to Navy property east of Oceana Boulevard. On August 3, 1987, a fire occurred at Oceana Salvage Yard where hot material from cutting operations fell on the ground which was covered in oil and gas. The Virginia Beach Fire Department initially responded to the fire but was unable to extinguish the blaze. The NAS Oceana Fire Department was called to assist. Reports indicate that NAS Oceana Fire Department used two AFFF trucks to extinguish the fire (VDEQ, 1994). While the use of AFFF is not documented, based on the date of the fire and the nature of materials likely to burn at the Salvage Yard (tires and fuel), it is likely that AFFF was used to extinguish the fire and was subsequently potentially released to the low-lying area between the salvage yard and NAS Oceana. The release was off-installation that migrated to Navy property. Results from an SI performed on Navy-owned property adjacent to the Oceana Salvage Yard indicate concentrations of PFOA and PFOS exceed the SLs (Weston Solutions, 2020); details of releases in this area and fate and transport pathways are provided in the forthcoming Oceana Salvage RI Report (CH2M, forthcoming).
4051 Leyte Court (Figure 4-1)	Yes	Yes	According to NAS Oceana Fire Department records (NRMFES District Chief, pers. comm., 2019), a house fire occurred at 4051 Leyte Court on April 26, 1996, and approximately 130 gallons of AFFF were released during firefighting efforts to extinguish the house fire (<i>AFFF Spill History</i> , 1999). Based on aerial photographs, this area of the Base included military housing until it was demolished sometime between 1996 and 2003. The housing area, including unit numbers, was also identified on historical base maps. Monitoring well OC-MW18 at 4051 Leyte Court was sampled for PFAS during the PFAS SI Addendum, and PFOA and PFOS were detected at concentrations exceeding the SLs (CH2M, forthcoming). Details of releases in this area, including migration pathways and potential receptors, are provided in the PFAS SI Report and forthcoming PFAS SI Addendum Report (CH2M, 2018, forthcoming).
Vehicle Crash Area (Figure 4-1)	Yes	Yes	Historical photographs documented a firefighting foam release onto a vehicle near the main gate at NAS Oceana in 1999 (NRMFES District Chief, pers. comm., 2020). Since NAS Oceana used AFFF for emergency response at this time, groundwater samples were collected at this location as part of the SI Addendum. Concentrations of PFOA and PFOS exceeded the SLs at this release area. Details of releases in this area, including migration pathways and potential receptors, are provided in the forthcoming PFAS SI Addendum Report (CH2M, forthcoming).
Areas with AFFF Fire Suppression Systems			
Fuel Tank Farm (New) (Figure 4-1)	No	Yes	The New Fuel Tank Farm, located on the western portion of NAS Oceana north of the Old Tank Farm, consists of three above ground fuel tanks surrounded by cement containment walls. The New Fuel Tank Farm replaced the Old Fuel Tank Farm; therefore, it is assumed to be operational as of 1997. The New Fuel Tank Farm is still in use and includes AFFF FSS piping. The configuration is presumed to be similar to that at other Navy fuel tank farms in the region, which have a connection for fire engines to connect hoses to, if necessary. AFFF is not stored at the tank farm and no evidence of the use or testing of this piping was identified during document review and the 2019 PFAS PA site visits. In May 2017, a fuel spill of 94,000 gallons occurred; however, interviewees indicated there was no fire and no AFFF was used (Former NAS Oceana Lead EPS, pers. comm., 2018). Additionally, monitoring wells at the New Fuel Tank Farm were sampled for PFAS during the PFAS SI and all PFOA and PFOS results were less than the SLs (CH2M, forthcoming). Due to no documented releases of AFFF and sampling results indicating PFOA and PFOS levels are less than the SLs, no further action is recommended for the New Fuel Tank Farm.

Table 4-1d. Areas Evaluated for Potential PFAS Releases for Stand Alone Sites

Building/Site/Area	Potential/ Confirmed PFAS Release Area? (Yes/No)	Previously Investigated in PFAS SI or SI Addendum (Yes/No)	Rationale
POL Site F8/F9 (Figure 4-1)	No	Yes	Trucks carrying AFFF would connect to the FSS piping adjacent to the POL Fuel Tank area near monitoring well OC-F8F9-MW-4. Potential releases of AFFF to the ground may have occurred when connecting and disconnecting from the pipes. Site F8/F9 is in close proximity to the Fuel Tank Farm which was sampled for PFAS during the PFAS SI, and all PFOA and PFOS results were less than the SLs (CH2M, forthcoming). Due to no documented releases of AFFF and sampling results indicating PFOA and PFOS levels are less than the SLs, no further action is recommended for POL Site F8/F9.
Hangars			
No current or historical areas with Hangars were identified within Stand-Alone Sites.			
Chromium Plating Shops			
No current or historical areas with Chromium Plating Shops were identified within Stand-Alone Sites.			
Fire Station			
No current or historical areas with Fire Station were identified within Stand-Alone Sites.			
Car Washes, Auto Hobby Shops, and Vehicle Maintenance Shops			
Building 296 (Figure 4-1)	No	No	Building 296, the NEX Car Wash, was constructed in 1998 and is located near the main gate of NAS Oceana (Navy, 2019a). Since the construction of Building 296, runoff from the car wash has been flowing to a drainage basin with an OWS. There is no documentation indicating cleaners or waxes used at the NEX Car Wash contain PFAS. While cleaners and waxes may contain PFAS, at the time of this report, cleaners and waxes are not being used to characterize PFAS sites for further investigation. The Navy recognizes that some cleaners and waxes have been manufactured utilizing PFAS; however, information regarding cleaners and waxes that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy; therefore, no further action is recommended.
Wash Racks			
No current or historical areas with Wash racks were identified within Stand-Alone Sites			
Specialty Paint, Cleaner, or Pesticide Use or Release			
Building 794 (Figure 4-1)	No	No	Building 794 is located on Dewey Drive in the southeastern portion of NAS Oceana. During the 2019 PFAS PA site visits, it was observed that Building 794 serves as the only storage for golf course pesticides and other chemicals. However, there was no indication any PFAS-containing pesticides are stored in the building. While pesticides may contain PFAS, at the time of this report, pesticides are not being used to characterize PFAS sites for further investigation. The Navy recognizes that some pesticides have been manufactured utilizing PFAS; however, information regarding pesticides that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy. Monitoring wells within the golf course, at the Fifth Green Landfill, were sampled for PFAS during the PFAS SI Addendum and all PFOA and PFOS results were less than the respective SLs (CH2M, forthcoming). Therefore, no further action is recommended for Building 794.
Building 796 (Figure 4-1)	No	No	Building 796 was identified as a potential pesticide storage area. This building is located on the golf course adjacent to Building 794. While pesticides may contain PFAS, at the time of this report, pesticides are not being used to characterize PFAS sites for further investigation. The Navy recognizes that some pesticides have been manufactured utilizing PFAS; however, information regarding pesticides that contain PFAS as well as any percentage or concentration is proprietary information not available to the Navy. No evidence of known usage or releases of AFFF or PFAS-containing materials was identified at this site; therefore, no further action is recommended for Building 796.
Potential PFAS Storage Areas			
No current or historical areas with Potential PFAS Storage Areas were identified within Stand-Alone Sites.			
Hazardous Waste Storage Areas			
No current or historical areas with Hazardous Waste Storage Areas were identified within Stand-Alone Sites.			
Other Notable Locations			
T-Line (Figure 4-1)	No	Yes	JP-5 jet fuel was transferred from the fuel farm to the Day Tank storage area via the underground T-Line. Fuel releases were identified along the T-Line in 1988 and 1990 approximately 1,000 feet to the east of the fuel tank farm. IDW was sampled from the fuel spill investigation and concentrations of PFOA and PFAS exceeded the SLs (Appendix A). However, because no PFAS source was identified, no further action is recommended. Details of releases in this area, including migration pathways and potential receptors, are provided in the forthcoming PFAS SI Addendum Report (CH2M, forthcoming).

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4.2 Potential PFAS Release Areas

Areas identified as potential PFAS release areas in **Tables 4-1a** through **4-1d** are further evaluated in the following subsections. Area-specific information including migration pathways and exposure assessment is also provided. Detailed figures showing each area are presented as **Figures 4-2** through **4-6**.

4.2.1 PFAS AOC 1 – Fire Training Area and Northwestern Runway Area

The Fire Training Area and Northwestern Runway Area (AOC 1) includes the following potential and/or confirmed release areas:

- Firefighting Training Area (previously investigated)
- Runway 14L-32R/Runway 14R-32L West
- Inert Landfill

Each potential/confirmed release area, with the exception of those previously investigated, is discussed in the following subsections and the recommendations for the entire AOC are included at the end of **Section 4.2.1**.

4.2.1.1 Runway 14L-32R/Runway 14R-32L West

Description and Operational History

Runway 14L-32/Runway 14R-32L West are active runways located on the northwestern portion of the flightline (**Figure 4-2**).

Potential for PFAS Use or Release

As presented in **Tables 4-1a** through **4-1d**, numerous incidents with potential or confirmed release of AFFF have occurred at unknown locations along the runways at NAS Oceana. Due to the uncertainty of AFFF releases along portions of the runway and the nature of activities on runways, Runway 14L-32R /Runway 14R-32L West had been identified as a potential PFAS release area.

Migration Pathway and Exposure Assessment

Any potential release on the runways would flow northeast or southwest from the centerline of the runways and likely infiltrate the grassy surfaces on either side of the runway. PFAS that infiltrated the ground surface may leach into groundwater and migrate in the direction of groundwater flow. Groundwater flows to the northwest and southwest from the runways. Alternately, runoff could enter the stormwater system via storm drains on the paved runways and ultimately discharge into London Bridge Creek.

Workers and trespassers may be present at the potential release area and workers, visitors, recreational users, including anglers and hunters, and residents may be present within 1 mile.

Recommendation

Additional investigation, including groundwater and soil sampling, is recommended at Runway 14L-32R/Runway 14R-32L West. It is recommended that the sampling be combined with further investigations at AOC 1.

4.2.1.2 Inert Landfill

Description and Operational History

The Inert Landfill is an unlined landfill encompassing approximately 26 acres. It was used as a borrow pit for soil during the construction of Interstate 44 (now Interstate 264) (A.T. Kearney, 1989) (**Figure 4-3**). Following completion of the highway, the pit was allowed to fill with water and was used as a dump by the local community (A.T. Kearney, 1989). Based on aerial imagery from 1974 and 1978, it appears that disposal of unknown materials by the community began sometime in 1976. The land on which the Inert Landfill is located was purchased by NAS Oceana in early 1979 (A.T. Kearney, 1989). A nonconforming permit (No. 267) was granted to NAS Oceana by the Virginia Department of Health in May 1979, which allowed the site to be used for the disposal of inert solid waste

(A.T. Kearney, 1989). The Inert Landfill was noted as active in 1989 and was being used by NAS Oceana specifically for the disposal of inert construction debris (A.T. Kearney, 1989). A visual site inspection (VSI) performed in 1988 observed releases to surrounding soils, and construction debris and scrap metal in the form of appliances present on the north shore of the pond (A.T. Kearney, 1989). According to interviews with installation personnel, this area was used by the installation for disposal of dirt and concrete during runway construction activities (NAS Oceana Electrician, pers. comm., 2019). The Navy ceased disposal activities before 1990 and has not used the area since (CH2M, 2003). No release controls were observed during the VSI (A.T. Kearney, 1989). During the PFAS PA site visits, the majority of the ground surface consisted of concrete debris and mounds, and trash and debris were discarded throughout the entire site.

Potential for PFAS Use or Release

While no written documentation of disposal of AFFF or other PFAS-containing materials at the Inert Landfill was identified during the PA, construction debris, soil, and concrete from on-installation that was disposed of at this site may have contained residual PFAS due to the use of AFFF on-installation, especially on or near the runways and subsequent disposal of runway concrete at this site.

Migration Pathway and Exposure Assessment

PFAS-containing materials that may have potentially been disposed of at the Inert Landfill could have been released by leaching from waste or disposed soil to surrounding soils and leached from soil to groundwater. A pond exists within the site boundary and PFAS-containing materials and soil may have been disposed of directly into the pond, where PFAS potentially leached into surface water and sediment. Groundwater flow at the Inert Landfill presumably flows northwest. PFAS could be transported via advection and dispersion with groundwater flow partitioning to sediment and surface water where the discharge occurs into the creek and/or river. Overland flow appears to be to the west/northwest toward the pond on the western side of the landfill, although the landfill is relatively flat and covered with concrete.

Workers and trespassers may be present at the Inert Landfill, and workers, visitors, recreational users, including anglers and hunters, and residents are present within 1 mile.

Recommendation

Additional investigation, including groundwater and soil sampling, is recommended at the Inert Landfill. It is recommended that the sampling be combined with further investigations at AOC 1.

Recommendations for Area of Concern 1

As documented in the forthcoming SI Addendum report, additional sampling in the form of an RI is recommended for AOC 1 (CH2M, forthcoming).

4.2.2 PFAS AOC 2 – Northeastern Runway Area

The Northeastern Runway Area (AOC 2) includes the following potential and/or confirmed release areas:

- Construction Debris Landfill
- 1986 Oceana Boulevard Crash (previously investigated)
- Runway 14L-32R/ Runway 14R-32L East
- Runway 5L-23R/Runway 5R-23L North (previously investigated)

Each potential/confirmed release area, with the exception of those previously investigated, is discussed in the following subsections and the recommendations for the entire AOC are included at the end of **Section 4.2.2**.

4.2.2.1 Construction Debris Landfill

Description and Operational History

The Construction Debris Landfill, located in the northern portion of the installation approximately 2,500 feet west of the intersection of South First Colonial Road and Oceana Boulevard (A.T. Kearney, 1989), is an unlined landfill,

approximately 0.5-acre in size, that was used for disposal of construction debris, furniture, empty paint and paint thinner cans, tires, and scrap metal (**Figure 4-4**). Although the site was designated as a construction debris landfill, controls on the type of waste disposed of at this landfill did not prevent other wastes from being disposed of at the site (A.T. Kearney, 1989). The area was reportedly discovered in early 1986 and was active during the VSI performed in 1988 (A.T. Kearney, 1989).

Potential for PFAS Use or Release

While no written documentation of disposal of AFFF or other PFAS-containing materials at the Construction Debris Landfill was identified during the PA, during a test pitting investigation in 2020 to determine the extent of the landfill, one 5-gallon AFFF drum was identified at the site. The 5-gallon drum was excavated from a test pit; it was crushed and empty.

Migration Pathway and Exposure Assessment

AFFF and other PFAS-containing materials that may have been disposed of at the Construction Debris Landfill could have potentially been released by leaching from waste to soil and leaching from soil to groundwater. PFAS may have been transported to the nearby pond via surface water runoff. Groundwater flow at the Construction Debris Landfill generally flows north toward a drainage channel which eventually leads to Great Neck Creek. PFAS could be transported via advection and dispersion with groundwater flow partitioning to sediment and surface water where the discharge occurs into the creeks and lake. Overland flow varies throughout the area but is generally anticipated to flow toward wetland depressions within the landfill boundary as well as to the stormwater ditch north of the landfill, which discharges to Outfall 006, which ultimately discharges to Great Neck Creek. Workers and trespassers may be present at the Construction Debris Landfill, and workers, visitors, recreational users, including anglers and hunters, and residents are present within 1 mile.

Recommendation

Additional investigation, including groundwater and soil sampling, is recommended at Construction Debris Landfill. It is recommended that the sampling be combined with further investigations at AOC 2.

4.2.2.2 Runway 14L-32R/Runway 14R-32L East

Description and Operational History

Runway 14L-32/Runway 14R-32L East are active runways located on the southeastern portion of the flightline (**Figure 4-5**).

Potential for PFAS Use or Release

As presented in **Tables 4-1a** through **4-1d**, numerous incidents with potential or confirmed release of AFFF have occurred at unknown locations along the runways at NAS Oceana. Due to the uncertainty of AFFF releases along portions of the runway and the nature of activities on runways, Runway 14L-32R /Runway 14R-32L East has been identified as a potential PFAS release area.

Migration Pathway and Exposure Assessment

Any potential release on the runways would flow radially from the center of the runways and likely infiltrate the grassy surfaces surrounding the runway. PFAS that infiltrated the ground surface may leach into groundwater and migrate in the direction of groundwater flow. Groundwater flows to the northeast from the runways. Alternately, runoff could enter the stormwater system via storm drains on the paved runways and ultimately discharge into Great Neck Creek.

Workers and trespassers may be present at the potential release area and workers, visitors, recreational users, including anglers and hunters, and residents may be present within 1 mile.

Recommendation

Additional investigation, including groundwater and soil sampling, is recommended at Runway 14L-32R/Runway 14R-32L East. It is recommended that the sampling be combined with further investigations at AOC 2.

4.2.2.3 Recommendations for AOC 2

As documented in the forthcoming SI Addendum report, additional sampling in the form of an RI is recommended for AOC 2 (CH2M, forthcoming).

4.2.3 PFAS AOC 3 – Aircraft Maintenance Area

The Aircraft Maintenance Area (AOC 3) includes the following potential and/or confirmed release areas:

- Hangar 56 (previously investigated)
- Hangar 111 (previously investigated)
- Hangar 122 (previously investigated)
- Hangar 137 (previously investigated)
- Hangar 139 (previously investigated)
- Hangar 145 (previously investigated)
- Hangar 200 (previously investigated)
- Hangar 223 (previously investigated)
- Hangar 404 (previously investigated)
- Hangar 500 (previously investigated)
- CALA (previously investigated)
- Building 220 Fire Station Area (previously investigated)
- Runway 5L-23R/Runway 5R-23L South (previously investigated)
- Jet Test Cell Area (previously investigated)
- Fuel Pit #10
- 1996 F-14 Crash (previously investigated)
- 2013 F/A-18E Brake Fire
- D Avenue Landfill/Sanitary Landfill
- Building 543/546 Area (previously investigated)
- Building 830 (previously investigated)

Each potential/confirmed release area, with the exception of those previously investigated, is discussed in the following subsections and the recommendations for the entire AOC are included at the end of **Section 4.2.3**.

4.2.3.1 Fuel Pit #10

Description and Operational History

According to the submission of the NAS Oceana Command History of 1985, on November 16, 1985, a potential disaster was averted when the crew of an MB-1 crash truck rapidly extinguished a fire involving an A-6 aircraft hot refueling in Fuel Pit #10 (**Figure 4-6**). No additional information was identified regarding this fire or the emergency response resulting from it.

Potential for PFAS Use or Release

The Class B fire resulting from hot refueling of an A-6 aircraft in Fuel Pit #10 was potentially extinguished with AFFF based on standard protocol for Class B fires.

Migration Pathway and Exposure Assessment

AFFF potentially released at Fuel Pit #10 was likely transported via stormwater runoff to the grass-covered area where it potentially impacted the soil and infiltrated into groundwater (**Figure 4-6**). Overland flow at the potential release area is generally to the northeast. Surface water from the site is directed via stormwater infrastructure to sewer drains on the western side of the pit and ultimately discharges to West Neck Creek. Based on groundwater flow data collected during the PFAS SI and SI Addendum, groundwater flow at Fuel Pit #10 is generally south and PFAS could be transported via advection and dispersion with groundwater flow partitioning to sediment and surface water where the discharge occurs (CH2M, 2018, forthcoming).

Workers and trespassers may be present at Fuel Pit #10, and workers, visitors, recreational users, including anglers and hunters, and residents are present within 1 mile.

Recommendation

Additional investigation, including groundwater sampling, is recommended at Fuel Pit #10. It is recommended that the sampling be combined with further investigations at AOC 3.

4.2.3.2 2013 F/A-18E Brake Fire

Description and Operational History

On August 20, 2013, the brakes of a F/A-18E aircraft caught fire post-landing at the squadron aircraft parking line. The fire was extinguished by the NAS Oceana Fire Department and it is unknown if AFFF was used to extinguish this fire. The NRMFES District Chief confirmed that an unknown agent was used in this incident (NRMFES District Chief, pers. comm., 2020) (**Figure 4-7**).

Potential for PFAS Use or Release

No written documentation of the use of AFFF or other PFAS-containing materials at the location of this crash was identified during the PA. However, because brake fires often involve greases and can be Class B fires, AFFF use at this fire cannot be ruled out based on available information.

Migration Pathway and Exposure Assessment

If AFFF or PFAS-containing materials were used for emergency response at the site of the 2013 F/A-18E brake fire, they were likely transported via stormwater runoff to the adjacent grass-covered area where they potentially impacted the soil and groundwater (**Figure 4-7**). Overland flow is generally toward the drainage swale southeast of the site. Surface water from the site is directed via stormwater infrastructure to drainage ditches that run to the south of the base and ultimately discharge to West Neck Creek via Outfall 001. Groundwater flow is generally south and PFAS could be transported via advection and dispersion with groundwater flow partitioning to sediment and surface water where the discharge occurs. Future residents could potentially be exposed to PFAS, if present in groundwater, through ingestion and dermal contact.

Workers and trespassers may be present at this brake fire site, and workers, visitors, recreational users, including anglers and hunters, and residents are present within 1 mile.

Recommendation

Additional investigation, including groundwater sampling, is recommended at 2013 F/A-18E Brake Fire. It is recommended that the sampling be combined with further investigations at AOC 3.

4.2.3.3 D Avenue Landfill/Sanitary Landfill

Description and Operational History

The Sanitary Landfill, also known as D Avenue Landfill, is an 11-acre, unlined landfill that was used for the disposal of solvents, pesticides, mixed municipal wastes, construction debris, electrical conductors, transformers, sanitary/refuse, photofinishing, and laboratory/hospital wastes (A.T. Kearney, 1989) (**Figure 4-8**). The landfill began accepting solid waste in 1961 and was issued a permit to operate by the State of Virginia on September 6, 1979 (Permit No. 278) (A.T. Kearney, 1989). The landfill was closed prior to 1996, when groundwater monitoring was implemented to comply with post closure care requirements. Approximately 30 tons of domestic waste per day were placed in the landfill in 1989 (A.T. Kearney, 1989). Concrete rubble that is removed from old aircraft runways and JP-5 jet fuel filters were also disposed of in the Sanitary Landfill (RGH, 1984). Solid waste from NALF Fentress was delivered to D Avenue Landfill/Sanitary Landfill from 1970 to at least 1984 (RGH, 1984). A VSI performed in 1988 indicated a waste fuel bowser was being stored in the landfill area; installation personnel reported the bowser was used by hazardous waste handlers to pump out OWSs (A.T. Kearney, 1989) including those that may have received overflow from potential AFFF releases. Nonhazardous solid waste generated on-installation and placed in dumpsters was picked up regularly and brought to the D Avenue Landfill/Sanitary

Landfill (RGH, 1984). On April 11, 1993, the Navy reported to VDEQ the discovery of approximately 70 5-gallon containers, including some partially buried, that were improperly disposed of at the D Avenue Landfill/Sanitary Landfill. These containers were removed, and their contents were observed to be primarily paint, grease, and lubricating oil; however, some cans appeared to contain a cleaning compound or an acid.

Potential for PFAS Use or Release

Historical records indicate that wastes disposed of in the D Avenue Landfill/Sanitary Landfill consisted of solvents, pesticides, mixed municipal wastes, construction debris, electrical conductors, transformers, sanitary/refuse, photofinishing, and laboratory/hospital wastes. Information obtained during historical document review indicated this landfill was in operation during a time when AFFF and potentially other PFAS-containing materials, including AFFF drums, were in use on-installation and consequently disposed of at this site. Additionally, wastes from NALF Fentress were disposed of at this landfill from 1970 to at least 1984, a time period that AFFF was commonly used. During the years that NALF Fentress brought solid waste to the D Avenue, AFFF was being used at NALF Fentress and there was no other operational landfill at Fentress or records of offsite disposal; therefore, it is likely that wastes containing AFFF and other PFAS-containing materials from NALF Fentress were disposed of at the D Avenue Landfill/Sanitary Landfill.

Migration Pathway and Exposure Assessment

PFAS-containing materials that may have been disposed of at the D Avenue Landfill/Sanitary Landfill could have potentially been released by leaching from waste to groundwater and leaching from soil to groundwater. Groundwater flow at the D Avenue Landfill/Sanitary Landfill generally flows south-southwest, and PFAS could be transported via advection and dispersion with groundwater flow partitioning to sediment and surface water where the discharge occurs into the creek. Overland flow is anticipated to flow radially from the center high point of the landfill toward the surrounding wooded area. Surface water from the site is directed toward two drains at the entrance of the landfill.

Workers and trespassers may be present at the D Avenue Landfill/Sanitary Landfill, and workers, visitors, recreational users, including anglers and hunters, and residents are present within 1 mile.

Recommendation

Additional investigation, including groundwater and soil sampling, is recommended at D Avenue Landfill/Sanitary Landfill. It is recommended that the sampling be combined with further investigations at AOC 3.

Recommendations for AOC 3

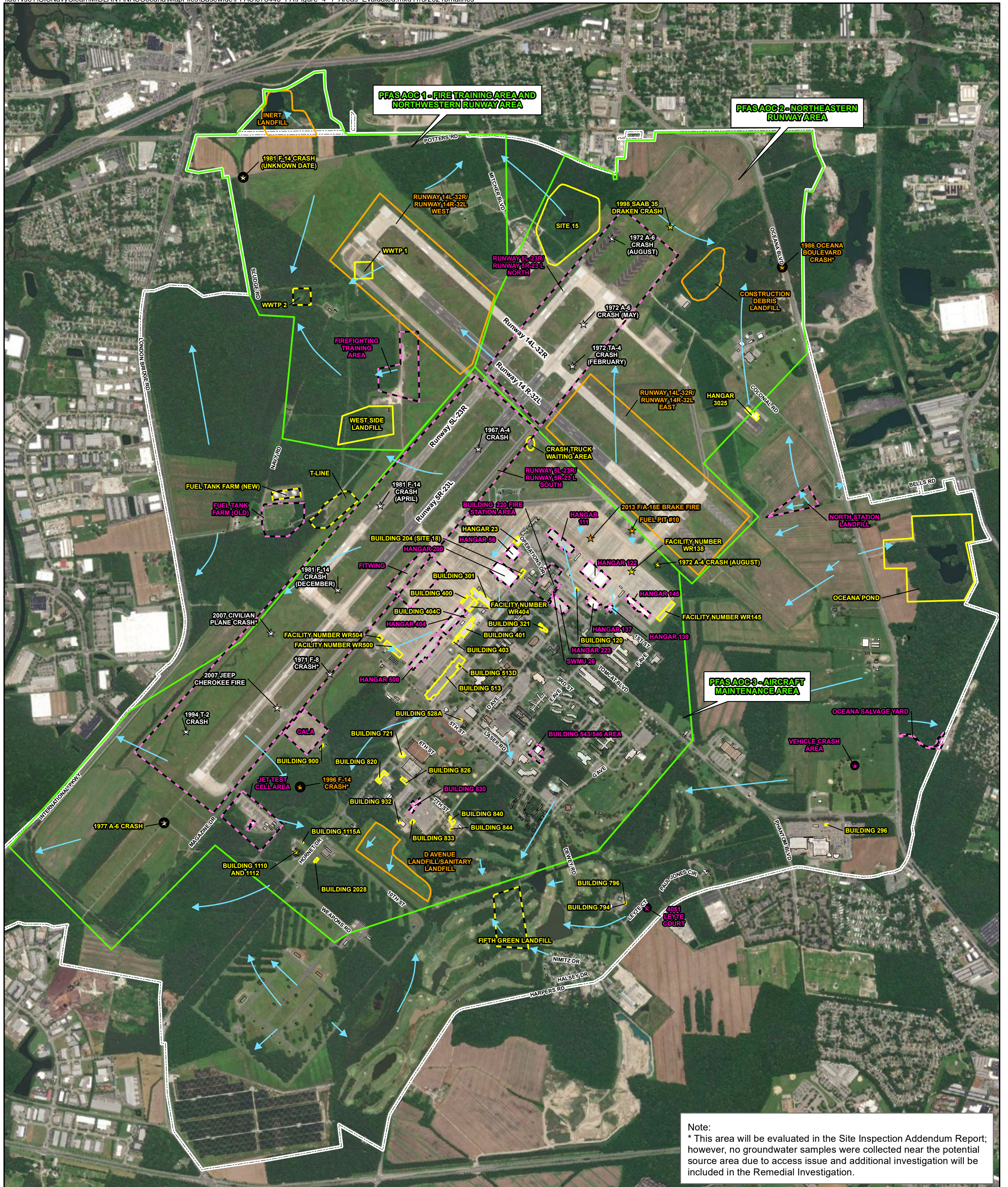
As documented in the forthcoming SI Addendum report, additional sampling in the form of an RI is recommended for AOC 3 (CH2M, forthcoming).

4.2.4 Standalone Sites

Standalone sites include the following potential and/or confirmed release areas:

- Oceana Salvage Yard (previously investigated)
- 4015 Leyte Court (previously investigated)
- Vehicle Crash Area (previously investigated)
- Fuel Tank Farm (Old) (previously investigated)
- North Station Landfill (previously investigated)

All potential/confirmed release areas were previously investigated during the PFAS SI and SI Addendum and are not discussed in further detail.



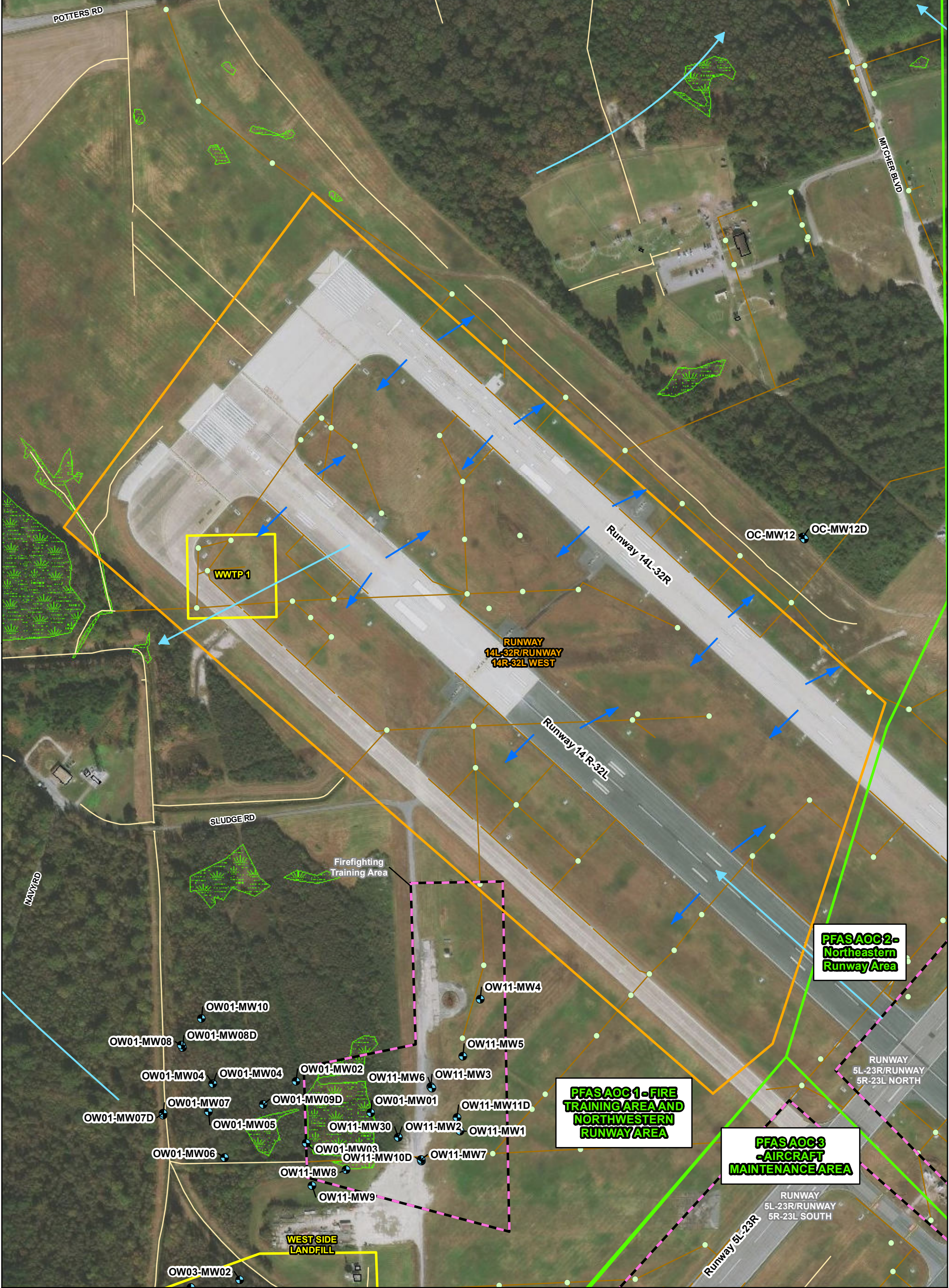
- Legend**
- PFAS AOC Boundary
 - Confirmed PFAS Release Area
 - Previously Investigated Confirmed Release Area
 - Potential PFAS Release Area
 - No Further Action Area
 - Previously Investigated No Further Action Area

- Confirmed PFAS Release Area
- Previously Investigated Confirmed Release Area
- Potential PFAS Release Area
- Previously Investigated Potential PFAS Release Area
- No Further Action Area
- Previously Investigated No Further Action Area
- Crash Location

- Columbia Aquifer Groundwater Flow Direction - September 2020
- Anticipated Groundwater Flow Direction - Columbia
- Groundwater Flow Direction - Columbia Aquifer
- Installation Boundary

Note:
* This area will be evaluated in the Site Inspection Addendum Report; however, no groundwater samples were collected near the potential source area due to access issue and additional investigation will be included in the Remedial Investigation.

