

Preliminary Assessment Narrative Report

Per- and Polyfluoroalkyl Substances

Former Fort Ord, California

Prepared for:



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On behalf of:



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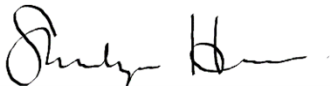
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Acronyms and Abbreviations

µg/L	micrograms per liter
ACL	aquifer cleanup level
AFFF	aqueous film-forming foam
Ahtna	Ahtna Global, LLC
Army	U.S. Department of the Army
AST	aboveground storage tank
ATWESS	Anti-Tank Weapon Effect Signature Simulator
bgs	below ground surface
CAMU	Corrective Action Management Unit
CCRWQCB	California Regional Water Quality Control Board – Central Coast Region
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CERFA	Community Environmental Response Facilitation Act
COC	chemical of concern
CDPR	California Department of Parks and Recreation
CMX	Commercial-Mixed Use
CSUMB	California State University Monterey Bay
DoD	U.S. Department of Defense
DOL	Directorate of Logistics
DRMO	Defense Reutilization and Marketing Office
DTSC	California Department of Toxic Substances Control
EOD	explosive ordnance disposal
FAAF	Fritzsche Army Airfield
FONR	Fort Ord Natural Reserve
FORA	Fort Ord Reuse Authority
FOSTA	Fort Ord Soil Treatment Area
FO-SVA	Fort Ord-Salinas Valley Aquitard
GWTP	groundwater treatment plant
HMX	cyclotetramethylene-tetranitramine
IA	interim action
MCL	Maximum Contaminant Level
MCWD	Marina Coast Water District
mg/kg	milligrams per kilogram
MRS	Munitions Response Site
MSL	mean sea level
MTV	magnesium/Teflon/Viton
NPL	National Priorities List
OU1	Operable Unit 1

OU2	Operable Unit 2
PA	Preliminary Assessment
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutane sulfonic acid
PFHxA	perfluorohexanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
POM	Presidio of Monterey
RCRA	Resource Conservation and Recovery Act
RDX	cyclotrimethylene-trinitramine
ROD	Record of Decision
RSL	Regional Screening Level
SI	Site Inspection
STP	sewage treatment plant
TCDD	tetrachlorodibenzo-p-dioxin
TCE	trichloroethene
TNT	trinitrotoluene
UCMBEST	University of California, Monterey Bay Education, Science, and Technology Center
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
WWTP	wastewater treatment plant

1.0 Introduction

This Preliminary Assessment (PA) Narrative Report is focused on identifying and evaluating potential source areas for per- and polyfluoroalkyl substances (PFAS) at the former Fort Ord. This report presents the findings of the PA performed by Ahtna Global, LLC (Ahtna) on behalf of the U.S. Army Corps of Engineers (USACE) at the former Fort Ord, Superfund Enterprise Management System identification number CA7210020676, located in Monterey County, California. This PA was conducted under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, 42 U.S.C. §9601 *et. seq.*), the National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 CFR Part 300), the Defense Environmental Restoration Program (10 U.S.C. §2701 *et. seq.*), and Department of the Army (Army) guidance, as well as U.S. Environmental Protection Agency (USEPA) guidance.

This report applied specific guidance documents such as the Army guidance for addressing releases of PFAS (Army, 2018) and the USEPA guidance for performing PAs under CERCLA (USEPA, 1991) to the extent practicable.

The purpose of the PA is found in 40 CFR 300.420 and shall:

- (i) Eliminate from further consideration those sites that pose no threat to public health or the environment;
- (ii) Determine if there is any potential need for removal action;
- (iii) Set priorities for site inspections (SI); and
- (iv) Gather existing data to facilitate later evaluation of the release pursuant to the Hazard Ranking System, if warranted.

1.1 Purpose and Scope of the Preliminary Assessment

The purpose of this PA was to collect information concerning conditions at sites at the former Fort Ord sufficient to assess unacceptable threats posed to human health and the environment and to determine the need for additional CERCLA action. The scope of the PA included a review of available file information, a comprehensive target survey,¹ and site reconnaissance. This report summarizes:

- A basewide review of historical activities with the potential to cause PFAS contamination in groundwater, surface water, soil, and air at former Fort Ord sites.
- A basewide pathway and environmental hazard assessment of the former Fort Ord sites where PFAS releases into the groundwater, surface water, or soil were likely.

Per the Army guidance for addressing releases of PFAS (Army, 2018), potential Army locations where releases of PFAS may have occurred prior to the closure of Fort Ord in September 1994, and which merited evaluation during the PA include:

- Current or former fire training areas where aqueous film-forming foam (AFFF) is known or suspected to have been applied

¹ A target is a physical or environmental receptor that is within the target distance limit for a particular pathway. Targets may include wells and surface water intakes supplying drinking water, fisheries, sensitive environments, and resources. A pathway is the environmental medium through which a hazardous substance may threaten targets. This PA evaluates the migration and threat potential through the groundwater, surface water, and soil exposure pathways (USEPA, 1991).

- Current or former AFFF storage locations
- Aircraft crash sites where AFFF may have been applied for fire control
- Aviation hangars and other buildings where AFFF is or was used in the fire suppression system and where a release may have occurred
- Plating facilities that may have used PFAS-containing mist suppressants
- Landfills where PFAS-containing materials may have been disposed
- Wastewater treatment plants (WWTPs) that may have received wastewater from facilities that used or disposed of PFAS-containing liquid effluents.

With respect to AFFF, this PA focuses on the Army's historical storage, use, and disposal of potential PFAS-containing AFFF at the former Fort Ord prior to the closure of Fort Ord in September 1994. This PA Narrative Report does not:

- Discuss AFFF storage, use, or disposal onsite by non-Army operations.
- Discuss AFFF storage, use, or disposal onsite by other local Army installations, such as the Presidio of Monterey (POM) and the Ord Military Community.
- Analyze the Army's historical storage, use, and disposal of firefighting foams that do not contain PFAS, notably Class A foams.

Potential sources of PFAS other than those listed above may be considered in future phases of the CERCLA process pending promulgation of Department of Defense (DoD) or Army guidance in response to the recommendations provided in the *Evaluation of the Department of Defense's Actions to Control Contaminant Effects from Perfluoroalkyl and Polyfluoroalkyl Substances at Department of Defense Installations* (DoD, 2021).

This PA Narrative Report includes recommendations for further investigation as a part of an SI, the next step in the CERCLA process, consistent with current Army policy and guidance (Army, 2018). However, this PA Narrative Report does not recommend investigation of secondary areas of concern (e.g., drainage ditches and outfall, groundwater seepage areas) as a part of the forthcoming SI because the investigation of secondary areas of concern is outside the scope of the SI. The SI will be consistent with the Guidance for Performing Site Inspections Under CERCLA (USEPA, 1992a). The goal of the SI will be to obtain information not readily accessible during the PA to better determine the need for further investigation under CERCLA, not to fully characterize the site or secondary areas of concern. If data collected during the SI indicates a PFAS release has occurred and PFAS may have entered secondary areas of concern, further sampling and analysis may be conducted as a part of another SI or a remedial investigation.

1.1.1 PFAS Background

PFAS refers to the entire class of approximately 600 per- and polyfluoroalkyl substances in commerce, of which perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) were historically the most widely used throughout the United States (DoD, 2019b). PFAS are human-made compounds originally developed in the late 1930s and do not occur naturally in the environment. By the 1950s, PFAS had become included in many consumer and industrial products, notably in stain and water-repellant

material, food packaging, and retail products (ITRC, 2020).² PFAS have been used in a variety of industrial applications, including aerospace, automotive, building and construction, and electronics, because they help reduce friction. In the 1970s, the DoD began using AFFF that contained PFOS and, in some formulations, PFOA. PFAS are mobile chemicals that bioaccumulate in humans and wildlife, are stable in the environment, and resist typical environmental degradation processes. PFOS, PFOA, and other PFAS have been found in people, the environment, wildlife, and fish all over the world.

In 2016, the USEPA established lifetime health advisory levels for PFOA and PFOS of 0.07 micrograms per liter ($\mu\text{g/L}$) to provide a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water. When both PFOA and PFOS are found in the drinking water, USEPA recommends the combined concentrations of PFOA and PFOS be compared with the 0.07 $\mu\text{g/L}$ health advisory level (USEPA, 2016).

In 2019, the DoD calculated tap water screening levels of 0.40 $\mu\text{g/L}$ for PFOA and PFOS and 400 $\mu\text{g/L}$ for perfluorobutane sulfonic acid (PFBS) using the USEPA online calculator; however, if multiple PFAS are encountered at a site, a 0.1 factor is applied to the screening level (i.e., the screening levels for PFOA, PFOS, and PFBS individually are 0.04 $\mu\text{g/L}$, 0.04 $\mu\text{g/L}$, and 40 $\mu\text{g/L}$, respectively) (DoD, 2019a).

USEPA added PFBS to the Regional Screening Level (RSL) list in 2014 and updated it in 2021 when USEPA released its updated toxicity assessment for PFBS. In 2022, the USEPA established RSLs for five additional PFAS (hexafluoropropylene oxide dimer acid [HFPO-DA], perfluorohexanesulfonic acid [PFHxS], perfluorononanoic acid [PFNA], PFOS, and PFOA). RSLs are risk-based values used to determine if further investigation or actions are needed to protect public health, such as sampling, assessing risks, and taking further action. When multiple PFAS are encountered at a site, a 0.1 factor is applied to the RSL (USEPA, 2022). Additionally, in 2022, the DoD updated the tap water screening levels for PFAS to match the USEPA RSLs (DoD, 2022).

No federal or State of California Maximum Contaminant Levels (MCLs) for PFAS in drinking water have been established.³

At Army installations, the primary mechanism for releases of PFAS is through the historical use of AFFF, a product applied during firefighting and firefighting-related training associated with fuel- or petroleum-based fires after 1972 (Army, 2018). AFFF for firefighting was generally used in areas where fuel- or petroleum-based fires may have occurred, such as in the vicinity of aviation assets, fuel farms, or aircraft crash sites.⁴ The Army's current practice is to not use AFFF for petroleum-based training fires. Other known sources of environmental releases of PFAS include mist suppressants for chromium

² PFAS can also be found in a range of products and processes including, but not limited to: paper products, textiles, leathers, metal plating/etching, wire manufacturing, carpeting, fabric softeners, polishes, waxes, personal care products, sporting equipment, paints, adhesives, medical products, nonstick cookware, industrial resins/surfactants/molds/plastics, and the semiconductor industry.

³ The Army does not own or operate potable water supply systems at the former Fort Ord. In October 2001, the Army transferred portions of the former Fort Ord to the Fort Ord Reuse Authority (FORA), who in turn transferred the water and wastewater systems to the Marina Coast Water District, a local water purveyor.

⁴ There are two major classes of firefighting foams. Class A foams were developed in the 1980s for fighting wildfires and are also used to fight structure fires (Class A foams do not contain PFAS). Class B foams are designed to effectively extinguish flammable and combustible liquids and gases; petroleum greases, tars, oils and gasoline; and solvents and alcohols. Class B foams can be synthetic foams, including AFFF (ITRC, 2020).

electroplating operations, and landfills and WWTPs that have inadvertently accepted PFAS-containing materials (Army, 2018).

1.1.2 Activities Conducted During the Preliminary Assessment

Several activities were conducted during the review effort of the PA. The primary source of information during the file search was the Fort Ord Administrative Record. Records of particular interest included site maps, inspection reports, aerial photographs, permit applications, and analytical sampling results that may be contained in site characterization reports, remedial action work plans and confirmation reports, site closeout reports, real property records, and findings of suitability to transfer.

A comprehensive targets survey was also conducted to identify physical or environmental receptors within the target distance limit for a particular pathway for specific sites.⁵ Targets may include wells and surface water intakes supplying drinking water, sensitive environments, and fisheries potentially affected by the site. The comprehensive targets survey included a review of maps, geologic reference materials, studies of groundwater resources, databases of public drinking water supplies, historical and current aerial photographs, and telephone and email inquiries with government and water control agency officials.

Interviews were also conducted with personnel who worked at Fort Ord in roles that may have used or managed AFFF or waste potentially containing PFAS. Personnel interviewed included current and former firefighting staff, Fritzsche Army Airfield (FAAF) staff, and environmental staff. Records of communication are in Appendix A.

Site reconnaissance was conducted to observe sites and their environs visually and collect additional information to assist the PA evaluation. Recorded observations include descriptions of the physical features of the site, observations that differ from descriptions gathered through previous data collection, descriptions of photographs taken, and conversations with site personnel and neighbors. Site reconnaissance information is in Appendix B.

1.2 Preliminary Assessment Methodology

A three-step assessment process (primary, secondary, and tertiary) was implemented for sites at the former Fort Ord to determine the likelihood of a PFAS release and determine the need for further action, as summarized below. This process included reviews of existing information about use and disposal practices at the installation and collection of limited field data.

1.2.1 Primary Assessment Methodology

In accordance with Army guidance for addressing releases of PFAS (Army, 2018), a primary review of basewide historical records was conducted to identify locations at the former Fort Ord where releases of PFAS may have occurred. Historical records reviewed during the primary assessment included:

- Enhanced Preliminary Assessment (Weston, 1990)
- Remedial Investigation Report, Remedial Investigation/Feasibility Study, Fort Ord Landfills (Dames & Moore, 1991)
- Literature Review and Base Inventory Report (EA, 1991)

⁵ The target distance limit is the maximum distance over which targets are evaluated and the distances vary by pathway (USEPA, 1991).

- Preliminary Assessment/Site Investigation for Fourteen Sites (JMM, 1991)
- Community Environmental Response Facilitation Act (CERFA) Report (ADL, 1994)
- Environmental Baseline Survey, Fritzsche Army Airfield Parcel (HLA, 1995a)
- Basewide Remedial Investigation/Feasibility Study (HLA, 1995d)
- Environmental Baseline Survey, Main Garrison Parcels (HLA, 1997d)
- Field Investigation and Data Review, Solid Waste Management Units (Harding ESE, 2002)
- Draft Final Five-Year Review Report, First Five-Year Review Report for Fort Ord Superfund Site (Army, 2002)
- Final Second Five-Year Review Report, Fort Ord Superfund Site (Army, 2007)
- Final 3rd Five-Year Review Report for Fort Ord Superfund Site (Army, 2012)
- Final 4th Five-Year Review Report for Fort Ord Superfund Site (Army, 2017)
- Technical Summary Report – Perfluorooctanoic Acid and Perfluorooctane Sulfonate, Basewide Review of Historical Activities and Groundwater Monitoring at Operable Unit 2 (AEI, 2020)⁶

During the primary review, historical sites at the former Fort Ord were evaluated to identify:

- Former fire training areas where firefighting exercises were conducted
- Potential former AFFF storage locations (e.g., fire stations)
- Aircraft crash sites where AFFF may have been applied for fire control
- Aviation hangars and other buildings or fuel storage areas where AFFF was used in the fire suppression system and where a release may have occurred
- Other aviation assets (runways, fuel farms, defueling areas) where fuel- or petroleum-based fires may have occurred and AFFF may have been applied for fire control
- AFFF firefighting equipment testing and washout discharge locations, including oil-water separators or other piping systems where released AFFF may have flowed
- Areas where large fires occurred (e.g., warehouse fires)
- Areas where chromium electroplating operations were performed
- Landfill and waste disposal areas that may have received waste streams containing PFAS, including waste material and sludge from WWTPs
- WWTPs that may have received wastewater from facilities that used or disposed of PFAS-containing liquid effluents

The list of sites included in the primary assessment is presented in Table 1 and results of the primary review are summarized in Section 3.0.

1.2.2 Secondary Assessment Methodology

Known or probable fire training areas, potential AFFF storage locations, aircraft crash sites, aviation hangars and other aviation assets, landfill areas, and WWTPs identified in the primary review then underwent a secondary records review. Historical records reviewed during the secondary assessment included:

- Site characterization reports
- Interim Action (IA) work plans

⁶ Although the Technical Summary Report was referenced during the PA, this PA Narrative Report is a stand-alone document and sites were reevaluated independently of the Technical Summary Report's conclusions.

- IA confirmation reports
- Data summary and evaluation reports
- Remedial action work plans
- Remedial action confirmation reports
- Closeout reports
- Real property records
- Criteria lists and scoresheets

Site reconnaissance and interviews with personnel either currently or formerly employed at Fort Ord were also conducted for the secondary assessment sites. The results of the secondary reviews are also summarized for each secondary assessment site in Section 4.0 and Table 2.

1.2.3 Tertiary Assessment Methodology

Known or probable fire training areas, potential AFFF storage locations, unplanned release areas, aviation hangars and other aviation assets, landfill areas, or WWTPs identified in the secondary review then underwent a tertiary records review. Information obtained during the tertiary assessment records review included:

- Geology, hydrogeology, hydrology, and soil settings at each site
- Residential, commercial, and industrial populations on or near each site
- Private and municipal drinking water wells on or near each site
- Groundwater use on or near each site
- Fisheries and sensitive environments downstream of each site

This information was used to develop a pathway and environmental hazard assessment for the selected sites. Sources of information reviewed during the tertiary assessment phase included:

- Data summary and evaluation reports
- Site characterization reports
- Vernal ponds and other sensitive environment maps
- Conversations with and information shared from local municipal water resource officials
- Census results
- Real property records

Information gathered during the primary and secondary assessments was used to identify targets and target populations. Target distance limits (the maximum distance over which targets are evaluated) for the groundwater and surface water pathways identified in the PA guidance (USEPA, 1991) were modified to account for site-specific conditions at the former Fort Ord. The target distance limit for the soil pathway is consistent with the PA guidance (200 feet for the resident population and 1 mile for the nearby population).

The hydrogeology at the former Fort Ord is well characterized (see Section 2.4); therefore, actual groundwater migration pathways were used to determine the distances between sites and wells instead of the general 4-mile radius from the PA guidance. Accordingly, drinking water supply wells screened at deep aquifers or shallow aquifers upgradient or cross-gradient of a site were not considered to be a potentially impacted well because potential PFAS-contaminated groundwater at the former Fort Ord is not within the capture zone of these drinking water supply wells.

Information about the watersheds was gathered from the United States Geological Survey National Hydrology Dataset. The onsite Marina and Salinas watersheds extend outside of the boundaries of the former Fort Ord and the boundaries of this PA and therefore were modified in the attached figures to highlight the extent of the watersheds within the boundaries of the former Fort Ord. Due to the high infiltration rates in the sandy soils covering the majority of the former Fort Ord, there is minimal stormwater runoff and there are no identified probable points of entry to surface water. Additionally, there are no surface water intakes supplying drinking water on the Salinas River downstream from the former Fort Ord.

The air pathway was not considered for this PA because Fort Ord closed in 1994 and vapor migration plays only a minor role in the mobility of most PFAS in the environment due to the low to very low vapor pressure of the majority of PFAS. Specifically, because the PFAS found in AFFF are non-volatile, air emissions of PFAS from AFFF use are not suspected to be significant. Wind transport of AFFF from the point of release is possible; however, studies at other sites suggest aerial transport is limited (Arcadis, 2019). Therefore, any PFAS releases into the air due to Army operations while Fort Ord was an active installation have dispersed and no longer pose an unacceptable threat to human health or the environment through the air pathway.

Based on the results of the tertiary assessment, selected sites are recommended for soil or groundwater investigation in an SI, the next step in the CERCLA process. Consideration was given to the presence of existing groundwater monitoring wells, if any, and consistency with the DoD's "worst first" approach, where potential PFAS release sites are prioritized and sequenced for further action based on risk, with higher risk sites (i.e., where human exposure to contaminated drinking water exists) being addressed before lower risk sites (Army, 2018).

The results of the tertiary reviews are summarized for each tertiary assessment site in Section 5.0 and Table 3.

2.0 Fort Ord Description

2.1 Fort Ord General Description

The former Fort Ord is located along the Pacific Ocean in northwest Monterey County, approximately 80 miles south of San Francisco, California (Figure 1). The former military installation covered about 28,000 acres, is bounded by Monterey Bay to the west and the Santa Lucia Range to the south, and is surrounded by the cities of Del Ray Oaks, Marina, Sand City, and Seaside. State Route 1 and the Union Pacific Railroad right-of-way traverse through the western portion of the former Fort Ord, separating the Monterey Bay beachfront from the rest of the installation. Fort Ord served as a training and staging facility for infantry troops from 1917 until its closure in 1994. In 1990, Fort Ord was placed on the USEPA National Priorities List (NPL),⁷ primarily due to volatile organic compounds found in groundwater beneath the Fort Ord Landfills. Fort Ord was closed in 1994 under the Base Realignment and Closure Act.⁸ Environmental remediation at the former Fort Ord is being completed pursuant to CERCLA §121 the NCP, and the Federal Facility Agreement signed by representatives of the Army, USEPA, the California Department of Health Services (now the California Department of Toxic Substances Control [DTSC]), and the California Regional Water Quality Control Board – Central Coast Region (CCRWQCB). The Federal Facility Agreement became effective on November 19, 1990.

2.2 Fort Ord Operational History

The original Fort Ord site was established in 1917 with the purchase of 16,324 acres of land near the former East Garrison. The base was originally named the Gigling Field Artillery Range and was used by locally stationed units as a maneuver area and field artillery and target range. In 1933, the site was renamed Camp Ord. Five years later, construction of the East Garrison began, which included administrative buildings, mess halls, and tent pads. Additional land was acquired to expand the base to over 20,000 acres, after which the base was renamed Fort Ord (Weston, 1990).

Fort Ord was used as a staging area during World War II, the Korean War, and the Vietnam War. In 1947, Ord became the headquarters for the 4th Replacement Training Center under the U.S. Army Training and Doctrine Command. From 1957 to 1974, the base was used as a basic infantry training center. FAAF was dedicated to Fort Ord in 1960 and expanded over the following year. Fort Ord was designated in 1974 as headquarters for the reactivated 7th Infantry Division. Since 1975, Fort Ord has accommodated both infantry and artillery units under the authority of the U.S. Army Forces Command. By 1990, Fort Ord supported a total population of approximately 33,800 personnel (Weston, 1990).

Since base closure in 1994, much of the original Fort Ord site is no longer owned by the Army and has been transferred to various public and private owners. The former Main Garrison area is now primarily owned and operated by California State University Monterey Bay (CSUMB), with some areas owned by Monterey Peninsula College, the City of Marina, and the City of Seaside. In 1995, the FAAF was transferred to the City of Marina for use as the Marina Municipal Airport. Portions of the former Fort Ord between Reservation Road and the airport are now owned by the University of California and are

⁷ The NPL is a list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the USEPA in determining which sites warrant further investigation.

⁸ BRAC is the process the Department of Defense has used to reorganize its installation infrastructure to more efficiently and effectively support its forces and increase operational readiness.

operated as the University of California, Monterey Bay Education, Science, and Technology Center (UCMBEST). The eastern part of the site is operated by the U.S. Bureau of Land Management as the Fort Ord National Monument. The former East Garrison area is owned by Century Communities and is now operated as the East Garrison housing development. The Pacific Ocean beach portions of the former Fort Ord are now owned by the California Department of Parks and Recreation and are operated as the Fort Ord Dunes State Park. Much of the Inland Ranges, however, remain owned by the Army. Further information about property transfer and ownership is in Table 4.

2.3 Fort Ord Waste Characteristics

A variety of waste was generated during active Fort Ord operations, including household waste, commercial waste, munitions and explosive waste, construction waste, and various hazardous wastes. Several sites, including Site 16, Site 31, and the Operable Unit 2 (OU2) Fort Ord Landfills, operated as landfills for onsite waste. Several sites, including Sites 1, 2, 32, and 36, operated as WWTPs, receiving influent water from residential, commercial, and military use. Hazardous waste was managed by the Directorate of Logistics (DOL).

Following base closure in 1994, a series of remediation efforts were undertaken onsite to address potential groundwater, surface water, soil, and air impacts to human health or the environment due to Fort Ord operations. Chemicals of concern (COCs) varied by site use but included heavy metals at training ranges and volatile organic compounds and petroleum hydrocarbons at maintenance yards, burn pits, landfills, and WWTPs. Petroleum hydrocarbon-impacted soils were treated at the Fort Ord Soil Treatment Area (FOSTA), which was active from 1995 to 1997. Several remediation efforts remain ongoing, including soil gas and groundwater remediation at Sites 2/12 and groundwater remediation associated with the OU2 Fort Ord Landfills.

2.4 Fort Ord Geology and Hydrogeology

The former Fort Ord is located within a geologically complex area of Monterey County. Stratigraphy consists of the Miocene Age Monterey formation, which is characterized by marine deposits. The Pliocene Age Purisima formation unconformably overlies the Monterey formation and consists of poorly indurated gravel, sand, silt, and silty clay. Stratigraphically above the Purisima is the Paso Robles formation of Pliocene/Pleistocene Age. The Paso Robles contains alluvial fan, lake, and floodplain deposits. Overlying the Paso Robles formation is the Aromas Sand, a Pleistocene unit consisting of well-sorted sand containing one or more gravel intervals and, in some localities, a thin basal breccia member. The youngest deposits in the area are unconsolidated gravel, sand, silt, and clay, which were deposited as alluvium, floodplain deposits, terrace deposits, and sand dunes. The former Fort Ord is located in a highly active seismic area, in the middle of a strip of land called the Palo Colorado-San Gregorio Fault Zone, located between the major San Andreas fault zone and a lesser zone that trends northwesterly from Point Sur (HLA, 1994d).

Fort Ord is underlain by the Monterey subbasin of the Salinas Basin in the northern and eastern areas and the Seaside Basin in the southwestern area (Figure 2). The Monterey subbasin includes the Main Garrison and East Garrison areas, the former FAAF, and the City of Marina. The Seaside Basin is comparatively small and includes the Inland Ranges, City of Del Rey Oaks, City of Seaside, and Sand City (HLA, 1995d).

Three groundwater aquifers within the Monterey subbasin are in the remediation phase of cleanup activities at the former Fort Ord: the unconfined A-Aquifer, the unconfined and confined Upper 180-Foot Aquifer, and the confined Lower 180-Foot Aquifer (Figure 3). The aquifers consist predominantly of fine to coarse-grained sands separated by silty clay or clayey fine-grained sand aquitards (MACTEC, 2001).

The A-Aquifer is located within the relatively homogenous dune sand deposits and is perched above the regional Fort Ord-Salinas Valley Aquitard (FO-SVA) (Figure 3). A groundwater divide in the A-Aquifer exists east of the OU2 Fort Ord Landfills and trends northward toward the former FAAF. Groundwater in the A-Aquifer east of the divide flows north and northeast toward the Salinas Valley and discharges at the bluff face above the Salinas River. Groundwater in the A-Aquifer west of the divide flows north and northwest to the edge of the FO-SVA (HLA, 1995d).

To the west where the FO-SVA pinches out, the unconfined A-Aquifer and confined Upper 180-Foot Aquifer combine to form a continuous, unconfined hydrostratigraphic unit (identified as the unconfined Upper 180-Foot Aquifer) (Figure 3). A north-trending groundwater divide in the unconfined Upper 180-Foot Aquifer exists midway between the FO-SVA and Monterey Bay. Groundwater in the unconfined Upper 180-Foot Aquifer west of the divide flows west and discharges to the Monterey Bay. Groundwater in the unconfined Upper 180-Foot Aquifer east of the divide flows under the FO-SVA (becoming confined) toward the Salinas Valley.

The Upper and Lower 180-Foot Aquifers and portions of the 400-Foot Aquifer (locally) are contained within valley-fill deposits composed predominantly of fluvial sand with some gravel. The Upper 180-Foot Aquifer is separated from the Lower 180-Foot Aquifer by the Intermediate 180-Foot Aquitard, which appears to be laterally discontinuous in the eastern portion of the former Fort Ord near the OU2 and Operable Unit Carbon Tetrachloride Plume areas creating a natural conduit between the aquifers (Army, 2008a) (Figure 3).

The Lower 180-Foot Aquifer and the 400-Foot Aquifer have similar groundwater elevations in the areas of the Main Garrison and the Fort Ord Landfills. Little hydraulic separation is evident at these locations; therefore, their groundwater elevations are contoured together and they are considered as a single hydrostratigraphic unit. Groundwater flow in the Lower 180-Foot Aquifer and the 400-Foot Aquifer is eastward toward the Salinas Valley and groundwater levels fluctuate in direct response to seasonal groundwater demand by Salinas Valley irrigation wells (HLA, 1995d). The Lower 180-Foot Aquifer and the 400-Foot Aquifer are penetrated by three Marina Coast Water District (MCWD) drinking water supply wells.

The “180-Foot” and “400-Foot” aquifer names at the former Fort Ord are derived from the aquifer names in common usage in the Salinas Valley. Underlying the 400-Foot Aquifer is a confining layer reported to be approximately 150 feet thick that separates the 400-Foot Aquifer from the 900-Foot Aquifer, which consists of sands and gravels interbedded with discontinuous lenses of clay between depths of approximately 750 and 1,700 feet below ground surface (bgs). The 900-Foot Aquifer is penetrated by three deep MCWD drinking water supply wells (HLA, 1995d).

The boundary between the Monterey subbasin and the Seaside Basin is not well defined. An east-west-trending “bedrock high,” as defined by the presence of the Monterey Formation, is believed to extend from the vicinity of Welch and Grant Ewing ridges eastward to at least Camp Huffman. The basin

boundary then extends southward from Camp Huffman toward Laguna Seca approximately parallel to Wildcat Ridge. The Seaside Basin includes the Uppermost Aquifer, Paso Robles Aquifer, and Santa Margarita Aquifer (Figure 4). The Uppermost Aquifer is not used for water supply, but the Paso Robles and Santa Margarita formations contain several water-bearing zones and are water supply sources (HLA, 1994d).

The Uppermost Aquifer is similar to the A-Aquifer of the Salinas Basin and consists of sandy, permeable soils. Groundwater within the Uppermost Aquifer is unconfined and perched, generally flowing from east to west. The degree of hydraulic communication between the Uppermost and the underlying Paso Robles Aquifers is considered relatively low because the upper Paso Robles Formation is poorly sorted, with considerable fine-grained components. Additionally, in much of the western portion of the Seaside Basin, an extensive clay (the Seaside clay) appears to separate the Uppermost and Paso Robles Aquifers (HLA, 1994d) (Figure 4).

The Paso Robles Formation is geologically older than the Uppermost Aquifer and the sediments (and aquifer zones) in this formation are believed to be deformed by faulting and folding. This deformation primarily affects the deeper portions of the formation and the faults are considered to act as significant barriers to groundwater flow where they are present. Groundwater in this aquifer is typically confined and flow is influenced to a large degree by pumping from supply wells (HLA, 1994d).

The deepest aquifer in the Seaside Basin is the Santa Margarita formation (Figure 4). Groundwater in this aquifer is confined and groundwater flow is strongly influenced by pumping. As in the Paso Robles Aquifer, this aquifer is deformed by folding and faulting with faults forming barriers to groundwater flow (HLA, 1994d).

Significant seawater intrusion or groundwater contamination has not been identified in the Seaside Basin aquifers (HLA, 1994d). Seawater intrusion is not occurring in the Seaside Basin, though both the Paso Robles and Santa Margarita Aquifers in the Seaside Basin are susceptible to seawater intrusion (Montgomery, 2020). Based on current seawater intrusion mapping from the Monterey County Water Resources Agency, seawater intrusion in Monterey County is located north of the former Fort Ord (MCWRA, 2022). Pure Water Monterey, a joint advanced water recycling project by the Monterey Peninsula Water Management District and Monterey One Water, works to address seawater intrusion in the Monterey subbasin through groundwater replenishment with treated recycled water (Pure Water Monterey, 2022).

2.5 Fort Ord Surface Water and Physiography

Several small unnamed lakes and intermittent tributaries are located at the former Fort Ord. The tributaries are mainly located in the undeveloped eastern portion of the facility and drain toward the north to the Salinas River or to the south to an unnamed tributary. Both the Salinas River and the unnamed tributary drain into the Pacific Ocean, which is located along the western border of the former Fort Ord. The western portion of the former Fort Ord, which extends from the coastline 4 or 5 miles inland, consists primarily of stabilized and shifting sand dunes. Elevations in this area range from sea level along the coastline of Monterey Bay to over 500 feet above mean sea level (MSL) on Merrilis Hill, near the center of the former Fort Ord. The eastern portion of the former Fort Ord, from the vicinity of the East Garrison south to Laguna Seca, consists of hilly land with randomly oriented ridges and drainage swales. Few surface water bodies exist in the area because the highly permeable sandy soils drain most

of the rainfall, leaving little runoff. Elevations in the eastern portion of the former Fort Ord range from approximately 200 feet above MSL in the vicinity of the East Garrison to over 900 feet above MSL near Laguna Seca (EA, 1990). Topography and drainage at the former Fort Ord are shown in Appendix C.

2.6 Fort Ord Soil Setting

The predominant lithology is loose, well-sorted (poorly graded) fine- to medium-grained sand. The sands represent active and recently active dunes and older Pleistocene-age dune sands. The active dune sands parallel the beach and extend several hundred feet inland. The older dune sands cover most of the northern and western portions of the former Fort Ord. Paleosols, representing former ground surfaces (silty sands), exist within these sands. These paleosols indicate that one or more cycles of dune deposition have occurred with intervening periods of soil development. The paleosols in the dunes bordering the beach indicate that older dune sand is locally present beneath the recent dune sand.

The dominant soil types found at the former Fort Ord include the Arnold, Baywood, and Oceano series. These soils formed in alluvium derived from mixed sources on alluvial fans and terraces and also formed in material derived from sand dunes, hills, and uplands. These soils are excessively drained, moderately erosive, and extremely low in fertility, and are therefore of limited agricultural value.

Arnold soils (Arnold-Santa Ynez Complex or Ar) are found mainly in the Inland Ranges. Baywood soils formed in stabilized sand dunes and are located west of the former FAAF, the golf course, Main Garrison area, and the western portion of the Inland Ranges. Vegetation in these areas is generally manzanita, chamise, and scattered oaks. Baywood soils are susceptible to erosion if the vegetation cover is removed.

Soils that are characteristic of the Oceano series are located at the former FAAF, portions of the Main Garrison, the northern portion of the Inland Ranges, and Fort Ord Dunes State Park. These soils support annual grasses, forbs, and scattered brush.

The southeastern corner of the former Fort Ord is characterized by soils from the Santa Ynez series. These soils are typically well-drained soils that form on terraces in alluvium derived from sandstone and granitic rock. Generally, the vegetation consists of annual grasses and forbs, scattered oaks, and brush.

Soils along the coast are principally formed on marine sedimentary rocks and sand dune deposits. These areas are partly covered by water during high tides and exposed during low tides. Inland from coastal beaches are the coastal dunes. Typical vegetation in dune areas includes ice plant, lupines, brush, and grasses (EA, 1990).

Because of the high permeability of the dune sand deposits that cover the surface of the former Fort Ord, rainfall generally percolates directly in the soil. As a result, most of the area of the former Fort Ord displays large, undrained basins; however, runoff does occur over developed areas in the former Main Garrison and along a few ephemeral streams in deep canyons in the southeastern area.

3.0 Primary Assessment Site Selection and Results

3.1 Site Selection

Following the methodology described in Section 1.2.1, a list of 103 historical Fort Ord sites and subsites was compiled that includes former or current remedial investigation sites, IA sites, no action sites, solid waste management units, and operable units. The primary assessment sites/subsites are listed in Table 1 and shown in Figure 5. As described in Section 1.2.1, each site was evaluated during the primary review to identify which were suspected to have been:

- Former fire training areas where firefighting exercises were conducted
- Potential former AFFF storage locations (e.g., fire stations)
- Aircraft crash sites
- Aviation hangars and other buildings or fuel storage areas
- Other aviation assets (runways, fuel farms, defueling areas)
- AFFF firefighting equipment testing and washout discharge locations
- Areas where large fires occurred (e.g., warehouse fires)
- Areas where chromium electroplating operations were performed
- Landfill and waste disposal areas
- WWTPs

3.2 Results

It was determined during the primary review that 39 sites or subsites were in one or more of the categories listed in Section 3.1 (Table 1). Specifically, for the former Fort Ord:

- Six sites were determined to have been fire training areas or similar sites where petroleum products were intentionally ignited for training purposes
- Seven sites were determined to have been potential former AFFF storage locations (fire stations or hazardous material storage facilities)
- Two aircraft crash sites were identified
- Nine aviation hangars and other buildings existed where AFFF may have been used in the fire suppression systems
- Two sites associated with aviation assets existed (fuel farms and defueling areas)
- Two sites where firefighting equipment testing and washout discharge locations existed
- Large fires occurred at one site
- There are no known chromium electroplating facilities or other types of metal electroplating, metal plating, or metal finishing operations
- Six sites were determined to be landfills or waste disposal areas
- Four sites were determined to have been WWTPs

These 39 sites were selected for secondary assessment because they were determined to be the site types which merit evaluation per the Army PFAS Guidance (Army, 2018). The remaining 64 sites or subsites were eliminated from further assessment because they were determined to not be the site types that merit evaluation (Army, 2018).

3.3 Primary Assessment Variances

Training ranges such as Site 7 (Ranges 40 and 41, Fire Demonstration Area), Site 8 (Range 49, Molotov Cocktail Range), and Site 9 (Range 40A, Flame Field Expedients Training Area) are not specifically identified in Section 1.2.1 as a type of site recommended for assessment per the Army PFAS Guidance (Army, 2018); however, results of the primary review indicated petroleum products were intentionally ignited at these sites during training activities. Therefore, an evaluation of fire suppression methods, including possible use of AFFF, at these sites was appropriate. Accordingly, Site 8 and Site 9 were selected for secondary assessment.

Site 7, Ranges 40 and 41, was identified as a Fire Demonstration Area during a literature review and site inventory conducted in 1990 after Fort Ord was placed on the NPL (EA, 1991). The site inventory indicated petroleum-based products may have been intentionally ignited at Ranges 40 and 41. This information would otherwise qualify a site to advance to secondary assessment; however, during the primary review it was also found that Site 7 was subsequently investigated to confirm the presence of trenches reportedly used for fire and smoke demonstrations. This investigation found that Range 40 was a low-crawl course and Range 41 was an antitank weapons range, and there was no evidence of trenches or stained soil at these ranges indicating use as a fire demonstration area. Additional information provided by a Fort Ord Range Control officer indicated Ranges 40 and 41 had been confused with adjacent Range 40A, the Flame Field Expedients Training Area (see Section 4.1.2). Based on this, no further investigation was required at Site 7 (HLA, 1994b) and Site 7 was therefore not selected for secondary assessment.

Site 5 formerly operated as Range 36A, an explosive ordnance disposal (EOD) range used for the disposal of various types of commercial explosives and military munitions from the 1940s through 1992 (HLA, 1993a). EOD ranges are not specifically identified in Section 1.2.1 as a type of site to be assessed per the Army PFAS Guidance (Army, 2018); however, plastic/polymer-bonded explosives may have been used for detonations at Range 36A, and plastic/polymer-bonded explosives may contain PFAS (Gaines, 2022). Therefore, Site 5 was selected for secondary assessment.

4.0 Secondary Assessment for Selected Sites

The results of the secondary records reviews for known or probable fire training areas, potential AFFF storage locations, aircraft crash sites, aviation hangars and other aviation assets, landfill areas, and WWTPs identified in the primary review are summarized below. Based on the results of the primary assessment, 39 sites were selected for secondary assessment. Two additional sites, Range 34 and a possible aircraft crash site on the FAAF runway, were discovered during the secondary assessment and added to the secondary assessment evaluation. The secondary assessment was also expanded for two sites, the FAAF Fire & Rescue Station and the Main Garrison Fire Station, because it was reported during interviews that AFFF testing and washout activities had occurred at these sites in addition to potential AFFF storage. Additionally, a review of munitions used at the former Fort Ord was included in the secondary assessment because the former Fort Ord operated as a military training base over several decades, which included use of a variety of munitions for training purposes. Military munitions are not specifically identified in Section 1.2.1 as a potential source of PFAS to be assessed per the Army PFAS Guidance (Army, 2018); however, munitions containing magnesium/Teflon/Viton (MTV), which contains PFAS, may have been used during training activities (Gaines, 2022). The secondary assessment sites are listed in Table 2 and shown in Figure 6.

4.1 Fire Training Areas

The following sections summarize the secondary assessments for former fire training areas where firefighting exercises were conducted and training sites where burning of petroleum products could have resulted in use of AFFF for fire control.

4.1.1 Site 8: Range 49, Molotov Cocktail Range Secondary Assessment

Site Description

Site 8 is located in the central portion of the former Fort Ord east of Parker Flats Road between Gigling Road and Eucalyptus Road at approximately 36.635 degrees latitude and -121.778 degrees longitude. From 1976 through 1988, the site was used as the Range 49 Molotov Cocktail Range (EA, 1991). Site 8 training activities included using handmade explosive devices containing gasoline, transmission fluid, detergent, and motor oil. Two unserviceable military tanks served as targets for the improvised weapons. Distinguishing features onsite included two foxholes and two areas of stained and burned soil where handmade explosives were thrown at the vehicles during training exercises (HLA, 1996f). No buildings were present onsite.

The site is roughly 6,000 square feet in size, and the undeveloped site topography slopes toward the south (HLA, 1996f). Training ranges such as Site 8 are not specifically identified in Section 1.2.1 as a type of site recommended for assessment per the Army PFAS Guidance (Army, 2018); however, petroleum-based products were intentionally ignited at Range 49. Therefore, the site was assessed for possible AFFF use to extinguish training-related fires.

Site reconnaissance was performed on January 21, 2021. No evidence of stained soil or stressed vegetation was found.⁹ No buildings or structures were present onsite. The site currently consists of trees, brush, and other vegetation, with a few clearings where the foxholes were likely located. The site

⁹ Mechanisms for plant uptake of PFAS are not fully understood, so the condition of vegetation does not necessarily indicate presence or absence of PFAS contamination.

is located in a depression, so stormwater runoff offsite is unlikely. Site photos and site visit information are in Appendix B.

Site 8 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 9. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army as an improvised-explosives training area; however, the site was inactive by 1990 (Appendix A, Valdez). The site property was transferred from the Army to the Fort Ord Reuse Authority (FORA) in 2009 and then transferred from FORA to Monterey County in 2020 (Table 4). The site is currently undeveloped and is designated as a habitat reserve in the *Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord* (Army, 1997c).

The site was formerly used during training activities for firing handmade explosives containing gasoline, transmission fluid, detergent, and motor oil. Two unserviceable military vehicles were used as targets. Two foxholes were also used in training activities onsite (HLA, 1996f).

Specific data regarding the chemical composition of the handmade explosives used at Site 8 was not recorded; however, such improvised explosive devices are made from commonly available materials and must contain a fuel (e.g., gasoline or oil) and an oxidizer (DHS, 2015). The “detergents” reportedly used at Range 49 were likely the oxidizing agent and would have had to be readily available; therefore, the primary active ingredients would have been compounds such as hydrogen peroxide or oleum (fuming sulfuric). PFAS are used as detergents or impregnating agents in numerous industrial applications, such as paper and packaging (food and non-food applications), as well as textile finishing, due to the inert and repellent characteristics they provide to surfaces they coat, but are not a common component in the types of household detergents that could be used in improvised explosive devices (Kotthoff, Matthias et al., 2015).

In September 1994, roughly 80 cubic yards of soil and debris were excavated from the site. The depth of excavation ranged from 6 inches to 2 feet, with excavations of up to 4 feet in depth at areas of isolated stained soil. The soil contained glass and metal debris from training activities. Debris was separated from the soil using a screen and shaker after the soil had been transported to the FOSTA. In June 1995, approximately 22 cubic yards of soil and debris were excavated from the site. The depth of excavation was about 5.5 feet. Excavated soil was transported to the FOSTA and the site was backfilled with clean soil (HLA, 1996f).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite. There is no evidence of fires at Site 8 that required suppression using AFFF (Appendix A, Riso). Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.1.2 Site 9: Range 40A, Flame Field Expedients Training Area Secondary Assessment

Site Description

Site 9 is in the central portion of the former Fort Ord within Site 39. The site is located adjacent to the former Range Control and Bureau of Land Management offices near the intersection of Eucalyptus Road and Parker Flats Cut-Off (HLA, 1992a). The approximate coordinates are 36.620 degrees latitude and -121.758 degrees longitude. From the mid-1940s through 1992, the site was used as the Flame Field Expedients Training Area where military personnel were trained in the construction and use of improvised weapons using flammable substances (Shaw, 2012). Training ranges such as Site 9 are not specifically identified in Section 1.2.1 as a type of site recommended for assessment per the Army PFAS Guidance (Army, 2018); however, petroleum-based products were intentionally ignited at Range 40A. Therefore, the site was assessed for possible AFFF use to extinguish training-related fires.

The site is about 100 feet by 200 feet, or roughly 0.5 acres in size (HLA, 1992a). A short concrete retaining wall separates Range 40 from Range 40A, and Range 40A is at an elevation several feet below Range 40 (HLA, 1992b). Site investigations in 1992 and 1994 indicate that topography included several linear depressions approximately 1 foot deep and a depressed, circular-shaped area with sides that sloped steeply upward, resembling an amphitheater (HLA, 1992a).

Site reconnaissance was performed on January 21, 2021. No evidence of stained soil or stressed vegetation was found. An aboveground storage tank (AST) for water used by the U.S. Department of the Interior, Bureau of Land Management for prescribed burns is located in the adjacent Range 40, which was formerly used as an open crawl area. The site currently consists of trees, brush, and other vegetation, with a few clearings. A few shallow depressions still remain from the former Flame Field Expedients site description, but the site is now primarily flat. The site is located in a depression, so stormwater runoff offsite is unlikely. Site photos and site visit information are in Appendix B.

Site 9 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 9. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was owned by the Army and operated by the Fort Ord Range Control from the mid-1940s through 1992. The site remains owned by the Army but has been inactive since site closure (Table 4). During its years of operation, Range 40A was used for training military personnel in the construction and use of improvised weapons using flammable substances. In the training exercises, a drum containing a gelatinous mixture of gasoline was partially buried so that its top pointed at a selected target. Detonation cord was used to blow the lid off the drum while a trinitrotoluene (TNT) charge in the drum ejected the burning material. According to Fort Ord Range Control personnel, the burning material generally fell 75 to 100 meters from the firing point. In addition to the Flame Field Expedients training exercises, three shallow trenches were used for fire and smoke demonstrations, which were conducted by filling the trenches with a fuel similar to that used for the Flame Field Expedients training and then igniting the fuel and allowing it to burn (HLA, 1995d). By 1992, the site had transitioned to use as a recreational small arms target practice site on the weekends (HLA, 1992a).

Field investigations conducted at Range 40A in 1992 and 1994 determined soils at the site consist of surficial yellowish-brown sand to silty sand and clayey sand underlain by a dark grayish-brown sandy clay layer, the bottom of which is hard and dry. Analytical results for soil samples collected during the

investigation indicated relatively low concentrations of petroleum hydrocarbons and metals, primarily in surface samples collected in the general vicinity of the three shallow trenches. Leaching of hydrocarbons and metals through soil to groundwater was not identified as a likely migration pathway because of the clay layer beneath the site. The absence of hydrocarbons beneath the clay layer indicates it is an effective barrier to vertical contaminant migration (HLA, 1995d). A 1992 field investigation also showed that Range 40A was heavily littered with burned plastic, metal canisters, and drum fragments, indicating that waste disposal practices may not have existed or been followed consistently (HLA, 1992b).

Additional site characterization sampling was conducted at Range 40A and adjacent Ranges 39 and 40 in 2001, 2002, 2003, and 2006. A remedial action was conducted in 2010 and 2011 to remove soil with elevated concentrations of lead (Shaw, 2012). Approximately 7,440 cubic yards of soil were excavated from Ranges 39, 40, and 40A and transported to the OU2 Fort Ord Landfills. The depth of the excavations ranged from about 6 inches to 4 feet (Shaw, 2011b).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite. Documentation of activities at Range 40A indicates Flame Field Expedients-related fires were allowed to burn out, and no active fire suppression using AFFF or other methods was required. Additionally, the site is underlain by a clay layer that is a barrier to vertical migration of contaminants, and soil remediation was completed at the site. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.1.3 Site 10: Former Burn Pit Secondary Assessment

Site Description

Site 10 is located in the Main Garrison area of the former Fort Ord near the main gate and about 160 feet south of the Main Garrison Fire Station. The site is near the intersection of Gigling Road and General Jim Moore Boulevard at approximately 36.6445 degrees longitude and -121.8055 degrees latitude. Although no construction record for the burn pit was found, it is believed to have been constructed soon after the fire station was built in the mid-1950s (Weston, 1990). During its years of operation, the site was used as a burn pit in which petroleum products were ignited and extinguished for firefighter training and demonstrations during Fire Prevention Week each year. The pit was approximately 45 feet long, 24 feet wide, and 2 feet deep (HLA, 1996g). A 2-inch diameter pipe penetrated the southern wall of the pit and a drainage swale, apparently resulting from soil settlement after installation of the pipe, extended from the south side of the burn pit (HLA, 1996g). The site is surrounded by grass and forb complexes, with some trees and commercial buildings. The site is unfenced and subject to light vehicular and pedestrian traffic (EA, 1990).

Site 10 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

This site was owned by the Army and operated by the Fort Ord Fire Department from the mid-1950s through 1990. During its years of operation, the site was used 3 to 4 times per year, with an estimated annual fuel consumption of 300 gallons (EA, 1990). During fire suppression training, the burn pit was

filled with 3 to 4 inches of water and fuel, ignited, and extinguished using a foaming product. Fuels used for this purpose reportedly included off-specification aviation fuel (JP-4), gasoline, diesel, and waste oil. After the training sessions, water and residual unburned fuel percolated into the soil at the bottom of the unlined burn pit (HLA, 1996g). By 1990, fire suppression training onsite involved partially filling seven half-drums with water, pouring fuel on top of the water, then igniting the fuel. After the fire was extinguished, the water and residual unspent fuel were allowed to percolate into the soil and evaporate (EA, 1990). This activity may have occurred four to five times for training and demonstrations annually during Fire Prevention Week, likely starting in the 1960s (Appendix A, Riso); however, AFFF would not have been used until after 1972. By 1991, the pit was no longer used and was grass-covered (EA, 1991), suggesting AFFF could have been used regularly at the site for almost two decades. The site is currently owned and managed by the City of Seaside (Table 4).

An IA was performed at Site 10 in July 1995 and required three excavations: one at the burn pit, one at the drainage swale, and one east of the burn pit. The excavation area was approximately 80 feet wide by 100 feet long to a maximum depth of 10 feet. 1,451 cubic yards of soil were removed and treated at the FOSTA, and the excavation was backfilled with clean soil. Further soil gas and soil matrix sampling in 1996 indicated that elevated concentrations of compounds detected at Site 10 were generally confined to the immediate burn pit area and limited in vertical extent (HLA, 1996g).

Secondary Assessment Conclusions

Site 10 is a suspected source area of PFAS. PFAS-containing AFFF was likely used at this site, although it would not have been used until after 1972. There is a potential unacceptable threat to human health or the environment because there is a known or suspected AFFF release onsite. Therefore, Site 10 was recommended for tertiary assessment because of the suspected release of PFAS associated with reported regular use of AFFF at the site for at least two decades and potential impacts to downgradient drinking water supply wells in the long term.

4.1.4 Site 34B: Former Burn Pit Secondary Assessment

Site Description

Site 34B is located in the former FAAF area and wholly within the Fort Ord Natural Reserve, bounded by Reservation Road to the south and Imjin Road to the east. The site is near the current entrance to the Marina Municipal Airport at approximately 36.675 degrees latitude and -121.770 degrees longitude. This site is a former burn pit, as identified in 1995 by Mr. Lee Stickler, a former range control officer; however, no historical records of the burn pit exist (Shaw, 2003). The size of the burn pit is approximately 40 feet by 100 feet (HLA, 2001). The topography is vegetated, and nearby land uses include the Marina Municipal Airport and residential communities south of Reservation Road.

Site reconnaissance was performed on January 8, 2021. No evidence of stained soil or stressed vegetation was found. No buildings are present onsite or nearby. Shrub cuttings placed by University of California staff were present in the pit. The site lies in a depression, so stormwater runoff does not discharge offsite. Site photos and site visit information are in Appendix B.

