



Naval Facilities Engineering Systems Command Northwest

FINAL Construction Completion Report

Oak Harbor Drinking Water Removal Actions (Sites 31, 55,
58), Ault Field

Naval Air Station Whidbey Island, Oak Harbor, Washington

September 26, 2023

Prepared For:



1101 Tautog Circle
Silverdale, Washington 98315-1101

Prepared By:



CAPE-ER JV LLC
500 Pinnacle Court, Suite 100
Norcross, GA 30071

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September 26, 2023

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Prepared by:  Date: 9/26/2023
Colin Caviness, PE, Senior Project Engineer, CAPE Environmental Management Inc

Independent Technical Reviewer:  Date: 9/26/2023
David L. Fortune, PE, Senior Engineer/Regulatory Specialist, CAPE Environmental Management Inc

Report Approval:  Date: 9/26/2023
Evan LeBlanc, Project Manager, CAPE Environmental Management Inc

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Executive Summary

This Construction Completion Report (CCR) presents a summary of the non-time critical removal action (NTCRA) activities completed for drinking water property owners impacted by per- and polyfluoroalkyl substances (PFAS) adjacent to Ault Field (including the Former Area 6 Landfill) at Naval Air Station Whidbey Island (NASWI), Oak Harbor, Washington. The work was conducted by CAPE-ER Joint Venture (JV) Limited Liability Corporation (LLC) (CAPE-ER) under Naval Facilities Engineering Systems Command Atlantic Contract N62470-18-D-7013, Naval Facilities Engineering Systems Command Northwest (NAVFAC NW) Task Order N4425520F4304. Navy oversight of the work was provided by NAVFAC NW.

The NTCRA followed the requirements of the Final Action Memorandum, Ault Field and Area 6 Drinking Water (Navy 2020), Final Accident Prevention Plan, 20 NASWI (Sites 31, 55, 58), Oak Harbor Drinking Water Removal Actions (CAPE-ER, 2020), Final Sampling and Analysis Plan for Oak Harbor Drinking Water Removal Actions (Sites 31, 55, 58) (CAPE-ER, 2021), and Final Work Plan for Oak Harbor Drinking Water Removal Actions (Sites 31, 55, 58) (CAPE-ER, 2022).

The project scope of work consisted of designing and constructing the necessary components to connect Ault Field Residence 1 to a new, deeper well not affected by PFAS, connect Ault Field Residence 2 to nearest public water supply (Navy water), and connect five homes and a mobile home park to the City of Oak Harbor's water distribution system. The scope also included conducting well modifications to Ault Field Residence 1 and 2's drinking water wells such that they could not be used for potable or non-potable purposes and decommissioning the drinking water well at a residence and a mobile home park in Oak Harbor. The field work was conducted between 1 and 18 November 2021 and 2 May and 9 June 2022.

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Acronyms and Abbreviations

AFFF	aqueous film-forming foam
AM	Action Memorandum
AMP	Archeological Monitoring Plan
APP	Accident Prevention Plan
ASM	ASM Affiliates
AWWA	American Water Works Association
bgs	below ground surface
C Johnson	C Johnson Construction, Inc.
CAPE-ER	CAPE-ER JV LLC
CCR	Construction Completion Report
CDF	controlled density fill
CDR	Contractor Daily Report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COR	Contracting Officer's Representative
CPR	Contractor Production Report
CQCR	Contractor Quality Control Report
Dahlman	Dahlman Pump & Well Drilling Inc.
DCVA	double check valve assembly
DOD	Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
ELAP	Environmental Laboratory Accreditation Program
FCR	Field Change Request
FIR	Field Inspection Report
Geotest	Geotest Services Inc.
H&S	health and safety
HA	health advisory
Harmsen	Harmsen, LLC
HDD	horizontal directional drill
HDPE	high-density polyethylene
IAPMO	International Association of Plumbing and Mechanical Officials
IDW	investigation-derived waste
JV	joint venture
KO	Contracting Officer
LDCI	Laboratory Data Consultants Inc.
LF	linear feet
LLC	limited liability corporation
µg/L	micrograms per liter
MMEC	Multimedia Environmental Compliance Group
msl	mean sea level
MW	Monitoring Well
ng/L	nanograms per liter
NAS	Naval Air Station
NASWI	Naval Air Station Whidbey Island

NAVFAC LANT	Naval Facilities Engineering Systems Command Atlantic
NAVFAC NW	Naval Facilities Engineering Systems Command Northwest
NOI	notice of intent
NTCRA	non-time critical removal action
PA	preliminary assessment
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonic acid
PM	Project Manager
POU	Point-of-Use
PPE	personal protective equipment
PQCP	Project Quality Control Plan
PRV	pressure reducing valve
psi	pounds per square inch
psig	pounds per square inch gauge
PVC	polyvinyl chloride
QC	quality control
RAC	removal action construction
ROE	right of entry
RPBA	reduced pressure backflow assembly
RPM	Remedial Project Manager
S/PQCM	Superintendent/Project Quality Control Manager
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SDR	standard dimension ratio
SIR	Safety Inspection Report
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SWPPP	Storm Water Pollution Prevention Plan
T/PCP	Traffic/Pedestrian Control Plan
URS	URS Consultants, Inc
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
Vista	Vista Analytical Laboratory
WA DOE	Washington State Department of Ecology

1.0 Introduction

CAPE-ER JV LLC (CAPE-ER) was contracted by the Naval Facilities Engineering Systems Command Atlantic (NAVFAC LANT), under Contract N62470-18-D-7013, NAVFAC Northwest (NW) Task Order N4425520F4304, to perform design and construction activities to address the impact of per- and polyfluoroalkyl substance (PFAS) on drinking water wells of property owners located adjacent to Naval Air Station Whidbey Island (NASWI) Ault Field (including the Former Area 6 Landfill). The NASWI complex is located in Island County, Washington, on Whidbey Island, and consists of Ault Field, Outlying Landing Field Coupeville, and Seaplane Base. Ault Field occupies approximately 4,300 acres 3 miles northwest of the city of Oak Harbor, Washington, and includes Area 6, a 260-acre tract in the southeastern corner of Ault Field. Navy oversight of the work is provided by NAVFAC NW.

This Construction Completion Report (CCR) presents a summary of the activities associated with drinking water removal actions as outlined in the Work Plan for Oak Harbor Drinking Water Removal Actions (Sites 31, 55, 58), Ault Field, and Area 6 Drinking Water (CAPE-ER, 2022).

1.1 Project Objectives

The Navy's overall objective for this non-time critical removal action (NTCRA) was to replace the drinking water supply for residents who have drinking water wells impacted by PFAS above the 2016 United States Environmental Protection Agency (USEPA) lifetime drinking water health advisories of 70 nanograms per liter (ng/L) for perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and PFOA plus PFOS.

The NTCRA was divided into five Work Elements in the scope of work.

Work Element 1 – Project Management

- Manage project activities.
- Maintain project schedule.
- Perform cost tracking and control functions.
- Lead and document project meetings including, but not limited to, coordination meetings.

Work Element 2 – Preconstruction Activities

- Perform site visits for reconnaissance.
- Develop the design.
- Develop the Work Plan documents, which include:
 - Accident Prevention Plan (APP)/Site Safety and Health Plan (SSHP).
 - Project Quality Control Plan (PQCP).
 - Environmental Protection Plan/Waste Management Plan.
 - Traffic/Pedestrian Control Plan (T/PCP).
 - Archeological Monitoring Plan.
 - Stormwater Pollution Prevention Plan (SWPPP).
- Perform initial sampling of the new well installed at Residence 1.
- Support the Navy in obtaining access agreements.

Work Element 3 – Removal Action Construction (RAC)

- Connect Residence 1 to the new drinking water well.
- Connect Residence 2 to NASWI’s drinking water main.
- Connect five residences in Oak Harbor to the City of Oak Harbor public water supply.
- Connect a mobile home park in Oak Harbor’s water distribution system to the City of Oak Harbor public water supply.

Work Element 4 – Operation and Maintenance (not included in CCR)

- For one year, perform quarterly sampling and analysis of the new drinking water well water for Residence 1 and document results in a Technical Memorandum.

Work Element 5 – Construction Completion Report

- Document all RAC activities in a Construction Completion Report.

1.2 Regulatory Framework

This project was executed to fulfill the requirements of the *Final Action Memorandum (AM) Ault Field and Area 6 Drinking Water, Naval Air Station Whidbey Island, Oak Harbor, Washington* (Navy, 2020) signed in June 2020. This action is governed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA). The Navy is the lead agency, under Executive Order 12580, for CERCLA actions at NASWI, and in accordance with Section 104 of CERCLA and SARA, the Navy is conducting this removal action.