Figure 4-1
Areas Evaluated for
Potential PFAS Releases
NAS Oceana
Virginia Beach, Virginia



Legend

- PFAS AOC Boundary
- Previously Investigated Confirmed Release Area
- Potential PFAS Release Area
- No Further Action Area
- Monitoring Well Location
- Stormwater Inlet Point
- Stormwater Ditches
- Stormwater Line

- Buildings
- Anticipated Overland Flow Direction
- Columbia Aquifer Groundwater Flow Direction - August 2019
- Wetland
- Installation Boundary



0 175 350 Feet

Imagery: Esri, 2019

Figure 4-2
Runway 14L-32R/Runway 14R-32L (West)
NAS Oceana
Virginia Beach, Virginia



Legend

- PFAS AOC Boundary
- Potential PFAS Release Area
- Stormwater Inlet Point
- Anticipated Groundwater Flow Direction - Columbia
- Anticipated Overland Flow Direction
- Water Body
- Wetland
- Installation Boundary










0 62.5 125
Feet

Imagery: Esri, 2019

Figure 4-3
Inert Landfill
NAS Oceana
Virginia Beach, Virginia



- ★ Potential PFAS Release Area
- ★ No Further Action Area
- PFAS AOC Boundary
- ▨ Previously Investigated Confirmed
- ▨ Potential PFAS Release Area
- ▨ No Further Action Area
- Monitoring Well Location
- Stormwater Inlet Point

-  Stormwater Ditches
- Stormwater Line
-  Buildings
-  Anticipated Overland Flow Direction
-  Groundwater Flow Direction - Columbia Aquifer
-  Water Body
-  Wetland
-  Installation Boundary



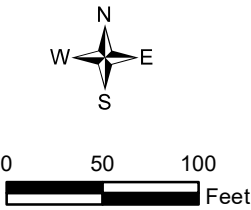
Category	Feet
Category 1	187.5
Category 2	375

Imagery: Esri, 2019

Figure 4-5
Runway 14R-32L/Runway 14L-32R (East)
NAS Oceana
Virginia Beach, Virginia

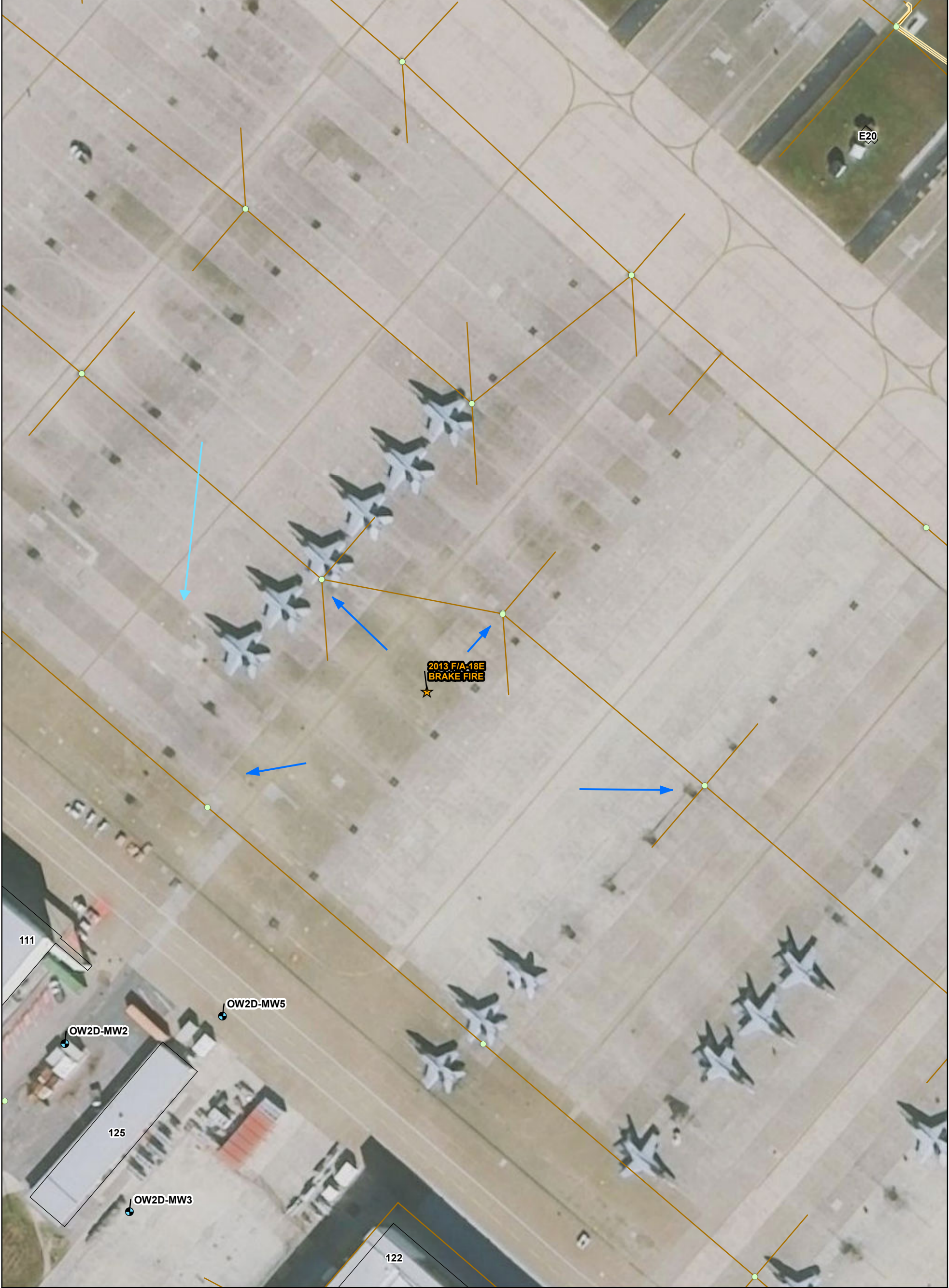


- Legend**
- ★ Potential PFAS Release Area
 - ▭ PFAS AOC Boundary
 - Stormwater Inlet Point
 - Stormwater Ditches
 - Stormwater Line
 - Anticipated Groundwater Flow Direction - Columbia
 - Anticipated Overland Flow Direction
 - Buildings

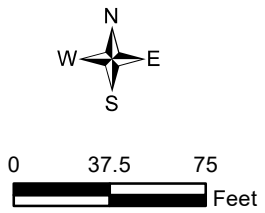


Imagery: Esri, 2019

Figure 4-6
Fuel Pit #10
NAS Oceana
Virginia Beach, Virginia



- Legend**
- Monitoring Well Location
 - Potential PFAS Release Area
 - Stormwater Inlet Point
 - Stormwater Ditches
 - Stormwater Line
 - Groundwater Flow Direction - Columbia Aquifer
 - Anticipated Overland Flow Direction
 - Buildings



Imagery: Esri, 2019

Figure 4-7
2013 F/A-18E Brake Fire
NAS Oceana
Virginia Beach, Virginia





Legend

- Previously Investigated Confirmed Release Area
- Potential PFAS Release Area
- Stormwater Inlet Point
- Stormwater Ditches
- Stormwater Line
- Water Centerline
- Groundwater Flow Direction - Columbia Aquifer
- Anticipated Overland Flow Direction
- Buildings
- Wetland

Note:
Potential PFAS release area is based
on extent of permitted landfill.



0 120 240
Feet

Imagery: Esri, 2019

Figure 4-8
D Avenue Landfill/Sanitary Landfill
NAS Oceana
Virginia Beach, Virginia

Conclusions

This PA evaluated the potential for PFAS release areas at NAS Oceana. **Tables 4-1a** through **4-1d** includes the evaluation of 76 potential PFAS release areas. Thirty-three of the potential PFAS release areas, grouped into three AOCs, have been evaluated in the SI and recommendations and further action will be include in the forthcoming SI Addendum Report (CH2M, Forthcoming). No further action is recommended for areas without evidence of a PFAS release or suspected release. Seven potential PFAS release areas were further evaluated in this PA and are recommended for further investigation as part of the AOCs evaluated in the SI Addendum report. The rationale for further assessment of each of those sites is provided in **Table 5-1**. Potential receptors and migration pathways for the sites with potential PFAS releases are discussed in **Section 4** or the PFAS SI and SI Addendum for sites previously investigated.

Based on available information, groundwater within 1 mile of the installation is used as a source of drinking water for at least 15 properties. One drinking water well had exceedances of the USEPA lifetime health advisory, and an expedited response action was implemented (CH2M, 2020d). This location is being provided bottled water under the expedited response action until a long-term solution is implemented. Connection to city water was selected in the EE/CA as a long-term solution.

DoD Instruction 4715.18, *Emerging Chemicals (EC)* (September 2019), requires that: “Identify ECs; assess the likelihood and severity of impacts associated with ECs to people, the environment, and DoD mission, programs, and resources enterprise-wide; and take management actions to reduce these impacts.” Additionally, the Navy *Interim Per- and Polyfluoroalkyl Substances (PFAS) Site Guidance for NAVFAC Remedial Project Managers (RPMs)/November 2020 Update* recommends additional investigation if the conceptual site model described in the PA indicates there is evidence of a potential release of a known PFAS-containing substance or if there is a documented release of AFFF where the formulation of the AFFF is unknown (Navy, 2020).

This PA has identified locations where potential AFFF releases are documented or suspected, triggering the need for further investigation to determine whether a release to the environment occurred that resulted in impacts to soil, sediment, surface water, or groundwater at levels that warrant remedial actions.

Table 5-1. Areas Not Previously Investigated Recommended for Additional Investigation

Area Assessed	Rationale for Further Investigation
AOC 1	
Inert Landfill	<ul style="list-style-type: none"> The Inert Landfill received waste that may have contained PFAS including construction debris, soil, and concrete from areas at and near the runways where AFFF was used in emergency responses.
Runway 14L-32R/Runway 14R-32L West	<ul style="list-style-type: none"> Emergency response with known or potential AFFF use has occurred at unknown locations along the runways at NAS Oceana.
AOC 2	
Construction Debris Landfill	<ul style="list-style-type: none"> An empty AFFF drum was identified in the Construction Debris Landfill.
Runway 14L-32R/Runway 14R-32L East	<ul style="list-style-type: none"> Emergency response with known or potential AFFF use has occurred at unknown locations along the runways at NAS Oceana
AOC 3	
Fuel Pit #10	<ul style="list-style-type: none"> Emergency response with potential AFFF use occurred at the Fuel Pit #10.
2013 F/A-18E Brake Fire	<ul style="list-style-type: none"> Emergency response with confirmed AFFF use occurred at the 2013 F/A-18E Brake Fire.
D Avenue Landfill/Sanitary Landfill	<ul style="list-style-type: none"> The D Avenue Landfill/Sanitary Landfill received waste that may have contained PFAS including solid waste from NALF Fentress which may have contained AFFF.

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Appendix A
Other Per- and Polyfluoroalkyl
Substances Data

Fifth Green Landfill

Soil Analytical Results - Raw Data*Fifth Green Landfill Site Inspection Report**Naval Air Station Oceana, Virginia Beach, Virginia*

Sample ID	OW07-IDWS01-020719
Sample Date	2/7/19
Chemical Name	
Per- and Polyfluoroalkylated Substances (UG/KG)	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	2.7 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	3.38 U
Perfluorobutanesulfonic acid (PFBS)	1.35 U
Perfluorodecanoic Acid (PFDA)	1.35 U
Perfluorododecanoic Acid (PFDoA)	0.68 U
Perfluoroheptanoic acid (PFHpA)	1.35 U
Perfluorohexanesulfonic acid (PFHxS)	0.68 U
Perfluorohexanoic Acid (PFHxA)	1.35 U
Perfluorononanoic acid (PFNA)	1.35 U
Perfluorooctane Sulfonate (PFOS)	0.75 J
Perfluorooctanoic acid (PFOA)	1.35 U
Perfluorotetradecanoic Acid (PFTeDA)	2.7 U
Perfluorotridecanoic Acid (PFTrDA)	1.35 U
Perfluoroundecanoic Acid (PFUnA)	1.35 U

Notes:

U - The material was analyzed for, but not detected

UG/KG - Micrograms per kilogram

Aqueous Analytical Results - Raw Data*Fifth Green Landfill Site Inspection Report**Naval Air Station Oceana, Virginia Beach, Virginia*

Sample ID	OW07-IDWA01-020719
Sample Date	2/7/19
Chemical Name	
Per- and Polyfluoroalkylated Substances (NG/L)	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	0.94 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	1.89 U
Perfluorobutanesulfonic acid (PFBS)	3.18 J
Perfluorodecanoic Acid (PFDA)	0.4 J
Perfluorododecanoic Acid (PFDoA)	0.47 U
Perfluoroheptanoic acid (PFHpA)	4.63 J
Perfluorohexanesulfonic acid (PFHxS)	16.08
Perfluorohexanoic Acid (PFHxA)	7.13
Perfluorononanoic acid (PFNA)	1.18 J
Perfluorooctane Sulfonate (PFOS)	10.65
Perfluorooctanoic acid (PFOA)	3.41 J
Perfluorotetradecanoic Acid (PFTeDA)	0.94 U
Perfluorotridecanoic Acid (PFTrDA)	0.47 U
Perfluoroundecanoic Acid (PFUnA)	0.94 U

Notes:

J - Analyte present. Value may or may not be accurate or precise

NG/L - Nanograms per liter

U - The material was analyzed for, but not detected

North Station Landfill

Aqueous Analytical Results - Raw Data

North Station Landfill IDW

Naval Air Station Oceana, Virginia Beach, Virginia

Sample ID	OW08-IDWA01-030719
Sample Date	1/11/19
Chemical Name	
Perfluoroalkylated substances (NG/L)	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	0.86 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	1.72 U
Perfluorobutanesulfonic acid (PFBS)	77.2 D
Perfluorodecanoic Acid (PFDA)	0.55 J
Perfluorododecanoic Acid (PFDoA)	0.43 U
Perfluoroheptanoic acid (PFHpA)	34.8
Perfluorohexanesulfonic acid (PFHxS)	27.4
Perfluorohexanoic Acid (PFHxA)	43.3
Perfluorononanoic acid (PFNA)	3.16 J
Perfluorooctane Sulfonate (PFOS)	28
Perfluorooctanoic acid (PFOA)	75.9 D
Perfluorotetradecanoic Acid (PFTeDA)	0.86 U
Perfluorotridecanoic Acid (PFTrDA)	0.43 U
Perfluoroundecanoic Acid (PFUnA)	0.86 U

Notes:

D - Dilution analysis.

J - The analyte has been detected beneath the LOQ.

NG/L - Nanograms per liter

U - The material was analyzed for but not detected.

Solid Analytical Results - Raw Data

North Station Landfill IDW

Naval Air Station Oceana, Virginia Beach, Virginia

Sample ID	OW08-IDWS01-030719
Sample Date	1/11/19
Chemical Name	
Perfluoroalkylated Substances (UG/KG)	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	2.4 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	2.99 U
Perfluorobutanesulfonic acid (PFBS)	1.2 U
Perfluorodecanoic Acid (PFDA)	1.2 U
Perfluorododecanoic Acid (PFDoA)	0.6 U
Perfluoroheptanoic acid (PFHpA)	1.2 U
Perfluorohexanesulfonic acid (PFHxS)	0.6 U
Perfluorohexanoic Acid (PFHxA)	1.2 U
Perfluorononanoic acid (PFNA)	1.2 U
Perfluorooctane Sulfonate (PFOS)	1.48 J
Perfluorooctanoic acid (PFOA)	1.2 U
Perfluorotetradecanoic Acid (PFTeDA)	2.4 U
Perfluorotridecanoic Acid (PFTrDA)	1.2 U
Perfluoroundecanoic Acid (PFUnA)	1.2 U

Notes:

J - The analyte was detected beneath the LOQ.

UG/KG - Nanograms per gram

U - The material was analyzed for but not detected.

Oceana Salvage Yard

GW Analytical Results - Raw Data

Oceana Salvage Yard RDE

Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-MW01		OSAL-MW02	OSAL-MW03	OSAL-MW04	OSAL-MW05	OSAL-MW06
Sample ID	OSAL-GW01-0119	OSAL-GW01P-0119	OSAL-GW02-0119	OSAL-GW03-0119	OSAL-GW04-0119	OSAL-GW05-0119	OSAL-GW06-0119
Sample Date	01/17/19	01/17/19	01/17/19	01/17/19	01/17/19	01/17/19	01/17/19
Chemical Name							
Per- and Polyfluoroalkylated Substances (UG/L)							
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	9.30E-04 U	8.90E-04 U	9.30E-04 U	9.30E-04 U	9.30E-04 U	9.40E-04 U	9.10E-04 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	0.00185 U	0.00179 U	0.00185 U	0.00185 U	0.00185 U	0.00189 U	0.00182 U
Perfluorooctane Sulfonate (PFOS)	0.0285	0.0344	0.0127	0.00766	0.0582	0.678	0.0307
Perfluoroundecanoic Acid (PFUnA)	9.30E-04 U	8.90E-04 U	9.30E-04 U	9.30E-04 U	9.30E-04 U	9.40E-04 U	9.10E-04 U
Perfluorohexanoic Acid (PFHxA)	0.0132	0.0133	0.00914	0.0427	0.0180	1.85	0.500
Perfluorododecanoic Acid (PFDoA)	4.60E-04 U	4.50E-04 U	4.60E-04 U	4.60E-04 U	4.60E-04 U	4.70E-04 U	4.50E-04 U
Perfluorooctanoic acid (PFOA)	0.0192	0.0171	0.0104	0.0250	0.0314	0.702	0.118
Perfluorodecanoic Acid (PFDA)	4.60E-04 U	4.50E-04 U	4.60E-04 U	4.60E-04 U	4.60E-04 U	0.00272 J	4.50E-04 U
Perfluorohexanesulfonic acid (PFHxS)	0.0206	0.0213	0.00992	0.0252	0.0139	0.0308	0.0593
Perfluorobutanesulfonic acid (PFBS)	0.00476	0.00457	0.00348 J	0.00645	0.0152	0.0232	0.00385 J
Perfluoroheptanoic acid (PFHpA)	0.00911	0.00912	0.00572	0.0269	0.0136	1.04	0.261
Perfluorononanoic acid (PFNA)	0.00299 J	0.00272 J	5.70E-04 J	5.00E-04 J	0.00337 J	0.116	0.00848
Perfluorotetradecanoic Acid (PFTeDA)	9.30E-04 U	8.90E-04 U	9.30E-04 U	9.30E-04 U	9.30E-04 U	9.40E-04 U	9.10E-04 U
Perfluorotridecanoic Acid (PFTTrDA)	4.60E-04 U	4.50E-04 U	4.60E-04 U	4.60E-04 U	4.60E-04 U	4.70E-04 U	4.50E-04 U

Notes:

Shading indicates detections

J - Analyte present, value may or may not be accurate or precise

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

UG/L - Micrograms per liter

SB Analytical Results - Raw Data
Oceana Salvage Yard RDE
Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SO57		OSAL-SO58	OSAL-SO59	OSAL-SO60		OSAL-SO61
Sample ID	OSAL-SB57-0H02-0119	OSAL-SB57P-0H02-0119	OSAL-SB58-0H02-0119	OSAL-SB59-0H02-0119	OSAL-SB60-0H02-0119	OSAL-SB60P-0H02-0119	OSAL-SB61-0H02-0119
Sample Date	01/07/19	01/07/19	01/11/19	01/11/19	01/11/19	01/11/19	01/11/19
Chemical Name							
Per- and Polyfluoroalkylated Substances (UG/KG)							
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA	2.16 U	2.38 U	2.21 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA	2.7 U	2.98 U	2.76 U
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA	1.24 J	0.42 J	0.99 J
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA	1.08 U	1.19 U	1.1 U
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA	1.08 U	1.19 U	1.1 U
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA	0.54 U	0.6 U	0.55 U
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA	1.08 U	1.19 U	1.1 U
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA	1.08 U	1.19 U	1.1 U
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA	0.54 U	0.6 U	0.55 U
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA	1.08 U	1.19 U	1.1 U
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA	1.08 U	1.19 U	1.1 U
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA	1.08 U	1.19 U	1.1 U
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA	2.16 U	2.38 U	2.21 U
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA	1.08 U	1.19 U	1.1 U

Notes:

Shading indicates detections

NA - Not analyzed
J - Analyte present, value may or may not be accurate or precise
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
NG/KG - Picograms per gram
UG/KG - Micrograms per kilogram

SB Analytical Results - Raw Data
Oceana Salvage Yard RDE
Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SO62		OSAL-SO63		OSAL-SO64	
Sample ID	OSAL-SB62-0H02-0119	OSAL-SB62-0203-0119	OSAL-SB63-0H02-0119	OSAL-SB63-0203-0119	OSAL-SB64-0H02-0119	OSAL-SB64-0203-0119
Sample Date	01/07/19	01/07/19	01/11/19	01/11/19	01/11/19	01/11/19
Chemical Name						
Per- and Polyfluoroalkylated Substances (UG/KG)						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA	NA	NA
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA	NA	NA
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA	NA	NA
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA	NA	NA
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA	NA	NA
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA	NA	NA
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed
J - Analyte present, value may or may not be accurate or precise
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
NG/KG - Picograms per gram
UG/KG - Micrograms per kilogram

SB Analytical Results - Raw Data
Oceana Salvage Yard RDE
Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SO65		OSAL-SO66		OSAL-SO67	OSAL-SO68	
Sample ID	OSAL-SB65-0H02-0119	OSAL-SB65-0203-0119	OSAL-SB66-0H02-0119	OSAL-SB66-0203-0119	OSAL-SB67-0H02-0119	OSAL-SB68-0H02-0119	OSAL-SB68P-0H02-0119
Sample Date	01/15/19	01/15/19	01/15/19	01/15/19	01/09/19	01/09/19	01/09/19
Chemical Name							
Per- and Polyfluoroalkylated Substances (UG/KG)							
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	2.41 U	2.3 U	2.23 U	2.53 U	NA	NA	NA
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	3.01 U	2.87 U	2.79 U	3.16 U	NA	NA	NA
Perfluorooctane Sulfonate (PFOS)	0.52 J	1.15 U	1.12 U	1.27 U	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	1.2 U	1.15 U	1.12 U	1.27 U	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	1.2 U	1.15 U	1.12 U	1.27 U	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	0.6 U	0.57 U	0.56 U	0.63 U	NA	NA	NA
Perfluorooctanoic acid (PFOA)	1.2 U	1.15 U	1.12 U	1.27 U	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	1.2 U	1.15 U	1.12 U	1.27 U	NA	NA	NA
Perfluorohexanesulfonic acid (PFHxS)	0.6 U	0.57 U	0.56 U	0.63 U	NA	NA	NA
Perfluorobutanesulfonic acid (PFBS)	1.2 U	1.15 U	1.12 U	1.27 U	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	1.2 U	1.15 U	1.12 U	1.27 U	NA	NA	NA
Perfluorononanoic acid (PFNA)	1.2 U	1.15 U	1.12 U	1.27 U	NA	NA	NA
Perfluorotetradecanoic Acid (PFTeDA)	2.41 U	2.3 U	2.23 U	2.53 U	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	1.2 U	1.15 U	1.12 U	1.27 U	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed
J - Analyte present, value may or may not be accurate or precise
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
NG/KG - Picograms per gram
UG/KG - Micrograms per kilogram

SB Analytical Results - Raw Data
Oceana Salvage Yard RDE
Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SO69	OSAL-SO70	OSAL-SO71	OSAL-SO72	OSAL-SO73	OSAL-SO74
Sample ID	OSAL-SB69-OH02-0119	OSAL-SB70-OH02-0119	OSAL-SB71-OH02-0119	OSAL-SB72-OH02-0119	OSAL-SB73-OH02-0119	OSAL-SB74-OH02-0119
Sample Date	01/15/19	01/16/19	01/16/19	01/16/19	01/22/19	01/16/19
Chemical Name						
Per- and Polyfluoroalkylated Substances (UG/KG)						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA	2.67 U	2.34 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA	3.33 U	2.92 U
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA	2.36 J	0.44 J
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA	1.33 U	1.17 U
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA	1.33 U	0.65 J
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA	0.67 U	0.58 U
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA	0.87 J	1.17 U
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA	1.33 U	1.17 U
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA	0.67 U	0.58 U
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA	1.33 U	1.17 U
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA	0.8 J	1.21 J
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA	1.33 U	1.17 U
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA	2.67 U	2.34 U
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA	1.33 U	1.17 U

Notes:

Shading indicates detections

NA - Not analyzed
J - Analyte present, value may or may not be accurate or precise
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
NG/KG - Picograms per gram
UG/KG - Micrograms per kilogram

SB Analytical Results - Raw Data
Oceana Salvage Yard RDE
Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SO75		OSAL-SO76	OSAL-SO77
Sample ID	OSAL-SB75-0H02-0119	OSAL-SB75P-0H02-0119	OSAL-SB76-0H02-0119	OSAL-SB77-0H02-0119
Sample Date	01/22/19	01/22/19	01/22/19	01/25/19
Chemical Name				
Per- and Polyfluoroalkylated Substances (UG/KG)				
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed
J - Analyte present, value may or may not be accurate or precise
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
NG/KG - Picograms per gram
UG/KG - Micrograms per kilogram

SD Analytical Results - Raw Data

Oceana Salvage Yard RDE

Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SWSD01	OSAL-SWSD02	OSAL-SWSD03	OSAL-SWSD04	OSAL-SWSD05	OSAL-SWSD06	OSAL-SWSD07	OSAL-SWSD08		OSAL-SWSD09
Sample ID	OSAL-SD01-0119	OSAL-SD02-0119	OSAL-SD03-0119	OSAL-SD04-0119	OSAL-SD05-0119	OSAL-SD06-0119	OSAL-SD07-0119	OSAL-SD08-0119	OSAL-SD08P-0119	OSAL-SD09-0119
Sample Date	01/10/19	01/09/19	01/09/19	01/08/19	01/08/19	01/08/19	01/08/19	01/09/19	01/09/19	01/08/19
Chemical Name										
Per- and Polyfluoroalkylated Substances (UG/KG)										
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA	NA	NA	NA	3.64 U	3.28 U	NA
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA	NA	NA	NA	4.55 U	4.1 U	NA
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA	NA	NA	NA	4.84 J	2.03 J	NA
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA	NA	NA	NA	1.82 U	1.64 U	NA
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA	NA	NA	NA	1.82 U	1.64 U	NA
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA	NA	NA	NA	0.91 U	0.82 U	NA
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA	NA	NA	NA	2.62 U	2.12 U	NA
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA	NA	NA	NA	1.82 U	1.64 U	NA
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA	NA	NA	NA	3.07 J	2.25 J	NA
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA	NA	NA	NA	1.82 U	1.64 U	NA
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA	NA	NA	NA	1.82 U	1.64 U	NA
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA	NA	NA	NA	1.82 U	1.64 U	NA
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA	NA	NA	NA	3.64 U	3.28 U	NA
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA	NA	NA	NA	1.82 U	1.64 U	NA

Notes:

Shading indicates detections

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B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
N - Tentative Identification, consider present, special methods may be needed to confirm its presence or absence in future sampling efforts
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
NG/KG - Picograms per gram
UG/KG - Micrograms per kilogram
UMOL/G - Micromoles per gram

SD Analytical Results - Raw Data

Oceana Salvage Yard RDE

Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SWSD10		OSAL-SWSD11	OSAL-SWSD12	OSAL-SWSD13	OSAL-SWSD14	OSAL-SWSD15	OSAL-SWSD16	OSAL-SWSD17	OSAL-SWSD18	OSAL-SWSD19
Sample ID	OSAL-SD10-0119	OSAL-SD10P-0119	OSAL-SD11-0119	OSAL-SD12-0119	OSAL-SD13-0119	OSAL-SD14-0119	OSAL-SD15-0119	OSAL-SD16-0119	OSAL-SD17-0119	OSAL-SD18-0119	OSAL-SD19-0119
Sample Date	01/14/19	01/14/19	01/14/19	01/10/19	01/10/19	01/10/19	01/18/19	01/18/19	01/18/19	01/18/19	01/18/19
Chemical Name											
Per- and Polyfluoroalkylated Substances (UG/KG)											
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA	3.31 U	NA	NA	NA	NA	NA	NA
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA	4.13 U	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA	4.4 J	NA	NA	NA	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA	1.65 U	NA	NA	NA	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA	1.65 U	NA	NA	NA	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA	0.83 U	NA	NA	NA	NA	NA	NA
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA	1.65 U	NA	NA	NA	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA	1.65 U	NA	NA	NA	NA	NA	NA
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA	0.83 U	NA	NA	NA	NA	NA	NA
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA	1.65 U	NA	NA	NA	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA	1.65 U	NA	NA	NA	NA	NA	NA
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA	1.65 U	NA	NA	NA	NA	NA	NA
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA	3.31 U	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA	1.65 U	NA	NA	NA	NA	NA	NA

Notes:

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J - Analyte present, value may or may not be accurate or precise
N - Tentative Identification, consider present, special methods may be needed to confirm its presence or absence in future sampling efforts
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
NG/KG - Picograms per gram
UG/KG - Micrograms per kilogram
UMOL/G - Micromoles per gram

SD Analytical Results - Raw Data

Oceana Salvage Yard RDE

Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SWSD20		OSAL-SWSD21	OSAL-SWSD22	OSAL-SWSD23	OSAL-SWSD24	OSAL-SWSD25	OSAL-SWSD26	OSAL-SWSD27	OSAL-SWSD28	OSAL-SWSD29
Sample ID	OSAL-SD20-0119	OSAL-SD20P-0119	OSAL-SD21-0119	OSAL-SD22-0119	OSAL-SD23-0119	OSAL-SD24-0119	OSAL-SD25-0119	OSAL-SD26-0119	OSAL-SD27-0119	OSAL-SD28-0119	OSAL-SD29-0119
Sample Date	01/18/19	01/18/19	01/21/19	01/21/19	01/21/19	01/21/19	01/21/19	01/21/19	01/21/19	01/22/19	01/22/19
Chemical Name											
Per- and Polyfluoroalkylated Substances (UG/KG)											
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA	NA	NA	NA	NA	3.28 U	3.45 U	2.34 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA	NA	NA	NA	NA	4.1 U	4.31 U	2.92 U
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA	NA	NA	NA	NA	1.84 J	1.92 J	0.48 J
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA	NA	NA	NA	NA	1.64 U	1.72 U	1.17 U
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA	NA	NA	NA	NA	1.64 U	1.72 U	1.17 U
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA	NA	NA	NA	NA	0.82 U	0.86 U	0.58 U
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA	NA	NA	NA	NA	1.23 J	1.72 U	1.17 U
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA	NA	NA	NA	NA	1.64 U	1.72 U	1.17 U
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA	NA	NA	NA	NA	0.93 J	0.86 U	0.58 U
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA	NA	NA	NA	NA	1.64 U	1.72 U	1.17 U
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA	NA	NA	NA	NA	1.64 U	1.72 U	1.17 U
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA	NA	NA	NA	NA	1.64 U	1.72 U	1.17 U
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA	NA	NA	NA	NA	3.28 U	3.45 U	2.34 U
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA	NA	NA	NA	NA	1.64 U	1.72 U	1.17 U

Notes:

Shading indicates detections

NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
N - Tentative Identification, consider present, special methods may be needed to confirm its presence or absence in future sampling efforts
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
NG/KG - Picograms per gram
UG/KG - Micrograms per kilogram
UMOL/G - Micromoles per gram

SD Analytical Results - Raw Data

Oceana Salvage Yard RDE

Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SWSD30	OSAL-SWSD31	OSAL-SWSD32	OSAL-SWSD33	OSAL-SWSD34	OSAL-SWSD35	OSAL-SWSD36	OSAL-SWSD37		OSAL-SWSD38	
Sample ID	OSAL-SD30-0119	OSAL-SD31-0119	OSAL-SD32-0119	OSAL-SD33-0119	OSAL-SD34-0119	OSAL-SD35-0119	OSAL-SD36-0119	OSAL-SD37-0119	OSAL-SD37P-0119	OSAL-SD38-0119	OSAL-SD38P-0119
Sample Date	01/23/19	01/23/19	01/23/19	01/23/19	01/23/19	01/23/19	01/23/19	01/25/19	01/25/19	01/25/19	01/25/19
Chemical Name											
Per- and Polyfluoroalkylated Substances (UG/KG)											
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
N - Tentative Identification, consider present, special methods may be needed to confirm its presence or absence in future sampling efforts
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
NG/KG - Picograms per gram
UG/KG - Micrograms per kilogram
UMOL/G - Micromoles per gram

SD Analytical Results - Raw Data

Oceana Salvage Yard RDE

Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SWSD39	OSAL-SWSD40	OSAL-SWSD41	OSAL-SWSD42	OSAL-SWSD43	OSAL-SWSD44	OSAL-SWSD45	OSAL-SWSD46
Sample ID	OSAL-SD39-0119	OSAL-SD40-0119	OSAL-SD41-0119	OSAL-SD42-0119	OSAL-SD43-0119	OSAL-SD44-0119	OSAL-SD45-0119	OSAL-SD46-0119
Sample Date	01/25/19	01/25/19	01/25/19	01/25/19	01/28/19	01/28/19	01/28/19	01/28/19
Chemical Name								
Per- and Polyfluoroalkylated Substances (UG/KG)								
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA	NA	NA	NA	NA
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed
B - Analyte not detected above the level reported in blanks
J - Analyte present, value may or may not be accurate or precise
N - Tentative Identification, consider present, special methods may be needed to confirm its presence or absence in future sampling efforts
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
NG/KG - Picograms per gram
UG/KG - Micrograms per kilogram
UMOL/G - Micromoles per gram

SS Analytical Results - Raw Data

Oceana Salvage Yard RDE

Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SO62		OSAL-SO63	OSAL-SO65	OSAL-SO66	OSAL-SO67		OSAL-SO68
Sample ID	OSAL-SS62-000H-0119	OSAL-SS62P-000H-0119	OSAL-SS63-000H-0119	OSAL-SS65-000H-0119	OSAL-SS66-000H-0119	OSAL-SS67-000H-0119	OSAL-SS67P-000H-0119	OSAL-SS68-000H-0119
Sample Date	01/07/19	01/07/19	01/11/19	01/15/19	01/15/19	01/09/19	01/09/19	01/09/19
Chemical Name								
Per- and Polyfluoroalkylated Substances (UG/KG)								
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	2.3 U	2.44 U	NA	NA	NA
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	2.87 U	3.05 U	NA	NA	NA
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	1.15 U	1.22 U	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	1.15 U	1.22 U	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	0.43 J	1.22 U	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	0.57 U	0.61 U	NA	NA	NA
Perfluorooctanoic acid (PFOA)	NA	NA	NA	1.15 U	1.22 U	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	1.15 U	1.22 U	NA	NA	NA
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	0.57 U	0.61 U	NA	NA	NA
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	1.15 U	1.22 U	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	1.15 U	1.22 U	NA	NA	NA
Perfluorononanoic acid (PFNA)	NA	NA	NA	1.15 U	1.22 U	NA	NA	NA
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	2.3 U	2.44 U	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	1.15 U	1.22 U	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed

J - Analyte present, value may or may not be accurate or precise

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

MG/KG - Milligrams per kilogram

NG/KG - Nanograms per kilogram

UG/KG - Micrograms per kilogram

SS Analytical Results - Raw Data

Oceana Salvage Yard RDE

Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SO69	OSAL-SO70	OSAL-SO71	OSAL-SO72	OSAL-SO73	OSAL-SO74	
Sample ID	OSAL-SS69-000H-0119	OSAL-SS70-000H-0119	OSAL-SS71-000H-0119	OSAL-SS72-000H-0119	OSAL-SS73-000H-0119	OSAL-SS74-000H-0119	OSAL-SS74P-000H-0119
Sample Date	01/15/19	01/16/19	01/16/19	01/16/19	01/22/19	01/16/19	01/16/19
Chemical Name							
Per- and Polyfluoroalkylated Substances (UG/KG)							
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA	2.5 U	2.5 U	2.52 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA	3.13 U	3.13 U	3.14 U
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA	1.96 J	0.52 J	0.38 J
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA	1.25 U	1.25 U	1.26 U
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA	1.25 U	1.25 U	1.26 U
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA	0.63 U	0.63 U	0.63 U
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA	0.81 J	1.25 U	1.26 U
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA	1.25 U	1.25 U	1.26 U
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA	0.63 U	0.63 U	0.63 U
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA	1.25 U	1.25 U	1.26 U
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA	0.61 J	1.25 U	0.75 J
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA	1.25 U	1.25 U	1.26 U
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA	2.5 U	2.5 U	2.52 U
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA	1.25 U	1.25 U	1.26 U