Site 34B is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 15, Figure 16, and Figure 17. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

Site 34B was formerly owned and operated by the Army. Since base closure in 1994, the site has been owned by the University of California and operated as a part of the Fort Ord Natural Reserve. According to Mr. Stickler, the burn pit may have been used a few times a year as a fire training area by dispensing gasoline or other fuels into the pit, lighting the fuels, and providing an opportunity for firefighters to practice extinguishing the fire. No historical records about the burn pit operations were found (Shaw, 2003).

A review of historical aerial photographs indicates the burn pit was not present in 1956 but was present in 1966. While the burn pit was established after 1956, it had not been used since sometime before 1971 (Appendix A, Riso). This information suggests this site may have been a temporary training area that was used while the FAAF was under construction in the early 1960s and before the FAAF Fire Drill Area was established in 1962.¹⁰

In November 1998, a 100-foot long by 2-foot wide trench was excavated through the long dimension of the former burn pit. Soil analysis indicated elevated levels of lead, petroleum hydrocarbons, and dioxin/furan concentrations limited to less than 5 feet bgs (HLA, 2001). In October 2002, an IA was performed at Site 34B. The excavation area was approximately 40 feet wide by 100 feet long to a maximum depth of 5 feet. 740 cubic yards of soil were removed and disposed of at the OU2 Fort Ord Landfills (Shaw, 2003).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite. Because the burn pit was not used after 1972, there is no suspected release of AFFF at this location. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.1.5 Site 41: Crescent Bluff Fire Drill Area Secondary Assessment

Site Description

The Crescent Bluff Fire Drill Area is located along Crescent Bluff Road, approximately 1 mile southeast of the developed portion of East Garrison, at approximately 36.6435 degrees latitude and -121.722 degrees longitude. It is suspected that Site 41 was used for fire drill practice in the 1940s and 1950s. The exact years of operation are unknown, but an aerial photo from 1956 shows the area is significantly disturbed, while aerial photos since 1966 indicate the site was inactive since at least the late 1960s. The site is bordered on the south by Crescent Bluff Road and the north by Reservation Road.

The site is approximately 1.5 acres with no buildings onsite (HLA, 1996b). There were four shallow depressions, ranging from 1 to 3 feet in depth, suspected to be burn pits formerly used for firefighting drills. These pits range in size from approximately 115 to 900 square feet (HLA, 1997b). The training pits are overgrown and contain ponded water during the wet season (HLA 1995a, Volume I). The elevation at Site 41 ranges from approximately 183 to 200 feet above MSL, with the land sloping toward the southwest. The site is undeveloped and is a seasonal wetland (HLA, 1996b). Land use in the area

¹⁰FAAF was dedicated to Fort Ord in 1960 and expanded in 1961 (Weston, 1990).

includes a large agricultural area north of the Salinas River and the East Garrison development to the northwest.

Site reconnaissance was performed on January 21, 2021. No evidence of stained soil or stressed vegetation was found. Three training pits are still present onsite, and rainfall depth gauges are present in each pit. Because the site is located in a low point, stormwater runoff is not discharged offsite. Site photos and site visit information are in Appendix B.

Site 41 is located in the Salinas River watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 18. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

Site 41 was reportedly an abandoned rock quarry before the Army's ownership of the land (HLA, 1996b). The Army owned and operated Site 41 as a fire drill area in the 1940s and the 1950s. There were four shallow depressions, ranging from 1 to 3 feet in depth, suspected to be burn pits formerly used for firefighting drills. A letter dated November 28, 1952, states liquids in burn pits were ignited and extinguished for demonstration purposes during a Fire Prevention Week in October 1952. Liquids used for the demonstration included used crankcase oil, napalm, gasoline, and kerosene. Approximately 0.3 of an acre of seasonal wetland occurs within the topographic depressions that were used as burn pits (HLA 1996h). The site is currently owned and operated by Monterey County (Table 4).

Based on the results of site characterization, three of the four shallow depressions were recommended for an IA (HLA, 1996b). The IA was performed at Site 41 in June 1996 and required three excavations, with a total of 76 cubic yards of soil removed and disposed of at the OU2 Fort Ord Landfills for use in the engineered cover system foundation layer (ECC, 1997a). Per the direction of the Fort Ord wildlife biologist, the excavated burn pits were not backfilled so the existing wetlands environment would be preserved (HLA, 1997b). The USEPA concurred that no further remedial action was necessary at Site 41 (USEPA, 1997 and DTSC, 2006).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite. Because the pits are small, it is suspected they were used for handheld fire extinguisher training (Appendix A, Riso). Additionally, their suspected use dates to the 1940s and 1950s and the pits were not used for training after 1971 (Appendix A, Riso). Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.1.6 Operable Unit 1: FAAF Fire Drill Area Secondary Assessment

Site Description

Operable Unit 1 (OU1) FAAF Fire Drill Area is located in the western part of the FAAF at approximately 36.680 degrees latitude and -121.773 degrees longitude.¹¹ From 1962 through 1985, the site was used

¹¹ The terms "Operable Unit 1" and "OU1" refer specifically to the actions taken, COCs analyzed, and conclusions stated as a part of historical OU1 operations and eventual closure, which does not include current PFAS assessments. This report refers to the site as the former FAAF Fire Drill Area for all PFAS-related activities.

as the FAAF Fire Drill Area, a training area for the Fort Ord Fire Department. The site is currently inactive.

The former fire drill area is circular, with an approximate 100-foot diameter. The training site is at an approximate elevation of 115 to 120 feet above MSL. The surrounding low hills range in elevation from 150 to 160 feet above MSL. The bowl-shaped site is located on dune sands that extend 80 to 120 feet bgs. During its operational period, the fire drill area was surrounded by a shallow V-shaped ditch and, on the north side of the fire drill area, an unnamed road extended from the fire drill area entrance gate to a drum and fuel unloading area adjacent to an AST (HLA, 1986).

Site reconnaissance was performed on January 8, 2021. No evidence of stained soil or stressed vegetation was found. The site is largely overgrown, with only a circular depression at the location of the former pit. The shallow ditch, drum and fuel unloading area, and AST are no longer present. The site is located in a low point surrounded by hills, so stormwater runoff offsite is unlikely. Site photos and site visit information are in Appendix B.

The FAAF Fire Drill Area is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 15, Figure 16, and Figure 17. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army as a fire drill area from 1962 to 1985, a soil remedial unit from 1987 to 1993, and a groundwater remedial unit from 1988 to 2014. The site is currently owned by the Army but is wholly within the Fort Ord Natural Reserve and will be transferred to the University of California Natural Reserve System (Table 4).

The FAAF Fire Drill Area was established in 1962 as a training area for the Fort Ord Fire Department west of FAAF. As part of training activities, waste fuel (primarily composed of outdated or water-contaminated JP-4) was discharged from an onsite storage tank into a pit, ignited, and then extinguished. Other fuels included hydraulic and lubrication oils, gasoline, diesel, and solvents. After 1972, AFFF was used during training activities to extinguish fires in the fire drill area, with training occurring at least once per quarter (i.e., four times per year) and 100 to 200 gallons of AFFF being used during each training event (Appendix A, Riso).¹² Training activities at the fire drill area were discontinued in 1985 and the associated structures (pipeline and AST) were removed.

These training activities are believed to have resulted in the release of contaminants to soil and groundwater (Army, 2017), though groundwater contamination was limited to the A-Aquifer, which is not used for drinking water purposes (HGL, 2017). The FO-SVA underlies the A-Aquifer beneath OU1 and continues in a downgradient direction more than 5,000 feet beyond the farthest historical extent of the OU1 groundwater plume. The low permeability and thickness of the FO-SVA prevents significant vertical migration of groundwater within the former OU1 plume area from the A-Aquifer into the underlying Upper 180-Foot Aquifer. Additionally, the OU1 area is located within the Fort Ord Special Groundwater Protection Zone, where installation of wells and use of the A-Aquifer for drinking water are restricted by Monterey County Code, and within the Fort Ord Natural Reserve (part of the University of California

¹² Firefighting foam was used before 1972 at Fort Ord; however, this material was referred to colloquially as “blood and guts” foam and was most likely a protein foam made from animal byproducts, including keratin protein. Anecdotally, it was also very good fertilizer.

Natural Reserve System), where development is prohibited. Consequently, there is no exposure pathway to human receptors for groundwater from the OU1 area (HGL, 2017).

In 1987, approximately 4,000 cubic yards of contaminated soil were removed from the former fire drill area to a depth of 31 feet, and the area was then backfilled with clean soil. Excavated soils were spread over the area of the former fire drill area to a depth of 2.5 to 3 feet above the original ground surface and remediated using treated groundwater supplemented with an aqueous nutrient formulation to stimulate microbial degradation of hydrocarbons in the soil (HLA, 1988b). As the soil was remediated, it was removed and transported to a soil borrow area for use as fill in construction projects at the former Fort Ord (HGL, 2017). Site reconnaissance and a review of historical aerial photographs of the soil borrow area indicate over 10,000 cubic yards of soil was removed from the borrow area between April 1991, after soil remediation at the FAAF Fire Drill Area was completed, and July 1992 (i.e., at least 6,000 cubic yards of clean native soil was removed in addition to the 4,000 cubic yards of treated soil). However, there are no records indicating where this soil was used at the former Fort Ord. A remediation confirmation study and risk assessment conducted in 1993 indicated chemicals remaining in soil at the former fire drill area did not present an unacceptable risk to human health or the environment and no further remedial action was necessary (Army, 1996).

Groundwater remediation using pump and treat systems and groundwater monitoring was conducted from 1988 through 2014 at OU1. Treated water from OU1 was discharged at different locations within OU1 depending on the specific treatment system that was in operation at the time. Treated water discharge facilities included two infiltration trench areas in the Fort Ord Natural Reserve (FONR), one infiltration basin in the OU1 Off-Post Area (Armstrong Ranch to the northwest of the FONR), two injection wells in the FONR, and a spray irrigation system in the former FAAF Fire Drill Area. Treatment facilities at OU1 utilized granular activated carbon to remove several COCs, though PFAS were not COCs and were not monitored during OU1 operations. However, sampling and analysis for PFOA and PFOS at the OU2 groundwater treatment plant (GWTP) in 2019 demonstrated that granular activated carbon was effective at removing these PFAS.

Groundwater monitoring results showed the aquifer cleanup levels (ACLs) for COCs specified in the OU1 Record of Decision (OU1 ROD) were achieved at all wells by September 2014. Attainment monitoring performed during 2015 confirmed the OU1 ROD requirements had been met and would be maintained in the future (HGL, 2017). Interviews with Fort Ord personnel indicate that some treated soil from the FAAF Fire Drill Area may have been used as fill material during construction of the Ammunition Supply Point in the East Garrison, but it would have been unlikely (Appendix A, Youngblood).

PFAS were not addressed in the OU1 ROD; however, PFOA and PFOS were included in the groundwater attainment monitoring program for OU1 in 2015 and were considered with COCs in evaluating the case for OU1 site closure. Analytical results for these samples are presented in Table 5, and PFOA/PFOS concentrations in the A-Aquifer are shown in Figure 19. The OU1 closeout report (HGL, 2017) summarizes the OU1 site history, remediation and monitoring activities, and decommissioning of the remediation system.

In March 2016, USEPA, DTSC, and the CCRWQCB concluded OU1 groundwater monitoring and remediation were complete and OU1 could be closed. However, the detected PFOA and PFOS

concentrations in two wells (PZ-OU1-10-A1 and MW-OU1-88-A)¹³ were greater than the USEPA health advisory levels published in May 2016.¹⁴ Therefore, USEPA, DTSC, and CCRWQCB also concluded PFOA and PFOS investigations would continue independently of the completed OU1 remediation effort, and additional work associated with PFOA and PFOS at any part of the former Fort Ord would not be associated with the OU1 ROD (HGL, 2017).

Review of the 2015 PFOA and PFOS data also showed detected PFOA and PFOS concentrations in three wells (PZ-OU1-10-A1, MW-OU1-88-A, and MW-OU1-26-A) exceeded the DoD screening levels for PFOA and PFOS published in October 2019.

Secondary Assessment Conclusions

Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site may pose a potential unacceptable threat of release to the environment and further investigation is warranted. Tertiary assessment of the former FAAF Fire Drill Area was recommended because of the suspected release of PFAS associated with reported regular use of AFFF at the site for at least 13 years and detections of PFOA and PFOS in three groundwater monitoring wells at concentrations greater than the USEPA RSLs and DoD screening levels.

4.1.7 Range 34, Multi-Use Range Secondary Assessment

Site Description

Range 34 is in the south-central portion of the former Fort Ord within Site 39. The site is located along the northeastern boundary of Site 39 west of Barloy Canyon Road (Shaw, 2011a). The approximate coordinates are 36.611 degrees latitude and -121.748 degrees longitude. The range was used for a variety of purposes starting in the late 1950s and may have been used for fougas (also “fougasse”) training (Shaw, 2012), which is similar to flame field expedients training (see Section 4.1.2). However, Range 34 was inactive by 1990 (Appendix A, Valdez). Training ranges such as Range 34 are not specifically identified in Section 1.2.1 as a type of site recommended for assessment per the Army PFAS Guidance (Army, 2018); however, petroleum-based products may have been intentionally ignited at Range 34. Therefore, the site was assessed for possible AFFF use to extinguish training-related fires.

Range 34 is approximately 13.8 acres and runs east to west, sloping upwards to a hill in the center of the range. This range is bordered by hills to the south, north and west, and is heavily vegetated with few open areas. Reconnaissance of this area was conducted in July 1999 for the basewide range assessment. The ridge in the center of the range, which is less vegetated than the rest of the range, appeared to be the main point of impact. The eastern slope was heavily impacted with spent small arms and military munitions. Approximately 1,200 feet west of Barloy Canyon Road, there was a pile of metal debris from 55-gallon drums, and three man-made depressions. The former use of these depressions is unknown. The debris appeared to be almost exclusively from 55-gallon drums. Drum lids visible in the debris were typically of a convex shape, which indicated an explosive force from within the drums. USACE unexploded ordnance safety specialists indicated hydrocarbons may have been used for fougas training at this range. Fougas typically consists of a petroleum fuel-gel discharged explosively from a drum using TNT. Additional drum fragments and partial drums were observed elsewhere at the site (Shaw, 2012).

¹³ These wells were decommissioned in July 2017 (HGL, 2017).

¹⁴ The USEPA health advisory levels were published six months after the attainment monitoring effort was completed.

Site reconnaissance was performed in April 2019 for Range 34 as part of ongoing habitat restoration and monitoring activities (Burlison, 2020). No evidence of stained soil or stressed vegetation was found. The site currently consists of low brush and other vegetation established during habitat restoration, with a few clearings. The site is located on a slope that is actively managed with erosion control measures, so stormwater runoff offsite is unlikely. Site photos and site visit information are in Appendix B.

Range 34 is located in the Salinas River watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 9. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was owned by the Army and operated by Fort Ord Range Control from the mid-1950s to 1990. The site remains owned by the Army but has been inactive since site closure (Table 4). Records indicate Range 34 was a multi-use range used as a Close Combat Course from the late 1950s through the late 1960s. By 1973, Fort Ord Training Ranges Standard Operating Procedures indicate it was used as a Machine Gun Assault Course, during which the M-60 machine gun and M-14 and M-16 rifles were used (Army, 1973). By 1980, the range was used as a mortar range to support Range 31, during which 81-millimeter and 4.2-inch mortars were used (Army, 1980). Fort Ord Training Ranges Standard Operating Procedures indicate the range was inactive by June 1991.

Site characterization sampling was conducted at Range 34 in 2003, 2004, and 2006 and a remedial action was conducted in 2011 to remove soil with elevated concentrations of lead (ITSI, 2014). Approximately 29,330 cubic yards of soil were excavated from Range 34 and transported to the OU2 Fort Ord Landfills. The depth of the excavations ranged from 1 to 5 feet (Shaw, 2011b).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite. Documentation of activities at Range 40A indicates flame field expedients-related fires were allowed to burn out, and no active fire suppression using AFFF or other methods was required, and it is expected similar procedures would have been used at Range 34. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.2 Potential AFFF Storage Areas

The following sections summarize the secondary assessments for potential former AFFF storage locations.

4.2.1 Site 29: Defense Reutilization and Marketing Office Secondary Assessment

Site Description

The Building T-111 polychlorinated biphenyl (PCB) storage area is located on Sloat Street in the East Garrison area within Site 29, the former Defense Reutilization and Marketing Office (DRMO) area, at approximately 36.654 degrees latitude and -121.731 degrees longitude. From 1985 to 1994, Building T-111 was used as a hazardous material storage unit designed to store PCB-impacted materials (Harding ESE, 2003b). The site has been inactive since base closure in 1994. Prior to 1985, Building T-111 was a general-purpose warehouse (Weston, 1990).

Building T-111 is a 30-foot by 100-foot concrete building with an adjoining 50-foot by 100-foot concrete-surfaced yard (Harding ESE, 2003a). The building structure is concrete and originally included locking sliding doors and sloped, bermed, and epoxy-sealed floors separated into three bays. The bays measured approximately 29 feet by 32 feet per bay. The bays were separated by 4-foot high cement block walls, each equipped with a walkover ladder. The floor sloped down from a midline along the length of the building to the berms on each side. Epoxy sealant was applied to the concrete floor and the bottom four feet of the walls. Building T-111 also included an adjoining concrete-surfaced yard. The yard was enclosed by Buildings T-111 and T-110 on two sides and by an 8-foot high, barbed wire-topped chain-link fence on each end. The concrete surface was sloped to one corner where stormwater was conveyed by a concrete culvert to the street curb (Harding ESE, 2003b).

Site reconnaissance was performed on January 21, 2021. No evidence of stained soil or stressed vegetation was found. The windows and doors on Building T-111 are boarded up. A sign describing PCB use onsite was posted on the front door. Some of the original concrete flooring was broken and the fuse box wiring had been removed. Wooden crates of roof tiles used in the East Garrison housing development were stored in the courtyard area, which was secured by a locked chain-link fence. A concrete stormwater ditch leads from the courtyard area northwest to Sloat Street and then northeast to Sherman Boulevard. Site photos and site visit information are in Appendix B.

Site 29 is located in the Salinas River watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 18. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned by the Army and operated by the DRMO. The site is currently owned and operated by Century Communities as part of the East Garrison housing development (Table 4). From 1985 through 1994, Building T-111 was used to temporarily store drums, transformers, and other equipment containing waste oil with PCB concentrations greater than 5 parts per million. Epoxy sealant was applied to the concrete floor and the bottom four feet of the walls. The adjoining exterior concrete surface was sloped to one corner where stormwater was conveyed by a concrete culvert to the street curb. However, the exterior concrete surface was not sealed (Harding ESE, 2003a) and was also used to store chemicals and equipment, though there was not much activity onsite between 1991 and 1993 (Appendix A, Wilcer). A site assessment conducted in 1988 by the Army Environmental Health Agency found the building to be in good condition with storage drums properly sealed, no sign of spillage, and floors properly bermed and sealed with epoxy (Harding ESE, 2003b).

For a 10-month period in 1989, a variety of other hazardous chemicals were stored in Building T-111, including hydraulic oils and paints. However, there is no record of spills or leaks from any stored chemicals at Building T-111 (Harding ESE, 2003a) and, in 2003, Building T-111 received clean closure certification from DTSC (DTSC, 2003).

A former employee reported that, before 1982, transformers were emptied into the field adjacent to the DRMO hazardous storage area before recycling the steel (EA, 1991). During a site visit in December 1991, soil discoloration and slight hydrocarbon odors were noted near the western boundary of the field near storage piles of chain-link fencing material. However, no PCBs were detected in the soil during a 1994 site characterization study (HLA, 1994a). PFAS and PFAS-related compounds were historically used

in transformer fluids but in very low concentrations and were no longer used by 1999 (3M, 1999; 3M, 2000).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. There was no known storage or use of AFFF at the Building T-111 (Appendix A, Riso). PFAS and PFAS-related compounds were historically used in transformer fluids and therefore may be associated with the presence of PCBs. Although the production of PCBs was banned in the United States in 1979, PCB-containing transformer oil was still widely used for years after 1979 and remains present at many sites today. Because the transformers were reportedly emptied into the field adjacent to the DRMO hazardous storage area prior to 1982, the transformers were likely older and would have had the PCB-containing transformer oil. However, no PCBs were detected in the soil when the site was investigated in 1994, indicating transformer oil disposal, if it actually occurred, was minimal or insignificant (HLA, 1994a). Therefore, it is unlikely significant amounts of PFAS were released at Site 29.

Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.2.2 Building T-105 East Garrison Fire House Secondary Assessment

Site Description

The former East Garrison Fire House was located in Building T-105 on Chapel Hill Road between Camp Street and Sherman Street in the East Garrison, at approximately 36.6537 degrees latitude and -121.7327 degrees longitude. Building T-105 was constructed in 1941 and was 3,158 square feet. As of 1991, the building was still identified as a “fire station,” but by 2007 the building had been demolished. The site is now part of the East Garrison residential development. Features near the site now include several parks, chapels, fire stations, libraries, and town centers, as well as residential areas.

Site reconnaissance was performed on January 21, 2021. No evidence of stained soil or stressed vegetation was found. The site is currently a vacant lot on Ord Avenue (formerly Chapel Hill Road) between Sherman Boulevard (formerly Sherman Street) and Kit Carson Drive (formerly Camp Street). The site is sparsely vegetated, and a sediment fence is present around the site. Site photos and site visit information are in Appendix B.

Building T-105 is located in the Salinas River watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 18. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army. The site is now owned and operated by Century Communities as part of the East Garrison housing development (Table 4). Building T-105 was constructed in 1941 as a firehouse. The 3,158 square-foot building operated as a firehouse for the East Garrison area of Fort Ord. In 1991, the building was still identified as a “fire station,” but by 2007 the building had been demolished.

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. AFFF was reportedly never stored or used at Building T-105 (Appendix A, Riso). Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.2.3 Building 514 FAAF Fire & Rescue Station Secondary Assessment

Site Description

The former FAAF Fire & Rescue Station is located in Building 514 at the FAAF (now the Marina Municipal Airport), south of the airport control tower and west of the Site 40A helicopter defueling area, at approximately 36.667 degrees latitude and -121.7607 degrees longitude. Building 514 was constructed in 1961, concurrent with the original buildout and expansion of FAAF, and included facilities typical to fire stations, such as a garage, an office, workshop, storeroom, kitchen, and sleeping quarters. The site is 2,857 square feet in size and the surrounding terrain is relatively flat and sparsely vegetated (DEI, 1993).

Site reconnaissance of the building exterior was performed on January 8, 2021. No evidence of stained soil or stressed vegetation was found. An outbuilding adjacent to the parking lot was constructed sometime after 2009. Stormwater runoff from the north and west sides of the site likely discharges to a low point to the north of the site. Stormwater runoff from the south and east sides of the site is likely retained in the unpaved area to the south of the FAAF Fire & Rescue Station as this is a topographic low with a high rate of infiltration relative to the surrounding paved areas. Site reconnaissance of the building interior was performed on March 5, 2021. No evidence of AFFF storage was found. Garage, office, workshop, storeroom, kitchen, and sleeping quarter spaces are still present onsite, but have been remodeled. Site photos and site visit information are in Appendix B.

Building 514 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 15, Figure 16, and Figure 17. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was owned and operated by the Army as a fire station from 1961 through base closure in 1994. AFFF was stored at the Main Garrison Fire Station in 5- or 10-gallon plastic containers and delivered to the FAAF Fire & Rescue Station to refill the tanks on firefighting vehicles on an as-needed basis. Old or expired AFFF would periodically be rotated out of the tanks on the firefighting vehicles, with the old AFFF being discharged to the grassy topographical low area south of the FAAF Fire & Rescue Station. This activity occurred approximately annually unless the AFFF tank on a vehicle had to be emptied for maintenance purposes, which occurred every several years (Appendix A, Riso).

The site is now owned by the City of Marina. The site is currently the Fire Rescue Station #2, located at 3260 Imjin Road, Marina, CA 93933 and operated by the Marina Fire Department. Fire station facilities included a garage, an office, workshop, storeroom, kitchen, and sleeping quarters and had been remodeled in 2012. Interviews with site personnel indicated that an old Army firetruck that contained a small amount of AFFF was present onsite when the property was transferred to the City of Marina. All AFFF was contained in the vehicle and there was no AFFF storage in the fire station. The truck was largely nonfunctional and used no more than once. Additionally, there were no AFFF discharges from the vehicle during Marina Fire Department use (Appendix A, Crechriou).

Secondary Assessment Conclusions

The former FAAF Fire & Rescue Station is a suspected source area of PFAS. PFAS-containing AFFF was likely discharged at this site, although not until after 1972. There is a potential unacceptable threat to human health or the environment because there is a known or suspected AFFF release onsite. Therefore, the former FAAF Fire & Rescue Station was recommended for tertiary assessment because of the suspected release of PFAS associated with reported intermittent discharges of AFFF in the grassy topographical low area on the south side of Building 514. Because this grassy area exists in a topographical depression, PFAS-impacted surface water runoff from this site is unlikely.

4.2.4 Building T-1820 South Main Garrison Fire House Secondary Assessment

Site Description

The former Main Garrison Fire House (South) is located in Building T-1820 on 1st Avenue between 4th Street and 5th Street at approximately 36.6565 degrees latitude and -121.814 degrees longitude. The 3,158 square-foot building is a potential historical AFFF storage site but is currently inactive. Building T-1820 was constructed in 1940 and likely used as a firehouse until approximately 1953, when the Building 4400 fire station was constructed. As of 1990, Building T-1820 was being used for office space (DEI, 1993). The building is located in the complex of abandoned Army buildings in the Main Garrison. A few nearby buildings are in use by Monterey County.

Site reconnaissance was performed on January 7, 2021. No evidence of stained soil or stressed vegetation was found. The site is currently overgrown. A “Door Blocked” sign is currently posted on the door, but most of the building’s doors and windows are broken. Graffiti and opened cans of cat food indicate recent visitors to the site. Site photos and visit information are in Appendix B.

Building T-1820 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army. The site is now owned and operated by the City of Marina. Building T-1820 was constructed in 1940 for use as a firehouse and was likely abandoned as a firehouse with the construction of the Building 4400 fire station in 1953. As of 1990, Building T-1820 was used for office space (DEI, 1993) but has been abandoned since the closure of Fort Ord in 1994. The site is currently owned and operated by the City of Marina (Table 4).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. AFFF was reportedly never stored or used at Building T-1820 (Appendix A, Riso). In addition, the site was not in operation as a firehouse after 1972; therefore, PFAS-containing AFFF would not have been in use while the site was an active firehouse. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.2.5 Building T-2898 North Main Garrison Fire House Secondary Assessment

Site Description

The former Main Garrison Fire House (North) was located in Building T-2898 on 11th Street between 12th Street and 13th Street at approximately 36.6695 degrees latitude and -121.806 degrees longitude. The 3,158 square-foot building is a potential historical AFFF storage site but is currently inactive. Building T-2898 was constructed in 1940 and was likely abandoned as a firehouse with the construction of the Building 4400 fire station in 1953. As of 1992, Building T-2898 was being used by the Deputy Chief of Staff (G3 ADE) for supply service administration (DEI, 1993) but was abandoned when Fort Ord closed in 1994 and had been demolished by 2007.

Site reconnaissance was performed on January 7, 2021. No evidence of stained soil or stressed vegetation was found. The site is currently a vacant lot. An old Army chapel is located on the adjacent property to the south. Some windblown litter was present onsite. An old sewer inlet and a capped potable water line are still present onsite. Stormwater runoff discharges to a depression to the north of the site. Site photos and visit information are in Appendix B.

Building T-2898 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characterization

The site was previously owned and operated by the Army. The site is now owned and operated by Monterey Peninsula College (Table 4). Building T-2898 was constructed in 1940 and was likely abandoned as a fire house with the construction of the Building 4400 fire station in 1953. As of 1992, Building T-2898 was being used by the Deputy Chief of Staff (G3 ADE) for supply service administration (DEI, 1993). By 2007, Building T-2898 had been demolished.

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. AFFF was reportedly never stored or used at Building T-2898 (Appendix A, Riso). In addition, the site was not in operation as a fire house after 1972; therefore, PFAS-containing AFFF would not have been in use while the site was an active fire house. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.2.6 Building T-3280 East Main Garrison Fire House Secondary Assessment

Site Description

The former Main Garrison Fire House (East) is located in Building T-3280 at the intersection of 9th Street and 5th Avenue, at approximately 36.6617 degrees latitude and -121.7995 degrees longitude. The 4,117 square-foot building is a potential historical AFFF storage site but is currently inactive. Building T-3280 was constructed in 1944 and was likely abandoned as a firehouse with the construction of the Building 4400 fire station in 1953. As of 1992, Building T-3280 was being used as a general-purpose building with office and storeroom facilities (DEI, 1993). The site is currently vacant, with the windows and doors boarded up. Chain-link fence surrounds the site. The area surrounding the site is lightly vegetated with

grass, trees, and bushes. The site is across 9th street from the Marina Equestrian Center and across 5th street from The Dunes on Monterey Bay residential development, also surrounded by a chain-link fence.

Site reconnaissance was performed on January 7, 2021. No evidence of stained soil or stressed vegetation was found. The site is currently a vacant building with a gravel lot to the northeast. Most of the doors and windows are boarded up. A drop ceiling and upper mezzanine were installed by the garage area after the site had been retired from fire department use. Site photos and site visit information are in Appendix B.

Building T-3280 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army. The site is now owned and operated by the City of Marina (Table 4). Building T-3280 was constructed in 1944 and was likely abandoned as a firehouse with the construction of the Building 4400 fire station in 1953. As of 1992, Building T-3280 was being used as a general-purpose building with office and storeroom facilities (DEI, 1993). The site is currently vacant, with the windows and doors boarded up.

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. AFFF was reportedly never stored or used at Building T-3280 (Appendix A, Riso). In addition, the site was not in operation as a firehouse after 1972; therefore, PFAS-containing AFFF would not have been in use while the site was an active fire house. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.2.7 Building 4400 Main Garrison Fire Station Secondary Assessment

Site Description

The Main Garrison Fire Station is located on General Jim Moore Boulevard between Lightfighter Drive and Gigling Road and includes a complex of three buildings. The original fire station, Building 4400, was constructed in 1953. The 6,096 square-foot building includes facilities typical to fire stations, such as a main garage, offices, dining room, kitchen, and sleeping quarters. Building 4400 is currently operated by the Army as the POM Fire Department, located at 4400 General Jim Moore Boulevard, Seaside, California, 93955 and approximately 36.646 degrees latitude and -121.805 degrees longitude. Building 4401, the Applied Instruction Building, was constructed in 1957 for training purposes, and the 225 square-foot facilities were limited to a hose tower and furnace room. Building S-4403 was constructed in 1982, and the 3,750 square-foot facility includes a garage, workshops, and a dry chemical shop (DEI, 1993).

Two 1,000-gallon double-walled fiberglass underground storage tanks (USTs) were installed onsite in 1984 to fuel fire department vehicles. Two 55-gallon aboveground drums were also present onsite to store kerosene and oil. The USTs, which contained diesel and unleaded gasoline, were monitored actively and the drums were stored in a cradle on a concrete block. A 500-gallon AST containing gasoline used to fuel fire trucks was also present onsite but had been removed by the early 1990s (EA, 1991).

The site is located at the southwestern edge of the CSUMB campus, south of the CSUMB Otter Sports Complex. Land use near the site includes commercial properties, including a gas station, laundromat, restaurants, and retail space, owned and operated by the Army, as well as educational facilities owned and operated by CSUMB.

Site reconnaissance was performed on March 19, 2021. No evidence of stained soil or stressed vegetation was found. The site is currently operated by the POM Fire Department. There is no AFFF stored onsite currently. There is no evidence of AFFF storage tanks inside the POM Fire Department, but the site has undergone some remodeling. Stormwater runoff from the front of Building 4400 flows north in a concrete channel parallel to General Jim Moore Boulevard and enters a depression at the intersection of Lightfighter Drive and General Jim Moore Boulevard. Site photos and site visit information are in Appendix B.

Building 4400 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army. The Army continues to operate Building 4400 as the POM Fire Station; however, the property is currently owned by the City of Seaside (Table 4). From 1953 through base closure in 1994, the Main Garrison Fire Station operated as the primary fire station servicing Fort Ord. AFFF was delivered to the Main Garrison Fire Station in 5- or 10-gallon plastic containers. Some of the AFFF was stored in Building 4400 or a CONEX shipping container next to the station until needed at either the Main Garrison Fire Station or the FAAF Fire & Rescue Station (Building 514). Old or expired AFFF would periodically be rotated out of the tanks on the firefighting vehicles, with the old AFFF being discharged to the grassy area on the west side of Building 4401. This activity occurred approximately annually. AFFF tanks on fire department vehicles were also drained when repairs on the tanks were needed. Some AFFF could have leaked or spilled in the grassy areas adjacent to the fire station during this activity, though servicing of AFFF systems occurred only five times over 40 years (Appendix A, Riso). Upon base closure, Buildings 4400, 4401, and S-4403 transitioned to use by the POM as a fire department facility.

Secondary Assessment Conclusions

The Main Garrison Fire Station is a suspected source area of PFAS. PFAS-containing AFFF was likely discharged at this site, although not until after 1972. There is a potential unacceptable threat to human health or the environment because there is a known or suspected AFFF release onsite. Therefore, the Main Garrison Fire Station was recommended for tertiary assessment because of the suspected release of PFAS associated with reported intermittent discharges of AFFF in the grassy area adjacent to Building 4401 and potential impacts to downgradient drinking water supply wells in the long term.

4.3 Aircraft Crash Sites

The following sections summarize the secondary assessments for reported aircraft crash sites where AFFF may have been applied for fire control.

4.3.1 Site 39: Inland Ranges Secondary Assessment

Site Description

Site 39 consists of approximately 6,830 acres designated as habitat reserve in the Habitat Management Plan (Army, 1997c) on the south side of the former Fort Ord. The Inland Ranges are bounded by Eucalyptus Road to the north, Barloy Canyon Road to the east, Old South Boundary Road to the south, and General Jim Moore Boulevard to the west. The Inland Ranges were reportedly used from the early 1900s through base closure in 1994 for various munitions training exercises but have been inactive since then. The topography consists of low rolling hills in the western and central portions and more rugged terrain comprising several canyons and ridges to the east. Elevations range from approximately 200 feet above MSL to 900 feet above MSL (HLA, 1994b). The site is currently owned and operated by the Army as part of the Army-managed portion of the Fort Ord National Monument and is closed to the public due to munitions hazards (Table 4).

Site reconnaissance was performed on January 21, 2021. No evidence of stained soil or stressed vegetation was found. No evidence of aircraft crash sites was found. A conversation with the unexploded ordnance technician escort, Chris Light, indicated that a surface sweep of the Watkins Gate Burn Area was conducted in 2003 after vegetation removal and no evidence of an aircraft crash was found. Mr. Light also noted that features on aerial photographs that appeared to be wreckage could have been targets, such as decommissioned armored vehicles, or other training materials used in the Inland Ranges. Site photos and site visit information are in Appendix B.

Site 39 is located partially in the Marina watershed and partially in the Canyon Del Rey watershed. Surface water information for the site is in Figure 7 and Figure 8. Groundwater information for the site and surrounding area is in Figure 9. Sensitive environments information for the watersheds is in Figure 10 and Figure 11.

Site Operational History and Waste Characterization

The site has been owned and operated by the Army since the early 1900s. The site is currently part of the Army-managed portion of the Fort Ord National Monument and is closed to the public due to munitions hazards. Site 39 was reportedly in use from the early 1900s through base closure in 1994 for various munitions training exercises (HLA, 1994b).

Potential AFFF use in the Inland Ranges included fire suppression at four reported aircraft crash sites. On August 2, 1993, small airplane wreckage was observed during a helicopter survey of Fort Ord in the northcentral portion of the Inland Ranges southwest of the intersection of Broadway Avenue and Evolution Road at approximately 36.608 degrees latitude and -121.798 degrees longitude (ADL, 1994). A review of after-action reports for prescribed burns and munitions responses in this part of the Inland Ranges could not confirm the presence of this wreckage. During interviews, site personnel had no recollection of an aircraft crash but noted that this wreckage may have been a mock-up used for training purposes (Appendix A, Valdez, Collins). However, participants in the 1993 helicopter survey had noted the apparent "accordion" shape of the wreckage, suggesting the airplane had crashed vertically into the ground (Appendix A, Wilcer). Regardless, if there was an aircraft crash in this area, it was in difficult to access terrain and likely occurred before 1971 (Appendix A, Riso). Additionally, fires in the Inland Ranges were often allowed to burn out on their own without intervention by the fire department (Appendix A, Wilcer); therefore, AFFF would not have been applied for fire control.

Two helicopter crashes were reported to have occurred in the Inland Ranges during training exercises sometime in the 1980s. The specific locations are unknown; however, there was no fire and no use of AFFF associated with these crashes (Appendix A, Riso).

In 1989, an AH-1 Cobra attack helicopter and an OH-58 Kiowa observation helicopter crashed approximately 150 yards apart in dense brush during a nighttime training mission. The two helicopters were badly damaged and leaking fuel started a small fire in the dense brush (UPI, 1989). The fire department responded to the crash, but no AFFF was used (Appendix A, Riso). The crash was reported to have occurred 1 mile southwest of FAAF (UPI, 1989); however, interviews with site personnel indicate the crash site was in the Inland Ranges (Appendix A, Riso).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite. Because there is no suspected release of PFAS related to the aircraft crashes no further action is required, and this site was not recommended for tertiary assessment.

4.3.2 Mudhen Lake Possible Aircraft Crash Site Secondary Assessment

Site Description

Mudhen Lake is located in the eastern portion of the former Fort Ord at the intersection of Eucalyptus Road, Crescent Bluff Road, and Jacks Road at approximately 36.627 degrees latitude and -121.731 degrees longitude. Mudhen Lake is an artificially constructed pond filled by direct precipitation and does not hold permanent water (USACE, 1992). A plaque at the site adjacent to Eucalyptus Road indicates Company A of the 84th Engineer Battalion completed construction of a dike across Mudhen Lake on June 30, 1960, dividing the lake into eastern and western sections.

The site of a helicopter crash at Mudhen Lake was noted during a helicopter survey of Fort Ord on August 2, 1993 (ADL, 1994). Munitions responses were completed onsite by 1997 because lakes and ponds have historically been used for the unauthorized discarding of unused munitions. The site is approximately 15.5 acres, divided into an 8.75-acre eastern area and a 6.75-acre western area (USA, 2000). The land is undeveloped and is identified as open space or habitat reserve as a part of the publicly accessible Fort Ord National Monument.

Site reconnaissance was performed on January 21, 2021. No evidence of stained soil or stressed vegetation was found. No evidence of aircraft wreckage was found. On the date visited, standing water was present in the lake along with some waterfowl. Site photos and site visit information are in Appendix B.

Mudhen Lake is located in the Salinas River watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 9. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army. The site is now owned and operated by the Bureau of Land Management as part of the publicly accessible Fort Ord National Monument (Table 4). The site is bounded by Eucalyptus Road and Jacks Road; however, motorized vehicle access is restricted.

There are no records of military training occurring onsite, but the site was an area of concern because lakes and ponds have historically been used for unauthorized discarding of unused munitions. Munitions

sampling and removal actions resulted in the discovery of several training-type items and smoke rifle grenades (USA, 2000).

The site of a helicopter crash at Mudhen Lake was noted during a helicopter survey of Fort Ord on August 2, 1993 (ADL, 1994); however, field surveys for botanical and wildlife resources in 1992 (USACE, 1992) and 1994 (Jones & Stokes, 1995) and the 1997 munitions response (USA, 2000) at Mudhen Lake did not note the presence of wreckage. No other helicopter crash sites were observed during the 1993 helicopter survey, so it is possible this crash site is the same as one of the crashes that potentially occurred in Site 39 (see Section 4.3.1). Interviews with site personnel also indicate no recollection of an aircraft crash at Mudhen Lake (Appendix A, Valdez, Collins). Additionally, the description in the CERFA report indicates the primary concern is a fuel spill and does not indicate any fire associated with this crash (ADL, 1994).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite. It was not fire department policy to use AFFF at fires occurring in remote locations, such as Mudhen Lake. Fires were instead managed using water tenders, clear cutting, or allowing fires to burn out. AFFF was not used for wildland fires and was not carried on wildland engines (Appendix A, Riso). Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.3.3 FAAF Possible Aircraft Crash Site Secondary Assessment

Site Description

The FAAF (now the Marina Municipal Airport) is located on the north side of the former Fort Ord adjacent to the City of Marina. Construction of the FAAF was completed in the early 1960s and it served as the general airfield for Fort Ord. The airfield was transferred to the City of Marina in 1994 and the Marina Municipal Airport was opened for public use in 1995 (City of Marina, 2020). The FAAF is approximately 836 acres in size and is the site of one aircraft crash incident during Army operation of the airfield.

The topography at the FAAF is relatively flat and lightly vegetated. Various military and industrial facilities were present onsite prior to FAAF closure, including several military companies which performed aircraft maintenance. The DOL also employed a civilian maintenance force at the FAAF in Buildings 533 and 535. Developed property within 1 mile of the FAAF includes the Abrams, Frederick, and Schoonover Parks residential areas and local services and commercial areas in the City of Marina to the west-southwest. Undeveloped property within 1 mile of the FAAF includes open space and agricultural land to the northwest and northeast and training grounds to the south (HLA, 1995a).

Site reconnaissance was performed on March 5, 2021, though the runway area could only be observed remotely because the runway is active. No evidence of stained soil or stressed vegetation or an aircraft crash was found. The runway is functional and operated by the City of Marina. Site photos and site visit information are in Appendix B.

FAAF is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 15, Figure 16, and Figure 17. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

Historically, the land on which FAAF is located was open space or used for ranching and agriculture. The remains of an old windmill and well site are present approximately 1,200 feet northwest of the main runway. The FAAF was constructed in the late 1950s and early 1960s. The airfield supported military aircraft maintenance, fueling, flight, and training operations. Many of the buildings, runways, taxiways, and aircraft parking aprons within the parcel are present today as originally built (HLA, 1995a).

A small aircraft crash landing occurred on the runway at FAAF when the aircraft landing gear did not deploy; however, there was no fire and AFFF was not used (Appendix A, Riso). The exact date of the crash is unknown; however, AFFF was reportedly available at the time of the crash (Appendix A, Riso), indicating the crash likely occurred after 1972, and personnel who started working at Fort Ord in 1984 were unaware of the crash (Appendix A, Willison), indicating the crash also likely occurred before 1984.

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite. Because the aircraft crash event did not result in the deployment of AFFF, there is no suspected release of PFAS. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.4 Aviation Hangars and Other Buildings

The following sections summarize the secondary assessments for aviation hangars and other buildings or fuel storage areas where AFFF may have been used in the fire suppression system and where a release may have occurred.

4.4.1 Site 20: South Parade Ground and 3800 and 519th Motor Pools Secondary Assessment

Site Description

Site 20 is located in the Main Garrison area of the former Fort Ord near the main gate. The site is bounded on the west by State Route 1, on the east by General Jim Moore Boulevard, on the north by 1st Street, and on the south by Lightfighter Drive at approximately 36.652 degrees latitude and -121.811 degrees longitude (HLA, 1995c). The site was formerly used as an airfield for small aircraft until the 1960s when the FAAF was built. The site was then used as a parade ground and two motor pool areas for vehicle maintenance until base closure in 1994 (HLA, 1995c).

The South Parade Grounds, the 3800 Motor Pool, and the 519th Motor Pool are roughly 36 acres together. Several buildings were onsite and active by site closure, such as Building T-3867 (operating as drilling supplies storage), Building T-3877 (operating as a restaurant), Buildings T-3854 through T-3859 (operating as office buildings, electrical supply buildings, and vehicle repair facilities), and Buildings S-3897 and S-3898 (automotive repair facilities which were formerly aircraft hangars). Several USTs, removed in the early 1990s, as well as oil-water separators, wash racks, and four storage areas for flammable materials were also present onsite. The topography slopes gently toward the Pacific Ocean.

Elevations range from approximately 200 feet above MSL at the 519th Motor Pool to approximately 130 feet above MSL in the troop training area (HLA, 1995c).

Site reconnaissance was performed on January 7, 2021. No evidence of stained soil or stressed vegetation was found. The site consists of CSUMB athletic fields and no remaining Army structures. A vacant lot is also present onsite. A concrete drainage channel runs from east to west from General Jim Moore Boulevard to 2nd Avenue and discharges west of 2nd Avenue into a stormwater structure and ultimately into Monterey Bay (HLA, 1995b). This drainage structure is relatively new and was likely constructed after the property was transferred to CSUMB. Site photos and site visit information are in Appendix B.

Site 20 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was formerly owned and operated by the Army, first as a small airfield, then as a parade ground and two motor pool areas. The site is currently owned and operated by CSUMB (Table 4). From the late 1940s until the construction of the FAAF in the 1960s, Site 20 operated as the Fort Ord Army Airfield. By 1964, all Fort Ord airfield activity had moved to the FAAF and the Fort Ord Army Airfield was closed, after which the site was used as a motor pool (CSUMB, 2006). In 1943, Building T-3872 was built for vehicle maintenance and service. In the late 1950s, the 519th Motor Pool was established as an aircraft service work area. In 1974, Building T-3872 was recategorized and designated as a general instruction area but was reverted to a motor pool in 1985. In 1982, the 519th Motor Pool was redesignated as a vehicle, light truck, and heavy equipment storage and maintenance yard. Buildings S-3897 and S-3898 were once aircraft hangars but converted to vehicle maintenance upon the closure of the airfield. Documentation was found to verify that Building T-3855 was an aircraft parts storage building, but no records were found describing material delivery and storage for those aircraft. Aircraft fueling likely took place at Building T-3855. In July 1995, Davy International excavated approximately 320 cubic yards of soil from the 3800 Motor Pool. This excavated soil was taken to the FOSTA for treatment and the excavations were backfilled with clean soil (HLA, 1996d).

Secondary Assessment Conclusions

There are no known or suspected sources of PFAS onsite. It is unlikely that PFAS-containing AFFF was released onsite from the airfield and aircraft hangar Buildings S-3897 and S-3898 because these facilities were no longer in use as aviation assets after the early 1960s and AFFF was not in use by the Army until after 1972. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.4.2 Site 22: 4400/4500 Block Motor Pool West Secondary Assessment

Site Description

The Building 4492 Auto Craft Shop is located at the intersection of 8th Avenue and Butler Street at the northwestern portion of Fort Ord in the Main Garrison within Site 22, at approximately 36.649 degrees latitude and -121.788 degrees longitude. From the early 1950s through base closure in 1994, the Building 4492 Auto Craft Shop was used by military personnel for personal vehicle maintenance. After

1994, the site included personal vehicle maintenance options for CSUMB and University of California students and faculty (Army, 2003). The site is approximately 4.5 acres in size bounded on the east by 8th Avenue, with the northern part divided into four separate paved areas, the western part a large, paved parking lot, and the southern part as Building 4492 (now the CSUMB Facilities Services and Operations Building No. 37).

Site reconnaissance was performed on March 5, 2021. No evidence of stained soil or stressed vegetation was found. Facility improvements were completed in 2019, including renovation of interior office space to create offices for CSUMB facility and maintenance personnel. No evidence of an AFFF fire suppression system was present during the site visit. Site photos and visit information are in Appendix B.

Site 22 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The Army owned and operated the site as the Auto Craft Shop. CSUMB Facilities Services and Operations currently occupies the building to support the day-to-day operations of the campus (Table 4; Army, 2003). From the 1950s through base closure in 1994, Site 22 was used as a vehicle maintenance facility (HLA, 1996c). Waste materials associated with automotive maintenance activities were stored in a solid waste management unit at the Auto Craft Shop, including waste oil and solvents, used antifreeze, used fuel filters and oil filters, rags, and contaminated dry sweep. Runoff collected in buried storm drains which discharged into Storm Drain 6, about 100 yards east of the intersection of 7th Avenue and Inter-Garrison Road, near the edge of the western block. The immediate point of discharge was a pool of water about 6 feet by 3 feet. During a 1990 site visit, water was dark brown and had a sheen that appeared to be a thin petroleum layer, and a strong hydrocarbon odor pervaded the area. A small channel distributed this ponded water over $\frac{1}{4}$ acre of sandy soil (EA, 1991). There was evidence of spills and stained soils, but these are likely due to petroleum, oil, or lubricant waste (Harding ESE, 2002). Interviews with Fort Ord personnel indicate waste oil collection for recycling was performed onsite, along with spill awareness training, and the site was clean and organized with spill kits available to address releases (Appendix A, Collins); however, no AFFF was stored onsite (Appendix A, Willison).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. There was no known storage or use of AFFF at the Auto Craft Shop and no suspected release of PFAS (AEI, 2020). Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.4.3 Site 34: FAAF Hangars Secondary Assessment

Site Description

The former FAAF (now the Marina Municipal Airport) is located on the north side of the former Fort Ord adjacent to the City of Marina. Site 34 is located at the airport at approximately 36.682 degrees latitude and -121.750 degrees longitude and includes five aviation hangars. Construction of the FAAF was completed in the early 1960s, after which the site served as the general airfield for Fort Ord. The airfield was transferred to the City of Marina in 1994, and the Marina Municipal Airport was opened for public use in 1995 (City of Marina, 2020). The FAAF is approximately 836 acres in the northernmost portion of

Fort Ord (HLA, 1995a). The topography is relatively flat and lightly vegetated. Various military and industrial facilities were present onsite prior to FAAF closure, including several military companies which performed aircraft maintenance. The DOL also employed a civilian maintenance force at the FAAF in Buildings 533 and 535. Developed property within 1 mile of the FAAF includes the Abrams, Frederick, and Schoonover Parks residential areas and local services and commercial areas in the City of Marina to the west-southwest. Undeveloped property within 1 mile of the FAAF includes open space and agricultural land to the northwest, northeast, and south.

There were five aviation hangars constructed at FAAF that are still in existence and are listed below:

AVIATION HANGARS

Army Building No.	Year Built	Former Army Occupant	Current Occupant	Address
507	1979	7 th Aviation Battalion, C & D Companies Flight Maintenance	Naval Postgraduate School Center for Interdisciplinary Remotely-Piloted Aircraft Studies; Joby Aviation	3200 Imjin Road, Suite A and Suite B
510	1959	2/9 th Cavalry Reconnaissance Flight Maintenance	Fort Ord Works High Performance Structures	3400 Imjin Road
524	1961	2/9 th Cavalry Reconnaissance Flight Maintenance	Joby Aviation	761 Neeson Road
527	1977	HHC Cavalry Regiment and 1/123 rd Aviation Regiment, A & B Companies	Joby Aviation	741 Neeson Road
533	1963	DOL Aircraft Maintenance	Skydive Monterey Bay	721 Neeson Road

Site reconnaissance of the hangar exteriors was performed on January 8, 2021. No evidence of stained soil or stressed vegetation was found at the hangars. A new tensioned fabric hangar was present to the southeast of Building 507. A 10-inch diameter storm drain line runs through the parking lot west of Building 507 and parallel to Imjin Road. This storm drain line discharged at an outfall approximately 350 feet southwest of Building 507, where UCMBEST is now located, and the discharge traveled via surface drainage to a topographic low area to the southeast of Building 507. Surface runoff from around Building 507 appears to have also drained to the same topographic low area (HLA, 1995b).

At Building 510, surface runoff is primarily captured by storm drain inlets surrounding the hangar, eventually discharging at an outfall near the Salinas River. A shallow infiltration basin is present to the south of the hangar and may capture some surface runoff from the south side of the hangar; however, this basin primarily receives surface runoff from the west side of Imjin Road via a culvert, with excess runoff entering the 10-inch diameter storm drain line associated with Building 507 (HLA, 1995b).

At Buildings 524 and 527, some stormwater runoff likely infiltrates the ground surface in a vegetated depression between the two hangars; however, the majority is captured by the storm drain system that discharges via an outfall to an ephemeral creek north of Building 533 (HLA, 1995b). At Building 533, stormwater runoff is primarily captured by storm drain inlets surrounding the hangar and also discharges to the ephemeral creek to the north of the hangar. Site photos and visit information is in Appendix B.

Site reconnaissance of the interiors of Hangars 507, 510, and 533 was performed on March 4 and 5, 2021. No evidence of AFFF-based fire suppression systems was found at the investigated hangars. At Building 507, hardware mounted to the roof trusses previously suspected to be high-expansion foam generators and part of an AFFF fire suppression system were determined to be heating units that are part of the Building 507 hydronic heating system and therefore contained no AFFF. Site photos and site visit information are in Appendix B.