The Navy is taking action to address drinking water above 70 ng/L PFOA and PFOS, individually or combined. On 15 June 2022, USEPA published new, final lifetime health advisories for perfluorobutanesulfonic acid (PFBS) and hexafluoropropylene oxide-dimer acid (HFPO-DA), 2000 ng/L and 10 ng/L, respectively, and new, interim lifetime health advisories for PFOA and PFOS, 0.004 ng/L and 0.02 ng/L, respectively. On 14 March 2023, USEPA proposed a draft regulatory drinking water standard for certain PFAS, including PFOA and PFOS. In response, the Department of Defense (DOD) has issued the following statement: “DOD respects and values the public comment process on this proposed nationwide drinking water rule and looks forward to the clarity that a final regulatory drinking water standard for PFAS will provide. In anticipation of the final standard that EPA expects to publish by the end of 2023, the DOD is assessing what actions DOD can take to be prepared to incorporate EPA’s final regulatory standard into our current cleanup process, such as reviewing our existing data and conducting additional sampling where necessary. In addition, DOD will incorporate nationwide PFAS cleanup guidance, issued by EPA and applicable to all owners and operators under the federal cleanup law, as to when to provide alternate water when PFAS are present.”

1.3 Report Organization

The remainder of this CCR is organized as follows:

- **Section 2: Site Background** – Summarizes the site background, previous investigations, and the drinking water removal actions

- **Section 3: Project Management** – Documents project roles and responsibilities, completed meetings and reports, as-built project schedule, production, quality control, health and safety, and subcontractors
- **Section 4: Pre-Construction Activities** – Documents an overview of pre-construction activities including the NTCRA design development, necessary access agreements and service line connection permits, Work Plan (with support plans) development, and sample collection from Monitoring Well (MW)-611
- **Section 5: Removal Action Construction** – Documents the NTCRA activities performed including mobilization, drinking water system modification for Residence 1, public water main extension and service connections for Residence 2, five residences in Oak Harbor, a mobile home park in Oak Harbor, the associate testing and flushing for all lines, and the existing well abandonment
- **Section 6: References** – Provides a list of references utilized during preparation of this CCR

2.0 Site Background

2.1 Overview

The following sections are adapted from Engineering Evaluation/Cost Analysis (EE/CA), Long-Term Solutions for Ault Field and Area 6 Drinking Water (CH2M, 2020a), and summarize the site history, geology, and prior investigations.

2.2 Description and History

The NASWI complex is located in Island County, Washington, on Whidbey Island, and consists of Ault Field, Outlying Landing Field Coupeville, and Seaplane Base. Ault Field occupies approximately 4,300 acres 3 miles northwest of the city of Oak Harbor, Washington, and includes Area 6, a 260-acre tract in the southeastern corner of Ault Field (Figure 2-1). Ault Field was commissioned in 1942 and was used for the rearming and refueling of Navy patrol planes and other tactical aircraft operating in the Puget Sound region. Currently, Ault Field supports Navy tactical electronic attack squadrons flying the EA-18G Growler aircraft, the P-3 Orion Maritime Patrol squadrons, and two Fleet Reconnaissance squadrons flying the EP-3E Aries aircraft (Navy, 2016).

The historical use of aqueous film-forming foam (AFFF) at Ault Field for firefighting and fire response training purposes has been identified as a source of PFAS releases to local groundwater. Known and potential source areas are being investigated as part of a preliminary assessment (PA) and site inspection work that is currently underway. The Ault Field PA identified 34 potential source areas at Ault Field for the release of PFAS into the environment (CH2M, 2018c). The following areas are three potential primary source areas of AFFF, where historical firefighting and fire response training activities occurred: Area 16 (Ault Field Runway Ditches), Area 31 (the former Runway Fire Training School), and the current firefighting school (referred to as Site 58) (Figure 2-2).

Although it is unknown if AFFF was used or disposed of at Area 6, its historical site use as a disposal area suggests that AFFF disposal within Area 6 is possible. Wastes are known to have been previously disposed of at two locations within Area 6: the former industrial waste disposal area (Site 55), which received acids, caustics, and solvents during the 1970s and 1980s, and liquid sludge between 1969 and the mid-1970s; and the Area 6 landfill, which received Navy waste from 1969 through the mid-1990s (Foster Wheeler Environmental Corporation, 1997; URS Consultants, Inc [URS], 1993; URS Group, Inc., a subsidiary of AECOM, 2016). There is no known disposal of regulated wastes at the Area 6 landfill since 1983 (URS, 1993).

2.3 Geology and Hydrogeology

2.3.1 Geology

Whidbey Island lies within the Puget Lowland, a topographic and structural depression between the Olympic Mountains and the Cascade Range. The geology of the area is heavily influenced by glacial advances and retreats. At the height of the most recent glaciation, ice is estimated to have reached a thickness of about 4,500 feet in the Oak Harbor area. The geologic units on Whidbey Island consist of a sequence of Quaternary-age (less than 2 million years old) glacial and interglacial deposits that

may be over 3,000 feet thick (United States Geological Survey [USGS], 2005) with near-surface deposits being mostly glacial sediment of the Fraser glaciation (20,000 to 10,000 years old).

The Everson and Vashon units of the Fraser glaciation, post-glacial sediment, and artificial fill make up most of the surface and near-surface soil underlying Ault Field. In general, stratigraphic units up to 100 feet thick, consisting of relatively impermeable clay, silt, and silty fine sand (Everson glaciomarine drift and Vashon till), form the near-surface layers. Underlying the Vashon Outwash in most places are sand, silt, and clay of the Whidbey Formation.

Three parallel active fault zones exist at Ault Field that are regionally significant. The Devil's Mountain, Strawberry Point, and Utsalady Point fault zones trend from southeast to northwest across Ault Field. Fault movement is oblique, with both horizontal and vertical components. In general, the horizontal component is left-lateral, while the vertical component is normal, with the north wedge up (USGS, 2005).

2.3.2 Hydrogeology

The USGS has identified five major hydrogeologic units, labeled A through E, on Whidbey Island. However, only Units D and E are present at Ault Field (USGS, 2005). Units D and E are termed intermediate and shallow aquifers, respectively (URS, 1993). Locally perched zones may exist over discontinuous areas of till or other clay-rich units (Multimedia Environmental Compliance Group [MMEC] and AECOM, 2016).

The shallow aquifer (Unit E) is a locally discontinuous unconfined aquifer consisting of sand and gravel with an average groundwater elevation of 20 feet above mean sea level (msl). At Ault Field, the shallow aquifer is found in the Vashon Outwash deposits at or near the surface. The intermediate aquifer (Unit D) is a moderately continuous sandy unit that is generally confined. Potentiometric surface elevations vary from 10 to 75 feet above msl (URS, 1993).

Groundwater beneath Ault Field is recharged by infiltration of precipitation. Groundwater flow in specific regions of Ault Field was documented in previous environmental investigations (URS, 1993; MMEC and AECOM, 2016).

The flight line and the eastern boundary of Ault Field lacks monitoring wells; thus, the groundwater flow directions in these areas are undefined. In general, groundwater flows to the east toward Dugualla Bay and mimics the topography of the Clover Valley. A groundwater divide extends southwest to northeast along the topographic high of the coastal bluff in the western part of Ault Field. Groundwater to the northwest of the divide flows west towards the Strait of Juan de Fuca, and groundwater to the southeast of the divide flows east toward the interior of the island.

2.4 Summary of Previous Investigations

2.4.1 Groundwater Investigation

In September 2015, the Navy conducted on-base groundwater sampling at Ault Field to evaluate the presence of PFAS in groundwater at Areas 16, 31, and Hangar 5 (MMEC, 2016). Concentrations of PFOA and PFOS exceeded applicable 2009 USEPA Provisional health advisory (HA) screening levels (PFOA at 0.4 micrograms per liter [$\mu\text{g}/\text{L}$]; PFOS at 0.2 $\mu\text{g}/\text{L}$) at two monitoring wells in Area 31

(referred to in this report as Former Runway Fire School) (MMEC, 2016). Additional detections of PFAS were observed in two monitoring wells near Hangar 5; however, both detections were below the Provisional HA screening levels. There were no detections of PFAS in two wells sampled at Area 16.

In December 2017, the Navy conducted an on-base groundwater study for PFAS at Area 6 (CH2M, 2020b). During this event, 13 monitoring wells were sampled, along with influent and effluent samples from the current groundwater treatment system. Results indicate that one of the 13 monitoring wells sampled exceeded the 2016 USEPA lifetime health advisory for PFOA, which was the groundwater investigation screening level at the time of the investigation. Additional detections of PFAS were observed in seven of the monitoring wells and the groundwater treatment system influent and effluent samples. However, the concentrations were below the 2016 USEPA lifetime health advisories for both PFOA and PFOS individually and for combined PFOA and PFOS.