Notes:

Shading indicates detections

- NA - Not analyzed
- J - Analyte present, value may or may not be accurate or precise
- U - The material was analyzed for, but not detected
- UJ - Analyte not detected, quantitation limit may be inaccurate
- MG/KG - Milligrams per kilogram
- NG/KG - Nanograms per kilogram
- UG/KG - Micrograms per kilogram

SS Analytical Results - Raw Data

Oceana Salvage Yard RDE

Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SO75	OSAL-SO76	OSAL-SO77
Sample ID	OSAL-SS75-000H-0119	OSAL-SS76-000H-0119	OSAL-SS77-000H-0119
Sample Date	01/22/19	01/22/19	01/25/19
Chemical Name			
Per- and Polyfluoroalkylated Substances (UG/KG)			
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA
Perfluorooctanoic acid (PFOA)	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	NA	NA	NA
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA
Perfluorononanoic acid (PFNA)	NA	NA	NA
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA

Notes:

Shading indicates detections

- NA - Not analyzed
J - Analyte present, value may or may not be accurate or precise
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/KG - Milligrams per kilogram
NG/KG - Nanograms per kilogram
UG/KG - Micrograms per kilogram

SW Analytical Results - Raw Data
Oceana Salvage Yard RDE
Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SWSD01	OSAL-SWSD02	OSAL-SWSD03	OSAL-SWSD04	OSAL-SWSD05	OSAL-SWSD06	OSAL-SWSD07	OSAL-SWSD08	OSAL-SWSD09	OSAL-SWSD10	
Sample ID	OSAL-SW01-0119	OSAL-SW02-0119	OSAL-SW03-0119	OSAL-SW04-0119	OSAL-SW05-0119	OSAL-SW06-0119	OSAL-SW07-0119	OSAL-SW08-0119	OSAL-SW09-0119	OSAL-SW10-0119	OSAL-SW10P-0119
Sample Date	01/10/19	01/09/19	01/09/19	01/08/19	01/08/19	01/08/19	01/08/19	01/08/19	01/08/19	01/14/19	01/14/19
Chemical Name											
Per- and Polyfluoroalkylated Substances (UG/L)											
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	9.10E-04 U	9.30E-04 U	9.10E-04 U	8.90E-04 U	9.30E-04 U	9.30E-04 U	9.30E-04 U	8.80E-04 U	8.90E-04 U	8.90E-04 U	8.60E-04 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	0.00182 U	0.00185 U	0.00182 U	0.00179 U	0.00185 U	0.00185 U	0.00185 U	0.00175 U	0.00179 U	0.00179 U	0.00172 U
Perfluorooctane Sulfonate (PFOS)	0.0214	0.0164	0.0111	0.0167	0.0178	0.0132	0.0120	0.00494	0.00648	0.00895	0.00709
Perfluoroundecanoic Acid (PFUnA)	9.10E-04 U	9.30E-04 U	9.10E-04 U	8.90E-04 U	9.30E-04 U	9.30E-04 U	9.30E-04 U	8.80E-04 U	8.90E-04 U	8.90E-04 U	8.60E-04 U
Perfluorohexanoic Acid (PFHxA)	0.00874	0.00714	0.00353 J	0.00357 J	0.0047	0.00405 J	0.00509	0.00547	0.00168 J	0.00384 J	0.00364 J
Perfluorododecanoic Acid (PFDoA)	4.50E-04 U	4.60E-04 U	4.50E-04 U	4.50E-04 U	4.60E-04 U	4.60E-04 U	4.60E-04 U	4.40E-04 U	4.50E-04 U	4.50E-04 U	4.30E-04 U
Perfluorooctanoic acid (PFOA)	0.0100	0.0202	0.00382 J	0.00431 J	0.00928	0.0100	0.0141	0.0177	0.00324 J	0.00386 J	0.00388 J
Perfluorodecanoic Acid (PFDA)	2.90E-04 J	1.80E-04 J	2.00E-04 J	3.10E-04 J	4.30E-04 J	2.30E-04 J	2.60E-04 J	4.40E-04 U	1.90E-04 J	4.50E-04 U	1.50E-04 J
Perfluorohexanesulfonic acid (PFHxS)	0.0232	0.0139	0.0145	0.0121	0.0301	0.0484	0.0809	0.0759	0.00713	0.00204 J	0.00192 J
Perfluorobutanesulfonic acid (PFBS)	0.00405 J	0.00234 J	0.00239 J	0.00209 J	0.00423 J	0.00695	0.0106	0.00718	0.00191 J	0.00176 J	0.00138 J
Perfluoroheptanoic acid (PFHpA)	0.00521	0.0026 J	0.00205 J	0.00251 J	0.002 J	0.00212 J	0.00183 J	0.00161 J	0.00136 J	0.0032 J	0.00308 J
Perfluorononanoic acid (PFNA)	0.00197 J	9.80E-04 J	7.70E-04 J	0.00118 J	0.00192 J	0.00138 J	0.00144 J	0.00107 J	0.00104 J	7.70E-04 J	8.00E-04 J
Perfluorotetradecanoic Acid (PFTeDA)	9.10E-04 UJ	9.30E-04 U	9.10E-04 U	8.90E-04 U	9.30E-04 U	9.30E-04 U	9.30E-04 U	8.80E-04 U	8.90E-04 U	8.90E-04 U	8.60E-04 U
Perfluorotridecanoic Acid (PFTrDA)	4.50E-04 U	4.60E-04 U	4.50E-04 U	4.50E-04 U	4.60E-04 U	4.60E-04 U	4.60E-04 U	4.40E-04 U	4.50E-04 U	4.50E-04 U	4.30E-04 U

Notes:
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J - Analyte present, value may or may not be accurate or precise
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/L - Milligrams per liter
UG/L - Micrograms per liter

SW Analytical Results - Raw Data

Oceana Salvage Yard RDE

Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SWSD11		OSAL-SWSD12	OSAL-SWSD13	OSAL-SWSD14	OSAL-SWSD15	OSAL-SWSD16	OSAL-SWSD17	OSAL-SWSD18	OSAL-SWSD19
Sample ID	OSAL-SW11-0119	OSAL-SW11P-0119	OSAL-SW12-0119	OSAL-SW13-0119	OSAL-SW14-0119	OSAL-SW15-0119	OSAL-SW16-0119	OSAL-SW17-0119	OSAL-SW18-0119	OSAL-SW19-0119
Sample Date	01/14/19	01/14/19	01/10/19	01/10/19	01/10/19	01/18/19	01/18/19	01/18/19	01/18/19	01/18/19
Chemical Name										
Per- and Polyfluoroalkylated Substances (UG/L)										
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	9.10E-04 U	8.90E-04 U	8.80E-04 U	9.30E-04 U	8.80E-04 U	NA	NA	NA	NA	NA
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	0.00182 U	0.00179 U	0.00175 U	0.00185 U	0.00175 U	NA	NA	NA	NA	NA
Perfluorooctane Sulfonate (PFOS)	0.0131	0.0149	0.0195	0.0228	0.0258	NA	NA	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	9.10E-04 U	8.90E-04 U	8.80E-04 U	9.30E-04 U	8.80E-04 U	NA	NA	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	0.0197	0.0208	0.0623	0.0667	0.0570	NA	NA	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	4.50E-04 U	4.50E-04 U	4.40E-04 U	4.60E-04 U	4.40E-04 U	NA	NA	NA	NA	NA
Perfluorooctanoic acid (PFOA)	0.0120	0.0124	0.0336	0.033	0.0349	NA	NA	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	2.60E-04 J	2.20E-04 J	3.80E-04 J	3.50E-04 J	4.70E-04 J	NA	NA	NA	NA	NA
Perfluorohexanesulfonic acid (PFHxS)	0.00661	0.00622	0.0106	0.0122	0.0127	NA	NA	NA	NA	NA
Perfluorobutanesulfonic acid (PFBS)	0.00222 J	0.00203 J	0.0031 J	0.00495	0.00436 J	NA	NA	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	0.0122	0.0124	0.0225	0.0326	0.0361	NA	NA	NA	NA	NA
Perfluorononanoic acid (PFNA)	0.00285 J	0.00277 J	0.00472	0.0054	0.00561	NA	NA	NA	NA	NA
Perfluorotetradecanoic Acid (PFTeDA)	9.10E-04 U	8.90E-04 U	8.80E-04 U	9.30E-04 U	8.80E-04 U	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	4.50E-04 U	4.50E-04 U	4.40E-04 U	4.60E-04 U	4.40E-04 U	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

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- U - The material was analyzed for, but not detected
- UJ - Analyte not detected, quantitation limit may be inaccurate
- MG/L - Milligrams per liter
- UG/L - Micrograms per liter

SW Analytical Results - Raw Data
Oceana Salvage Yard RDE
Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SWSD20		OSAL-SWSD21	OSAL-SWSD22	OSAL-SWSD23	OSAL-SWSD24	OSAL-SWSD25	OSAL-SWSD26	OSAL-SWSD27	OSAL-SWSD28	OSAL-SWSD29
Sample ID	OSAL-SW20-0119	OSAL-SW20P-0119	OSAL-SW21-0119	OSAL-SW22-0119	OSAL-SW23-0119	OSAL-SW24-0119	OSAL-SW25-0119	OSAL-SW26-0119	OSAL-SW27-0119	OSAL-SW28-0119	OSAL-SW29-0119
Sample Date	01/18/19	01/18/19	01/21/19	01/21/19	01/21/19	01/21/19	01/21/19	01/21/19	01/22/19	01/22/19	01/22/19
Chemical Name											
Per- and Polyfluoroalkylated Substances (UG/L)											
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA	NA	NA	NA	NA	8.80E-04 U	8.90E-04 U	9.10E-04 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA	NA	NA	NA	NA	0.00175 U	0.00179 U	0.00182 U
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA	NA	NA	NA	NA	0.00731	0.0110	0.0131
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA	NA	NA	NA	NA	8.80E-04 U	8.90E-04 U	9.10E-04 U
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA	NA	NA	NA	NA	0.00811	0.00324 J	0.0282
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA	NA	NA	NA	NA	4.40E-04 U	4.50E-04 U	4.50E-04 U
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA	NA	NA	NA	NA	0.0232	0.00551	0.0132
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA	NA	NA	NA	NA	2.00E-04 J	3.90E-04 J	3.00E-04 J
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA	NA	NA	NA	NA	0.0568	0.00603	0.00444 J
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA	NA	NA	NA	NA	0.00778	0.00213 J	0.00215 J
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA	NA	NA	NA	NA	0.00245 U	0.0024 U	0.0144
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA	NA	NA	NA	NA	0.00126 J	0.00194 J	0.00244 J
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA	NA	NA	NA	NA	8.80E-04 U	8.90E-04 U	9.10E-04 U
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA	NA	NA	NA	NA	4.40E-04 U	4.50E-04 U	4.50E-04 U

Notes:
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NA - Not analyzed
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MG/L - Milligrams per liter
UG/L - Micrograms per liter

SW Analytical Results - Raw Data
Oceana Salvage Yard RDE
Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SWSD30	OSAL-SWSD31	OSAL-SWSD32	OSAL-SWSD33	OSAL-SWSD34	OSAL-SWSD35	OSAL-SWSD36	OSAL-SWSD37		OSAL-SWSD38	
Sample ID	OSAL-SW30-0119	OSAL-SW31-0119	OSAL-SW32-0119	OSAL-SW33-0119	OSAL-SW34-0119	OSAL-SW35-0119	OSAL-SW36-0119	OSAL-SW37-0119	OSAL-SW37P-0119	OSAL-SW38-0119	OSAL-SW38P-0119
Sample Date	01/23/19	01/23/19	01/23/19	01/23/19	01/23/19	01/23/19	01/23/19	01/25/19	01/25/19	01/25/19	01/25/19
Chemical Name											
Per- and Polyfluoroalkylated Substances (UG/L)											
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
Shading indicates detections
NA - Not analyzed
J - Analyte present, value may or may not be accurate or precise
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/L - Milligrams per liter
UG/L - Micrograms per liter

SW Analytical Results - Raw Data
Oceana Salvage Yard RDE
Naval Air Station Oceana, Virginia Beach, Virginia

Station ID	OSAL-SWSD39	OSAL-SWSD40	OSAL-SWSD41	OSAL-SWSD42	OSAL-SWSD43	OSAL-SWSD44	OSAL-SWSD45	OSAL-SWSD46
Sample ID	OSAL-SW39-0119	OSAL-SW40-0119	OSAL-SW41-0119	OSAL-SW42-0119	OSAL-SW43-0119	OSAL-SW44-0119	OSAL-SW45-0119	OSAL-SW46-0119
Sample Date	01/25/19	01/25/19	01/25/19	01/25/19	01/28/19	01/28/19	01/28/19	01/28/19
Chemical Name								
Per- and Polyfluoroalkylated Substances (UG/L)								
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	NA	NA	NA	NA	NA	NA	NA	NA
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctane Sulfonate (PFOS)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluoroundecanoic Acid (PFUnA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanoic Acid (PFHxA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorododecanoic Acid (PFDoA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic acid (PFOA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorodecanoic Acid (PFDA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorohexanesulfonic acid (PFHxS)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorobutanesulfonic acid (PFBS)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluoroheptanoic acid (PFHpA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorononanoic acid (PFNA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotetradecanoic Acid (PFTeDA)	NA	NA	NA	NA	NA	NA	NA	NA
Perfluorotridecanoic Acid (PFTrDA)	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Shading indicates detections

NA - Not analyzed
J - Analyte present, value may or may not be accurate or precise
U - The material was analyzed for, but not detected
UJ - Analyte not detected, quantitation limit may be inaccurate
MG/L - Milligrams per liter
UG/L - Micrograms per liter

Petroleum-Oil-Lubricant Sites

IDW Analytical Results - Raw Data*POL Sites**Naval Air Station Oceana, Virginia Beach, Virginia*

Site	Day Tank (PC# 88-0666 and 93-0077)	NEX Gas Station (PC# 93-0990)	Fuel Farm (PC# 88-0665)	Jet Test Cell (PC# 04-5104)	SWMU 1 (PC# 2010-5038)
Chemical Name					
Per- and Polyfluoroalkylated Substances (UG/L)					
Perfluorooctane Sulfonate (PFOS) + Perfluorooctanoic acid (PFOA)	890	390	74	647	22200

Notes:

Shading indicates detections

West Side Landfill

Aqueous Analytical Results - Raw Data

West Side Landfill IDW

Naval Air Station Oceana, Virginia Beach, Virginia

Sample ID	OW03-IDW-042519-AQ
Sample Date	4/25/19
Chemical Name	
Per- and Polyfluoroalkylated Substances (NG/L)	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	0.86 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	1.72 U
Perfluorobutanesulfonic acid (PFBS)	4.74
Perfluorodecanoic Acid (PFDA)	0.66 J
Perfluorododecanoic Acid (PFDoA)	0.3 J
Perfluoroheptanoic acid (PFHpA)	2.54 J
Perfluorohexanesulfonic acid (PFHxS)	37.29
Perfluorohexanoic Acid (PFHxA)	6.68
Perfluorononanoic acid (PFNA)	0.57 J
Perfluorooctane Sulfonate (PFOS)	25.92
Perfluorooctanoic acid (PFOA)	11.97
Perfluorotetradecanoic Acid (PFTeDA)	0.86 U
Perfluorotridecanoic Acid (PFTrDA)	0.43 U
Perfluoroundecanoic Acid (PFUnA)	0.86 U

Notes:

J - Analyte present. Value may or may not be accurate or precise

NG/L - Nanograms per liter

U - The material was analyzed for but not detected

Solid Analytical Results - Raw Data*West Side Landfill IDW**Naval Air Station Oceana, Virginia Beach, Virginia*

Sample ID	OW03-IDW-042519-SO
Sample Date	4/25/19
Chemical Name	
Per- and Polyfluoroalkylated Substances (UG/KG)	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (EtFOSAA)	2.31 U
N-Methyl Perfluorooctanesulfonamidoacetic Acid (MeFOSAA)	2.89 U
Perfluorobutanesulfonic acid (PFBS)	1.16 U
Perfluorodecanoic Acid (PFDA)	1.16 U
Perfluorododecanoic Acid (PFDoA)	0.58 U
Perfluoroheptanoic acid (PFHpA)	1.16 U
Perfluorohexanesulfonic acid (PFHxS)	0.58 U
Perfluorohexanoic Acid (PFHxA)	1.16 U
Perfluorononanoic acid (PFNA)	1.16 U
Perfluorooctane Sulfonate (PFOS)	1.16 U
Perfluorooctanoic acid (PFOA)	1.16 U
Perfluorotetradecanoic Acid (PFTeDA)	2.31 U
Perfluorotridecanoic Acid (PFTrDA)	1.16 U
Perfluoroundecanoic Acid (PFUnA)	1.16 U

Notes:

U - The material was analyzed for but not detected

UG/KG - Micrograms per kilogram

Other Per- and Polyfluoroalkyl Substances Sampling

GW Analytical Results - Raw Data*Naval Air Station Oceana, Virginia Beach, Virginia*

Sample ID	B-5 PFAS	B-4 PFAS
Sample Date	7/3/19	7/3/19
Chemical Name		
Per- and Polyfluoroalkylated Substances (NG/L)		
PFBA	13	53
PFPeA	37	110
PFBS	7.5	10
PFHxA	35	86
PFPrOPrA	ND	ND
PFHpA	13	35
NaDONA	ND	ND
PFHxS	4.2	15
PFOA	13	54
PFNA	97	910
PFOS	29	100
PFDA	ND	ND
PFUda	ND	ND
N-MeFOSAA	ND	ND
N-EtFOSAA	ND	ND
PFDS	ND	ND
PFDoA	ND	ND
PFTTrDA	ND	ND
PFTeDA	ND	ND
PFHxDA	ND	ND
PFODA	ND	ND

Notes:

ND - Nondetect

NG/L - Nanograms per liter

Appendix B

Summary of Records Reviewed

Document Type	From	To	Document Name/Regarding	Date	Description
Internet Records					
News Article	Daily Press	NA	A-6 pilot broke rules, officer says	1989, Apr	A-6E Intruder jet crashed on Oceana Blvd. Crash was off-facility.
News Article	CNN	NA	Pilot, officer safe after F-14 crash	1996, Apr	F-14 crashed and exploded in unspecified woods near Oceana. Crash was off-facility.
News Article	The Virginian-Pilot	NA	Pilot dies in crash during rehearsal for Oceana Air Show	2007, Sep	WWII SNJ-2 plane crashed and exploded during preshow practice on flight line.
News Article	Reuters	NA	Navy jet crashes in Virginia apartments, at least 9 hurt	2012, Apr	F/A-18D crashed into apartment complex less than 2 miles away from Oceana. Crash was off-facility.
News Article	The Virginian-Pilot	NA	Oceana has had 25-plus aircraft crashes over decades	2012, Apr	Brief description of selected aircraft crashes associated or in proximity to Oceana. Crash was off-facility.
News Article	NA	NA	Fliers, Motorist Die in Norfolk Crash of A-6E	1986, Jun	Navy Times article detailing a bomber crashed shortly after takeoff on May 21, 1986. There was no direct mention of AFFF.
News Article	Ledger-Star	NA	Landing Gear Stuck - Pilots Unhurt as Plane Belly-Flops at Oceana	1965, Jul	S2 landed on foamed runway when landing gear was stuck
News Article	Virginia Beach Sun	NA	Oceana Pilot Killed	1965, Sep	Phantom II crashed at end of runway.
News Article	The Virginian Pilot	NA	Navy Plane Crashes, 2 Jump Safely	1972, Feb	TA4F Skyhawk crashed and disintegrated on a runway at Oceana due to mechanical difficulties.
News Article	The Virginian Pilot	NA	Pilot Safe In Emergency	1972, Mar	Runway was heavily foamed prior to emergency landing.
News Article	The Virginian Pilot	NA	Pilot Killed In Crash At Oceana	1972, May	A6 Intruder crashed attempting to land at Oceana during routine field carrier landing practice.
News Article	The Virginian Pilot	NA	Oceana Jet Crash Kills 2	1972, Aug	A6 intruder crashed while attempting to land at Oceana.
News Article	The Virginian Pilot	NA	Flight Mishap By F14	1975, Jun	One engine of an F14 explodes and bursts into flames just after takeoff at Oceana.
News Article	The Virginian Pilot	NA	A6 Jet Crashes, 1 Safe, 1 Missing	1977, Aug	A6 trainer jet crashed and exploded on impact at Runway 5 at NAS Oceana.
News Article	The Virginian Pilot	NA	2 Killed in Crash of F14 at Beach (x 2)	1977, Nov	F14 explodes on impact shortly after taking off from Runway 5 at NAS Oceana.
News Article	The Virginian Pilot	NA	Navy Jet Lands Without Wheels	1979, Aug	Oceana crash crew foamed the runway prior to emergency landing at NAS Oceana.
News Article	Ledger-Star	NA	No link found in series of A-6 crashes (x 2)	1986, May	Fatal crash at end of NAS Oceana runway.
News Article	Daily Press	NA	Jet Crashes at Oceana Kills 1 Pilot, Injures Another	1994, Jul	Mississippi-based Navy T-2 Buckeye crashed into wooded area of NAS Oceana.
News Article	Daily Press	NA	F-14 crashes at Oceana 2 crewmen eject during landing try (x2)	1996, Apr	F-14 crashes in wooded area near runway at NAS Oceana, igniting fire.
News Article	Daily Press	NA	2 Oceana jets collide pilots manage to return to base after accident off NC coast (x2)	1996, Apr	Reviewed; no relevant information.
News Article	Daily Press	NA	NA	1998, Jun	Fighter jet subcontracted by a Newport News firm crashed at NAS Oceana.
Google Earth file	NA	NA	Google Earth MISHAP File	1960s-2010s	Lists multiple crashes at NAS Oceana and whether foam was used for emergency response.
News Article	Navy News	NA	Aviators Rescued Following Tomcat Crash	2002, Jul	During a routine training mission, an F-14 Tomcat crashed off VACAPES. No direct mention of AFFF.
Facility Operations Records					
Form	NA	NA	HW Manifest Tract Down N60191- 7154-7935, 7936, 7938, 7939, 7941, 7942, 7943, 7945, 7956	1997	Reviewed; no relevant information.
Form	NA	NA	HW Manifest Tract Down DTID- 7274-7930 thru 7274-7931, 7936, 7938, 7939	1997	Reviewed; no relevant information.
Form	NA	NA	HW Manifest Track Down N60191 7274-7951, 7952, 7953	1997	Reviewed; no relevant information.
Form	NA	NA	HW Manifest Track Down N60191 7274-7941, 7946	1997	Reviewed; no relevant information.
Form	NA	NA	HW Manifest Track Down N60191 7274-7932,7933,7935, 7937	1997	Reviewed; no relevant information.
Form	NA	NA	HW Manifest Track Down N60191 7274-7142, 7947, 7945, 7944	1997	Reviewed; no relevant information.
Form	NA	NA	HW Manifest Track Down N60191 7174-7430, 7943, 7949, 7948, 7954, 7955, 7950	1997	Reviewed; no relevant information.
Form	NA	NA	HW Manifest Track Down N60191- 7154-7950, 7951, 7955	1997	Reviewed; no relevant information.
Form	NA	NA	HW Manifest Track Down N60191- 7154-7932, 7933, 7934, 7953	1997	Reviewed; no relevant information.
Form	NA	NA	HW Manifest Track Down N60191- 7154-7930, 7931, 7957	1997	Reviewed; no relevant information.
Form	NA	NA	HW Manifest Track Down N60161- 7133-7943, 7952, 7954, 7956	1997	Reviewed; no relevant information.
Form	NA	NA	NAS Oceana HW Manifest Tract Down Sheet	1998	150 pounds Purple-K fire extinguisher picked up on 5/21/1997 pg. 7
Form	NA	NA	HW Manifest Tract Down N60191- 7154-7944, 7946, 7947, 7948, 7949, 7952, 7954	1998	Reviewed; no relevant information.
Spreadsheet	NA	NA	Naval Safety Center Query, 1967 - 2015	2019	A summary of various plane crashes/fires from October 1967 to August 2015.
Application	NAVFAC	USEPA	NPDES Application for Permit to Discharge	1977, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	NAS Oceana Commanding Officer	NPDES wastewater permit reapplication information	1977-1984	Reviewed; no relevant information.
Form	PWC	USEPA	Notification of Hazardous Waste Activity	1980, Jul	Reviewed; no relevant information.
Checklist	NA	NA	RCRA Checklist for Inspection of Generators	1981, Jun	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Firefighting School & Wash racks Industrial Operations	1983, Apr	Foam used in firefighting school operations is deemed toxic.
Memo and Report	NAVFAC	NAVFAC	Industrial and Sanitary Waste Treatment at the Oceana Naval Air Station	1983, Jan	Reviewed; no relevant information.
Correspondence	Navy	Navy	Letter	1985, Feb	Reviewed; no relevant information.
Application	NAVFAC	Distribution	NPDES Permit Application	1985, Jan	FFTR discharges to a ditch, but is planned to connect to holding tank in Spring 1985.
Correspondence	NAVFAC	NAVFAC	Notice of Unsatisfactory Inspection	1985, Jan	Reviewed; no relevant information.
Correspondence	NAVFAC	Bureau of Hazardous Waste Management	NAS Oceana Hazardous Waste Storage Facility Closure Plan; Hazardous Waste Facility Inspection Checklist	1986, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Notification of Noncompliance with VHWMR	1986, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Notification of Changes to the VHWMR	1986, May	Reviewed; no relevant information.
Report	NA	NA	Attachment - Land Restricted Wastes	1986-1992	Attachment listing waste code, waste category, and effective date of land disposal restricted wastes, log of waste analysis, including record number, description, analysis, location, and date sampled.
Correspondence	VDEQ	NAVFAC	Completion of Revised Part A Permit Application	1987, Dec	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	VHWMR Compliance Inspection	1987, Feb	Reviewed; no relevant information.
Memorandum and Report	NAVFAC	NAVFAC	1996 Hazardous Waste Annual Report	1987, Jan	Reviewed; no relevant information.
Notes and Report	NA	NA	Naval Facilities Inspection Visits 11/17, 18/1987	1987, Nov	Reviewed; no relevant information.
Report	NA	NA	Hazardous Waste Generator's Report 1987 and 1988	1987/1988	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	Consent Order	1988, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Revised Enforcement Order	1988, Aug	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Notification of Noncompliance with VHWMR	1988, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	RCRA Compliance Inspection	1988, Feb	Reviewed; no relevant information.
Report	NAVFAC	Department of Waste Management	Building 1110 and 1112 Closure Plan	1988, Jun	Reviewed; no relevant information.
Meeting Notes	NA	NA	Meeting Notes, List of Attendees	1988, Mar	Reviewed; no relevant information.
Notes	NA	NA	HWAA Storage Meeting Notes	1988, Mar	Reviewed; no relevant information.
Correspondence	VDEQ	The Virginian-Pilot	Legal Notice of the Enforcement Order	1988, Nov	Reviewed; no relevant information.
Draft Report	NAVFAC	VDEQ	Virginia Waste Management Board Enforcement Order	1988, Sep	Reviewed; no relevant information.
Table	NA	NA	USEPA CM&E Evaluations List	1988-1999	Reviewed; no relevant information.
Report	NA	NA	Hazardous Waste Generator's Report 1989	1989	Reviewed; no relevant information.
Memorandum	VDEQ	VDEQ	Draft Enforcement Order	1989, Aug	Reviewed; no relevant information.
Correspondence	Navy	Navy	Draft Consent Order	1989, Dec	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	RCRA Compliance Inspection	1989, Jan	Reviewed; no relevant information.
Report	NAVFAC	Department of Waste Management	Neutralization of Battery Acid no longer occurring at AIMD 62C/D Work Center	1989, Jan	Reviewed; no relevant information.
Correspondence	Navy	Navy	Establishment of a 90-day HWAA	1989, Nov	A new less than 90 day HWAA adjacent to the northwest side of Hangar 111 was established. Records did not indicate storage or disposal of PFAS-containing materials or an AFFF fire supression system.
Checklist	NA	NA	Checklist for Hazardous Waste Inspection of Generators	1989, Nov	Reviewed; no relevant information.
List	NA	NA	Inspection Chronology - Federal DOD Facilities	1989, Nov	Reviewed; no relevant information.
Correspondence	Navy	Navy	Enforcement Order	1989, Oct	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	Review and Comment period of Enforcement Order	1989, Sep	Reviewed; no relevant information.
Correspondence	VDEQ	United States Senate	Solid Waste	1990	Complaints of thick black smoke revealed waste fuel oil is burned for fire control practice in a pit with absorbent material, as approved by Department of Air Pollution Control.

Document Type	From	To	Document Name/Regarding	Date	Description
Report	NA	NA	Hazardous Waste Generator's Report 1990	1990	1990 Hazardous Waste Generators Report. 20,271 pounds of AFFF light water generated.
Correspondence	VDEQ	Navy	RCRA Compliance Inspection	1990, Apr	Reviewed; no relevant information.
Report	Department of Waste Management	Navy	Enforcement Order for Naval Air Station - Oceana	1990, Apr	Reviewed; no relevant information.
Correspondence	COMNAVBASE	COMNAVBASE	Discharge of Pollutants into Waterways	1990, Feb	Aircraft wash racks adjacent to hangars 500, 404, and building 138 discharge to oil water separators.
Correspondence	VDEQ	Navy	RCRA Compliance Inspection	1990, Jan	Reviewed; no relevant information.
Report	Navy	Navy	Enforcement Order	1990, Jul	Reviewed; no relevant information.
Correspondence	Navy	Navy	Follow-up	1990, Jul	Reviewed; no relevant information.
Memorandum and Report	NAVFAC	NAVFAC	Reinforcement Order for U.S. Navy, NAS Oceana	1990, Jul	Reviewed; no relevant information.
Report	Department of Waste Management	Navy	Enforcement Order for Naval Air Station - Oceana	1990, Jul	Reviewed; no relevant information.
Memorandum	COMNAVBASE	Distribution	Use of Wash racks	1990, Mar	Wash racks at Building 528A, 830, 840, and 401 will no longer be used because they are noncompliant with Clean Water Act and Virginia Permit Regulation VR680-14-01.
Correspondence	VDEQ	Division of Regulation	Consent Order	1990, Mar	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	Revised Draft Order	1990, Mar	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	Identification of Drum Quantities, Volume and Contents at Building 1110	1990, Mar	Reviewed; no relevant information.
Memorandum	VDEQ	United States Senate	Complaint - Burning of Tires	1990, Nov	Confirmation that waste fuel oil is burned for fire control practice in a pit weekly, with a fuel recovery system.
Report	NA	NA	Hazardous Waste Generator's Report 1991	1991	Lists of hazardous wastes generated, including 440 pounds of AFFF "light water."
Correspondence	Navy	VDEQ	Revised Part A Application	1991, Dec	Interim Status Change Justification. Reviewed; no relevant information.
Checklist	NA	NA	Checklist for Hazardous Waste Inspection of Generators	1991, Dec	Reviewed; no relevant information.
Checklist	NA	NA	Checklist for Hazardous Waste Inspection of Land-Restricted Waste Management	1991, Dec	Reviewed; no relevant information.
Checklist	NA	NA	Checklist for RCRA Inspection of Recyclable Materials (Used Oil, Hazardous Waste Fuel, and Precious Metals)	1991, Dec	Reviewed; no relevant information.
Checklist	NA	NA	Inspection Checklist for the Use and Management of Containers	1991, Dec	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	Implementation of the Contingency Plan	1991, Feb	Reviewed; no relevant information.
Memorandum	VDEQ	VDEQ	Request for Status Report	1991, Jan	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	RCRA Compliance Evaluation Inspection	1991, May	Reviewed; no relevant information.
Report	NA	NA	Hazardous Waste Generator's Report Jan-Dec 1992	1992	Lists of hazardous wastes generated, including 440 pounds of AFFF "light water."
Report	NAVFAC	NA	NAS Oceana Instruction 11345.1E	1992	Reviewed; no relevant information.
Form	NA	NA	Return Manifests Check-off List 1992	1992	Reviewed; no relevant information.
Correspondence	NA	NA	Contingency Plan	1992, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	JP-5 Waste Management	1992, Dec	Reviewed; no relevant information.
Checklist	NA	NA	Checklist for Hazardous Waste Inspection of Generators	1992, Dec	Reviewed; no relevant information.
Checklist	NA	NA	Checklist for Hazardous Waste Inspection of Land-Restricted Waste Management	1992, Dec	Reviewed; no relevant information.
Checklist	NA	NA	Checklist for RCRA Inspection of Recyclable Materials (Used Oil, Hazardous Waste Fuel, and Precious Metals)	1992, Dec	Reviewed; no relevant information.
Checklist	NA	NA	Checklist for the Inspection of Interim Status or Unauthorized Hazardous Waste Facilities	1992, Dec	Reviewed; no relevant information.
Checklist	NA	NA	Inspection Checklist for the Use and Management of Containers	1992, Dec	Reviewed; no relevant information.
Correspondence	NAVFAC	NAVFAC	Correspondence	1992, Feb	Rationale for black smoke from fire fighting training ring practice, no mention of AFFF.
Correspondence	VDEQ	Navy	RCRA Compliance Inspection	1992, Jan	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	Hangar 404 Spill Report	1992, Jul	Approximately 2,500 gallons of AFFF and water mixture spilled in bay deck and a pump room after fire prevention system failed. Approximately 1000 gallons of the mixture was released to the storm drain system.
Report	Department of Waste Management	NA	Virginia Waste Management Board, Enforcement Order	1992, Jul	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Firefighting Training Permit to Discharge Wastewater	1992, Mar	Outfalls 002, 201, 202 receive flow from FFTR that is treated by permanent floating boom #5.
Report	NA	NA	NAS Oceana Hazardous Substance and Spill Contingency Instructions	1992, May	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Continuation of Interim Status for Storage of HW	1992, Oct	Reviewed; no relevant information.
Form	NA	NA	Hazardous Waste Manifest Track down Sheet 1993	1993	A manifest with AFFF listed.
Form	NA	NA	Hazardous Waste Operations Form	1993	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	UST Closure Plan, Hangar 404 Tank C	1993, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	USEPA	Chlorine Spill at Building 1110	1993, Aug	Reviewed; no relevant information.
Report	NAVFAC	USEPA	Progress Report, NAS Oceana, RFI/CMS/POL Investigations	1993, Aug	Reviewed; no relevant information.
Memorandum	VDEQ	VDEQ	Storm Drain near New Hazardous Waste Facility	1993, Aug	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Tank Closure Report, Hangar 404	1993, Dec	Reviewed; no relevant information.
Report	NAVFAC	USEPA	Progress Report, NAS Oceana, RFI/CMS/POL Investigations	1993, Dec	Reviewed; no relevant information.
Correspondence	USEPA	Monsanto	Letter	1993, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	RCRA Compliance Inspection	1993, Jan	Reviewed; no relevant information.
Memorandum	VDEQ	VDEQ	HW Storage Area	1993, May	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Closure Plan	1993, May	Closure Plan for HW Storage Tank C in Hangar 404.
Memorandum	NAVFAC	NAVFAC	Wash rack Use at Construction Battalion Unit Compound	1993, Oct	Reviewed; no relevant information.
Report	NAVFAC	USEPA	Progress Report, NAS Oceana, RFI/CMS/POL Investigations	1993, Oct	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Response to Revisions of Part B Permit	1993, Sep	Reviewed; no relevant information.
Permit	NA	NA	Module III Storage in Containers	1994	Reviewed; no relevant information.
Report	NA	NA	Training Records	1994	Reviewed; no relevant information.
Report	NA	NA	Sampling Costs FY94	1994	Reviewed; no relevant information.
Notes	VDEQ	VDEQ	Inspection Notes	1994, Apr	Reviewed; no relevant information.
Form	VDEQ	NAVFAC	RCRA Compliance Inspection	1994, Apr	Reviewed; no relevant information.
Presentation	Navy	NA	Station Consolidated Hazardous Material Reutilization Inventory Management Program	1994, Apr	Reviewed; no relevant information.
Report	VDEQ	Navy	Authorization to Discharge Under the Virginia Pollutant Discharge Elimination System and the Virginia State Water Control Law	1994, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Response to Comments	1994, Apr	Reviewed; no relevant information.
Memorandum	PWC	PWC	Silver Recovery System & Flowchart	1994, Aug	Reviewed; no relevant information.
Email	NAVFAC	NAVFAC	AFFF restrictions at COMNAVBASE	1994, Dec	Reviewed; no relevant information.
Report	NAVFAC	HRSD	Hangar 111 Spill Report	1994, Dec	Approximately 30 gallons of water and AFFF mixture were spilled within pump room of Hangar 111, of which 3 gallons entered the sanitary sewer.
Correspondence	NAVFAC	HRSD	Response to AFFF Discharge Inquiry	1994, Dec	Short term plan to inspect all mechanical rooms with AFFF storage within 60 days, and plan to eliminate the potential for discharge within 270 days.
Correspondence	HRSD	NAVFAC	Violations and Compliance Actions	1994, Dec	Class A violation AFFF spill at Hangar 111.
Memorandum	NAVFAC	NAVFAC	AFFF Problem	1994, Dec	Tank F-17a at the old fuel tank farm failed tank tightness testing.
Memorandum	NAVFAC	NAVFAC	Environmental Compliance Division Input	1994, Dec	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	RCRA Compliance Inspection	1994, Dec	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	HW Inspection	1994, Dec	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	Spill Report	1994, Feb	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	Spill Report	1994, Jul	T-2 aircraft crash required a mixture of 1000 gallons of 3% AFFF and water to extinguish the fire.
Correspondence	Aviation Safety Council	Distribution	June 1994 Aviation Safety Council Minutes	1994, Jun	Hangars 404 and111 listed as having AFFF sprinkler systems (500, 23, 122 have water sprinklers), and table of AFFF storage quantities, tank size, deck drain and trench drain pathway.
Meeting Notes	NA	NA	FFTR Meeting Notes	1994, Jun	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Letter addressing violations	1994, Jun	Reviewed; no relevant information.