Due to security concerns, Joby Aviation provided photographs and site descriptions for the fire suppression systems inside Buildings 507 (Suite B), 524, and 527. This was supplemented by information gathered during reconnaissance of these hangars conducted in January 2020 (AEI, 2020). No evidence of AFFF-based fire suppression systems was found at the investigated hangars. Site photos are in Appendix B.

Site 34 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 15, Figure 16, and Figure 17. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The former FAAF was previously owned by the Army and included various military and industrial operators. The former FAAF is now owned by the City of Marina and operated as the Marina Municipal Airport (Table 4). The hangars are currently operated by various government and commercial entities, as listed in the table above. The FAAF area was originally outside the formal boundaries of Fort Ord but was incorporated into Fort Ord in 1960 and expanded in 1961. Historically, the land on which FAAF is located was open space or used for ranching and agriculture. The remains of an old windmill and well site are present approximately 1,200 feet northwest of the main runway. The FAAF was constructed in the late 1950s and early 1960s. The airfield supported military aircraft maintenance, fueling, flight, and training operations. Many of the buildings, runways, taxiways, and aircraft parking aprons within the parcel are present today as originally built (HLA, 1995a).

Building 507 was constructed in 1978 and occupied by the 7th Aviation Battalion, C & D Companies Flight Maintenance crew. The total gross square footage is 64,920 square feet (DEI, 1993). Because the building was constructed after 1972, it is possible the fire suppression systems contained AFFF. However, the real property record for Building 507 indicates the fire suppression system consisted of a sprinkler system and hoses, and a fire alarm, indicating a water-based system that did not contain AFFF (Appendix D).

Building 510 was constructed in 1959 and occupied by the 2/9th Cavalry Reconnaissance Flight Maintenance crew. The total gross square footage is 21,947 square feet (DEI, 1993). A review of real property records for this hangar indicates the original fire suppression system consisted of automatic sprinklers, deluge systems, fire hydrants, and fire alarms, and this system was never modified during Army occupation (Appendix D). Additionally, the interior views of Building 510 indicate the original deluge system was replaced with a wet pipe system, no foam-based suppression system is currently present, and there is no infrastructure in place that would have supported a foam-based suppression system; therefore, it is unlikely the fire suppression system at this hangar contained AFFF (Appendix B).

Building 524 was constructed in 1961 and occupied by the 2/9th Cavalry Reconnaissance Flight Maintenance crew. The total gross square footage is 36,007 square feet (DEI, 1993). A review of real property records for this hangar indicates the original fire suppression system consisted of automatic

sprinklers, deluge systems, fire hydrants, and fire alarms, and this system was never modified (Appendix D). Additionally, the interior views of Building 524 indicate the original deluge system is still in place, no foam-based suppression system is currently present, and there is no infrastructure in place that would have supported a foam-based suppression system; therefore, it is unlikely the fire suppression system at this hangar contained AFFF (Appendix B).

Building 527 was constructed in 1977 and was occupied by the Headquarters and Headquarters Company (HHC) Cavalry Regiment and 1/123rd Aviation Regiment, A & B Companies. The total gross square footage is 39,446 square feet (DEI, 1993). Because the building was constructed after 1972, it is possible that the fire suppression system contained AFFF. The real property record for Building 527 does not include details regarding fire protection (Appendix D), but photos of the building interior indicate no foam-based suppression system is currently present, and there is no infrastructure in place that would have supported one (Appendix B). Building 527 also stored several 55-gallon drums of waste oil, used oil filters, waste antifreeze and transmission fluid, and spent solvent and lube oil. There is no evidence of spills, and these drums were removed by 1993 (Harding ESE, 2002).

Building 533 was constructed in 1963 and was occupied by the DOL Aircraft Maintenance crew. The total gross square footage is 35,000 square feet (DEI, 1993). A review of real property records for this hangar indicates the original fire suppression system consisted of automatic sprinklers, deluge systems, fire hydrants, and fire alarms, and this system was never modified (Appendix D). Additionally, the interior views of Building 533 indicate the original deluge system is still in place, no foam-based suppression system is currently present, and there is no infrastructure in place that would have supported a foam-based suppression system; therefore, it is unlikely the fire suppression system at this hangar contained AFFF (Appendix B).

During the inspection of Building 510, the Operations Manager for Fort Ord Works High Performance Structures stated all the hangars at FAAF had water-based deluge fire suppression systems supplied by an elevated water storage tank (Appendix A, Wilcoxson). This assertion was based on information provided by his father, who had served in the Army at Fort Ord and, after being discharged, worked as a civilian boiler mechanic at Fort Ord for the remainder of his career. Fort Ord Works personnel had previously worked in Building 527 starting in the 1990s and not seen any evidence of foam-based fire suppression systems (Appendix A, Uncangco, Wilcoxson). The current fire suppression systems for all five hangars consist of water-based systems supplied by 10-inch diameter pipelines, and there are no active foam-based suppression systems. These systems were supplied by the elevated water storage tank, which was decommissioned, and the systems were then connected to the MCWD water system (AEI, 2020). MCWD water system basemaps also indicate water supplied to the fire suppression systems is non-potable.

It was reported that there was an accidental discharge of foam from the fire suppression system in one of the newer hangars (Building 507 or Building 527), which resulted in more than five feet of foam covering the floor of the hangar (AEI, 2020). However, further interviews with site personnel indicate that the hangar instead filled with three feet of water and a “very thin” layer of foam on top of the water that had been discharged from the deluge system (Appendix A, Riso, Uncangco). The source of the foam present in this discharge incident is unknown, but it is unlikely it was AFFF because:

- AFFF typically forms an expansive layer.

- Site reconnaissance found no evidence of foam-based fire suppression systems currently present in any of the hangars and there is no infrastructure in place that would have supported one historically (Appendix B).
- Interviews with site personnel indicated all of the hangars were originally constructed with water-based deluge fire suppression systems, some of which were modified to water-based wet pipe systems but not foam-based systems.
- Real property records indicate all of the hangars were originally constructed with water-based fire suppression systems that were never modified to foam-based systems.

Secondary Assessment Conclusions

Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.5 Fuel Farms and Other Aviation Assets

The following sections summarize the secondary assessments for other aviation assets (runways, fuel farms, defueling areas) where fuel- or petroleum-based fires may have occurred and AFFF may have been applied for fire control.

4.5.1 Site 34: FAAF Aircraft Fuel Facility Buildings 501, 502, and 503 Secondary Assessment

Site Description

The former FAAF (now the Marina Municipal Airport) is located on the north side of the former Fort Ord adjacent to the City of Marina. The former FAAF aircraft fuel facilities were within a 2-acre area located near the main entrance to the airport at approximately 36.682 degrees latitude and -121.750 degrees longitude. Construction of the FAAF was completed in the early 1960s, after which the site served as the general airfield for Fort Ord. The airfield was transferred to the City of Marina in 1994 and the Marina Municipal Airport was opened for public use in 1995 (City of Marina, 2020). The former FAAF aircraft fuel facilities were transferred separately to the University of California in 2004. The FAAF aircraft fuel facilities included Buildings 501, 502, and 503. Fuels were stored in eight USTs that had a total capacity of 140,000 gallons. Four 10,000-gallon USTs were installed at Building 501 in 1961 and four 25,000-gallon USTs were installed at Building 503 in 1976. All USTs were removed and Buildings 501 and 503 were demolished in 1996 (RCI, 1996). The topography is relatively flat and lightly vegetated. Developed property within 1 mile of the FAAF includes the Abrams, Frederick, and Schoonover Parks residential areas, and local services and commercial areas in the City of Marina to the west-southwest.

Undeveloped property within 1 mile of the FAAF includes open space and agricultural land to the northwest, northeast, and south.

Site reconnaissance was performed on March 5, 2021. No evidence of stained soil or stressed vegetation was found. The only remaining structure onsite is Building 502, with the rest of the site occasionally used as an equipment staging area for nearby construction projects. Site photos and site visit information are in Appendix B.

Site 34 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 15, Figure 16, and Figure 17. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The area of the former FAAF aircraft fuel facilities was previously owned by the Army and is now owned by the University of California as UCMBEST (Table 4). The former FAAF was originally outside the formal boundaries of Fort Ord but was incorporated into Fort Ord in 1960 and expanded in 1961. Historically, the land on which FAAF is located was open space or used for ranching and agriculture. The remains of an old windmill and well site are present approximately 1,200 feet northwest of the main runway. The FAAF was constructed in the late 1950s and early 1960s. The airfield supported military aircraft maintenance, fueling, flight, and training operations. Many of the buildings and runways within the parcel are present today as originally built (HLA, 1995a).

From 1961 through 1994, Site 34 was used as an aircraft fuel facility. In 1961, four 10,000-gallon USTs were installed at Building 501. In 1976, four 25,000-gallon USTs were installed at Building 503. All eight USTs stored JP-4 aviation fuel. In 1988, following the installation of new dispensing equipment for the USTs, all USTs successfully passed pressure testing (Weston, 1990). There are no records of major spills or fires at Buildings 501, 502, and 503 (EA, 1991). In February 1996, all eight USTs were removed and Buildings 501 and 503 were demolished. The USTs were inspected for leakage and found to be in good condition, but the soil under Building 501 showed signs of past leakage. The liquid remaining in the USTs was removed by vacuum truck and transported offsite. The Army transported the USTs offsite, where they were cleaned and disposed of as scrap metal. Roughly 1,060 cubic yards of soil was excavated from the site and transported to the FOSTA (RCI, 1996). During remediation and demolition efforts, AFFF was not observed to be present onsite (Appendix A, Wilcer).

Secondary Assessment Conclusions

There is no evidence of major spills or fires at the former FAAF aircraft fuel facilities. Therefore, it is unlikely that PFAS-containing AFFF was used in firefighting operations at these facilities. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.5.2 Site 40: West FAAF Helicopter Defueling Area Secondary Assessment

Site Description

Site 40 is located in the northwestern portion of the FAAF, consisting of four areas in the vicinity of aviation hangar Building 533 where helicopter parking, defueling, and routine maintenance operations were performed (HLA, 1996a). The site is located at approximately 36.686 degrees latitude and -121.767 degrees longitude. Site 40 operated as a helicopter defueling area from the 1970s until the helicopter defueling area was relocated to Site 40A (see Section 4.5.3). Buildings 533 and 535 are adjacent to the site. The terrain at Site 40 is flat and mostly paved, with sparse vegetation on the west side of the site.

Site reconnaissance was performed on March 5, 2021. No evidence of stained soil or stressed vegetation was found. Gravel and some overgrown concrete paving are still present onsite. An active fire hydrant operated by the City of Marina is also onsite. Site photos and site visit information are in Appendix B.

Site 40 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 15, Figure 16, and Figure 17. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

Site 40 was owned and operated by the Army until base closure in 1994. The site is now owned by the City of Marina and operated as part of the Marina Municipal Airport (Table 4). Defueling stationary aircraft at a single point was performed to prevent leakage while the aircraft was on the ground or to facilitate maintenance operations. Defueling trucks were used to vacuum the bulk of the fuel out of the aircraft. During defueling operations at the FAAF, the fire department was on standby in case of a spill or other incident. There were no reported spill incidents or fires at Site 40 (Appendix A).

In June 1996, approximately 980 cubic yards of impacted soil was removed from two areas onsite. The depth of the excavation ranged from 3 feet bgs to 9 feet bgs. About 650 cubic yards of excavated soil was transported to the FOSTA for treatment and the remaining soil was disposed in the OU2 Fort Ord Landfills (ECC, 1997b).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite. There is no evidence an AFFF or other PFAS release occurred at Site 40. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.5.3 Site 40A: East FAAF Helicopter Defueling Area Secondary Assessment

Site Description

Site 40A is located in the northwestern portion of the FAAF, east of the FAAF Fire & Rescue Station, at approximately 36.678 degrees latitude and -121.756 degrees longitude. New helicopter pads were constructed east of the Fire & Rescue Station in the mid- to late 1970s and the helicopter defueling area was likely relocated from Site 40 to Site 40A around this time (Appendix A, Riso). The site is roughly 1 acre in size, with no major buildings or structures onsite. The terrain is flat and sparsely vegetated.

Site reconnaissance was performed on March 5, 2021. No evidence of stained soil or stressed vegetation was found. The adjacent lot is gravel with a few structures and equipment owned and operated by hangar tenants present on the northwest side of the lot. Site photos and site visit information are in Appendix B.

A 24-inch diameter storm drain line runs through the helicopter parking apron east of the Fire & Rescue Station and parallels Imjin Road. This storm drain line discharges at an outfall approximately 450 feet east of the Fire & Rescue Station. From there, the discharge travels via surface drainage to a topographic low area to the northeast of the helicopter parking apron. Surface runoff from the helicopter parking apron appears to have also drained to the same topographic low area (HLA, 1995b).

Site 40A is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 15, Figure 16, and Figure 17. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was owned and operated by the Army until base closure in 1994. The site is now owned by the City of Marina and operated as part of the Marina Municipal Airport (Table 4). During Army operation, defueling stationary aircraft at a single point was performed to prevent leakage while the aircraft was on

the ground or to facilitate maintenance operations. Defueling trucks were used to vacuum the bulk of the fuel out of the aircraft. During defueling operations at FAAF, the fire department was on standby in case of a spill or other incident.

Sometime in the late 1970s or early 1980s, a defueling tank ruptured, and 5,000 to 10,000 gallons of fuel were spilled. The fire department applied AFFF to the spill area to reduce the likelihood of fire (Appendix A, Riso). After the spill was contained, soil was placed in the spill area to absorb the fuel (and AFFF), after which the soil was loaded into dump trucks and disposed of at an unknown location (Appendix A, Riso). It was also stated that some AFFF entered the topographic low area to the north of the site. Interviews with Fort Ord personnel indicate that the waste soil was likely disposed of somewhere at FAAF or possibly the Fort Ord Landfills (Appendix A, Riso, Youngblood).

Groundwater contamination at the former FAAF would have been limited to the A-Aquifer, which is not used for drinking water purposes (HGL, 2017). The FO-SVA underlies the A-Aquifer beneath Site 40A and continues in a downgradient direction, daylighting at the bluffs above the Salinas River along the eastern boundary of the former Fort Ord (HLA, 1995d, Volume II). Additionally, the low permeability and thickness of the FO-SVA prevents significant vertical migration of groundwater within the former FAAF area from the A-Aquifer into the underlying Upper 180-Foot Aquifer. Consequently, there is no exposure pathway to human receptors for groundwater from the Site 40A area.

Secondary Assessment Conclusions

Site 40A is a suspected PFAS source area due to a reported discharge of AFFF at a previously unidentified helicopter defueling area east of the Fire & Rescue Station and cleanup after the accidental discharge could have resulted in AFFF entering the storm drainage system. No PFAS-containing AFFF was reportedly stored onsite. There is a potential unacceptable threat to human health or the environment because there is a known or suspected AFFF release onsite. Therefore, Site 40A was recommended for tertiary assessment because of the reported use of AFFF for a fuel spill response. However, there is no pathway from this site to existing drinking water supply wells.

4.6 Firefighting Equipment Testing and Washout Discharge Locations

The following sections summarize the secondary assessments for former AFFF firefighting equipment testing and washout discharge locations, including oil-water separators or other piping systems where released AFFF may have flowed. See Section 4.2.5 and Section 4.2.9 for discussion of firefighting equipment testing and washout discharge activities at fire stations.

4.6.1 Site 12: DOL Automotive Yard

Site Description

Site 12 is located in the Main Garrison area of the former Fort Ord east of State Route 1 and south of the City of Marina at approximately 36.666 degrees latitude and -121.812 degrees longitude. The 8.5-acre DOL Automotive Yard was located east of State Route 1 and was bounded by 12th Street to the north, 11th Street to the south, 2nd Avenue to the east, and the Lower Meadow to the west. The site included a building formerly used as a paint shop (Building 2726), two wash racks, an oil-water separator, an AST, and several buildings used for automotive repair. The Lower Meadow received runoff from the DOL Automotive Yard, which had a completely paved surface. Several drain pipes, including storm drain Outfall 31, lead from the DOL Automotive Yard to two catch basins in the Lower Meadow. These drain pipes and the associated catch basins were located at the southeast corner and on the east slope of the Lower Meadow (HLA, 1994f). The Outfall 31 area included a grass-covered depression with a catch basin

that received surface runoff and storm drainage flow from the drain pipes. The two catch basins were connected by an 8-inch diameter corrugated metal pipe, with storm water discharging from the southern catch basin to a 42-inch diameter pipe leading to Outfall 15, which was the ultimate and only discharge point for stormwater originating from Site 12 (HLA, 1995d, Volume II).¹⁵

The predominant topography reflects a morphology typical of the dune sand deposits that underlie Sites 2 and 12. In these areas, the ground surface slopes gently to the west, draining toward the Monterey Bay. Elevations at Site 12 range from 65 to 95 feet above MSL (AES, 2015). In March 2004, the Army transferred the property at Site 12 to FORA and the land was redeveloped into a commercial retail area. The site currently is The Dunes on Monterey Bay Retail Center, a 375,000 square-foot retail center owned by Shea Properties and leased by Commercial Retail Associates. The site now includes several big-box stores and a large parking area (Shea Properties, 2020).

Site reconnaissance was performed on January 7, 2021. No evidence of stained soil or stressed vegetation was found. The site has been entirely regraded and now consists of a parking lot for The Dunes on Monterey Bay Retail Center. Site photos and site visit information are in Appendix B.

Site 12 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army. The site is currently owned by Shea Properties and leased by Commercial Retail Associates (Table 4). The site is operated as a retail center by a host of chain stores as The Dunes on Monterey Bay Retail Center (Shea Properties, 2020). During the Army's operation, activities potentially resulting in the release of hazardous materials at the DOL Automotive Yard included transmission repair, degreasing, engine testing, steam cleaning and washing vehicles, and petroleum/oil/lubricant storage (HLA, 1995d, Volume II).

Fire department vehicles were serviced at Building T-2722, and this may have included flushing tanks and systems containing AFFF. Fire department vehicles that used AFFF were equipped with a single 25-gallon AFFF tank that was drained of AFFF at the Main Garrison Fire Station before servicing (Appendix A, Riso). Therefore, only residual amounts of AFFF would have been flushed from the tanks and systems. It was also noted that servicing of AFFF systems on fire department vehicles was needed only five times over 40 years (Appendix A, Riso), with some of this servicing occurring at the DOL Maintenance Yard (see Section 4.6.2). The facility included a concrete-paved wash rack where runoff discharged to an adjacent oil-water separator. It is suspected fire department vehicle tanks would have been flushed at the wash rack and into the oil-water separator. Waste oil from the oil-water separator was stored in USTs prior to disposal by an offsite contractor, likely at an offsite disposal location (Weston, 1990), and water from the oil-water separator entered the sanitary sewer system and was treated at the Main Garrison Sewage Treatment Plant (STP). Based on historical disposal practices at the DOL Automotive Yard (EA, 1991), some residual AFFF could have also been discharged to the ground surface and flowed to the Lower Meadow as surface runoff or through the storm drain system.

Surface water runoff from Site 12 flowed as street gutter flow and overland sheet flow in a westerly direction to storm drain inlets located east of the State Route 1 right-of-way. No natural drainage

¹⁵ See Section 4.8.1 for additional information about the Lower Meadow and Outfall 31.

conveyances existed within the boundary of Site 12. The Site 12 storm drain system laterals converged at junction boxes located beneath the Lower Meadow and State Route 1. Surface water runoff was then directed to a 54-inch diameter concrete storm drain outfall (Outfall 15) located in the dunes to the west of State Route 1. Outfall 15 was the ultimate and only discharge point for stormwater originating from Site 12. Surface water runoff discharged from this pipe into a closed depression within the dunes. Surface water runoff collected from the State Route 1 and Union Pacific Railroad rights of way also discharged from Outfall 15. There is no surface flow path from this depression into Monterey Bay (HLA, 1995d, Volume II).

Surface water containing PFAS from the DOL Automotive Yard could have been discharged at Outfall 15; however, the amount of PFAS discharged would have been small and intermittent. Additionally, due to pesticides, metals, volatile organic compounds, and petroleum hydrocarbons detected in soil at Outfall 15, 430 cubic yards of soil were excavated from the Outfall 15 discharge area in 1997 and 1998 and placed in the OU2 Fort Ord Landfills for use in the foundation layer. The excavation was then backfilled with imported clean soil (HLA, 1998b). Based on this information, no additional investigation at Outfall 15 is recommended.

67,100 cubic yards of soil and debris were excavated in 1997 and 1998 during the remediation of Site 12. 58,400 cubic yards of the excavated materials were designated potentially impacted by debris or petroleum hydrocarbons, based on either visual observation or sample results, and were placed in Area E of the OU2 Fort Ord Landfills as general fill. The remaining 8,700 cubic yards of excavated soil not impacted by debris or petroleum hydrocarbons were stockpiled onsite and later used to backfill the Lower Meadow excavation along with 52,000 cubic yards of clean soil imported from OU2 Fort Ord Landfills Area A (IT, 1999c). This activity included the removal of the several drain pipes, Outfall 31, and the associated storm drain infrastructure. Based on this information, no additional investigation in the former Outfall 31 area is recommended.

Groundwater contamination at Site 12 was limited to the unconfined Upper 180-Foot Aquifer, which is not used for drinking water purposes. Additionally, the Site 12 area is located within the Fort Ord Special Groundwater Protection Zone, where installation of wells and use of the Upper 180-Foot Aquifer for drinking water are restricted by Monterey County Code. Consequently, there is no exposure pathway to human receptors for groundwater from the Site 12 area.

Secondary Assessment Conclusions

No known quantities of PFAS-containing materials were stored or used onsite. Reportedly poor waste disposal practices at the DOL Automotive Yard could have resulted in discharges of AFFF to the Lower Meadow (see Section 4.8.1), the storm drain system, and the sanitary sewer system; however, the AFFF discharged was only residual after the tanks on fire department vehicles had already been drained at the Main Garrison Fire Station, this activity occurred infrequently, and the AFFF would have mostly been contained in the oil-water separator. AFFF discharged to the oil-water separator would have likely remained on the surface of the petroleum product or partitioned to the petroleum/water interface and would have been skimmed off and disposed of along with the petroleum product before the contents of the oil-water separator entered the sanitary sewer system.¹⁶ Waste oil from the oil-water separator was

¹⁶ AFFF forms a film that spreads rapidly across the surface of a petroleum product. The aqueous film is produced by the action of the fluorochemical surfactant reducing the surface tension of the foam solution to a point where the solution is supported on the surface of the petroleum product.

stored in USTs prior to disposal by an offsite contractor, likely at an offsite disposal location (Weston, 1990). Soil remediation was also completed at the Lower Meadow and Outfall 15 and potentially impacted soils were removed and placed in the OU2 Fort Ord Landfills. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.6.2 Site 16: DOL Maintenance Yard Secondary Assessment

Site Description

Site 16 is located in the Main Garrison area of the former Fort Ord between the OU2 Fort Ord Landfills and State Route 1. The DOL Maintenance Yard is a 4.3-acre site located near the intersection of 8th Street and 5th Avenue (HLA, 1995d). The approximate coordinates for Site 16 are 36.659 degrees latitude and -121.798 degrees longitude. From the 1950s through base closure in 1994, the DOL Maintenance Yard was used as a heavy equipment maintenance facility. Onsite structures and buildings included five buildings, a steam cleaner shed, a wash rack, an oil-water separator, and a diesel fuel AST (EA, 1991). The property that includes DOL Maintenance Yard was transferred from the Army to FORA in 2004 and subsequently transferred from FORA to CSUMB. All former Army structures on the property were decommissioned in 2014, and CSUMB residential dormitories were constructed in 2015.

Site reconnaissance at the former DOL Maintenance Yard (currently the CSUMB Promontory dormitory) was performed on March 5, 2021. No evidence of stained soil or stressed vegetation was found. High-density polyethylene storm sewer pipes outside the CSUMB Promontory building indicate that the storm sewer system has been renovated since property transfer from the Army. Site photos and site visit information are in Appendix B.

Site 16 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned by the Army and operated by the DOL. The site is currently owned and operated by CSUMB and includes the Promontory student housing building (Table 4). From the 1950s through base closure in 1994, the DOL Maintenance Yard was used as a heavy equipment maintenance facility. The heavy equipment, primarily large civilian trucks, was serviced mostly in Building 4900, including servicing of fire department vehicles where flushing of tanks and systems containing AFFF may have occurred. Fire department vehicles that used AFFF were equipped with a single 25-gallon AFFF tank that was drained of AFFF at the Main Garrison Fire Station before servicing (Appendix A, Riso). Therefore, only residual amounts of AFFF would have been flushed from the tanks and systems. It was also noted servicing of AFFF systems on fire department vehicles was needed only five times over 40 years (Appendix A, Riso), with some of this servicing occurring at the DOL Automotive Yard (see Section 4.6.1). The facility included a concrete-paved wash rack where runoff discharged to an adjacent oil-water separator. It is suspected fire department vehicle tanks would have been flushed at the wash rack and into the oil-water separator. Waste oil from the oil-water separator was stored in USTs prior to disposal by an offsite contractor, likely at an offsite disposal location (Weston, 1990), and water from the oil-water separator entered the sanitary sewer system and was treated at the Main Garrison STP.

Drainage from the DOL Maintenance Yard that did not reach the oil-water separator or sanitary sewer system (i.e., areas other than the wash rack) drained to Pete's Pond Extension (see Section 4.8.2).

There was also a sewage pump station at Building 4906 to the southwest of the DOL Maintenance Yard that served Building 4900. Overflows are suspected of having occurred, releasing raw sewage into the surrounding area (EA, 1991).

Groundwater was investigated at Site 16 and organic chemicals, including tetrachloroethene (PCE) and trichloroethene (TCE), were detected; however, it was concluded these were associated with OU2 (Army, 1997b). In 1997, approximately 6,620 cubic yards of soil were excavated from the DOL Maintenance Yard during remedial actions and placed in the OU2 Fort Ord Landfills as general fill. The site was backfilled with clean soil from onsite sources and base rock was placed in the excavation area at the DOL Maintenance Yard (IT, 1999d).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. Though AFFF may have been discharged at the wash rack associated with Building 4900 during maintenance activities, it was only residual AFFF after the tanks on fire department vehicles had already been drained at the Main Garrison Fire Station, this activity occurred infrequently, and the AFFF would have mostly been contained in the oil-water separator. AFFF discharged to the oil-water separator would have likely remained on the surface of the petroleum product or partitioned to the petroleum/water interface and would have been skimmed off and disposed of along with the petroleum product before the contents of the oil-water separator entered the sanitary sewer system. Waste oil from the oil-water separator was stored in USTs prior to disposal by an offsite contractor, likely at an offsite disposal location (Weston, 1990). Additionally, sewage overflows from the pump station at Building 4906 would have been intermittent and with a low probability of AFFF being discharged at the wash rack during an event that caused a sewage overflow (e.g., a significant storm event). Soil remediation was also completed and potentially impacted soils were removed and placed in the OU2 Fort Ord Landfills. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.7 Large Fires and Other Unplanned Releases

The following sections summarize the secondary assessments for areas where large fires or other unplanned releases of PFAS occurred.

4.7.1 Site 5: Range 36A, Explosive Ordnance Disposal Secondary Assessment

Site Description

This site is located within Impossible Canyon, a large north-south trending canyon in the Site 39 Inland Ranges, at approximately 36.190 degrees latitude and -121.751 degrees longitude. Site 5 is adjacent to Impossible Canyon Road, which can be accessed from Eucalyptus Road north of the site. The site formerly operated as Range 36A, an EOD range used for the disposal of various types of commercial explosives and military munitions from the 1940s through 1992 (HLA, 1993a). EOD ranges are not specifically identified in Section 3.0 as a type of site to be assessed per the Army PFAS Guidance (Army, 2018); however, plastic/polymer-bonded explosives may have been used for detonations at Range 36A, and plastic/polymer-bonded explosives may contain PFAS. The range was temporarily reopened in 1994 and was used on a limited basis by the Army's munitions response contractor in support of the Army's

Time Critical Removal Action program for disposal of munitions found outside the Inland Ranges. Activities ended in January 1995 (MACTEC, 2005) and the site has been inactive since.

The site is approximately 2 acres in size, with dimensions of roughly 200 feet by 400 feet (HLA, 1993a). Site reconnaissance was performed on January 21, 2021. No evidence of stained soil or stressed vegetation was found. No buildings or structures were present onsite. The site currently consists of trees, brush, and other vegetation along the north, south, and east sides of the site and Impossible Canyon Road along the west side of the site. Stormwater drainage is largely limited to the site, with some potential drainage to the north of the site. Site photos and site visit information are in Appendix B.

Site 5 is located in the Salinas River watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 9. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site has been owned by the Army since the 1940s and remains under the Army's ownership. From the 1940s through October 1992, the site was operated as Range 36A by the U.S. Army Forces Command 49th Ordnance Detachment and was operated for a short period in 1994 by the Army's munitions response contractor (MACTEC, 2005).

EOD activity occurred onsite, though the site was only used sporadically for this purpose. During major detonation activities, the site was used daily for a week at a time but could also go unused for several months (HLA, 1993a). The majority of detonation events were training activities, but a small number of detonation events were for disposal of unserviceable munitions or explosives obtained by the bomb disposal units of local police agencies (HLA, 1991). Detonations were limited to 25 pounds of explosives per event, resulting in up to 1,500 pounds of explosives detonated onsite per year (MACTEC, 2005). The primary explosive used for detonations onsite was C-4 (C-4 contains 90% cyclotrimethylene-trinitramine [RDX] and 10% polyisobutylene, a synthetic rubber), which was likely completely consumed in the detonation process. Other items disposed of at Range 36A included picric acid, powder charges, and various types of mortar rounds (Appendix A, Valdez).

By October 1992, the Fort Ord EOD unit was deactivated as part of the closure of Fort Ord (HLA, 1993a). For a short period in 1994, Range 36A was reactivated and used on a limited basis by a munitions response contractor in support of the Army's Time Critical Removal Action program for disposal of munitions found outside the Inland Ranges. Activities ended in January 1995 (MACTEC, 2005). All munitions received at Range 36A were disposed of immediately and not stored (HLA, 1993a).

During an investigation at Range 36A in 1990, soil and groundwater samples were collected and analyzed for explosive compounds, including cyclotetramethylene-tetranitramine (HMX), RDX, trinitrophenylmethylnitramine, dinitrobenzene, trinitrobenzene, TNT, and dinitrotoluene. No explosive compounds were detected in groundwater. HMX and RDX were detected in soil, though at low concentrations. No other explosive compounds were detected in soil (JMM, 1991).

Based on the results of the 1990 investigation, additional soil samples were collected in 1993 and analyzed for HMX and RDX. A total of 69 soil samples were collected during both investigations and analyzed for explosive compounds. HMX was detected in only five samples at concentrations less than the HMX preliminary remediation goal of 3.1 milligrams per kilogram (mg/kg). RDX was detected in only

nine samples with only three detections at concentrations greater than the RDX preliminary remediation goal of 4.4 mg/kg and a maximum concentration of 16.5 mg/kg (Shaw, 2007).

Based on the results of these investigations, Range 36A was identified for closure as a former hazardous waste management unit under the Resource Conservation and Recovery Act. As part of the closure process, ten additional soil samples were collected and analyzed for RDX. At the request of the DTSC, the soil samples were also analyzed for perchlorate, a chemical used in propellants for some munitions, and for dioxins, a typical byproduct of incineration processes. To evaluate dioxins, congener-specific concentrations were converted to tetrachlorodibenzo-p-dioxin (TCDD)-toxic equivalent concentrations using toxic equivalency factors developed by the USEPA. The toxic equivalency factors were derived based on the toxic potential of each congener in relation to 2,3,7,8-TCDD, the congener for which toxic effects were the most thoroughly studied and documented.

No perchlorate was detected in the ten soil samples collected. RDX was detected in one sample at a concentration of 1.4 mg/kg, which is below the preliminary remediation goal. Dioxins were detected at low levels, but also below the 2,3,7,8-TCDD preliminary remediation goal.

It was reported that a few fires occurred onsite; the Fort Ord Fire Department was onsite for support but did not actively extinguish these fires because fuel breaks were already in place for containment (Appendix A, Valdez).

Secondary Assessment Conclusions

These results indicate the intensity of explosives use and munitions disposal at Range 36A was low and there were few fires at the site. The fire department historically used water tenders and fuel breaks as the primary tools for fighting fires in the Inland Ranges, where Range 36A is located, and AFFF was never used at Range 36A (AEI, 2020). Additionally, an operating procedures document for this site does not indicate the storage or use of PFAS-containing AFFF onsite (HLA, 1991).

While plastic/polymer-bonded explosives may have been used for detonations at Range 36A, there is no specific evidence of their use and any PFAS release that may have occurred at Range 36A has no pathway to receptors. There are no nearby drinking water supply wells or surface water bodies which could have been impacted. Additionally, the site is currently undeveloped and is publicly inaccessible and remote, preventing human exposure through shallow soil.

Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.7.2 Site 39: Inland Ranges Secondary Assessment

Site Description

Site 39 consists of approximately 6,830 acres designated as habitat reserve in the Habitat Management Plan (Army, 1997c) on the south side of the former Fort Ord. The Inland Ranges are bounded by Eucalyptus Road to the north, Barloy Canyon Road to the east, Old South Boundary Road to the south, and General Jim Moore Boulevard to the west. The Inland Ranges were reportedly used from the early 1900s through base closure in 1994 for various munitions training exercises but have been inactive since then. The topography consists of low rolling hills in the western and central portions and more rugged

terrain comprising several canyons and ridges to the east. Elevations range from approximately 200 feet above MSL to 900 feet above MSL (HLA, 1994b). The site is currently owned and operated by the Army part of the Army-managed portion of the Fort Ord National Monument and is closed to the public due to munitions hazards (Table 4).

Site reconnaissance was performed on January 21, 2021. No evidence of stained soil or stressed vegetation was found. Site photos and site visit information are in Appendix B.

Site 39 is located partially in the Marina watershed and partially in the Canyon Del Rey watershed. Surface water information for the site is in Figure 7 and Figure 8. Groundwater information for the site and surrounding area is in Figure 9. Sensitive environments information for the watersheds is in Figure 10 and Figure 11.

Site Operational History and Waste Characterization

The site has been owned and operated by the Army since the early 1900s. The site is currently part of the Army-managed portion of the Fort Ord National Monument and is closed to the public due to munitions hazards. Site 39 was reportedly in use from the early 1900s through base closure in 1994 for various munitions training exercises (HLA, 1994b).

It was observed that accidental wildland fires occurred annually or every other year from 1951 through the 1960s and 1970s, though some fires were also intentional. These fires would be contained using heavy equipment, such as bulldozers, and soldiers with hand tools to cut fuel breaks, along with water trucks and aircraft applying fire retardant (Appendix A; Weaver).

Within Site 39 is the Impact Area Munitions Response Area, which is being remediated in accordance with the Record of Decision, Impact Area Munitions Response Area, Track 3 Munitions Response Site (Army, 2008b). The selected remedy includes prescribed burning of up to 800 acres per year to clear vegetation and provide access to conduct remediation of munitions and explosives of concern. Prescribed burning is the preferred method for vegetation removal because successful conservation of maritime chaparral is dependent on proper management of the habitat by using fire as a management tool (Army, 1997c).

During prescribed burning at the former Fort Ord, fire foam or retardant may be used for pre-treatment of the containment line around the burn unit (POM, 2016) or to extinguish fires that have gone outside the containment line. However, these are Class A foams or retardants designed for use on combustible materials, such as wood, and not AFFF, which is a Class B foam designed for use on flammable liquids (Appendix A, Wilcox). Class A foams do not contain PFAS. It was also noted during interviews with site personnel that:

- An aquatic ecosystem-friendly firefighting foam was used by the fire department for the prescribed burn program (Appendix A, Duymich).
- Water tenders and fuel breaks were the primary firefighting mechanisms in the Inland Ranges, with occasional storage and use of Class A foams that do not contain PFAS (Appendix A, Valdez, Wilcer).
- AFFF was not used for wildland fires and the wildland engines did not carry AFFF (Appendix A, Riso).

Additionally, per California State Water Resources Control Board and Division of Drinking Water orders, samples were collected from water supply wells adjacent to Site 39 and analyzed for PFAS in 2019 and 2020. All PFAS analyzed for were not detected (Table 6 and Figure 20). Based on this information, there is no suspected release of PFAS due to prescribed burning or wildfires in the Inland Ranges.

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.7.3 Use of PFAS-Containing Munitions Secondary Assessment

Site Description, Operational History, and Waste Characterization

The former Fort Ord operated as a military training base over several decades, which included use of a variety of munitions for training purposes. Military munitions are not specifically identified in Section 1.2.1 as a potential source of PFAS to be assessed per the Army PFAS Guidance (Army, 2018); however, munitions containing MTV, which contains PFAS, may have been used during training activities.

There is no evidence military flares or ignition sources containing MTV were used at the former Fort Ord. MTV is primarily used in flares for aircraft countermeasure (decoy) systems as a deterrent to infrared-guided (heatseeking) air-to-air or surface-to-air missiles. The former Fort Ord served primarily as a training and staging facility for infantry troops and historical use indicates such flares were not used. MTV is also used as an igniter for solid propellant in rocket motors; however, the types of rockets used historically at Fort Ord used black powder igniters and not MTV. The exception is the M22 Anti-Tank Weapon Effect Signature Simulator (ATWESS) Cartridge which was a pyrotechnic item used to simulate the sound, flash, and smoke generated when firing an anti-tank missile or rocket. The M22 contained a pellet of magnesium-Teflon composition to provide the flash and smoke effect and 60 milligrams of loose magnesium-Teflon powder to provide the sound effect but did not contain any Viton. According to the Fort Ord Military Munitions Response Program database, munitions responses at the former Fort Ord found:

- Nine M22 cartridges at Munitions Response Site (MRS)-16, which is consistent with the last documented use of the area before base closure as an anti-armor training area designed to train troops engaged with attacking armored vehicles (Shaw, 2012).
- Six M22 cartridges at MRS-31, which is consistent with the historical use of the area for troop training with pyrotechnic munitions (UXB, 1995).
- Three M22 cartridges in MRS-53 and MRS-53EXP (Parker Flats), which is consistent with the last documented uses of the area before base closure as an anti-armor training area and a tube-launched, optically-tracked, wire-guided missile tracking area (MACTEC, 2006b).

Secondary Assessment Conclusions

A small number of M22 cartridges were observed at four MRS locations. This indicates very limited use of the M22 ATWESS that would not have resulted in any significant release of PFAS at any site at the former Fort Ord. Based on the information available, potential storage, use, or disposal of PFAS-containing munitions at the former Fort Ord does not pose a potential threat of release to the

environment and further investigation is not warranted. Therefore, no further action is required and PFAS-containing munitions were not recommended for tertiary assessment.

4.8 Landfills

The following sections summarize the secondary assessments for landfill and waste disposal areas that may have received waste streams containing PFAS, including waste material and sludge from WWTPs.

4.8.1 Site 12: Lower Meadow Disposal Area Secondary Assessment

Site Description

Site 12 is located in the Main Garrison area of the former Fort Ord east of State Route 1 and south of the City of Marina at approximately 36.666 degrees latitude and -121.812 degrees longitude. It is unclear when use of the site as a disposal area began, but evidence suggests it was once a 30-foot deep depression filled with road construction waste, which likely dated to the 1950s through 1960s and was no longer in use by the 1980s (EA, 1991). The Lower Meadow Disposal Area was a grassy field of approximately 2 acres located east of State Route 1 near Imjin Parkway. The Lower Meadow was bounded on the east by the DOL Automotive Yard, to the west and north by 1st Avenue, and to the south by 11th Street. There were no buildings within the Lower Meadow but Building T-2722 in the DOL Automotive Yard was located immediately to the east. The Lower Meadow was reportedly used for disposal of waste material generated by the DOL, such as scrap metal, oil, and batteries. The area was also used for disposal of road construction debris.

The Lower Meadow was approximately 5 feet lower than the DOL Automotive Yard, which had a completely paved surface, and received runoff from it. Several drain pipes discharged runoff from the DOL Automotive Yard to catch basins in the Lower Meadow, including two 30-inch diameter pipes, one of which was storm drain Outfall 31, and a 13-inch diameter pipe located at the southeast corner of the Lower Meadow, and 12-inch and 6-inch diameter pipes on the east slope of the Lower Meadow, approximately 100 feet north of Outfall 31 (IT, 1997b). The two catch basins were connected by an 8-inch diameter corrugated metal pipe, with storm water discharging from the southern catch basin to a 42-inch diameter pipe leading to Outfall 15, which was the ultimate and only discharge point for stormwater originating from Site 12 (HLA, 1995d).

The predominant topography reflects a morphology typical of the dune sand deposits that underlie Sites 2 and 12. In these areas, the ground surface slopes gently to the west, draining toward the Monterey Bay. Elevations at Site 12 range from 65 to 95 feet above MSL (AES, 2015). In March 2004, the Army transferred the property at Site 12 to FORA and the land was redeveloped into a commercial retail area. The site currently is The Dunes on Monterey Bay Retail Center, a 375,000 square-foot retail center owned by Shea Properties and leased by Commercial Retail Associates. The site now includes several big-box stores and a large parking area (Shea Properties, 2020).

Site reconnaissance was performed on January 7, 2021. No evidence of stained soil or stressed vegetation was found. The site has been entirely regraded and now consists of a parking lot for The Dunes on Monterey Bay Retail Center. Site photos and site visit information are in Appendix B.

Site 12 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army. The site is currently owned by Shea Properties and leased by Commercial Retail Associates (Table 4). The site is operated as a retail center by a host of chain stores as The Dunes on Monterey Bay Retail Center (Shea Properties, 2020). During the Army's operation, activities potentially resulting in the release of hazardous materials at the DOL Automotive Yard included transmission repair, degreasing, engine testing, steam cleaning and washing vehicles, and petroleum/oil/lubricant storage (HLA, 1995d, Volume II). Fire department vehicles were serviced at Building T-2722, and this may have included flushing tanks and systems containing AFFF. Fire department vehicles that used AFFF were equipped with a single 25-gallon AFFF tank that was drained of AFFF at the Main Garrison Fire Station before servicing (Appendix A, Riso). Therefore, only residual amounts of AFFF would have been flushed from the tanks and systems. It was also noted servicing of AFFF systems on fire department vehicles was needed only five times over 40 years (Appendix A, Riso). Through this process, some residual AFFF could have been discharged to the ground surface and flowed to the Lower Meadow as surface runoff or through the storm drain system (see Section 4.6.1).

67,100 cubic yards of soil and debris were excavated in 1997 and 1998 during the remediation of Site 12. 58,400 cubic yards of the excavated materials were designated potentially impacted by debris or petroleum hydrocarbons, based on either visual observation or sample results, and were placed in Area E of the OU2 Fort Ord Landfills as general fill. The remaining 8,700 cubic yards of excavated soil not impacted by debris or petroleum hydrocarbons were stockpiled onsite and later used to backfill the Lower Meadow excavation along with 52,000 cubic yards of clean soil imported from OU2 Fort Ord Landfills Area A (IT, 1999c). This activity included the removal of the several drain pipes, Outfall 31, and the associated storm drain infrastructure. Based on this information, no additional investigation in the former Outfall 31 area is recommended.

Groundwater contamination at Site 12 was limited to the unconfined Upper 180-Foot Aquifer, which is not used for drinking water purposes. Additionally, the Site 12 area is located within the Fort Ord Special Groundwater Protection Zone, where installation of wells and use of the Upper 180-Foot Aquifer for drinking water are restricted by Monterey County Code. Consequently, there is no exposure pathway to human receptors for groundwater from the Site 12 area.

Secondary Assessment Conclusions

No known quantities of PFAS-containing materials were stored or used onsite. Reportedly poor waste disposal practices at the DOL Automotive Yard could have resulted in discharges of AFFF to the Lower Meadow and the storm drain system; however, the AFFF discharged was only residual after the tanks on fire department vehicles had already been drained at the Main Garrison Fire Station. This activity occurred infrequently and the AFFF would have mostly been contained in the oil-water separator at the DOL Automotive Yard (see Section 4.6.1). Soil remediation was also completed at the Lower Meadow and Outfall 31 and potentially impacted soils were removed and placed in the OU2 Fort Ord Landfills. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.8.2 Site 16: Pete's Pond and Pete's Pond Extension

Site Description

Site 16 is located in the Main Garrison area of the former Fort Ord between the OU2 Fort Ord Landfills and State Route 1. Pete's Pond is an approximately 3.3-acre triangular depression between 5th Avenue, the 5th Avenue cut-off, and 8th Street. Pete's Pond Extension is a 3.5-acre vacant area between the DOL Maintenance Yard, 5th Avenue, and the 5th Avenue cut-off (HLA, 1995d). The approximate coordinates for Site 16 are 36.659 degrees latitude and -121.798 degrees longitude. The property that includes Pete's Pond and Pete's Pond Extension was transferred from the Army to FORA in 2004 and subsequently transferred from FORA to the City of Marina.

Site reconnaissance at Pete's Pond and Pete's Pond Extension was performed on January 7, 2021. No evidence of stained soil or stressed vegetation was found. The Pete's Pond and Pete's Pond Extension area currently consists of trees, brush, and other vegetation. Some erosion control measures are present on the east slope of Pete's Pond Extension, including netting and riprap. An erosion channel in Pete's Pond Extension and leading to Pete's Pond indicates stormwater runoff from the east side of the site enters Pete's Pond. Site photos and site visit information are in Appendix B.

Six storm drains discharge to Pete's Pond. Although the depression is dry most of the year, it occasionally fills with up to 5 feet of water for short periods of time during heavy rainfall (HLA, 1995d). Site 16 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army. The Pete's Pond and Pete's Pond Extension area is currently owned and operated by the City of Marina (Table 4). From the 1950s through base closure in 1994, the adjacent DOL Maintenance Yard was used as a heavy equipment maintenance facility, which included servicing of fire department vehicles where flushing of tanks and systems containing AFFF may have occurred (Appendix A, Riso). Fire department vehicles that used AFFF were equipped with a single 25-gallon AFFF tank that was drained of AFFF at the Main Garrison Fire Station before servicing. Therefore, only residual amounts of AFFF were flushed from the tanks and systems. It was also noted servicing of AFFF systems on fire department vehicles was needed only five times over 40 years (Appendix A, Riso). Drainage from the DOL Maintenance Yard that did not reach the oil-water separator or sanitary sewer system drained to Pete's Pond Extension (see Section 4.6.2).

Based on aerial photographs, Pete's Pond and Pete's Pond Extension were also used for refuse disposal between the late 1940s and early 1950s (Army, 1997b). In 1985, excavations to improve drainage at Pete's Pond were discontinued because scrap metal was encountered at a depth of approximately 5 feet bgs. Evidence of past dumping was also found during the Basewide Remedial Investigation, including concrete, ordnance, and other scrap metal (HLA, 1995d). Incinerated debris and medical debris dating to the 1950s was also landfilled in Pete's Pond Extension (Army, 1997b). During remedial actions in 1997, the debris encountered in Pete's Pond consisted of household refuse and 49 practice 2.36-inch rockets were found in Pete's Pond Extension. It was evident from the disposition of the rockets that they had been buried as a means of disposal and had not penetrated the ground as a result of being fired (IT, 1999d).

Groundwater was investigated at Site 16 and organic chemicals, including PCE and TCE, were detected; however, it was concluded these were associated with OU2 (Army, 1997b). During remedial actions in 1997, 230 cubic yards of soil were excavated from Pete's Pond and 20,920 cubic yards of soil were excavated from Pete's Pond Extension and placed in the OU2 Fort Ord Landfills as general fill (IT, 1999d). The site was backfilled with clean soil from onsite sources, Pete's Pond and Pete's Pond Extension were regraded, the Pete's Pond Extension slope was hydroseeded, and 5th Avenue was repaved (IT, 1999d).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. The period of refuse dumping at Pete's Pond and Pete's Pond Extension makes it unlikely any PFAS-containing material was placed there. Soil remediation was also completed and potentially impacted soils were removed and placed in the OU2 Fort Ord Landfills.

Though AFFF may have been discharged at the adjacent DOL Maintenance Yard during maintenance activities, the volume and frequency of discharge were insignificant and would have mostly been contained (see Section 4.6.2). Additionally, sewage overflows from the pump station at Building 4906, which received wastewater from the DOL Maintenance Yard, would have been intermittent and with a low probability of AFFF being discharged at the wash rack during an event that caused a sewage overflow (e.g., a significant storm event). Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.8.3 Site 17: Disposal Area, 1400 Block Motor Pool Secondary Assessment

Site Description

Site 17 is located in the Main Garrison area of the former Fort Ord between the OU2 Fort Ord Landfills and State Route 1. The 1400 Block Motor Pool encompasses the area and buildings between 4th and 5th Avenues and 3rd and 8th Streets west of Site 16. The disposal areas are located near the baseball field in the 1400 Block Motor Pool at approximately 36.659 degrees latitude and -121.800 degrees longitude. The site was a disposal area for hospital and medical wastes from the Fort Ord hospital and other incinerated and unincinerated debris from other sources from as early as 1935 until 1951. From 1977 through base closure in 1994, the site was used as the 1400 Block Motor Pool for motor vehicle service, maintenance, and storage (HLA, 1995d).

Site 17 is approximately 8 acres in size. In the late 1930s to early 1940s, the Fort Ord hospital was constructed on the site along with several storage buildings along 4th Avenue. The hospital was demolished and the 1400 Block Motor Pool complex was constructed by 1977. By 1994, the site consisted of the 1400 Block Motor Pool complex, a baseball field, and the storage buildings along 4th Avenue.

Site reconnaissance was performed on January 7, 2021. No evidence of stained soil or stressed vegetation was found. The site consisted of a large parking lot, with no buildings present onsite. A concrete trapezoidal stormwater ditch is present to the east of the site and running parallel to 5th Avenue. The bottom width of the ditch is approximately two feet, the top width is approximately four feet, and the depth is approximately 2 feet. Site photos and site visit information are in Appendix B.

Site 17 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was formerly owned and operated by the Army, but currently is owned and operated as a soccer field and parking lot by CSUMB (Table 4). The Fort Ord hospital was located close to the site and disposed of incinerated wastes at Site 17 from the 1940s through 1951. Other incinerated and unincinerated waste was present at Site 17 from as early as 1935, as well as various motor oils, metals, and dioxins, indicate that other sources of waste may have been present in addition to hospital wastes (Army, 1997b). Incinerated and unincinerated debris in a sand matrix was encountered in test pits and borings during the RI. The debris, which ranged in depth from the surface (in an unpaved landscaped area) to 16 feet bgs, included scrap metal; melted, whole, and broken glass bottles; burnt and unburnt wood; asphalt and concrete chunks; medical debris; and other miscellaneous materials. Dated debris (e.g., bottles, newspapers) ranged from 1935 to 1951, although dates on recovered newspapers ranged only from June 1949 to March 1951 (HLA, 1995d). From 1977 through 1994, the site was the location of the 1400 Block Motor Pool and was used for motor vehicle service, maintenance, and storage. The facilities serviced light and heavy trucks, as well as other Army vehicles. Lubricating oils, brake fluids, coolants, cleaning solvent, diesel, and gasoline were all used on the premises. Several wash racks and grease racks were present, and runoff from the racks flowed to nearby oil-water separators (HLA, 1993d). No PFAS releases are suspected from the 1400 Block Motor Pool land use. During the remedial action for Site 17, no medical waste was encountered during excavation or handling of soil and debris, though one ampule was uncovered and found to contain a saline solution through laboratory analysis (IT, 1999b). Approximately 107,000 cubic yards of soil and debris were excavated during remediation of Site 17 in 1997 and placed in the OU2 Fort Ord Landfills (IT, 1999d).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. Due to the operational period of the Site 17 Disposal Area and the age of the waste found, it is unlikely any PFAS-containing material was stored or used onsite and there is no suspected release of PFAS. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.8.4 Site 31: Former Dump Site Secondary Assessment

Site Description

Site 31 is located in the southern part of the East Garrison area, approximately 0.2 of a mile southeast of the intersection of Watkins Gate Road and Barloy Canyon Road at approximately 36.649 degrees latitude and -121.731 degrees longitude. Site 31 is the former East Garrison Dump Site, a landfill used in the 1940s and 1950s, as estimated by items of refuse found onsite (EA, 1991). Some evidence suggests that the landfill may have been in use as early as the 1930s (HLA, 1994e).