Following the 2017 on-base PFAS sampling event, a second phase of groundwater sampling was conducted between February and August 2018 for Area 6. During this time, four additional on-base groundwater monitoring wells, 12 off-base groundwater monitoring wells, and four off-base privately-owned groundwater (non-potable) supply wells were sampled. Results indicate detections of PFOA and/or PFOS in seven of the 20 wells. However, the concentrations were all below the HA for PFOA and/or PFOS. From January to March 2018, the Navy conducted Phase 1 of the Ault Field PFAS Site Inspection. Nine on-base monitoring wells and two off-base potential alternative water supply wells were installed between the eastern and southern portions of the base, within the shallow, intermediate, and deep zones of the aquifer. Soil samples collected during drilling had detections of PFOA and PFOS below the sample quantitation limit. Groundwater sample results from the nine newly installed groundwater monitoring wells were non-detect for PFOS and PFOA. Only one of the off-base potential alternative water supply wells had PFAS detections, of which the PFOS and PFOA detections were below the HA. In addition to the new wells, groundwater samples were collected from 17 existing on-base wells that had no prior PFAS sampling. The results confirmed that groundwater samples from nine of the 17 wells had detections of PFOS and PFOA above the 2016 USEPA lifetime health advisories (CH2M, 2019).

The two new Ault Field Residence 1 and Residence 2 monitoring wells (MW-611 and MW-615) were constructed to meet Washington State Department of Ecology and Island County drinking water well construction standards to allow the wells to be converted and permitted as household drinking water wells if the water quality could be proven appropriate. The Ault Field Residence 1 new well was installed deeper than the existing, impacted residential water supply well, below a potential confining clay layer. At Ault Field Residence 2, no viable deeper water-bearing unit was identified, so the new well was screened at a similar depth to the existing PFAS-impacted residential water supply well (although the existing well construction is uncertain).

The analysis of the initial sample from the Ault Field Residence 1 new monitoring well did not indicate detections of PFAS. The initial samples from the Ault Field Residence 2 new monitoring well had detections of PFOA and PFOS that were below the 2016 USEPA lifetime health advisories. Therefore, these new monitoring wells were selected for aquifer testing and additional PFAS sampling (CH2M, 2018a). Aquifer testing was performed in July 2018 at Ault Field Residence 1 and in June 2018 at Ault Field Residence 2. Results from aquifer testing and PFAS sampling at the new Ault Field Residence 1 monitoring well (MW-611) showed PFOA and/or PFOS remained below detection limits with no evidence of hydraulic connection with the existing, impacted drinking water

well (CH2M, 2018b). Results from aquifer testing and PFAS sampling at the new Ault Field Residence 2 monitoring well (MW-615) showed a slight increase in PFOA and/or PFOS concentrations during aquifer testing and pumping of the new well-induced measurable drawdown in the pre-existing drinking water well, indicating significant hydraulic connection between the newly installed well and the existing, impacted drinking water well.

2.4.2 Drinking Water Well Investigation

From November 2016 to June 2017, Ault Field off-base drinking water wells were sampled under a voluntary sampling program for PFAS. Because of the uncertainty of groundwater flow direction at the time, the Navy used the Current Fire Fighting School (referred to in this report as Current Fire Training Area), Runway and Drainages, and Former Fire Fighting School (referred to in this report as Former Runway Fire School) as the center points to draw a 1-mile radius to initiate the Phase 1 off-base drinking water sampling. The Phase 1 results indicate that PFOA and/or PFOS are above the HA in one off-base drinking water well south of Ault Field (Residence 2) (Navy, 2018). Based on the Phase 1 results, the Navy expanded the drinking water investigation an additional 1/2 mile in some portions south and east of Ault Field. This additional area is referred to as the Phase 2 sampling area. The Phase 2 results indicate that PFOA and/or PFOS are above the 2016 USEPA lifetime health advisories in one off-base drinking water well east of Ault Field (Residence 1) (Navy, 2018). Based on the Phase 2 results, the Navy expanded the drinking water investigation an additional 1/2 mile from this property. This additional area is referred to as the Phase 3 sampling area. There were no exceedances of the 2016 USEPA lifetime health advisories for PFOA and/or PFOS in the Phase 3 area. Based on the Phase 3 results, the Navy did not expand the drinking water sampling area near Ault Field beyond the Phase 3 area.

In October 2018, the Navy identified PFAS in a stormwater drain near Hangar 6 and in an associated stormwater drainage system that empties into Clover Valley Stream and Dugualla Bay. As a result of this new information, the Navy initiated Phase 4 of drinking water sampling for wells located within a half mile to the north-northeast and south-southeast of the surface water body where the PFAS was detected above the 2016 USEPA lifetime health advisories. This Ault Field Phase 4 sampling began in January 2019 and was completed in April 2019. No additional wells have been identified with 2016 USEPA lifetime health advisories exceedances of PFOA and/or PFOS as part of Phase 4.

Due to the detection of PFOA above the 2016 USEPA lifetime health advisory in one of the Area 6 monitoring wells during the December 2017 groundwater sampling event, the Navy conducted two voluntary off-base drinking water well sampling events for wells hydraulically downgradient of Area 6 (CH2M, 2020b). The Phase 1 sampling event, conducted in winter/spring 2018, included wells 1/2 mile to the west and south of the Area 6 boundary. The Phase 2 sampling event, conducted in summer 2018, included parcels within the Phase 1 sampling area that were not sampled in the spring and wells within one-half mile to the southwest of the drinking water wells with PFAS exceedances in the Phase 1 sampling area. One additional well within the Phase 1 sampling area was sampled in summer 2018. There were no exceedances for PFOA and/or PFOS in the Phase 2 area. Drinking water samples were collected from 17 wells during the Phase 1 and Phase 2 events. Results from the Phase 1 and Phase 2 sampling events indicate that five of the 17 drinking water wells sampled contain PFOA and/or PFOS above the 2016 USEPA lifetime health advisories; the exceedances occurred at a mobile home park and four residences.

Following the initial phased voluntary drinking water sampling performed at Ault Field, a periodic drinking water sampling program was developed in 2017 to monitor PFAS within drinking water wells. As part of the periodic drinking water sampling, residences with PFAS detections and residences adjacent to residences with PFAS exceedances would be sampled bi-annually to evaluate temporal and spatial variability of PFAS. In spring 2019, Area 6 residences were added to the periodic drinking water sampling program for Ault Field. In preparation for the November 2019 sampling event, request letters were sent to seven residences adjacent to the five exceedances. Of the seven residences, one residence responded to the request and was added to the fall 2019 periodic drinking water sampling event. PFOS was detected above the HA for the additional Area 6 residence; thus, the residence was added to the periodic drinking water sampling program.

2.5 Drinking Water Removal Actions

2.5.1 Emergency Actions

An emergency removal action was implemented in December 2016 (Navy, 2017) to supply affected residents at Ault Field Residence 1 and Residence 2 with bottled water for drinking and cooking. The same emergency response action was performed for Area 6 off-base residences after receiving the preliminary results of drinking water samples collected in spring 2018 for four residences and a mobile home park's water system. An emergency response action was also performed upon receipt of the November 2019 results for an additional residence. Residents were verbally notified of the 2016 USEPA lifetime health advisories exceedances within 24 hours of receipt of the preliminary data from the laboratory. Bottled water for drinking and cooking was delivered within 48 hours of receipt of the preliminary data, and the residents were scheduled for routine bottled water deliveries. Ault Field Residence 1 and Residence 2, five residences in Oak Harbor, and 19 units in an Oak Harbor mobile home park were receiving bottled water for drinking and cooking purposes prior to the completion of the NTCRA.

2.5.2 Time-Critical Removal Action

The Navy also implemented a time-critical removal action in early 2018 to allow residents the option to have a Point-of-Use (POU) treatment system installed for their kitchen sink water as a replacement for the bottled water (Navy, 2018). The POU treatment system is designed to minimize risks in the same manner as bottled water, but with potential greater convenience to the resident. No resident near Area 6 or Ault Field has a POU treatment system. Both removal actions (bottled water and POU treatment systems) were designed to minimize resident PFOA- and/or PFOS-related risks before the implementation of the long-term remedial solution.

2.5.3 Non-Time Critical Action

In March 2020, the Navy published an EE/CA to address PFOA and PFOS in drinking water wells above the 2016 USEPA lifetime health advisories near Ault Field and Area 6 (CH2M, 2020a). The EE/CA compared four general categories of removal actions based on their effectiveness, implementability, and cost, to address current exposure to drinking water above the 2016 USEPA lifetime health advisories. The four categories include:

1. No further action (continue providing bottled water),

2. Whole-house water from the existing drinking water well,
3. Connection to Navy or public water supply, and
4. New replacement well.

The Navy grouped the drinking water wells into four groups for this evaluation: Ault Field Residence 1 (one well), Ault Field Residence 2 (one well), Oak Harbor Residences (five wells), and an Oak Harbor mobile home park (one well serving 19 homes). The Navy determined the best alternative for each grouping was as follows:

- Ault Field Residence 1: Connect home to new well (MW-611) that Navy installed on property as potential new drinking water well.
- Ault Field Residence 2: Connect home to existing Navy water system water line (originating from City of Oak Harbor water line).
- Oak Harbor Residences: Extend the City of Oak Harbor water main and connect five homes to the water main.
- Mobile Home Park: Connect all residences to the City of Oak Harbor water main.