Appendix B
Summary of Records Reviewed
Naval Air Station Oceana, Virginia Beach, Virginia

Document Type	From	To	Document Name/Regarding	Date	Description
Correspondence	Base Civil Engineer	Public Works Center	Contract N62470-92-C-1398, Environmental Analytical Services for the Navy Public Works Center	1994, Mar	Documentation that outfall 002 (storm runoff from FFTR area) must be monitored for effluent discharge per NPDES.
Correspondence	Navy	VDEQ	Noncompliance with VHWMR	1994, May	Reviewed; no relevant information.
Correspondence	HRSD	NAVFAC	Violations and Compliance Actions	1994, Nov	Class A violation AFFF spill at Hangar 137.
Memorandum	NAVFAC	NAVFAC	AFFF	1994, Nov	Buildings that satisfy Fire Department's minimum requirements to test AFFF equipment on fire trucks.
Memorandum	NAVFAC	PWC	Aqueous Film Forming Foam	1994, Nov	Water/AFFF mixture used during weekly testing is collected in an underground storage tank and tank must be emptied within 24 hours. Public Works Center, Norfolk, Industrial Waste Division doesn't guarantee weekly truck service for emptying.
Report	Navy	VDEQ	Closure Certification Report	1994, Nov	Closures of D-Avenue/Sanitary Landfill and Asbestos Landfill.
Correspondence	NA	NA	Schedule for RCRA Inspection	1994, Nov	Reviewed; no relevant information.
Memorandum	NAVFAC	NAVFAC	AFFF	1994, Nov	Fire department's minimum requirements for testing AFFF equipment on fire trucks.
Report	NA	NA	Final 1994 Self Environmental Compliance Evaluation NAS Oceana Volume III	1994, Nov	Reviewed; no relevant information.
Meeting Notes	NA	NA	FFTR Meeting Notes	1994, Oct	FFTR/AFFF/Fire Trucks Valve Testing is set up at fuel farm, truck loading ramp.
Report	NAVFAC	VDEQ	Aircraft Accident (PR #95-1588) Remediation Activities, Laboratory Analyses, Custody Transfer, Disposal Manifest/Certificates	1994, Oct	Documentation including mention of AFFF in custody transfer of soil samples from an aircraft accident dated July 23, 1994.
Report	COMNAVBASE	NCDEM	Accident Report	1994, Sep	F-14 aircraft crashed into the Juncus R Marsh resulting in a fire. Crash was off-facility.
Report	NAVFAC	USEPA	Follow-up Report of Continuous Release at the FFTR	1994, Sep	AFFF is released during weekly readiness tests for firefighting equipment.
Correspondence	HRSD	NAVFAC	Release Compliance Letter Request	1994, Sep	Notification that HRSD does not allow un-pretreated AFFF into sanitary sewer. Compliance letter with outline of specific actions and time frames must be submitted to prevent future spills.
Correspondence	NAVFAC	VDEQ	Correspondence	1994, Sep	Request to discontinue notification to local authorities prior to conducting fire fighting training activities due to improvements.
Report	VDEQ	NAVFAC	Survey of Spill Response and Pollution Prevention	1994, Sep	Lists new construction of fire FFTR which uses propane instead of jet fuel.
Correspondence	NAVFAC	HRSD	HRSD Permit Extension Request	1994, Sep	Reviewed; no relevant information.
Memorandum	NAVFAC	NA	Testing AFFF Systems On Fire Trucks	1994, Sep	Continual release of AFFF in hangar bay testing and crash truck testing.
Release Form	NA	NA	Release Form for Initial Written Notification	1994, Sep	The release form for Oceana fire department testing their equipment and releasing a 64.6 to 90 gallons water and 2 to 3 gallons AFFF mix weekly, which enters oil-water separator then goes to outfall 002.
Report	NA	NA	Aircraft Accident Information Sheet	1994, Sep	Documentation of a crash between two planes on September 14, 1994.
Report	Navy	VDEQ	Closure Plan for Hazardous Waste Storage Compound, Closure Plan Modification	1994/1995	Reviewed; no relevant information.
Correspondence	NAVFAC	NAVFAC	Tank At Fuel Farm	1994-1995	Discussion of where to test the fire department AFFF system.
Report	NA	NA	AFFF Spill History	1994-1998	A spreadsheet detailing AFFF spill information from February 1994 to September 1998. Spills occurred at the following locations, building 830 parking lot, runway 5-L, FFTR, 4052 Leyte Court, and hangars 111, 137, 223, and 404.
Correspondence	NAVFAC	NAVFAC	AFFF Meeting	1995	Meeting notes regarding AFFF issues.
Report	NA	NA	Site Investigation and Best Management Practices Plan for the Trap, Skeet, and Sporting Clays Range at Naval Air Station Oceana	1995	Reviewed; no relevant information.
Notes	NA	NA	AFFF Sign In Sheet 4-18-95	1995, Apr	Reviewed; no relevant information.
Notes	NA	NA	AFFF In Fire Mains	1995, Apr	The handwritten notes on a meeting regarding AFFF in fire mains.
Correspondence	NAVFAC	NAVFAC	AFFF Treatment System Study	1995, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	NAVFAC	AFFF -REPLY -REPLY	1995, Apr	Fire water piping capacities in hangar 122.
Memorandum	NAVFAC	NAVFAC	AFFF Containment Facility	1995, Dec	Aircraft washing inside hangars and AFFF containment.
Correspondence	NAVFAC	A/E Services	AFFF Containment Facility, NAS Oceana and NALF Fentress	1995, Dec	Requirements for AFFF containment facility for testing a fire truck AFFF system.
Memorandum	NAVFAC	NAVFAC	AFFF Containment Facility, NAS Oceana And NALF Fentress	1995, Dec	Points of contact (POCs) for scope of work on AFFF containment facility.
Notes	NA	NA	AFFF Containment System For AO	1995, Jul	Meeting notes regarding various options for AFFF containment system.
Memorandum	NAVFAC	NAVFAC	AFFF Underground Storage Tanks	1995, Jul	Two new 30,000-gallon underground tanks to contain AFFF will not require an air permit.
Memorandum	Wiley & Wilson	Wiley & Wilson	Documentation Form - Project Meeting - AFFF Containment Study	1995, Jul	Project meeting for the AFFF containment study on July 19, 1995.
Correspondence	NAVFAC	NAVFAC	FFTR	1995, Jun	Fire-fighting Training Ring (FFTR) storm drain foaming to determine presence of AFFF.
Report	Systech Group, INC	NAVFAC	AFFF Discharge Containment Study Final Contract	1995, Jun	The confirmation of AFFF discharge site survey schedule and purpose.
Report	Wiley & Wilson	NAVFAC	AFFF Discharge Containment Study	1995, Jun	Report documenting the AFFF discharge containment study at NAS Oceana hangars 111, 137, 223, and 404.
List	VDEQ	VDEQ	List of Attendees	1995, Mar	Reviewed; no relevant information.
Report	NAVFAC	NAVFAC	AFFF Discharge Containment Study Scope of Work	1995, Mar	Fax transmittal for the scope of work for AFFF discharge containment study.
Correspondence	NAVFAC	Naval Surface Warfare Center	Foam Resupply Trailers	1995, Mar	Reviewed; no relevant information.
Form	NA	NA	NAS Oceana Environmental Compliance Division Sample Log	1995, Mar	The sample log and chains of custody for testing for AFFF in Hangars 223, 137, 111, and 122.
Memorandum and Diagrams	NAVFAC	NAVFAC	POA: AFFF Fire Protection Systems @ BLDG 223 & HGR 404	1995, Mar	Memorandum and enclosed fire protection piping diagrams for Hangar 223.
Table	NA	NA	Various tables	1995, Mar	VDH, Waterworks Regulations table of inorganic chemicals and their respective maximum contaminant level.
Correspondence	International Technology Corporation	VDEQ	Closure of HW Storage Compound	1995, May	Reviewed; no relevant information.
Report	NAVFAC	Fire Department	AFFF Study	1995, May	Wiley & Wilson's visit sites at NAS Oceana on April 19, 1995 for AFFF study.
Report	NAVFAC	Systech Group	Order for Supplies or Services	1995, May	Report for engineering services for AFFF discharge study.
Memorandum	NAVFAC	NAVFAC	Head's Up On Fire Department Crash Trucks	1995, Nov	Crash truck must be tested for AFFF after maintenance has been completed and truck is returned to the fire department.
Correspondence	NAVFAC	COMNAVBASE	FY-96 Environmental Compliance Evaluation	1995, Oct	Site visits of aircraft wash racks for VPDES. Hangar 111 has floor drains, Hangar 404 has a building trench drain, aircraft maintenance occurs at Hangars 137 and 223.
Report	NAVFAC	NAVFAC	AFFF	1995, Oct	Reviewed; no relevant information.
Notes	NAVFAC	NAVFAC	13 Sep AFFF meeting at LANTDIV	1995, Oct	April 19, 1995 meeting notes on the lack of disposal options for AFFF.
Correspondence	Navy	USEPA	Notification of Release	1995, Sep	Reviewed; no relevant information.
Notes	NA	NA	NAS Oceana AFFF Summary (p. 7)	1995, Sep	Meeting notes regarding AFFF issues.
Correspondence	NAVFAC	NAVFAC	AFFF Release	1996, Apr	Release and subsequent containment of 100 gallons of 3% AFFF on July 24, 1996 at Hangar 223.
Correspondence	NAVFAC	VDEQ	Notification of Minor Permit Modifications	1996, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Letter of Noncompliance	1996, Dec	Reviewed; no relevant information.
Notes	NA	NA	Inspection Notes	1996, Dec	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	RCRA Compliance Inspection	1996, Feb	Reviewed; no relevant information.
Correspondence	NAVFAC	NAVFAC	Re: spill containment	1996, Feb	Reviewed; no relevant information.
Notes	NAVFAC	NAVFAC	Beneficial Suggestion	1996, Feb	Reviewed; no relevant information.
Report	Navy	VDEQ	Hazardous Waste Annual Report, CY 95	1996, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Discrepancies with Permit	1996, Jan	Reviewed; no relevant information.
Notes	NA	VDEQ	RCRA Inspection Schedule and notes	1996, Jan	Reviewed; no relevant information.
Report	NAVFAC	NAVFAC	Evaluation of the Effects of AFFF Inputs on the VIP Biological Nutrient Removal Process and Pass-Through Toxicity	1996, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Container Storage Risk-Based Closure Plan	1996, Jul	Reviewed; no relevant information.
Correspondence	NAVFAC	NAVFAC	AFFF Info	1996, Jun	Correspondence regarding options for stormwater management and AFFF containment and treatment.
Correspondence	VDEQ	NAVFAC	Letter addressing violations	1996, Mar	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	RCRA Inspection Violation	1996, Mar	Reviewed; no relevant information.
Report	Navy	Department of Waste Management	NAS Oceana 1995 Hazardous Waste Annual Report	1996, Mar	Reviewed; no relevant information.
Report	Navy	VDEQ	Permit modifications	1996, Mar	Reviewed; no relevant information.
Correspondence	NAVFAC	HRSD	Correspondence	1996, Oct	Deadline extension for AFFF compliance schedule.
Correspondence	NAVFAC	HRSD	5 Day Response For AFFF Release on Sep 12	1996, Sep	1000 gallons of AFFF release at Hangar 111, did not discharge to sanitary sewer.
Report	Navy	VDEQ	Risk-Based Closure Plan for Hazardous Waste Storage Compound	1997	Reviewed; no relevant information.
Correspondence	International Technology Corporation	VDEQ	Closure of HW Storage Compound	1997, Apr	HW Storage Compound restoration activities.

Document Type	From	To	Document Name/Regarding	Date	Description
Correspondence	VDEQ	Navy	Modification for Container Storage Risk-Based Closure Plan	1997, Apr	Reviewed; no relevant information.
Report	NA	NA	NAS Oceana and NAS Fentress Mishaps	1997, Aug	Documentation of crashes from 1967 to 1996.
Memorandum	VDEQ	VDEQ	Establishment of a <90-day HWAA	1997, Dec	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Letter addressing violations	1997, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	USEPA	Notification of Attendance of Meeting	1997, Jan	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	Notice of Noncompliance	1997, Jan	Reviewed; no relevant information.
Email	VDEQ	VDEQ	Correspondence	1997, Jul	Reviewed; no relevant information.
Memo	NAVFAC	NAVFAC	Diverting Valves For Sanitary Sewage System In Hangars 111, 137, 223, And 404	1997, Jul	Notification of installation of diverting valves for sanitary sewage system in hangars 111, 137, 223, and 404.
Memo	Base Civil Engineer	Distribution	Operating Procedures for AFFF Diverter Valves Hangar 111, 137, 223, 404,	1997, Jul	Hangar 111 is outfitted with two diverter valves (located at oil-water separators) to stop the release of AFFF to sanitary sewer. Hangars 137, 223, and 404 are outfitted with one diverter valve (located at oil-water separators) to stop the release of AFFF to sanitary sewer.
Correspondence	USEPA	VDEQ	Notice of USEPA's Compliance Inspection	1997, Jun	Reviewed; no relevant information.
Brochure	NA	NA	Aircraft Intermediate Maintenance Department	1997, Jun	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Establishment of a <90-day HWAA	1997, May	Reviewed; no relevant information.
Report	NA	NA	VPDES Permit Fact Sheet	1997, Nov	VPDES permit fact sheet. Page 6 lists FFTR associated with outfall 002 and page 10 describes industrial effluent limitations associated with outfall 002.
Correspondence	VDEQ	Navy	Acceptance of Final Closure Report	1997, Sep	Reviewed; no relevant information.
Report	Navy	VDEQ	Generation of Silver Effluent Streams and Silver Recovery Processes	1998, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Conversion of HWAA to SAA at Building 829	1998, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Modification of Part B Permit	1998, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Closure of Skeet Range	1998, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Classification of Aerosol Spray Cans	1998, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Rearrangement of Bay Configuration	1998, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Establishment of a <90-day HWAA	1998, Dec	Establishment of 2 temporary, less than 90-day HWAA's at Hangars 111 and 122. Records did not indicate storage or disposal of PFAS-containing materials or an AFFF fire supression system at the HWAA's.
Report	NA	NA	Hazardous Waste Report	1998, Dec	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	RCRA Inspection Schedule	1998, Feb	Reviewed; no relevant information.
Report	VDEQ	USEPA	1991 Hazardous Waste Annual Report; 1992 Biennial Inventory	1998, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	USEPA	Discussion of Annual Compliance Inspection	1998, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	RCRA Compliance Inspection	1998, Feb	Reviewed; no relevant information.
Form	NA	NA	HW Manifest	1998, Feb	415 pounds of AFFF were received on March 6, 1997 and March 19, 1997.
Report	NAVFAC	VDEQ	NAS Oceana 1997 Hazardous Waste Biennial Report	1998, Feb	Reviewed; no relevant information.
Report	VDEQ	NAVFAC	USEPA ID #VA2170024606	1998, Feb	Reviewed; no relevant information.
Manifest	NA	NA	Uniform Hazardous Waste Manifest	1998, Feb	Reviewed; no relevant information.
Report	NA	NA	Hazardous Waste Annual Refresher Course Table of Contents page	1998, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Approval of Painting Maintenance Operations	1998, Jan	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Establishment and Disestablishment of HWAA	1998, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Response to Aerosol Spray Inquiry	1998, Jul	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Permit Modification	1998, Jun	Reviewed; no relevant information.
Memorandum	VDEQ	VDEQ	Re-establishment of a <90-day HWAA	1998, Mar	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Addressing Silver Recovery Procedures	1998, May	Reviewed; no relevant information.
Report	NA	NA	Hazardous Waste Report	1998, Nov	Reviewed; no relevant information.
Application	NAVFAC	VDEQ	VPDES Stormwater Permit Application, NAS Oceana, October 1998	1998, Oct	Reviewed; no relevant information.
Application	NA	NA	USEPA Application for Permit to Discharge Storm Water, Discharges Associated with Industrial Activity	1998, Sep	Supplemental information and outfall summary report for VPDES with various AFFF spill details.
Report	NA	NA	Routing & Transmittal - VPDES Minor Permits	1999, Apr	Reviewed; no relevant information.
Email	VDEQ	VDEQ	Generator Name	1999, Dec	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Minor Permit Modification	1999, Dec	Reviewed; no relevant information.
Report	VDEQ	NAVFAC	USEPA ID #VA2170024606	1999, Dec	Reviewed; no relevant information.
Report	NA	NA	NAS Oceana - Hazardous Waste Storage Facility (HWSF), Hazardous Waste Accumulation Area (HWAA) and Satellite Accumulation Area (SAA)	1999, Dec	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Notification of Ownership Transfer	1999, Feb	Reviewed; no relevant information.
Correspondence	USEPA	Navy	Acknowledgement of Notification of Regulated Waste Activity Verification	1999, Feb	Reviewed; no relevant information.
Correspondence	NFESC	Naval Base, Norfolk	Summary of Oil and Hazardous Substance Spills	1999, Jan	Reviewed; no relevant information.
Memorandum	NAVFAC	VDEQ	Establishment of a <90-day HWAA	1999, Jul	Reviewed; no relevant information.
Report	VDEQ	NAVFAC	USEPA ID #VA2170024606	1999, Mar	Reviewed; no relevant information.
Form	NA	NA	RCRIS CM&E evaluation view scan screen	1999, Mar	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	Evidence of Fire	1999, May	On April 9, 1999 there was a small, self-contained fire in HW (hazardous waste) permitted facility compound.
Memorandum	VDEQ	NAVFAC	Reissuance of VPDES Permit No. VA0005266 US - Naval Air Station Oceana, Virginia Beach, VA	1999, May	Reviewed; no relevant information.
Report	VDEQ	Navy	Authorization to Discharge Under the Virginia Pollutant Discharge Elimination System and the Virginia State Water Control Law	1999, May	VDEQ discharge permit. Page 5 states outfall 002 is associated with FFTR runoff and AFFF activity.
Form	VDEQ	Navy	Form 8700-12	1999, Nov	Reviewed; no relevant information.
Correspondence	USEPA	COMNAVBASE	Correspondence	2000, Apr	Reviewed; no relevant information.
Report	NA	NA	Aircraft Engine Cleaning Characterization	2000, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	5090 940-12-0057	2000, Feb	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Acknowledgement of Violations	2000, Feb	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Minor Permit Modification	2000, Feb	Reviewed; no relevant information.
List	NA	NA	1999 Facility and Transporter Information	2000, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Ownership Transfer Information	2000, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Request for Unmanifested Waste Reports	2000, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Termination of Enforcement Order	2000, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Case Closure Memorandum	2000, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Consent Order	2000, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Termination of Order of Agreement	2000, Jan	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Unmanifested Waste Reports	2000, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Minor Permit Modifications	2001, Dec	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	Sign-up Sheet for HW-generator Training	2001, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Minor Permit Modification	2001, Jan	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Signatory Authorization	2001, Mar	Reviewed; no relevant information.
Report	NA	NA	Attachment III TRAINING OUTLINE	2001, May	Reviewed; no relevant information.
Report	VDEQ	NAVFAC	USEPA ID #VA2170024606	2001, May	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	HW Permit	2001, Nov	Reviewed; no relevant information.
Email	VDEQ	VDEQ	Address Change	2001, Oct	Reviewed; no relevant information.

Document Type	From	To	Document Name/Regarding	Date	Description
Report	NA	NA	VDEQ Water Division Laboratory Inspection Report	2001, Oct	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Permit Part A	2001, Sep	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	Modification of Facility Notification of Regulated Waste Activity	2001, Sep	Reviewed; no relevant information.
Survey	VDEQ	Navy	Survey Sheet for Inspection of Hazardous Waste Facilities	2001, Sep	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	Letter	2001, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Minor Permit Modification	2001, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Lead Acid Batteries	2001, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Silver as CCP Substitute	2001/2002	Reviewed; no relevant information.
Report	NAVFAC	NA	Tier Two Emergency and Hazardous Chemical Inventory	2002	Reviewed; no relevant information.
Report	VDEQ	NAVFAC	Technical Inspection Report, NAS Oceana (VA0005266)	2002, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Minor Permit Modification	2002, Feb	Reviewed; no relevant information.
Form	VDEQ	NAVFAC	RCRA Evaluation - Violation - Enforcement Form	2002, Jan	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	Training Information	2002, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Acronyms	2002, Jan	Reviewed; no relevant information.
Form	NA	NA	Land Disposal Restriction Notification Form	2002, Jan	Reviewed; no relevant information.
Report	VDEQ	NAVFAC	USEPA ID #VA2170024606	2002, Jan	Reviewed; no relevant information.
Form	NA	NA	Handler Information, CM&E Evaluations List	2002, Jan	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Signatory Authorization	2002, Jul	Reviewed; no relevant information.
Report	Froehling & Robertson (F&R)	VDEQ	VPDES Permit Modification - Permit No. VA0005266, US Naval Air Station, Oceana	2002, Jul	Permit modification to install a low-level foam fire suppression system in Hangars 200 and 500.
Form	VDEQ	NAVFAC	RCRA Evaluation - Violation - Enforcement Form	2002, May	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Silver Sludge	2002, Nov	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Acknowledgement of Receipt of Withdrawal	2003, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Withdrawal of RCRA Permit	2003, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	PWC	Establishment of a Temporary 90-day HWAA	2003, Aug	Establishment of a Temporary HWAA at water tower 507. Records did not indicate storage or disposal of PFAS-containing materials or an AFFF fire supression system.
Report	VDEQ	NAVFAC	USEPA ID #VA2170024606	2003, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Renewal of HW Management Permit	2003, Jan	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Establishment of a Temporary 90-day HWAA	2003, Jan	Reviewed; no relevant information.
Report	VDEQ	VDEQ	RCRA Report and Closeout Schedule	2003, Jul	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Letter Requesting Partial Closure of Storage Area at Buildings 1110 and 1112	2003, Jun	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Withdrawal of RCRA Permit	2003, Mar	Reviewed; no relevant information.
Memo	NAVFAC	NAVFAC	Tier II Reports	2003, Mar	Tier Two Emergency and Hazardous Chemical Inventory entries for Oceana. AFFF light water (3%) stored at Hangar 111 and Building 220.
Report Attachments	CH2M	NAVFAC	Industrial Waste Source Survey attachments	2003, Mar	AFFF inventory
Correspondence	NAVFAC	VDEQ	Letter	2003, Nov	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Establishment of a Temporary 90-day HWAA	2003, Nov	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Establishment of a Temporary 90-day HWAA	2003, Sep	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Establishment of a Temporary HWAA	2003, Sep	Establishment of a Temporary HWAA at water tower 507. Records did not indicate storage or disposal of PFAS-containing materials or an AFFF fire supression system.
Report	NA	NA	VPDES Permit Attachments	2003, Sep	VPDES permit attachments: significant materials and best management practices (BMPs), leaks and spills, sampling report results, and AFFF spill descriptions.
Tables and Charts	NA	NA	NAS Oceana AFFF Waste	2003-2007	AFFF inventory
Record	NA	NA	Hazardous Waste Container Storage Facility, Weekly Inspection Record	2004	Reviewed; no relevant information.
Report Attachment	NA	NA	2004 VPDES Permit Program Fact Sheet	2004	Reviewed; no relevant information.
Form	NAVFAC	USEPA	RCRA Subtitle C Site Identification Form	2004, Dec	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Closure Amendment Request	2004, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Closure of Permitted Units	2004, Feb	Reviewed; no relevant information.
Email	VDEQ	Navy	Facility Closure of Permitted Storage Facilities	2004, Jan	Reviewed; no relevant information.
Report	NA	NA	VPDES Permit Fact Sheet	2004, Jan	VPDES permit fact sheet.
Report	NA	NA	VPDES Permit Attachments	2004, Jan	Reviewed; no relevant information.
Report	VDEQ	VDEQ	Status Report	2004, Jul	Reviewed; no relevant information.
List	VDEQ	NA	List of Attendees	2004, Jun	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Establishment of a Temporary 90-day HWAA	2004, Jun	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Establishment of a Temporary 90-day HWAA	2004, Mar	Reviewed; no relevant information.
Diagrams	NAVFAC	VDEQ	Naval Air Station Oceana, Golf Maintenance Facility	2004, Mar	Establishment of an equipment wash rack with a bioremediation treatment system at the new golf maintenance facility.
Report	VDEQ	NAVFAC	USEPA ID #VA2170024606	2004, Mar	Reviewed; no relevant information.
Form	NA	NA	RCRA Evaluation - Violation - Enforcement Form	2004, Mar	Reviewed; no relevant information.
Form	NA	NA	RCRA Evaluation - Violation - Enforcement Form	2004, Mar	Reviewed; no relevant information.
Form	NA	NA	RCRA Site Detail	2004, Mar	Reviewed; no relevant information.
Correspondence	Navy	VDEQ	Notice of Violation USEPA ID# VA2170024606	2004, May	Reviewed; no relevant information.
Report	VDEQ	NAVFAC	Reissuance of VPDES Permit No. VA0005266	2004, May	Reviewed; no relevant information.
Form	NA	NA	P2 Shop Report Update Form	2004, May	Reviewed; no relevant information.
Form	NA	NA	RCRA Evaluation - Violation - Enforcement Form	2004, May	Reviewed; no relevant information.
Report	VDEQ	Navy	Authorization to Discharge Under the Virginia Pollutant Discharge Elimination System and the Virginia State Water Control Law	2004, May	VDEQ discharge permit. Page 5 states outfall 002 is associated with FFTR runoff and AFFF activity.
Standard Operating Procedure	NAVFAC	NAVFAC	AFFF System Activation Clean-Up	2004, Nov	AFFF System SOP clarification.
Correspondence	Navy	VDEQ	Proposed Consent Order USEPA ID# VA2170024607	2004, Nov	Reviewed; no relevant information.
List	VDEQ	NA	List of Attendees	2004, Nov	Reviewed; no relevant information.
Email	VDEQ	VDEQ	Hazardous Waste in Buildings 1110 and 1112	2004, Oct	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Conversion of Flight line HWAAs	2004, Sep	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Permit Expiration	2004, Sep	Reviewed; no relevant information.
Report	VDEQ	NA	Confidential Enforcement Recommendation and Plan (ERP)	2004, Sep	Reviewed; no relevant information.
Telephone Call Log	NA	NA	USEPA ID# VA2170024606	2004-2005	Reviewed; no relevant information.
Report Attachments	NA	NA	EPCRA Reporting Year 2005	2005	AFFF inventory
Correspondence	USEPA	Navy	Notification of Regulated Waste Activity Verification	2005, Apr	Reviewed; no relevant information.
Report	VDEQ	CNRMA	Virginia Waste Management Board Enforcement Action, Order by Consent	2005, Feb	Reviewed; no relevant information.
Public Notice	The Virginian-Pilot	NA	Affidavit of Publication	2005, Feb	Reviewed; no relevant information.
Correspondence	NAVFAC	Distribution	Cold Weather Hangar and Warehouse Procedures	2005, Jan	Reviewed; no relevant information.
Form	NA	NA	RCRA Evaluation - Violation - Enforcement Form	2005, Jan	Reviewed; no relevant information.
Form	NA	NA	RCRA Evaluation - Violation - Enforcement Form	2005, Jan	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Silver Waste	2005, Jun	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Establishment of a <90-day HWAA	2005, Jun	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Notice of Opportunity to Comment	2005, Jun	Reviewed; no relevant information.
Receipt	VDEQ	NA	Trade Receipt Transmittal Log	2005, Mar	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Closure Plan Submission for Buildings 1110 and 1112	2005, Mar	Reviewed; no relevant information.

Document Type	From	To	Document Name/Regarding	Date	Description
Correspondence	NAVFAC	VDEQ	RCRA Progress Report	2005, Mar	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Naval Air Station Oceana Spill Report #2005-T-1236	2005, Mar	Spill report for 1,150 gallons of AFFF spilled at Hangar 404 on March 9, 2005.
Correspondence	VDEQ	NAVFAC	Approval of the Closure Plan	2005, Sep	Reviewed; no relevant information.
Spreadsheet	NA	NA	Hampton Roads Spill Log - NASO	2005-2018	Spill log documenting AFFF spills at the following locations: building 900, hangars 122, 139, 145, 200, 404, and 500, CCH-139, OC-122, OC-139, OC-145, OC-220, OC-500, OC-1100, and OC-1116 from January 2005 to March 2018.
Permit	NAVFAC	Navy Region, Mid-Atlantic	HRSD Industrial Wastewater Discharge Permit Reapplication	2006	A section of the document regarding details of spills of AFFF in different locations.
Report Attachments	NA	NA	EPCRA Reporting Year 2006	2006	AFFF inventory
Correspondence	VDEQ	NAVFAC	Request to Modify the Approved Closure Plan	2006, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	RCRA Compliance Inspection	2006, Aug	Reviewed; no relevant information.
Email	NAVFAC	VDEQ	HWAA at Branch Health Clinic	2006, Dec	Records did not indicate storage or disposal of PFAS-containing materials or an AFFF fire supression system at the HWAA at the Branch Health Clinic.
Email	NAVFAC	VDEQ	HWAA at Building 829	2006, Dec	Records did not indicate storage or disposal of PFAS-containing materials or an AFFF fire supression system at the HWAA at Building 829.
Correspondence	NAVFAC	VDEQ	Establishment of a <90-day HWAA	2006, Dec	Reviewed; no relevant information.
Email	NAVFAC	VDEQ	Waste Characterization	2006, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Received Waste Characterization	2006, Jan	Buildings 1110 and 1112 are deemed as nonhazardous.
Email	NAVFAC	NAVFAC	Follow-up to Inspection	2006, Jul	Reviewed; no relevant information.
Email	NAVFAC	NAVFAC	Closure	2006, Jul	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	New Facility Response Plan	2006, Jul	Reviewed; no relevant information.
Email	NAVFAC	VDEQ	Closure Wastes	2006, Jun	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Request for 60-day closure extension for Building 1112	2006, Jun	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Closure Amendment Request	2006, Jun	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	RCRA Closure of Generated Wastes	2006, Jun	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Closure Amendment Request	2006, Mar	Reviewed; no relevant information.
Email	NAVFAC	NAVFAC	RCRA Closure of Generated Sites	2006, May	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Amendment Request for Closure Extension at Building 1112	2006, May	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	Closure Report for Storage Area at Building 1110	2006, May	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Acknowledgement of Closure Report	2006, May	Reviewed; no relevant information.
Email	NAVFAC	VDEQ	HWAA at Building 1112	2006, Oct	Records did not indicate storage or disposal of PFAS-containing materials or an AFFF fire supression system at the HWAA at Building 1112.
Email	VDEQ	NAVFAC	Closure Approval Memo	2007, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Establishment of a <90-day HWAA	2007, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	RCRA HW Compliance Evaluation Inspection	2007, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	HWAA at Building 513	2007, Apr	Reviewed; no relevant information.
Form	VDEQ	USEPA	RCRA Evaluation - Violation - Enforcement Form	2007, Dec	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Oceana Inspection	2007, Feb	Reviewed; no relevant information.
Technical Memorandum	VDEQ	VDEQ	Closure Report for Hazardous Waste Storage Facility Building SDA-1112	2007, May	Reviewed; no relevant information.
Form	NAVFAC	USEPA	RCRA Subtitle C Site Identification Form	2007, Nov	Reviewed; no relevant information.
Correspondence	USEPA	Navy	Acknowledgement of Notification of Regulated Waste Activity Verification	2007, Nov	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	RCRA Waste Focused Compliance Inspection	2007, Nov	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Closure Report for Building 1110	2007, Sep	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Acceptance of Response to Comments for Closure Report for Building 1110	2007, Sep	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Notice of Violation	2008, Aug	Reviewed; no relevant information.
Email	NAVFAC	VDEQ	HWAA Site #829	2008, Dec	Records did not indicate storage or disposal of PFAS-containing materials or an AFFF fire supression system at HWAA Site #829.
Report	NA	NA	VPDES Permit Fact Sheet	2008, Dec	Reviewed; no relevant information.
Report	NA	NA	Standard Special Condition Change Sheet	2008, Dec	Reviewed; no relevant information.
Email	NAVFAC	VDEQ	Drum Transport	2008, Jul	Reviewed; no relevant information.
Manifest	NA	NA	Uniform Hazardous Waste Manifest	2008, Jun	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	2007 HW Reports	2008, Mar	Reviewed; no relevant information.
Application	NAVFAC	VDEQ	NAS Oceana Outfall Grouping Rationale for VPDES Permit #VA0005266 Reapplication	2008, Oct	Supplemental information and outfall summary report for VPDES with various AFFF spill details.
Application	AH Environmental Solutions	NAVFAC	Virginia Pollution Discharge Elimination System Permit Application	2008, Oct	VPDES permit application. Indicates FFTR is inactive.
Application	AH Environmental Solutions	NAVFAC	Virginia Pollution Discharge Elimination System Permit Application	2008, Oct	Reviewed; no relevant information.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2009	Reviewed; no relevant information.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2009	Reviewed; no relevant information.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ Discharge Monitoring Report	2009	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Reissuance of VPDES Permit No. VA0005266, U.S. Naval Air Station Oceana, Virginia Beach, VA 23460	2009, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Termination of Order of Consent	2009, Aug	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Case Closure Memorandum	2009, Aug	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	Naval Air Station Oceana Spill Report #2010-T-0105	2009, Aug	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	VDEQ Environmental Pollution Report	2009, Aug	Spill report for 375 gallons of AFFF spilled at Hangar 139 on August 28, 2009.
Report and Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report	2009, Aug	At hangar 139, 425 gallons of AFFF spilled.
Report and Correspondence	NAVFAC	VDEQ	Spill Information/Notification Report	2009, Feb	A spill report for wash water from Hangar 500 wash rack caused by closed diverter valve.
Report	NA	NA	Tier Two Emergency and Hazardous Chemical Inventory	2009, Feb	Reviewed; no relevant information.
Correspondence	NAVFAC	HRSD	Correspondence	2009, Jan	Release of diluted AFFF on November 18, 2008 from Hangar 145.
Report	NAVFAC	VDEQ	Naval Air Station Oceana Spill Report #2010-T-0063	2009, Jul	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report	2009, Jul	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report	2009, Jul	At hangar 139, 1 gallon of foam was released.
Report	NAVFAC	VDEQ	Proposed Alternative Monitoring Options, Outfall 002	2009, Jul	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report	2009, Jun	Reviewed; no relevant information.
Report	NA	NA	NAS Oceana Spill Report	2009, Mar	At hangar 139, 4 gallons of AFFF was spilled and recovered. At hangar 223, 5 gallons of AFFF was spilled and recovered.
Report	VDEQ	Navy	Authorization to Discharge Under the Virginia Pollutant Discharge Elimination System and the Virginia State Water Control Law	2009, May	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	Signatory Authorization Form	2009, Nov	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Naval Air Station Oceana Spill Report #2010-T-1190	2009, Nov	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Naval Air Station Oceana Spill Report #2010-T-1363	2009, Nov	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	NAS Oceana, VPDES Permit No. VA0005266, Warning Letter (WL) No. W-2009-10-T-1001, IR# 2010-0063	2009, Nov	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Letter	2009, Oct	Warning letter for 50 gallons spill of wash water from Hangar 500 to storm water drainage.
Report	NAVFAC	VDEQ	Naval Air Station Oceana Spill Report #2010-T-1094	2009, Oct	Reviewed; no relevant information.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2010	Reviewed; no relevant information.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2010	Reviewed; no relevant information.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2010	Reviewed; no relevant information.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2010	Reviewed; no relevant information.