Site 31 is located within and adjacent to a ravine that is oriented from west to east and is about 60 feet deep. Remedial action at Site 31 was conducted on the north slope of this ravine. The slope is very steep, with a gradient of about 50 percent. The slope is vegetated mostly with grasses, with several small patches of coast-live oak trees. An ephemeral stream is located on the ravine floor, but streamflow

only occurs during heavy rains (IT, 1999a). The site encompasses an approximately 900-foot long section of the western side of the ravine. A 500-ton incinerator was reportedly located at the top of the ravine at Site 31. The site is currently undeveloped but is located near the East Garrison development.

Site reconnaissance was performed on January 21, 2021. No evidence of stained soil or stressed vegetation was found. A small vacant building was present onsite. Site photos and site visit information are in Appendix B.

Site 31 is located in the Salinas River watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 18. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was formerly owned and operated by the Army as a landfill. The site property was transferred from the Army to FORA in 2007 and then transferred from FORA to Monterey County (Table 4). From the 1940s through the 1950s, Site 31 was used as a dump site for incinerated refuse. A 500-ton incinerator, built in the 1940s, was reportedly located at the top of the ravine at Site 31. Refuse was wholly or partially incinerated and dumped over the northern slope of the ravine. Debris found in the ravine, particularly the northern slope, included whole, broken, and melted cans and glass, burnt pieces of wood, fragments of concrete, asphalt, brick, tile, plastic items, scrap metal, and crushed, empty 55-gallon drums. Interviews with Fort Ord personnel indicate that, in addition to ash from the incinerator, the site was used for disposal of some furniture and green waste (Appendix A, Willison). No fires are known to have occurred at Site 31 (Appendix A, Collins). Debris was located both at the soil surface and as deep as 15 feet bgs in the ravine (HLA, 1999). Following the dismantling of the incinerator, the Leadership Reaction Training structure was located at the site. This structure was removed in preparation for remedial activities in the late 1990s (IT, 1999a).

In June 1998, approximately 1,500 cubic yards of soil and debris were excavated from Site 31 and transported to the OU2 Fort Ord Landfills. All soil removed was placed in the general fill of the OU2 Fort Ord Landfills. Site restoration consisted of grading the sides of the excavation slope to blend with the surrounding topography. No backfilling or compaction was required or completed. Areas were hydroseeded to increase erosion resistance and some areas reinforced with a geosynthetic mat to provide additional erosion resistance. By 1999, remedial action for Site 31 was completed and the property was eligible for transfer (IT, 1999a).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. Due to its operational period and the age of the waste found, it is unlikely any PFAS-containing material was placed, stored, or used in the East Garrison Dump Site. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.8.5 Fort Ord Soil Treatment Area Secondary Assessment

Site Description

The FOSTA was located at Site 20 in the former 519th Motor Pool, northwest of the intersection of Lightfighter Drive and General Jim Moore Boulevard, at approximately 36.649 degrees latitude and -

121.806 degrees longitude. From 1995 through 1997, the site was used as a bioremediation facility for soil containing petroleum hydrocarbons excavated from IA sites at the former Fort Ord. The FOSTA was an approximately 200-foot by 200-foot lined and bermed treatment unit, consisting of a foundation layer, a 40-mil (40 thousandths of an inch) high-density polyethylene liner placed over the foundation layer and the berm, and an operational layer. The Fort Ord Underground Storage Tank Soil Remediation Area was located adjacent to the FOSTA (IT, 2000a).

Two large storage buildings, Buildings S-3897 and S-3898 (former aircraft hangars; see Section 4.4.1), were present onsite for the storage of waste, including hazardous waste, in containers appropriate for the waste type. Each building comprised an area of approximately 4,950 square feet. A water treatment system area was also present for the collection and treatment of excess stormwater from within the FOSTA and the adjacent Underground Storage Tank Soil Remediation Area (IT, 2000a).

The site is now in use as the CSUMB Otter Sports Complex, which contains an aquatic center, a soccer field, a football stadium, a baseball field, a softball field, and a large parking lot.

Site reconnaissance was performed on January 7, 2021. No evidence of stained soil or stressed vegetation was found. The former FOSTA is an unimproved area located between the softball field and the soccer field, and the majority of precipitation likely infiltrates the ground surface. The site was regraded to construct the sports complex, and any stormwater runoff likely discharges to the concrete stormwater ditch to the north of the site in Site 20 (see Section 4.4.1). Site photos and site visit information are in Appendix B.

The FOSTA is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army as a soil treatment area for IA sites after base closure. The site is currently owned and operated by CSUMB as a sports complex (Table 4).

From 1995 to 1997, soil from IA sites suitable for bioremediation was transported to the FOSTA, stockpiled, and treated. The soil stockpiles were located in a concrete-paved area west of the FOSTA, pending available treatment space, and were placed on and covered with polyethylene sheeting at all times to prevent potential migration of soil or contaminants to the surrounding areas (HLA, 1994g). Following the completion of treatment, the soils were transported to the OU2 Fort Ord Landfills (Uribe, 1999).

The *Record of Decision, Basewide Remedial Investigation Sites, Fort Ord, California* (Army, 1997b), in conjunction with the *Explanation of Significant Differences, Consolidation of Remediation Waste in a Corrective Action Management Unit (CAMU), Operable Unit 2 Landfill* (Army, 1997a) and the *Explanation of Significant Differences, No Further Action for Munitions and Explosives of Concern, Landfill Gas Control, Reuse of Treated Groundwater, Designation of Corrective Action Management Unit (CAMU) Requirements as Applicable or Relevant and Appropriate Requirements (ARARs)* (Army, 2006) designate CAMU regulations as ARARs for the existing boundaries of Fort Ord Landfills Areas B through F. Such designation allows remediation waste to be placed at the OU2 Fort Ord Landfills and used as a foundation layer without triggering certain disposal regulations. Soil remedies for remedial investigation sites and IA sites at the former Fort Ord utilized the OU2 Fort Ord Landfills for placement of excavated

soil and debris, which are managed, incorporated within the landfill foundation layer, and capped as part of the OU2 Fort Ord Landfills engineered cover system (Ahtna, 2021b).

Prior to designation of CAMU regulations as ARARs, approximately 6,000 cubic yards of soil was treated at the FOSTA and transported and placed at the OU2 Fort Ord Landfills as fill (e.g., soil from Sites 8, 10, 20, 34, and 40). After designation of CAMU regulations as ARARs, approximately 2,000 cubic yards of soil from IA sites stockpiled for bioremediation at the FOSTA were transported to the OU2 Fort Ord Landfills. The FOSTA was shut down in April 1997, and soil subsequently excavated from other IA sites was transported directly to the OU2 Fort Ord Landfills for placement as fill (e.g., soil from Sites 9, 31, 32, and 36).

After the FOSTA was shut down, approximately 1,602 cubic yards of operational layer soils were removed and placed in Area E of the OU2 Fort Ord Landfills. The high-density polyethylene liner was cut into approximately 20-foot by 50-foot sections and also disposed of in Area E of the OU2 Fort Ord Landfills. Laboratory analysis of confirmation soil samples collected from the foundation layer and berm soils indicated petroleum hydrocarbons (motor oil and diesel) were present at concentrations above the cleanup criteria in two soil samples collected from the equipment decontamination area adjacent to the FOSTA but not within the FOSTA itself. The 35-foot by 35-foot quadrant in the equipment decontamination area represented by these samples was excavated to a depth of 6 inches (approximately 68 cubic yards) and transported to OU2 Fort Ord Landfills Area E for disposal. Confirmation sampling indicated no COCs were present in the soil above cleanup criteria. The remaining foundation layer and the earthen berm were integrated with clean fill soil from Sites 2 and 12, and this mixed material was used to backfill the FOSTA site (Uribe, 1999).

The concrete-paved areas used to stockpile soil before treatment were cleaned using a power washer. A minimum amount of water was used to limit the amount of wastewater. Washing began along the outer margins of the paved areas and proceeded toward the center. Wastewater was collected as it began to pond and was transported to holding tanks for treatment and discharge (Uribe, 1999). Closure of the FOSTA was completed in April 1999 (IT, 2000a).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. The FOSTA received soil from Site 10, which may have contained PFAS (see Section 4.1.3); however, this soil was managed in stockpiles covered and underlain with polyethylene sheeting to prevent potential migration of soil or contaminants to surrounding areas, and then contained in a treatment area lined with 40-mil high-density polyethylene. Detections of petroleum hydrocarbons in soil in the equipment decontamination area can be attributed to the equipment being decontaminated there and were unrelated to management and treatment of soil from Site 10. Therefore, there is no suspected release of PFAS from the FOSTA. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment and further investigation is not warranted. Therefore, no further action is required and this site was not recommended for tertiary assessment.

4.8.6 Operable Unit 2 Fort Ord Landfills Secondary Assessment

Site Description

The OU2 Fort Ord Landfills are located east of the Main Garrison area in the northcentral part of the former Fort Ord at approximately 36.659 degrees latitude and approximately -121.781 degrees

longitude. The site can be accessed by Engineering Equipment Road via 8th Street and Imjin Parkway. Because the site is a landfill, it potentially received PFAS-containing waste from other locations at Fort Ord. The Fort Ord Landfills were active from 1955 to 1987 and were used for residential and on-base waste disposal typical of municipal landfills during that time. The site is currently inactive.

The OU2 Fort Ord Landfills formerly included six landfill areas, one area north and five areas south of Imjin Parkway, covering approximately 150 acres, including the immediate surrounding area. The former Area A Landfill, north of Imjin Parkway, was approximately 33 acres separated from the Areas B through F Landfills to the south of Imjin Parkway. The Areas B through F Landfills encompass approximately 120 acres of undeveloped land. The former Area A was used from 1956 to 1966. Areas B, C, and D were used from 1966 through 1975, Area E was used from 1960 through 1987, with the northern portion of Area E used specifically for disposal of demolition debris, and Area F was operated from 1966 until 1987, when interim closure of the facility began, which effectively terminated waste disposal activities at the Fort Ord Landfills (Army, 1994b).

The site is located south of Imjin Parkway and the Abrams Park residential community and southwest of the Preston Park residential community. To the east of the site is the Schoonover Park residential community and to the southwest of the site is the CSUMB campus.

Site reconnaissance was performed on January 7, 2021. No evidence of stained soil or stressed vegetation was found. The OU2 Fort Ord Landfills are currently inactive. The OU2 GWTP is currently operational onsite. Site photos and visit information are in Appendix B.

The OU2 Fort Ord Landfills are located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The USEPA added Fort Ord to the NPL primarily based on groundwater contamination discovered in 1990 beneath the Fort Ord Landfills area, which was subsequently designated as OU2. The Fort Ord Landfills were active from 1955 to 1987 and were used for residential and on-base waste disposal typical of municipal landfills during that time. Waste was placed in parallel trenches from 10 to 30 feet deep and then covered over with the native dune sand excavated during trenching operations. Detailed disposal records are not available; however, information gathered during field activities and from other sources indicates household and on-base commercial refuse, dried sewage sludge, construction debris, and small amounts of chemical waste (paint, oil, pesticides, electrical equipment, ink, and epoxy adhesive) were placed in the Fort Ord Landfills (Shaw, 2005). Additionally, in the 1970s or 1980s, there were at least two fire incidents at the Fort Ord Landfills (likely in Area E or Area F) where consolidated waste including tires burned and AFFF was used to suppress the fire (Appendix A, Riso). These activities led to the release of contaminants to the underlying unconfined A-Aquifer.

The remedial action at the former Area A was conducted from 1996 to 1998. Approximately 585,000 cubic yards of refuse were excavated during the remediation. This material was placed and compacted as part of the general fill in Areas B, C, D, and F of the OU2 Fort Ord Landfills. The selected remedial action for soil at OU2 included placement of an engineered cover system over buried refuse at the OU2 Fort Ord Landfills. The engineered cover over Areas B through F was constructed from 1997 to 2003 (AEI, 2019).

Based on DTSC's recommendation to sample groundwater at the former Fort Ord for PFOA and PFOS analysis and the operational history of the Fort Ord Landfills, groundwater samples were collected from twelve OU2 monitoring wells and the OU2 GWTP for PFOA/PFOS analysis during the First Quarter 2019 OU2 groundwater monitoring program event performed March 4 through March 8, 2019. Analytical results for these samples are presented in Table 7, and PFOA/PFOS concentrations in the A-Aquifer are shown in Figure 21 and PFOA/PFOS concentrations in the Upper 180-Foot Aquifer are shown in Figure 22. Results and conclusions are summarized below.

- PFOA and PFOS were not detected in four of the monitoring wells sampled (EW-OU2-01-180, MW-OU2-27-A, -44-A, and -73-A).
- All monitoring well detections, except for MW-OU2-23-180, were below the USEPA RSLs and DoD screening levels, indicating limited impact on groundwater at OU2.
- Most detections were estimated results (J-qualified) below the limit of quantitation.
- PFOA and PFOS are present in the A-Aquifer at the leading edges of the COC plumes west of the groundwater divide, where groundwater flows to the west and northwest, but at concentrations below the USEPA RSLs and DoD screening levels (Figure 21).
- PFOA and PFOS were not detected in the A-Aquifer well east of the groundwater divide (monitoring well MW-OU2-27-A), where groundwater flows to the east and northeast, and therefore may not be associated with the PCE plume in the A-Aquifer (Figure 21).
- PFOA and PFOS were not detected in A-Aquifer wells near the OU2 Fort Ord Landfills (monitoring wells MW-OU2-27-A, -44-A, and -73-A), indicating the OU2 Fort Ord Landfills are not a continuing source of PFOA/PFOS in groundwater (Figure 21).
- PFOA and PFOS were detected at concentrations exceeding the USEPA RSLs and DoD screening levels at one Upper 180-Foot Aquifer well (MW-OU2-23-180), which suggests an upgradient source of PFOA/PFOS to the southern lobe of the Upper 180-Foot Aquifer TCE plume (Figure 22).
- PFOA and PFOS were detected at the OU2 GWTP Eastern Main influent (TS-OU2-INF-01) but at concentrations below the USEPA RSLs and DoD screening levels. Because PFOA and PFOS do not appear to be present in the A-Aquifer near the OU2 Fort Ord Landfills, this indicates the PFOA and PFOS are coming from Upper 180-Foot Aquifer extraction wells in the Abrams/Imjin Network (EW-OU2-05-180, -06-180, and -12-180) and the GWTP Network (EW-OU2-10-180).
- PFOA and PFOS were not detected at the OU2 GWTP Western Main influent (TS-OU2-INF-02), which further suggests there are no PFOA/PFOS in the A-Aquifer exceeding the USEPA RSLs and DoD screening levels. None of the OU2 Western Network extraction wells (EW-OU2-01-A through -06-A) were operating at the time samples were collected; however, PFOA was not detected and PFOS was detected at a concentration an order of magnitude less than the USEPA RSL and DoD screening level at downgradient A-Aquifer monitoring well MW-OU2-40-A, which is adjacent to the Western Network of extraction wells (Figure 21).
- PFOA and PFOS were not detected at any GWTP sampling points downstream of the influent, indicating granular activated carbon treatment is effectively removing PFOA and PFOS.
- Duplicate samples were collected from monitoring wells MW-OU2-08-A and -56-180. Estimated (J-qualified) concentrations of PFOA close to the limit of detection were detected in the primary samples, but both PFOA and PFOS were not detected in the duplicate samples. This indicates PFOA may be present in groundwater at these locations, but at very low concentrations that cannot be consistently detected.

Additionally, per California State Water Resources Control Board and Division of Drinking Water orders, samples were collected from water supply wells in the vicinity of OU2 and analyzed for PFAS in 2019 and 2020. PFAS were not detected in any water supply wells in the OU2 area except MCWD water supply well 29, where perfluorohexanoic acid (PFHxA) was detected in the samples collected during all four quarterly sampling events and PFBS was detected in the sample collected during the first quarter 2020 sampling event, though PFOA and PFOS were not detected (Table 6 and Figure 23). MCWD water supply well 29 is the downgradient supply well closest to OU2 (Figure 23), though PFAS originating at OU2 must migrate via the groundwater pathway to the west through the A-Aquifer to the western edge of the FO-SVA, then down to the Upper 180-Foot Aquifer and back to the east to a discontinuity in the Intermediate 180-Foot Aquitard that would allow vertical migration down to the Lower 180-Foot Aquifer, which MCWD water supply well 29 is partly screened in. Therefore, the groundwater pathway distance between the OU2 Fort Ord Landfills and MCWD water supply well 29 is approximately 4.25 miles.

Secondary Assessment Conclusions

There is a potential unacceptable threat to human health or the environment because there are known or suspected AFFF releases and possible disposal of other PFAS-containing materials onsite. Tertiary assessment of OU2 in the Upper 180-Foot Aquifer was recommended because of a suspected release of PFAS associated with the disposal practices used, reported discharges of AFFF at the Fort Ord Landfills, detections of PFOA and PFOS at concentrations above the USEPA RSLs and DoD screening levels in monitoring well MW-OU2-23-180, and detections of PFBS and PFHxA in downgradient MCWD water supply well 29 (PFOA and PFOS were not detected in this well).

4.9 Wastewater Treatment Plants

The following sections summarize the secondary assessments for former WWTPs that may have received wastewater from facilities that used or disposed of PFAS-containing liquid effluents.

4.9.1 Site 1: Ord Village Sewage Treatment Plant Secondary Assessment

Site Description

Site 1 is located in the southwest corner of the former Fort Ord at approximately 36.629 degrees latitude and -121.840 degrees longitude. The site is on the south end of Fort Ord Dunes State Park and can be accessed via the 8th Street overpass and Beach Range Road. The site was formerly used as a WWTP but is currently inactive. The WWTP was built in the early 1950s to treat sewage from the now-demolished Ord Village housing area but was abandoned in 1964 when an offsite pumping station was built to pump sewage flow to the Main Garrison STP (HLA, 1996e).

Site 1 is approximately 2.3 acres in size and includes a sewage lift station operated by the MCWD. The site is situated on dune sand deposits and in a depression between two northwest-southeast trending dunes. The top of the dunes is roughly 140 feet above MSL, and the rest of Site 1 sits at approximately 65 feet above MSL (HLA, 1996e). The site lies wholly within Fort Ord Dunes State Park, which is bounded by the Union Pacific Railroad right-of-way and State Route 1 to the east, Monterey Bay to the west, and private property to the south.

Site reconnaissance was performed on January 14, 2021. No evidence of stained soil or stressed vegetation was found. The sewage lift station operated by MCWD is still present onsite. The site is secured with a chain-link fence. California Department of Parks and Recreation (CDPR)-protected land is

present along the north and south boundaries of Site 1. Site photos and site visit information are in Appendix B.

Site 1 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 9. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was formerly owned and operated by the Army as the Ord Village STP, a WWTP that was later converted to a sewage pumping station. The site was transferred to the CDPR in 2006 and is operated as part of the Fort Ord Dunes State Park (Table 4). The site is undeveloped except for the sewage lift station operated by MCWD. The CDPR plans to develop new campground and beach access facilities in Fort Ord Dunes State Park, which will involve the construction of new access roads, buildings, and parking lots. However, current plans indicate all development will occur at least one mile northeast of Site 1, close to the old military bunkers and the railroad balloon spur, and no construction will occur on or near Site 1 (CDPR, 2020).

From the early 1950s through 1964, Site 1, as the Ord Village STP, conducted primary wastewater treatment. The volume of wastewater received at the Ord Village STP is not reported; however, based on a review of historical aerial photographs, the Ord Village STP served a residential area of approximately 800 households. From the mid-1950s to the mid-1960s, the average household size was 3.3 persons (Wetzel, 1990). The average daily water use for a typical residential home is approximately 60 gallons per capita per day; therefore, the Ord Village STP could have received approximately 160,000 gallons per day (Tchobanoglous, 1991). Onsite treatment facilities included two trickling filters, two clarifiers, a sludge digestion tank, a chlorine contact tank, three small sludge-drying beds, and a holding pond.

In 1964, an offsite pumping station was built to pump sewage flow to the Main Garrison STP. The Ord Village STP buildings and facilities were abandoned until 1983, when the facilities were demolished, and the Ord Village Pumping Station was built onsite to pump sewage to the Main Garrison STP (IT, 1997a). In 1990, sewage flow through the Ord Village Pumping Station was routed to the Monterey Regional Treatment Plant following the phase-out of the Main Garrison STP (HLA, 1996e).

In December 1991 through February 1992 and February 1996, the Army performed site characterization field investigations, including drilling and sampling of 19 soil borings, collecting six surface soil samples, installing and sampling three groundwater monitoring wells, and excavating three exploratory trenches. Samples were analyzed for a variety of COCs, including several organic compounds, pesticides, and metals (HLA, 1997e). PFAS compounds were not included in the sampling.

In accordance with the Interim Action Record of Decision (Army, 1994a), an IA excavation was completed at Site 1 in 1997 to remove soils with concentrations of organic compounds and metals above target cleanup concentrations. 862 cubic yards of soils and dried sludge were excavated from the area of the former trickling filters and holding pond and placed at the OU2 Fort Ord Landfills in the foundation layer for the engineered cover system (HLA, 1997e).

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite. The Ord Village STP served a residential area and did not receive wastewater from industrial or commercial facilities that used or disposed of PFAS-containing effluents prior to Ord Village STP closure in 1964. Additionally, the Army had abandoned the Ord Village STP before the introduction and use of PFAS-containing AFFF at Fort Ord after 1972, so it is unlikely wastewater containing PFAS due to AFFF was treated at the Ord Village STP. Finally, sewage sludge where PFAS may have been concentrated was removed from the site and transported to the OU2 Fort Ord Landfills in 1997. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment. However, because Site 1 is a site type that merits evaluation per the Army PFAS Guidance, it was recommended for tertiary assessment.

4.9.2 Site 2: Main Garrison Sewage Treatment Plant Secondary Assessment

Site Description

Site 2 is located on the western side of former Fort Ord between State Route 1 and the Monterey Bay at approximately 36.664 degrees latitude and -121.817 degrees longitude. The site can be accessed from Beach Range Road. The site is a former WWTP but is currently inactive. The former treatment facility is fenced and contains a small number of buildings and two large trickling filters. Outside of the fenced area were three unlined sewage ponding areas and ten asphalt-lined sludge drying beds, which were demolished and removed in 1997 (IT, 2000b). The site operated as the Main Garrison STP from the late 1930s through decommissioning in May 1990. The Main Garrison STP served as the primary WWTP for the former Fort Ord, serving a majority of the residential areas and main industrial areas during its years of operation.

The site is approximately 28 acres in size and consists largely of permeable sand dune and nearshore deposits (JMM, 1991). The site lies wholly within Fort Ord Dunes State Park, bounded by the Union Pacific Railroad right-of-way and State Route 1 to the east, Monterey Bay to the west, and private property to the north and south.

Site reconnaissance was performed on January 7, 2021. No evidence of stained soil or stressed vegetation was found. Some of the STP infrastructure was still present onsite, including buildings and tanks. The asphalt-lined sludge drying beds have been removed. Some loose pipes, wood planks, and tree trimmings were present onsite. The site is secured with a chain-link fence. Ponding Areas 1, 2, and 3 still exist as depressions in the dunes, with Ponding Area 2 acting as a primary stormwater infiltration basin for inland runoff. An overflow pipe extends to Ponding Area 1, now acting as an overflow infiltration basin. Site photos and site visit information are in Appendix B.

Site 2 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 12, Figure 13, and Figure 14. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned by the Army and operated from the late 1930s through 1990 as a WWTP. The site is currently owned by the CDPR and is part of the Fort Ord Dunes State Park (Table 4). From its construction in the mid-1930s through its closure in 1990, the site served as the primary WWTP for the

former Fort Ord, serving a majority of the residential areas and main industrial areas during its years of operation. The Main Garrison STP had a design capacity of 4.25 million gallons per day but typically treated only 2.8 million gallons per day (EA, 1991). The Main Garrison STP consisted of a bar screen, two barminutors, an aerated grit removal chamber, three primary sedimentation tanks, two trickling filters, a secondary settling tank, a chlorine contact chamber, and two digesters. Effluent from the Main Garrison STP was discharged into a storm drain that emptied onto Indian Head Beach during low tide and directly into Monterey Bay during high tide (HLA, 1995d). The sewage sludge was digested anaerobically, dried in asphalt-lined sludge drying beds, and reportedly used as a soil conditioner in various areas across Fort Ord. The configuration of the site and analytical results from soil sampling conducted in 1996 indicate effluent from the sludge drying beds discharged to the evaporation pond immediately to the south (Ponding Area 1) with overflow going to Ponding Area 2 and Ponding Area 3 (HLA, 1997f). The Main Garrison STP operated under National Pollutant Discharge Elimination System Permit No. CA0110001 (Weston, 1990).

Before 1980, difficulties arose in complying with ammonia and chlorine residual National Pollutant Discharge Elimination System Permit discharge limits. From 1983 through 1985, the WWTP underwent extensive maintenance and repair. Nonetheless, the Main Garrison STP was still unable to consistently comply with effluent limits, so operation of the Main Garrison STP was phased out by 1990 (Weston 1990). No remedial action was proposed for soil at Site 2 (Army, 1997b); however, in 1997, as part of the maintenance and cleanup activities associated with the closure of Site 2, sludge was removed from the drying beds and evaporation ponds. The asphalt-lined drying beds were demolished and about 3 feet of soil was excavated. Approximately 15,000 cubic yards of sludge, soil, and asphalt and wood debris were disposed of in the OU2 Fort Ord Landfills under the engineered cover system. In addition, conveyance piping under the drying beds and evaporation ponds was removed and disposed of in the OU2 Fort Ord Landfills. The area was then revegetated with native plants (IT, 2000b). In 2006, the site was transferred to CDPH and is currently operated as part of the Fort Ord Dunes State Park, although public access to the site is restricted to the general public by a chain-link fence and signage. It is expected that this area will remain a habitat reserve and general public access will remain restricted in the future.

Secondary Assessment Conclusions

The Main Garrison STP was active from the mid-1930s until it was closed in 1990, which encompassed a period of expanded and widespread use of PFAS-containing products. The Main Garrison STP served as the primary WWTP for the former Fort Ord, treating an average 2.8 million gallons per day from residential, light industrial, and commercial sources. Analytical results from the remedial investigation indicate contaminants were mainly confined to the sludge in the asphalt-lined drying beds (HLA, 1995d, Volume II) and the sludge and asphalt were removed from the site. There are no known records of how much sewage sludge was used for soil conditioning or where it was placed on the former Fort Ord; however, interviews with Fort Ord personnel indicated use of dried sewage sludge from STPs as a soil conditioner on Fort Ord would have been unlikely (Appendix A, Youngblood).

There is a potential unacceptable threat to human health or the environment because the Main Garrison STP, as the primary WWTP for the former Fort Ord, could have inadvertently accepted PFAS-containing wastewater. Tertiary assessment of the Main Garrison STP was recommended because of a potential release of PFAS associated with treatment of wastewater from residential, light industrial, and commercial sources over several decades.

4.9.3 Site 32: East Garrison Sewage Treatment Plant Secondary Assessment

Site Description

Site 32 is located at the eastern portion of the former Fort Ord, north of Inter-Garrison Road and south of Reservation Road at approximately 36.656 degrees latitude and -121.738 degrees longitude. The site was operated as the East Garrison STP, a WWTP which operated from the 1940s through 1997. The East Garrison STP was built before the 1940s as a primary treatment plant to serve the municipal needs of the East Garrison. Onsite structures included several unlined sludge beds, an unlined percolation pond, and two concrete Doten-sedimentation tanks (HLA, 1998a). Boundaries of the sludge beds and percolation ponds were unclear because these areas had been disturbed numerous times by off-road vehicles and once by earth moving equipment during a search for a missing person (HLA, 1997a).

The site is located on a bluff above the Salinas River Valley and is now within the East Garrison residential development. All East Garrison STP features were demolished and removed from the site in 2007 during redevelopment activities. Features near the site now include several parks, a chapel, a fire station, and residential areas.

Site reconnaissance was performed on January 21, 2021. No evidence of stained soil or stressed vegetation was found. The area of the former STP currently encompasses a portion of Eleanor Roosevelt Park and residences near the intersection of Warren Avenue and McClellan Circle. The site has been entirely regraded and redeveloped and no STP features remain onsite. Site photos and site visit information are in Appendix B.

Site 32 is located in the Salinas River watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 18. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army. The site is currently owned and operated by Century Communities as part of the East Garrison housing development. The East Garrison STP was constructed prior to the 1940s as a primary treatment plant to serve the municipal needs of the East Garrison. Treatment facilities consisted of unlined sludge beds, an unlined percolation pond, and two concrete Doten-sedimentation tanks (HLA, 1998a). The East Garrison STP effluent was discharged to the Salinas River until around 1973 when the discharge pipe was capped (Weston, 1990). Prior to the early 1980s, the sludge beds received solid waste that was removed from the Doten tanks. The sludge beds were used to dewater the solid material; however, the sludge had never been removed from the sludge beds and chlorination was never conducted at the East Garrison STP (HLA, 1997a).

The East Garrison STP operated until 1997, but only received wastewater from toilets and showers used at the East Garrison, approximately 2,000 to 5,000 gallons per day. By 1997, sewage entered the East Garrison STP through the southeasternmost Doten tank and the suspended solids were settled out through a series of holding tanks. Liquid sewage was released through an overflow valve to a diversion box and out onto the ground directly north of the diversion box, where the liquid ponded. A portion of the sludge beds and the percolation ponds were no longer utilized. Approximately 3,000 gallons of effluent water was released via the diversion box each day to the sludge bed next to the Doten tanks. The sludge material settled out in the Doten tanks was removed and transported to the regional treatment plant in Marina (HLA, 1997a). Hydraulic loading was approximately 900,000 gallons per

month, except during winter months when loading was reduced to around 317,000 gallons per month (Weston, 1990).

In 1997, dried sewage sludge was removed from the inactive drying beds and soil containing elevated concentrations of metals, pesticides, and petroleum hydrocarbons was removed from the IA areas. Approximately 1,800 cubic yards of soil was excavated and transported to the OU2 Fort Ord Landfills for use in the foundation layer of the engineered cover system (HLA, 1998a). The Doten tanks were emptied, cleaned, and capped (IT, 2000b). The results of confirmation sampling and risk evaluation indicated no further threat to human health, the environment, or groundwater (HLA, 1998a). The Site 32 property was transferred in 2004 and the East Garrison residential development was constructed over the area.

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite. The East Garrison STP operational history also indicates it did not receive wastewater from industrial or commercial facilities that used or disposed of PFAS-containing effluents. Additionally, sewage sludge where PFAS may have been concentrated was removed from the site. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment. However, because Site 32 is a site type that merits evaluation per the Army PFAS Guidance, it was recommended for tertiary assessment.

4.9.4 Site 36: FAAF Sewage Treatment Plant Secondary Assessment

Site Description

Site 36 was located in the northeastern portion of the FAAF near the former Fort Ord boundary at approximately 36.682 degrees latitude and -121.756 degrees longitude. From the site's construction in the late 1950s through March 1991, the site operated as the FAAF STP, a WWTP that received both sanitary sewage and wastewater from wash racks and maintenance shops at the FAAF and the nearby U.S. Army Reserve Center (HLA, 1996h).

Site 36 is approximately 4 acres in size and previous onsite structures included a barminutor, an Imhoff tank, two concrete-lined evaporation ponds with an estimated capacity of 20,000 gallons per day, two small sludge-drying beds for the Imhoff tank sludge, and a sewage overflow outfall. By 1996, the barminutor and Imhoff tanks had been removed (HLA, 1996h). The site is now largely natural and sparsely vegetated. Land use in the area includes a large agricultural area north of the Salinas River and the Marina Municipal Airport to the southwest.

Site reconnaissance was performed on March 5, 2021. No evidence of stained soil or stressed vegetation was found. The only remaining structure onsite is an airport communication tower used and operated by the City of Marina. The sludge drying bed and evaporation pond area is currently a well-vegetated depression. The outfall area is largely overgrown. Site photos and site visit information are in Appendix B.

Site 36 is located in the Marina watershed. Surface water information for the watershed is in Figure 7. Groundwater information for the site and surrounding area is in Figure 15, Figure 16, and Figure 17. Sensitive environments information for the watershed is in Figure 10.

Site Operational History and Waste Characteristics

The site was previously owned and operated by the Army. Since base closure in 1994, Site 36, along with the rest of the FAAF, has been owned and operated by the City of Marina as the Marina Municipal Airport. From the late 1950s through March 1991, the FAAF STP operated as an active WWTP, with onsite structures that included a barminutor, an Imhoff tank, two concrete-lined evaporation ponds with an estimated capacity of 20,000 gallons per day, two small sludge-drying beds for the Imhoff tank sludge, and a sewage overflow outfall. Chlorination did not occur at Site 36 (HLA, 1996h).

The FAAF STP treated an average of 16,500 gallons per day of sanitary sewage and wastewater from wash racks and maintenance shops at FAAF and the nearby U.S. Army Reserve Center. Wastewater from the helicopter washdown was occasionally pumped to the oxidation ponds of the FAAF STP instead of the holding tanks in the wash area (EA, 1991). There was no off-base effluent discharge from the evaporation ponds, and sludge was never removed from the drying beds (Harding ESE, 2002).

Oil-water separators were installed in the 1960s to pre-treat wastewater from the aircraft wash racks and prevent petroleum hydrocarbons from entering the sanitary sewer system. In March 1997, an IA excavation removed approximately 600 cubic yards of impacted soil from the evaporation ponds and approximately 8,700 cubic yards of sewage sludge from the drying beds. All excavation soil and sludge were transported to the OU2 Fort Ord Landfills for disposal under the engineered cover system. In May 1997, the site was graded so that surface water would flow off the site. The final work phases involved temporary erosion control and revegetation using native plants. Straw crimping was completed in August 1997 and seeding was completed by the end of 1997 (IT, 2000b).

The Imhoff tank experienced overflows from the oil-water separators, and the evaporation ponds had cracks in the bottom, so it was possible for wastewater to percolate into the ground (HLA, 1997c), though groundwater contamination would have been limited to the A-Aquifer, which is not used for drinking water purposes (HGL, 2017). The FO-SVA underlies the A-Aquifer beneath Site 36 and continues in a downgradient direction, daylighting at the bluffs above the Salinas River along the eastern boundary of the former Fort Ord (HLA, 1995d, Volume II). Additionally, the low permeability and thickness of the FO-SVA prevents significant vertical migration of groundwater within the Site 36 area from the A-Aquifer into the underlying Upper 180-Foot Aquifer. Consequently, there is no exposure pathway to human receptors for groundwater from the Site 36 area.

Secondary Assessment Conclusions

There are no known or suspected source areas of PFAS onsite. No known quantities of PFAS-containing materials were stored or used onsite and there are no known or suspected AFFF discharge events at the FAAF in which AFFF could have entered the sanitary sewer system. Based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment. However, because Site 36 is a site type that merits evaluation per the Army PFAS Guidance, it was recommended for tertiary assessment.

5.0 Tertiary Assessment Pathway and Environmental Hazard Assessment for Selected Sites

The results of the tertiary assessments for known or probable fire training areas, potential AFFF storage locations, aircraft crash sites, aviation hangars and other aviation assets, landfill areas, and WWTPs identified in the secondary assessment are summarized below. The tertiary assessment sites are listed in Table 3 and shown in Figure 24.

5.1 Site 1: Ord Village Sewage Treatment Plant Tertiary Assessment

5.1.1 Groundwater Pathway

Hydrogeologic Setting

Site 1 overlies the Seaside basin. The Seaside basin is structurally complex and includes several recognized faults and folds. Three aquifers are recognized in the Seaside basin: the Uppermost Aquifer, the Paso Robles Aquifer, and the Santa Margarita Aquifer (HLA, 1994d).

The Uppermost Aquifer is not used for water supply, but the other two aquifers are considered water-supply sources. The Uppermost Aquifer comprises the saturated portions of the older dune sand and Aromas Sand. This aquifer is composed predominately of fine- to medium-grained sand, locally coarse-grained in its lower sections, with occasional silt beds. The Uppermost Aquifer is unconfined and perched, with westward flow approximately parallel to topography. The overall hydraulic gradient in the Uppermost Aquifer is approximately 0.015 ft/ft (HLA, 1994d). Based on site characterization data collected at Site 1 in 1992, the average depth to water at Site 1 is approximately 60 ft bgs (HLA, 1996e).

The aquifers of the Paso Robles Formation are below the Uppermost aquifer. This unit consists of several significant, confined water-producing zones at depth, and numerous small, confined zones in discontinuous, lenticular strata in its upper sections. In the Northern Seaside basin, where Site 1 is located, the flow direction in the Paso Robles Formation is generally northward, with hydraulic gradients ranging from approximately 0.005 to 0.020 ft/ft (HLA, 1994d).

The Santa Margarita Formation forms the lowermost aquifer in the Seaside basin. This confined aquifer is composed predominately of quartzose sand with a thoroughgoing clay defining a lower and upper member. The Santa Margarita formation is apparently absent near areas of bedrock highs in the Monterey Formation. The groundwater flow regimes in the Santa Margarita Formation in each of the fault-bounded subbasins are considered to be generally independent (HLA, 1994d).

Groundwater Targets

Local target populations and sensitive environments are shown in Figure 25.¹⁷ Downgradient of Site 1 are six California American Water supply wells, which are located between 0.8 and 1.4 miles from Site 1 and draw water from the Paso Robles Formation (Figure 26). These wells supply potable water to much of northern Monterey County (Appendix E). The California American Water supply system operates as a complex blended system.

¹⁷ A target population is the human population associated with the site or its targets. Target populations consist of those people who use target wells or surface water intakes supplying drinking water, consume food chain species taken from target fisheries, or are regularly present on the site or within target distance limits.

Groundwater Conclusions

Because the flow rate at Site 1 remained low during its years of operation and there are no known significant historical sources of PFAS at Site 1, it is unlikely significant amounts of PFAS were released at Site 1. Based on the information available, the potential storage, use, or disposal of PFAS-containing material does not pose a potential threat of release to the environment. Therefore, the release of PFAS from Site 1 to groundwater is not suspected. No groundwater investigations are recommended at Site 1; however, Site 1 may be considered for PFAS investigation in the future should additional evidence becomes available indicating that further investigation is appropriate.

5.1.2 Surface Water Pathway

Hydrologic Setting

Most rainfall at Fort Ord occurs from November through April with an average annual precipitation of 14 inches (Harding ESE, 2002). Site 1 is located in the Marina watershed (Figure 7). The site lies in an area of minimal flood hazard, with elevations above the 100-year flood level. Surface water infiltration is high at Site 1 due to the permeable dune sand and near shore beach deposits existing at the site. The nearest surface water body is the Monterey Bay, located approximately 0.1 of a mile from the site. Stormwater runoff from Site 1 to the Monterey Bay or other surface water bodies is unlikely due to the high topography dunes surrounding the site and high infiltration soil types present at the site. Stormwater runoff from the site flows generally towards the area of the former onsite sludge drying beds and holding pond.

Surface Water Targets

Local target populations and sensitive environments are shown in Figure 25. There are no drinking water intakes, fisheries, or aqueous sensitive environments downstream of Site 1. Due to the groundwater flow directions in the Upper 180-Foot Aquifer, it is also unlikely that there is a groundwater impact to surface water resulting from historical activities at Site 1.

Surface Water Conclusions

Because the flow rate at Site 1 remained low during its years of operation and there are no known significant historical sources of PFAS at Site 1, it is unlikely significant amounts of PFAS were released at Site 1. Based on the information available, the potential storage, use, or disposal of PFAS-containing material does not pose a potential threat of release to the environment. Therefore, the release of PFAS from Site 1 to surface water is not suspected. No surface water investigations are recommended at Site 1; however, Site 1 may be considered for PFAS investigation in the future should additional evidence becomes available indicating that further investigation is appropriate.

5.1.3 Soil Pathway

Physical Conditions

In general, the subsurface soil at Site 1 consists of brownish-yellow to yellow sand and silty sand to the maximum depth of 101.5 feet bgs explored during soil borings conducted from December 1991 through January 1992. Most of the sand was classified as moist, medium dense to very dense, and fine- to medium-grained with some coarse-grained sand. The particle size analyses indicated that the materials encountered were predominately poorly graded sand (SP) or silty sand (SM). At approximately 100 feet bgs, a very stiff, dark gray to dark greenish-gray silty clay containing shell fragments was encountered in the pilot boring. Fill debris was encountered to 5 feet bgs in the five shallow borings drilled within the clarifier footprints and three trenches excavated within the trickling filter footprints (HLA, 1996e).

In accordance with the Interim Action Record of Decision (Army, 1994a), an IA excavation was completed at Site 1 in 1997 to remove soils with concentrations of organic compounds and metals above target cleanup concentrations. 862 cubic yards of soils and dried sludge were excavated from the area of the former trickling filters and holding pond and placed at the OU2 Fort Ord Landfills in the foundation layer for the engineered cover system (HLA, 1997e).

Soil Targets

Local target populations and sensitive environments are shown in Figure 25. There are no onsite resident, school, daycare, or worker populations at this site. Therefore, there are no primary target populations.

Soil Exposure Conclusions

Because the flow rate at Site 1 remained low during its years of operation and there are no known significant historical sources of PFAS at Site 1, it is unlikely significant amounts of PFAS were released at Site 1. Based on the information available, the potential storage, use, or disposal of PFAS-containing material does not pose a potential threat of release to the environment. Therefore, the release of PFAS from Site 1 to soil is not suspected. No soil investigations are recommended at Site 1; however, Site 1 may be considered for PFAS investigation in the future should additional evidence becomes available indicating that further investigation is appropriate.

5.2 Site 2: Main Garrison Sewage Treatment Plant Tertiary Assessment

5.2.1 Groundwater Pathway

Hydrogeologic Setting

Site 2 overlies the unconfined Upper 180-Foot Aquifer west of the FO-SVA. Because the FO-SVA is absent at Site 2, the A-Aquifer is considered part of the Upper 180-Foot Aquifer. The lithology of both the Upper 180-Foot Aquifer and Lower 180-Foot Aquifer is primarily sand to silty sand with up to 15 percent gravel in some zones. The Intermediate 180-Foot Aquitard, present between the Upper 180-Foot Aquifer and the Lower 180-Foot Aquifer at approximately 128 to 138 feet bgs, is mainly sandy silt to silty and clayey sand and ranges in thickness from about 8 to 20 feet. During initial site characterization in 1992, the depth to groundwater ranged from about 40 to 60 feet bgs. Groundwater flow in the Upper-180 Foot Aquifer is generally southwest toward Monterey Bay, with a maximum hydraulic gradient of 6.9×10^{-4} feet/feet. Upper 180-Foot Aquifer water levels close to Monterey Bay are influenced by tidal fluctuation but the effects decrease to less than 0.1 foot approximately 1,000 feet from the shore. Groundwater flow in the Lower 180-Foot Aquifer is generally from Site 2 inland towards Site 12. Local variation in flow direction in the Lower 180-Foot Aquifer does occur near the Monterey Bay where water levels are affected by tidal conditions; however, there are only minor seasonal variations in water levels. Influence on water levels in the Lower 180-Foot Aquifer related to tidal changes is present over 2,000 feet from Monterey Bay, with a change of over one foot in water level measured at Site 12 during tidal influence monitoring in 1994. The Upper 180-Foot Aquifer is unconfined at Site 2 while the Lower 180-Foot Aquifer is confined and aquifer stress testing (from pumping) applied to the Upper 180-Foot Aquifer did not influence the Lower 180-Foot Aquifer. Pump tests were not conducted in the Lower 180-Foot Aquifer in the Site 2 area, though the Lower 180-Foot Aquifer was monitored during pump testing in the Upper 180-Foot Aquifer (HLA, 1995d).

Groundwater Targets

Local target populations and sensitive environments are shown in Figure 27. Generally, the highest concentrations of groundwater COCs are detected from 0 to 20 feet below the top of the water table. Concentrations decrease to non-detection at the bottom of the Upper 180-Foot Aquifer. COCs are not detected below the Intermediate 180-Foot Aquitard showing that the unit is a barrier to their downward migration (i.e., the Lower 180-Foot Aquifer is not impacted) (HLA, 1995d). The Upper 180-Foot Aquifer is not used for water supply and there is no downgradient groundwater use. For deeper aquifers, downgradient of Site 2 are the MCWD drinking water supply wells 29, 30, 31, and 34, located approximately 3.4 miles, 3.6 miles, 3.9 miles, and 4.2 miles away from Site 2, respectively (Figure 28). Wells 29, 30, and 31 draw water from the Lower 180-Foot Aquifer and the 400-Foot Aquifer; however, these aquifers are hydraulically separated from the Upper 180-Foot Aquifer, which flows toward the Monterey Bay at Site 2. Well 34 draws water from the 900-Foot Aquifer (MCWD, 2020); however, the 900-Foot Aquifer is separated from the above aquifers by a confining layer that is approximately 150 feet thick. These wells supply potable water to the City of Marina, the CSUMB campus, and parts of the City of Seaside (Appendix E). The MCWD water supply system operates as a blended system.

Groundwater Conclusions

The release of PFAS from Site 2 to the Upper 180-Foot Aquifer is possible because of the Main Garrison STP, as the primary WWTP for the former Fort Ord, could have inadvertently accepted PFAS-containing wastewater from residential, light industrial, and commercial sources over several decades and discharged the treated wastewater to unlined evaporation ponds. Because of the mobility of PFAS in the soil pathway, a groundwater investigation is recommended in Site 2 area (see Section 6.0).

5.2.2 Surface Water Pathway

Hydrologic Setting

Most rainfall at Fort Ord occurs from November through April with an average annual precipitation of 14 inches (Harding ESE, 2002). Site 2 is located in the Marina watershed (Figure 7). The site lies in an area of minimal flood hazard, with elevations above the 100-year flood level. Surface water infiltration is high at Site 2 due to the permeable dune sand and near shore beach deposits existing at the site. The nearest surface water body is the Monterey Bay, located approximately 0.2 of a mile from the site. Stormwater runoff from Site 2 to the Monterey Bay or other surface water bodies is unlikely due to the high topography dunes surrounding the site and high infiltration soil types present at the site.

Ponding Areas 1, 2, and 3 still exist as depressions in the dunes, with Ponding Area 2 acting as a primary stormwater infiltration basin for inland runoff. An overflow pipe extends to Ponding Area 1, now acting as an overflow infiltration basin. Stormwater runoff from Site 2 is primarily towards these ponding areas.

Surface Water Targets

Local target populations and sensitive environments are shown in Figure 27. There are no drinking water intakes, fisheries, or aqueous sensitive environments downstream of Site 2. Due to the groundwater flow directions in the Upper 180-Foot Aquifer, it is also unlikely that there is a groundwater impact to surface water resulting from historical activities at Site 2.

Surface Water Conclusions

Because no surface water is present onsite and there is no significant stormwater runoff to surface water from Site 2, it is unlikely that PFAS generated from Site 2 STP activities migrated to surface water bodies. Therefore, no additional surface water investigation is recommended.

5.2.3 Soil Pathway

Physical Conditions

At Site 2, permeable dune sand and near shore beach deposits are present from the ground surface to approximately 70 feet bgs. A sandy silt present at approximately 128 to 138 feet bgs acts as an aquitard between the Upper 180-Foot Aquifer and Lower 180-Foot Aquifer (HLA, 1995d).

The configuration of the site and analytical results from soil sampling conducted in 1996 indicate effluent from the sludge drying beds discharged to the evaporation pond immediately to the south (Ponding Area 1) with overflow going to Ponding Area 2 and Ponding Area 3 (HLA, 1997f). No previous remedial action was proposed for soil at Site 2 (Army, 1997b); however, in 1997, as part of the maintenance and cleanup activities associated with the closure of Site 2, sludge was removed from the drying beds and evaporation ponds. The asphalt-lined drying beds were demolished and about 3 feet of soil was excavated. Approximately 15,000 cubic yards of sludge, soil, and asphalt and wood debris were disposed of in the OU2 Fort Ord Landfills under the engineered cover system. In addition, conveyance piping under the drying beds and evaporation ponds was removed and disposed of in the OU2 Fort Ord Landfills. The area was then revegetated with native plants (IT, 2000b).

Soil Targets

Local target populations and sensitive environments are shown in Figure 27. There are no onsite resident, school, daycare, or worker populations at this site. Therefore, there are no primary target populations.

Soil Exposure Conclusions

Because of the high permeability of soil in the area, PFAS infiltration into the soil in the area of the sludge drying beds and ponding areas at Site 2 is possible and PFAS-impacted soil could remain near the ground surface. Although approximately 15,000 cubic yards of sludge, soil, and asphalt and wood debris were removed, the high mobility of PFAS and site use as a WWTP for several decades indicates PFAS-impacted soil could remain at the site in the unlined evaporation ponds. Soil sampling for PFAS analysis in the topographic low area in Ponding Area 1 at depths ranging from the ground surface to 10 feet bgs is recommended because this evaporation pond received effluent directly from the sludge drying beds and long-term retention of longer-chain PFAS in shallow soils after extended percolation is possible (see Section 6.0).

5.3 Site 10: Former Burn Pit Tertiary Assessment

5.3.1 Groundwater Pathway

Hydrogeologic Setting

Site 10 overlies the unconfined or semiconfined Upper 180-Foot Aquifer west of the FO-SVA (HLA, 1995d). During initial site characterization in 1992, groundwater elevations in the Site 10 wells ranged from approximately 236 to 244 feet bgs and the horizontal hydraulic gradient was measured to be 0.004 feet/foot in the area surrounding the burn pit and 0.002 feet/foot closer to the burn pit (HLA, 1993c). The Upper-180 Foot Aquifer was approximately 50 feet thick in the Site 10 vicinity and is predominantly

composed of sand with minor amounts of silt and gravel. Hydraulic conductivities in this aquifer can reach up to 366 feet per day (HLA, 1995d, Volume II). Groundwater flow in the Upper 180-Foot Aquifer in this area is to the northeast toward the OU2 Fort Ord Landfills (Figure 13). Particle tracking analysis using the Fort Ord groundwater model indicates that PFAS entering the Upper 180-Foot Aquifer at Site 10 could have traveled as far as the OU2 Fort Ord Landfills within 30 years and potentially commingled with the OU2 TCE plume in the Upper 180-Foot Aquifer (AEI, 2020). East of the OU2 Fort Ord Landfills, groundwater flows from the Upper 180-Foot Aquifer down into the Lower 180-Foot Aquifer through a natural discontinuity in the Intermediate 180-Foot Aquitard (HLA, 1995d and MACTEC, 2006a), which allows low concentrations of COCs associated with OU2 to enter the Lower 180-Foot Aquifer.

Groundwater Targets

Local target populations and sensitive environments are shown in Figure 27.¹⁸ Downgradient of Site 10 are the MCWD drinking water supply wells 29, 30, 31, and 34, located approximately 3.0 miles, 3.3 miles, 3.5 miles, and 3.7 miles away from Site 10, respectively (Figure 28). Wells 29, 30, and 31 draw water from the Lower 180-Foot Aquifer and the 400-Foot Aquifer and therefore could be impacted by migration of PFAS in groundwater from Site 10. Well 34 draws water from the 900-Foot Aquifer (MCWD, 2020); however, the 900-Foot Aquifer is separated from the above aquifers by a confining layer that is approximately 150 feet thick. These wells supply potable water to the City of Marina, the CSUMB campus, and parts of the City of Seaside (Appendix E). The MCWD water supply system operates as a blended system.

Groundwater Conclusions

The release of PFAS from Site 10 to the Upper 180-Foot Aquifer is suspected because of reported historical use of AFFF for training and demonstration purposes at the site for at least two decades. Due to relatively high hydraulic conductivity, the potential for migration of PFAS in groundwater is high and there are downgradient water supply wells. Therefore, additional groundwater investigation is recommended (see Section 6.0).

5.3.2 Surface Water Pathway

Hydrologic Setting

Most rainfall at Fort Ord occurs from November through April with an average annual precipitation of 14 inches (Harding ESE, 2002). Site 10 is located in the Marina watershed (Figure 7). The site lies in an area of minimal flood hazard, with elevations above the 500-year flood level. Surface water infiltration is high at Site 10 due to silty sand which extends from ground surface to 200 feet bgs and layers of well-graded and poorly graded sand below 200 feet bgs (HLA, 1996g). The nearest surface water body is the Monterey Bay, located approximately 1.3 miles away from the site. Stormwater runoff from Site 10 to the Monterey Bay or other surface water bodies is unlikely due to the topography and high infiltration soil types present at the site.