In June 2020, the Navy published an Action Memorandum that summarized the preferred actions identified in the final EE/CA (Navy, 2020).

3.0 Project Management

The following section captures and summarizes the components of Work Element 1.

3.1 Key Project Personnel

The project teams and contact information are presented in the following tables. The project stakeholders include NAVFAC NW, NAVFAC LANT, Region 10 USEPA, and the Washington State Department of Ecology (WA DOE). NAVFAC NW and NAVFAC LANT are responsible for the scope, review, and overall direction of this project, in addition to technical review. In accordance with the Interagency Federal Facilities Agreement for NASWI, the principal regulatory agency for this action is the USEPA.

Table 3-1: Project Stakeholders Table

Agency/ Company	Title/Role	Name	Phone	Email
NAVFAC NW	Contracting Officer (KO)	Steven Wells	(360) 315-8299	steven.k.wells.civ@us.navy.mil
NAVFAC LANT	Contracting Officer's Representative (COR)	Pete Clifford	(757) 322-8307	peter.clifford@navy.mil
NAVFAC NW	Remedial Project Manager (RPM) and Task Order COR	Kendra Clubb	(509) 999-6843	Kendra.r.clubb.civ@us.navy.mil
NAVFAC NW	Navy Technical Representative	Steve Skeeahan	(253) 279-0212	steven.b.skeeahan@us.navy.mil
NASWI	Installation Environmental Program Director	Laura Muhs	(360) 257-4025	laura.r.muhs@navy.mil
USEPA Region 10	RPM	Chan Pongkhamsing	(206) 553-1806	pongkhamsing.chan@epa.gov
Washing Department of Ecology	RPM	Binod Chaudhary	(564) 669-3015	Bcha461@ecy.wa.gov

CAPE-ER had the following roles for its project management team.

Table 3-2: CAPE-ER Project Team

Title/Role	Name	Phone	Email
Program Manager	Chris Caviness	(678) 287-1640	ccaviness@cape-inc.com
Operations Manager	Dave Bettendorf	(240) 625-4409	dbettendorf@cape-inc.com
Project Manager (PM)	Gerald Karg	(304) 685-0945	gkarg@cape-inc.com

Title/Role	Name	Phone	Email
Superintendent/Project Quality Control Manager (S/PQCM)	Evan LeBlanc	(504) 237-8389	eleblanc@cape-inc.com
Site Safety and Health Officer (SSHO)	Rachel Haney	(518) 645-2723	rhaney@cape-inc.com
Project Chemist	Wayne Vermeychuk	(727) 940-4713	wvermeychuk@cape-inc.com

The CAPE-ER Project Management team, led by the PM, was responsible for controlling all aspects of the project, including the project scope, project schedule, financials, and mitigation of risk throughout the course of the work. Controls were accomplished through the planning and reporting processes: Conducting work as presented in the Work Plan, PQCP, and Sampling and Analysis Plan (SAP); detailed task management planning; and weekly review of the project budget and schedule.

CAPE-ER directly subcontracted with seven primary subcontractors to perform the removal action construction activities. Each subcontractor is listed in the table below with their role and area of responsibility for executing the NTCRA.

Table 3-3: CAPE-ER Subcontractors

Subcontractor	Address	Role	Responsibility
ASM Affiliates (ASM)	PO Box 51058 Seattle, WA 98115	Archaeologist	Archaeological monitoring
C Johnson Construction, Inc. (C Johnson)	3080 NE Halyard Ln, Ste C Oak Harbor, WA 98277	Utility Contractor	Water main extension, residence service connections, restoration
Dahlman Pump & Well Drilling Inc. (Dahlman)	17313 Cook Road, Bow P.O. Box 422 Burlington, WA 98233	Well Driller	Well pump removal, well pump installation, well abandonment
Geotest Services Inc. (Geotest)	741 Marine Drive Bellingham, WA 98225	Utility Locator	Ground penetrating radar utility survey
		Material Testing	Field density testing
Harmsen, LLC (Harmsen)	840 SE 8 th St Oak Harbor, WA	Designer/Engineer of Record	Design and Record Drawing development
		Land Surveyor	Pre- and post-construction surveying
Vista Analytical Laboratory (Vista)	1104 Windfield Way Eldorado Hills, CA 95762	Analytical Laboratory	Aqueous sample analysis
Laboratory Data Consultants Inc. (LDCI)	2701 Loker Ave West Suite 220 Carlsbad CA 92010	Analytical Data Validator	Sample results data validation

3.2 Meeting and Reports

A project kickoff meeting conducted on 19 August 2020 covered the following items: Project Success, Project Scope and Risks, Cost Tracking, and Next Steps. An on-site kickoff meeting was

conducted on 3 September 2020 to review and summarize the upcoming NTCRA with the stakeholders. Details of the on-site kickoff meeting are captured under the Preconstruction Activities in Section 4.0. Prior to the start of the pre-construction, 2021 fall, and 2022 spring removal action construction, project kickoff meetings were also conducted.

During this project, weekly project meetings were held between the CAPE-ER PM and the Navy Task Order RPM/COR. During the removal action construction period, a weekly quality control (QC) meeting was also conducted to cover the field work activities. The meetings included a safety moment, discussion of any variances or deficiencies noted through the construction QC process, a summary of work performed, projection of work ahead, and discussion of any constraints on remaining work, including necessary access agreements, design development, material procurement, subcontractor availability, and stakeholder oversight activities.

The CAPE-ER PM provided a Monthly Project Status Report to the Navy, detailing the status of each work element, difficulties encountered, corrective actions taken, activities anticipated during the next period, financial summary, budget variance report and analysis, subcontracts, and schedule progress during the reporting period.

3.3 Schedule and Cost Tracking

CAPE-ER maintained a NTCRA project schedule in Microsoft Project. CAPE-ER's project controls group updated the schedule monthly and also supported the PM in cost tracking and preparing the budget variance report and analysis. Each month, both the updated schedule and budget variance report were provided to the Navy as part of the Monthly Project Status Report. A copy of the as-built project schedule is provided in Figure 3-1: As-Built Project Schedule.

3.4 Field Management

CAPE-ER's superintendent led the field management of the NTCRA and was responsible for coordinating between the subcontractors on-site, the local Navy personnel, and City of Oak Harbor Representatives, as well as working with the PM. They completed the Contractor Production Report (CPR) daily, recording the manpower hours, equipment hours, work completed, and material tracking. The CPR is the first primary document making up the Contractor Daily Report (CDR). All of the CDRs are compiled by day in Appendix G.

3.5 Quality Control

CAPE-ER's PQCM was responsible for implementing the Contractor Quality Control Plan for this NTCRA. The PQCM completed the Contractor Quality Control Report (CQCR) daily where the three phases of inspection were summarized, testing results were reported, rework items were captured and their corrections recorded, and remarks were provided for additional information. Copies of all documents supporting the CQCR were attached to the daily reports. The CQCR is the second primary document that makes up the CDR (Appendix G).

3.5.1 Inspections

CAPE-ER conducted the three phases of inspection (preparatory, initial, follow-up) in accordance with the PQCP. Each phase of inspection was recorded on its associated worksheets, and copies of each inspection phase document package was included as an attachment to that day's CQCR. Copies of all inspection documents, preparatory packages, initial packages, and follow-up inspections captured on CAPE-ER Field Inspection Reports (FIRs) can be found in Appendix F by phase type (preparatory, initial, follow-up).

3.5.2 Testing

QC testing was performed on the newly installed water lines and replacement asphalt. The new water lines received pressure testing and flushing that was documented on C. Johnson's pressure test form and CAPE-ER's service line flushing form. The City of Oak Harbor also performed pressure testing on the new lines. The city did not have any testing forms; therefore, CAPE was provided with an email confirmation of the passed pressure test. This email is included in Appendix F. Backflow preventer testing was performed on all public water connections.

CAPE-ER's third-party testing firm, Geotest, provided asphalt density testing in accordance with the design. Copies of all test reports can be found in Appendix F after the inspection records.

3.6 Health and Safety

Site operations were conducted in accordance with the health and safety (H&S) policies and procedures set forth in the site-specific APP-SSHP developed in accordance with the latest edition of the United States Army Corps of Engineers EM 385-1-1 Safety and Health Requirements Manual. The APP-SSHP was provided for this project under separate cover (CAPE-ER, 2020). Specific activity hazard analyses for anticipated site activities (excavation, pipe cutting, pipefitting, backfilling, compaction, and drinking water sampling) were incorporated into the APP-SSHP, and site personnel completed the training requirements listed in Section 5.1 of the APP-SSHP prior to beginning work on-site.