Appendix B
Summary of Records Reviewed
Naval Air Station Oceana, Virginia Beach, Virginia

Document Type	From	To	Document Name/Regarding	Date	Description
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2010	Reviewed; no relevant information.
Public Notice	VDEQ	NAVFAC	VPDES Permit No. VA0005266, U.S. Naval Air Station Oceana, Virginia Beach, Virginia	2010, Dec	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	RE: Christmas Wishes!	2010, Dec	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	NAS Oceana, Biological Monitoring for Outfall 003	2010, Dec	Reviewed; no relevant information.
Report and Correspondence	NA	NA	NAS Oceana Spill Report	2010, Dec	On December 15th, 2010, 250 gallons of AFFF concentrate spilled from the fire suppression system in Hangar 122 into drains.
Correspondence	COMNAVBASE	VDEQ	Spill Report #2011-T-0008	2010, Jul	Approximately 55 gallons of wash water were released from the wash rack at Hangar 500.
Report	NA	NA	NAS Oceana Spill Report	2010, Jul	3,000 gallons of a water and AFFF mixture spilled from Hangar 200.
Report	NA	NA	NAS Oceana Spill Report	2010, Jul	Reviewed; no relevant information.
Email	NAVFAC	VDEQ	NASO-HWAA-285-01 Closures	2010, Jun	HWAA-285-01 was closed out. Records did not indicate storage or disposal of PFAS-containing materials or an AFFF fire supression system at HWAA-285-01.
Report and Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report	2010, Mar	700 gallons of AFFF concentrate spilled from Hangar 145, caused by activated fire alarm.
Email	NAVFAC	VDEQ	Accumulation Area Changes	2010, May	Reviewed; no relevant information.
Correspondence	VDEQ	Virginia Department of Health (VDH)	VPDES Permit No. VA0005266 NAS Oceana - Permit Modification Action	2010, Nov	A request for comments on the proposed VPDES permit modification.
Report	NA	NA	VPDES Permit Fact Sheet	2010, Nov	VPDES permit fact sheet attachments. Page 23 predicts 108 gallons AFFF per year, and 240 gallons total test and flush water per year as a result of monthly AFFF valve operability checks, and the proposal and rationale of monitoring modifications and visual inspections.
Report	NAVFAC	NAVFAC	Spill Information/Notification Report	2010, Oct	5 gallons of wash water with paint chips was spilled at Building 179.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2011	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	NAS Oceana, Biological Monitoring for Outfall 901	2011, Apr	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	Spill Information/Notification Report	2011, Aug	Reviewed; no relevant information.
Public Notice	VDEQ	Virginian Pilot	Public Notice Verification Sheet	2011, Feb	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	HRSD	NAS Oceana Spill Report	2011, Feb	At hangar 122, 50 to 60 gallons of AFFF concentrate spilled and none was recovered.
Spreadsheet	NA	NA	2010 NAS Oceana Spill Inventory	2011, Jan	Recorded spill log for Oceana and Dam Neck.
Report and Correspondence	NAVFAC	VDEQ	Spill Information/Notification Report	2011, Jul	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	Spill Information/Notification Report	2011, Jul	At hangar 122, 1,250 gallons of AFFF spilled and 270 gallons went to the waterway.
Public Notice	VDEQ	NAVFAC	Modification of VPDES Permit No. VA0005266, U.S. Naval Air Station Oceana, Virginia Beach, VA 23460	2011, Mar	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	Naval Air Station Oceana, Hydrostatic Test	2011, Mar	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report	2011, Nov	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	Signatory Authorization For Navy Region, Mid-Atlantic	2011, Oct	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	Spill Information/Notification Report	2011, Sep	Reviewed; no relevant information.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2012	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Establishment and Closeout of a Temporary HWAA	2012, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	NASO Stormwater Discharge Request	2012, Apr	Stormwater and groundwater intrusion issues with the AFFF holding tanks located on the flight line. AFFF release on July 7, 2011 at Hangar 122.
Correspondence	NAVFAC	VDEQ	Naval Air Station Oceana Spill Report Reference #14004	2012, Apr	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report	2012, Apr	Reviewed; no relevant information.
Report	Reed & Associates	NAVFAC	Required Acute Test Data Review Checklist	2012, Apr	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	Tier Two Emergency and Hazardous Chemical Inventory	2012, Feb	Inventory of ansulite 6% (AFFF concentrate), including storage codes and locations, container type, and amount of product.
Correspondence	VDEQ	NAVFAC	Establishment of a Temporary HWAA	2012, Jul	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	FW: NASO storm water discharge request	2012, Jun	Storm water discharge request for two tanks at Hangar 122, following the removal of AFFF contaminated surface water and cleaning/sampling of the tanks.
Correspondence	NAVFAC	VDEQ	Signatory Authorization	2012, Mar	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Investigation	2012, Mar	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Establishment of a Temporary HWAA	2012, Mar	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Complaint	2012, Mar	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Clean Closure	2012, May	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Establishment and Closeout of a Temporary HWAA	2012, May	Reviewed; no relevant information.
Correspondence	HRSD	VDEQ	Notification of Visual Inspections of Service Area	2012, May	Reviewed; no relevant information.
Report	NA	NA	RCRA Subtitle C Inspection Report Hazardous Waste Compliance Evaluation Inspection	2012, May	Reviewed; no relevant information.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2013	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	FW: NAS Oceana Golf Course - potential pesticide application	2013, Apr	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	NAS Oceana Anti-Icing Request	2013, Apr	Reviewed; no relevant information.
Report	Reed & Associates	NAVFAC	Required Acute Test Data Review Checklist	2013, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Correspondence	2013, Aug	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2013, Aug	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report Reference ID# 21195	2013, Aug	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2013, Dec	Reviewed; no relevant information.
report	VDEM	VDEQ	Hazmat Incidents	2013, Dec	Reviewed; no relevant information.
Correspondence	Department of Conservation and Recreation (DCR)	VDEQ	FW: VA0005266, Naval Air Station Oceana	2013, Dec	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	WL No. W2013-02-T-1004, US Navy - Naval Air Station - Oceana, VPDES Permit No. VA0005266	2013, Feb	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	NAS Oceana, VPDES Permit Number VA0005226, WL Number W2013-02-T-1004	2013, Feb	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	Tier Two Emergency and Hazardous Chemical Inventory	2013, Feb	Inventory of ansulite 6% (AFFF concentrate), including storage codes and locations, container type, and amount of product.
Correspondence	VDEQ	NAVFAC	RE: NAS Oceana Golf Course - potential pesticide application	2013, Jul	Reviewed; no relevant information.
Table	NAVFAC	VDEQ	Naval Air Station Oceana, Outfall Grouping Justification For VPDES Permit #VA0005266 Reapplication	2013, Jun	Outfall grouping justification for the VPDES permit reapplication. FFTR and AFFF use associated with outfall 002 mentioned.
Correspondence	VDEQ	NAVFAC	WL No. W2013-02-T-1004, US Navy - Naval Air Station - Oceana, VPDES Permit No. VA0005266	2013, Mar	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	RE: Oceana - Golf Equipment Wash Facility - Outfall 111	2013, May	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Establishment of a Temporary HWAA	2013, Nov	Establishment of a Temporary HWAA at Building 311. Records did not indicate storage or disposal of PFAS-containing materials or an AFFF fire supression system.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2013, Nov	12 gallons spill of red and white latex paint into storm ditch 100 yards west of Hangar 500, which flows into a boomed outfall, on November 7, 2013.
Correspondence	NAVFAC	VDEQ	FW: NAS Oceana VPDES samples	2013, Nov	Reviewed; no relevant information.
Memorandum	VDH	VDEQ	Memorandum regarding raw water intake	2013, Nov	Reviewed; no relevant information.
Report	NA	NA	VPDES Permit Fact Sheet	2013, Nov	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2013, Oct	300 gallons spill of 3% AFFF solution on October 28, 2013 at the Aircraft High Power Pad at Building 1116.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2013, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	FW: NAS Oceana Anti-Icing Request	2013, Sep	Reviewed; no relevant information.
Report	VDEQ	NAVFAC	VDEQ Wastewater Facility Inspection Report	2013, Sep	Reviewed; no relevant information.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2014	Reviewed; no relevant information.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2014	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Establishment of a Temporary HWAA	2014, Apr	Establishment of a Temporary HWAA at Hangar 200. Records did not indicate storage or disposal of PFAS-containing materials or an AFFF fire supression system.
Report and Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report	2014, Apr	Reviewed; no relevant information.
Report	VDEM	VDEQ	Hazmat Incidents	2014, Apr	Reviewed; no relevant information.
Report	Reed & Associates	NAVFAC	Required Acute Test Data Review Checklist	2014, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2014, Aug	Reviewed; no relevant information.

Appendix B
Summary of Records Reviewed
Naval Air Station Oceana, Virginia Beach, Virginia

Document Type	From	To	Document Name/Regarding	Date	Description
Correspondence	NAVFAC	VDEQ	VPDES Permit VA0005266	2014, Aug	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	VPDES Permit No. VA0005266, Reissuance for U.S. Naval Air Station Oceana, Virginia Beach, VA	2014, Aug	Reviewed; no relevant information.
Report	VDEM	VDEQ	Hazmat Incidents	2014, Dec	Report of 3 gallons of aircraft soap water entering a storm drain.
Report and Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report	2014, Dec	Reviewed; no relevant information.
Report	VDEQ	Navy	Authorization to Discharge Under the Virginia Pollutant Discharge Elimination System and the Virginia State Water Control Law	2014, Dec	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2014, Feb	3 gallon JP-5 fuel spill at Oil Boom 2.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2014, Feb	Reviewed; no relevant information.
Email	NAVFAC	VDEQ	FW: HPTU at outfall 004; Engine Test Cell activity?	2014, Feb	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2014, Feb	Reviewed; no relevant information.
Report	VDEM	VDEQ	Hazmat Incidents	2014, Feb	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	Tier Two Emergency and Hazardous Chemical Inventory	2014, Feb	Inventory of ansulite 6% (AFFF concentrate), including storage codes and locations, container type, and amount of product.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2014, Jan	Reviewed; no relevant information.
Email	NAVFAC	VDEQ	FW: Oceana permit reissue - a few questions	2014, Jan	Reviewed; no relevant information.
Report	NA	NA	NAS Oceana Spill Report	2014, Jan	At hangar 145, 20,000 gallons of AFFF spilled and 99.9% was recovered.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2014, Jul	161 gallon spill of water mixed with 5 gallons of AFFF on June 28, 2014 at Hush House Building 1116.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2014, Jun	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report	2014, Jun	5 gallons of AFFF and 111 gallons of water spilled from a fire truck during fire-fighting training at the Hush House Building 1116.
Report	VDEM	VDEQ	Hazmat Incidents	2014, Jun	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Correspondence	2014, Mar	Enclosure of MSDS for AFFF fire suppression systems located in Hangars 122, 145, 200, and 500.
Correspondence	Virginia Department of Emergency Management (VDEM)	VDEQ	Hazmat Incidents	2014, Mar	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	FW: NASO RF-11 Anti-icing application	2014, Mar	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Conformance Review	2014, Mar	Reviewed; no relevant information.
Application	NAVFAC	VDEQ	Virginia Pollution Discharge Elimination System Permit Application	2014, Mar	Reviewed; no relevant information.
Report	Reed & Associates	NAVFAC	Required Acute Test Data Review Checklist	2014, Mar	Reviewed; no relevant information.
Correspondence	NAVFAC	NAVFAC	Incident Report	2014, Nov	100 gallon spill of JP-5 fuel.
Report	VDEM	VDEQ	Hazmat Incidents	2014, Nov	Reviewed; no relevant information.
Affidavit	NAVFAC	VDEQ	NAS Oceana, Publication Affidavit	2014, Nov	Reviewed; no relevant information.
Notice	VDEQ	NAVFAC	Reissuance of VPDES Permit No. VA0005266	2014, Nov	Reviewed; no relevant information.
Email	NAVFAC	VDEQ	Closing of Temporary <90 DAY HWAA	2014, Oct	A temporary hazardous waste accumulation area (HWAA) (OC-HWAA-Hanger 200-B) was closed out. Records did not indicate storage or disposal of PFAS-containing materials or an AFFF fire supression system.
Report	VDEM	VDEQ	Hazmat Incidents	2014, Oct	Reviewed; no relevant information.
Report	NA	NA	NAS Oceana Spill Report	2014, Oct	At hangar 122, a half-pound of AFFF spilled and was recovered.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2014, Sep	JP-5 fuel spill at Hangar 111.
Correspondence	NAVFAC	VDEQ	FW: VPDES Permit VA0005266 (Naval Air Station Oceana DP and FS)	2014, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	FW: NAS Oceana (Permit No. VA0005266) DP & FS Revisions	2014, Sep	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	FW: Oceana TMDL Review (VA0005266)	2014, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2014, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Chesapeake Bay Total Maximum Daily Load Action Plan Guidance Document	2014, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	NAVFAC and VDEQ	5 Day Letter 20140925	2014, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	NAVFAC and VDEQ	5 Day Letter 20140902	2014, Sep	Reviewed; no relevant information.
Report	VDEM	VDEQ	Hazmat Incidents	2014, Sep	Reviewed; no relevant information.
Report	NA	NA	NAS Oceana Spill Report	2014, Sep	At hangar 122, 10 gallons of AFFF spilled and was recovered.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2015	Reviewed; no relevant information.
Table	NA	NA	EPCRA Section 312 Hazardous Chemical Threshold Summary, Reporting Year 2015	2015	AFFF (3% concentrate) is added as a reportable hazardous chemical in Reporting Year 2015.
Table	NA	NA	NEX Command EPCRA Section 312 Hazardous Chemical Threshold Summary, Reporting Year 2015	2015	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Spill Letter Hanger 500 Slight Oil Sheen	2015, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	NAS Oceana, Hangar 145 AFFF release/cleanup	2015, Apr	18 gallon spill of AFFF at Hangar 145 on April 22, 2015 into the storm drain that flows to West Neck Creek.
Correspondence	NAVFAC	VDEQ	FW: NAS Oceana, Former Steam Plant, Bldg. 601 basement water	2015, Apr	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	NAS Oceana, Former Steam Plant, Bldg. 601 basement water	2015, Apr	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report	2015, Apr	At hangar 145 approximately 18 gallons of an AFFF and water mixture spilled.
Report	VDEM	VDEQ	Hazmat Incidents	2015, Aug	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Closure of 90-day HWAA at Building 520 Parking Lot	2015, Dec	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Stormwater Sampling at Oceana	2015, Dec	Reviewed; no relevant information.
Report	AH/BC Joint Venture	NAVFAC	Comprehensive Site Compliance Evaluation Report	2015, Dec	AFFF structural control treatment BMP and specific AFFF spill details, including spills at buildings 122, 131, 145, and 1116.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2015, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	HWAA at Building 401	2015, Jun	Reviewed; no relevant information.
Report	VDEM	VDEQ	Hazmat Incidents	2015, Jun	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	Signatory Authorization for Navy Region Mid-Atlantic	2015, Jun	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	WL No. W2015-06-T-1003, US Navy - Naval Air Station - Oceana, VPDES Permit No. VA0005266	2015, Jun	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2015, Mar	JP-5 fuel spill at Hangar 122.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2015, Mar	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Spill Letter JP5 Hanger 122 NASO	2015, Mar	Reviewed; no relevant information.
Notice	NAVFAC	VDEQ	NAS Oceana, VPDES Deicing Report	2015, Mar	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2015, May	Spill of 18 gallons of AFFF on April 22, 2015 into the parking lot of Hangar 145.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2015, May	JP-5 fuel spill at Hangar 200.
Correspondence	VDEQ	NAVFAC	90-day HWAA at Building 520 Parking Lot	2015, Nov	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2015, Nov	JP-5 fuel spill at Hangar 122.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2015, Nov	2 gallon JP-5 fuel spill at Hangar 122.
Correspondence	VDEM	VDEQ	Hazmat Incidents	2015, Nov	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2015, Oct	JP-5 fuel spill at Hangar 122.
Report	VDEM	VDEQ	Hazmat Incidents	2015, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Spill Letter JP5 Bldg. 137 ID#43534	2015, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Spill Letter Soap Bldg. 299 ID# 43892	2015, Sep	Reviewed; no relevant information.
Report	NA	NA	NAS Oceana Spill Report	2015, Sep	Approximately 20 gallons of AFFF was spilled at the west side of Hangar 139.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2016	Reviewed; no relevant information.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ Discharge Monitoring Report	2016	Reviewed; no relevant information.
Report	NAVFAC	Environmental POC NAS Oceana	AFFF Holding Tank Intrusion Standard Operating Procedure	2016, Aug	The standard operating procedures for AFFF holding tank intrusion.
Report	VDEM	VDEQ	Newport News City Hazmat HMVA-16749	2016, Feb	Reviewed; no relevant information.

Appendix B
Summary of Records Reviewed
Naval Air Station Oceana, Virginia Beach, Virginia

Document Type	From	To	Document Name/Regarding	Date	Description
Report	NA	NA	Tier Two Emergency and Hazardous Chemical Inventory	2016, Feb	Reviewed; no relevant information.
Table	NA	NA	NAS Oceana EPCRA Section 311 List Submittal	2016, Feb	AFFF (Ansulite 6%) is listed as an immediate health hazard.
Report and Correspondence	NAVFAC	VDEQ	Signatory Authorization for Navy Region Mid-Atlantic	2016, Jan	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2016, Jun	6 gallons of automobile oils spilled at Building 536 parking lot.
Report	VDEM	VDEQ	Hazmat Incidents	2016, Jun	Reviewed; no relevant information.
Report	NA	NA	NAS Oceana Spill Report	2016, Jun	Approximately 20 gallons of AFFF was spilled and recovered at Hangar 139.
Correspondence	NAVFAC	VDEQ	5 Day Spill Letter ID#53466_OC404_JP5_5GAL	2016, Mar	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Signatory Authorization	2016, May	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2016, May	<20 gallons of automobile oils were spilled.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2016, May	JP-5 fuel spill at Hangar 145.
Report	VDEM	VDEQ	Hazmat Incidents	2016, May	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	Signatory Authorization for Navy Region Mid-Atlantic	2016, May	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	VDEQ Inspection	2016, Nov	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	RCRA HW Compliance Evaluation Inspection	2016, Nov	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report ID# 80904, NRC#1163958	2016, Nov	Reviewed; no relevant information.
Email	VDEQ	VDEQ	30-day extensions at Oceana and Dam Neck	2016, Oct	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Formal 30 Day Extension Letter	2016, Oct	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	90-day Extension on HWAA	2016, Oct	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2016, Oct	800 gallon spill of JP-5 fuel at Building 833.
Manifest	NAVFAC	VDEQ	30-day extension letters	2016, Oct	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Signatory Authorization	2016, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Spill Letter ID# 51213_OC541_Gasoline	2016, Sep	Reviewed; no relevant information.
Report and Correspondence	NA	NA	NAS Oceana Spill Report	2016, Sep	At building 1116 approximately 2 gallons of AFFF spilled.
Report	Navy Region, Mid-Atlantic	VDEQ	VDEQ NPDES Discharge Monitoring Report	2017	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2017, Apr	Reviewed; no relevant information.
Report	Reed & Associates	NAVFAC	JRA_20170428_161747	2017, Apr	Analytical report for Oceana Flight Line for AFFF sampling.
Correspondence	VDEM	VDEQ	Hazmat Incidents	2017, Aug	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2017, Aug	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Notice of Violation	2017, Dec	Reviewed; no relevant information.
correspondence	VDEQ	NAVFAC	VPDES Permit No. VA0005266	2017, Dec	Reviewed; no relevant information.
Application	NAVFAC	VDEQ	E-DMR Application Package for U.S. - Naval Air Station Oceana (VPDES Permit #VA0005266)	2017, Dec	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Signatory Authorization	2017, Feb	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	Signatory Authorization for Navy Region Mid-Atlantic	2017, Feb	Reviewed; no relevant information.
Report	NAVFAC	Office of Emergency Management	Tier Two Emergency and Hazardous Chemical Inventory	2017, Feb	Inventory of AFFF, including storage codes and locations, container type, and amount of product.
Correspondence	NAVFAC	VDEQ	NAS Oceana Anti-Icing	2017, Jan	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Oceana Deicing Event Reporting Forms	2017, Jan	Reviewed; no relevant information.
Report	Reed & Associates	NAVFAC	Required Acute Test Data Review Checklist	2017, Jan	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Notification of HW Disposal	2017, Jul	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Self-Disclosure of HW Disposal	2017, Jul	Reviewed; no relevant information.
Report	VDEM	VDEQ	Hazmat Incidents, Incident: VDEM - 2017-05	2017, Jul	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Naval Air Station Oceana, Outfall 003 Characterization, Additional Sample	2017, Jun	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report ID# 102367, NRC#1182295	2017, Jun	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report ID# 93989	2017, Mar	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	NAS Oceana JP-5 Fuel Spill	2017, May	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	NAS Oceana JP-5 Fuel Spill	2017, May	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	5 Day Letter	2017, May	Reviewed; no relevant information.
Report	VDEM	VDEQ	Hazmat Incidents	2017, May	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	NAS Oceana Spill Report ID# 96810	2017, May	Reviewed; no relevant information.
Report with Diagrams	NA	NA	NAS Oceana AFFF Holding Tank Investigation 15MAY17 - OFFICIAL DRAFT	2017, May	A report for AFFF holding tanks, showing the storm drains and overflow from a AFFF holding tank.
Report and Correspondence	NA	NA	NAS Oceana Spill Report	2017, May	At building 1100 approximately 1 gallon of AFFF spilled.
Report	NA	NA	Situation Report #3, NAS Oceana Fuel Spill 'Wolfsnare Creek'	2017, May	Reviewed; no relevant information.
Report	NA	NA	Annual Comprehensive Site Compliance Evaluation	2017, May	Discusses various AFFF spills/leaks.
Correspondence	NAVFAC	VDEQ	Request for Information	2017, Nov	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Mobile Range Maintenance Activities	2017, Nov	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Waste Disposal Incident	2017, Sep	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Notification of Investigation	2017, Sep	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Final Contingency Plan	2017, Sep	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Request for Information Extension	2017, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Request for Information	2017, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Request for Information	2017, Sep	Reviewed; no relevant information.
Table	NAVFAC	VDEQ	Naval Air Station Oceana Outfall Grouping Justification for VPDES Permit #VA0005266 Reapplication	2018, Aug	Outfall grouping justification for the VPDES permit reapplication. FFTR and AFFF use associated with outfall 002 mentioned.
Correspondence	Navy	VDEQ	Owner Name Change	2018, Feb	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	Emergency Planning and Community Right-to-Know Act (EPCRA) Section 311 Update and 312 Notification, reporting Year 2017	2018, Feb	Inventory, mixture components storage locations and codes (non-confidential) including type, pressure, and temperature of storage.
Correspondence	NAVFAC	VDEQ	3 Jan 2018 RF-11 spray areas	2018, Jan	Reviewed; no relevant information.
Report	NA	NA	Navy Regional Mid-Atlantic Regional Spill Report	2018, Jan	Reviewed; no relevant information.
Report	Reed & Associates	NAVFAC	Required Acute Test Data Review Checklist	2018, Jan	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	NAVFAC	Spill Information/Notification Report	2018, Jul	Reviewed; no relevant information.
Report and Correspondence	NAVFAC	VDEQ	Navy Regional Mid-Atlantic Regional Spill Report	2018, Mar	A half-gallon of AFFF spilled at Fire Station 7, due to malfunctioning valve.
Database from Naval Safety Center	NA	NA	Naval Safety Center, Web Enabled Safety System Hazard Narrative Word Search	2018, Nov	Database entry detailing that AFFF suppression systems are not working as of May 8, 2018 in all hangars.
Report	NAVFAC	VDEQ	NAS Oceana, VPDES Permit VA0005266 Inspection Response	2018, Oct	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Storm Preparation - Hydrant Water in empty tank	2018, Sep	Reviewed; no relevant information.
Report	VDEQ	NAVFAC	VDEQ Wastewater Facility Inspection Report	2018, Sep	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Reissuance of VPDES Permit VA0005266	2019, Jan	Reviewed; no relevant information.
Article	NA	NA	FOAM	unknown	Undated newspaper article detailing effects on the environment, storage, and re-ignition information for AFFF from various representatives.
Note	NA	NA	Inspection Notes	unknown	Reviewed; no relevant information.
Reference Excerpt	NA	NA	OSHA Excerpt	unknown	Reviewed; no relevant information.
Table and Notes	NA	NA	HRSD Permit Application, Table of Discharges to Sanitary Sewer, Section E-4	unknown	Undated tables of discharges to sanitary sewer, with no direct mention of AFFF.
Report	NA	NA	AFFF Environmental Reporting Requirements	unknown	Base AFFF user requirements for reporting and controlling discharges on the basis of amount of glycol ether discharged.

Document Type	From	To	Document Name/Regarding	Date	Description
Report	NA	NA	Report Summary Biological Treatment of AFFF at Oceana NAS	unknown	Documentation of application, sample preparation, instrumental analysis, and results/conclusions of testing for AFFF.
Form	NA	NA	HW Manifests 7133-7914, 7944, 7945, and 7947	various	Reviewed; no relevant information.
Various Documents	NA	NA	Various AFFF Documents		AFFF dilution modeling, AFFF inventory, and correspondence.
Various Documents	NA	NA	Various correspondence regarding AFFF		Correspondence regarding AFFF.
Environmental Restoration Program Records					
Report	R. E. Wright Associates	NAS Oceana	Extent of Sub-Surface Fuel Contamination NAS Oceana	1983, Feb	Runoff from fire fighting exercises usually included fuel and is drained into cannels.
Report	Naval Energy and Environmental Support Activity	NAVFAC	Initial Assessment Study of NAS Oceana	1984, Dec	Provided history of operations and potential areas of contamination at NAS Oceana.
Correspondence	NAVFAC	VDEQ	Request for Extension	1988, Apr	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Response to Letter	1988, Mar	Reviewed; no relevant information.
Memorandum	VDEQ	United States Senate	Draft Enforcement Order	1989, Aug	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Response to Proposed Draft Consent Order	1989, Feb	Reviewed; no relevant information.
Report	A. T. Kearney	USEPA	RCRA Facility Assessment Revised Phase II Report	1989, Mar	Report including documentation of waste storage areas for AFFF.
Correspondence	VDEQ	NAVFAC	Draft Enforcement Order	1989, Nov	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Revision to the Draft Enforcement Order	1989, Sep	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Draft Enforcement Order	1990, Apr	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Letter responding to Draft Enforcement Order	1990, Mar	Reviewed; no relevant information.
Report	CH2M	NAVFAC	Interim RCRA Facility Investigation (RFI)	1991, Aug	Site history for Site 11.
Report	USEPA	Navy	RCRA Consent Order	1991, Jun	Reviewed; no relevant information.
Report	CH2M	NAVFAC	RCRA Facility Investigation Final Report - Phase 1	1993, Dec	Reviewed; no relevant information.
Report	NA	NA	Cost Estimate - Remediation of Petroleum Contaminated Soils	1994	Reviewed; no relevant information.
Report	NA	NA	Remediation of Petroleum Contaminated Soil	1994	Reviewed; no relevant information.
Report	NAVFAC	USEPA	Bimonthly Progress Report for years 1994 - 2012	1994 - 2012	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Investigative Derived Waste near Building 301	1994, Mar	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	1994, Mar	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	1994, Mar	Reviewed; no relevant information.
Memorandum	VDEQ	VDEQ	Investigative Derived Waste	1994, May	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	1994, Nov	Reviewed; no relevant information.
Report	NA	NA	Corrective Measures Study for Petroleum Contaminated Sites	1994, Oct	AFFF is used at Site 11.
Report	NA	NA	Excavation, Transportation, and Disposal of Petroleum-Contaminated Soils	1995, Apr	Soil samples collected near the fire ring.
Notes	NA	NA	Pre-Site Visit and Field Notes	1996, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	USEPA	RCRA Work-sharing	1996, Jul	Reviewed; no relevant information.
Memorandum and Report	NA	NA	USEPA Validation Report	1996, Mar	Reviewed; no relevant information.
Correspondence	VDEQ	USEPA	Summary of activities and observations during site visits of SWMUs	1996, Nov	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	1996, Oct	Reviewed; no relevant information.
Report	NA	NA	Initial SMP	1996, Oct	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit Notes	1997, Jul	Reviewed; no relevant information.
Presentation	NA	NA	USEPA Region III and VDEQ Multi-media Compliance Inspection	1997, Jul	Management plan developed for containment, treatment, and release of AFFF to sewage system.
Correspondence	VDEQ	USEPA	Comments on Draft Final Work Plan for GW Remediation at SWMU 24	1998, Apr	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	1998, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Proposed Biotreatment Facility for Soils at SWMU 15	1998, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	USEPA	Work Plan for Groundwater Remediation	1998, Mar	Reviewed; no relevant information.
Correspondence	VDEQ	USEPA	Comments of Draft SWMU 2C	1998, May	Reviewed; no relevant information.
Correspondence	VDEQ	USEPA	Comments on Final Work Plan for Confirmatory Soil Sampling at SWMU 15	1998, May	Reviewed; no relevant information.
Report	CH2M	NAVFAC	Final Report For The Phase III RCRA Facility Investigation	1999, Aug	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	1999, Dec	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	1999, Mar	Reviewed; no relevant information.
Report	NAVFAC	VDEQ	USEPA 1998 HW Annual Report	1999, Mar	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	Consent Order	2000, Jan	Reviewed; no relevant information.
Report	NA	NA	RCRA Administrative Order on Consent	2001	Reviewed; no relevant information.
Report	CH2M, Baker, and CDM	NAVFAC	Final Screening and Baseline Ecological Risk Assessment Steps 1, 2, and 3 for SWMUS 2B, 11, 16, 16GC, 21, 22, and 26	2001, Dec	Reviewed; no relevant information.
Report	CH2M	NAVFAC	Final Decision Document for SWMUS 11, 16, 16GC, 21, 22, and 26	2001, Dec	Reviewed; no relevant information.
Correspondence	VDEQ	USEPA	Final Decision for SWMUs 2D, 18, 19, 20 and 23	2001, Jun	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	2001, May	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	FFA Negotiation	2001, May	Reviewed; no relevant information.
Correspondence	VDEQ	USEPA	Final Decision Document for SWMUs 11, 16, 16GC, 21, 22 and 26	2002, Jan	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	2002, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	RCRA Progress Report	2002, Jan	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	2003, Mar	Reviewed; no relevant information.
Correspondence	NAVFAC	USEPA	Final Decision Document for SWMU 25	2003, Oct	Reviewed; no relevant information.
Memorandum	VDEQ	VDEQ	Referral for Enforcement Action	2004, Apr	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	2004, Mar	Reviewed; no relevant information.
Correspondence	VDEQ	PWC	Corrective Action Work Plan	2004, May	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Draft Consent Order	2004, Nov	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Order by Consent	2005, Jan	Reviewed; no relevant information.
Correspondence	VDEQ	The Virginian-Pilot	Legal Notice to Advertised Legal Ad	2005, Jan	Reviewed; no relevant information.
Correspondence	NAVFAC	VDEQ	Consent Order	2005, Jan	Reviewed; no relevant information.
Memorandum	VDEQ	VDEQ	Public Notice and Fact Sheet	2005, Jun	Reviewed; no relevant information.
Notes	NA	NA	Site Visit Notes	2005, Jun	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Acknowledgement of Receipt of Closure Report	2005, Mar	Reviewed; no relevant information.
Notes	NA	NA	Site Visit Notes	2006, Jul	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Technical Review Comments	2006, Nov	Reviewed; no relevant information.
Correspondence	VDEQ	VDEQ	NAS Oceana Site Visit Memorandum	2006, Sep	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	2007, Feb	Reviewed; no relevant information.
Correspondence	VDEQ	NAVFAC	Acknowledgement of Receipt of Closure Report	2007, May	Reviewed; no relevant information.
Notes	NA	NA	Site Visit Notes	2007, Oct	Reviewed; no relevant information.
Correspondence	VDEQ	Navy	Final Decision Document for SWMUs 2b, 2c, and 2e Review Notification	2008, Sep	Reviewed; no relevant information.
Notes	NA	NA	Pre-Site Visit and Field Notes	2012, Oct	Reviewed; no relevant information.
Website	NA	NA	NAS Oceana Site Descriptions	2018, Jul	Reviewed; no relevant information.