Stormwater runoff from the Site 10 area is primarily toward a vegetated depression a few hundred feet southwest of the site; however, the site's original design as a burn pit also indicates that stormwater collected in the pit and infiltrated into the soil and groundwater.

¹⁸ A target population is the human population associated with the site or its targets. Target populations consist of those people who use target wells or surface water intakes supplying drinking water, consume food chain species taken from target fisheries, or are regularly present on the site or within target distance limits.

Surface Water Targets

Local target populations and sensitive environments are shown in Figure 27. There are no drinking water intakes, fisheries, or aqueous sensitive environments downstream of Site 10. Due to the distance of surface water bodies and groundwater flow directions in the Upper 180-Foot Aquifer, it is also unlikely that there is a groundwater impact to surface water resulting from historical activities at Site 10.

Surface Water Conclusions

Because no surface water is present onsite and there is no stormwater runoff to surface water from Site 10, it is unlikely that PFAS generated from Site 10 burn pit activities migrated to surface water bodies and there are no associated primary targets. Therefore, no additional surface water investigation is recommended.

5.3.3 Soil Pathway

Physical Conditions

Dark brown silty sand extends from the ground surface to 6 to 12 feet bgs. The predominant material underlying the silty sand is a yellow-brown, fine- to medium-grained sand, which generally extends to at least 200 feet bgs. Only a few thin layers (less than 10 feet thick) of fine-grained material (i.e., silty sand or sandy clay) are interbedded with this thick sand deposit. Below 200 feet, layers of well-graded sand are interbedded with poorly graded sands and silty layers (HLA, 1993c).

Approximately 1,451 cubic yards of soil were removed down to 10 feet bgs and the excavation was backfilled with clean soil (HLA, 1996g). PFAS was not a COC at that time, and the removed soil was not sampled and analyzed for PFAS compounds. However, the soil was sampled for a variety of organic compounds associated with the fuels used in training and demonstration events at the burn pit and all soil above the target cleanup concentrations for those compounds was removed.

Soil Targets

Local target populations and sensitive environments are shown in Figure 27. There are no resident populations or schools within 200 feet of Site 10. Approximately 200 feet to the northeast of the site is the former Main Garrison Fire Station, which currently operates as the POM Fire Station (Figure 27). Site 10 is no longer in use as a training area (Appendix A, Wilcox) and there is no direct exposure pathway because potentially impacted soil is at least 10 feet bgs. Therefore, this worker population is considered a secondary target population.

The property is zoned as Commercial-Mixed Use (CMX) and future land use could include both commercial and residential where PFAS-impacted soil could be exposed during development of these uses. However, Site 10 is within a designated commercial center that is part of the larger Campus Town CMX development. Per the Campus Town specific plan, future residential use is permitted but would be limited to levels above commercial spaces (second floor or higher) and the Site 10 area will be hardscaped (i.e., there are no expected exposure points for future residents) (City of Seaside, 2020).

Soil Exposure Conclusions

Because 1,451 cubic yards of contaminated soils were already removed as part of previous site remediation, it is unlikely any PFAS-impacted soil remains near the ground surface at Site 10 and there is no direct pathway to target populations. However, soil sampling is recommended below the vertical limits of the previous excavation to determine if any PFAS-impacted soil remains at Site 10 (see Section 6.0).

5.4 Site 32: East Garrison Sewage Treatment Plant Tertiary Assessment

5.4.1 Groundwater Pathway

Hydrogeologic Setting

Site 32 is located in the Monterey subbasin. The A-aquifer is perched and unconfined above the FO-SVA throughout much of the Main Garrison, East Garrison, and FAAF areas, including the Site 32 area. The FO-SVA in the vicinity of the East Garrison is at a higher elevation than the SVA beneath the Salinas Valley. The FO-SVA pinch out in the East Garrison area indicates a potential for flow from the A-Aquifer to enter the 180-Foot Aquifer along the edge of the FO-SVA in that area (HLA, 1994d).

Data from measurements taken as a part of initial site characterization in 1992 indicated groundwater elevations ranging from 185 to 233 feet bgs. These groundwater elevations indicate that groundwater flows to the north-northwest. The groundwater gradient at the site is approximately 2×10^{-3} foot/foot (HLA, 1997a).

Groundwater Targets

Local target populations and sensitive environments are shown in Figure 29. The A-Aquifer is not used for water supply and there is no downgradient groundwater use. All MCWD drinking water wells are located upgradient or cross-gradient from the site (Figure 28) and draw water from the deeper aquifers that are separated from the A-Aquifer by multiple aquitards.

Groundwater Conclusions

Because the flow rate at Site 32 remained low during its years of operation and there are no known significant historical sources of PFAS at Site 32, it is unlikely significant amounts of PFAS were released at Site 32. Based on the information available, the potential storage, use, or disposal of PFAS-containing material does not pose a potential threat of release to the environment and the release of PFAS from Site 32 to groundwater is not suspected. No groundwater investigations are currently recommended at Site 32; however, Site 32 may be considered for PFAS investigation in the future should additional evidence becomes available indicating that further investigation is appropriate.

5.4.2 Surface Water Pathway

Hydrologic Setting

Most rainfall at Fort Ord occurs from November through April with an average annual precipitation of 14 inches (Harding ESE, 2002). Site 32 is located in the Salinas River watershed (Figure 7). The site lies in an area of minimal flood hazard, with elevations above the 500-year flood level. Surface water infiltration is high at Site 32 due to the sand, silty sand, and sand with clay which extends from ground surface to 20 feet bgs (HLA, 1998a). The nearest surface water body is the Salinas River, located approximately 0.8 miles away from the site. Stormwater runoff from Site 32 to the Salinas or other surface water bodies is unlikely due to the topography and high infiltration soil types present at the site.

Based on previous site characterization maps, stormwater runoff from Site 32 remained onsite (HLA, 1997a). The Site 32 area was significantly regraded following the closure of the East Garrison STP and currently stormwater runoff from the Site 32 area flows primarily towards the southeast.

Surface Water Targets

Local target populations and sensitive environments are shown in Figure 29. There are no drinking water intakes, fisheries, or aqueous sensitive environments downstream of Site 32. Due to the distance of

surface water bodies and groundwater flow directions, it is also unlikely that there is a groundwater impact to surface water resulting from historical activities at Site 32.

Surface Water Conclusions

Because the flow rate at Site 32 remained low during its years of operation and there are no known significant historical sources of PFAS at Site 32, it is unlikely significant amounts of PFAS were released at Site 32. Based on the information available, the potential storage, use, or disposal of PFAS-containing material does not pose a potential threat of release to the environment and the release of PFAS from Site 32 to surface water is not suspected. No surface water investigations are currently recommended at Site 32; however, Site 32 may be considered for PFAS investigation in the future should additional evidence becomes available indicating that further investigation is appropriate.

5.4.3 Soil Pathway

Physical Conditions

The maximum depth explored during the Site 32 preliminary assessment/site investigation in 1990 was 20 feet. In general, subsurface materials consisted of yellowish brown, medium dense to very dense, fine sand and silty sand. The particle size analysis indicated that the materials encountered between 9.0 and 14 feet bgs are classified as sand and sand with clay. Groundwater was encountered during drilling at depths ranging between 180 and 230 feet bgs (HLA, 1998a).

Soil Targets

Local target populations and sensitive environments are shown in Figure 29. Following base closure in 1994, the East Garrison area, including the East Garrison STP, was redeveloped into a residential community. Approximately 65 houses and 66 apartments are located onsite or within 200 feet of the former East Garrison STP. Based on the U.S. average of 2.60 persons per household, the resident population at Site 32 is roughly 340 people (U.S. Census Bureau, 2017).

The East Garrison Preschool and the East Garrison Family Child Care home are also located onsite or within 200 feet of Site 32. The East Garrison Preschool has two listed employees and, based on its reported adult/child ratio of 1:7, there are approximately 14 children attending this school (East Garrison Preschool, 2022). The East Garrison Family Childcare Facility is a home family childcare facility with one listed employee (East Garrison Family Childcare, 2022). Based on State of California requirements, up to eight children can be cared for by one adult in a family childcare home, meaning that eight or less children may attend the East Garrison Family Childcare (California Department of Social Services, 2005). In total, the school and daycare population at Site 32 is approximately 22.

The only worker populations onsite are the East Garrison Preschool and East Garrison Family Child Care home, with worker populations of two and one, respectively. The total worker population at Site 32 is approximately three people.

These residential, daycare, and worker populations are considered secondary target populations because Site 32 has been significantly regraded and there are no known or suspected PFAS sources to the soil.

Soil Exposure Conclusions

Because the flow rate at Site 32 remained low during its years of operation and there are no known significant historical sources of PFAS at Site 32, it is unlikely significant amounts of PFAS were released at

Site 32. Based on the information available, the potential storage, use, or disposal of PFAS-containing material does not pose a potential threat of release to the environment and the release of PFAS from Site 32 to soil is not suspected. No soil investigations are currently recommended at Site 32; however, Site 32 may be considered for PFAS investigation in the future should additional evidence becomes available indicating that further investigation is appropriate.

5.5 Site 36: FAAF Sewage Treatment Plant Tertiary Assessment

5.5.1 Groundwater Pathway

Hydrogeologic Setting

No previous hydrogeologic site investigations have occurred at Site 36; however, site-specific geology and hydrogeology can be inferred from adjacent sites and basewide information (see Section 2.4). The Salinas Basin underlies Site 36. At the Former Fort Ord, the Salinas Basin is composed of relatively flat-lying to gently dipping, poorly consolidated sediments. Aquifers within the Salinas Basin at the former Fort Ord, from top to bottom, are the A-Aquifer, Upper 180-Foot Aquifer, Lower 180-Foot Aquifer, 400-Foot Aquifer, and 900-Foot Aquifer.

The A-Aquifer is unconfined and occurs within the permeable older dune sand, which is among the youngest deposits of the area. The older dune sand extends from the ground surface to a depth of approximately 125 feet bgs in the former Fire & Rescue Station area. A groundwater divide in the A-Aquifer exists east of the OU2 Fort Ord Landfills and trends northward toward the former FAAF. The site is located east of the A-Aquifer groundwater divide and groundwater flow in the A-Aquifer in the area is toward the northeast (Figure 15). Localized areas of seepage are present in the bluffs bordering the Salinas Valley, which indicates surface discharge is occurring from the A-Aquifer. Beneath the A-Aquifer lies the FO-SVA, an extensive fine-grained sequence that is approximately 15 feet thick in the FAAF area (HLA, 1995d) and appears to be an effective barrier that prevents downward migration of contaminants from the A-Aquifer into the underlying Upper 180-Foot Aquifer (HGL, 2017).

In the FAAF area, the Upper 180-Foot Aquifer is confined beneath the FO-SVA (HLA, 1995d). The Upper 180-Foot Aquifer consists of about 60 feet of fine to coarse sand and some gravel and is laterally extensive throughout the area. Groundwater flows eastward and southeastward under largely confined conditions. The direction of flow appears controlled by the degree of hydraulic communication with the underlying Lower 180-Foot Aquifer, separated by the Intermediate 180-Foot Aquitard, where present. Where this aquitard is discontinuous, groundwater from the Upper 180-Foot Aquifer drains into the Lower 180-Foot Aquifer (MACTEC, 2006a).

The Intermediate 180-Foot Aquitard consists of approximately 50 feet of interbedded clay and clayey sand layers, occasionally mixed with coarse gravel. This aquitard hydraulically isolates the Upper and Lower 180-Foot Aquifers from one another but is discontinuous in the area south of Reservation Road, allowing recharge to the Lower 180-Foot Aquifer to occur (MACTEC, 2006a).

The Lower 180-Foot Aquifer consists of approximately 200 feet of coarse sand and gravel and the 400-Foot Aquifer consists of up to 250 feet of a sequence of interbedded sand and clay. These aquifers have historically been and continue to be a significant source of potable water for the former Fort Ord and City of Marina areas (MACTEC, 2006a).

Underlying the 400-Foot Aquifer is a confining layer reported to be approximately 150 feet thick that separates the 400-Foot Aquifer from the 900-Foot Aquifer, which consists of sands and gravels interbedded with discontinuous lenses of clay between depths of approximately 750 and 1,700 feet bgs. The 900-Foot Aquifer is penetrated by the deep MCWD drinking water supply wells (HLA, 1995d).

Groundwater Targets

Local target populations and sensitive environments are shown in Figure 29. The A-Aquifer is not used for water supply and there is no downgradient groundwater use. All MCWD drinking water wells are located upgradient or cross-gradient from the site (Figure 28) and draw water from the deeper aquifers that are separated from the A-Aquifer by multiple aquitards.

Groundwater Conclusions

Because the flow rate at Site 36 remained low during its years of operation and there are no known significant historical sources of PFAS at Site 36, it is unlikely significant amounts of PFAS were released at Site 36. Based on the information available, the potential storage, use, or disposal of PFAS-containing material does not pose a potential threat of release to the environment and the release of PFAS from Site 36 to groundwater is not suspected. No groundwater investigations are currently recommended at Site 36; however, Site 36 may be considered for PFAS investigation in the future should additional evidence becomes available indicating that further investigation is appropriate.

5.5.2 Surface Water Pathway

Hydrologic Setting

Most rainfall at Fort Ord occurs from November through April, with an average annual precipitation of 14 inches (Harding ESE, 2002). Site 36 is located in the Marina watershed (Figure 7). The site lies in an area of minimal flood hazard, with elevations above the 500-year flood level. Surface water infiltration is high at Site 36 due to the high permeability of soils present onsite (HLA, 1994c). The nearest surface water body is the Salinas River, located approximately 0.1 of a mile away from the site. Stormwater runoff from Site 36 to the Salinas River or other surface water bodies is unlikely due to the topography and high infiltration soil types present at the site. Stormwater runoff from Site 36 is primarily towards the two former evaporation ponds and the two former sludge-drying beds located onsite.

Surface Water Targets

Local target populations and sensitive environments are shown in Figure 29. There are no drinking water intakes, fisheries, or aqueous sensitive environments downstream of Site 36. Due to the distance of surface water bodies and groundwater flow directions in the A-Aquifer, there is a potential for groundwater impact to surface water resulting from historical activities at Site 36.

Surface Water Conclusions

Because the flow rate at Site 36 remained low during its years of operation and there are no known significant historical sources of PFAS at Site 36, it is unlikely significant amounts of PFAS were released at Site 36. Based on the information available, the potential storage, use, or disposal of PFAS-containing material does not pose a potential threat of release to the environment and the release of PFAS from Site 36 to surface water is not suspected. No surface water investigations are currently recommended at Site 36; however, Site 36 may be considered for PFAS investigation in the future should additional evidence becomes available indicating that further investigation is appropriate.

5.5.3 Soil Pathway

Physical Conditions

In general, the subsurface soil at the site consists predominately of pale yellow to yellow-olive to yellow-brown sand and sand with clay. Most of the sand was classified in the field as loose to dense, moist to wet, and very fine to fine grained. The particle size analysis indicated that the materials were classified as poorly graded sand or sand with clay. No odors or organic vapor was noted. The depth to groundwater is approximately 95 feet (HLA, 1996h).

Soil Targets

Local target populations and sensitive environments are shown in Figure 29. There are no onsite resident, school, daycare, or worker populations at this site. Therefore, there are no primary target populations.

Soil Exposure Conclusions

Because the flow rate at Site 36 remained low during its years of operation and there are no known significant historical sources of PFAS at Site 36, it is unlikely significant amounts of PFAS were released at Site 36. Based on the information available, the potential storage, use, or disposal of PFAS-containing material does not pose a potential threat of release to the environment and the release of PFAS from Site 36 to soil is not suspected. No soil investigations are currently recommended at Site 36; however, Site 36 may be considered for PFAS investigation in the future should additional evidence becomes available indicating that further investigation is appropriate.

5.6 Site 40A: East FAAF Helicopter Defueling Area Tertiary Assessment

5.6.1 Groundwater Pathway

Hydrogeologic Setting

No previous site investigations have occurred at Site 40A; however, site-specific geology and hydrogeology can be inferred from adjacent sites and basewide information (see Section 2.4). The Salinas Basin underlies the Site 40A area. At the Former Fort Ord, the Salinas Basin is composed of relatively flat-lying to gently dipping, poorly consolidated sediments. Aquifers within the Salinas Basin at the former Fort Ord, from top to bottom, are the A-Aquifer, Upper 180-Foot Aquifer, Lower 180-Foot Aquifer, 400-Foot Aquifer, and 900-Foot Aquifer.

The A-Aquifer is unconfined and occurs within the permeable older dune sand, which is among the youngest deposits of the area. The older dune sand extends from the ground surface to a depth of approximately 125 feet bgs in the Site 40A area. A groundwater divide in the A-Aquifer exists east of the OU2 Fort Ord Landfills and trends northward toward the former FAAF. Site 40A is located east of the A-Aquifer groundwater divide and groundwater flow in the A-Aquifer in the area is toward the northeast (Figure 15). Localized areas of seepage are present in the bluffs bordering the Salinas Valley, which indicates surface discharge is occurring from the A-Aquifer. Beneath the A-Aquifer lies the FO-SVA, an extensive fine-grained sequence that is approximately 15 feet thick in the Site 40A area (HLA, 1995d) and appears to be an effective barrier that prevents downward migration of contaminants from the A-Aquifer into the underlying Upper 180-Foot Aquifer (HGL, 2017).

In the FAAF area, the Upper 180-Foot Aquifer is confined beneath the FO-SVA (HLA, 1995d). The Upper 180-Foot Aquifer consists of about 60 feet of fine to coarse sand and some gravel and is laterally extensive throughout the area. Groundwater flows eastward and southeastward under largely confined

conditions. The direction of flow appears controlled by the degree of hydraulic communication with the underlying Lower 180-Foot Aquifer, separated by the Intermediate 180-Foot Aquitard, where present. Where this aquitard is discontinuous, groundwater from the Upper 180-Foot Aquifer drains into the Lower 180-Foot Aquifer (MACTEC, 2006a).

The Intermediate 180-Foot Aquitard consists of approximately 50 feet of interbedded clay and clayey sand layers, occasionally mixed with coarse gravel. This aquitard hydraulically isolates the Upper and Lower 180-Foot Aquifers from one another but is discontinuous in the area south of Reservation Road, allowing recharge to the Lower 180-Foot Aquifer to occur (MACTEC, 2006a).

The Lower 180-Foot Aquifer consists of approximately 200 feet of coarse sand and gravel and the 400-Foot Aquifer consists of up to 250 feet of a sequence of interbedded sand and clay. These aquifers have historically been and continue to be a significant source of potable water for the former Fort Ord and City of Marina areas (MACTEC, 2006a).

Underlying the 400-Foot Aquifer is a confining layer reported to be approximately 150 feet thick that separates the 400-Foot Aquifer from the 900-Foot Aquifer, which consists of sands and gravels interbedded with discontinuous lenses of clay between depths of approximately 750 and 1,700 feet bgs. The 900-Foot Aquifer is penetrated by the deep MCWD drinking water supply wells (HLA, 1995d).

Groundwater Targets

Local target populations and sensitive environments are shown in Figure 29. The A-Aquifer is not used for water supply and there is no downgradient groundwater use. All MCWD drinking water wells are located upgradient or cross-gradient from the site (Figure 28) and draw water from the deeper aquifers that are separated from the A-Aquifer by multiple aquitards.

Groundwater Conclusions

The release of PFAS from Site 40A to the A-Aquifer is suspected because of reported historical use of AFFF during a response to a fuel spill in the late 1970s or early 1980s to reduce the likelihood of fire. Because of the mobility of PFAS in the soil pathway, a groundwater investigation is recommended in the downgradient area between the helicopter parking apron and the former Fort Ord boundary to the east (see Section 6.0).

5.6.2 Surface Water Pathway

Hydrologic Setting

Most rainfall at Fort Ord occurs from November through April, with an average annual precipitation of 14 inches (Harding ESE, 2002). Site 40A is located in the Marina watershed (Figure 7). The site lies in an area of minimal flood hazard, with elevations above the 500-year flood level. Surface water infiltration is high at Site 40A due to the high permeability of soils present onsite (HLA, 1994c). The nearest surface water body is the Salinas River, located approximately 0.4 of a mile away from the site. Stormwater runoff from Site 40A to the Salinas River or other surface water bodies is unlikely due to the topography and high infiltration soil types present at the site.

Stormwater runoff from Site 40A is primarily toward a topographic low area to the northeast of the site. Stormwater runoff is also possible across the pavement toward the southwest and into a 24-inch diameter storm drain line which runs through the helicopter parking apron east of the FAAF Fire & Rescue Station. This storm drain line discharges at an outfall approximately 450 feet east of the FAAF

Fire & Rescue Station (HLA, 1995b). Surface runoff from Site 40A and the storm drain line both discharge to the same topographic low, which is depicted in the reconnaissance photographs for Site 40A in Appendix B.

Surface Water Targets

Local target populations and sensitive environments are shown in Figure 29. There are no drinking water intakes, fisheries, or aqueous sensitive environments downstream of Site 40A. It is also unlikely that there is a groundwater impact to surface water due to the reported use of AFFF at Site 40A because the A-Aquifer downgradient of Site 40A discharges at the bluff face bordering the Salinas Valley and not to a surface water body.

Surface Water Conclusions

Because no surface water is present onsite and there is no stormwater runoff to surface water from Site 40A, it is unlikely that PFAS generated from the Site 40A fuel spill response migrated to surface water bodies, and there are no associated primary targets. Surface runoff from the site enters the topographic low area previously discussed and then infiltrates the ground surface. Therefore, no additional surface water investigation is recommended.

5.6.3 Soil Pathway

Physical Conditions

In general, surface soils in the area of Site 40A consist of brown fine to coarse sand with some silt. Below about 5 feet bgs, subsurface soils down to the FO-SVA typically consist of yellowish-brown to yellow fine to coarse sand.

Soil Targets

Local target populations and sensitive environments are shown in Figure 29. There are no onsite resident, school, daycare, or worker populations at this site. Therefore, there are no primary target populations.

Soil Exposure Conclusions

Because of the high permeability of soil in the area, AFFF infiltration into the soil in the drainage area north of Site 40A is possible and PFAS-impacted soil could remain near the ground surface. Surface runoff from Site 40A and the storm drain line 450 feet east of the FAAF Fire & Rescue Station both discharge to the same topographic low, which is depicted in the reconnaissance photographs for Site 40A in Appendix B. Therefore, soil sampling for PFAS analysis in the topographic low area at depths ranging from the ground surface to 10 feet bgs is recommended because long-term retention of longer-chain PFAS in shallow soils after extended percolation is possible (see Section 6.0).

5.7 Building 514 FAAF Fire & Rescue Station Tertiary Assessment

5.7.1 Groundwater Pathway

Hydrogeologic Setting

No previous site investigations have occurred at the former FAAF Fire & Rescue Station (now Marina Fire Rescue Station #2); however, site-specific geology and hydrogeology can be inferred from adjacent sites and basewide information (see Section 2.4). The Salinas Basin underlies the former Fire & Rescue Station area. At the Former Fort Ord, the Salinas Basin is composed of relatively flat-lying to gently dipping, poorly consolidated sediments. Aquifers within the Salinas Basin at the former Fort Ord, from top to

bottom, are the A-Aquifer, Upper 180-Foot Aquifer, Lower 180-Foot Aquifer, 400-Foot Aquifer, and 900-Foot Aquifer.

The A-Aquifer is unconfined and occurs within the permeable older dune sand, which is among the youngest deposits of the area. The older dune sand extends from the ground surface to a depth of approximately 125 feet bgs in the former Fire & Rescue Station area. A groundwater divide in the A-Aquifer exists east of the OU2 Fort Ord Landfills and trends northward toward the former FAAF. The former Fire & Rescue Station is located east of the A-Aquifer groundwater divide and groundwater flow in the A-Aquifer in the area is toward the northeast (Figure 15). Localized areas of seepage are present in the bluffs bordering the Salinas Valley, which indicates surface discharge is occurring from the A-Aquifer. Beneath the A-Aquifer lies the FO-SVA, an extensive fine-grained sequence that is approximately 15 feet thick in the former Fire & Rescue Station area (HLA, 1995d) and appears to be an effective barrier that prevents downward migration of contaminants from the A-Aquifer into the underlying Upper 180-Foot Aquifer (HGL, 2017).

In the FAAF area, the Upper 180-Foot Aquifer is confined beneath the FO-SVA (HLA, 1995d). The Upper 180-Foot Aquifer consists of about 60 feet of fine to coarse sand and some gravel and is laterally extensive throughout the area. Groundwater flows eastward and southeastward under largely confined conditions. The direction of flow appears controlled by the degree of hydraulic communication with the underlying Lower 180-Foot Aquifer, separated by the Intermediate 180-Foot Aquitard, where present. Where this aquitard is discontinuous, groundwater from the Upper 180-Foot Aquifer drains into the Lower 180-Foot Aquifer (MACTEC, 2006a).

The Intermediate 180-Foot Aquitard consists of approximately 50 feet of interbedded clay and clayey sand layers, occasionally mixed with coarse gravel. This aquitard hydraulically isolates the Upper and Lower 180-Foot Aquifers from one another but is discontinuous in the area south of Reservation Road, allowing recharge to the Lower 180-Foot Aquifer to occur (MACTEC, 2006a).

The Lower 180-Foot Aquifer consists of approximately 200 feet of coarse sand and gravel and the 400-Foot Aquifer consists of up to 250 feet of a sequence of interbedded sand and clay. These aquifers have historically been and continue to be a significant source of potable water for the former Fort Ord and City of Marina areas (MACTEC, 2006a).

Underlying the 400-Foot Aquifer is a confining layer reported to be approximately 150 feet thick that separates the 400-Foot Aquifer from the 900-Foot Aquifer, which consists of sands and gravels interbedded with discontinuous lenses of clay between depths of approximately 750 and 1,700 feet bgs. The 900-Foot Aquifer is penetrated by the deep MCWD drinking water supply wells (HLA, 1995d).

Groundwater Targets

Local target populations and sensitive environments are shown in Figure 29. The A-Aquifer is not used for water supply and there is no downgradient groundwater use. All MCWD drinking water wells are located upgradient or cross-gradient from the site (Figure 28) and draw water from the deeper aquifers that are separated from the A-Aquifer by the multiple aquitards.

Groundwater Conclusions

The release of PFAS from the former FAAF Fire & Rescue Station to the A-Aquifer is suspected because of reported historical discharge of AFFF to the grassy topographical low areas next to the FAAF Fire &

Rescue Station. This activity occurred approximately annually. Because of the mobility of PFAS in the soil pathway, a groundwater investigation is recommended in the downgradient area between the former FAAF Fire & Rescue Station and the former Fort Ord boundary to the east (see Section 6.0).

5.7.2 Surface Water Pathway

Hydrologic Setting

Most rainfall at Fort Ord occurs from November through April, with an average annual precipitation of 14 inches (Harding ESE, 2002). The former FAAF Fire & Rescue Station is located in the Marina watershed (Figure 7). The site lies in an area of minimal flood hazard, with elevations above the 500-year flood level. Surface water infiltration is high at the former FAAF Fire & Rescue Station due to the high permeability of soils present onsite (HLA, 1994c). The nearest surface water body is the Salinas River, located approximately 0.4 miles away from the site. Stormwater runoff from the former FAAF Fire & Rescue Station to the Salinas River or other surface water bodies is unlikely due to the topography and high infiltration soil types present at the site. Stormwater runoff from the north and west sides of the site likely discharges to a low point to the north of the site. Stormwater runoff from the south and east sides of the site is likely retained in the unpaved area to the south of the FAAF Fire & Rescue Station as this is a topographic low with a high rate of infiltration relative to the surrounding paved areas. Because the grassy areas reported to have received AFFF discharge exist at a topographical low at the site, offsite discharge of PFAS-impacted stormwater is unlikely.

Surface Water Targets

Local target populations and sensitive environments are shown in Figure 29. There are no drinking water intakes, fisheries, or aqueous sensitive environments downstream of the former Fire & Rescue Station. It is also unlikely that there is a groundwater impact to surface water due to the reported discharges of AFFF at the former Fire & Rescue Station because the A-Aquifer downgradient of the former Fire & Rescue Station discharges at the bluff face bordering the Salinas Valley and not to a surface water body.

Surface Water Conclusions

Because no surface water is present onsite and there is no stormwater runoff to surface water from the former Fire & Rescue Station, it is unlikely that PFAS generated from the discharges of AFFF at the site migrated to surface water bodies, and there are no associated primary targets. Surface runoff from the site enters the topographic low area to the north of the former Fire & Rescue Station and then infiltrates the ground surface. Therefore, no additional surface water investigation is recommended.

5.7.3 Soil Pathway

Physical Conditions

In general, surface soils in the area of the former Fire & Rescue Station consist of brown fine to coarse sand with some silt. Below about 5 feet bgs, subsurface soils down to the FO-SVA typically consist of yellowish-brown to yellow fine to coarse sand.

Soil Targets

Local target populations and sensitive environments are shown in Figure 29. There are no resident populations or schools within 200 feet of the former FAAF Fire & Rescue Station; however, because the site is currently in use as the Marina Fire Rescue Station #2, the worker population is considered a primary target population.

Soil Exposure Conclusions

Because of the high permeability of soil in the area, AFFF infiltration into the soil in the unpaved area south of the former Fire & Rescue Station is possible and PFAS-impacted soil could remain near the ground surface. Soil sampling for PFAS analysis in this area at depths ranging from the ground surface to 10 feet bgs is recommended because long-term retention of longer-chain PFAS in shallow soils after extended percolation is possible (see Section 6.0).

5.8 Building 4400 Main Garrison Fire Station Tertiary Assessment

5.8.1 Groundwater Pathway

Hydrogeologic Setting

The former Main Garrison Fire Station (now the POM Fire Station) overlies the unconfined or semiconfined Upper 180-Foot Aquifer west of the FO-SVA (HLA, 1995d). During initial characterization of adjacent Site 10 in 1992, groundwater elevations in the area ranged from 8.7 to 1.1 feet above MSL and the horizontal hydraulic gradient was measured to be 0.004 feet/feet in the area surrounding Site 10 (HLA, 1993c). The Upper-180 Foot Aquifer was approximately 50 feet thick in the area and is predominantly composed of sand with minor amounts of silt and gravel. Hydraulic conductivities in this aquifer can reach up to 366 feet per day (HLA, 1995d, Volume II). Groundwater flow in the Upper 180-Foot Aquifer in this area is to the northeast toward the OU2 Fort Ord Landfills (Figure 13). Particle tracking analysis using the Fort Ord groundwater model indicates that PFAS entering the Upper 180-Foot Aquifer at the former Main Garrison Fire Station could have traveled as far as the OU2 Fort Ord Landfills within 30 years and potentially commingled with the OU2 TCE plume in the Upper 180-Foot Aquifer (AEI, 2020). East of the OU2 Fort Ord Landfills, groundwater flows from the Upper 180-Foot Aquifer down into the Lower 180-Foot Aquifer through a natural discontinuity in the Intermediate 180-Foot Aquitard (HLA, 1995d and MACTEC, 2006a), which allows low concentrations of COCs associated with OU2 to enter the Lower 180-Foot Aquifer.

Groundwater Targets

Local target populations and sensitive environments are shown in Figure 27. Downgradient of the former Main Garrison Fire Station are the MCWD drinking water supply wells 29, 30, 31, and 34 (Figure 28). Wells 29, 30, and 31 draw water from the Lower 180-Foot Aquifer and the 400-Foot Aquifer and therefore could be impacted by migration of PFAS in groundwater from Site 10. Well 34 draws water from the 900-Foot Aquifer (MCWD, 2020); however, the 900-Foot Aquifer is separated from the above aquifers by a confining layer that is approximately 150 feet thick. These wells supply potable water to the City of Marina, the CSUMB campus, and parts of the City of Seaside (Appendix E). The MCWD water supply system operates as a blended system.

Groundwater Conclusions

The release of PFAS from the former Main Garrison Fire Station to the Upper 180-Foot Aquifer is suspected because of reported historical discharge of AFFF to the grassy area next to Building 4401. This activity occurred approximately annually. Because of the mobility of PFAS in the soil pathway, a groundwater investigation is recommended in the downgradient area between the former Main Garrison Fire Station and the OU2 Fort Ord Landfills (see Section 6.0).

5.8.2 Surface Water Pathway

Hydrologic Setting

Most rainfall at Fort Ord occurs from November through April with an average annual precipitation of 14 inches (Harding ESE, 2002). The former Main Garrison Fire Station is located in the Marina watershed (Figure 7). The site lies in an area of minimal flood hazard, with elevations above the 500-year flood level. Surface water infiltration is high at the site due to silty sand, which extends from ground surface to 200 feet bgs, and layers of well-graded and poorly graded sand below 200 feet bgs (HLA, 1996g). The nearest surface water body is the Monterey Bay, located approximately 1.3 miles away from the site. Stormwater runoff from the site to the Monterey Bay or other surface water bodies is unlikely due to the topography and high infiltration soil types present at the site. Based on previous surface water investigations, stormwater runoff from the site is primarily towards the north (HLA, 1995b).

Surface Water Targets

Local target populations and sensitive environments are shown in Figure 27. There are no drinking water intakes, fisheries, or aqueous sensitive environments downstream of the former Main Garrison Fire Station. Due to the distance of surface water bodies and groundwater flow directions in the Upper 180-Foot Aquifer, it is also unlikely that there is a groundwater impact to surface water resulting from historical activities at the former Main Garrison Fire Station.

Surface Water Conclusions

Because no surface water is present onsite and there is no stormwater runoff to surface water from the site, it is unlikely that PFAS generated from the discharges of AFFF at the site migrated to surface water bodies, and there are no associated primary targets. Therefore, no additional surface water investigation is recommended.

5.8.3 Soil Pathway

Physical Conditions

Dark brown silty sand extends from the ground surface to 6 to 12 feet bgs. The predominant material underlying the silty sand is a yellow-brown, fine- to medium-grained sand, which generally extends to at least 200 feet bgs. Only a few thin layers (less than 10 feet thick) of fine-grained material (i.e., silty sand or sandy clay) are interbedded with this thick sand deposit. Below 200 feet, layers of well-graded sand are interbedded with poorly graded sands and silty layers (HLA, 1993c).

Soil Targets

Local target populations and sensitive environments are shown in Figure 27. There are no resident populations or schools within 200 feet of the Main Garrison Fire Station; however, because the site is currently in use by POM Fire Department, this worker population is considered a primary target population.

The firefighters at the Main Garrison Fire Station are DoD employees and therefore have a regular tour of duty consisting of three 24-hour shifts per week, equivalent to 72 hours per week (DoD, 2018). However, firefighters are not considered to be residential receptors. Per the USEPA Risk Assessment Guidance for Superfund Volume I, Human Health Evaluation Manual (Part A), a maximum daily exposure period for a resident of 24 hours (168 hours per week) is possible and the exposure duration is assumed to be 30 years, or up to a lifetime exposure of 70 years in some cases, when calculating reasonable maximum residential exposures (USEPA, 1989). Conversely, the career of a firefighter in federal service

is reasonably assumed to be 20 years or less due the physically demanding aspects of the profession and federal requirements for maximum entry age and mandatory separation based on age (DoD, 2015). Additionally, a worker is defined as a person working on a property with an area of observed contamination and whose workplace area is on or within 200 feet of an area of observed contamination, and a resident is defined as a person who lives or attends school or day care on a property with an area of observed contamination and whose residence, school, or day care center is on or within 200 feet of the area of observed contamination (USEPA, 1992b). Based on the USEPA guidance and federal requirements, firefighters are reasonably classified as workers and not residential receptors.

The Main Garrison Fire Station is within a designated commercial center that is part of the larger Campus Town CMX development. Per the Campus Town specific plan, future residential use is permitted but would be limited to levels above commercial spaces (second floor or higher) and the Main Garrison Fire Station area will be hardscaped (i.e., there are no expected exposure points for future residents) (City of Seaside, 2020).

Soil Exposure Conclusions

Because of the high permeability of soil in the area, AFFF infiltration into the soil in the grassy area on the west side of Building 4401 is possible and PFAS-impacted soil could remain near the ground surface. Soil sampling for PFAS analysis in this area at depths ranging from the ground surface to 10 feet bgs is recommended because long-term retention of longer-chain PFAS in shallow soils after extended percolation is possible (see Section 6.0).

5.9 Fritzsche Army Airfield Fire Drill Area Tertiary Assessment

5.9.1 Groundwater Pathway

Hydrogeologic Setting

The Salinas Basin underlies the FAAF Fire Drill Area. At the former Fort Ord, the Salinas Basin is composed of relatively flat-lying to gently dipping, poorly consolidated sediments. Aquifers within the Salinas Basin at the former Fort Ord, from top to bottom, are the A-Aquifer, Upper 180-Foot Aquifer, Lower 180-Foot Aquifer, 400-Foot Aquifer, and 900-Foot Aquifer. Contaminants at the former OU1 were detected only in the A-Aquifer (HGL, 2017).

The A-Aquifer is unconfined and occurs within the permeable older dune sand, which is among the youngest deposits of the area. Aquifer materials in the saturated zone of the A-Aquifer consist predominantly of permeable, slightly silty, fine- to medium-grained sands with some coarse-grained sands. Typically, this aquifer depth ranges from approximately 80 feet to 125 feet bgs in the FAAF Fire Drill Area. The depth to water ranges from approximately 60 feet to 110 feet bgs. A groundwater divide in the A-Aquifer exists east of the OU2 Fort Ord Landfills and trends northward toward the former FAAF. The FAAF Fire Drill Area is located west of the A-Aquifer groundwater divide and groundwater flow in the A-Aquifer in the area is toward the northwest (Figure 15).

The A-Aquifer is underlain by a sequence of impermeable silts and clays that compose the FO-SVA. In the former OU1 area, the FO-SVA appears to be an effective barrier that prevents downward migration of contaminants from the A-Aquifer into the underlying Upper 180-Foot Aquifer (HGL, 2017).

In the FAAF area, the Upper 180-Foot Aquifer is confined beneath the FO-SVA (HLA, 1995d). The Upper 180-Foot Aquifer consists of about 60 feet of fine to coarse sand and some gravel and is laterally extensive throughout the area. Groundwater flows eastward and southeastward under largely confined

conditions. The direction of flow appears controlled by the degree of hydraulic communication with the underlying Lower 180-Foot Aquifer, separated by the Intermediate 180-Foot Aquitard, where present. Where this aquitard is discontinuous, groundwater from the Upper 180-Foot Aquifer drains into the Lower 180-Foot Aquifer (MACTEC, 2006a).

The Intermediate 180-Foot Aquitard consists of approximately 50 feet of interbedded clay and clayey sand layers, occasionally mixed with coarse gravel. This aquitard hydraulically isolates the Upper and Lower 180-Foot Aquifers from one another but is discontinuous in the area south of Reservation Road, allowing recharge to the Lower 180-Foot Aquifer to occur (MACTEC, 2006a).

The Lower 180-Foot Aquifer consists of approximately 200 feet of coarse sand and gravel and the 400-Foot Aquifer consists of up to 250 feet of a sequence of interbedded sand and clay. These aquifers have historically been and continue to be a significant source of potable water for the former Fort Ord and City of Marina areas (MACTEC, 2006a).

Underlying the 400-Foot Aquifer is a confining layer reported to be approximately 150 feet thick that separates the 400-Foot Aquifer from the 900-Foot Aquifer, which consists of sands and gravels interbedded with discontinuous lenses of clay between depths of approximately 750 and 1,700 feet bgs. The 900-Foot Aquifer is penetrated by the deep MCWD drinking water supply wells (HLA, 1995d).

Groundwater Targets

Local target populations and sensitive environments are shown in Figure 29. The A-Aquifer is not used for water supply and there is no downgradient groundwater use in the A-Aquifer. The closest drinking water wells are MCWD wells 10, 11, and 12, located 0.8, 0.4, and 1.0 mile away from the FAAF Fire Drill Area, respectively, which are part of a blended system that supplies potable water to the City of Marina, the CSUMB campus, and parts of the City of Seaside (Appendix E). However, these wells draw water from the 900-Foot Aquifer, which is separated from the above aquifers by a confining layer that is approximately 150 feet thick (Figure 28). Because groundwater contamination in the vicinity of the site is confined to the A-Aquifer, there is no pathway from this site to existing drinking water supply wells and it is unlikely that these drinking water supply wells have been impacted by AFFF use at the FAAF Fire Drill Area.

Groundwater Conclusions

The release of PFAS from the FAAF Fire Drill Area to the A-Aquifer is suspected because of reported regular use of AFFF at the former FAAF Fire Drill Area for at least 13 years and historical detections of PFOA and PFOS in three A-Aquifer groundwater monitoring wells at concentrations exceeding the USEPA RSL and DoD screening levels (see Section 4.1.6). Therefore, additional groundwater investigation is recommended (see Section 6.0).

5.9.2 Surface Water Pathway

Hydrologic Setting

Most rainfall at Fort Ord occurs from November through April with an average annual precipitation of 14 inches (Harding ESE, 2002). The FAAF Fire Drill Area is located in the Marina watershed (Figure 7). The site lies in an area of minimal flood hazard, with elevations above the 500-year flood level. The FAAF Fire Drill Area is located on a Holocene dune sand deposit with very high permeability (HLA, 1986). The nearest surface water body is the Salinas River, located approximately 1 mile away from the site.

Stormwater runoff from the FAAF Fire Drill Area to the Salinas River or other surface water bodies is unlikely due to the topography and high infiltration soil types present at the site.

The FAAF Fire Drill Area is located in a depression and is unpaved, with the exception of a small concrete equipment staging area used during OU1 remediation efforts. Stormwater runoff offsite is unlikely because of the topography and the high permeability of the soils present onsite.

Surface Water Targets

Local target populations and sensitive environments are shown in Figure 29. There are no drinking water intakes, fisheries, or aqueous sensitive environments downstream of the FAAF Fire Drill Area. Due to the distance of surface water bodies and groundwater flow directions in the A-Aquifer, it is also unlikely that there is a groundwater impact to surface water due to the reported use of AFFF at the FAAF Fire Drill Area.

Surface Water Conclusions

Because no surface water is present onsite and there is no stormwater runoff to surface water from the FAAF Fire Drill Area, it is unlikely that PFAS generated from use of AFFF at the site migrated to surface water bodies, and there are no associated primary targets. Surface runoff at the site remains in the topographic low area that characterizes the FAAF Fire Drill Area and then infiltrates the ground surface. Therefore, no surface water investigation is recommended.

5.9.3 Soil Pathway

Physical Conditions

In general, surface soils in the area of the FAAF Fire Drill Area consist of black to yellowish-brown fine- to medium-grained sand with some silt. Below about 5 feet bgs, subsurface soils down to the FO-SVA consist of Holocene dune sand deposits, which is typically relatively clean, yellowish-brown, well-sorted sand, with depths ranging from 80 to 125 feet bgs in the former OU1 area. The dune sands are highly permeable, and the soil moisture content in the top 25 feet of soil varies seasonally (HLA, 1986).

Soil Targets

Local target populations and sensitive environments are shown in Figure 29. There are no onsite or nearby resident, school, daycare, or worker populations at this site. Therefore, there are no primary target populations.

In 1987, approximately 4,000 cubic yards of contaminated soil were removed from the former fire drill area to a depth of 31 feet, and the area was then backfilled with clean soil. Excavated soils were spread over the area of the former fire drill area to a depth of 2.5 to 3 feet above the original ground surface and remediated using treated groundwater supplemented with an aqueous nutrient formulation to stimulate microbial degradation of hydrocarbons in the soil (HLA, 1988b). As the soil was remediated, it was removed and transported to a soil borrow area for use as fill in construction projects at the former Fort Ord (HGL, 2017). Site reconnaissance and a review of historical aerial photographs of the soil borrow area indicate over 10,000 cubic yards of soil was removed from the borrow area between April 1991, after soil remediation at the FAAF Fire Drill Area was completed, and July 1992 (i.e., at least 6,000 cubic yards of clean native soil was removed in addition to the 4,000 cubic yards of treated soil). However, there are no records indicating where this soil was used at the former Fort Ord. A remediation confirmation study and risk assessment conducted in 1993 indicated chemicals remaining in soil at the

former fire drill area did not present an unacceptable risk to human health or the environment and no further remedial action was necessary (Army, 1996).

PFAS may have been present in the excavated soils and bioremediation activities could have caused downward leaching of PFAS to groundwater; however, analytical results for PFOA and PFOS in samples collected in May 2015 from A-Aquifer wells downgradient of the former fire drill area indicate the former fire drill area was no longer a source of PFAS (HGL, 2017).

Soil Exposure Conclusions

Because extensive soil remediation and removal has already occurred at the FAAF Fire Drill Area, it is unlikely that any PFAS-impacted soil remains onsite. However, soil sampling within the limits of the previous excavation area is recommended to determine if any PFAS-impacted soil remains at the FAAF Fire Drill Area (see Section 6.0).

5.10 Operable Unit 2: Fort Ord Landfills Tertiary Assessment

5.10.1 Groundwater Pathway

Hydrogeologic Setting

The Salinas Basin underlies the OU2 area. At the former Fort Ord, the Salinas Basin is composed of relatively flat-lying to gently dipping, poorly consolidated sediments. Aquifers within the Salinas Basin at the former Fort Ord, from top to bottom, are the A-Aquifer, Upper 180-Foot Aquifer, Lower 180-Foot Aquifer, 400-Foot Aquifer, and 900-Foot Aquifer. Contaminants at OU2 are detected in the A-Aquifer, Upper 180-Foot Aquifer, and potentially the Lower 180-Foot Aquifer (Ahtna, 2021a).

The A-Aquifer is unconfined and occurs within the permeable older dune sand, which is among the youngest deposits of the area. These dune sand deposits range in thickness from 85 feet at the northwest edge of OU2 to 202 feet at the southeast edge of OU2. Aquifer materials in the saturated zone of the A-Aquifer consist predominantly of permeable, slightly silty, fine- to medium-grained sands with some coarse-grained sands. Depth to groundwater in the unconfined A-Aquifer is between 65 and 180 feet bgs in the OU2 area. The A-Aquifer is underlain by a sequence of impermeable silts and clays that compose the FO-SVA. In the OU2 area, the FO-SVA ranges in thickness from 54 feet in the west edge of the site to 65 feet in the northwest edge of the site (HLA, 1988a) and appears to be an effective barrier that prevents downward migration of contaminants from the A-Aquifer into the underlying confined Upper 180-Foot Aquifer. A groundwater divide in the A-Aquifer exists east of the OU2 Fort Ord Landfills and trends northward toward the former FAAF. The OU2 Fort Ord Landfills are located west of the A-Aquifer groundwater divide and groundwater flow in the A-Aquifer in the area is to the north and northwest.

In the OU2 area, the Upper 180-Foot Aquifer is mostly confined beneath the FO-SVA (HLA, 1995d) and depth to groundwater in the Upper 180-Foot Aquifer is between 60 and 265 feet bgs. To the west where the FO-SVA pinches out, the unconfined A-Aquifer and confined Upper 180-Foot Aquifer combine to form a continuous, unconfined hydrostratigraphic unit (identified as the unconfined Upper 180-Foot Aquifer). A north-trending groundwater divide in the unconfined Upper 180-Foot Aquifer exists midway between the FO-SVA and Monterey Bay. Groundwater in the unconfined Upper 180-Foot Aquifer west of the divide flows west and discharges to the Monterey Bay. Groundwater in the unconfined Upper 180-Foot Aquifer east of the divide flows under the FO-SVA (becoming confined) toward the Salinas Valley. The Upper 180-Foot Aquifer consists of about 60 feet of fine to coarse sand and some gravel and

is laterally extensive throughout the area. Groundwater flows generally eastward under largely confined conditions. The direction of flow appears controlled by the degree of hydraulic communication with the underlying Lower 180-Foot Aquifer, separated by the Intermediate 180-Foot Aquitard, where present. Where this aquitard is discontinuous, groundwater from the Upper 180-Foot Aquifer drains into the Lower 180-Foot Aquifer (MACTEC, 2006a).

The Intermediate 180-Foot Aquitard consists of approximately 50 feet of interbedded clay and clayey sand layers, occasionally mixed with coarse gravel. This aquitard hydraulically isolates the Upper and Lower 180-Foot Aquifers from one another but is discontinuous in the area south of Reservation Road, allowing recharge to the Lower 180-Foot Aquifer to occur (MACTEC, 2006a).

The Lower 180-Foot Aquifer consists of approximately 200 feet of coarse sand and gravel and the 400-Foot Aquifer consists of up to 250 feet of a sequence of interbedded sand and clay. These aquifers have historically been and continue to be a significant source of potable water for the former Fort Ord and City of Marina areas (MACTEC, 2006a).

Underlying the 400-Foot Aquifer is a confining layer reported to be approximately 150 feet thick that separates the 400-Foot Aquifer from the 900-Foot Aquifer, which consists of sands and gravels interbedded with discontinuous lenses of clay between depths of approximately 750 and 1,700 feet bgs. The 900-Foot Aquifer is penetrated by the deep MCWD drinking water supply wells (HLA, 1995d).

Groundwater Targets

Local target populations and sensitive environments are shown in Figure 29. Downgradient of the OU2 Fort Ord Landfills are MCWD drinking water supply wells 29, 30, 31, and 34 (Figure 28). Wells 29, 30, and 31 draw water from the Lower 180-Foot Aquifer and the 400-Foot Aquifer and therefore could be impacted by migration of PFAS in groundwater from OU2. Well 34 draws water from the 900-Foot Aquifer (MCWD, 2020); however, the 900-Foot Aquifer is separated from the above aquifers by a confining layer that is approximately 150 feet thick. These wells supply potable water to the City of Marina, the CSUMB campus, and parts of the City of Seaside (Appendix E). The MCWD water supply system operates as a blended system.

Groundwater Conclusions

The release of PFAS from OU2 to the A-Aquifer is suspected because the Fort Ord Landfills received a variety of residential and commercial waste from various sources from 1960 through May 31, 1987. The Fort Ord Landfills also received impacted soils from a variety of Fort Ord remediation sites, and AFFF-impacted soil from Site 40A may have been disposed of in the Fort Ord Landfills (Appendix A, Riso). Additionally, in the 1970s or 1980s, there were at least two fire incidents at the Fort Ord Landfills where consolidated waste including tires burned and AFFF was used to suppress the fire. Finally, PFOA and PFOS were detected at concentrations above the USEPA RSLs and DoD screening levels in monitoring well MW-OU2-23-180 (Table 7 and Figure 22). PFBS and PFHxA were detected at low concentrations in downgradient MCWD water supply well 29; however, PFOA and PFOS were not detected in this well (Table 6 and Figure 23). Therefore, additional groundwater investigation at OU2 is recommended to evaluate the groundwater pathway (see Section 6.0).

5.10.2 Surface Water Pathway

Hydrologic Setting

Most rainfall at Fort Ord occurs from November through April with an average annual precipitation of 14 inches (Harding ESE, 2002). The OU2 Fort Ord Landfills are located in the Marina watershed (Figure 7). The site lies in an area of minimal flood hazard, with elevations above the 500-year flood level. Soil in the area is primarily permeable dune sand deposits (HLA, 1988a). The nearest surface water bodies are a few vernal ponds located in the Fort Ord National Monument, approximately 1.2 miles southeast of the site. However, these vernal ponds are in the Salinas River watershed and the OU2 Fort Ord Landfills are located in the Marina watershed, making stormwater runoff from the Fort Ord Landfills to the vernal ponds unlikely. Stormwater runoff from the OU2 Fort Ord Landfills to other surface water bodies is also unlikely due to the topography and high infiltration soils present around the Landfills.

Surface Water Targets

Local target populations and sensitive environments are shown in Figure 29. There are no downstream drinking water intakes, fisheries, or sensitive environments. Due to the distance of surface water bodies and groundwater flow directions in the A-Aquifer and Upper 180-Foot Aquifer, it is also unlikely that there is a groundwater impact to surface water due to PFAS in the OU2 Fort Ord Landfills. The engineered cover system currently in place at the OU2 Fort Ord Landfills includes a linear low-density polyethylene liner and is impermeable to precipitation, which prevents stormwater from infiltrating through waste containing PFAS that may be below the cover system.

Surface Water Conclusions

No surface water is present onsite, there is no stormwater runoff to surface water from the OU2 Fort Ord Landfills, and the engineered cover system includes an impermeable linear low-density polyethylene liner that prevents stormwater from infiltrating through waste in the Landfills. Therefore, no surface water investigation is recommended.