Work was conducted in Level D personal protective equipment (PPE), consisting of regular work clothes, steel-toed and steel-shank safety boots, hardhats, safety glasses, hearing protection, high-visibility reflective vests, and hand protection (as appropriate). The SSHO conducted daily tailgate safety meetings and regular safety inspections which were recorded in the daily Safety Inspection Report (SIR). The SIR is the third primary document that makes up the CDR (Appendix G).

4.0 Pre-Construction Activities

The following section captures and summarizes the components of Work Element 2.

4.1 Site Reconnaissance & Meetings

CAPE-ER conducted an on-site kickoff meeting on 3 September 2020, which included meeting with the City of Oak Harbor Engineering and Public Works Department, at which the City Engineer, ASM archeologist, and Navy RPM/Task Order COR were in attendance, and onsite visits to each residence, where connections were to be designed and constructed. The PM provided a summary of the meeting to the Navy on 11 September 2020. These on-site visits also provided site reconnaissance for the NTCRA design development.

4.2 Pre-Construction Approvals/Access Agreements

CAPE-ER assisted the Navy and/or obtained the necessary pre-construction approvals/access agreements to complete the NTCRA at each residence or group of residences. For Residence 1, the Navy obtained a temporary right of entry (ROE) with the resident for access, and CAPE-ER, via subcontractor Dahlman, filed a Notice of Intent to WA DOE to alter the existing monitoring well to a water well (i.e., drinking water well). For Residence 2, the Navy obtained one temporary ROE with the resident for access on private property and one ROE with Island County for the segment of waterline under Clover Valley Road. For all applicable Oak Harbor residences and the mobile home park, the Navy obtained separate ROEs for access on each private property, and the Navy obtained a temporary construction easement with the City of Oak Harbor for installation of the new water main and appurtenances in the city's right of way. All ROEs and easements authorized CAPE-ER and its subcontractors to perform the necessary work in accordance with the approved work plans and design.

CAPE-ER obtained eight City of Oak Harbor Development Services Permits for the new water service connections and water main on a residential street and at a mobile home park in Oak Harbor, which included six water meter installation permits, a right-of-way permit, and a complex water connection permit. Note that the Navy does obtain permits for work performed under CERCLA; however, these permits were deemed a necessary cost to provide clean drinking water to the residences in accordance with the NTCRA AM. Copies of all access agreements and approved permits are found in Appendix B.

4.3 NTCRA Design Development

Based on information obtained during the site visits, CAPE-ER and the subcontractor, Harmsen, developed the design for connecting Residence 1 to the new drinking water supply well, connecting Residence 2 to the NASWI drinking water supply main, and connecting Oak Harbor residences and mobile home residences to the City of Oak Harbor drinking water system.

The design included detailed drawings specifying the material, equipment, and installation requirements of the project. The design incorporated the requirements of the Navy for connection to the Whidbey Island drinking water supply and the City of Oak Harbor for the connections to the

city drinking water mains. Also, the design for the well pump, appurtenances, and plumbing for Residence 1 met the applicable American Water Works Association (AWWA) standards (e.g., AWWA E102 for the well pump design) and the International Association of Plumbing and Mechanical Officials (IAPMO) Uniform Plumbing Code.

Through the design development, reviews from NAVFAC NW, NASWI, and the City of Oak Harbor were received and incorporated into the design. The design As-Built (Record) Drawings are found in Appendix A.

4.4 Plan Development

CAPE-ER, with necessary subcontractors, developed a comprehensive NTCRA Work Plan which contained the following key sections and sub-plans:

- Project Management
- Preconstruction Activities
- Removal Action Construction
- Well Decommissioning
- Design Drawings and Basis of Design
- APP/SSHP
- PQCP
- Environmental Protection Plan
- Waste Management Plan
- T/PCP
- Archeological Monitoring Plan
- SWPPP
- SAP
- Service Line Flushing Standard Operating Procedure
- Baseline Schedule

4.5 MW-611 Sample Collection

Prior to connecting Residence 1 to the new well, CAPE-ER collected a water sample from the proposed new well, MW-611, on 13 April 2021. The sample and QC samples, which included a field duplicate, matrix spike and matrix spike duplicate, and a field blank, were collected and analyzed in accordance with the project SAP and analyzed by PFAS Isotope Dilution/LC-MSMS Method Compliant with Table B-15 of DOD Quality Systems Manual 5.3 (Aqueous), by CAPE-ER's subcontracted laboratory, Vista, which is DOD Environmental Laboratory Accreditation Program (ELAP) – A2LA Accredited and holds a Washington Department of Ecology accreditation for drinking water analysis.

The sample results were validated by LDCI using Stage 4 data validation. The validated results confirmed that the groundwater samples collected from the well do not contain PFAS constituents at concentrations above the laboratory reporting limits. This data suggests that groundwater in MW-611 is acceptable for drinking water. Based on the data, the Navy confirmed the decision to change MW-611 into a drinking water well. To do so, CAPE-ER via the licensed water well driller, Dahlman,

filed a Notice of Intent to WA DOE to change the existing monitoring well to a water well (i.e., drinking water well). The WA DOE accepted the notice of intent on 4 November 2021.

5.0 Removal Action Construction Activities

The following section provides an overview of completed removal action construction activities and design changes that were implemented due to differing field conditions during field work. Field activities were conducted between 1 and 18 November 2021 at Residences 1 and 2 and on 2 May and 9 June 2022 at residences in Oak Harbor and at an Oak Harbor Mobile Home Park.

5.1 Deviations from Work Plan and Design

There were two types of deviations from the Work Plan and Design. The first type were minor deviations which consisted of clarifications in the Work Plan and Design and adjustments for constructability. These were captured in the QC phase inspections minutes, QC meetings minutes, FIRs, or the contractor maintained red-line drawings. Descriptions of recorded minor deviations are incorporated into their respective removal action activity sections. All of the minor deviations were incorporated into the As-Built (Record) Drawings.

The second type were the Field Change Requests (FCR)s which document more complicated deviations from the Work Plan and Design that require proposed resolutions and concurrence on the execution of the resolution. An FCR was completed when changes in the project construction work or site conditions impacting previously approved plans were identified. The proposed or actual changes documented in the FCR were reviewed by the S/PQCM and PM. Upon resolution, each one signed the FCR, and the PM forwarded the FCR to the Task Order COR for review and concurrence. The recorded project FCRs are discussed in the following section.

5.1.1 Field Change Requests

A total of five FCRs were submitted during the removal action construction activities. The FCRs were prepared in accordance with the PQCP and provided reference in the production of the As-Built (Record) Drawings. The FCRs are summarized in Table 5-1 below.

Table 5-1: FCR Summary

FCR #	Date Opened	Issue Description	Response Action	Date Closed
001	3-May-22	Fire Hydrant on a residential street in Oak Harbor, 6-inch ductile and hydrant riser can't maintain 36 inches of cover due to topography	Move Fire Hydrant assembly 20 feet east. Add culvert to achieve depth.	3 May 22
002	4-May-22	Meter boxes at Residences A and D will be in car parking areas	Move Residence A meter box 6 feet west and Residence D meter box 15 feet east.	4 May 22
003	20-May-22	Existing 2-inch water line for connection at an Oak Harbor mobile home park is not at location indicated	Connect to existing system 250 feet further and tie in.	20 May 22
004	N/A	Unsubmitted	Unsubmitted	N/A

FCR #	Date Opened	Issue Description	Response Action	Date Closed
005	26-May-22	Blow off valve at Koetje St connection to main is supposed to be turned in to the city but is broken	Bury valve in place.	26 May 22
006	26-May-22	Two yard hydrants required, but hydrants are not shown in plans	Supply and install two yard hydrants at Residence A.	26 May 22

An FCR log was created for tracking the FCRs from identification of the field issue through the response action addressing the field issue. Copies of the log and the five FCRs can be found in Appendix D – Field Change Requests.

5.2 Mobilization

CAPE-ER mobilized to the sites with C Johnson and Dahlman supporting the removal action construction activities. Two mobilizations occurred, with the first in Fall 2021 and the second in Spring 2022. The mobilization for Residences 1 and 2 occurred on 1 November 2021, with Dahlman Pump and Well Drilling and CAPE-ER and NAVFAC oversight. The Oak Harbor residences and mobile home park mobilization occurred on 2 May 2022, with C Johnson, CAPE-ER, and NAVFAC oversight.

5.2.1 Pre-Construction and Utility Surveying

Prior to performing utility locates, CAPE-ER contracted Harmsen, a Washington-registered land surveyor, to provide the pre-construction survey. Surveying included establishing survey controls; verifying project-specific landmarks, structures, and utilities; obtaining current elevation and topographic data; and marking and staking the construction and limits of disturbance.

Prior to potholing or excavation activities, C Johnson notified Washington 811 in accordance with Washington state law. Washington 811 is a communication center that provides notice to utility owners that potentially have underground utilities traversing the proposed drilling locations. Additionally, CAPE-ER had unmarked utilities located with ground penetrating radar by Geotest. During the removal action construction activities, CAPE-ER maintained all marks and protected all impacted utilities.