Appendix B
Summary of Records Reviewed
Naval Air Station Oceana, Virginia Beach, Virginia

Document Type	From	To	Document Name/Regarding	Date	Description
Report	NA	NA	All Combined CNRMA AFFF Results - Option 1 - CNRMA Facilities (VA area, Great Lakes, Philadelphia Navy Yard)	2018, Jun	Analytical results for PFAS from the Navy base locations sampled.
Report	NA	NA	Fact Sheet - NAS Oceana PFOA/PFOS Investigation	2018, Sep	Factsheet figure that indicates location of shallow and deep monitoring wells that detect and exceed PFOS/PFOA levels.
Email	NAVFAC	CH2M	FW Oceana PFAS Preliminary Assessment	2019, Oct	Morale, Welfare, and Recreation (MWR) golf course stores their pesticides in a ventilated storage locker near Building 796 and mixes on a nearby concrete pad. The NAS Oceana natural resources department stores pesticides in a shed (Building 1115A) and mixes them at Dam Neck at Building 613.
Report	CH2M	NAVFAC	Final Corrective Measures Study for Petroleum Contaminated Sites	1994, Oct	Provided history of operations and potential areas of petroleum contamination at NAS Oceana.
Report	CH2M	NAVFAC	Wastewater Pretreatment Device Management Plan	2012, Aug	Wash water from Building 830 is collected by machines and discharged to an aircraft wash rack drain that discharges to an OWS prior to entering sanitary sewer.
Report	CH2M	NAVFAC	Final Basewide Per- and Polyfluoroalkyl Substances Site Inspection Report	2018, Aug	Provided history of operations and potential areas of PFAS contamination at NAS Oceana.
Report	CH2M	NAVFAC	Final Aerial Photographic Analysis of Naval Air Station Oceana, Volumes 1 and 2	2020, Jan	Provided history of operations and aerial imagery of potential areas of contamination at NAS Oceana.
Environmental Data Resources Reports					
Report	NA	NA	EDR Geocheck Report	2016, Jun	Reviewed; no relevant information.
Report	NA	NA	EDR Offsite Receptor Report	2019, Jan	Offsite drinking water receptors within 5 miles of the installation boundary.
Report	NA	NA	EDR NEPASearch™ Map Report	2019, Jan	Ecological receptors within 3 miles of the installation boundary.
Report	NA	NA	EDR Historical Aerial Photo Decade Package	2019, Jan	Historic topographic maps of the installation.
Maps, Diagrams, and Photographs					
Map	NA	NA	AFFF System Hangar 200 Site Plan	2004, Aug	Site plans, including areas using AFFF.
Map	NA	NA	Proposed Monitoring Well Locations	2016, Jul	Old figure showing site 11 well locations and AFFF events.
Map	NA	NA	Well Locations	2016, May	Reviewed; no relevant information.
Map	NAVFAC	VDEQ	Map	1988, May	Map identifying HWAAs.
Diagram	NA	NA	Addition to Squadron Trainer Building 223, Plumbing First Floor Plan, 08-10-52	1952, Aug	Reviewed; no relevant information.
Diagram	NA	NA	Building 223 Squadron Training Building, Plumbing 1st Floor 12-25-52	1952, Dec	Reviewed; no relevant information.
Diagram	NA	NA	Building 223 Squadron Training Building, Layout & Utility Plan 12-25-52	1952, Dec	Reviewed; no relevant information.
Diagram	NA	NA	Aircraft Maintenance Hangar 200 Plot Plan & Utility Entrances 05-19-52	1952, May	Hangar 200 plot plan and utility entrances, including fire protection loop and fire department connect.
Diagram	NA	NA	Aircraft Maintenance Hangar 200 Plumbing Drainage System 05-19-52	1952, May	Reviewed; no relevant information.
Diagram	NA	NA	Public Works Garage 830 Heating, Ventilating, & Plumbing Plan 09-10-1952	1952, Sep	Public works garage building 830 heating, ventilating, and plumbing plan.
Diagram	NA	NA	36. Public Works Garage 830 Site & Utility Plan 09-10-52	1952, Sep	Reviewed; no relevant information.
Diagram	NA	NA	Crash Facilities Building Site & Utility Plan 02-20-53	1953, Feb	Reviewed; no relevant information.
Diagram	NA	NA	Aircraft Maintenance Hangar 200 Drainage System & Details, Plumbing 04-14-54	1954, Apr	Reviewed; no relevant information.
Diagram	NA	NA	Building 220 Fire Station Site Plan 4-4-1955	1955, Apr	Building 220 fire station site plan/miscellaneous details.
Diagram	NA	NA	Hangar 137 Medium Attack Weapons School, 1st Floor Plan, Plumbing and Comp. Air 05-16-60	1960, May	Hangar 137 1st floor plan, plumbing, compressed air, and wall hydrant (non-freeze) in the diagram.
Diagram	NA	NA	Hangar 223 Squadron Training Building Plumbing 1st floor 12-23-1962	1962, Dec	Hangar 223 first floor plumbing plan, including a horizontal foam concentrate line visible across the center.
Diagram	NA	NA	Building 721 Heating Plan 3-15-1964	1964, Mar	Reviewed; no relevant information.
Diagram	NA	NA	Building 513 Avionics Shop Plumbing Floor Plan, Parts A and B	1968, Jun	Reviewed; no relevant information.
Diagram	NA	NA	37. Building 513 Avionics Shop Grading, Utilities Plan 06-03-1968	1968, Jun	Reviewed; no relevant information.
Diagram	NA	NA	Relocation of Building 23 Aircraft Maintenance Hangar, Floor Plan, Plumbing 12-3-71	1971, Dec	Relocation of Hangar 23 plumbing floor plan with sprinklers.
Diagram	NA	NA	Engine Preservation Shop, Aircraft Maintenance Hangar, Floor Plan, Plumbing 12-3-71	1971, Dec	Engine preservation shop at the maintenance hangar plumbing floor plan with sprinklers.
Diagram	NA	NA	Aircraft Maintenance Hangar 403, Ground Support Equip. Storage Fac., Floor Plan, Plumbing 12-71	1971, Dec	Reviewed; no relevant information.
Diagram	NA	NA	Hangar 111 First Floor Plan Mods 1, 2, and 3 Plumbing 12-3-1971	1971, Dec	Hangar 111 first floor plumbing plan mod 1.
Diagram	NA	NA	Building 513 Airframe Maintenance Facility Site Plan	1972, Nov	Reviewed; no relevant information.
Diagram	NA	NA	Building 513 Avionics Shop Plumbing Plan, Part A	1972, Nov	Plumbing system of Building 513 part A with sprinklers.
Diagram	NA	NA	Building 513 Avionics Shop Plumbing Plan, Part B 11-17-72	1972, Nov	Plumbing system of Building 513 part B with sprinklers.
Diagram	NA	NA	Building 310 Tactical Aircrew Combat Training System Site Plan 07-27-75	1975, Jul	Reviewed; no relevant information.
Diagram	NA	NA	Building 310 Tactical Aircrew Combat Training System Floor Plan Legend & Schedule 07-27-75	1975, Jul	Reviewed; no relevant information.
Diagram	NA	NA	Building 310 Tactical Aircrew Combat Training, Mechanical Plumbing Plan & Details 07-27-75	1975, Jul	Reviewed; no relevant information.
Diagram	NA	NA	Aircraft Maintenance Hangar 404 Site Utilities Plan 12-07-78	1978, Dec	Reviewed; no relevant information.
Diagram	NA	NA	Aircraft Wash Facility Demolition and Site Plans - 5 Position Site	1980, Sep	Reviewed; no relevant information.
Diagram	NA	NA	Building 301 Engine Maintenance Shop Addition Site Plan & Details (date is illegible - sometime in 1980's)	1980s	Reviewed; no relevant information.
Diagram	NA	NA	F-14 Crash, 24 April 1981, Site Survey	1981, Apr	Aerial view of trajectory, debris, destroyed sites, and stopping point location of F-14 crash along runways.
Diagram	NA	NA	Crash Site Survey, A-6E Buno 162181	1986, May	Aerial view of impact area, burn area, and debris location of A-6E along Oceana Boulevard.
Diagram	NA	NA	Aircraft Maintenance Hangar 111, Mechanical Site and Plumbing Floor Plan	1986, May	Hangar 111 mechanical site plan, including flush fire hydrants outside of walls and fire main shown.
Diagram	NA	NA	Hangar 137 Medium Attack Weapons School, Site Plan 08-18-90	1990, Aug	Reviewed; no relevant information.
Diagram	NA	NA	Building 401 Ground Handling Equipment Building, Utilities Plan - 1966	1994, Dec	Reviewed; no relevant information.
Diagram	NA	NA	Building 401 Ground Handling Equipment Building, Plumbing Plan - 1966	1994, Dec	Reviewed; no relevant information.
Diagram	Burns and McDonnell	NAVFAC	Aircraft Acoustical Enclosure	1999, Dec	Utility map showing several locations for fire water.
Diagram	Burns and McDonnell	NAVFAC	Aircraft Acoustical Enclosure Plumbing Plan	1999, Dec	Reviewed; no relevant information.
Diagram	Burns and McDonnell	NAVFAC	Aircraft Acoustical Enclosure Plumbing Details and Riser Diagrams	1999, Nov	Domestic hot and cold water riser diagram has wall hydrant and post hydrant supply locations.
Diagram	NA	NA	Master Shore Development Plan	2006, Feb	Locations of outfalls, booms, aircraft parking areas, storm sewers, and drainage patterns.
Diagram	Clark Nexsen	NAVFAC	P837- C-40 Aircraft Maintenance Hangar Utility Details	2009, Mar	Fire hydrant construction diagram. There is mention of reinforcing at AFFF junction box.
Index of Diagram Plans	Clark Nexsen	NAVFAC	P837- C-40 Aircraft Maintenance Hangar Title Sheet	2009, Mar	Reviewed; no relevant information.
Diagram	Clark Nexsen	NAVFAC	P837- C-40 Aircraft Maintenance Hangar Utility Plan	2009, Mar	Reviewed; no relevant information.
Diagram	NA	NA	Wastewater Pretreatment Device Management Plan for NAS Oceana	2012, Aug	Building numbers with facility type and discharge route to HRSD or storm drain.
Report	Baker	NA	SWPPP Update 2013	2013, Oct	Reviewed; no relevant information.
Diagram	NA	NA	Aircraft Maintenance Hangar 200 Plot Plan & Utilities	unknown	Hangar 200 plot plan and utilities, including fire hydrant and fire protection loop listed.
Diagram	NA	NA	New FFTR Location	unknown	Location of new FFTR is off of the abandoned runway.
Diagram	NA	NA	Aircraft Maintenance Hangar 500 Utilities, Civil Plan	unknown	Reviewed; no relevant information.
Diagram	NA	NA	Cold Storage Building Site & Utility Plan	unknown	Reviewed; no relevant information.
Photograph	NA	NA	Aerial photograph	1962, Jul	Aerial photograph of Oceana with coastline in view and surrounding farm land.
Photograph	NA	NA	Aerial photograph	1962, Jul	Aerial photograph of Oceana with coastline in view and surrounding farm land.
Photograph	NA	NA	Aerial photograph of flight line at higher elevation	1968	Aerial photo of the western area of the flight line with jets in position.
Photograph	NA	NA	Aerial photograph of flight line	1985	Aerial photo of the western area of the flight line with jets in position and possible crash trucks adjacent to the left row.
Photograph	NA	NA	Photograph of Crash Truck #8	1989	Photo of Crash Truck #8 on the flight line with a jet in the background.
Photograph	NA	NA	Photograph of Crash Truck #5	1989	Photo of Crash Truck #5 on the flight line with a plane in the background.
Photograph	NA	NA	Blurry aerial photograph	unknown	Undated aerial photograph of the flight line with jets in position and some smoke.
Photograph	NA	NA	Photograph of Fuel Truck	unknown	Undated photograph of an overturned fuel truck on an unidentified flightline/taxiway
National Archives and Naval Heritage and History Command Records					
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	History of Naval Air Station Oceana, Virginia Beach, Virginia, 1 January 1959 – 31 December 1959 (OPNAV Report 5750-5)	1960	The Photographic Laboratory and Hobby Shop were constructed during this period.

Document Type	From	To	Document Name/Regarding	Date	Description
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	U.S. Naval Air Station Oceana, Virginia Beach, Virginia, Annual History 1963	1946	Reviewed; no relevant information.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	History of the Naval Air Station Oceana, Virginia Beach, Virginia, 1 January 1966 – 31 December 1966	1967	Reviewed; no relevant information.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	History of the Naval Air Station Oceana, Virginia Beach, Virginia, 1 January 1967 – 1 January 1968	1968	There was an air crash aboard the Station on October 25, 1967. There was no direct mention of AFFF.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	Twenty Eight Years, Complete Naval Air Station Oceana History	1968, Oct	The history of Oceana from 1940-1968. Reviewed; no relevant information.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1968 History for Naval Air Station Oceana	1969, Feb	Documentation of a pilot program to introduce a new fire fighting technique by equipping search and rescue helicopters with fire extinguishing gear to be used while hovering over a fire.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	History of the Naval Air Station Oceana, Virginia Beach, Virginia, 1 January 1969 – 31 December 1969	1970	Documents summarizing various aircraft crashes. All of the documents have no direct mention of AFFF.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	History of the Naval Air Station Oceana, 1 January 1970 – 31 December 1970	1971	Documentation of a forest fire and plane crash.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	History of the Naval Air Station Oceana, 1 January 1972 – 31 December 1972	1973	Documentation of various plane crashes.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1974 Command History (Report OPNAV 5750-1)	1975, Apr	1974 Command History.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1976 Command History (Report OPNAV 5750-1)	1977, Mar	1976 Command History.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	Command History (Report OPNAV 5750-1), History of the Naval Air Station Oceana, 1 January 1977 – 31 December 1977	1978	Two paint storage sheds were completed in the vicinity of hangars 122 and 200.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	Command History (Report OPNAV 5750-1) , History of the Naval Air Station Oceana, 1 January 1978 – 31 December 1978	1979	Reviewed; no relevant information.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1979 Command History (Report OPNAV 5750-1)	1980, Apr	1979 Command History.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	NAS Oceana 1983 Command History	1984	Reviewed; no relevant information.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	Submission of NAS Oceana 1985 Command History	1986	Documentation of various fires, firefighting training, and aircraft fires.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	NAS Oceana 1988 Command History Report	1989	Documentation of firefighting training and emergency response.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1977 Command History (Report OPNAV 5750-1)	1978, Mar	1977 Command History (with missing pages), documenting : "An aircraft wash facility was started in late September 1977 to provide pollution abatement provisions to an older aircraft wash facility."
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1984 Command History (Report OPNAV 5750-1)	1985, Feb	Reviewed; no relevant information.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1986 Command History (Report OPNAV 5750-1)	2987, Apr	1986 Command History.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1987 Command History (Report OPNAV 5750-1)	1988, Jul	1987 Command History.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1989 Command History (Report OPNAV 5750-1)	1990, May	1989 Command History.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1990 Command History (Report OPNAV 5750-1)	1991, Aug	1990 Command History.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1991 Command History (Report OPNAV 5750-1)	1993, Jan	1991 Command History.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1992 Command History (Report OPNAV 5750-1)	1993, Apr	1992 Command History.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1992 Command History (Report OPNAV 5750-1)	1993, Apr	Reviewed; no relevant information.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1993 Command History (Report OPNAV 5750-1)	1984, Mar	1993 Command History.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1994 Command History (Report OPNAV 5750-1)	1995, Feb	1994 Command History, discussing emergency response, firefighting training, spill response and cleanup, and testing equipment with spill containment.

Document Type	From	To	Document Name/Regarding	Date	Description
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1995 Command History (Report OPNAV 5750-1)	1996, Mar	1995 Command History (with missing pages), discussing fire response and aircraft related emergencies and AFFF pollution prevention.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1996 Command History (Report OPNAV 5750-1)	1997, Mar	1996 Command History (with missing pages), including information that "Two car wash stalls were added to the original four at the Automotive Hobby Shop in March." It also discusses emergency response, aircraft crashes, and firefighting training.
Command Operation Report/Command Heritage Report	Commander, NAS Oceana	Director of Naval History, Washington Navy Yard	1997 Command History (Report OPNAV 5750-1)	1998, Mar	1997 Command History (with missing pages), discussing fire response, AFFF violations, and a study to determine toxicity of AFFF.

Notes:
AFFF = aqueous film-forming foam
BMP = best management practice
CBU = Construction Battalion Unit
CFR = code of federal regulation
CNN = Cable News Network
CNRMA = Commander, Navy Region, Mid-Atlantic
COMNAVBASE = Commander, Naval Base
DCR = Department of Conservation and Recreation
DGBE = Diethylene Glycol Butyl Ether
EDAW, Inc. = Eckbo, Dean, Austin, and Williams, Incorporated
EPCRA = Emergency Planning and Community Right-to-Know Act
F&R = Froehling & Robertson
FCTC = Fleet Combat Training Center
FFA = Federal Facilities Agreement
FFTR = Fire Fighting Training Ring

FY = fiscal year
HRSD = Hampton Roads Sanitation District
HW = hazardous waste
HWAA = hazardous waste accumulation area
lbs = pounds
MBAS = Methylene Blue Active Substances
MWR = Morale, Welfare, and Recreation
NA = not applicable
NASO = Naval Air Station Oceana
NAVFAC = Naval Facilities Engineering Command
NCDEM = North Caroline Department of Environmental Management
NFESC = Naval Facilities Engineering Service Center
NPDES = Nation Pollutant Discharge Elimination System
OWS = oil-water separator
PFOA = perfluorooctanoic acid

POC = point of contact
psia = pounds per square inch
PWC = Public Works Center
RCRA = Resource Conservation and Recovery Act
RFI = RCRA Facility Investigation
SAA = satellite accumulation area
SOP = Standard Operating Procedure
USEPA = United States Environmental Protection Agency
VDEM = Virginia Department of Emergency Management
VDH = Virginia Department of Health
VHWMR = Virginia Hazardous Waste Management Regulations
VMRC = Virginia Marine Resources Commission
VPDES = Virginia Pollutant Dishcharge Elimination System
WWII = World War II
WWTP = wastewater treatment plant

Appendix C

Interview Record



***Final
Preliminary Assessment for
Per- and Polyfluoroalkyl Substances
Naval Air Station Oceana
Virginia Beach, Virginia***

**NOTIFICATION: APPENDIX C CONTAINS SENSITIVE BUT UNCLASSIFIED
INFORMATION WHICH IS PROTECTED BY THE FREEDOM OF INFORMATION ACT**

***FOIA Exemption 6 (5 USC 552(b)(6))
Personal Information Affecting an Individual's Privacy***

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Appendix D



Photo Documentation



Facility 3007

Comment:
Propane tank

Legend

-  FieldObservationPoint
-  Structures







Facility 3007

Comment:
Observation structure

Legend

-  FieldObservationPoint
-  Structures



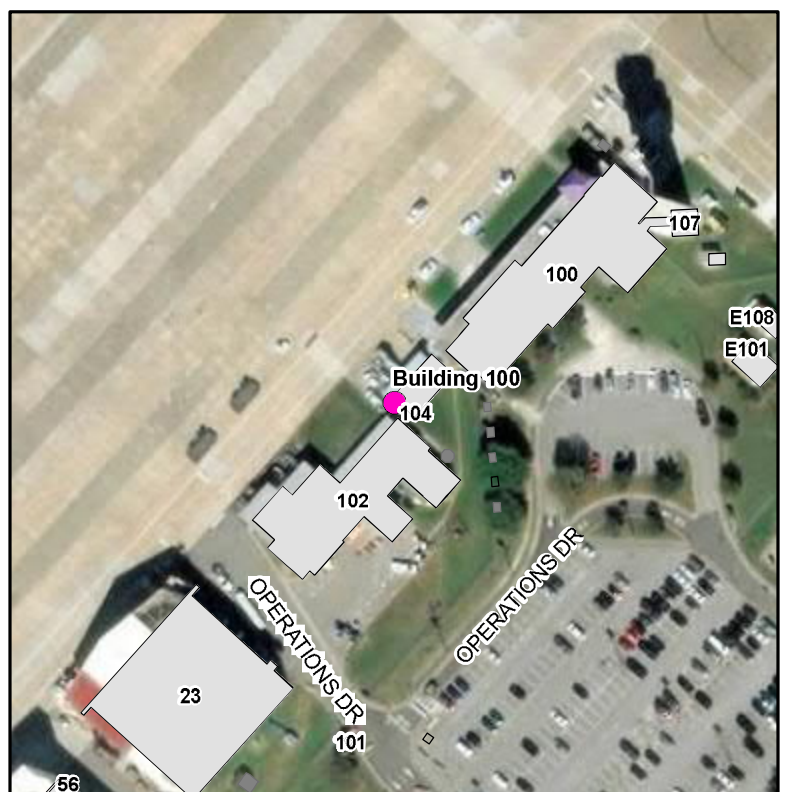


Building 100

Comment:
Idle fire truck near building

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



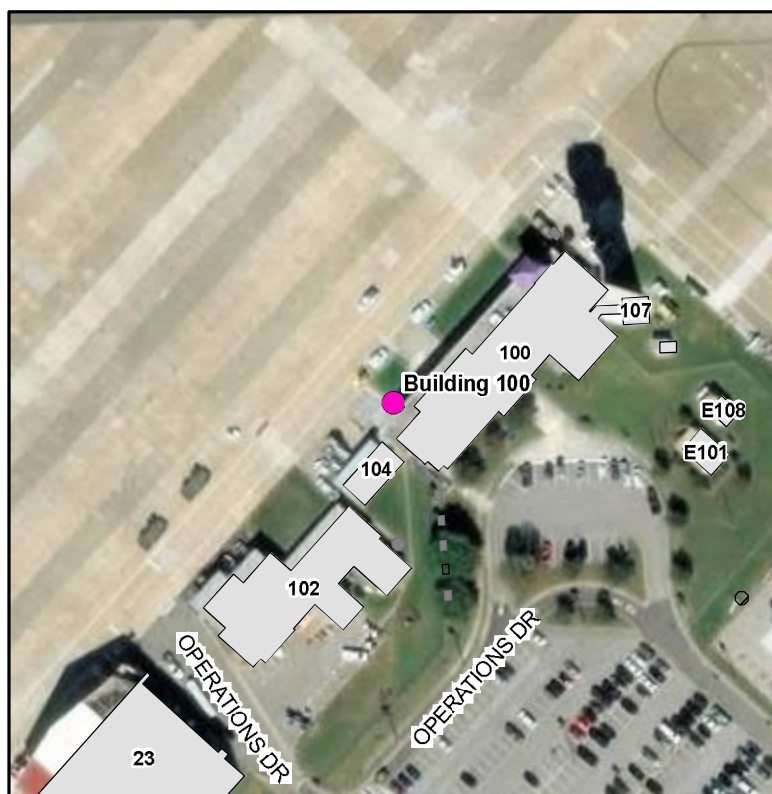


Building 100

Comment:
Exterior of building

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



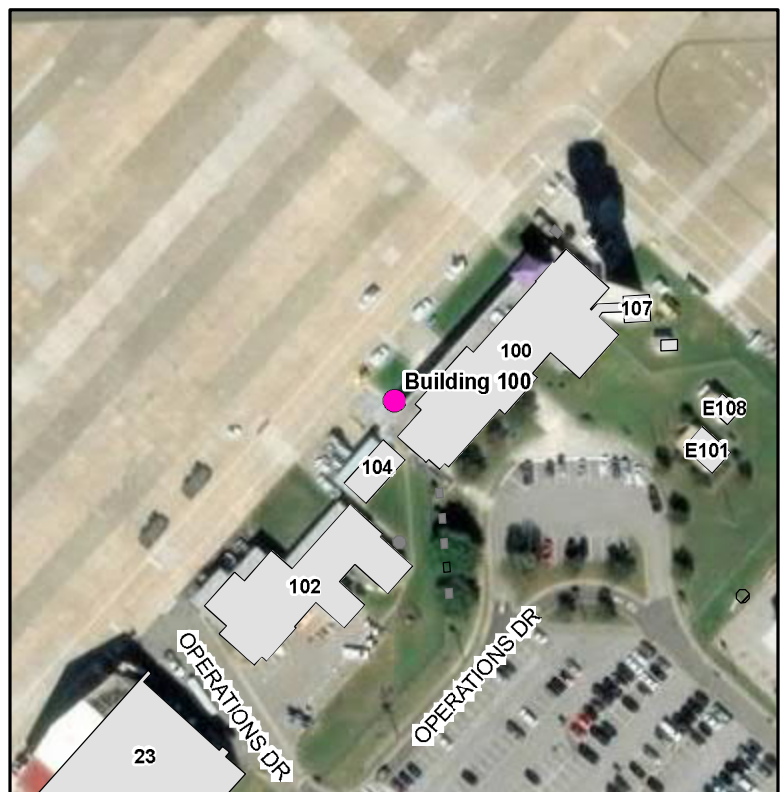


Building 100

Comment:
Exterior of building

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



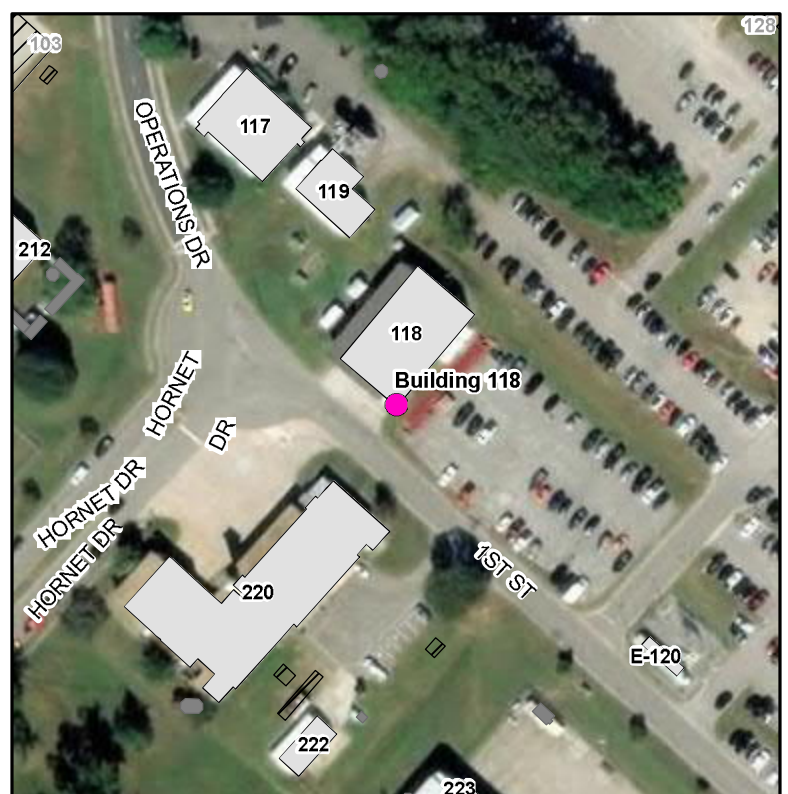


Building 118

Comment:
Fire extinguishers

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings







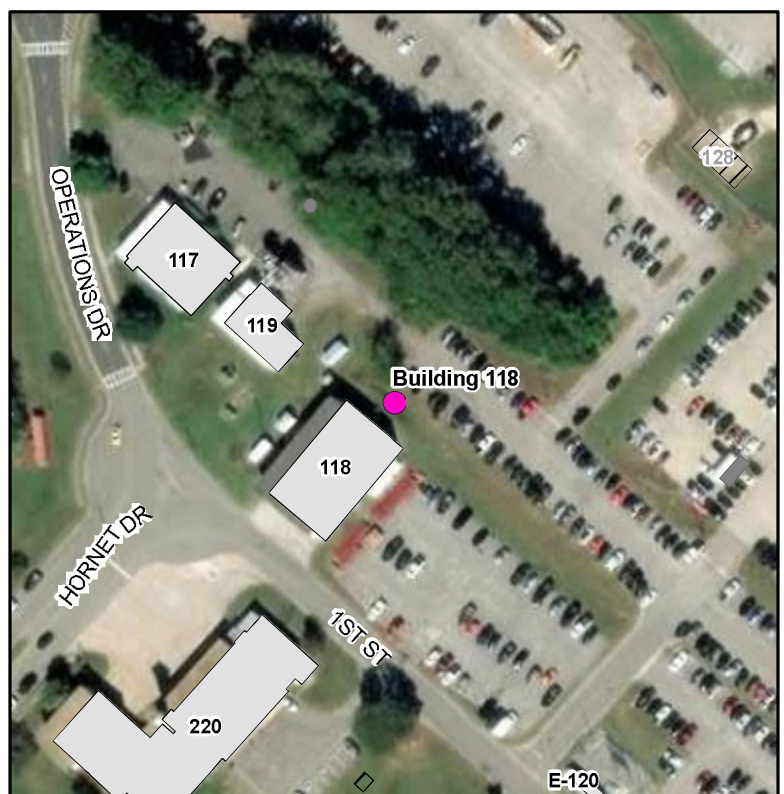


Building 118

Comment:
Standing water

Legend

-  FieldObservationPoint
-  Buildings
-  Structures
-  DemolishedBuildings



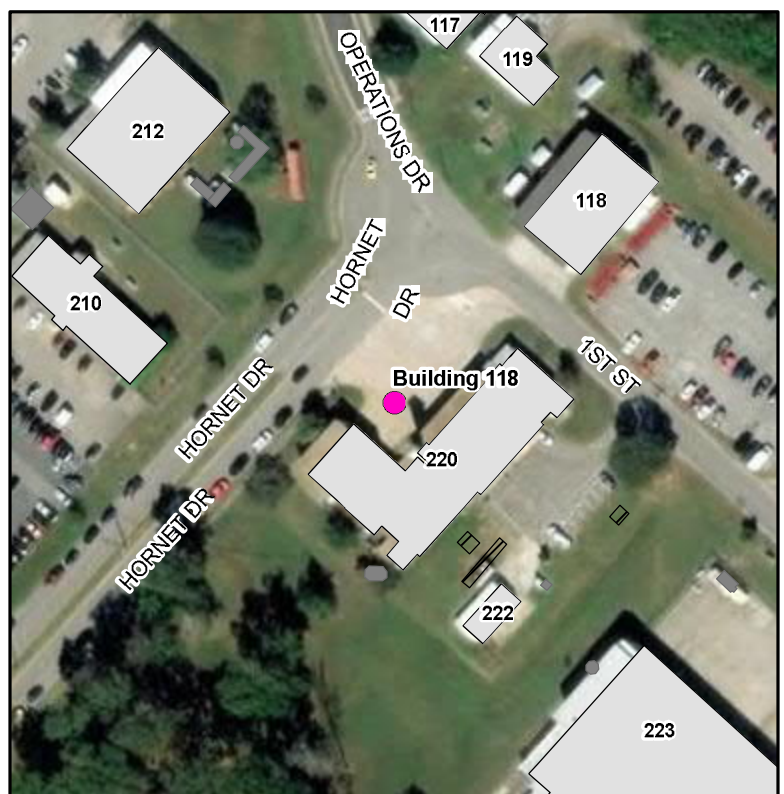


Building 118

Comment:
Wash area for fire trucks

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



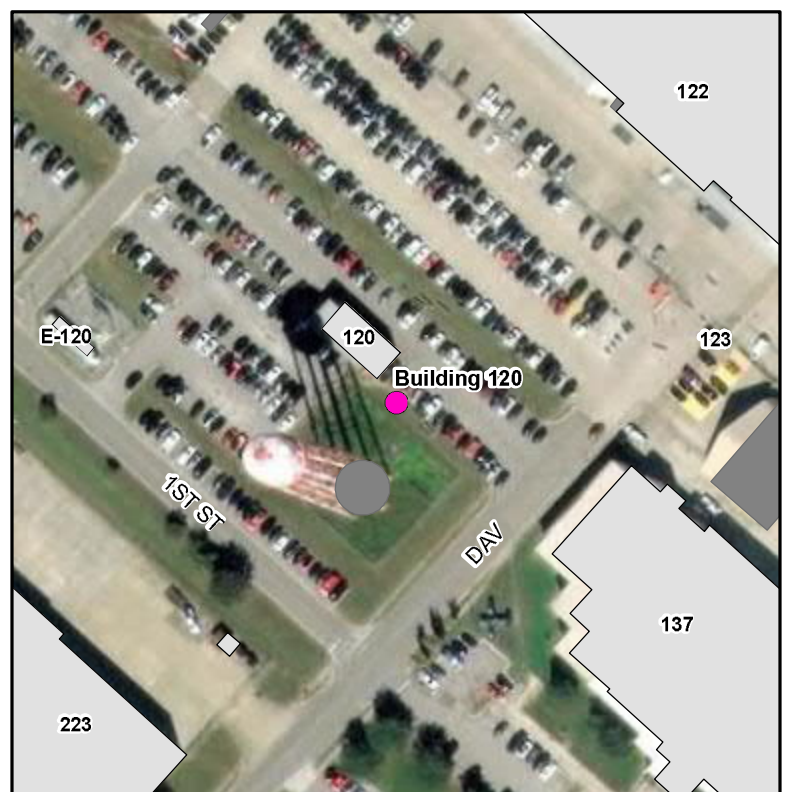


Building 120

Comment:
Storm inlet

Legend

- FieldObservationPoint
- Buildings
- Structures



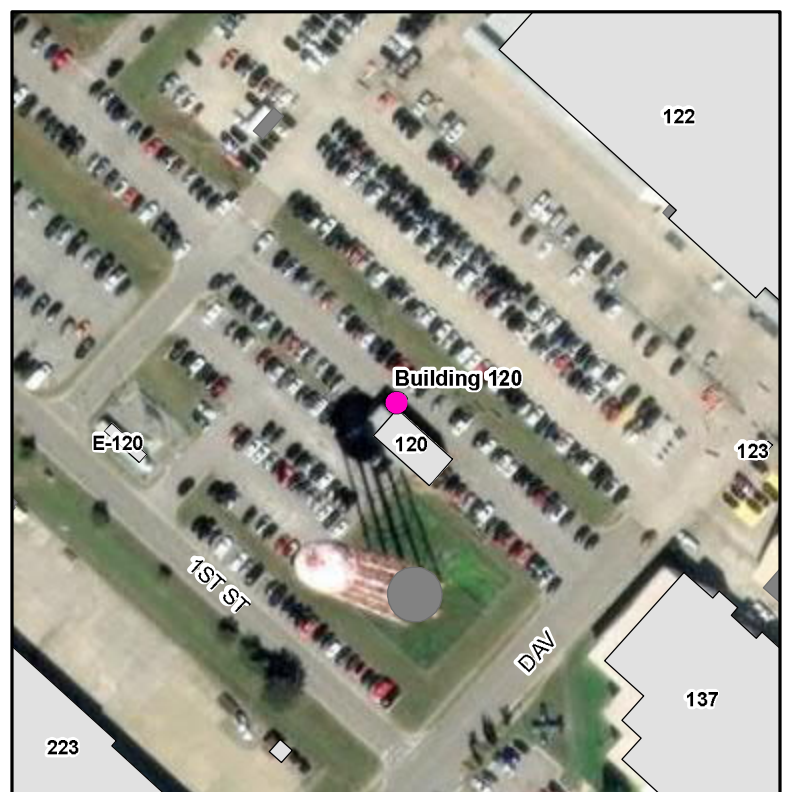


Building 120

Comment:
Valves outside of building (facing southwest)