5.10.3 Soil Pathway

Physical Conditions

Soil in the area around the OU2 Fort Ord Landfills is primarily permeable dune sand deposits (HLA, 1988a). The Fort Ord Landfills area is part of a larger complex of older dune sands present through the west and north of the former Fort Ord (HLA, 1993b). Soils onsite are largely covered by landfill material and are inaccessible due to the engineered cover system in place at the OU2 Fort Ord Landfills.

Soil Targets

Local target populations and sensitive environments are shown in Figure 29. There are no onsite or nearby resident, school, daycare, or worker populations at this site. Therefore, there are no primary target populations.

The suspected sources of PFAS at the OU2 Fort Ord Landfills are the AFFF discharged during fire suppression in the 1970s or 1980s and possible disposal of other PFAS-containing materials there. At this time, the cover system for the OU2 Fort Ord Landfills consisted only of the native sandy soil; therefore, AFFF discharged during fire suppression would have been absorbed with minimal runoff due to the high permeability of soils at the former Fort Ord and PFAS impacts to surface soil in the area surrounding the OU2 Fort Ord Landfills due to surface runoff is unlikely. Impacted soils would be beneath the waste and

inaccessible due to the engineered cover system constructed from 1997 to 2002 at the OU2 Fort Ord Landfills.

Soil Exposure Conclusions

The suspected sources of PFAS at the OU2 Fort Ord Landfills are the buried waste and AFFF discharged during fire suppression there. Impacted soils would be beneath the waste and inaccessible due to the engineered cover system in place at the OU2 Fort Ord Landfills. The engineered cover system also acts as an impermeable barrier to precipitation, thereby eliminating infiltration as a transport mechanism. Additionally, PFOA and PFOS were not detected in A-Aquifer wells near the OU2 Fort Ord Landfills, indicating the OU2 Fort Ord Landfills are not a continuing source of PFOA/PFOS in the groundwater (see Section 4.8.6). Therefore, no soil investigation is recommended at the OU2 Fort Ord Landfills.

6.0 Summary and Conclusions

Fort Ord served as a training and staging facility for infantry troops from 1917 until its closure in 1994. By the 1950s, PFAS had become included in many consumer and industrial products, notably in stain and water-repellant material, food packaging, and retail products. At Army installations, the primary mechanism for releases of PFAS is through the historical use of AFFF, though AFFF was not used at Army installations until after 1972.

6.1 Primary Assessment

A primary review of basewide historical records was conducted to identify locations at the former Fort Ord where releases of PFAS may have occurred (Section 3.0). It was determined during the primary review that, for the former Fort Ord:

- Six sites were determined to have been fire training areas or similar sites where petroleum products were intentionally ignited for training purposes
- Seven sites were determined to have been potential former AFFF storage locations (fire stations or hazardous material storage facilities)
- Two aircraft crash sites were identified
- Nine aviation hangars and other buildings existed where AFFF may have been used in the fire suppression systems
- Two sites associated with aviation assets existed (fuel farms and defueling areas)
- Two sites where firefighting equipment testing and washout discharge locations existed
- Large fires occurred at one site
- There are no known chromium electroplating facilities
- Six sites were determined to be landfills or waste disposal areas
- Four sites were determined to have been WWTPs

6.2 Secondary Assessment

Secondary assessment of these sites included a review of available records, site reconnaissance, and personnel interviews (Section 4.0). It was determined during the secondary review that, for the former Fort Ord:

- Two fire training areas existed that were operated after 1972 and where AFFF was used
- Two AFFF storage locations (fire stations) existed
- There is no evidence that AFFF was applied at any aircraft crash sites
- There is no evidence that AFFF was used in the fire suppression systems for any aviation hangars or other buildings
- One aviation asset (helicopter defueling area) existed after 1972 where AFFF was used
- Two firefighting equipment testing and washout discharge locations existed after 1972 where AFFF was used
- Large fires occurred after 1972 in wildland areas; however, there is no evidence AFFF was used
- There is one current landfill area that could have received waste streams containing PFAS starting in the 1950s

- There is no evidence former WWTPs received significant waste streams containing PFAS; however, there is one former WWTP that could have inadvertently accepted PFAS-containing wastewater starting in the 1950s

6.3 Tertiary Assessment

The secondary assessment served to identify sites with known or suspected PFAS releases that merited tertiary assessment (Section 5.0) as summarized below. For seven of these sites, further investigation is warranted under an SI, the next step in the CERCLA process, as will be further described in a future work plan. For three of these sites, further investigation is not warranted under the SI because, based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment.

6.3.1 Site 1, Ord Village Sewage Treatment Plant

No further investigation at Site 1 is warranted under the SI because, based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment. However, Site 1 may be considered for PFAS investigation in the future should additional evidence becomes available indicating that further investigation is appropriate.

6.3.2 Site 2, Main Garrison Sewage Treatment Plant

The Main Garrison STP, as the primary WWTP for the former Fort Ord, could have inadvertently accepted PFAS-containing wastewater from residential, light industrial, and commercial sources over several decades, which may have adversely affected soil and groundwater (see Section 4.9.2). Therefore, additional groundwater investigation in the Upper 180-Foot Aquifer is recommended.

Surface water has a low potential for contamination due to site topography and high rates of infiltration in the native dune sand. Human exposure to PFAS in near-surface soil is possible though there are no human targets within 200 feet of the site. However, because of long-term retention of longer-chain PFAS in shallow soils after extended percolation is possible, soil sampling for PFAS analysis in the former evaporation pond immediately south of the former sludge drying beds (Ponding Area 1) is recommended.

6.3.3 Site 10, Former Burn Pit

Regular historical use of AFFF for training and demonstration purposes may have adversely affected groundwater and thereby could pose an unacceptable threat to human targets through drinking water supply contamination (see Section 4.1.3). Additional groundwater investigation in the Upper 180-Foot Aquifer is recommended because of reported regular use of AFFF at Site 10 for at least two decades and potential impacts to downgradient drinking water supply wells in the long term (see Section 4.1.3).

Surface water has a low potential for contamination due to site topography and high rates of infiltration in the native dune sand. Due to removal of soil down to 10 feet bgs during previous site remediation, human exposure to contaminated soil is unlikely; however, additional soil sampling is recommended outside the vertical limits of the previous excavation area because of the high mobility of PFAS in the environment.

6.3.4 Site 32, East Garrison Sewage Treatment Plant

No further investigation at Site 32 is warranted under the SI because, based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a

potential threat of release to the environment. However, Site 32 may be considered for PFAS investigation in the future should additional evidence becomes available indicating that further investigation is appropriate.

6.3.5 Site 36, FAAF Sewage Treatment Plant

No further investigation at Site 36 is warranted under the SI because, based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment. However, Site 36 may be considered for PFAS investigation in the future should additional evidence becomes available indicating that further investigation is appropriate.

6.3.6 Site 40A, East FAAF Helicopter Defueling Area

Use of AFFF during a response to a fuel spill may have adversely affected soil and groundwater (see Section 4.5.3). There is no pathway from Site 40A to existing drinking water supply wells; however, additional investigation is recommended at Site 40A because of the reported use of AFFF during a fuel spill response. Due to the mobility of PFAS, a groundwater investigation is recommended in the downgradient area between the helicopter parking apron and the former Fort Ord boundary to the east.

Human exposure to PFAS in near-surface soil is possible though there are no human targets within 200 feet of the site. However, because of long-term retention of longer-chain PFAS in shallow soils after extended percolation is possible, soil sampling for PFAS analysis in the drainage area to the north and east of the suspected helicopter defueling area is recommended.

Surface water has a low potential for contamination due to site topography and high rates of infiltration in the native dune sand.

6.3.7 Building 514, FAAF Fire & Rescue Station

Routine discharge of old or expired AFFF may have adversely affected soil and groundwater (see Section 4.2.3). There is no pathway from Building 514 to existing drinking water supply wells; however, due to the mobility of PFAS, a groundwater investigation is recommended in the downgradient area between the former FAAF Fire & Rescue Station and the former Fort Ord boundary to the east.

Human exposure to PFAS in near-surface soil is possible and there are human targets within 200 feet of the site. Therefore, because long-term retention of longer-chain PFAS in shallow soils after extended percolation is possible, soil sampling for PFAS analysis in the grassy area to the south of Building 514 is recommended.

Surface water has a low potential for contamination due to site topography and high rates of infiltration in the native dune sand.

6.3.8 Building 4400, Main Garrison Fire Station

Routine discharge of old or expired AFFF may have adversely affected soil and groundwater and thereby could pose an unacceptable threat to human targets through drinking water supply contamination (see Section 4.2.7). Therefore, investigation of groundwater in the Upper 180-Foot Aquifer is recommended because of potential impacts to downgradient drinking water supply wells in the long term.

Human exposure to PFAS in near-surface soil is possible and there are human targets within 200 feet of the site. Investigation of shallow soil near Building 4401 at the Main Garrison Fire Station (now the POM

Fire Station) is recommended because of long-term retention of longer-chain PFAS in shallow soils after extended percolation that could result in potential exposure of workers at the site to PFAS.

Surface water has a low potential for contamination due to site topography and high rates of infiltration in the native dune sand.

6.3.9 FAAF Fire Drill Area

Regular historical use of AFFF for training purposes may have adversely affected subsurface soil and groundwater (see Section 4.1.6). There is no pathway from the FAAF Fire Drill Area to existing drinking water supply wells; however, additional groundwater investigation in the A-Aquifer is recommended because of reported regular use of AFFF at the former FAAF Fire Drill Area for at least 13 years and detections of PFOA and PFOS in three groundwater monitoring wells at concentrations exceeding the USEPA RSLs and DoD screening levels.

Due to previous soil remediation and the remote location of the site, human exposure to contaminated soil is unlikely, though PFAS in soil could be a continuing source to groundwater. Therefore, soil sampling for PFAS analysis within the limits of the previous excavation area from the ground surface down to the groundwater interface is recommended to determine if any PFAS-impacted soil remains at the FAAF Fire Drill Area.

Surface water has a low potential for contamination due to site topography and high rates of infiltration in the native dune sand.

6.3.10 OU2

Use of AFFF during responses to landfill fires and disposal of waste containing PFAS may have adversely affected groundwater and thereby could pose an unacceptable threat to human targets through drinking water supply contamination (see Section 4.8.6). Therefore, additional groundwater investigation at OU2 in the Upper 180-Foot Aquifer is recommended because of potential impacts to downgradient drinking water supply wells in the long term due to the historical disposal practices used, the reported discharge of AFFF at the Fort Ord Landfills, and the detections of PFOA and PFOS at concentrations above the USEPA RSLs and DoD screening levels in monitoring well MW-OU2-23-180.

Due to the good condition of the engineered cover system at the Fort Ord Landfills and limited access to the site, the likelihood of human exposure to PFAS-contaminated soil or refuse is negligible. Surface water also has a low potential for contamination due to the presence of the engineered cover system.

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¹⁹ At the end of references included in the Fort Ord Administrative Record are the Administrative Record Numbers (AR#s) (e.g. BW-1234). To find the referenced document, this number may be typed into the Online Search tool at: <http://www.fortordcleanup.com/documents/search/>. Please note the referenced documents were available in the Fort Ord Administrative Record at the time this document was issued; however, some may have been superseded by more current versions and were subsequently withdrawn. TBD: to be determined.

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Tables

Table 1. Primary Assessment Sites

RI Site No.	Site Name	SWMU (FTO-)	SWMU Name	Building No.	SWMU Type	Applicable Decision Document	Suspected PFAS Release Site Type
1	Ord Village STP	059	Ord Village STP	NA	wastewater treatment	IA Sites ROD	wastewater treatment plant
2	Main Garrison STP	012	Main Garrison STP	2076	wastewater treatment	BW RI Sites ROD	wastewater treatment plant
3	Beach Trainfire Ranges	NA	NA	NA	NA	Track 1/Site 3	NA
4	Beach Stormwater Outfalls	NA	NA	NA	NA	BW RI Sites ROD	NA
5	Range 36A, EOD	016	Open Detonation Area	NA	thermal treatment	BW RI Sites ROD	unplanned release
6	Range 39, Abandoned Car Dump	NA	NA	NA	NA	IA Sites ROD	NA
7	Ranges 40 and 41, Fire Demonstration Area	NA	NA	NA	NA	No Action Sites ROD	NA
8	Range 49, Molotov Cocktail Range	NA	NA	NA	NA	IA Sites ROD	fire training area
9	Range 40A, Flame Field Expedients Training Area	NA	NA	NA	NA	BW RI Sites ROD	fire training area
10	Burn Pit	014	Fire Training Area at Fort Ord Fire Station	4400	thermal treatment	IA Sites ROD	fire training area
11	AAFES Fueling Station	010	AAFES Service Station	4220	waste POL/container storage	No Action Sites ROD	NA
12	Lower Meadow Disposal Area	007	Cannibalization Area	T-2460	waste pile	BW RI Sites ROD	NA
		037	DOL Main Automotive Yard	T-2726	temporary container storage	BW RI Sites ROD	AFFF testing/washout
		038	DOL General Equipment Maintenance Yard	T-2424	temporary container storage	BW RI Sites ROD	NA
		060	Lower Meadow Disposal Area	NA	landfill	BW RI Sites ROD	landfill
13	Railroad Right-of-Way	NA	NA	NA	NA	No Action Sites ROD	NA
14	707th Maintenance Facility	004	707th Maintenance BN, A, B, and C Co Motor Pools	4885	temporary container storage	IA Sites ROD	NA
		061	Transfer Station South of Building 4885	4885	temporary container storage	IA Sites ROD	NA
15	DEH Yard	015	PCB Storage Area	4891, H482	temporary container storage	IA Sites ROD	NA
		018	Pesticide Mixing Area	T-4897	pest management	IA Sites ROD	NA
16	DOL Maintenance Yard	036	DOL Heavy Equipment Maintenance Yard	T-4900	temporary container storage	BW RI Sites ROD	AFFF testing/washout
		062	Pete's Pond and Pete's Pond Extension	NA	landfill	BW RI Sites ROD	landfill
17	Disposal Area, 1400 Block Motor Pool	013	Building 1442 Autoclave	1442	low temp thermal treatment	BW RI Sites ROD	NA
		048	6th/8th Field Artillery BN Motor Pool	1483	temporary container storage	BW RI Sites ROD	NA
		049	7th/15th Field Artillery BN Motor Pool	1489	temporary container storage	BW RI Sites ROD	NA
		050	7/7th Air Defense Artillery Motor Pool	1495	temporary container storage	BW RI Sites ROD	NA
		051	5/15th Field Artillery BN Motor Pool	1489	temporary container storage	BW RI Sites ROD	NA
		063	Unit east of Aces Carpentry	T-1440	temporary container storage	BW RI Sites ROD	NA
		064	Unit between Buildings T-1458 and T-1468	T-1458, T-1468	temporary container storage	BW RI Sites ROD	NA
		065	Site 17 Disposal Area	1483	landfill	BW RI Sites ROD	landfill
18	1600 Block Facility	017	TASC Plastics Shop	T-1663	temporary container storage	No Action Sites ROD	NA
		023	TASC Graphics Shop	T-1665	temporary container storage	No Action Sites ROD	NA
		040	DOL Temporary Motor Pool	T-1672	temporary container storage	No Action Sites ROD	NA
		041	590th SS Co Motor Pool	T-1637	temporary container storage	No Action Sites ROD	NA
		044	121st Aviation BN, Co E Motor Pool	T-1697	temporary container storage	No Action Sites ROD	NA
		052	2/62nd ADA B-Battery Motor Pool	T-1641	temporary container storage	No Action Sites ROD	NA
		053	7th Medical BN Motor Pool	T-1697	temporary container storage	No Action Sites ROD	NA
		056	7th MP Co Motor Pool	T-1681	temporary container storage	No Action Sites ROD	NA
		057	571st MP Co Motor Pool	T-1686	temporary container storage	No Action Sites ROD	NA
		058	761st Chemical Co Motor Pool	T-1656	temporary container storage	No Action Sites ROD	NA
19	2200 Block Facility	NA	NA	NA	NA	No Action Sites ROD	NA
20	South Parade Ground and 3800 and 519th Motor Pools	024	519th Maintenance Co	3896, 3899	temporary container storage	IA Sites ROD	AFFF fire suppression system
		066	Units in Former Troop Training Area	H381, H382	temporary container storage	IA Sites ROD	NA
		067	3800 Motor Pool	H3882, H3883	temporary container storage	IA Sites ROD	NA

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RI Site No.	Site Name	SWMU (FTO-)	SWMU Name	Building No.	SWMU Type	Applicable Decision Document	Suspected PFAS Release Site Type
21	4400/4500 Block Motor Pool East	027	2/9 Reconnaissance BN Motor Pool	4495	temporary container storage	IA Sites ROD	NA
		028	56th Medical Co Motor Pool	4499E	temporary container storage	IA Sites ROD	NA
		029	9th Regiment HHC Motor Pool	4499W	temporary container storage	IA Sites ROD	NA
		030	HHC/Air Force Detachment Motor Pool	4518W	temporary container storage	IA Sites ROD	NA
		031	8th Evacuation Hospital Motor Pool	4522	temporary container storage	IA Sites ROD	NA
		032	7th Aviation BN, C & D Co Motor Pool	4506E	temporary container storage	IA Sites ROD	NA
		033	1/23rd Aviation REGT, A, B, C & D Co Motor Pool	4506W	temporary container storage	IA Sites ROD	NA
		034	2nd BDE Consolidated Motor Pool	4512	temporary container storage	IA Sites ROD	NA
22	4400/4500 Block Motor Pool West	005	13th Engineer BN Motor Pool	4544	temporary container storage	IA Sites ROD	NA
		025	14th Engineer BN Motor Pool	4534	temporary container storage	IA Sites ROD	NA
		026	127th Signal Co Motor Pool	4548	temporary container storage	IA Sites ROD	NA
		035	3rd BDE Consolidated Motor Pool	4538	temporary container storage	IA Sites ROD	NA
		068	Auto Craft Shop	4492	temporary container storage	IA Sites ROD	AFFF fire suppression system
23	3700 Block Motor Pool Complex	054	107th Medical BN	T-3772, T-3776	temporary container storage	No Action Sites ROD	NA
		069	107th Medical BN Motor Pool	T-3767	temporary container storage	No Action Sites ROD	NA
24	Old DEH Yard	NA	NA	NA	NA	IA Sites ROD	NA
25	Former DRMO	022	Former DRMO site	NA	abandoned storage site	BW RI Sites ROD	NA
26	Sewage Pump Stations, Buildings 5871 and 6143	NA	NA	NA	NA	No Action Sites ROD	NA
27	Army Reserve Motor Pool	055	USAR Center Motor Pool	705	temporary container storage	No Action Sites ROD	NA
28	Barracks and Main Garrison Area	NA	NA	NA	NA	No Action Sites ROD	NA
29	DRMO	009	DRMO PCB Storage Area	T-111	temporary container storage	No Action Sites ROD	potential AFFF storage
30	Driver Training Area	NA	NA	NA	NA	IA Sites ROD	NA
31	Former Dump Site	070	East Garrison Dump Site	NA	landfill	BW RI Sites ROD	landfill
32	East Garrison STP	011	East Garrison STP	145	wastewater treatment	IA Sites ROD	wastewater treatment plant
33	Golf Course Maintenance Area	071	Golf Course Maintenance Area	4110	temporary container storage	BW RI Sites ROD	NA
34	FAAF Fueling Facility	NA	NA	501, 502, 503	NA	NA	fuel farm/aviation asset
		006	HHC Cavalry REGT Motor Pool	527	temporary container storage	IA Sites ROD	AFFF fire suppression system
		039	DOL Aircraft Maintenance Motor Pool	533	temporary container storage	IA Sites ROD	AFFF fire suppression system
		042	HHC Combat Aviation BDE Motor Pool	509	temporary container storage	IA Sites ROD	AFFF fire suppression system
		043	1/123rd Aviation REGT, A & B Co Motor Pool	527	temporary container storage	IA Sites ROD	AFFF fire suppression system
		045	23rd Medical Detachment Motor Pool	541	temporary container storage	IA Sites ROD	AFFF fire suppression system
		046	2/9th Cavalry Recon Flight Maintenance Motor Pool	510 or 524	temporary container storage	IA Sites ROD	AFFF fire suppression system
		047	7th Aviation BN, C & D Co Flight Maintenance Motor Pool	507	temporary container storage	IA Sites ROD	AFFF fire suppression system
34B	Former Burn Pit	NA	NA	NA	NA	IA Sites ROD	fire training area
35	FAAF Aircraft Cannibalization Yard	NA	NA	NA	NA	No Action Sites ROD	NA
36	FAAF STP	003	FAAF STP	540	wastewater treatment	IA Sites ROD	wastewater treatment plant
37	Trailer Park Maintenance Shop	NA	NA	NA	NA	No Action Sites ROD	NA
38	AAFES Dry Cleaners	019	AAFES Economy Cleaners	1434	USTs	No Action Sites ROD	NA
39	Inland Ranges	NA	NA	NA	NA	BW RI Sites ROD	aircraft crash/large fire
39A	East Garrison Ranges	NA	NA	NA	NA	IA Sites ROD	NA
39B	Inter-Garrison Training Area	NA	NA	NA	NA	IA Sites ROD	NA
40	FAAF Helicopter Defueling Area	NA	NA	NA	NA	IA Sites ROD	aviation asset
41	Crescent Bluff Fire Drill Area	072	Crescent Bluff Fire Drill Area	NA	thermal treatment	IA Sites ROD	fire training area
NA	DRMO	008	DRMO Hazardous Waste Storage Area	53A		RCRA Closure Report	NA
NA	FAAF	NA	NA	NA	NA	NA	NA

Table 1. Primary Assessment Sites

RI Site No.	Site Name	SWMU (FTO-)	SWMU Name	Building No.	SWMU Type	Applicable Decision Document	Suspected PFAS Release Site Type
NA	NA	020	Infectious Waste Incinerator at Silas B. Hayes Hospital	4385	incinerator	NA	NA
NA	NA	021	Silver Recovery Unit	4385	recovery unit	NA	NA
NA	Fort Ord Soil Treatment Area (FOSTA)	NA	NA	NA	NA	NA	landfill
NA	FAAF Fire & Rescue Station	NA	NA	514	NA	NA	potential AFFF storage
NA	East Garrison Fire House	NA	NA	T-105	NA	NA	potential AFFF storage
NA	Main Garrison Fire House - South	NA	NA	T-1820	NA	NA	potential AFFF storage
NA	Main Garrison Fire House - North	NA	NA	T-2898	NA	NA	potential AFFF storage
NA	Main Garrison Fire House - East	NA	NA	T-3280	NA	NA	potential AFFF storage
NA	Main Garrison Fire Station	NA	NA	4400	NA	NA	potential AFFF storage
NA	Mudhen Lake	NA	NA	NA	NA	NA	aircraft crash
OF-34/35	Outfalls 34 and 35	NA	NA	NA	NA	IA Sites ROD	NA
OU1	Operable Unit 1	001	FAAF Fire Drill Area	NA	thermal treatment	OU1 ROD	fire training area
OU2	Operable Unit 2	002	Fort Ord Landfills	NA	landfill	OU2 ROD	landfill
OUCTP	Operable Unit Carbon Tetrachloride Plume	NA	NA	NA	NA	OUCTP ROD	NA
NA	PFAS-Containing Munitions	NA	NA	NA	NA	NA	NA

Notes:

Sites in **bold** were selected for secondary assessment.

Acronyms and Abbreviations:

AAFES = Army and Air Force Exchange Service
 BDE = Brigade
 BN = Battalion
 Co = Company
 DEH = Directorate of Engineering and Housing
 DOL = Directorate of Logistics
 DRMO = Defense Reutilization Marketing Office
 EOD = Explosive Ordnance Disposal
 FAAF = Fritzsche Army Airfield
 HHC = Headquarters and Headquarters Company
 IA = Interim Action
 NA = not applicable
 OF = Outfall
 PCB = polychlorinated biphenyl
 POL = petroleum, oil, and lubricants
 REGT = Regiment
 RCRA = Resource Conservation and Recovery Act
 RI = Remedial Investigation
 ROD = Record of Decision
 STP = Sewage Treatment Plant
 TASC = Training and Support Center
 USAR = U.S. Army Reserve

Decision Document Key:

BW RI Sites ROD = Record of Decision, Basewide Remedial Investigation Sites, Fort Ord, California. AR# RI-025.
 IA Sites ROD = Interim Action Record of Decision, Contaminated Surface Soil Remediation, Fort Ord, Monterey, California. AR# IAFS-089.
 No Action Sites ROD = No Action Plug-In Record of Decision, Fort Ord, California. AR# BW-0984.
 OU1 ROD = Record of Decision, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Fort Ord, California. AR# OU1-362
 OU2 ROD = Record of Decision, Operable Unit 2, Fort Ord Landfills, Fort Ord, California. AR# OU2-480.
 OUCTP ROD = Record of Decision, Operable Unit Carbon Tetrachloride Plume, Former Fort Ord, California. AR# OUCTP-0021D.
 Track 1/Site 3 = Record of Decision, No Further Action Related to Munitions and Explosives of Concern - Track 1 Sites, No Further Remedial Action with Monitoring for Ecological Risks from Chemical Contamination at Site 3 (MRS-22), Former Fort Ord, California. AR# OE-0526.

Site ID	Site Name	Building No.	Suspected Site Type
1	Ord Village Sewage Treatment Plant	NA	wastewater treatment plant
2	Main Garrison Sewage Treatment Plant	2076	wastewater treatment plant
5	Range 36A, Explosive Ordnance Disposal	NA	unplanned release
8	Range 49, Molotov Cocktail Range	NA	fire training area
9	Range 40A, Flame Field Expedients Training Area	NA	fire training area
10	Fire Training Area at Fort Ord Fire Station	4400	fire training area
12	Lower Meadow Disposal Area	NA	landfill
12	DOL Automotive Yard	NA	AFFF testing/washout
16	DOL Maintenance Yard	NA	AFFF testing/washout
16	Pete's Pond and Pete's Pond Extension	NA	landfill
17	Disposal Area, 1400 Block Motor Pool	1483	landfill
20	South Parade Ground and 3800 and 519th Motor Pools (former airfield)	3897, 3898	AFFF fire suppression system
22	Building 4492, Auto Craft Shop	4492	AFFF fire suppression system
29	DRMO Building T-111, PCB Storage Area	T-111	potential AFFF storage
31	East Garrison Former Dump Site	NA	landfill
32	East Garrison Sewage Treatment Plant	145	wastewater treatment plant
34	FAAF Fueling Facility	501, 502, 503	fuel farm/aviation asset
34	Building 507 (aircraft hangar)	507	AFFF fire suppression system
34	Building 510 (aircraft hangar)	510	AFFF fire suppression system
34	Building 524 (aircraft hangar)	524	AFFF fire suppression system
34	Building 527 (aircraft hangar)	527	AFFF fire suppression system
34	Building 533 (aircraft hangar)	533	AFFF fire suppression system
34B	Former Burn Pit	NA	fire training area
36	FAAF Sewage Treatment Plant	540	wastewater treatment plant
39	Inland Ranges	NA	aircraft crash
39	Inland Ranges	NA	large fire
40	West FAAF Helicopter Defueling Area	NA	aviation asset
40A	East FAAF Helicopter Defueling Area	NA	aviation asset
41	Crescent Bluff Fire Drill Area	NA	fire training area
NA	FAAF runway	NA	aircraft crash/aviation asset
NA	Fort Ord Soil Treatment Area (FOSTA)	NA	landfill
NA	FAAF Fire & Rescue Station	514	potential AFFF storage/testing/washout
NA	East Garrison Fire House	T-105	potential AFFF storage
NA	Main Garrison Fire House - South	T-1820	potential AFFF storage
NA	Main Garrison Fire House - North	T-2898	potential AFFF storage
NA	Main Garrison Fire House - East	T-3280	potential AFFF storage
NA	Main Garrison Fire Station	4400, 4401	potential AFFF storage/testing/washout
NA	Mudhen Lake	NA	aircraft crash
NA	Range 34, Multi-Use Range	NA	fire training area
OU1	FAAF Fire Drill Area	NA	fire training area
OU2	Fort Ord Landfills	NA	landfill
NA	Use of PFAS-Containing Munitions	NA	potential MTV use

Notes:

No plating facilities that may have used PFAS-containing mist suppressants were identified at the former Fort Ord. Sites in **bold** were selected for tertiary assessment.

Sites in yellow were added during the secondary assessment.

Acronyms and Abbreviations:

AFFF = aqueous film-forming foam

DOL = Directorate of Logistics

DRMO = Defense Reutilization Marketing Office

FAAF = Fritzsche Army Airfield

MTV = magnesium/Teflon/Viton

NA = not applicable

OU1 = Operable Unit 1

OU2 = Operable Unit 2

PCB = polychlorinated biphenyls

Site ID	Site Name	Building No.	Suspected Site Type
1	Ord Village Sewage Treatment Plant	5990	wastewater treatment plant
2	Main Garrison Sewage Treatment Plant	2076	wastewater treatment plant
10	Fire Training Area at Fort Ord Fire Station	4400	fire training area
32	East Garrison Sewage Treatment Plant	147	wastewater treatment plant
36	FAAF Sewage Treatment Plant	540	wastewater treatment plant
40A	East FAAF Helicopter Defueling Area	NA	aviation asset
NA	FAAF Fire & Rescue Station	514	potential AFFF storage/testing/washout
NA	Main Garrison Fire Station	4400, 4401	potential AFFF storage/testing/washout
OU1	FAAF Fire Drill Area	NA	fire training area
OU2	Fort Ord Landfills	NA	landfill

Notes:

Tertiary assessment sites, except for Sites 1, 32, and 36, are recommended for inclusion in a Site Inspection.

Acronyms and Abbreviations:

AFFF = aqueous film-forming foam

FAAF = Fritzsche Army Airfield

NA = not applicable

OU1 = Operable Unit 1

OU2 = Operable Unit 2

Table 4. Property Transfer Information for Secondary Sites

Site ID	Site Name	Former Site Use	USACE Parcel No.	Transfer Date	Current Site Owner/Operator	Current Site Use
1	Ord Village Sewage Treatment Plant	wastewater treatment plant	S3.1.1	9/26/2006	California Department of Parks and Recreation	Fort Ord Dunes State Park
2	Main Garrison Sewage Treatment Plant	wastewater treatment plant	S3.1.1	9/26/2006	California Department of Parks and Recreation	Fort Ord Dunes State Park
5	Range 36A, EOD	explosive ordnance disposal	F1.13	NA	U.S. Army	Fort Ord National Monument
7	Ranges 40 and 41, Fire Demonstration Area	low-crawl course, antitank weapons range	F1.13	NA	U.S. Army	Fort Ord National Monument
8	Range 49, Molotov Cocktail Range	improvised explosives training area	E19a.4	5/28/2009	County of Monterey	open space
9	Range 40A, Flame Field Expedients Training Area	improvised explosives training area	F1.13	NA	U.S. Army	Fort Ord National Monument
10	Fire Training Area at Fort Ord Fire Station	fire training area	F2.3.3	5/8/2008	City of Seaside	Presidio of Monterey Fire Department
12	DOL Automotive Yard	vehicle maintenance	E2b.2.1	3/15/2004	Shea Properties/Commercial Retail Associates	The Dunes on Monterey Bay Retail Center
12	Lower Meadow Disposal Area	landfill	E2b.2.1	3/15/2004	Shea Properties/Commercial Retail Associates	The Dunes on Monterey Bay Retail Center
16	DOL Maintenance Yard	vehicle maintenance	L20.17.1	3/15/2004	California State University Monterey Bay	dormitory
16	Pete's Pond and Pete's Pond Extension	landfill	L5.8.2	3/15/2004	City of Marina	stormwater basin
17	Disposal Area, 1400 Block Motor Pool	landfill	S1.5.1.2	10/16/2003	California State University Monterey Bay	open space
20	South Parade Ground and 3800 and 519th Motor Pools	airfield	L33.2	1/26/2004	California State University Monterey Bay	athletic fields
22	Building 4492, Auto Craft Shop	personal vehicle maintenance	L32.2.1	1/26/2004	California State University Monterey Bay	facilities services and operations

Table 4. Property Transfer Information for Secondary Sites

Site ID	Site Name	Former Site Use	USACE Parcel No.	Transfer Date	Current Site Owner/Operator	Current Site Use
29	DRMO Building T-111, PCB Storage Area	hazardous material storage unit	L23.3.2.1	9/1/2004	Century Communities	general storage
31	Former Dump Site	landfill	L23.3.2.2	7/10/2009	County of Monterey	open space
32	East Garrison Sewage Treatment Plant	wastewater treatment plant	E11b.3	9/1/2004	Century Communities	residential
34	FAAF Fueling Facility	aircraft fuel facility	S2.1.4.1	6/28/2004	University of California	none, undeveloped
34B	Former Burn Pit	burn pit	S2.1.1.2	6/15/1994	University of California	Fort Ord Natural Reserve
36	FAAF Sewage Treatment Plant	wastewater treatment plant	L5.1.8	10/5/2001	City of Marina	Marina Municipal Airport
39	Inland Ranges	munitions training	F1.13	NA	U.S. Army	Fort Ord National Monument
40	West FAAF Helicopter Defueling Area	helicopter defueling area	L5.1.4	10/5/2001	City of Marina	Marina Municipal Airport
40A	East FAAF Helicopter Defueling Area	helicopter defueling area	L5.1	8/11/1995	City of Marina	Marina Municipal Airport
41	Crescent Bluff Fire Drill Area	fire training area	E11b.7.1.2	7/10/2009	Monterey County	open space
NA	FAAF Aircraft Crash Site	airfield	L5.1	8/11/1995	City of Marina	Marina Municipal Airport
NA	Fort Ord Soil Treatment Area	bioremediation facility	L33.2	1/26/2004	California State University Monterey Bay	athletic fields
NA	FAAF Fire & Rescue Station	fire station	L5.1	8/11/1995	City of Marina	fire station
NA	East Garrison Fire House	fire station	L35.7	3/15/2004	Century Communities	none, undeveloped
NA	Main Garrison Fire House, South	fire station	E2b.3.1.1	3/15/2004	City of Marina	none, derelict
NA	Main Garrison Fire House, North	fire station	L23.1.3	9/1/2004	Monterey Peninsula College	none, undeveloped
NA	Main Garrison Fire House, East	fire station	E2d.3.2	7/10/2009	City of Marina	none, derelict
NA	Main Garrison Fire Station	fire station	F2.3.3	8/28/2008	City of Seaside	Presidio of Monterey Fire Department
NA	Mudhen Lake	habitat	F1.1.1	10/19/1996	Bureau of Land Management	Fort Ord National Monument

Table 4. Property Transfer Information for Secondary Sites

Site ID	Site Name	Former Site Use	USACE Parcel No.	Transfer Date	Current Site Owner/Operator	Current Site Use
NA	Range 34, Multi-Use Range	close combat course, machine gun assault course, mortar range	F1.13	NA	U.S. Army	Fort Ord National Monument
OU1	Fire Drill Area	fire training area	S2.1.2	NA	U.S. Army	Fort Ord Natural Reserve
OU2	Fort Ord Landfills	landfill	E8a.1.1.1, E8a.2	NA	U.S. Army	landfill

Acronyms and Abbreviations:

DOL = Directorate of Logistics

EOD = Explosive Ordnance Disposal

FAAF = Fritzsche Army Airfield

PCB = polychlorinated biphenyl

Table 5. Summary of Groundwater Monitoring Analytical Results at OU1, 2015

Sample Date	PFOA (µg/L)								PFOS (µg/L)								Total PFOA/PFOS (µg/L)			
	5/11/15		7/20/15		10/5/15		12/14/15		5/11/15		7/20/15		10/5/15		12/14/15		5/11/15	7/20/15	10/5/15	12/14/15
Well ID	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Result	Result	Result
EW-OU1-52-A	0.003	J-	0.004		0.004		0.005		<0.010	UJ-	<0.010	U	<0.010	U	<0.010	U	0.003	0.004	0.004	0.005
EW-OU1-53-A	0.014	J-	0.013		0.009		0.013		<0.010	UJ-	<0.010	U	<0.010	U	<0.010	U	0.014	0.013	0.009	0.013
IW-OU1-02-A	0.009	J-	0.010		0.007		0.009		<0.010	UJ-	<0.010	U	<0.010	U	<0.010	U	0.009	0.010	0.007	0.009
MW-OU1-26-A	0.034	J-	0.040		<i>0.042</i>		0.039		0.007	J	0.012		0.015		0.012		<i>0.041</i>	<i>0.052</i>	<i>0.057</i>	<i>0.051</i>
MW-OU1-61-A	0.003	J-	0.003		0.002	J	0.002		<0.010	UJ-	<0.010	U	<0.010	U	<0.010	U	0.003	0.003	0.002	0.002
MW-OU1-61-A-DUP	0.004	J-	-		-		-		<0.010	UJ-	-		-		-		0.004	-	-	-
MW-OU1-88-A	0.270	J-	0.230		0.180		0.210		0.064	J-	0.062		0.037		0.033		0.334	0.292	0.217	0.243
MW-OU1-88-A-DUP	-		0.260		0.200		0.200		-		0.072		0.044		0.036		-	0.332	0.244	0.236
PZ-OU1-10-A1*	0.120	J-	-		-		-		<0.010	UJ-	-		-		-		0.120	-	-	-
PZ-OU1-49-A1	0.007	J-	0.008		0.009		0.011	U	<0.010	UJ-	<0.010	U	<0.010	U	<0.010	U	0.007	0.008	0.009	0.011

Notes:

Data are from the Final Remedial Action Completion Report/Technical Memorandum, Operable Unit 1 Attainment Monitoring Results, Sampling Events #1 through #4 (AR# OU1-623A)

Collected samples were analyzed using a laboratory accredited by the DoD Environmental Laboratory Accreditation Program (ELAP) for analysis of PFAS using EPA Method 537 Rev. 1.1. Analyses were performed in accordance with DoD QSM Version 5.0.

Results in *gray* are not detected above the limit of detection

Results in **bold** are above the EPA Regional Screening Levels (2022) and DoD screening levels (2022) (0.06 µg/L for PFOA and 0.04 µg/L for PFOS)

Results in *italics* are above the Department of Defense screening level of 0.04 µg/L

*PZ-OU1-10-A1 was removed from the sampling program after Event #1 because a damaged screen was compromising samples.

Acronyms and Abbreviations:

- = not applicable

µg/L = micrograms per liter

DoD = Department of Defense

DUP = duplicate

EPA = U.S. Environmental Protection Agency

PFAS = per- and polyfluoroalkyl substances

PFOA = perfluorooctanoic acid

PFOS = perfluorooctane sulfonate (perfluorooctanesulfonic acid)

Q = qualifier

QSM = Quality Systems Manual

Data Qualifiers:

J = estimated; it is not possible to assess the direction of potential bias; the associated value is the detected level; false positives are unlikely

J- = estimated with a low bias likely to occur; the associated value is the detected level

U = not detected above the limit of detection

UJ- = not detected above the limit of detection with a low bias likely to occur; false negatives are unlikely

Table 6. Summary of Groundwater Monitoring Analytical Results at Regional Water Supply Wells, 2019-2020

System	Well ID	PFBS (µg/L)				PFHpA (µg/L)				PFHxS (µg/L)				PFNA (µg/L)				PFOS (µg/L)				PFOA (µg/L)				NETFOSAA (µg/L)				
		2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	
CalAm - Ambler Park	Ambler Oaks Well	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Ambler Park	Well 04	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Ambler Park	Well 06	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Bishop	Bishop Well 01	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Bishop	Bishop Well 03	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Hidden Hills	Bay Ridge Well	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Monterey	Luzern Well 02	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Monterey	Ord Grove Well 02	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Monterey	Paralta Well	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Monterey	Playa Well 03	-	-	0.0056	-	-	-	ND	-	-	-	0.0068	-	-	-	ND	-	-	-	0.00615	-	-	-	0.00575	-	-	-	ND	-	
CalAm - Monterey	Plumas Well No. 4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
CalAm - Monterey	Santa Margarita ASR Well 01	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	
CalAm - Monterey	Seaside Middleschool ASR 03	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	
CalAm - Toro	Well 01	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-
CalAm - Toro	Well 02	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
MCWD	Well 10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MCWD	Well 11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MCWD	Well 29	ND	ND	ND	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MCWD	Well 30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MCWD	Well 31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MCWD	Well 34	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Marina Landfill	Well	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MRWPCA	Well 01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Ryan Ranch	Well 07	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	

Notes:

Per California Division of Drinking Water order, collected samples were analyzed using a laboratory accredited by the California Environmental Laboratory Accreditation Program (ELAP) to perform USEPA Method 537.1 for per- and polyfluoroalkyl substances (PFAS) compliant with Table B-15 of DoD QSM version 5.1 (or later).
 Data are from the California State Water Resources Control Board at https://www.waterboards.ca.gov/pfas/docs/pfas_monitoring_Q1Q2Q3Q4.xlsx

Results highlighted in yellow are PFAS detections.

Acronyms and Abbreviations:

- = not applicable
- µg/L = micrograms per liter
- ND = not detected
- PFBS = perfluorobutanesulfonic acid
- PFHpA = perfluoroheptanoic acid
- PFHxS = perfluorohexane sulfonic acid
- PFNA = perfluorononanoic acid
- PFOS = perfluorooctane sulfonate (perfluorooctanesulfonic acid)
- PFOA = perfluorooctanoic acid
- NETFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
- NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

- PFDA = perfluorodecanoic acid
- PFDoA = perfluorododecanoic acid
- PFHxA = perfluorohexanoic acid
- PFTA = perfluorotetradecanoic acid
- PFTTrDA = perfluorotridecanoic acid
- PFUnA = perfluoroundecanoic acid
- HFPO-DA = hexafluoropropylene oxide dimer acid
- 9Cl-PF3ONS = 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid
- 11Cl-PF3OUdS = 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
- ADONA = 4,8-dioxa-3H-perfluorononanoic acid

Table 6. Summary of Groundwater Monitoring Analytical Results at Regional Water Supply Wells, 2019-2020

System	Well ID	NMeFOSAA (µg/L)				PFDA (µg/L)				PFDoA (µg/L)				PFHxA (µg/L)				PFTA (µg/L)				PFTrDA (µg/L)				PFUnA (µg/L)				
		2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	
CalAm - Ambler Park	Ambler Oaks Well	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Ambler Park	Well 04	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Ambler Park	Well 06	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Bishop	Bishop Well 01	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Bishop	Bishop Well 03	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Hidden Hills	Bay Ridge Well	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Monterey	Luzern Well 02	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Monterey	Ord Grove Well 02	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Monterey	Paralta Well	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Monterey	Playa Well 03	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	0.0061	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
CalAm - Monterey	Plumas Well No. 4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
CalAm - Monterey	Santa Margarita ASR Well 01	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	
CalAm - Monterey	Seaside Middleschool ASR 03	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	-	-	ND	ND	
CalAm - Toro	Well 01	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-
CalAm - Toro	Well 02	-	-	ND	ND	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	
MCWD	Well 10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MCWD	Well 11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MCWD	Well 29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0052	0.0047	0.0051	0.0049	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MCWD	Well 30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MCWD	Well 31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MCWD	Well 34	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Marina Landfill	Well	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
MRWPCA	Well 01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Ryan Ranch	Well 07	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	-	-	ND	-	

Notes:

Per California Division of Drinking Water order, collected samples were analyzed using a laboratory accredited by the California Environmental Laboratory Accreditation Program (ELAP) to perform USEPA Method 537.1 for per- and polyfluoroalkyl substances (PFAS) compliant with Table B-15 of DoD QSM version 5.1 (or later).
 Data are from the California State Water Resources Control Board at https://www.waterboards.ca.gov/pfas/docs/pfas_monitoring_Q1Q2Q3Q4.xlsx

Results highlighted in yellow are PFAS detections.

Acronyms and Abbreviations:

- = not applicable
- µg/L = micrograms per liter
- ND = not detected
- PFBS = perfluorobutanesulfonic acid
- PFHpA = perfluoroheptanoic acid
- PFHxS = perfluorohexane sulfonic acid
- PFNA = perfluorononanoic acid
- PFOS = perfluorooctane sulfonate (perfluorooctanesulfonic acid)
- PFOA = perfluorooctanoic acid
- NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
- NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid
- PFDA = perfluorodecanoic acid
- PFDoA = perfluorododecanoic acid
- PFHxA = perfluorohexanoic acid
- PFTA = perfluorotetradecanoic acid
- PFTrDA = perfluorotridecanoic acid
- PFUnA = perfluoroundecanoic acid
- HFPO-DA = hexafluoropropylene oxide dimer acid
- 9Cl-PF3ONS = 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid
- 11Cl-PF3OUdS = 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
- ADONA = 4,8-dioxa-3H-perfluorononanoic acid

Table 6. Summary of Groundwater Monitoring Analytical Results at Regional Water Supply Wells, 2019-2020

System	Well ID	HFPO-DA (µg/L)				9Cl-PF3ONS (µg/L)				11Cl-PF3OUdS (µg/L)				ADONA (µg/L)			
		2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20	2Q19	3Q19	4Q19	1Q20
CalAm - Ambler Park	Ambler Oaks Well	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Ambler Park	Well 04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Ambler Park	Well 06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Bishop	Bishop Well 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Bishop	Bishop Well 03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Hidden Hills	Bay Ridge Well	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Monterey	Luzern Well 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Monterey	Ord Grove Well 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Monterey	Paralta Well	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Monterey	Playa Well 03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Monterey	Plumas Well No. 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Monterey	Santa Margarita ASR Well 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Monterey	Seaside Middleschool ASR 03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Toro	Well 01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CalAm - Toro	Well 02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MCWD	Well 10	-	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND
MCWD	Well 11	-	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND
MCWD	Well 29	-	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND
MCWD	Well 30	-	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND
MCWD	Well 31	-	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND
MCWD	Well 34	-	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND	-	ND	ND	ND
Marina Landfill	Well	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MRWPCA	Well 01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ryan Ranch	Well 07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

Per California Division of Drinking Water order, collected samples were analyzed using a laboratory accredited by the California Environmental Laboratory Accreditation Program (ELAP) to perform USEPA Method 537.1 for per- and polyfluoroalkyl substances (PFAS) compliant with Table B-15 of DoD QSM version 5.1 (or later). Data are from the California State Water Resources Control Board at https://www.waterboards.ca.gov/pfas/docs/pfas_monitoring_Q1Q2Q3Q4.xlsx

Results highlighted in yellow are PFAS detections.

Acronyms and Abbreviations:

- = not applicable
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 ND = not detected
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 PFNA = perfluorononanoic acid
 PFOS = perfluorooctane sulfonate (perfluorooctanesulfonic acid)
 PFOA = perfluorooctanoic acid
 NEtFOSAA = N-ethyl perfluorooctanesulfonamidoacetic acid
 NMeFOSAA = N-methyl perfluorooctanesulfonamidoacetic acid

PFDA = perfluorodecanoic acid
 PFDoA = perfluorododecanoic acid
 PFHxA = perfluorohexanoic acid
 PFTA = perfluorotetradecanoic acid
 PFTrDA = perfluorotridecanoic acid
 PFUnA = perfluoroundecanoic acid
 HFPO-DA = hexafluoropropylene oxide dimer acid
 9Cl-PF3ONS = 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid
 11Cl-PF3OUdS = 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
 ADONA = 4,8-dioxa-3H-perfluorononanoic acid

Table 7. Summary of Groundwater Monitoring Analytical Results at OU2, 2019

Well ID	Sample Depth (ft btoc)	PFOA (µg/L)		PFOS (µg/L)		Total PFOA/PFOS (µg/L)
		Result	Qualifier	Result	Qualifier	
A-Aquifer						
MW-OU2-06-AR	118	0.00762		0.00790		0.01552
MW-OU2-08-A	125	0.00245	J	<0.0020	U	0.00245
MW-OU2-08-A-DUP	125	<0.0020	U	<0.0020	U	-
MW-OU2-27-A	113	<0.0020	U	<0.0020	U	-
MW-OU2-40-A	118	<0.0020	U	0.00351	J	0.00351
MW-OU2-44-A	90	<0.0020	U	<0.0020	U	-
MW-OU2-73-A	122	<0.0020	U	<0.0020	U	-
MW-OU2-75-A	116	<0.0020	U	0.00193	J	0.00193
Upper 180-Foot Aquifer						
EW-OU2-01-180	158	<0.0020	U	<0.0020	U	-
MW-OU2-23-180	219	0.113		0.447		0.560
MW-OU2-24-180	214	0.00326	J	0.00254	J	0.00580
MW-OU2-44-180	188	0.00309	J	0.00343	J	0.00652
MW-OU2-56-180	225	0.00252	J	<0.0020	U	0.00252
MW-OU2-56-180-DUP	225	<0.0020	U	<0.0020	U	-
OU2 Groundwater Treatment Plant						
TS-OU2-INF-01	-	0.0156		0.0153		0.03090
TS-OU2-INF-02	-	<0.0020	U	<0.0020	U	-
TS-OU2-EFF-1A	-	<0.0020	U	<0.0020	U	-
TS-OU2-EFF-2A	-	<0.0020	U	<0.0020	U	-
TS-OU2-INJ-01	-	<0.0020	U	<0.0020	U	-

Notes:

Data are from the Technical Summary Report – Perfluorooctanoic Acid and Perfluorooctane Sulfonate, Basewide Review of Historical Activities and Groundwater Monitoring at Operable Unit 2, Former Fort Ord, California (AR# OU2-722B). Collected samples were analyzed using a laboratory accredited by the Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) for analysis of per- and polyfluoroalkyl substances (PFAS) using U.S.

Environmental Protection Agency (EPA) Method 537M. All analyses were performed in accordance with DoD Quality Systems Manual (QSM) Version 5.1.