5.2.2 Site Preparation, Temporary Facilities, and T/PCP

No contractor laydown area was established for Ault Field Residence 1 activities due to the short duration, and all materials were brought in on the day of the work. A minor contractor laydown area was established for the activities associated with Ault Field Residence 2. Another minor contractor laydown area was established off of a residential street in Oak Harbor during the water main extension and service connections for the Oak Harbor residence and mobile home action sites. The laydown area was primarily used for the storage of equipment, materials, and temporary facilities.

CAPE-ER provided one portable toilet, one wash station, and a dumpster for use as temporary facilities. These facilities were established while the removal action activities took place at Ault Field Residence 2, Oak Harbor Residences, and the mobile home park action sites.

C Johnson implemented traffic controls and pedestrian crossing protection in accordance with the T/PCP where construction activities occurred within 4 feet of a roadside, including removal action construction activities at Ault Field Residence 2, at residences in Oak Harbor, and at an Oak Harbor mobile home park.

5.3 Removal Action Activities

5.3.1 Ault Field Residence 1

The removal action construction activities at Residence 1 were performed from 2 November to 5 November 2021. The work included setting a new pump in the well, installing a new 119-gallon pressure tank, installing a new water line and connecting it to the main supply for the home, and installing pump controls. Dahlman, a Washington-state-licensed well driller, installed the pump, electrical, pump controls, and new water line, and performed the new plumbing. All equipment and materials meet the requirements of the design.

MW-611 was modified by adding a carbon steel riser 2 feet above ground surface, installing a 1.25-inch pitless adapter, and attaching a WA DOE unique well tag with the identification BKB 717. The new well pump is a Grundfos electrical submersible pump, set at 155 feet below ground surface (bgs) with 1.25-inch polyvinyl chloride (PVC) riser pipe, designed for 20 gallons per minute service at the operating depth design total dynamic head calculated to a maximum of 262 feet. The new well pump was connected to the new pressure tank through 160 linear feet (LF) of 1.25-inch high-density polyethylene (HDPE) pipe. During the preparatory phase inspection, a discrepancy on the required pipeline sizes of 1-inch or 2-inch was discussed. Dahlman recommended to match the well pump discharge of 1.25 inches. Harmsen, as the Designer of Record, agreed that the 1.25-inch line was acceptable for installation. This minor deviation was documented in the preparatory phase inspection minutes attached to the CDR for 2 November 2021 found in Appendix G and is reflected in the As-Built (Record) Drawings (Appendix A).

Alongside the 1.25-inch HDPE pipe, 160 LF of electrical line in 1-inch PVC conduit was installed to provide power to the new well pump. The lines were installed in a common trench at 26 inches bgs. This trench was backfilled and compacted with the native soil from the trench. The well pump electrical system was modified to be in compliance with the local electrical code. The modifications consisted of hardwiring the well pump electrical system into the home electric system and installing new electrical outlets, a pump disconnect, and two new cut-off switches for the pump and the pressure tank. The existing household pressure reducing valve (PRV) was adjusted to 40 pounds per square inch gauge (psig) and the new pressure tank was set to 60 psig to meet the pressure and flow demands of the new well pump system. Additional details of the construction activities at Ault Field Residence 1 can be found in the CDRs for the respective days of work in Appendix G.

Dahlman disinfected the Ault Field Residence 1's new drinking water well, all of the new piping systems, and any other affected vessels or equipment in accordance with AWWA standards C651, C653, and C654. The new piping between the well and the pressure tank was subjected to a leak test at 60 psig with no observed signs of leakage. The new system was flushed with approximately 100 gallons of well water prior to taking water samples for bacteriological analysis. The resident was notified that the results from the bacteriological analysis were received with Total Coliform and E. Coli bacteria being absent from the sample and the water from the new well system was safe to

drink. Copies of the completed forms and test reports can be found in Appendix F: Inspections and Testing.

5.3.2 Ault Field Residence 2

The removal action construction activities at Residence 2 were performed from 8 November to 18 November 2021. In total, 855 LF of 2-inch standard dimension ratio (SDR) 11 service line HDPE pipe was installed on Navy, Island County, and Residence 2 property. A hot tap was performed on the 10-inch NASWI water main, which was witnessed by the Navy subcontractor, Chugach. C Johnson performed a jack and bore for 59 LF and installed 4-inch PVC sleeve three feet under Clover Valley Road. The 2-inch service line was pulled through the sleeve. The new 1-inch reduced pressure backflow assembly (RPBA) was installed on Navy property with a stainless-steel electrical enclosure with 60-amp service for freeze protection. The RPBA's electrical service was pulled from the nearest Navy utility pole via a 60 LF utility trench and 50 LF of 2-inch PVC conduit. A new 1-inch water meter in buried meter vault was installed adjacent to the RPBA. In addition, a new yard hydrant with shutoff valve was installed along the new service line near the former yard hydrant on Residence 2 property. Additional details of the construction activities at Ault Field Residence 2 can be found in the Contractor Daily Reports for the respective days of work in Appendix G.

C Johnson disinfected the Ault Field Residence 2's new service connection, appurtenances, and piping systems, in accordance with AWWA standard C651. The new service line was pressure tested at 120 pounds per square inch (psi) for 4 hours with no leaks or loss of pressure, and then the 2-inch service line was flushed with over three pipe volumes, approximately 500 gallons of water, according to the QC FIR for 16 November 2021. The RPBA testing was conducted by a Washington-state-certified backflow testing subcontractor, Precision Plumbing and Backflow Testing. CAPE-ER conducted the residence fixture flushing on 18 November 2021 in accordance with the CAPE-ER flushing standard operating procedure. Copies of the completed forms and test reports can be found in Appendix F.

5.3.3 Oak Harbor Residences

The removal action construction activities consisted of installing a new 8-inch C909 PVC water main along two residential streets in Oak Harbor and connecting five residences to the City of Oak Harbor public water supply. The water main installation began on 5 May 2022 and was completed with a passing chlorine and pressure test of 225 psi on 16 May 2022. The final water main tie-ins to the City of Oak Harbor system were completed on 25 May for the Koetje connection and 31 May for the residential street in Oak Harbor connection. Approximately 1,068 LF of 8-inch C909 PVC water main was installed, with tracer wire and blue warning tape placed 2.5 feet from the surface and bedded with approximately 453 tons of screened fill, in an 18-inch-wide by 4-foot-deep trench along Koetje Street and East Street. A controlled density fill (CDF) was used as backfill where the trench passed under the residential streets.

A minor deviation to the design was captured in FIR for 12 May 2022. With approval from the City of Oak Harbor, a 20-foot section of the new water main was placed with 2.5 feet of cover over it due to residential street topography. One fire hydrant was installed near the corner of two residential streets and was shifted 22 feet to the east due to existing ground conditions as documented in FCR-001. The blow off valve that was at the Koetje Street connection was found to be broken.

Documented in FCR-005, direction was received from the City of Oak Harbor to bury the valve in place in lieu of returning the valve to the City of Oak Harbor.

C Johnson performed water line pressure tests, chlorine testing, flushing, bacteria sample collection, and final tie-ins on the new water lines connected to the City of Oak Harbor's water system in accordance with City of Oak Harbor requirements. The testing was performed under the oversight of the City of Oak Harbor representative who provided verbal approvals for each test. Copies of the City of Oak Harbor testing documents and results are included in Appendix F.

The service connections for the five residences began on 17 May 2022 with locating the existing water service connections to each residence by hand digging. Next, meter boxes, double check valve assemblies (DCVAs), and PRVs were installed at the service taps at all of the residences. A pneumatic mole was used to horizontal directional drill (HDD) the service lines through each of the lots up to their existing water connection points. Approximately 566 feet of 1-inch SDR 9 HDPE pipe was installed from the water main to the property connection points. The HDD mole was also used for the service line to connecting a residence in Oak Harbor. The water service for all properties was completed by 3 June 2022.

The DCVAs installed on the new service lines were tested on 8 June 2022 by a Washington-state-certified backflow preventer, in accordance with state of Washington requirements and documented on City of Oak Harbor Backflow Prevention Assembly Test Reports. CAPE-ER flushed all new service lines in accordance with the approved Standard Operating Procedure for Flushing Service Lines (Appendix G in Final Work Plan). The purpose of the flushing was to remove any residual PFAS from the existing interior plumbing and flush the service lines as part of the process prior to use. Each flushing operation was recorded on a Drinking Water Service Line Flushing Form. Copies of the completed forms and test reports can be found in Appendix F: Inspections and Testing. After flushing was complete, the residences were notified that the water was safe to drink.