Legend

- FieldObservationPoint
- Buildings
- Structures



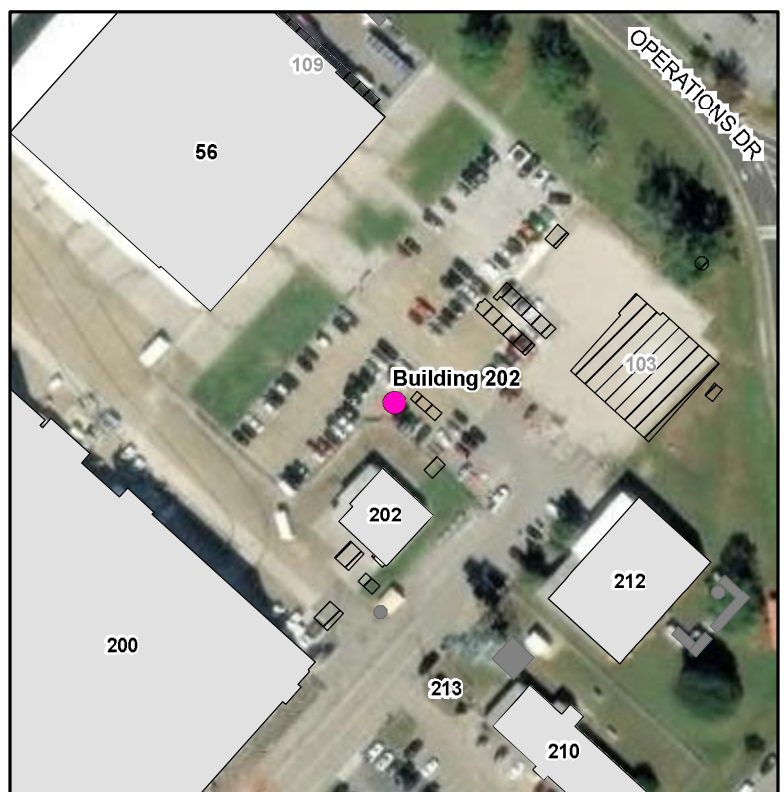


Building 202

Comment:
Exterior of building

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



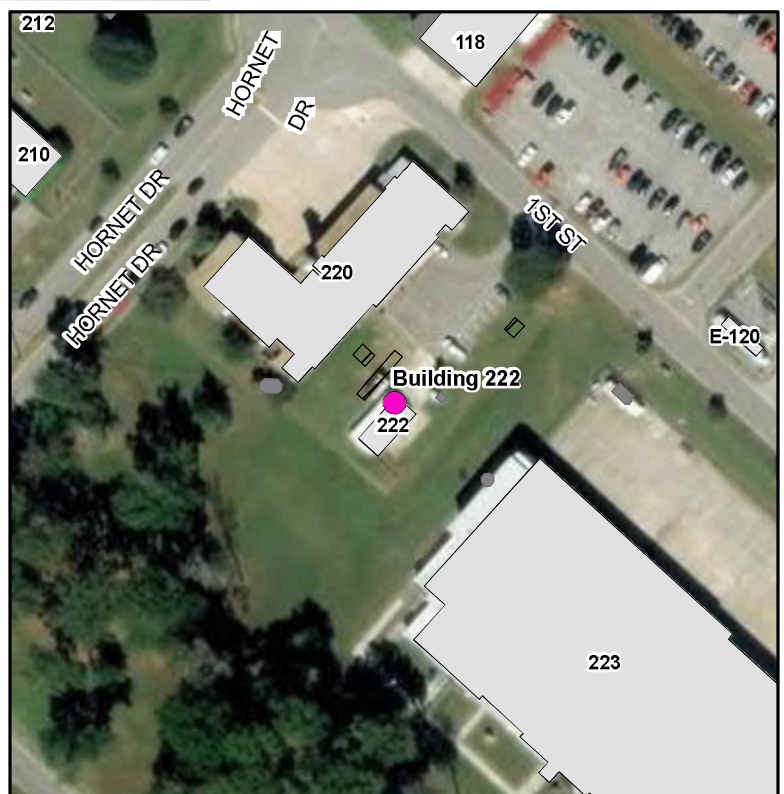


Building 222

Comment:
Door to building

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



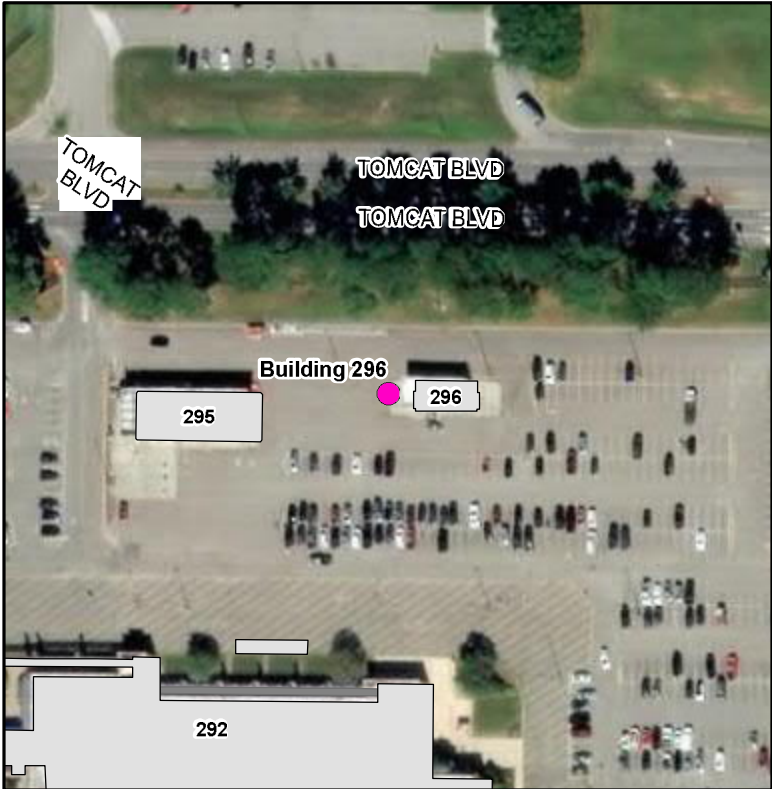


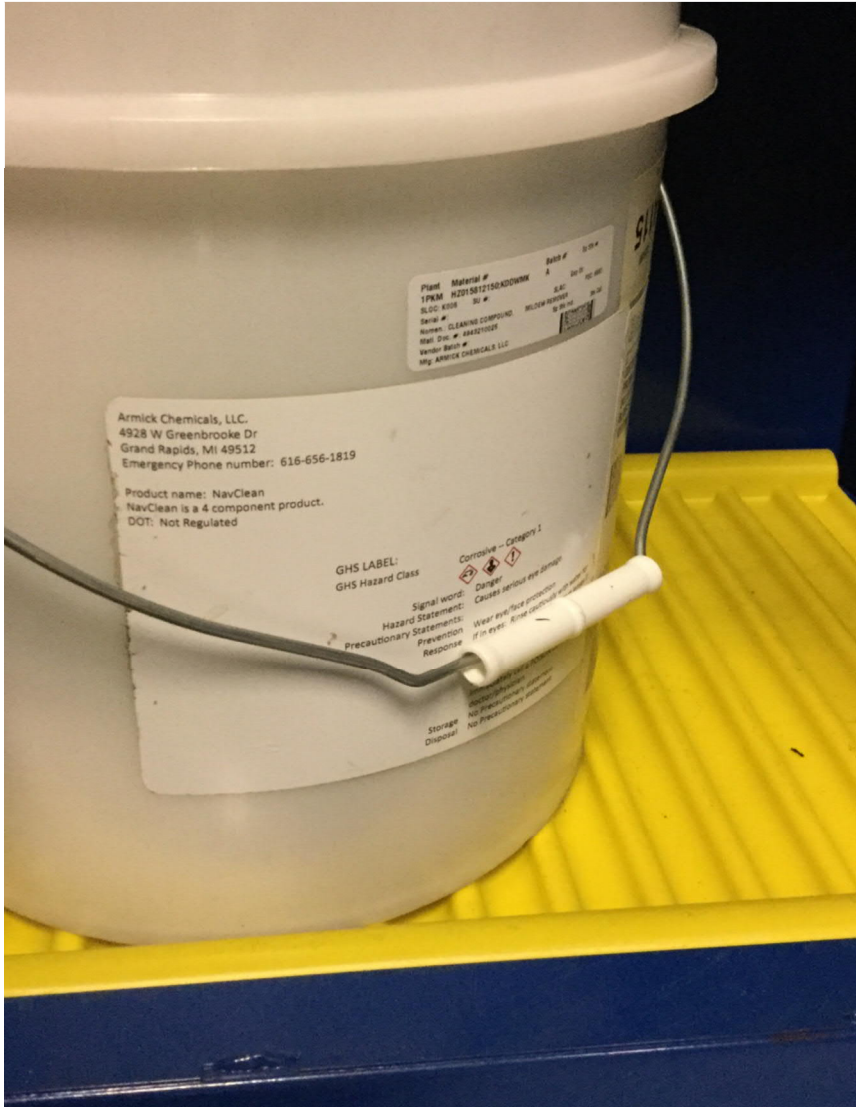
Building 296

Comment:
Car wash sign

Legend

- FieldObservationPoint
- Buildings



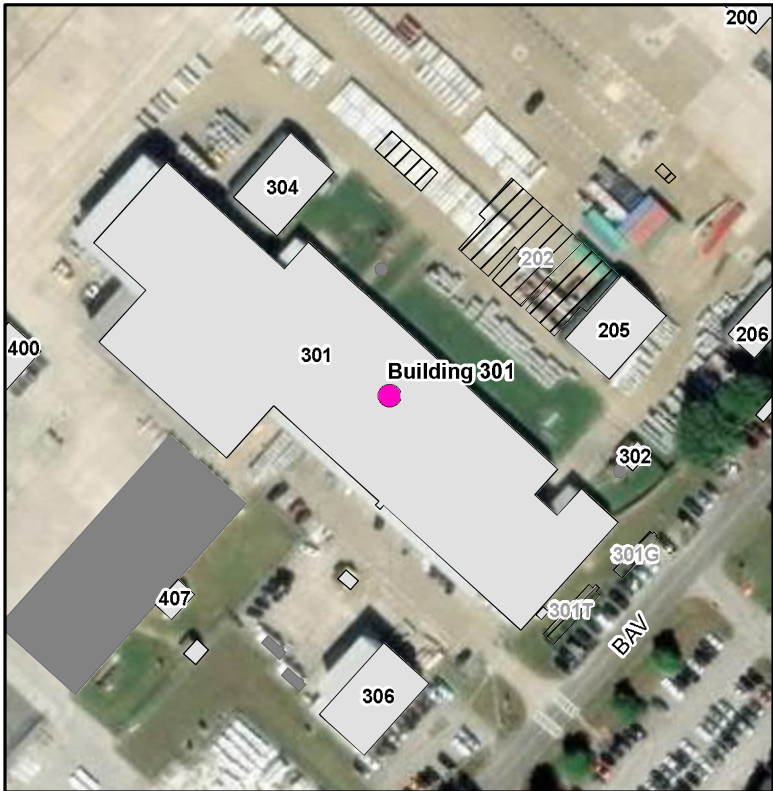


Building 301

Comment:
Hazmat locker contents

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings







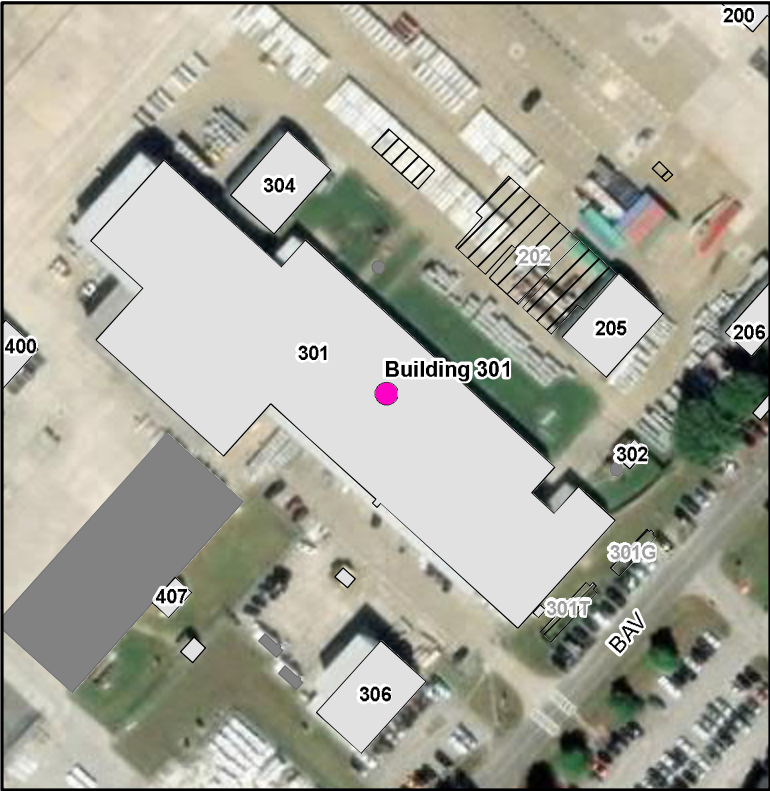


Building 301

Comment:
Hazmat locker contents

Legend

-  FieldObservationPoint
-  Buildings
-  Structures
-  DemolishedBuildings



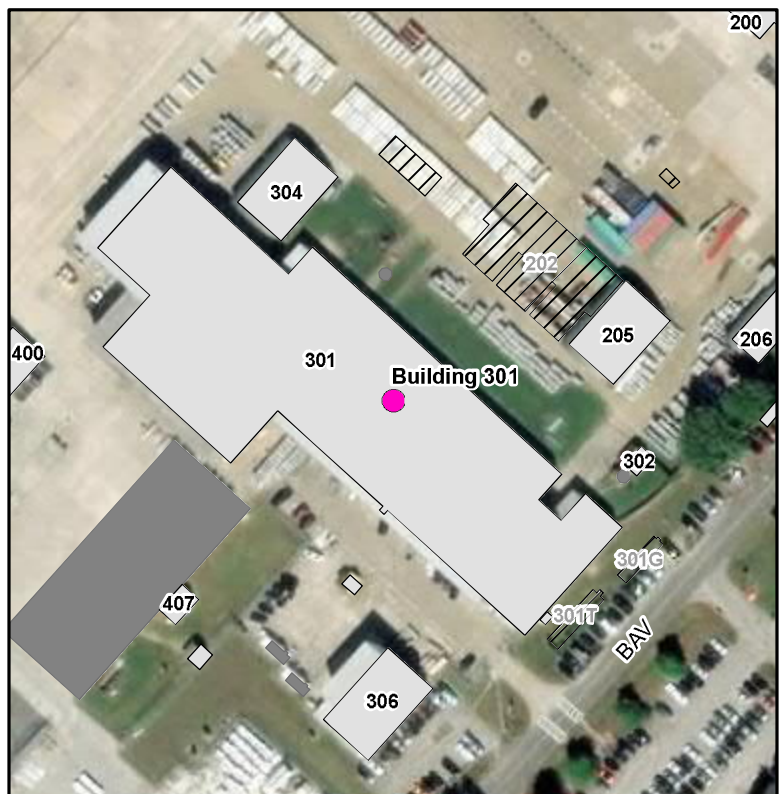


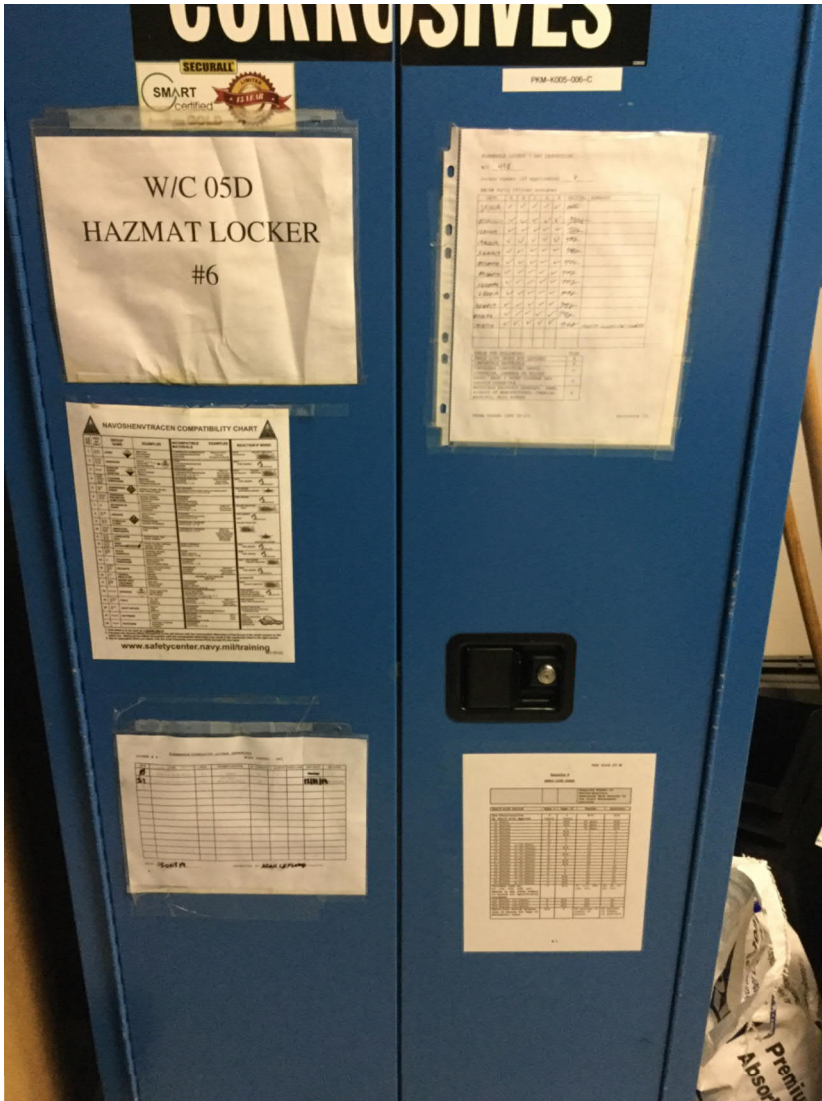
Building 301

Comment:
Hazmat locker

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings







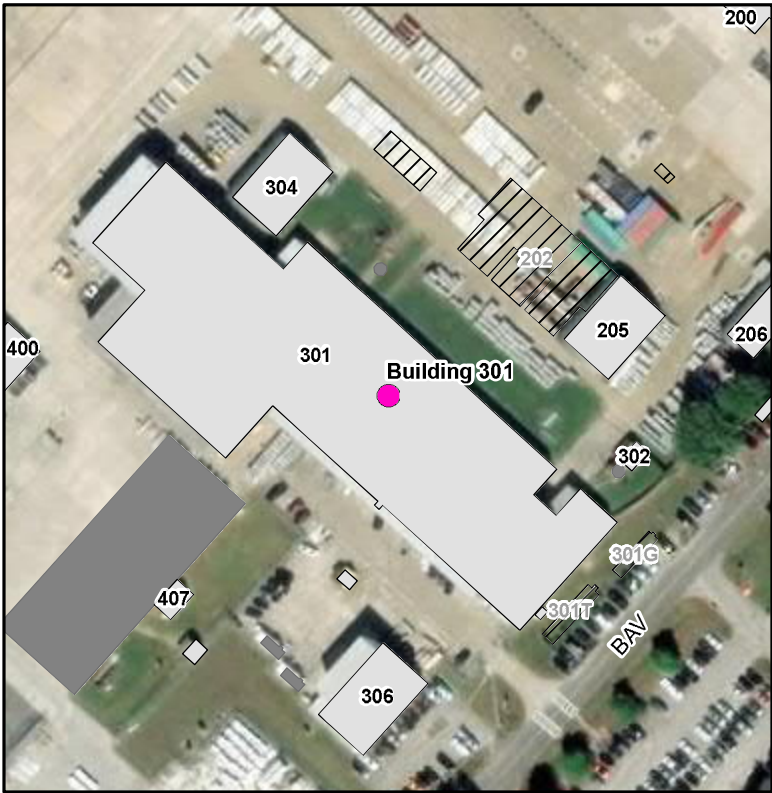


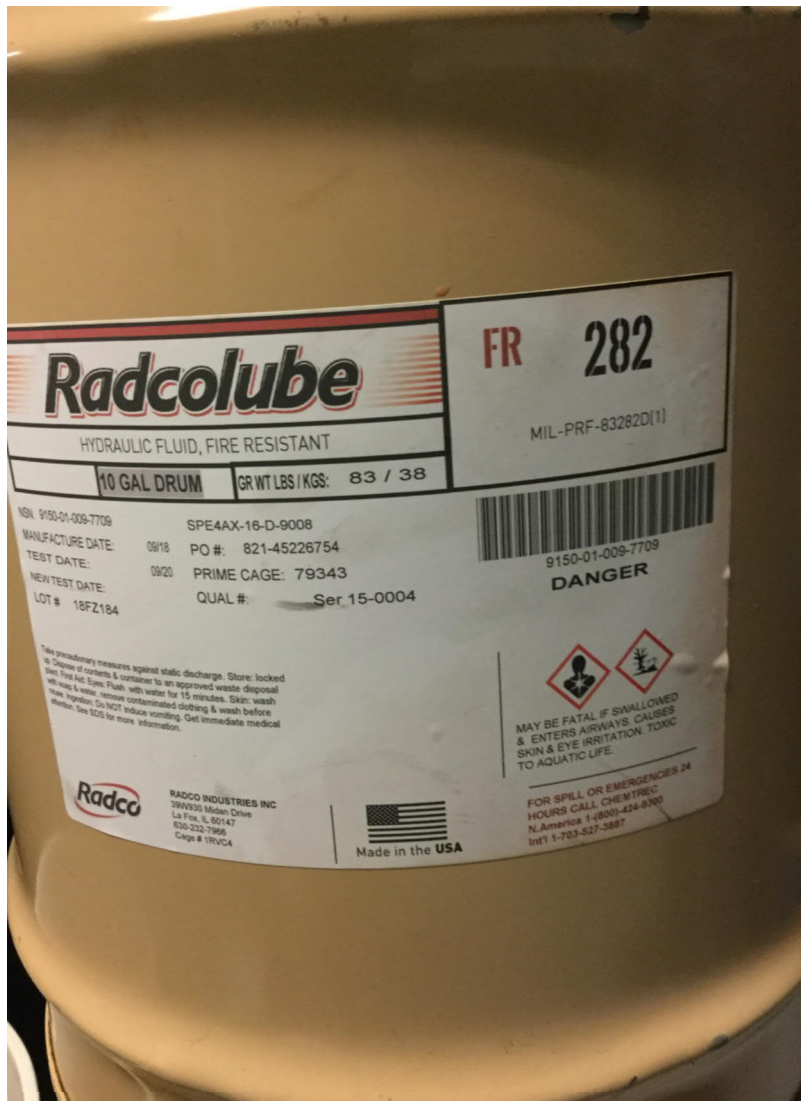
Building 301

Comment:
Hazmat locker

Legend

-  FieldObservationPoint
-  Buildings
-  Structures
-  DemolishedBuildings







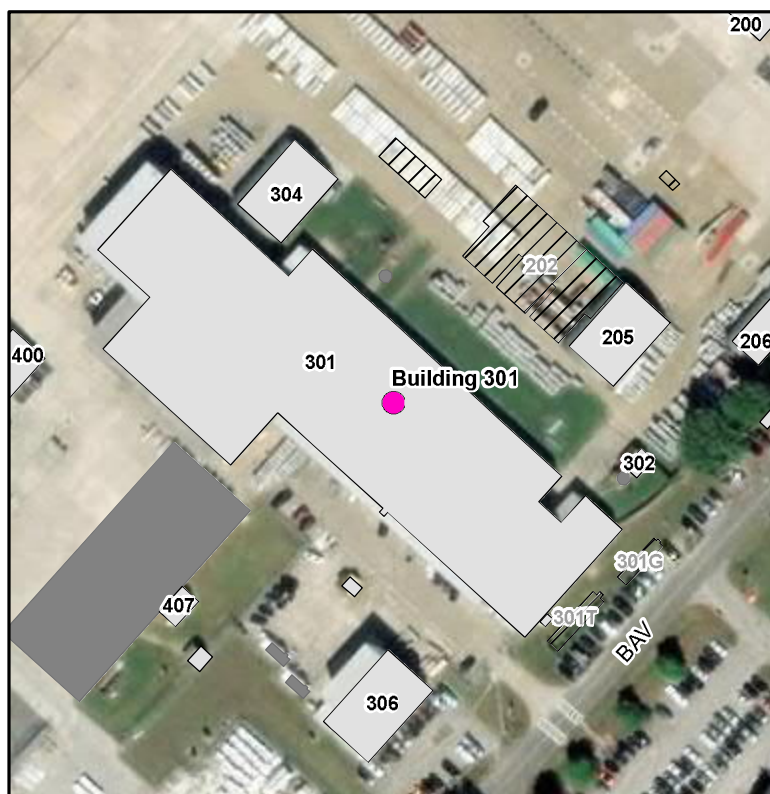


Building 301

Comment:
Hazmat locker contents

Legend

-  FieldObservationPoint
-  Buildings
-  Structures
-  DemolishedBuildings



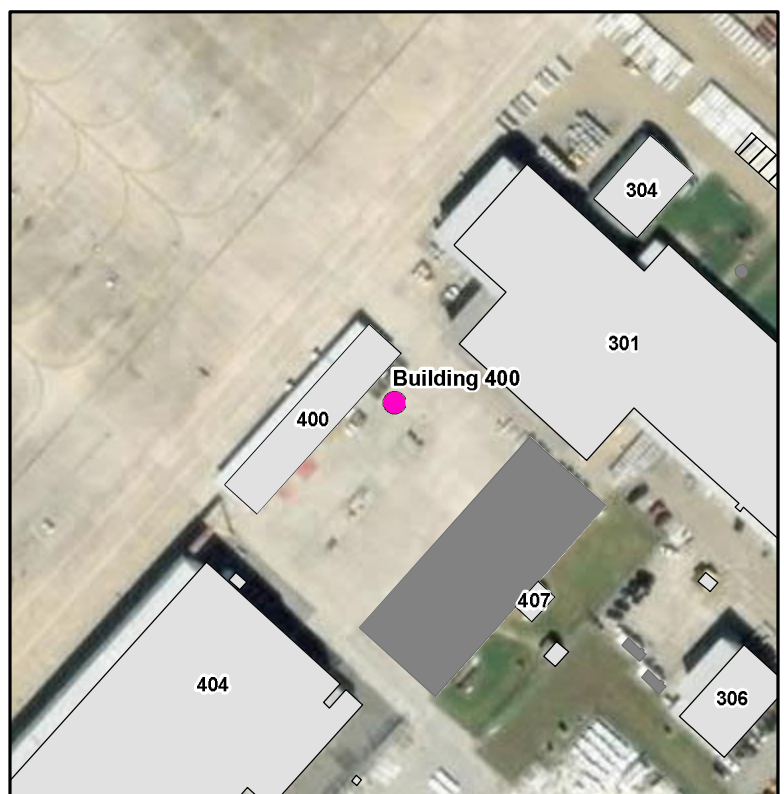


Building 400

Comment:
Exterior of building

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings





Building 404C

Comment:
Contact information

Legend

- FieldObservationPoint
- Buildings
- Structures



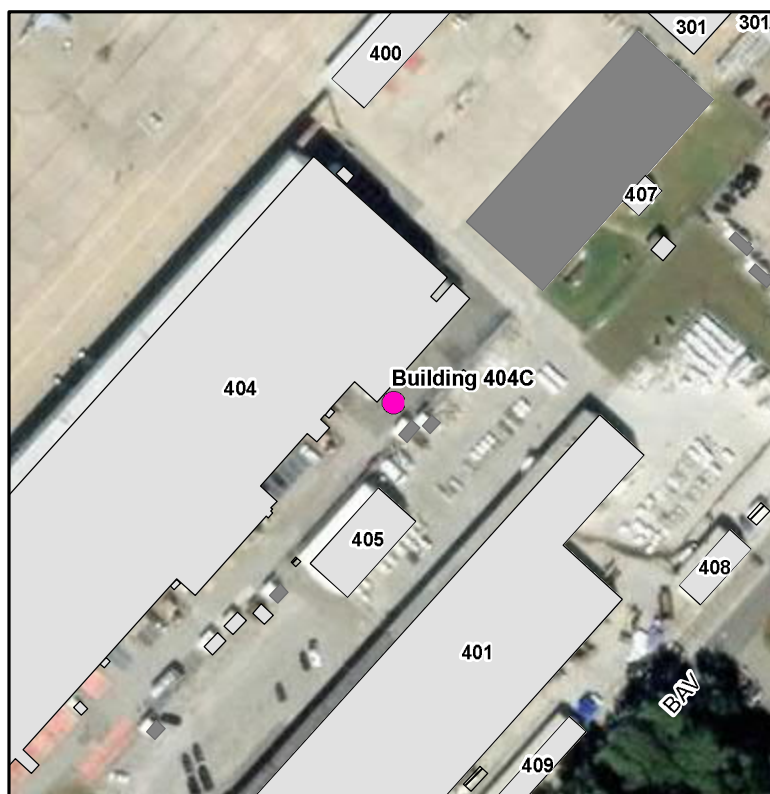


Building 404C

Comment:
Exterior of building

Legend

- FieldObservationPoint
- Buildings
- Structures





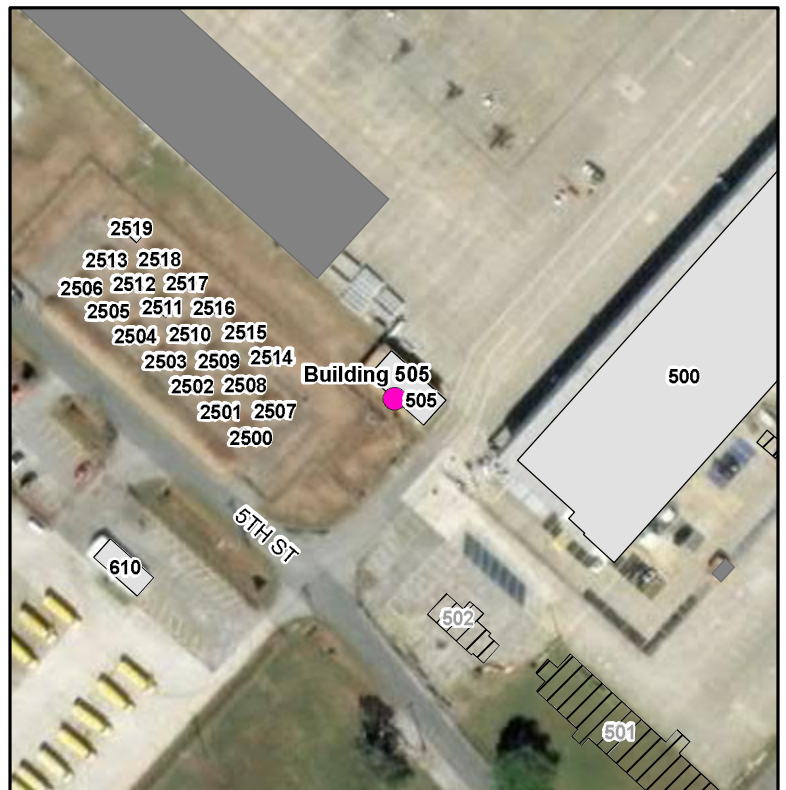
Building 505

Comment:

Exterior of building

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



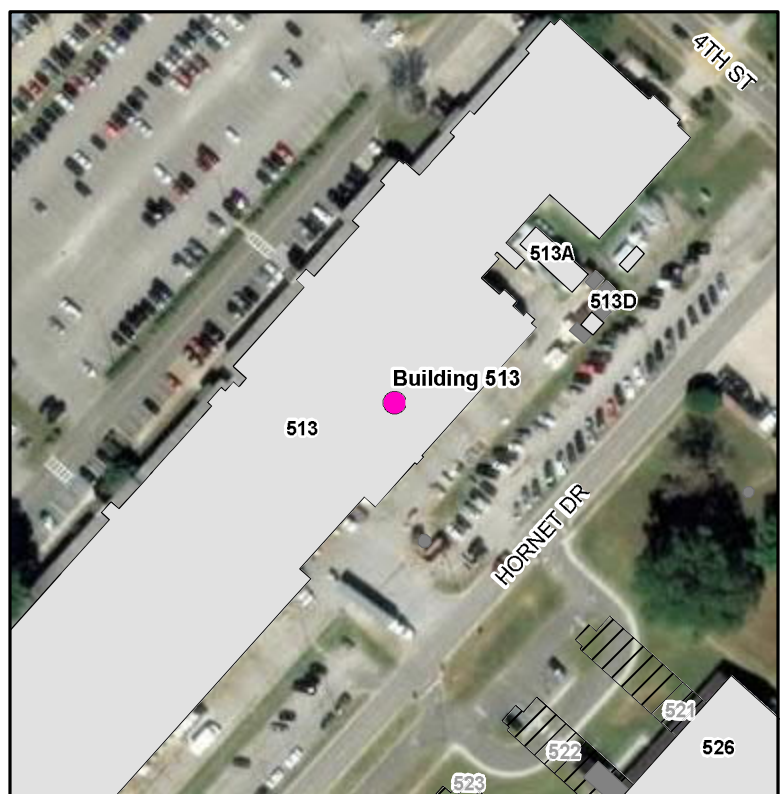


Building 513

Comment:
Paint storage

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings







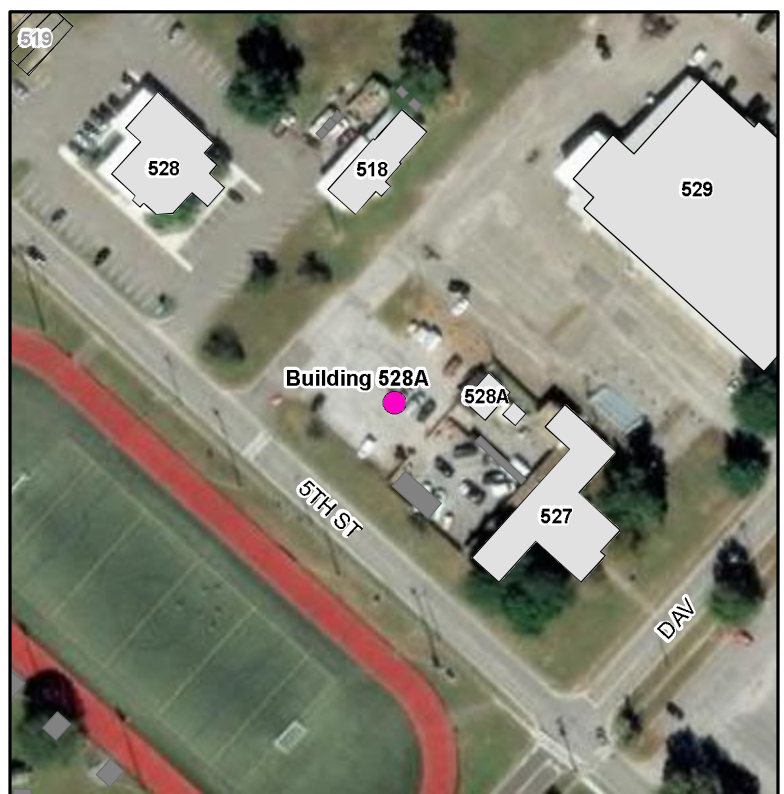


Building 528A

Comment:
Exterior of building

Legend

-  FieldObservationPoint
-  Buildings
-  Structures
-  DemolishedBuildings



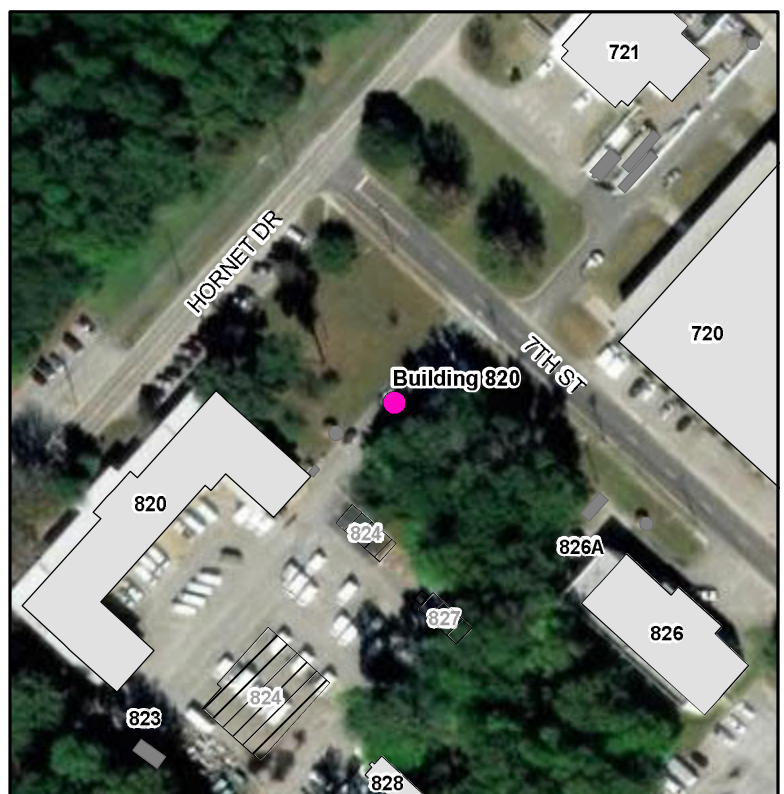


Building 820

Comment:
Exterior of building

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



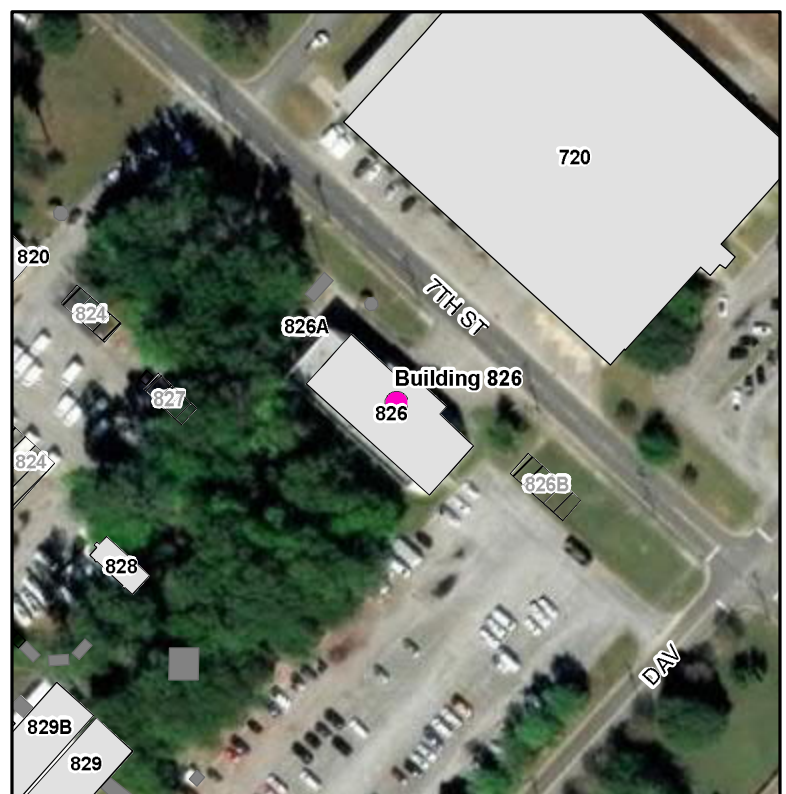


Building 826

Comment:
Fire suppression system

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings





Building 826

Comment:
Fire suppression system piping

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings





Building 826

Comment:
Fire suppression system

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



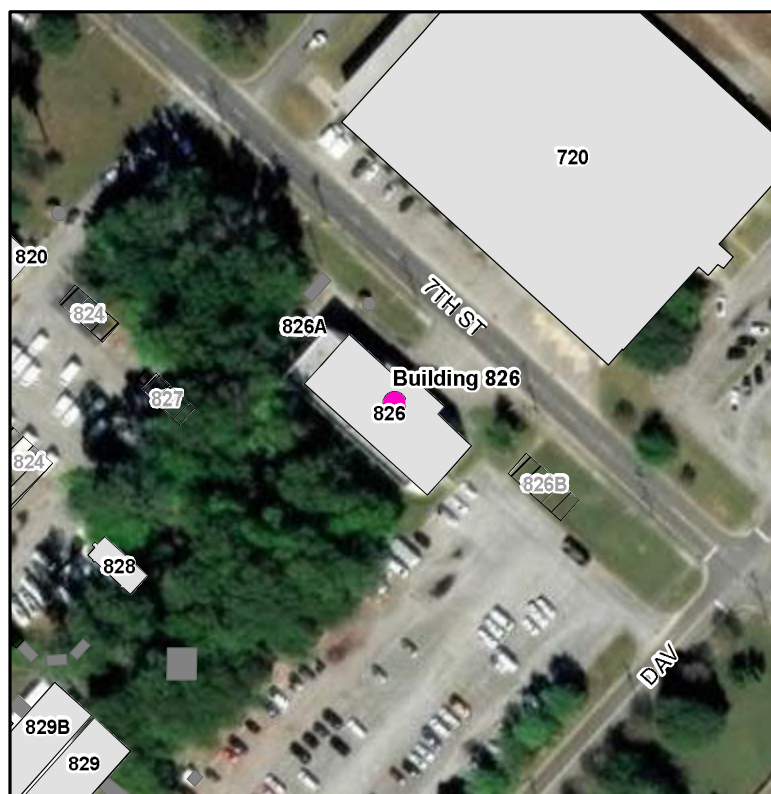


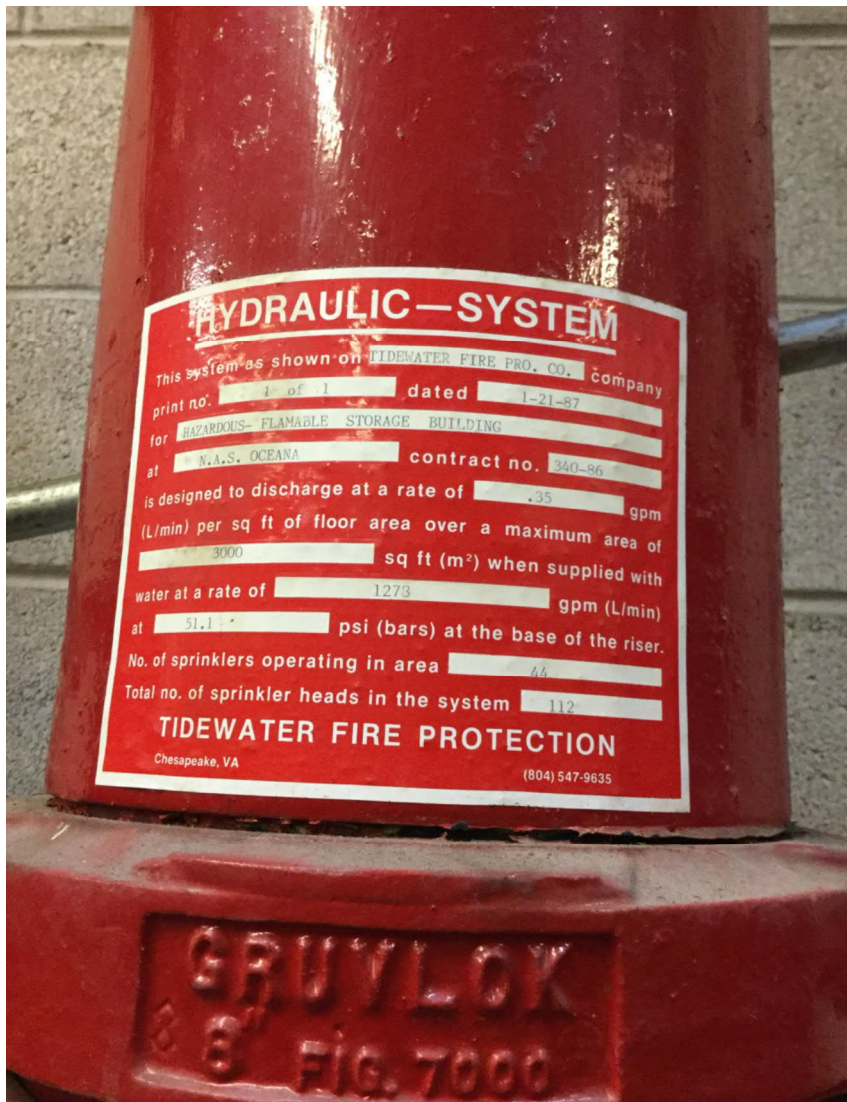
Building 826

Comment:
Fire suppression system

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings





Building 826

Comment:
Fire suppression system

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



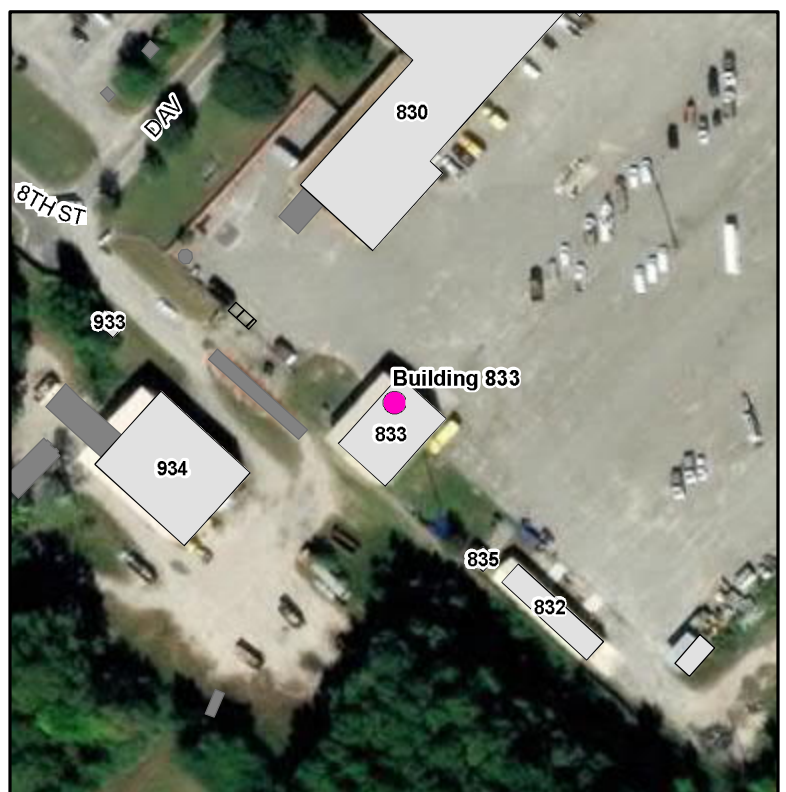


Building 833

Comment:
Tanker inside buidling

Legend

- FieldObservationPoint
- Buildings
- Structures



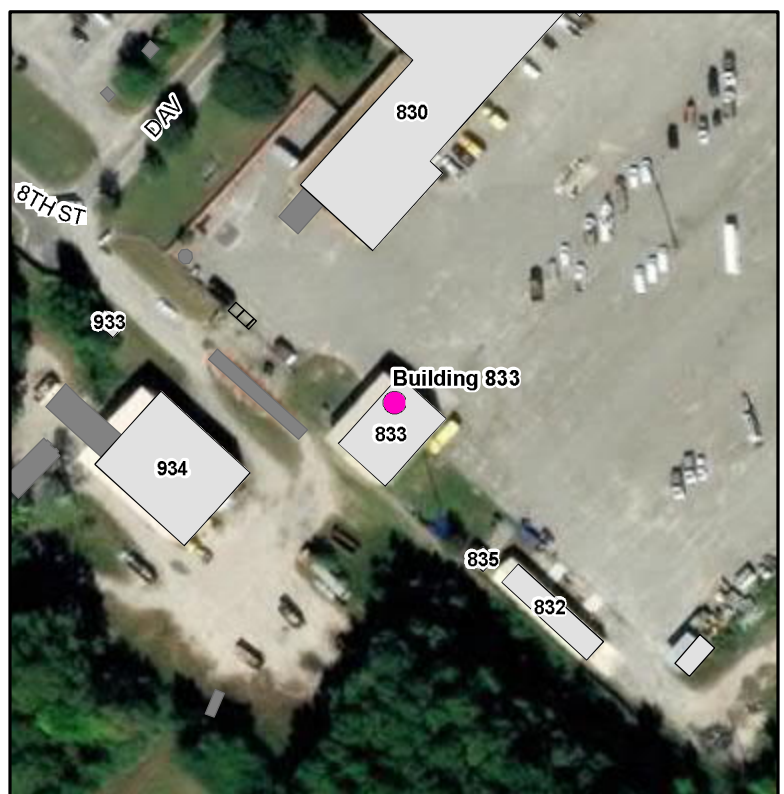


Building 833

Comment:
Floor drains inside buidling

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings





Building 844

Comment:
Interior of building

Legend

- FieldObservationPoint
- Buildings
- DemolishedBuildings





Building 844

Comment:
Interior of building



Legend

- FieldObservationPoint
- Buildings
- DemolishedBuildings



Building 844

Comment:
Interior of building



Legend






- FieldObservationPoint
- Buildings
- DemolishedBuildings



Building 900

Comment:
Exterior of Building

Legend

-  FieldObservationPoint
-  WaterCourseLine
-  Buildings
-  Structures
-  DemolishedBuildings





Building 900

Comment:
Exterior of Building

Legend

- FieldObservationPoint
- WaterCourseLine
- Buildings
- Structures
- ▨ DemolishedBuildings








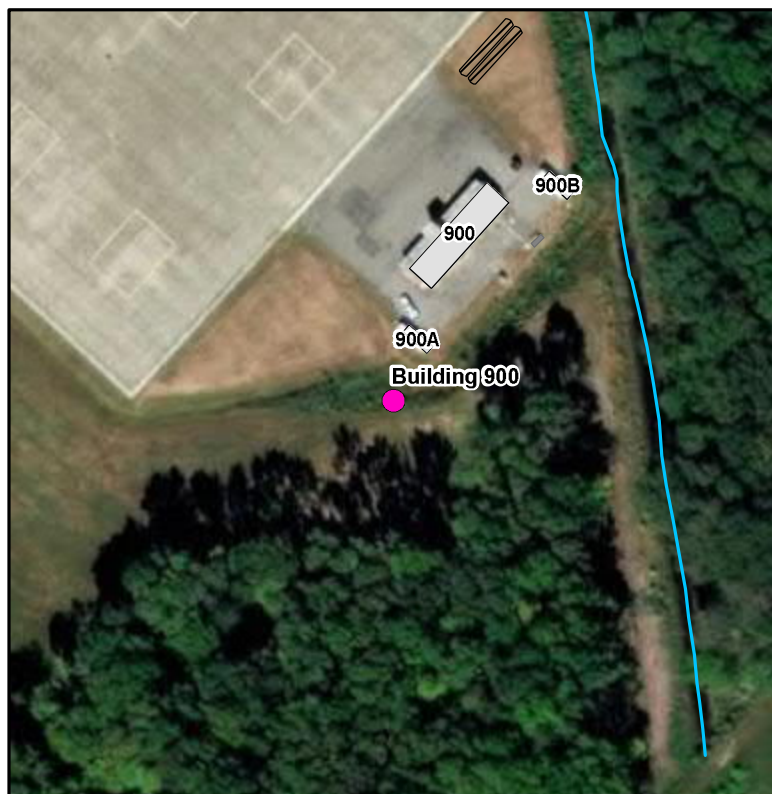


Building 900

Comment:
Drainage ditch (facing east)

Legend

-  FieldObservationPoint
-  WaterCourseLine
-  Buildings
-  Structures
-  DemolishedBuildings









Building 932

Comment:
Standing water

Legend

-  FieldObservationPoint
-  Buildings
-  Structures
-  DemolishedBuildings






Building 1100

Comment:
Entrance to building

Legend

-  FieldObservationPoint
-  Buildings





Building 1100

Comment:
Pump room

Legend

- FieldObservationPoint
- Buildings
- Structures





Building 1112

Comment:
Entrance to building

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



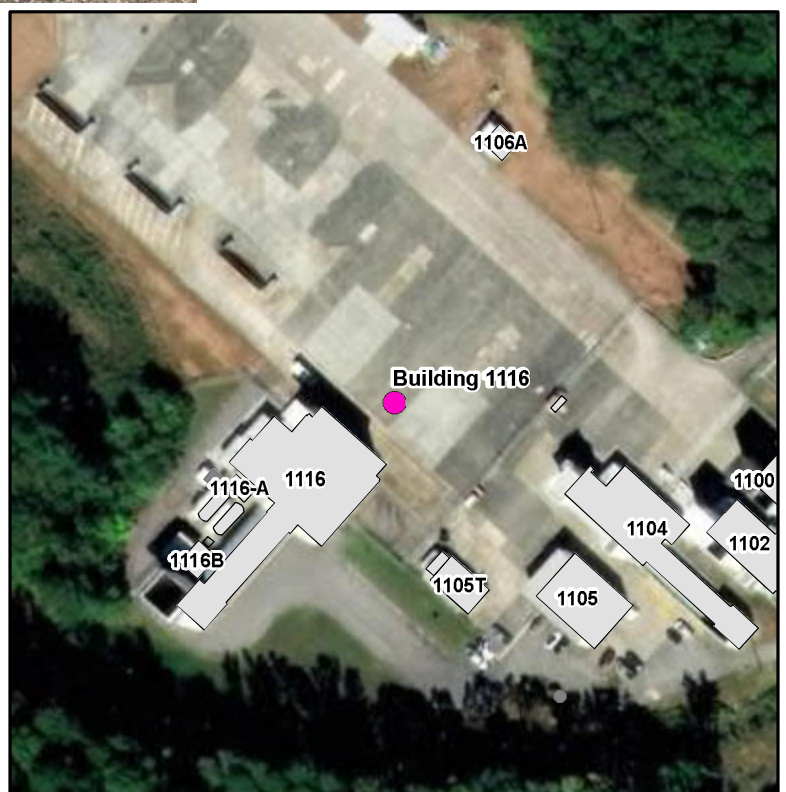


Building 1116

Comment:
Exterior of building

Legend

-  FieldObservationPoint
-  Buildings





Building 1116

Comment:
AFFF system leak residue

Legend

- FieldObservationPoint
- Buildings
- Structures



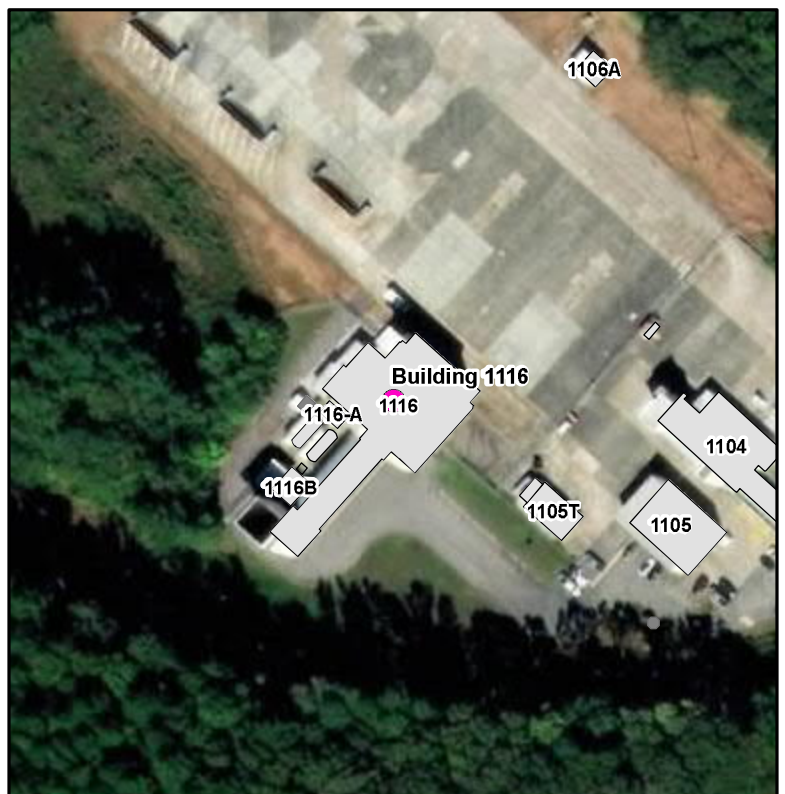


Building 1116

Comment:
AFFF system leak residue

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings





Building 1116

Comment:
Interior of building

Legend

- FieldObservationPoint
- Buildings



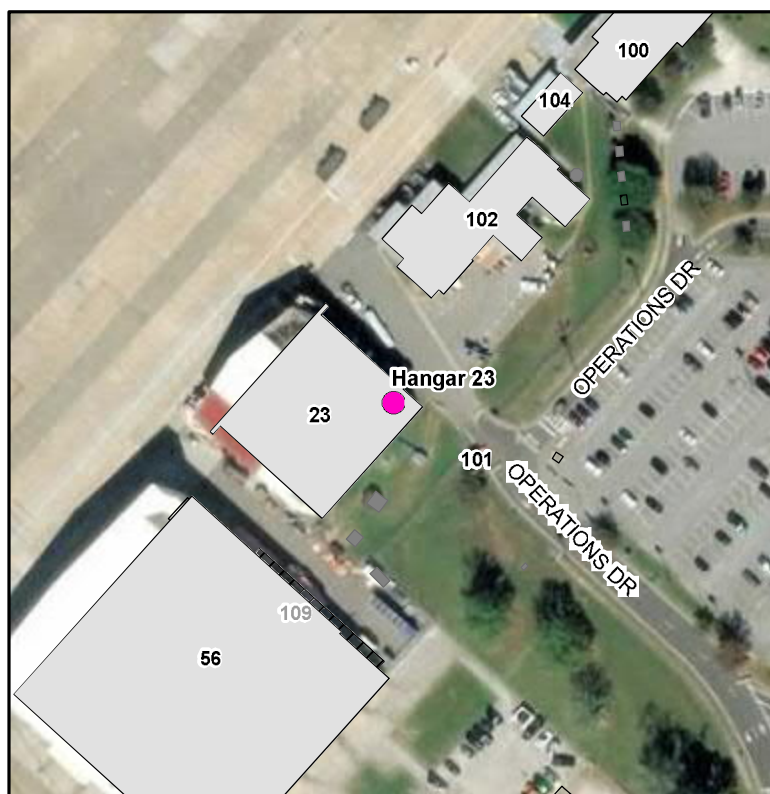


Hangar 23

Comment:
Fire suppression system

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



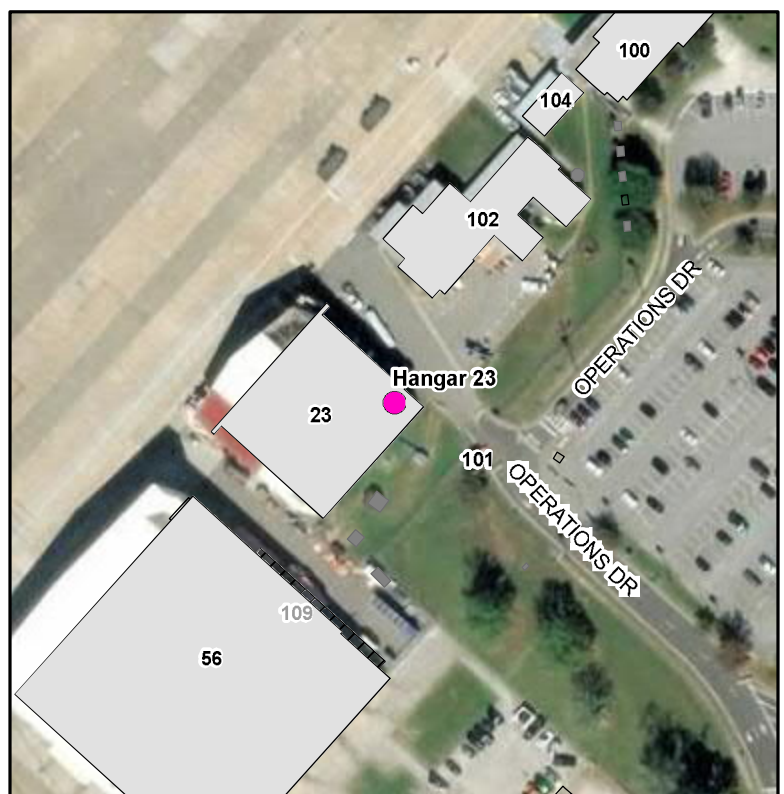


Hangar 23

Comment:
Fire suppression system

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



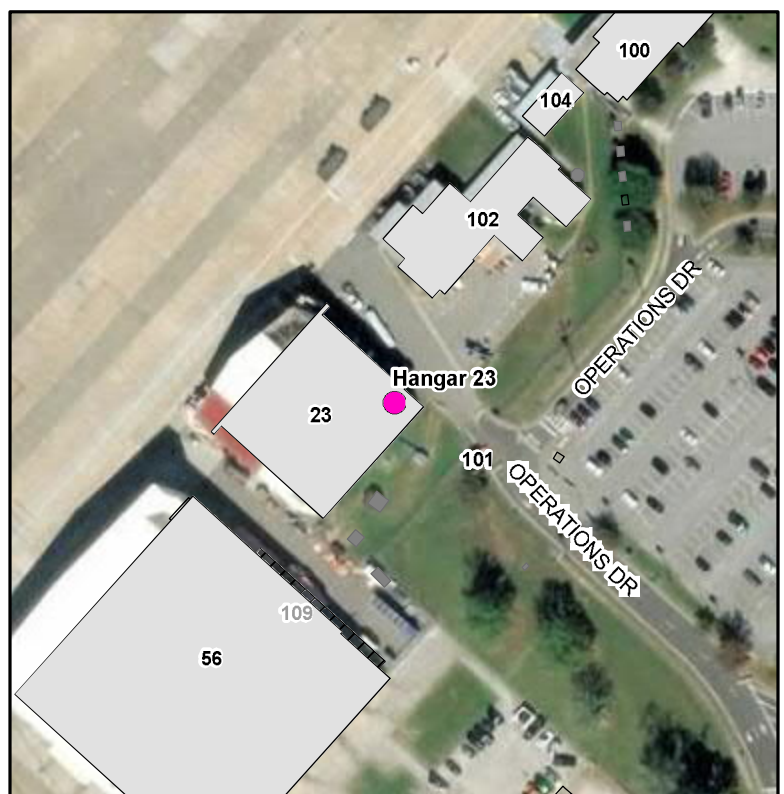


Hangar 23

Comment:
Fire suppression system

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings



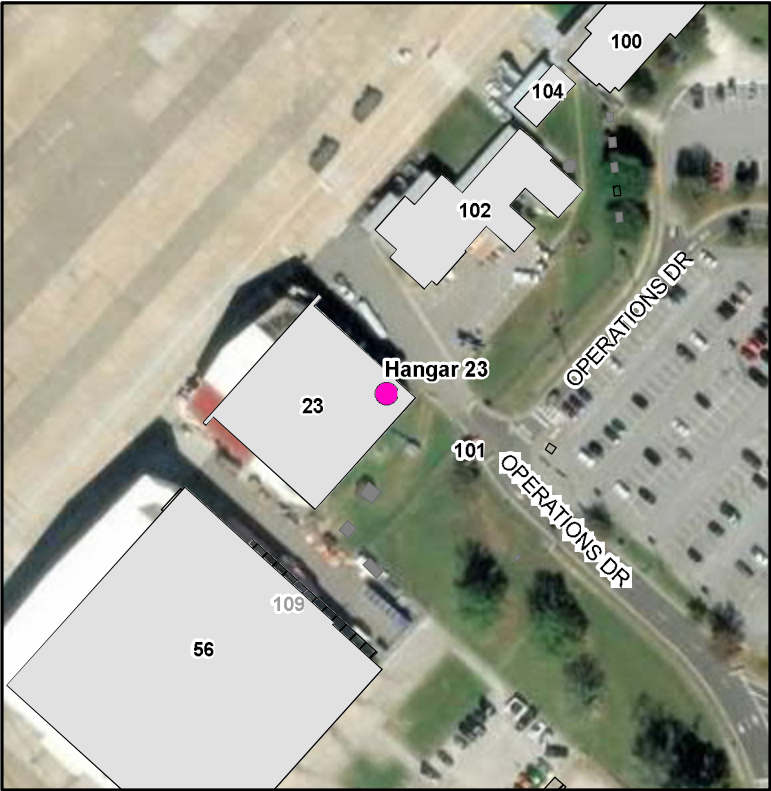


Hangar 23

Comment:
Fire suppression system

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings





Building 795

Comment:

Building used for pesticide storage

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings





Building 795

Comment:
Building used for pesticide storage

Legend

- FieldObservationPoint
- Buildings
- Structures
- DemolishedBuildings





Fuel Tank Farm (new)

Comment:
Ditch between old and new tank farms

Legend

- FieldObservationPoint
- Buildings
- Structures





Fuel Tank Farm (new)

Comment:

Ditch between old and new tank farms

Legend

- FieldObservationPoint
- Buildings
- Structures



Appendix E

Unknown Locations

Areas Evaluated for Potential PFAS Releases – Unknown Locations

NAS Oceana, Virginia Beach, Virginia

Some areas listed in Table E1 are identified as potential per- and polyfluoroalkyl substances (PFAS) source areas because of aqueous film-forming foam (AFFF) use; however, all areas are recommended for no further action at this time because their locations could not be determined.

Table E1. Areas Evaluated for Potential PFAS Releases – Unknown Locations
NAS Oceana, Virginia Beach, Virginia

Area ¹	Potential PFAS Release Area? (Yes/No)	Description
1964 Grass Fire	No	In 1964, a grass fire occurred between the Naval Air Station (NAS) Oceana runway and Oceana Boulevard and was extinguished by firefighters from NAS Oceana (<i>The Virginia Beach Sun</i> , 1964). The exact location of the fire was not determined during development of this PFAS Preliminary Assessment (PA); however, brush fires are not Class B fires where aqueous film forming foam (AFFF) would be used, so it is unlikely that AFFF was used during this incident; therefore, no further action is recommended for the 1964 Grass Fire. If additional information regarding the location of this incident and use of AFFF becomes available, this area will be reevaluated.
1984 Canopy Jettison System Incident	No	On March 30, 1984, the canopy jettison system of a KA-6D aircraft fired during servicing (Navy, 2019). There was no indication of a fire occurring during this incident and no evidence of known usage or releases of AFFF was identified. Because there was no fire and no evidence of AFFF use, no further action is recommended.
Old CPO Club Landfill	No	The Old CPO Club Landfill was an unlined scrap metal and tire dump located on the parking lot of the old CPO Club, of which the exact location of is unknown (A.T. Kearney, 1989). Historical reports indicate that only tires were disposed of at this landfill (A.T. Kearney, 1989). No data regarding the exact dates of start-up or closure for the Old CPO Club Landfill are available (A.T. Kearney, 1989). No evidence of use or release of AFFF or other PFAS-containing materials was identified during document review; therefore, no further action is recommended.
Sludge Disposal Areas	No	Until the mid-1970s, sanitary sewage generated on-base was treated at the Navy-owned WWTP 2, located in the northwestern corner of the station (Buildings SD1-1 and SD-0) (RGH, 1984). This plant was put into operation in 1951 and replaced WWTP 1 (RGH, 1984). Sludge was routinely disposed of by land spreading on the western sides of the base, giving it away as fertilizer, and landfilling. The exact location of landspreading is unknown; therefore, no additional action is recommened. If an exact location is identified in the future, this area will be reevaluated.

Notes:
AFFF = aqueous film-forming foam
NAS = Naval Air Station
NRMFES = Navy Region Mid-Atlantic Fire and Emergency Services
PA = Preliminary Assessment
PFAS = per- and polyfluoralkyl substances

References
A.T. Kearney. 1989. *1989 Resource Conservation and Recovery Act (RCRA) Facility Assessment Revised Phase II Report (RFA)*. March.
Navy. 2019. Naval Safety Center Database Search. Accessed February 2019.
Navy Region Mid-Atlantic Fire and Emergency Services (NRMFES) District Chief. 2020. Personal communication (email). March 24.
Rogers, Golden & Halpern (RGH). 1984. *Initial Assessment Study of Naval Air Station, Oceana, Virginia Beach, VA*. December.
The Virginia Beach Sun. 1964. “Grass Fire Near Oceana Air Station.” December 3.

¹ Detailed information regarding these incidents was requested from NAS Oceana; no additional information has been made available.