Results in gray are not detected above the limit of detection

Results in bold are above the EPA Regional Screening Levels (2022) and DoD screening levels (2022) (0.06 µg/L for PFOA and 0.04 µg/L for PFOS)

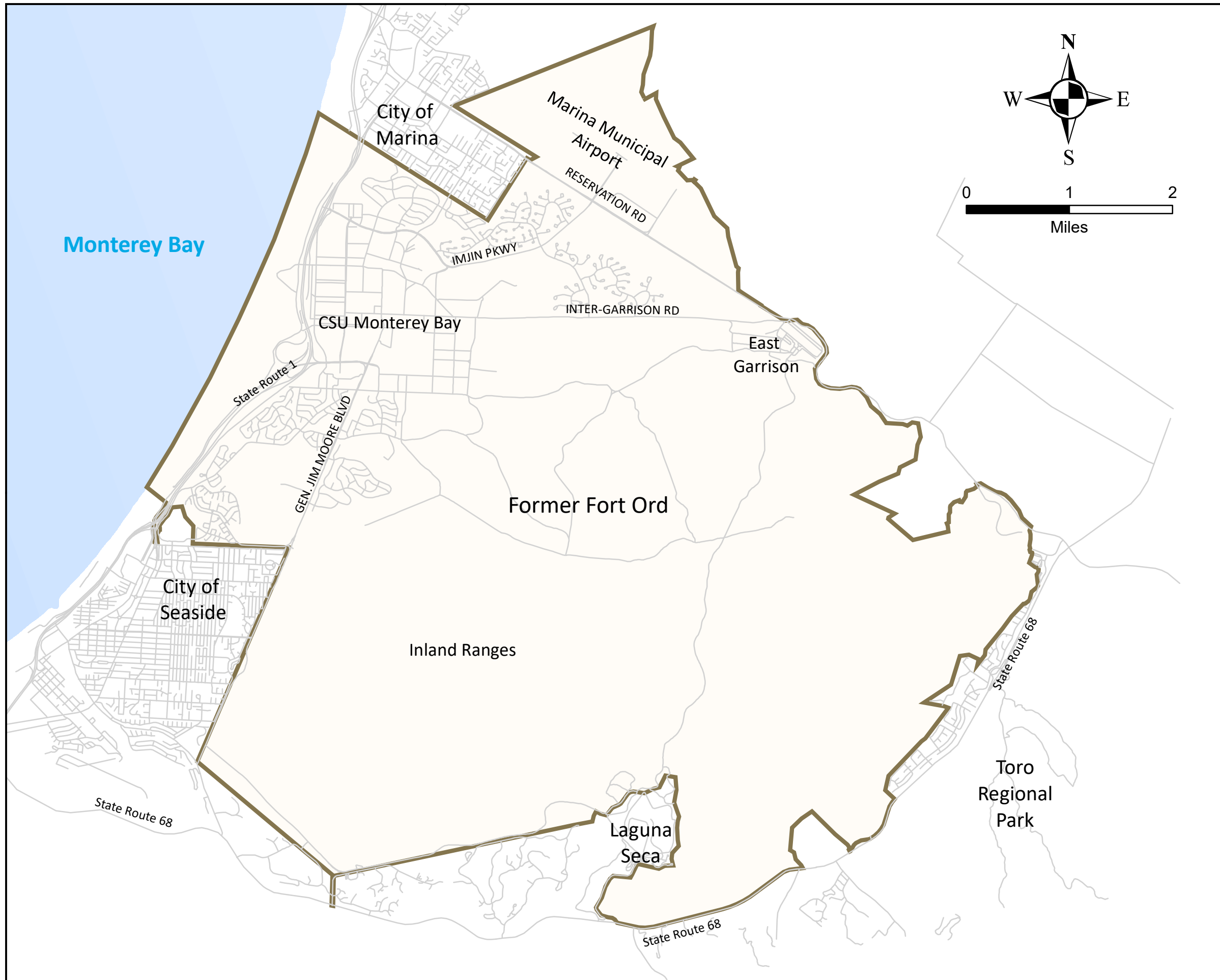
Acronyms and Abbreviations:

- = not applicable
- µg/L = micrograms per liter
- DUP = duplicate
- ft btoc = feet below top of casing
- PFOA = perfluorooctanoic acid
- PFOS = perfluorooctane sulfonate (perfluorooctanesulfonic acid)
- TS-OU2-INF-01 = Eastern Main influent
- TS-OU2-INF-02 = Western Main influent
- TS-OU2-EFF-1A = Lead GAC Vessel Effluent for GAC Train #1
- TS-OU2-EFF-2A = Lead GAC Vessel Effluent for GAC Train #2
- TS-OU2-INJ-01 = GWTP effluent



Data Qualifiers:

- J = estimated result below the limit of quantitation
- U = not detected above the limit of detection

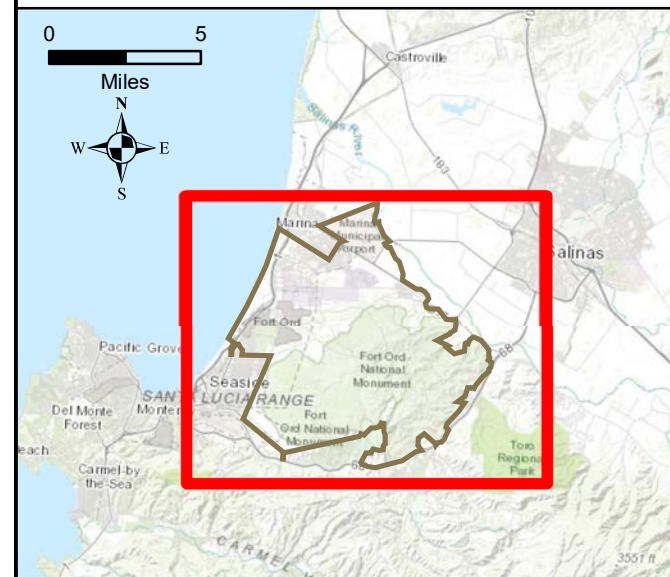
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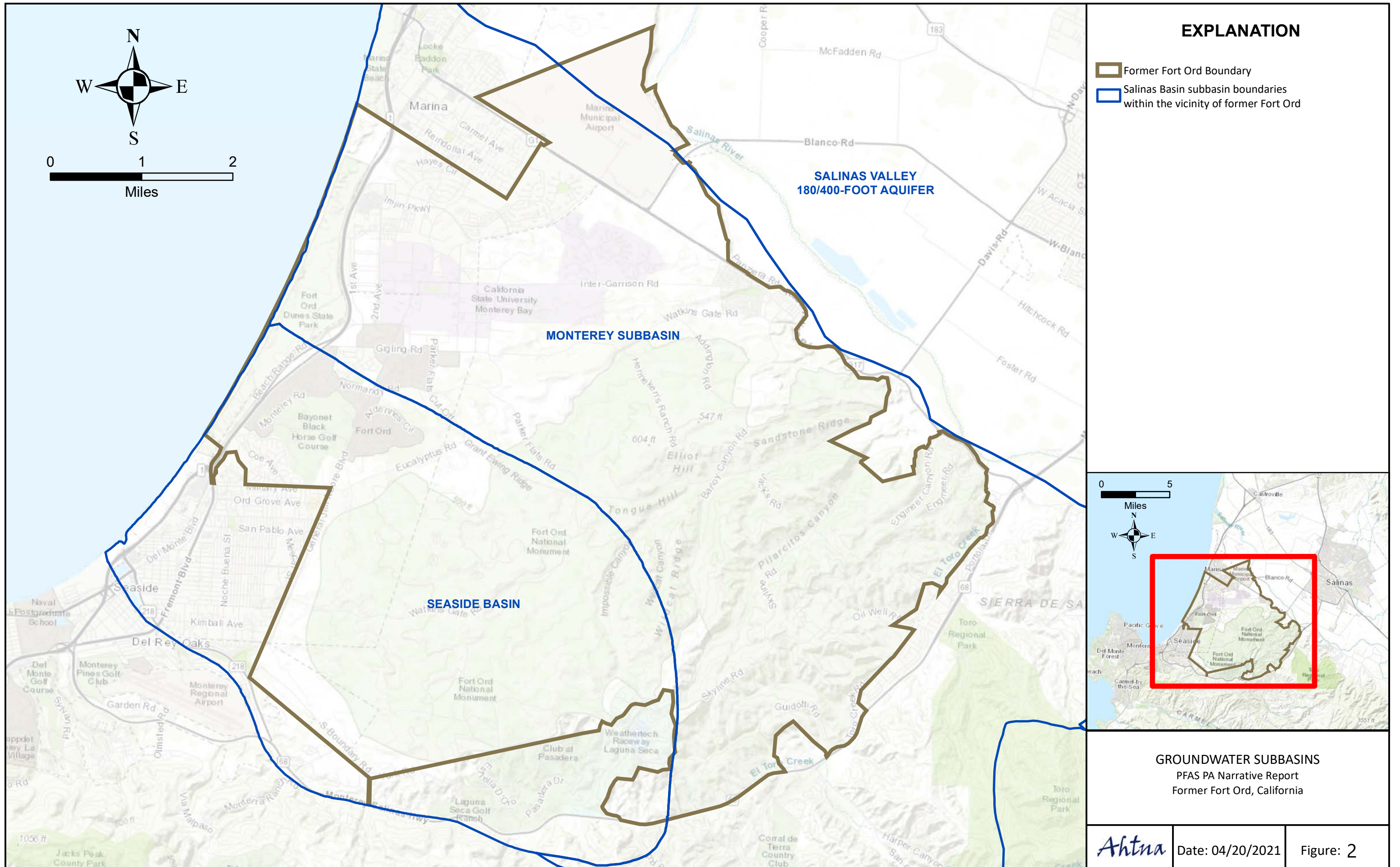
EXPLANATION

-  Former Fort Ord Boundary
-  Roads

- NOTES:**
1. Marina Municipal Airport is the former Fritzsche Army Airfield
 2. CSU Monterey Bay is located within the former Main Garrison area.

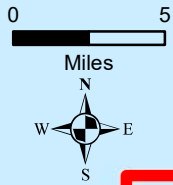
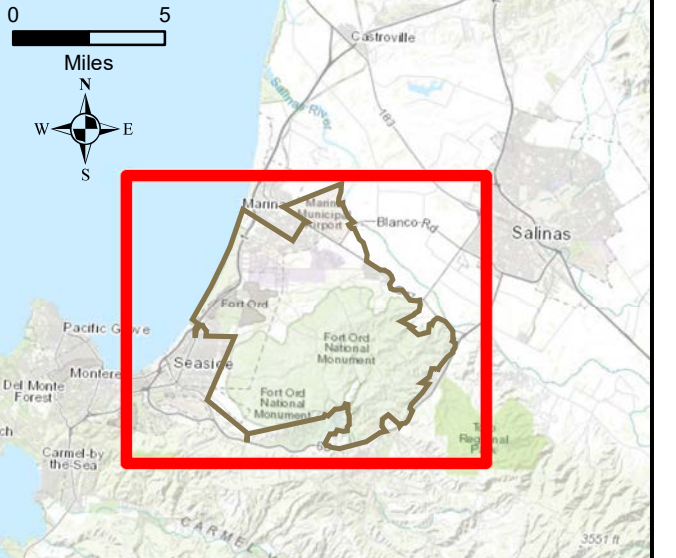
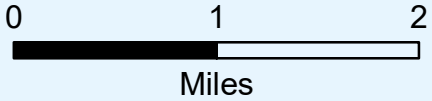
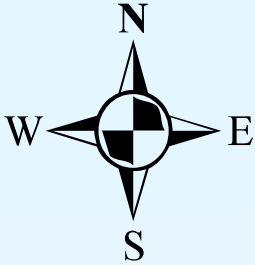


FORMER FORT ORD LOCATION MAP
 PFAS PA Narrative Report
 Former Fort Ord, California

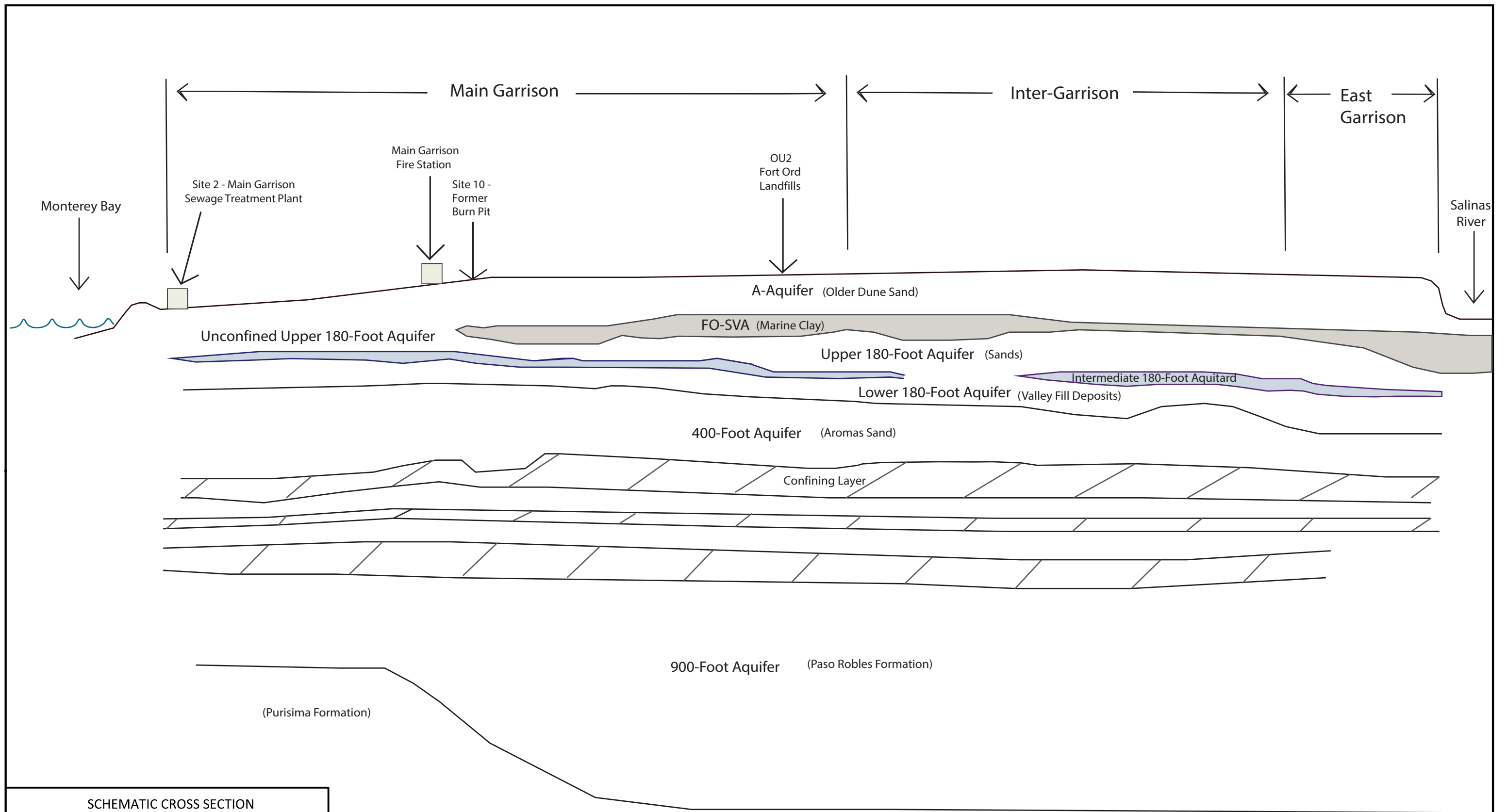


EXPLANATION

- Former Fort Ord Boundary
- Salinas Basin subbasin boundaries within the vicinity of former Fort Ord



GROUNDWATER SUBBASINS
 PFAS PA Narrative Report
 Former Fort Ord, California



SCHEMATIC CROSS SECTION
 NORTHERN FORT ORD
 HYDROSTRATIGRAPHY
 PFAS PA Narrative Report
 Former Fort Ord, California

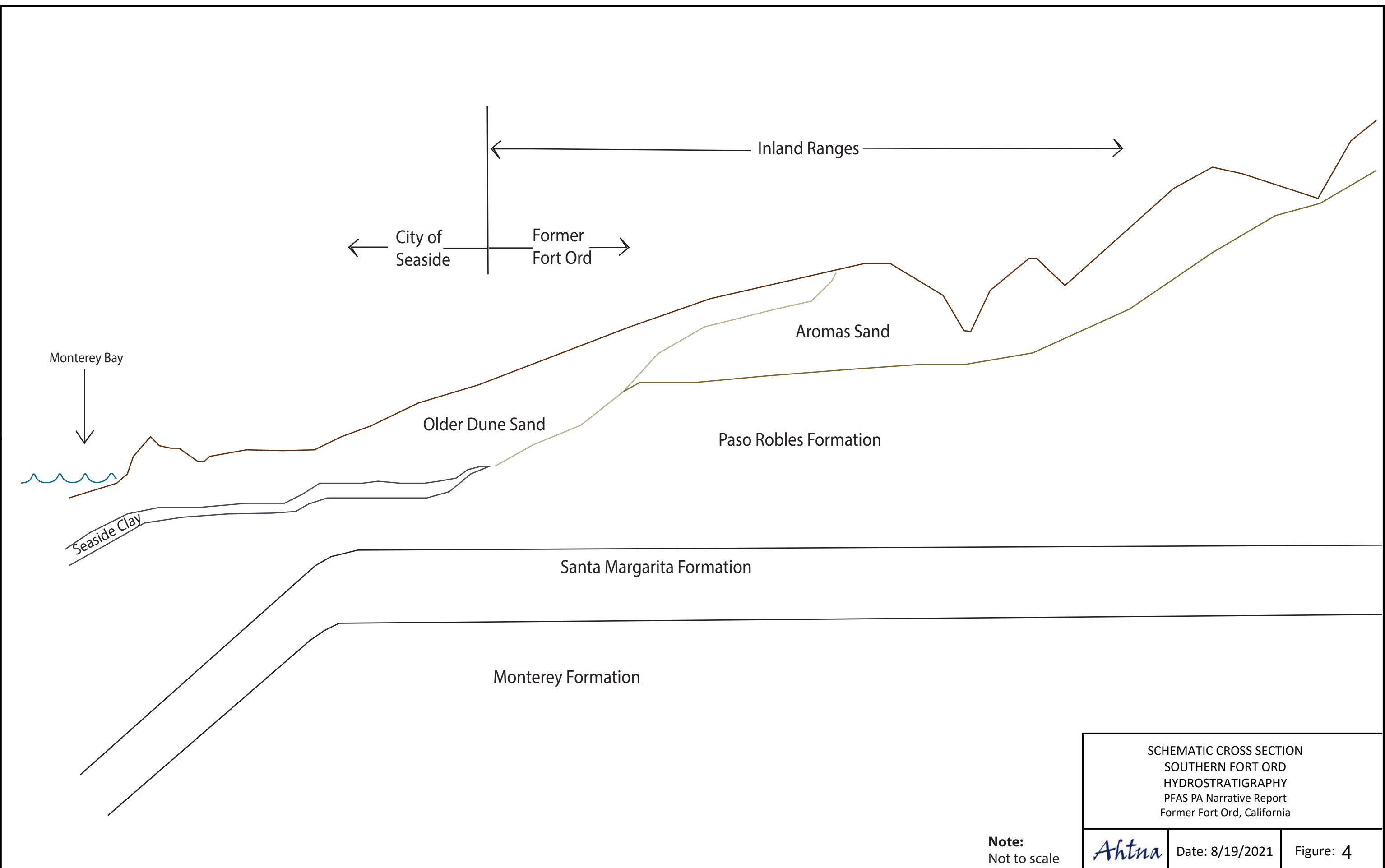
Notes:

OU2 = Operable Unit 2

FO-SVA = Fort Ord Salinas Valley Aquitard

Intermediate 180-Foot Aquitard consists of interbedded clay and clayey sand layers, occasionally mixed with coarse gravel

Confining layer between the 400-Foot Aquifer and 900-Foot Aquifer Consists of massive clay units interbedded with sands



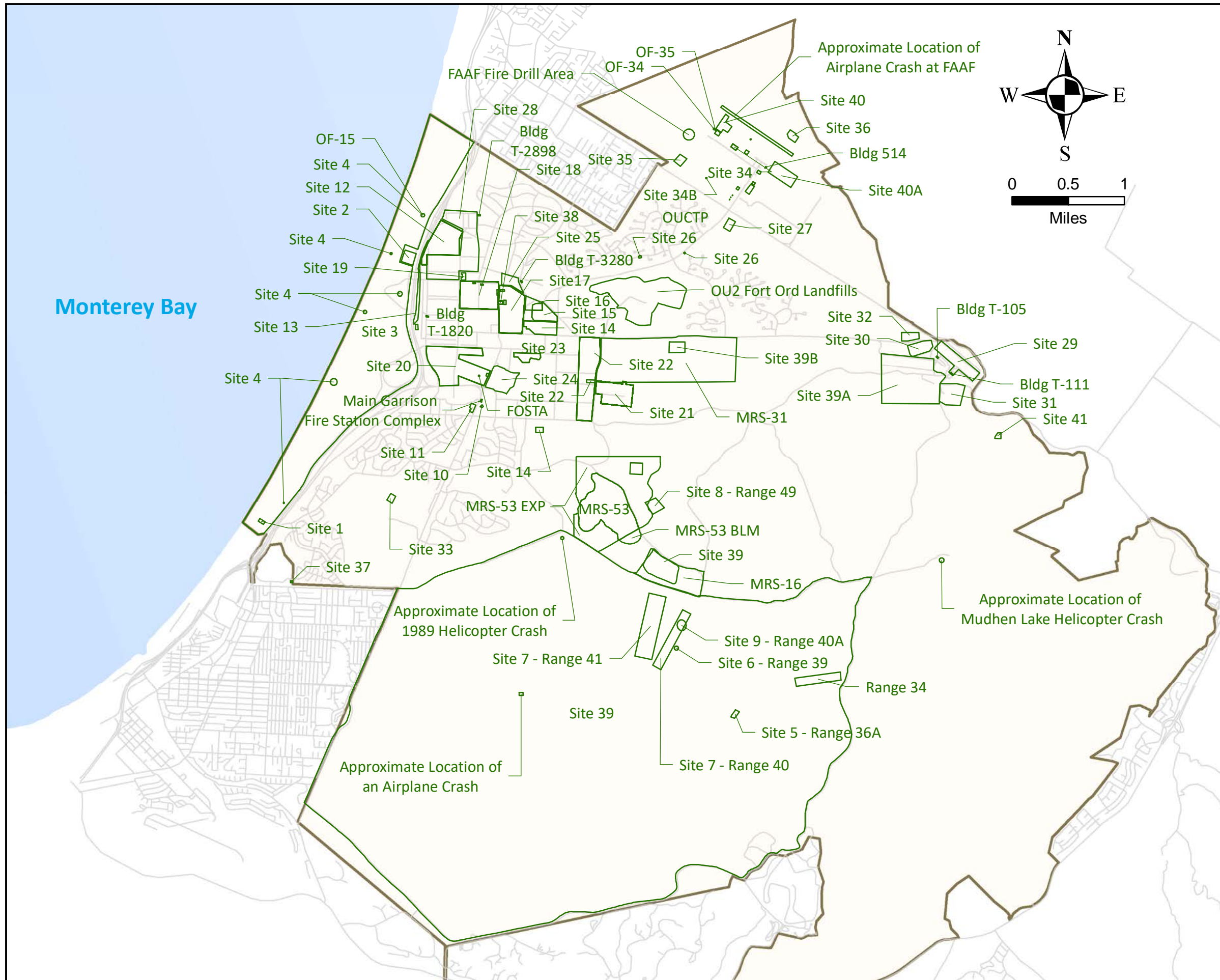
SCHEMATIC CROSS SECTION
 SOUTHERN FORT ORD
 HYDROSTRATIGRAPHY
 PFAS PA Narrative Report
 Former Fort Ord, California

Note:
 Not to scale

Ahtna

Date: 8/19/2021

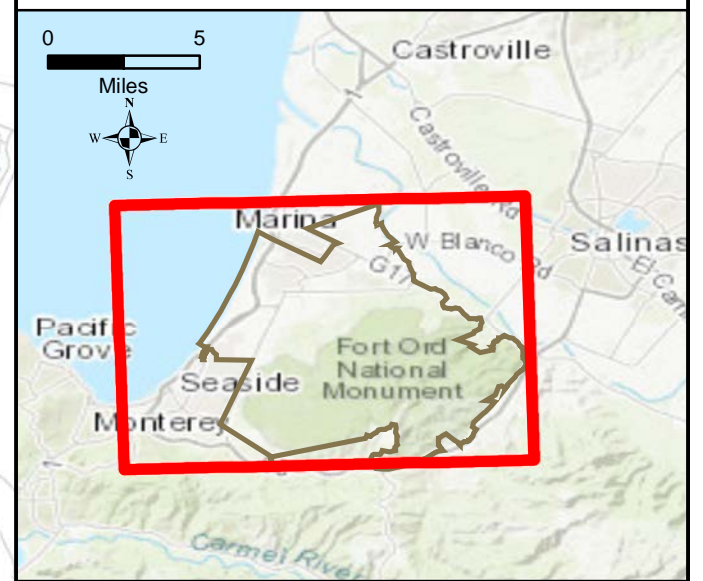
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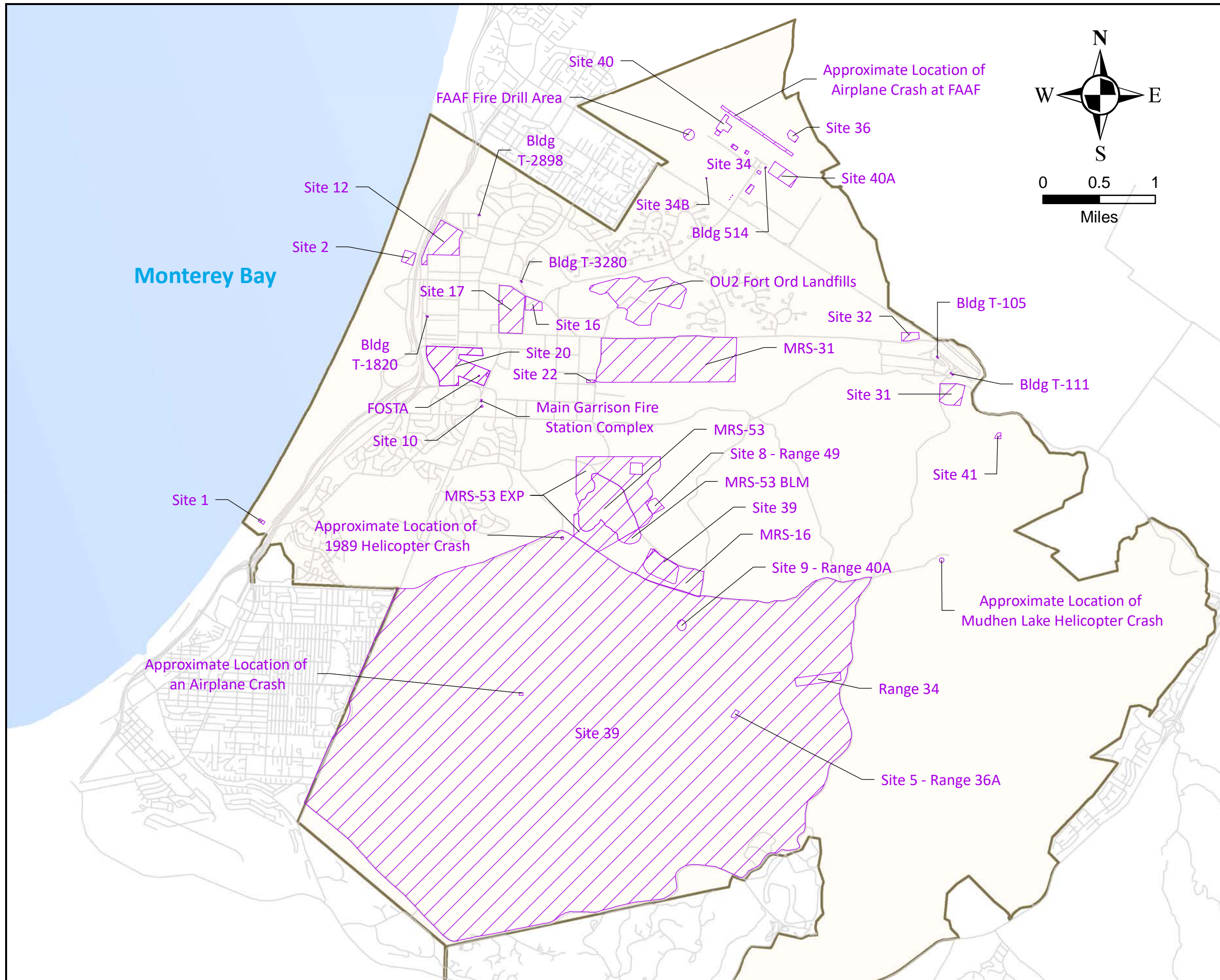
EXPLANATION

- Primary Assessment Site
- Former Fort Ord boundary
- Roads

NOTE:
 FAAF = former Fritzsche Army Airfield (Marina Municipal Airport)
 OU2 = Operable Unit 2
 OUCTP = Operable Unit Carbon Tetrachloride Plume
 FOSTA = Fort Ord Soil Treatment Area
 Main Garrison Fire Station Complex = Bldgs 4400, 4401, and S-4403



PRIMARY ASSESSMENT SITES
 PFAS PA Narrative Report
 Former Fort Ord, California

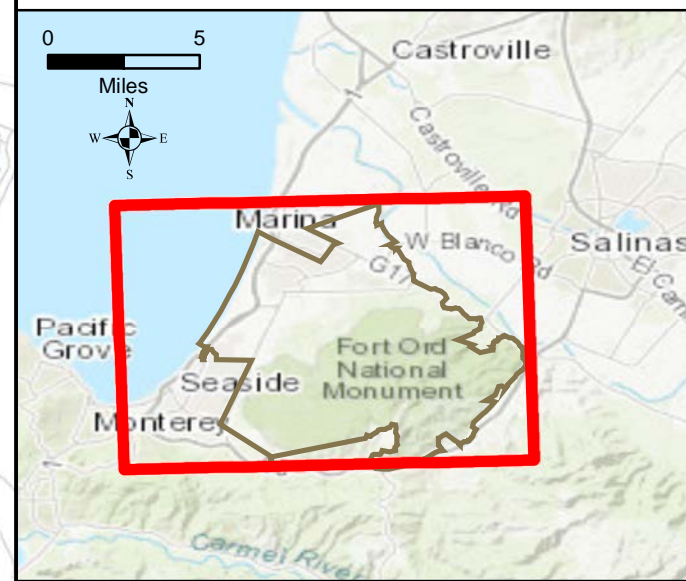


EXPLANATION

- Secondary Assessment Sites
- Former Fort Ord Boundary
- Roads

NOTE:

FAAF = Fritzsche Army Airfield (Marina Municipal Airport)
 OU2 = Operable Unit 2
 FOSTA = Fort Ord Soil Treatment Area
 Main Garrison Fire Station Complex = Bldgs 4400, 4401, and S-4403

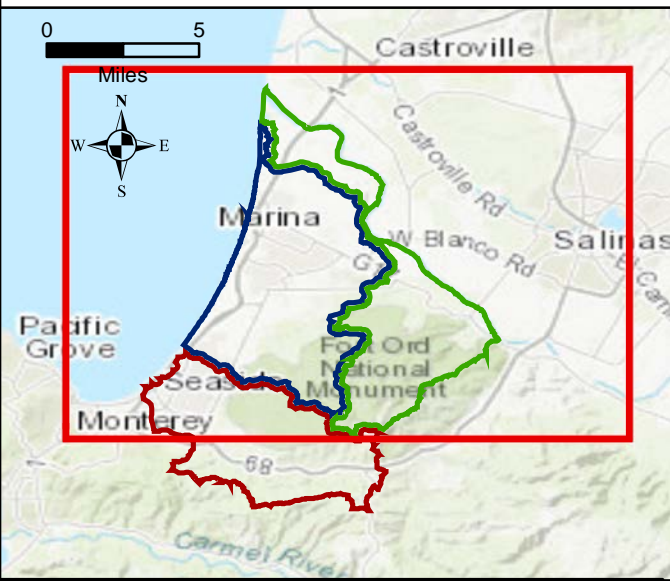
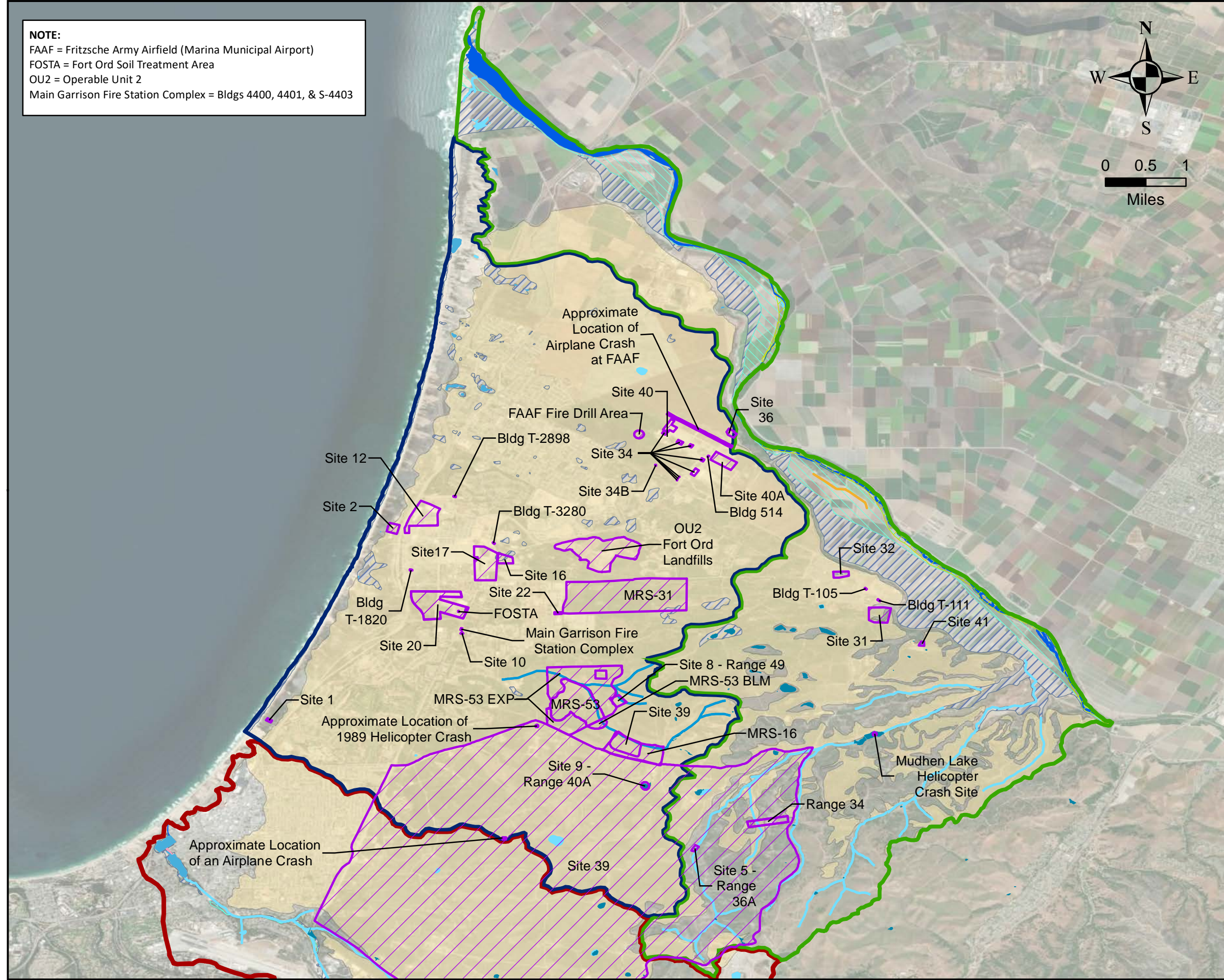


SECONDARY ASSESSMENT SITES
 PFAS PA Narrative Report
 Former Fort Ord, California

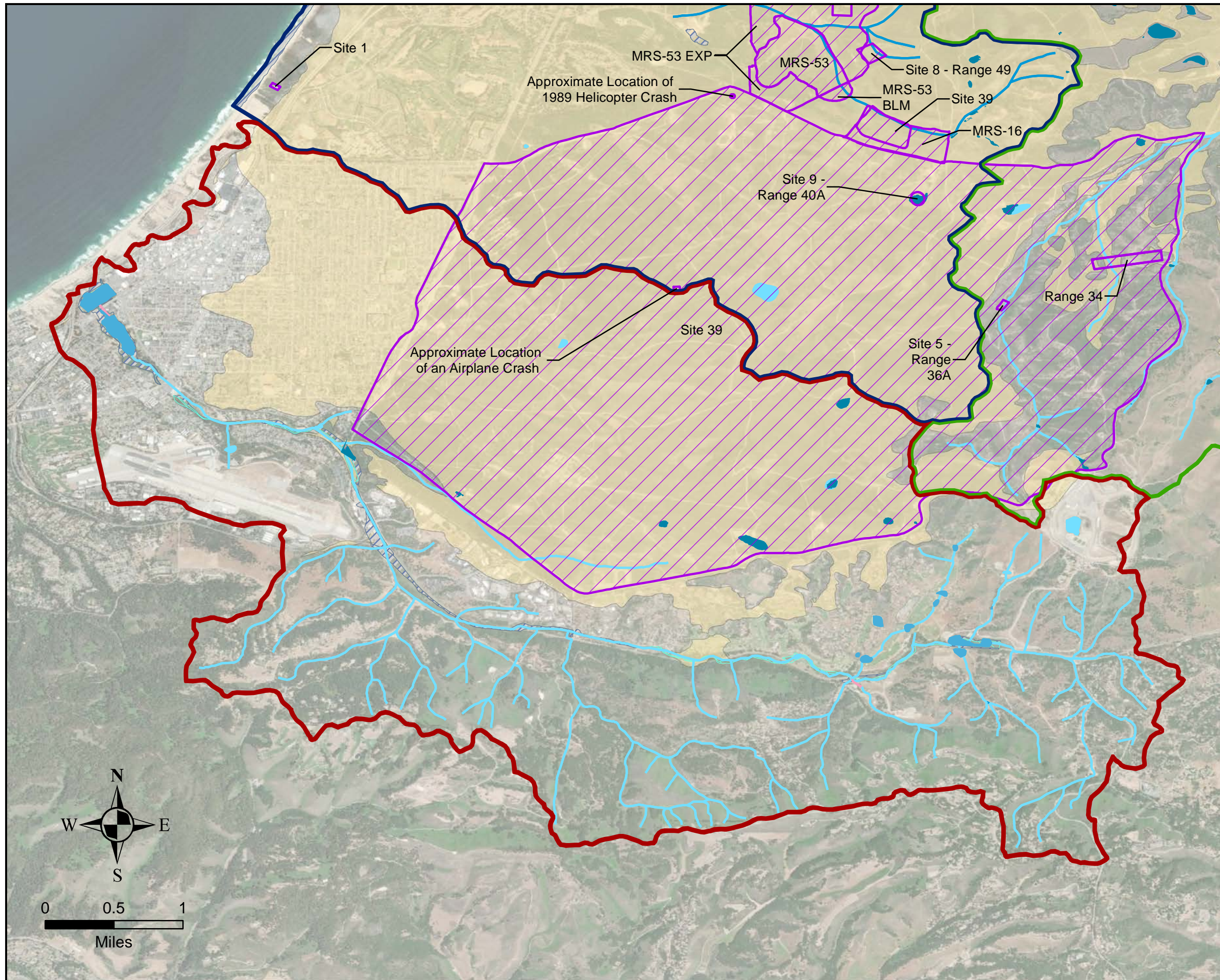
NOTE:
 FAAF = Fritzsche Army Airfield (Marina Municipal Airport)
 FOSTA = Fort Ord Soil Treatment Area
 OU2 = Operable Unit 2
 Main Garrison Fire Station Complex = Bldgs 4400, 4401, & S-4403

















- ### EXPLANATION
- Secondary Assessment Sites
 - Potential Recharge Areas (Moderate-High Infiltration)
- Watershed Area Boundaries**
- Salinas River - Southwest Portion
 - Marina/Monterey Bay
 - Canyon Del Rey
- Waterbodies**
- Lake/Pond Intermittent
 - Lake/Pond Perennial
 - Stream/River Intermittent
 - Stream/River Perennial
 - Wash
 - Vernal Ponds
- Surface Water Flowline**
- Canal/Ditch
 - Connector (e.g. culvert)
 - Stream/River Ephemeral
 - Stream/River Intermittent
 - Stream/River Perennial
- Flood Hazard**
- Floodway
 - 100 Year Flood

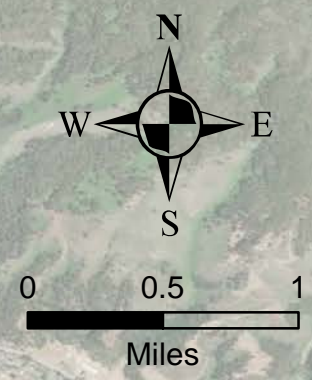
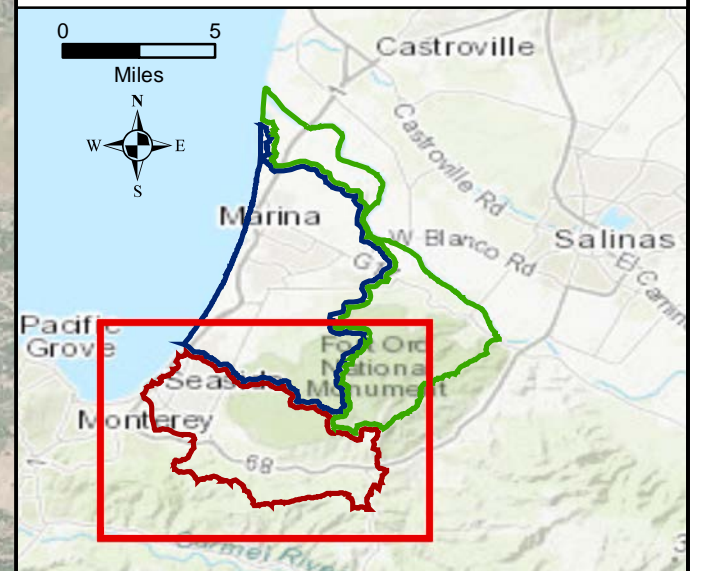


SECONDARY ASSESSMENT SITES
 SURFACE WATER OVERVIEW
 SALINAS RIVER & MARINA WATERSHEDS
 PFAS PA Narrative Report
 Former Fort Ord, California

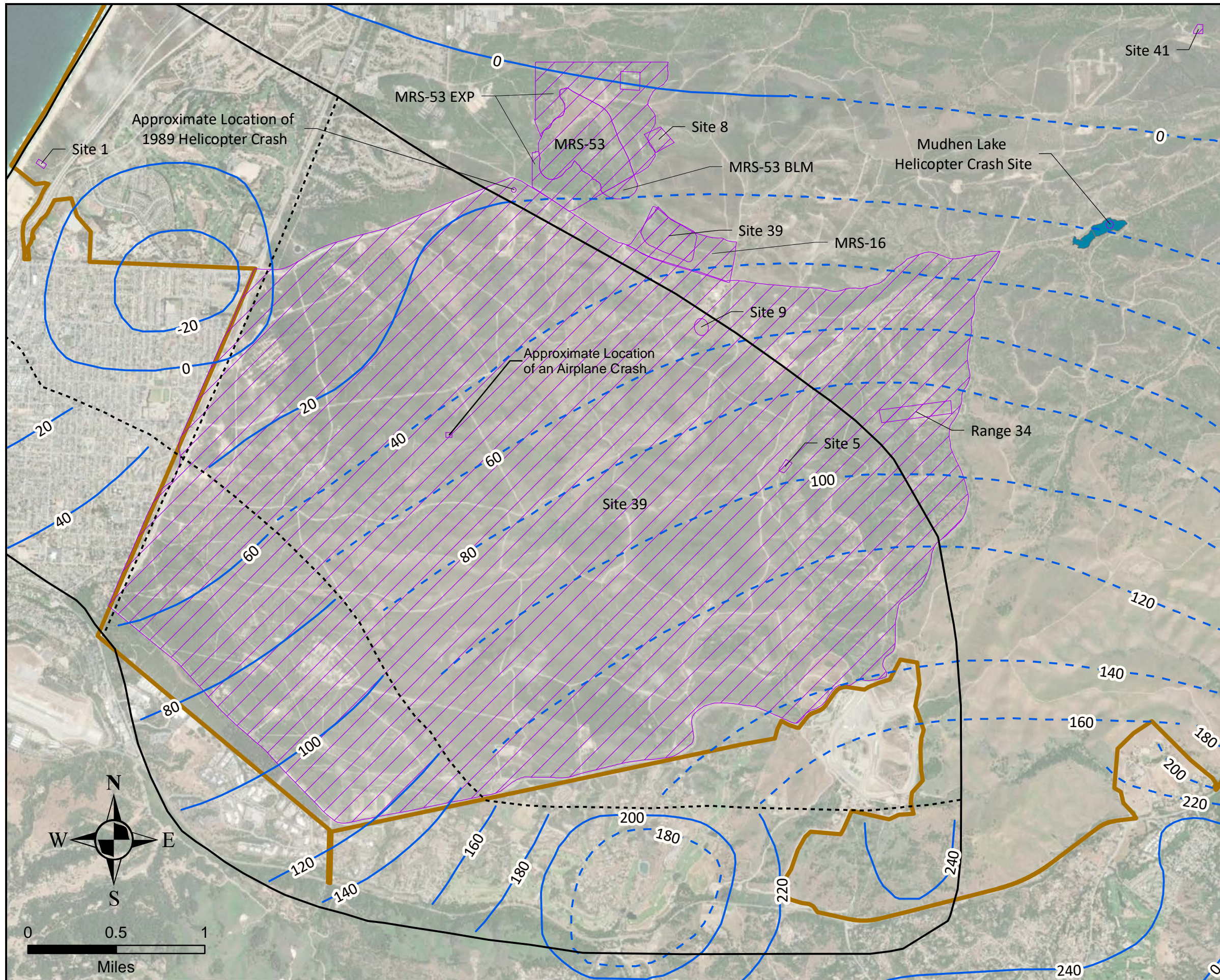


EXPLANATION

-  Secondary Assessment Sites
-  Potential Recharge Areas (Moderate-High Infiltration)
- Watershed Area Boundaries**
-  Canyon Del Rey
-  Marina/Monterey Bay
-  Salinas River - Southwest Portion
- Waterbodies**
-  Lake/Pond Intermittent
-  Lake/Pond Perennial
-  Vernal Ponds
- Surface Water Flowline**
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-  Stream/River Intermittent
-  Stream/River Perennial
- Flood Hazard**
-  Floodway
-  100 Year Flood



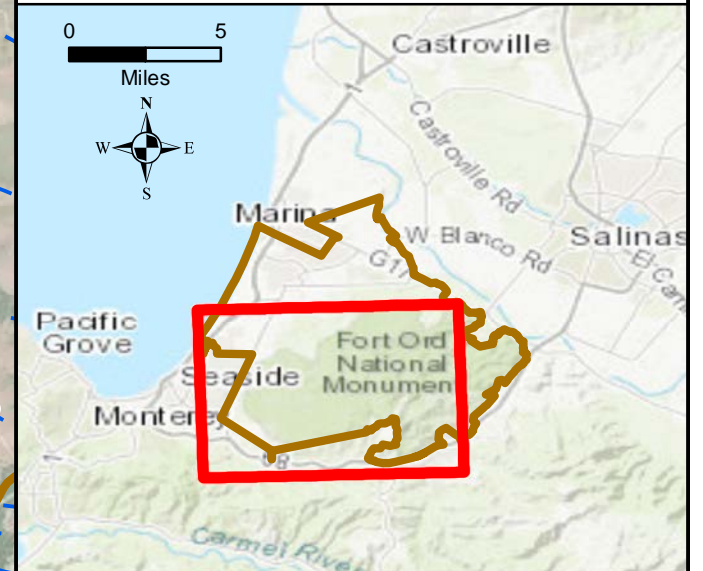
SECONDARY ASSESSMENT SITES
 SURFACE WATER OVERVIEW
 CANYON DEL REY WATERSHED
 PFAS PA Narrative Report
 Former Fort Ord, California



EXPLANATION

- Secondary Assessment Sites
- Mudhen Lake
- Former Fort Ord Boundary
- Groundwater Basin Boundary*
- Groundwater Subbasin Boundary*
- Groundwater Elevation, Paso Robles Formation*
- Inferred Groundwater Elevation, Paso Robles Formation*

NOTES:
 *HydroMetric Groundwater Modeling and Protective Groundwater Elevations, Paso Robles Formation (11/06/2009)
 Groundwater elevation contours are in feet above mean sea-level (msl)



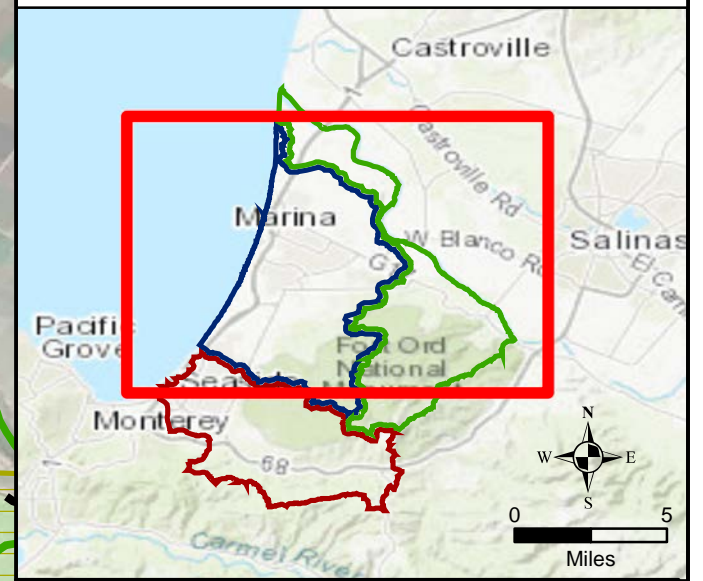
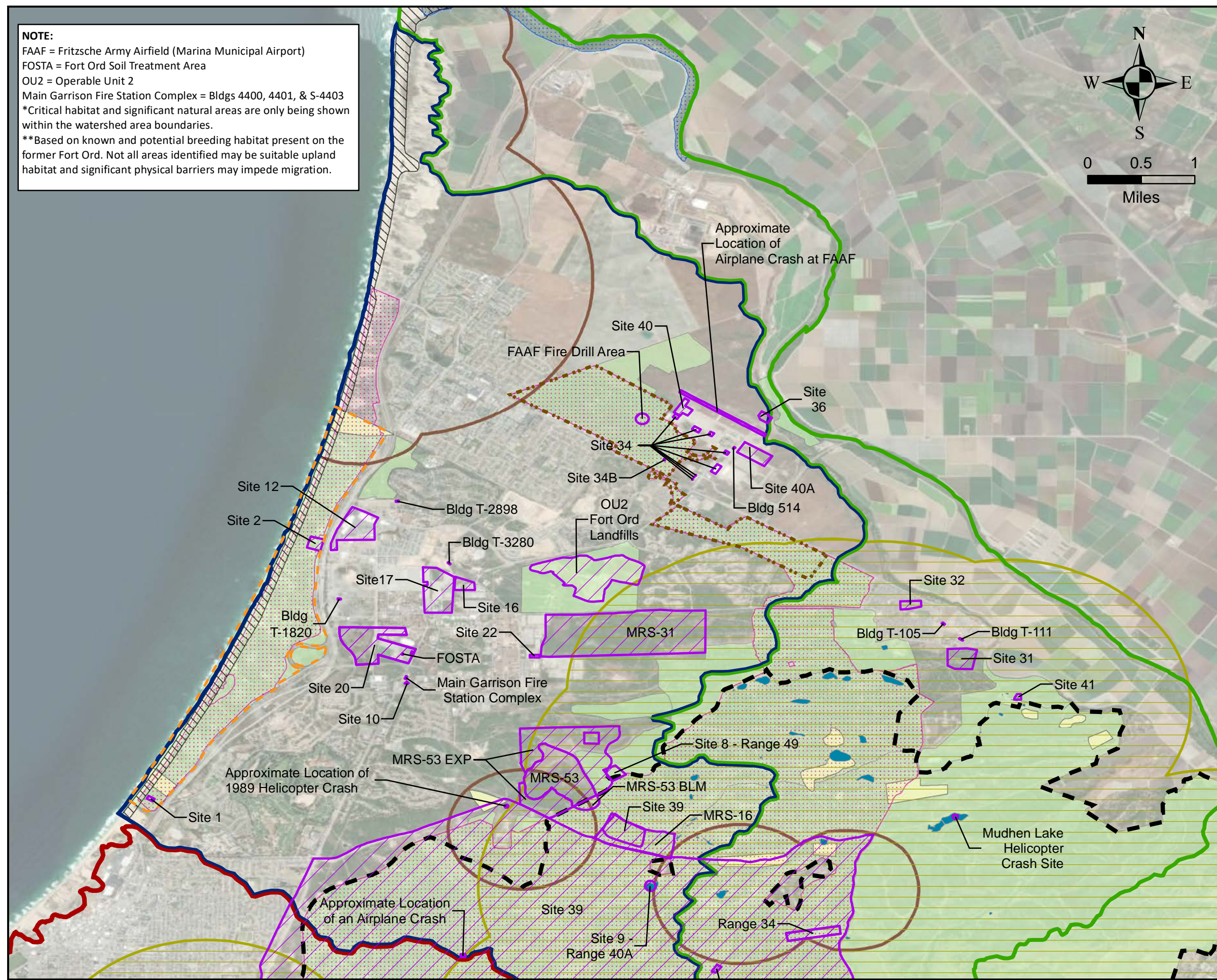
SECONDARY ASSESSMENT SITES
 GROUNDWATER OVERVIEW
 SOUTHERN FORT ORD
 PASO ROBLES FORMATION
 PFAS PA Narrative Report
 Former Fort Ord, California

NOTE:
 FAAF = Fritzsche Army Airfield (Marina Municipal Airport)
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 OU2 = Operable Unit 2
 Main Garrison Fire Station Complex = Bldgs 4400, 4401, & S-4403
 *Critical habitat and significant natural areas are only being shown within the watershed area boundaries.
 **Based on known and potential breeding habitat present on the former Fort Ord. Not all areas identified may be suitable upland habitat and significant physical barriers may impede migration.