A residence in Oak Harbor had two noted deviations from the design. The water meter box shifted 6-feet to the west from the design location so it would not be in a vehicle parking area. This shift is documented in FCR-002. Additionally, two yard hydrants were installed on their property to replace in-kind irrigation faucets that were served by the impacted well. The addition of the two yard hydrants is captured in FCR-006. Lot A has kept its existing water well for non-potable use. Lot A's water meter was installed on 25 May 2022, and the indoor plumbing was flushed on 2 June 2022.

Details of the activities that took place on a residential street and the associated lots can be found in the Contractor Daily Reports for the respective days of work in Appendix G.

5.3.4 Oak Harbor-Based Mobile Home Park

Removal action construction activities for the mobile home park in Oak Harbor consisted of installing 48 feet of 8-inch C909 PVC pipe water main off of the City of Oak Harbor water main across Goldie Road. Potholing and trenching for the 8-inch water main started on 9 May 2022. This water-main leg was hot tapped and backfilled with 15 cubic yards of CDF and then terminated at the entrance to the mobile home park with a tee to a fire hydrant and the mobile home park's service entrance which was backfilled with 15 tons of screened fill. The mobile home park's service entrance consists of a meter box, a reduced pressure zone backflow preventer, and a PRV. After the PRV,

approximately 270 LF of 2-inch HDPE SDR 11 pipe service line was installed to the existing service main.

The mobile home park's designed tie-in location was not found where anticipated. Potholing performed on 17 and 18 May 2022 was unsuccessful. CAPE-ER submitted FCR-003 to document the missing existing line and the plan to trench further west to connect to the park's existing 2-inch distribution line near the well house. The government approved the initial FCR on 20 May 2022 for immediate implementation; the FCR was later revised/accepted on 23 June 2022 (see Appendix D FCRs). CAPE-ER's subcontractor, Geotest, performed a private utility locate with ground penetrating radar in the mobile home park for the extended pipe path, and the trenching of the new service line continued as per the FCR-supplied drawing. As part of the new alignment, the service line was driven under four driveways using the pneumatic mole HDD. The tie-in to the existing service occurred on 6 June 2022 after the existing water service well was cut and capped.

The mobile home park's water system was connected to the City of Oak Harbor public water supply on 26 May 2022. C Johnson performed water main pressure tests, chlorine testing, flushing, bacteria sample collection, and final tie-ins on the new water main connected to the City of Oak Harbor's water system in accordance with City of Oak Harbor requirements. The testing was performed under the oversight of the City of Oak Harbor representative who provided verbal approvals for each test. Copies of the City of Oak Harbor testing documents and results are included in Appendix F. On 7 June 2022, the mobile home park's backflow preventer was tested, and the service line flushing for the trailers began.

CAPE-ER flushed all new service lines in accordance with the approved Standard Operating Procedure for Flushing Service Lines (Appendix G in Final Work Plan). The purpose of the flushing was to remove any residual PFAS from the existing interior plumbing and flush the service lines as part of the process prior to use. Each flushing operation was recorded on a Drinking Water Service Line Flushing Form. Copies of the completed forms and test reports can be found in Appendix F: Inspections and Testing. After flushing was complete, the residences were notified that the water was safe to drink. Trailer flushing occurred from 7 June to 9 June 2022, except Trailer 13. Trailer 13 was not flushed by CAPE-ER due to unresponsiveness. The trailer park manager was provided with instructions for proper flushing for Trailer 13 to occur when the owner is responsive. Details of the construction activities at the mobile home park can be found in the Contractor Daily Reports in Appendix G for the respective days of work.

5.3.5 Drinking Water Well Decommissioning

Well decommissioning was performed by Dahlman, CAPE-ER's Washington-licensed well driller. Notices of intent (NOIs) were filed with the WA DOE prior to starting the work. On 7 June 2022, the drinking water well at a residence in Oak Harbor (DOE Well Tag Number illegible due to corrosion and unable to be located on any the database) and at the mobile home park (DOE Well Tag Number ABR419) were abandoned in accordance with WA DOE requirements (Washington Administrative Code 173-160-381). The water well reports recording the well decommissioning performed were submitted to WA DOE on 8 June 2022. In addition, the submersible well pumps and well risers were removed from the drinking water wells at Ault Field Residence 1 on 4 Nov 2021 and Ault Field Residence 2 on 9 June 2022. NOIs were not required for the modifications to wells at Ault Field Residences 1 and 2 because the modifications did not change the type of well type per WA DOE

requirements. Details of the well decommissioning activities can be found in the CDRs (Appendix G) and in copies of the well decommissioning reports, which can be found in Appendix H.

5.4 Erosion Control Measures

Soil stabilization, also referred to as erosion control, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in stormwater runoff. Erosion control best management practices protect the soil surface by covering and/or binding soil particles. CAPE-ER and C Johnson implemented the Erosion Control Measures by installing silt socks on a residential street, and all trenches were closed at completion of each workday.

5.5 Archaeological Resource Monitoring

At the start of the removal action construction activities, there were no known natural, historical, or cultural resources identified within the work area. However, there was a possibility of historical or cultural resources being unearthed during the removal action construction activities; therefore, CAPE-ER subcontracted ASM (who purchased Cascadia during the project) to develop an Archaeological Monitoring Plan (AMP) that described how the removal action construction activities will be monitored and defined processes for notifying the Navy and the state of any finds and mitigating project impacts. ASM provided archaeological oversight in accordance with the AMP for all trenching activities and no protected cultural resources were identified during the archaeological monitoring of construction activities. The final Archeological Monitoring Report prepared by ASM covers how the removal action construction activities were monitored and the findings made. A copy of the Archaeological Monitoring Report is provided as Appendix I.

5.6 Waste Management

CAPE-ER and its subcontractors performed waste management in accordance with the Waste Management Plan. During sampling the Ault Field Residence 1 groundwater and drinking water well sampling, CAPE-ER generated investigation-derived waste (IDW) including PPE, spent sampling supplies, and purge water. Purge water was released to the ground at Residence 1, and PPE and spent sampling supplies were placed into a plastic garbage bag and disposed of as sanitary refuse.

During the removal action construction activities, excavated soils were temporarily placed on the ground next to the piping trench and returned to trench at the end of the day. Accumulated stormwater was drained to surface for infiltration.

An estimated 5 cubic yards of demolished asphalt and concrete was recycled at F-1 Sand and Gravel. All recovered steel, metal riser pipes, pumps, and segregated cardboard were recycled at Skagit Steel and Recycling. Trench spoils that were not able to be reused as back fill were sent to Miles Sand and Gravel for pit reclamation. Municipal solid waste, plastic riser pipe from the Residence 2 well, and other non-recyclable materials were disposed at the City of Oak Harbor landfill. Water generated from flushing the existing service lines/interior plumbing at all residences was disposed in on-site septic or sewer system (as applicable), consistent with all waste water (i.e., grey or black water) generated by the property owners. This practice is consistent with current household practice for homes with PFAS impacted water and Appendix G of the project work plans.

5.7 Site Restoration

CAPE-ER, C Johnson, and Dahlman conducted the necessary site restoration at all project locations, including removing the equipment from the laydown area on-site and spreading topsoil and seed along the open trenches at all project areas, in accordance with the design. Fifteen tons of 3/8 Hot Mix Asphalt were placed in two 2-inch layers to patch the driveways on all project areas where the asphalt was removed during water line installation. Compaction testing on the installed hot mix asphalt was performed by Geotest on 6 June 2021, and a copy of this test result is included in Appendix F.

5.8 Post Construction Survey

The post-construction survey was conducted on 5 and 6 July 2022 by Harmsen, which included the finished topographic shots and locations for all vaults, handholes, and installed mechanical appurtenances. These surveys were compiled and added to the As-Built (Record) Drawings. The surveys also included documenting the new water easement boundaries for each property, 10 feet by 10 feet at each residential street connection and 10 feet by 50 feet at the mobile home park in Oak Harbor's service line connection. The easement boundaries were incorporated into easement packages between the property owners to the City of Oak Harbor for future operation and maintenance of new water meters and pressure reducing valves.

5.9 Punch List Inspections

A pre-final inspection was performed by CAPE-ER and NAVFAC NW on 8 June 2022 with eight items being placed on the punch list. All of the items were addressed by the following day, 9 June 2022. The final inspection was performed by CAPE-ER and NAVFAC NW on 9 June 2022 and found that all items from the pre-final inspection were completed. Copies of the complete inspection forms can be found in Appendix J.

6.0 References

- CAPE-ER JV LLC (CAPE-ER). 2022. Final Work Plan, Oak Harbor Drinking Water Removal Actions (Sites 31, 55, 58). March.
- CAPE-ER. 2021. Final Sampling and Analysis Plan to Support Oak Harbor Drinking Water Removal Actions (Sites 31, 55, and 58), Ault Field, Naval Air Station Oak Harbor, Washington. Prepared for the Navy. April.
- CAPE-ER. 2020. Final Accident Prevention Plan, 20 NASWI (Sites 31, 55, 58), Oak Harbor Drinking Water Removal Actions, Naval Air Station, Whidbey Island, Oak Harbor, Washington. Prepared for the Navy. November.
- CH2M. 2020a. Engineering Evaluation/Cost Analysis, Long-term Solutions for Ault Field and Area 6 Drinking Water, Naval Air Station Whidbey Island, Oak Harbor Washington. Prepared for the Navy. March.
- CH2M. 2020b. Final Evaluation of Per- and Polyfluoroalkyl Substances, 1,4-Dioxane, and Vinyl Chloride in Groundwater and Drinking Water, Ault Field, Area 6, Naval Air Station Whidbey Island, Oak Harbor, Washington. Prepared for the Navy. September.
- CH2M. 2019. Final Evaluation of Per- and Polyfluoroalkyl Substances in Groundwater, Ault Field, Naval Air Station Whidbey Island, Oak Harbor, Washington. Technical Memorandum. Prepared for the Navy. March.
- CH2M. 2018a. Final Sampling and Analysis Plan Addendum Phase I Site Investigation for Per- and Polyfluoroalkyl Substances in Soil and Groundwater, Ault Field, Naval Air Station Whidbey Island, Oak Harbor, Washington. Addendum. Prepared for the Navy. June.
- CH2M. 2018b. Final New Residential Well Remedial Alternative, Ault Field, Naval Air Station Whidbey Island, Coupeville, Washington. Technical Memorandum. Prepared for the Navy. October.
- CH2M. 2018c. Final Preliminary Assessment for Per- and Polyfluoroalkyl Substances (PFAS), Ault Field, Naval Air Station Whidbey Island, Oak Harbor, Washington. Prepared for the Navy. November.
- Foster Wheeler Environmental Corporation. 1997. Final Remedial Action Report Volume 1; Operable Unit 1; Naval Air Station, Whidbey Island, Washington. August.
- Multimedia Environmental Compliance Group (MMEC) & AECOM. 2016. Final Soil and Groundwater Sampling Results, Hangar 5, Naval Air Station Whidbey Island, Oak Harbor, Washington. Prepared for the Navy. April.
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- Navy. 2020. Final Action Memorandum, Ault Field and Area 6 Drinking Water, Naval Air Station Whidbey Island, Oak Harbor, Washington. Prepared by CH2M. June.
- Navy. 2018. Emergency Response Action Memorandum, Point-of-Use Treatment, Naval Air Station Whidbey Island, Ault Field, Oak Harbor and Outlying Landing Field, Coupeville, Island County, Whidbey Island, Washington. April.
- Navy. 2017. Emergency Response Action Memorandum, Naval Air Station Whidbey Island, Ault Field, Oak Harbor and Outlying Landing Field, Coupeville, Island County, Whidbey Island, Washington. February 13.
- Navy. 2016. Environmental Impact Statement for EA-18G "Growler" Airfield Operations at Naval Air Station Whidbey Island Complex, Volume 1. November.
- URS Consultants, Inc (URS). 1993. Remedial Investigation for Operable Unit 4 Naval Air Station Whidbey Island. Volume 1. Prepared for the Navy. June.
- URS Group, Inc., a subsidiary of AECOM. 2016. DRAFT Focused Feasibility Study, Area 6, Naval Air Station Whidbey Island, Oak Harbor, Washington. Prepared for the Navy. May.
- United States Geological Survey (USGS). 2005. Geologic map of the Oak Harbor, Crescent Harbor, and part of the Smith Island 7.5-minute quadrangles, Island County, Washington. [map] https://ngmdb.usgs.gov/Prodesc/proddesc_78698.htm. Accessed 20 December 2017.

Figures



Construction Completion Report

Oak Harbor Drinking Water Removal Actions (Sites 31, 55, 58), Ault Field

Naval Air Station Whidbey Island, Oak Harbor, Washington

**NOTICE: FIGURE 2-2 CONTAINS SENSITIVE BUT UNCLASSIFIED INFORMATION WHICH IS
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Appendices

Appendix A: As-Built (Record) Drawings (Redacted)



Construction Completion Report

Oak Harbor Drinking Water Removal Actions (Sites 31, 55, 58), Ault Field

Naval Air Station Whidbey Island, Oak Harbor, Washington

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Appendix B: Access Agreements and Approved Permits (Redacted)



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Oak Harbor Drinking Water Removal Actions (Sites 31, 55, 58), Ault Field

Naval Air Station Whidbey Island, Oak Harbor, Washington

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Appendix C: Submittal Register

SUBMITTAL REGISTER (PART B)

NAVFAC Atlantic Contract No. N62470-18-D-7013 (RAC MAC)	CTO N4425520F4304 20 NASWI (Sites 31, 55, 58) Oak Harbor Drinking Water Removal Actions	Contractor: CAPE-ER JV LLC
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SPEC. SECT.	SD NUMBER AND TYPE OF SUBMITTAL MATERIAL OR PRODUCT	PARA No.	APPROVING AUTHORITY	GOV'T REVIEWER	CONTRACTOR ACTION			APPROVING AUTHORITY ACTION					REMARKS	
					CONTRACT SUBMITTAL DATE			ACTUAL SUBMITTAL DATE	DATE FWD TO OTHER REVIEWER	DATE RCVD FROM REVIEWER	TYPE OF APPROVAL	DATE REC'D FROM NAVY w/ COMMENT		MAIL TO CONTR. or REC'D FROM AUTHORITY
(a)	(b)	(c)	(d)	(e)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
PWS	Initial Schedule	2.1.1	NAVFAC NW	Kendra Clubb	Within 30 days of contract award			11Sep20						
PWS	Internal Draft Accident Prevention Plan	2.2.2	NAVFAC NW	Kendra Clubb	90 days from contract award			26Oct20						
PWS	Internal Draft SAP	2.2.2	NAVFAC NW	Kendra Clubb	90 days from contract award			04Nov20						
PWS	Internal Draft Work Plan/Designs	2.2.2	NAVFAC NW	Kendra Clubb	90 days from contract award			03Feb21						
PWS	Draft Archeological Plan	2.2.2	NAVFAC NW	Kendra Clubb	90 days from contract award			07Jan21						
PWS	Final APP	2.2.2	NAVFAC NW	Kendra Clubb	45 days from receipt of Navy comments			25Nov20						
PWS	Draft SAP	2.2.2	NAVFAC NW	Kendra Clubb	45 days from receipt of Navy comments			22Jan21						
PWS	Final Archeological Plan	2.2.2	NAVFAC NW	Kendra Clubb	45 days from receipt of Navy comments			28Apr21						
PWS	Draft Work Plan/Designs	2.2.2	NAVFAC NW	Kendra Clubb	45 days from receipt of Navy comments			29Apr21						
PWS	Final SAP	2.2.2	NAVFAC NW	Kendra Clubb	20 days from receipt of stakeholder comments			08Apr21						
PWS	Final Work Plan/Designs	2.2.2	NAVFAC NW	Kendra Clubb	20 days from receipt of stakeholder comments			28Apr22						
PWS	Draft Technical Memorandum	2.4	NAVFAC NW	Kendra Clubb	60 days after fourth sampling event			27Jan23						
PWS	Final Tech Memo	2.4	NAVFAC NW	Kendra Clubb	20 days from receipt of Navy comments			11Aug23						
PWS	Internal Draft Construction Completion Report	2.5	NAVFAC NW	Kendra Clubb	60 days after completion of construction completion			31Aug22						
PWS	Draft Construction Completion Report	2.5	NAVFAC NW	Kendra Clubb	30 days after receipt of Navy comments			12Jun23						
PWS	Final Construction Completion Report	2.5	NAVFAC NW	Kendra Clubb	20 days after receipt of stakeholder comments			26Sep23						

By our signatures, we attest that the deliverables identified above have been prepared and submitted by the Contractor and accepted on behalf of the Government. The deliverables represent those identified in the Statement of Work and/or otherwise prepared and submitted during the course of executing the work assigned under this Contract Task Order.

PM for CAPE-ER:  Date: 21-Sep-2023	Approver for Navy: Kendra Clubb Date:
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Appendix D: Field Change Requests (Redacted)



Construction Completion Report

Oak Harbor Drinking Water Removal Actions (Sites 31, 55, 58), Ault Field

Naval Air Station Whidbey Island, Oak Harbor, Washington

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Appendix E: Photographic Log (Redacted)



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Oak Harbor Drinking Water Removal Actions (Sites 31, 55, 58), Ault Field

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Appendix F: Inspection and Testing Reports (Redacted)



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Oak Harbor Drinking Water Removal Actions (Sites 31, 55, 58), Ault Field

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**Appendix G: Contractor Daily Reports (CPR, CQCR, SIR)
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Oak Harbor Drinking Water Removal Actions (Sites 31, 55, 58), Ault Field

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Appendix H: Well Decommissioning Reports (Redacted)



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Appendix I: Archaeological Monitoring Report (Redacted)



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Appendix J: Punch List Inspection Report (Redacted)



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