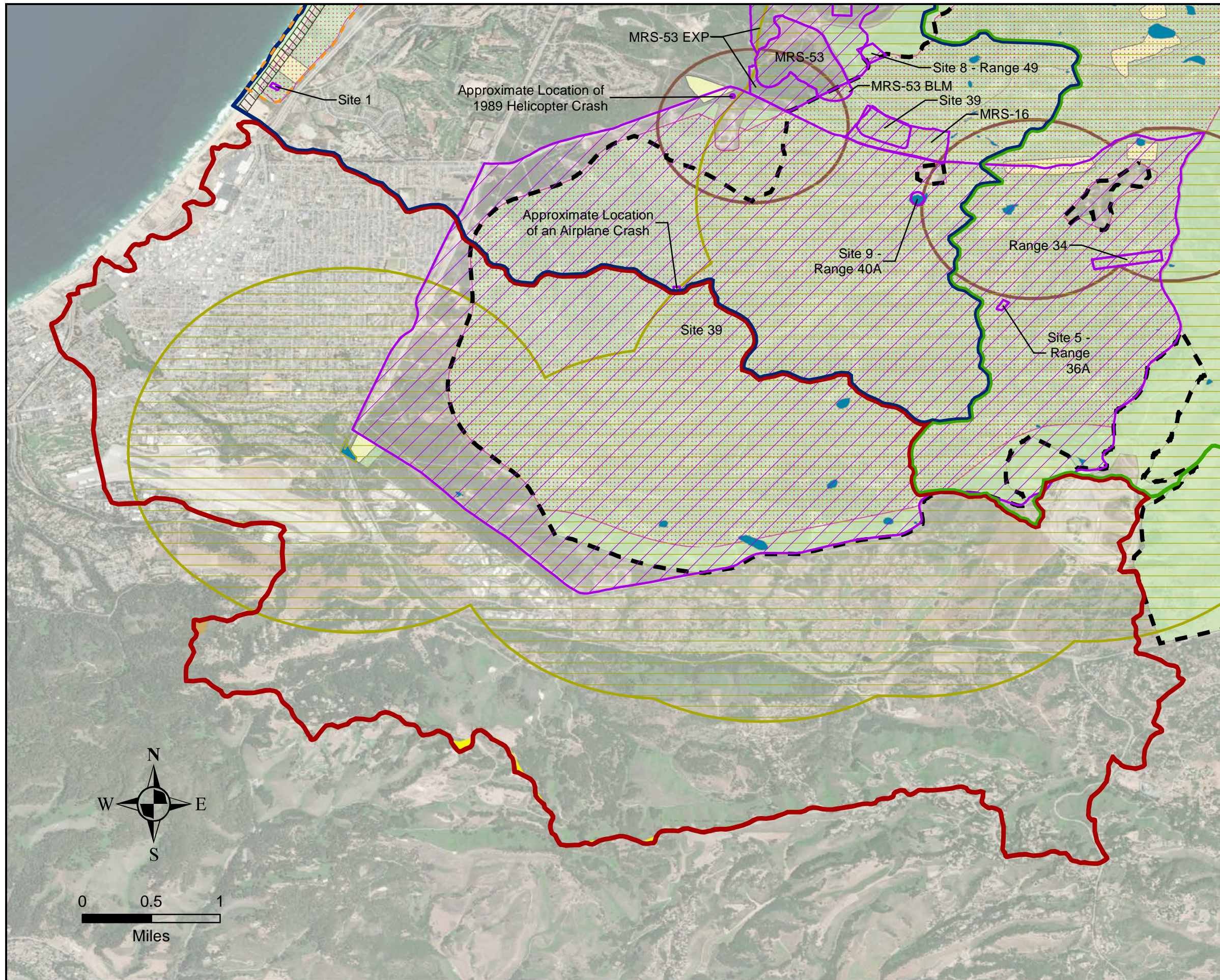


EXPLANATION

- Secondary Assessment Sites
- Watershed Area Boundaries**
 - Salinas River - Southwest Portion
 - Canyon Del Rey
 - Marina/Monterey Bay
- Environmentally Sensitive Areas**
 - Vernal Ponds
 - Fort Ord Natural Reserve
 - Fort Ord Dunes State Park
 - Fort Ord National Monument
 - Fort Ord Habitat Management Areas
 - California Native Plant Society - Fort Ord Native Plant Reserve
 - California Department of Fish and Wildlife - Significant Natural Areas*
 - Monterey Spineflower Critical Habitat*
 - Snowy Plover Critical Habitat*
 - Tidewater Goby Critical Habitat*
 - Potential Upland Habitat for California Tiger Salamander**



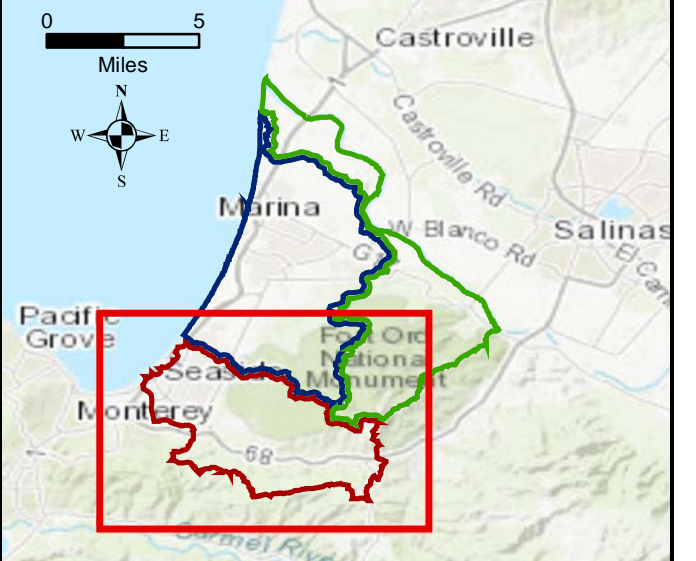
SECONDARY ASSESSMENT SITES
 SENSITIVE ENVIRONMENTS OVERVIEW
 SALINAS RIVER AND MARINA WATERSHEDS
 PFAS PA Narrative Report
 Former Fort Ord, California



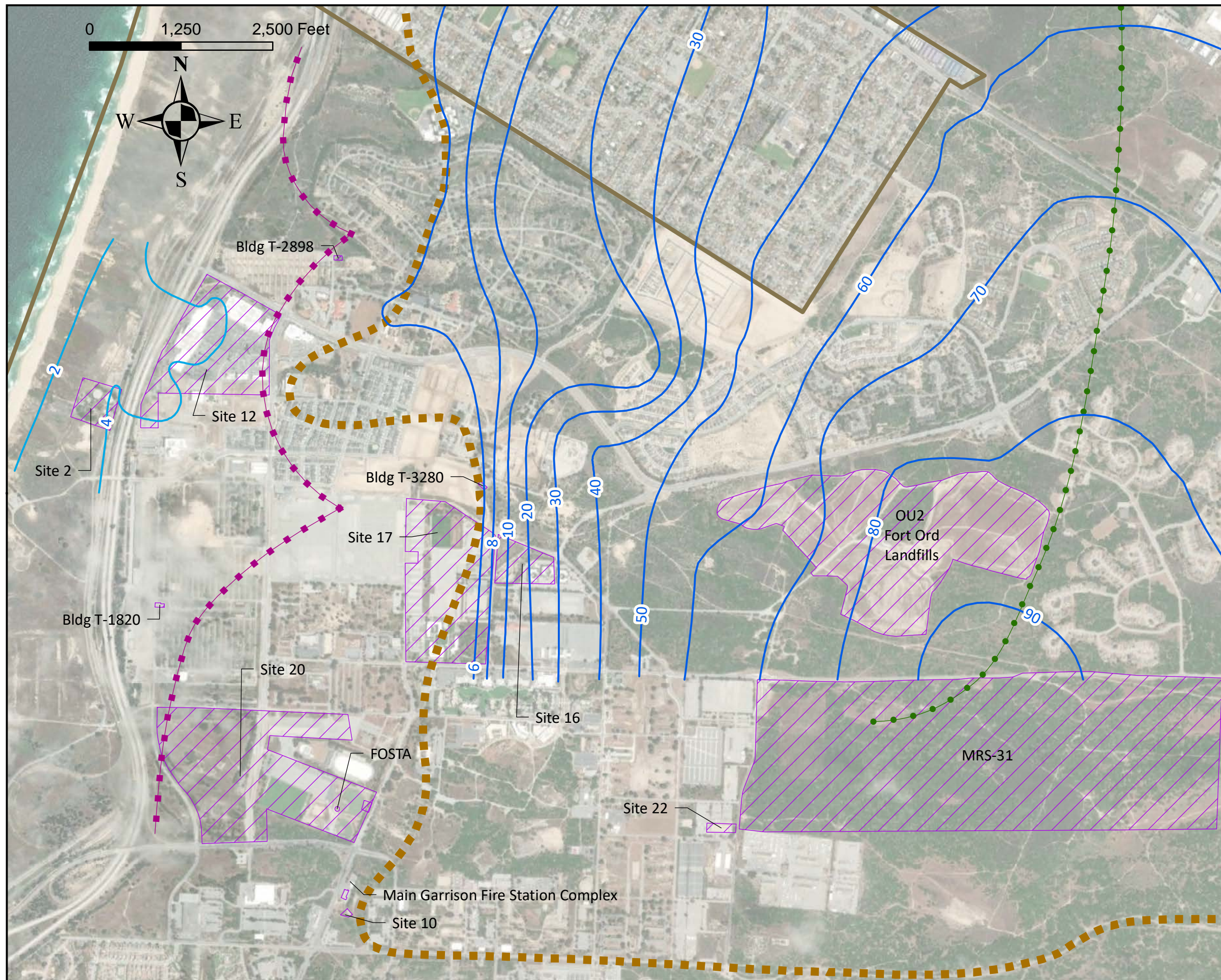
EXPLANATION

- Secondary Assessment Sites
- Watershed Area Boundaries**
- Canyon Del Rey
- Marina/Monterey Bay
- Salinas River - Southwest Portion
- Environmentally Sensitive Areas**
- Vernal Ponds
- Fort Ord Dunes State Park
- Fort Ord National Monument
- Fort Ord Habitat Management Areas
- California Native Plant Society - Fort Ord Native Plant Reserve
- California Department of Fish and Wildlife - Significant Natural Areas*
- California Red-Legged Frog Critical Habitat*
- Monterey Spineflower Critical Habitat*
- Snowy Plover Critical Habitat*
- Yadon's Piperia Critical Habitat*
- Potential Upland Habitat for California Tiger Salamander**

NOTE:
 * Critical habitat and significant natural areas are only being shown within the watershed area boundaries.
 ** Based on known and potential breeding habitat present on the former Fort Ord. Not all areas identified may be suitable upland habitat and significant physical barriers may impede migration.



SECONDARY ASSESSMENT SITES
 SENSITIVE ENVIRONMENTS OVERVIEW
 CANYON DEL REY WATERSHED
 PFAS PA Narrative Report
 Former Fort Ord, California



EXPLANATION

- Secondary Assessment Sites
- Former Fort Ord Boundary
- Groundwater Elevation, Unconfined Upper 180-Foot Aquifer*
- Groundwater Elevation, A-Aquifer*
- Approximate Edge of the FO-SVA
- Approximate Location of the A-Aquifer Groundwater Divide
- Approximate Location of the Upper 180-Foot Groundwater Divide west of the FO-SVA

NOTES:

*Fourth Quarter 2019 - Third Quarter 2020 OU2 Remedy Monitoring and Operations and Maintenance (Ahtna, 2021)

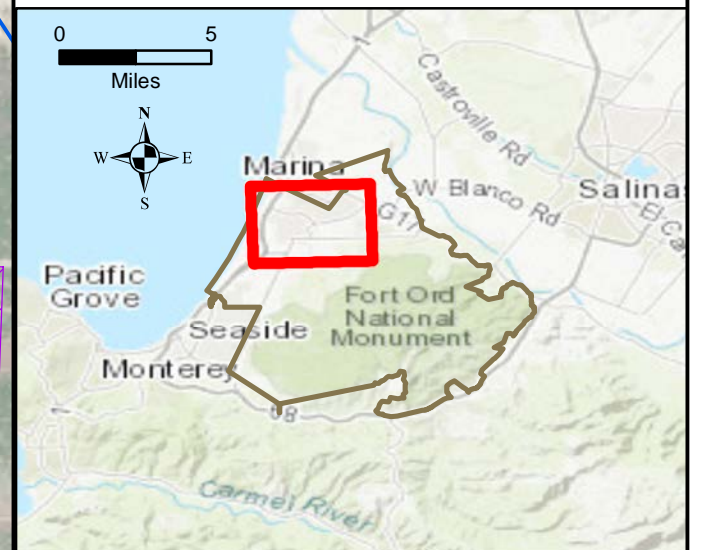
Groundwater elevation contours are in feet above mean sea-level (msl)

FO-SVA = Fort Ord - Salinas Valley Aquitard

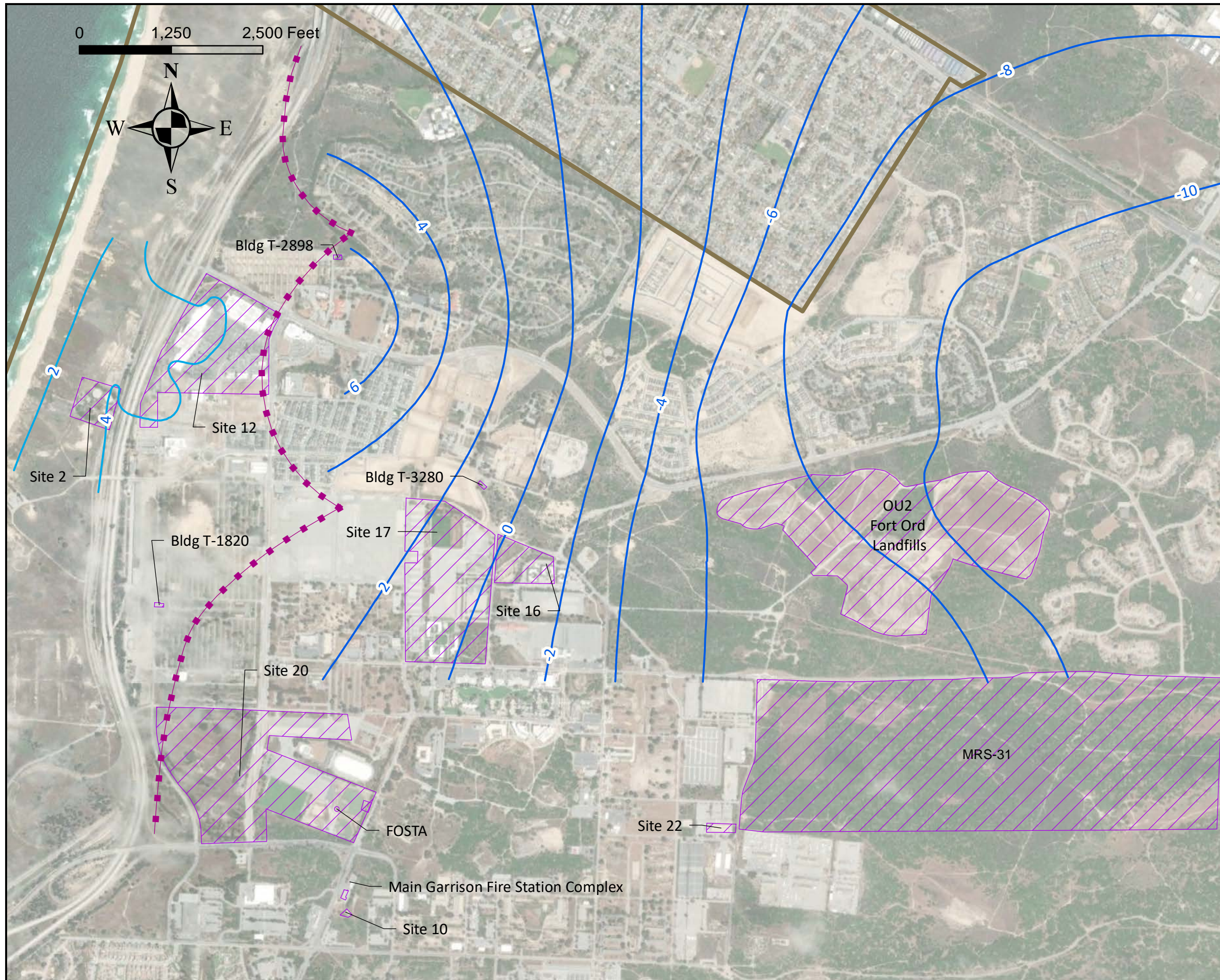
OU2 = Operable Unit 2

FOSTA = Fort Ord Soil Treatment Area

Main Garrison Fire Station Complex = Bldg 4400, 4401, and S-4403



SECONDARY ASSESSMENT SITES
GROUNDWATER OVERVIEW, MAIN GARRISON AREA
A-AQUIFER
PFAS PA Narrative Report
Former Fort Ord, California



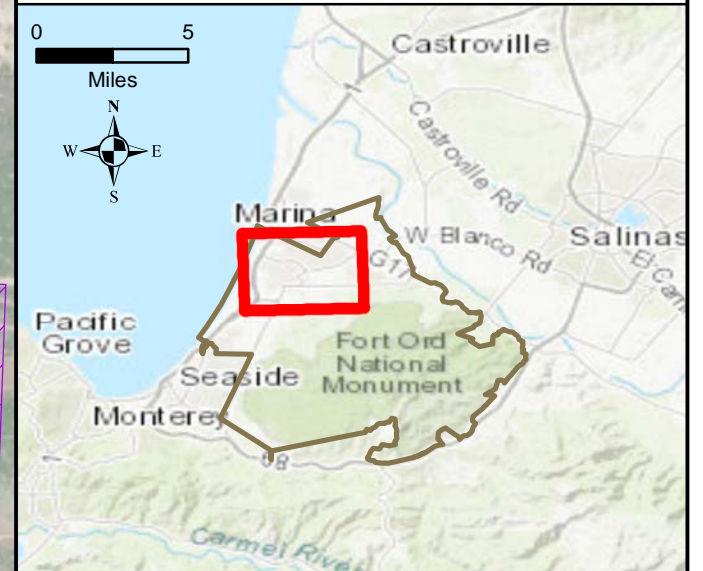
EXPLANATION

- Secondary Assessment Sites
- Former Fort Ord Boundary
- Groundwater Elevation, Unconfined Upper 180-Foot Aquifer*
- Groundwater Elevation, Upper 180-Foot Aquifer*
- Approximate Location of the Upper 180-Foot Groundwater Divide

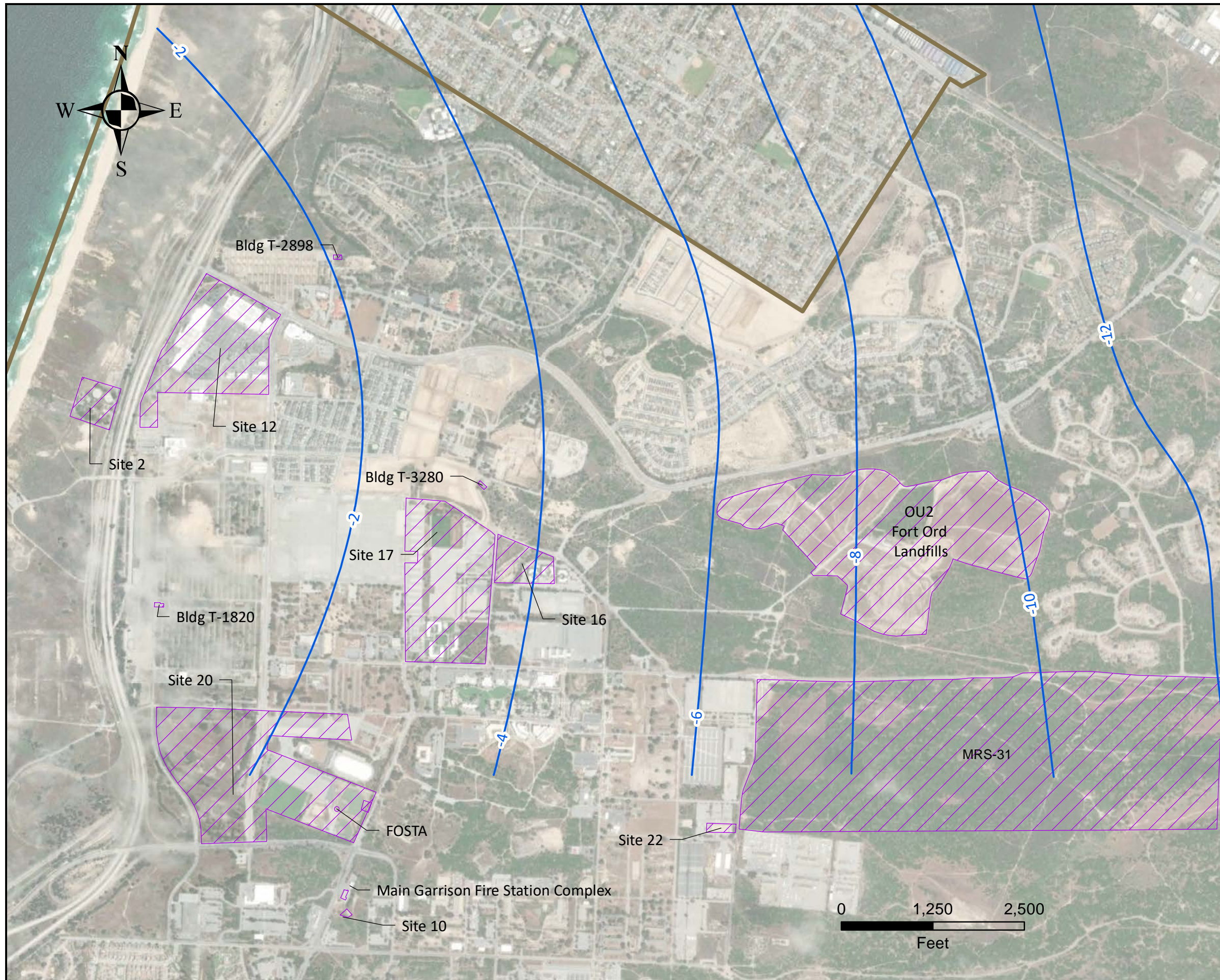
NOTES:
 *Fourth Quarter 2019 - Third Quarter 2020 OU2 Remedy Monitoring and Operations and Maintenance (Ahtna, 2021)

Groundwater elevation contours are in feet above mean sea-level (msl)




OU2 = Operable Unit 2
 FOSTA = Fort Ord Soil Treatment Area
 Main Garrison Fire Station Complex = Bldg 4400, 4401, and S-4403



SECONDARY ASSESSMENT SITES
 GROUNDWATER OVERVIEW, MAIN GARRISON AREA
 UPPER 180-FOOT AQUIFER
 PFAS PA Narrative Report
 Former Fort Ord, California



EXPLANATION

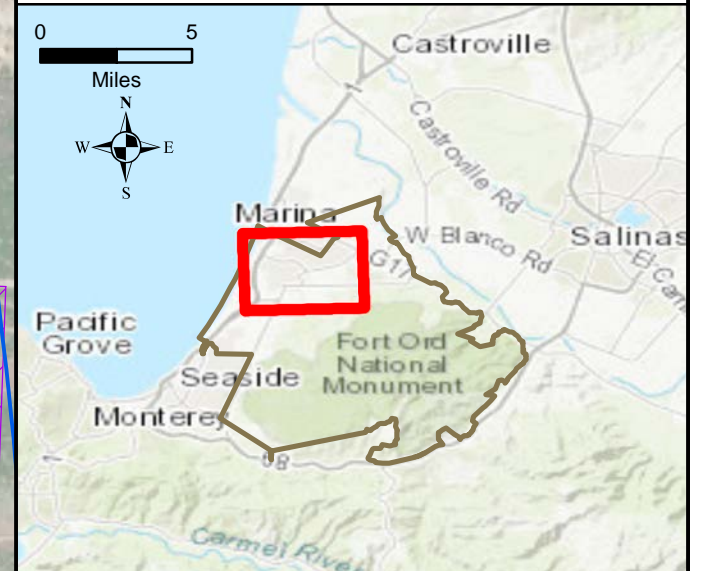
-  Secondary Assessment Sites
-  Former Fort Ord Boundary
-  Groundwater Elevation, Lower 180-Foot Aquifer*

NOTES:

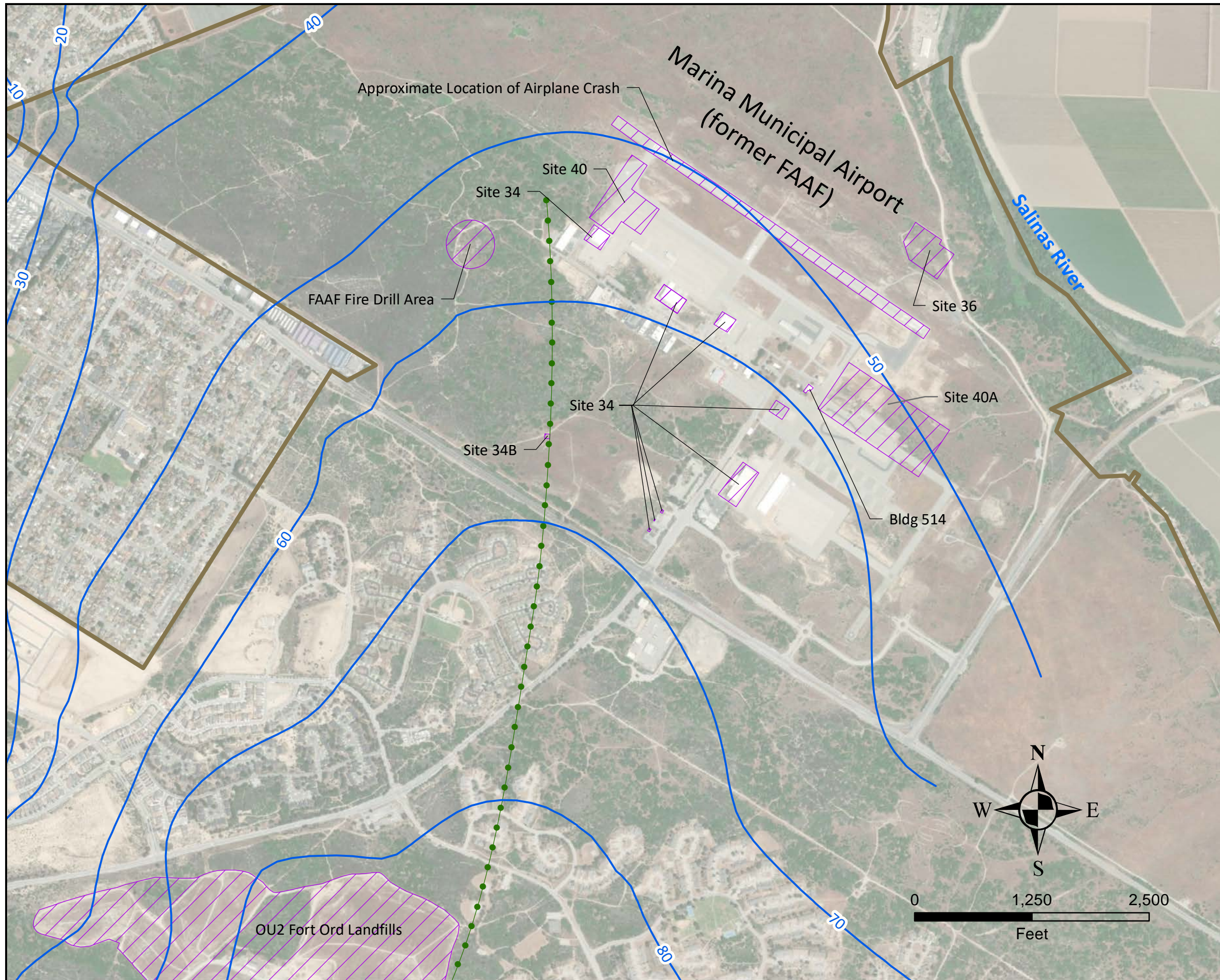
*Operable Unit Carbon Tetrachloride Plume Fourth Quarter 2019 - Third Quarter 2020 Groundwater Monitoring Report (Ahtna, 2021)

Groundwater elevation contours are in feet above mean sea-level (msl)

OU2 = Operable Unit 2
 FOSTA = Fort Ord Soil Treatment Area
 Main Garrison Fire Station Complex = Bldg 4400, 4401, and S-4403



SECONDARY ASSESSMENT SITES
 GROUNDWATER OVERVIEW, MAIN GARRISON AREA
 LOWER 180-FOOT/400-FOOT AQUIFER
 PFAS PA Narrative Report
 Former Fort Ord, California



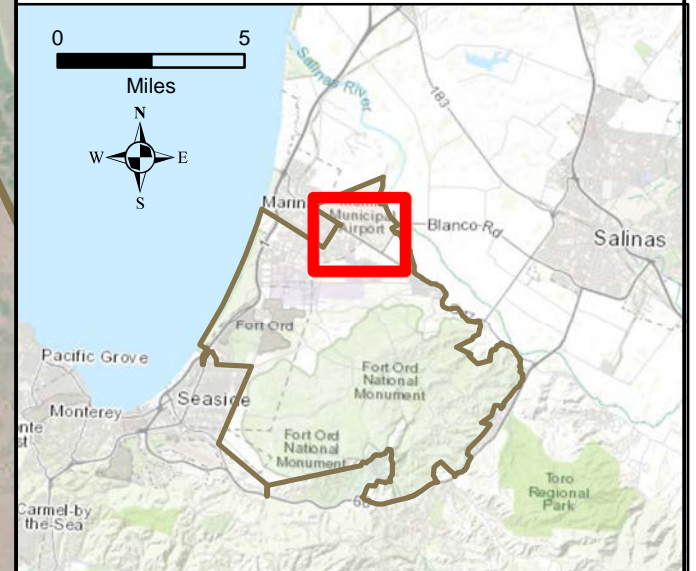
EXPLANATION

- Secondary Assessment Sites
- Former Fort Ord Boundary
- Groundwater Elevation, A-Aquifer*
- Approximate Location of the A-Aquifer
- Groundwater Divide

NOTES:
 *Fourth Quarter 2019 - Third Quarter 2020 OU2 Remedy Monitoring and Operations and Maintenance (Ahtna, 2021)

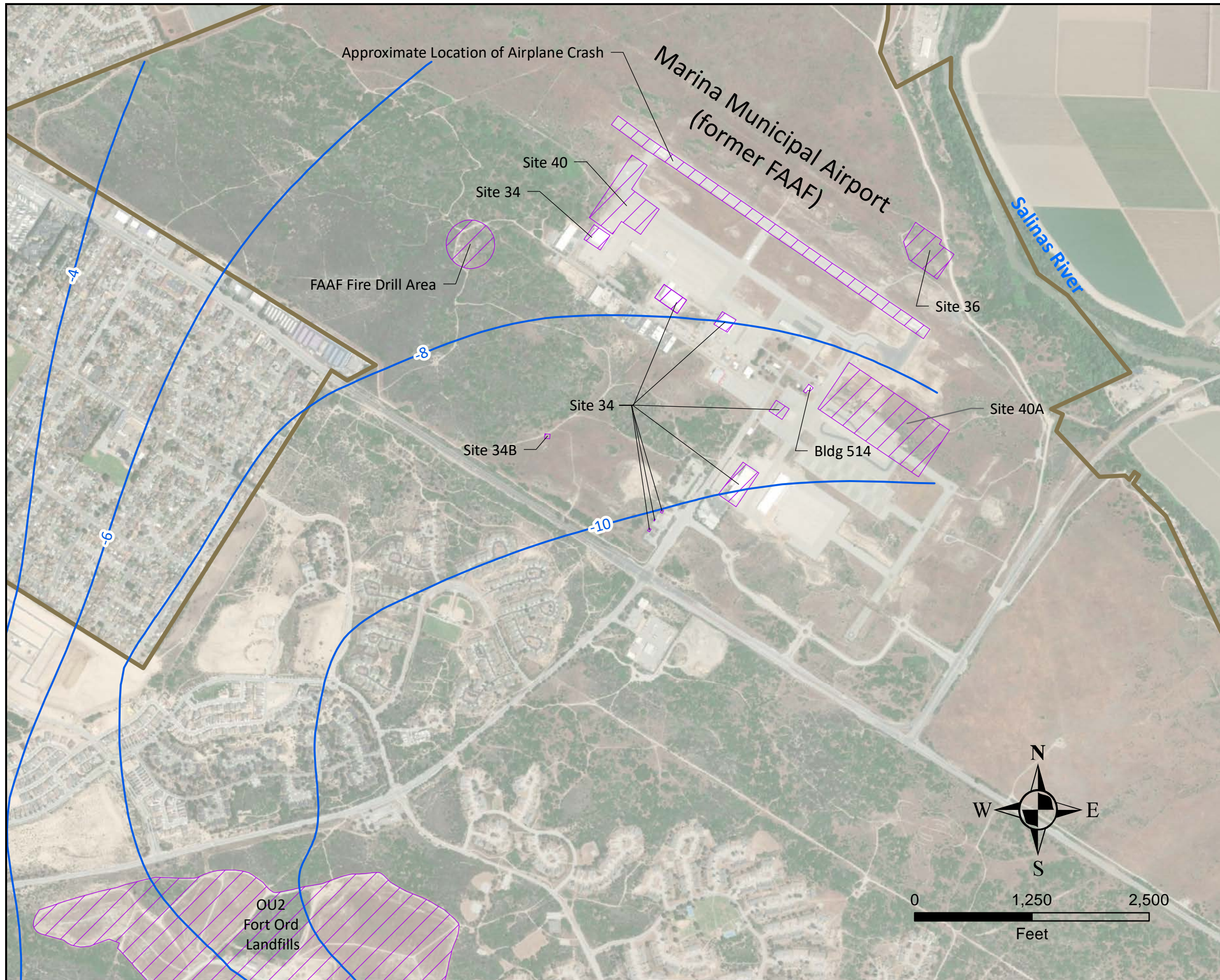
Groundwater elevation contours are in feet above mean sea-level (msl)

FAAF = former Fritzsche Army Airfield (Marina Municipal Airport)
 OU2 = Operable Unit 2



**SECONDARY ASSESSMENT SITES
 GROUNDWATER OVERVIEW, FAAF AREA
 A-AQUIFER**
 PFAS PA Narrative Report
 Former Fort Ord, California





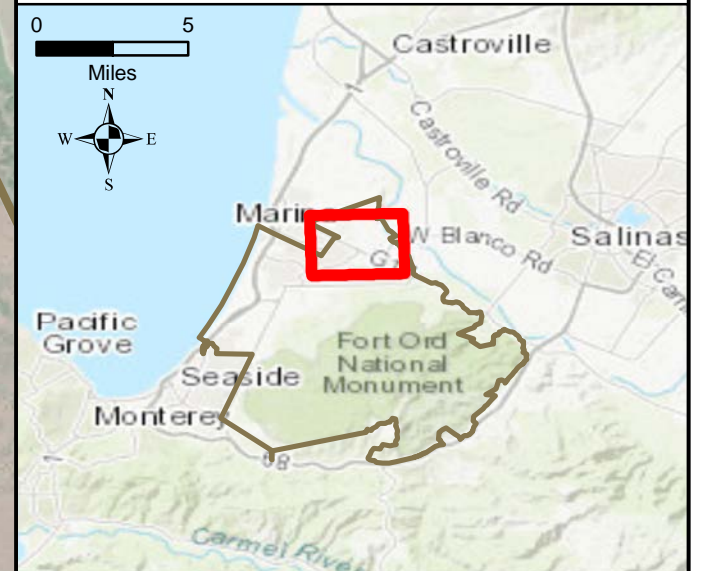
EXPLANATION

- Groundwater Elevation, Upper 180-Foot Aquifer*
- Secondary Assessment Sites
- Former Fort Ord Boundary

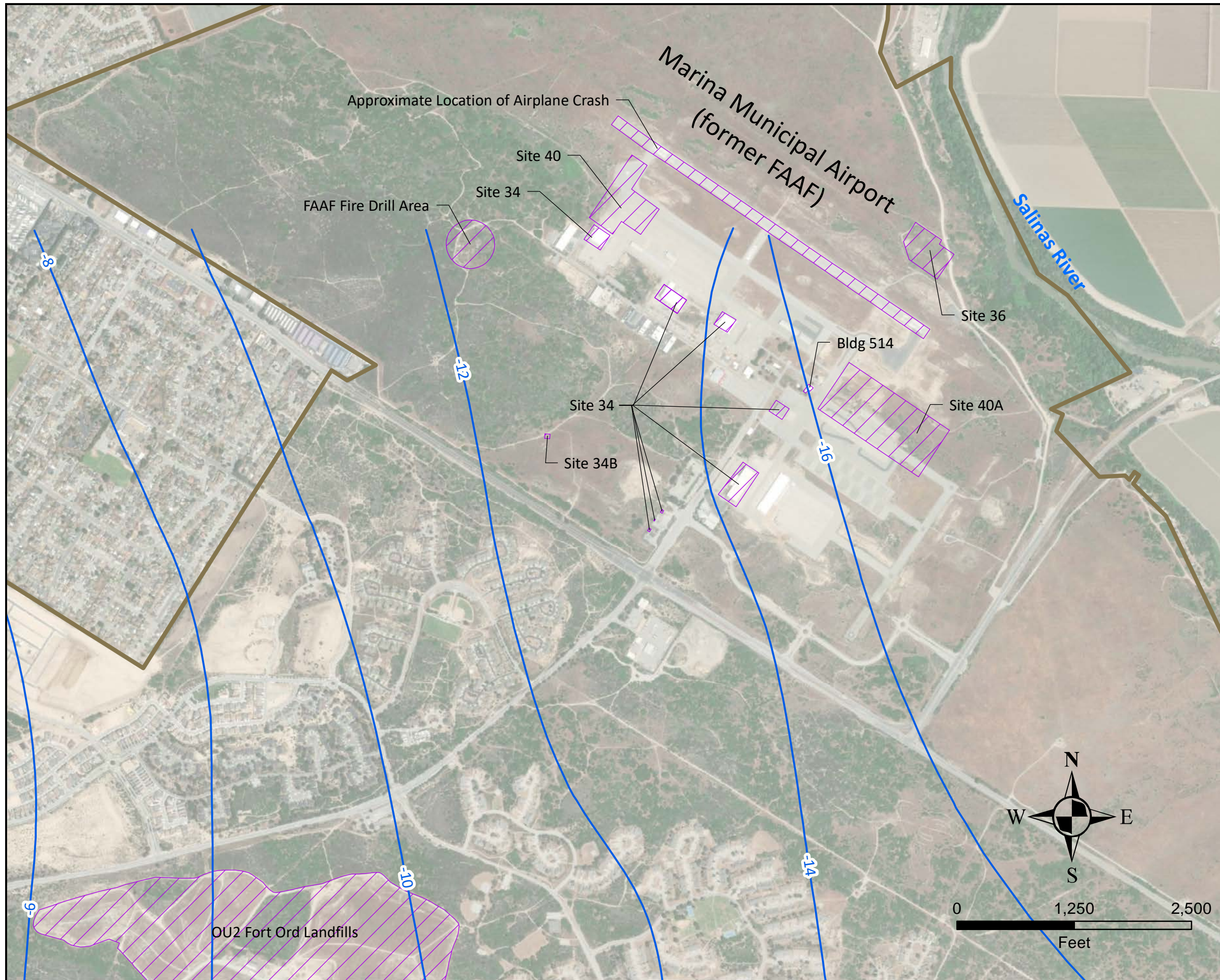
NOTES:
 *Fourth Quarter 2019 - Third Quarter 2020 OU2 Remedy Monitoring and Operations and Maintenance (Ahtna, 2021)

Groundwater elevation contours are in feet above mean sea-level (msl)

FAAF = former Fritzsche Army Airfield (Marina Municipal Airport)
 OU2 = Operable Unit 2



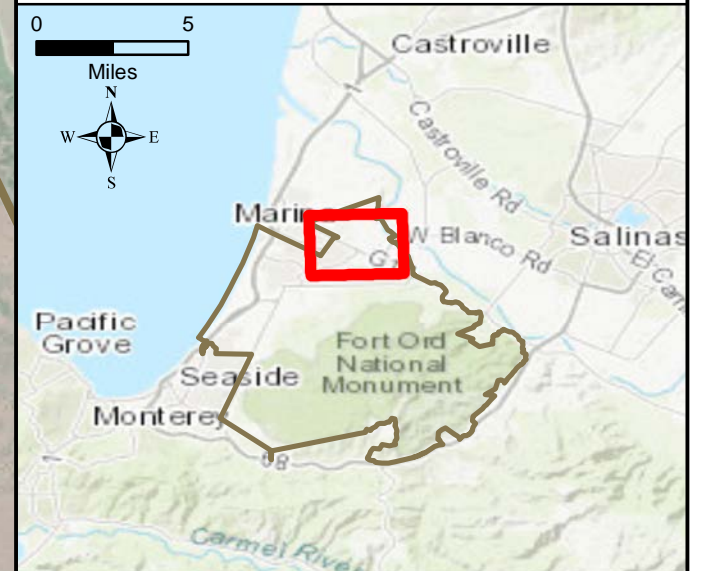
SECONDARY ASSESSMENT SITES
 GROUNDWATER OVERVIEW, FAAF AREA
 UPPER 180-FOOT AQUIFER
 PFAS PA Narrative Report
 Former Fort Ord, California



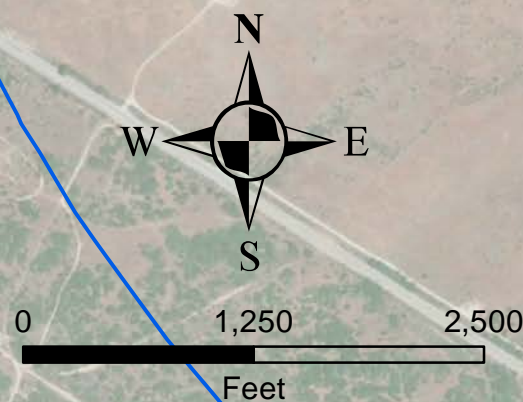
EXPLANATION

- Groundwater Elevation, Lower 180-Foot Aquifer*
- Secondary Assessment Sites
- Former Fort Ord Boundary

NOTES:
 *Operable Unit Carbon Tetrachloride Plume Fourth Quarter 2019 - Third Quarter 2020 Groundwater Monitoring Report (Ahtna, 2021)
 Groundwater elevation contours are in feet above mean sea-level (msl)
 FAAF = former Fritzsche Army Airfield (Marina Municipal Airport)
 OU2 = Operable Unit 2



SECONDARY ASSESSMENT SITES
 GROUNDWATER OVERVIEW, FAAF AREA
 LOWER 180-FOOT/400-FOOT AQUIFER
 PFAS PA Narrative Report
 Former Fort Ord, California



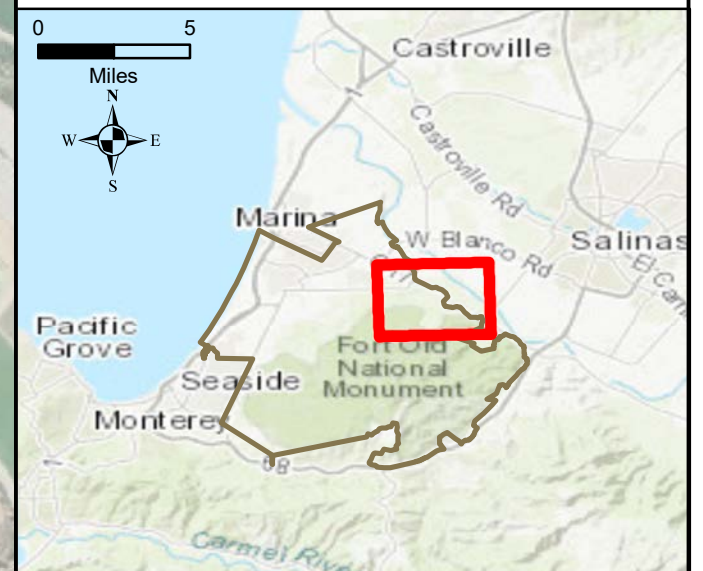


EXPLANATION

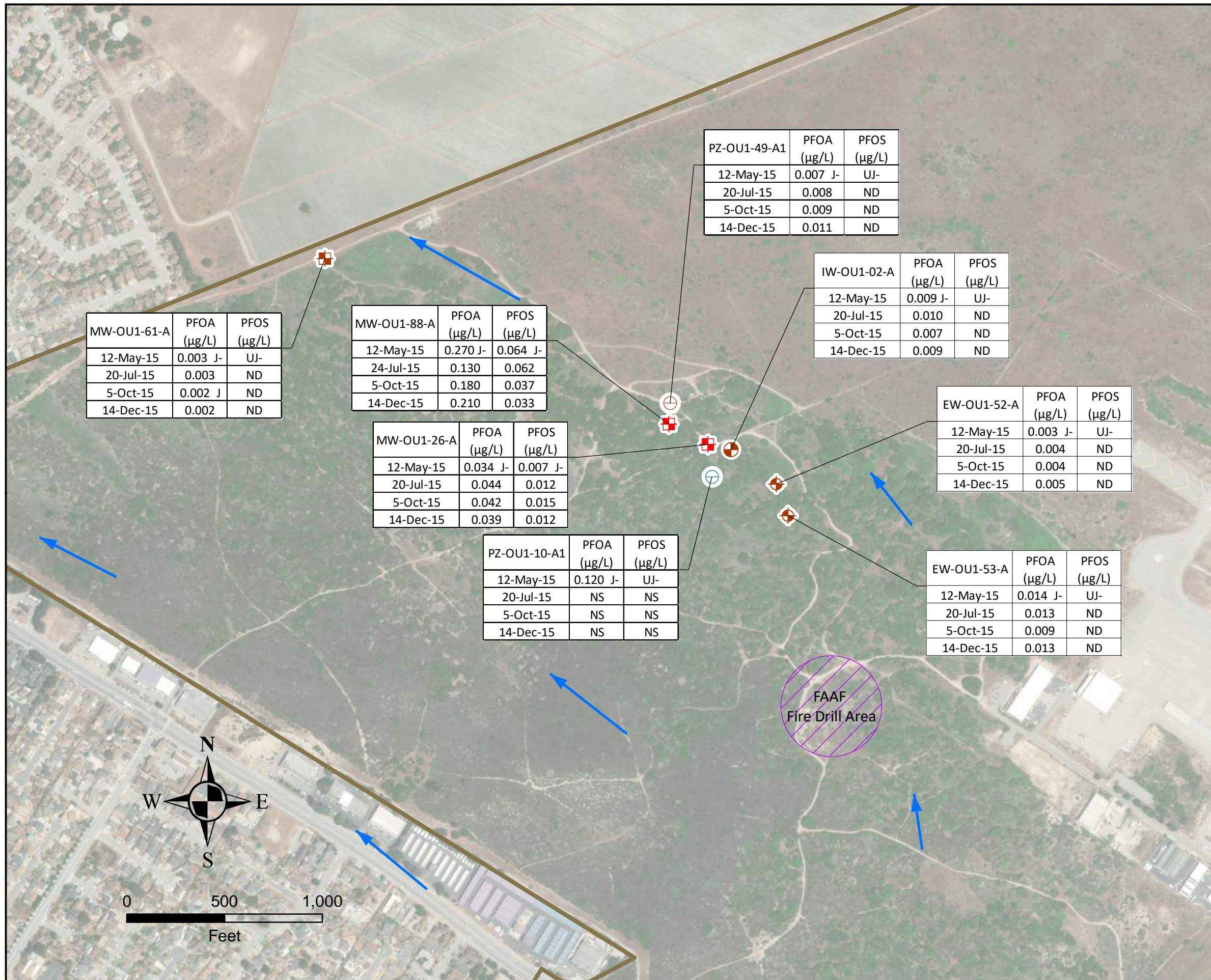
- Groundwater Elevation, Paso Robles Formation*
- Secondary Assessment Sites
- Former Fort Ord Boundary

NOTES:
 *HydroMetric Groundwater Modeling and Protective Groundwater Elevations, Paso Robles Formation (11/06/2009)

Groundwater elevation contours are in feet above mean sea-level (msl)



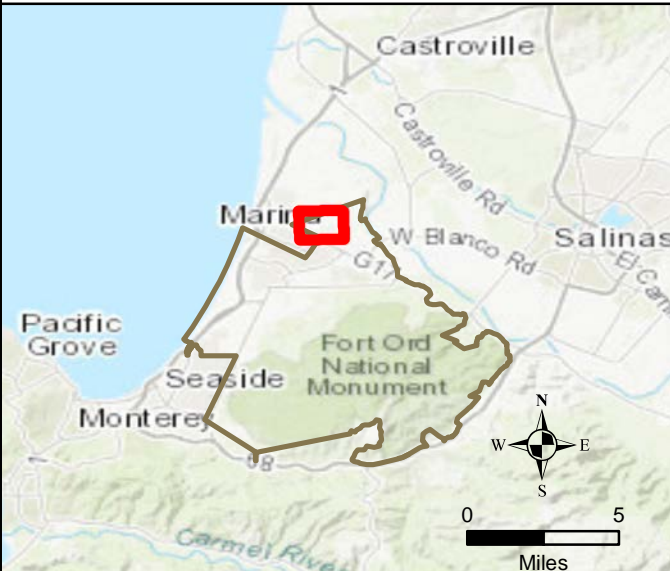
SECONDARY ASSESSMENT SITES
 GROUNDWATER OVERVIEW, EAST GARRISON AREA
 PASO ROBLES FORMATION
 PFAS PA Narrative Report
 Former Fort Ord, California



EXPLANATION

- Secondary Assessment Sites
 - General Groundwater Flow Direction, A-Aquifer*
 - Former Fort Ord Boundary
- Well type & detected concentrations in µg/L of PFOA or PFOS**
- Monitoring Well: Concentration above USEPA regional screening level (RSL) and DoD screening level
 - Piezometer: Concentration above USEPA RSL and DoD screening level
- Concentrations below USEPA RSL and DoD screening level**
- Monitoring Well
 - Extraction Well
 - Injection Well
 - Piezometer

NOTES:
 *Fourth Quarter 2019 - Third Quarter 2020 OU2 Remedy Monitoring and Operations and Maintenance (Ahtna, 2021)
 PFOA (perfluorooctanoic acid)
 PFOS (Perfluorooctane sulfonate)
 The USEPA RSL for PFOA in drinking water is 0.06 micrograms per liter (µg/L) and the RSL for PFOS in drinking water is 0.04 µg/L. When multiple PFAS are detected, RSLs set at a hazard quotient of 0.1 are used for screening purposes (e.g., the RSL for PFOA would be 0.006 µg/L [0.1 x 0.06 µg/L = 0.006 µg/L]) (DoD, 2022 and USEPA, 2022).
 DoD screening levels (DoD, 2022) are equivalent to USEPA RSLs (USEPA, 2022).



GROUNDWATER MONITORING ANALYTICAL RESULTS AT OU1 A-AQUIFER, 2015
 PFAS PA Narrative Report
 Former Fort Ord, California

PZ-OU1-49-A1	PFOA (µg/L)	PFOS (µg/L)
12-May-15	0.007 J-	UJ-
20-Jul-15	0.008	ND
5-Oct-15	0.009	ND
14-Dec-15	0.011	ND

IW-OU1-02-A	PFOA (µg/L)	PFOS (µg/L)
12-May-15	0.009 J-	UJ-
20-Jul-15	0.010	ND
5-Oct-15	0.007	ND
14-Dec-15	0.009	ND

MW-OU1-61-A	PFOA (µg/L)	PFOS (µg/L)
12-May-15	0.003 J-	UJ-
20-Jul-15	0.003	ND
5-Oct-15	0.002 J	ND
14-Dec-15	0.002	ND

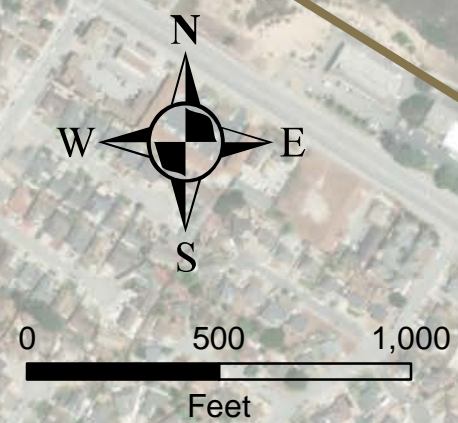
MW-OU1-88-A	PFOA (µg/L)	PFOS (µg/L)
12-May-15	0.270 J-	0.064 J-
24-Jul-15	0.130	0.062
5-Oct-15	0.180	0.037
14-Dec-15	0.210	0.033

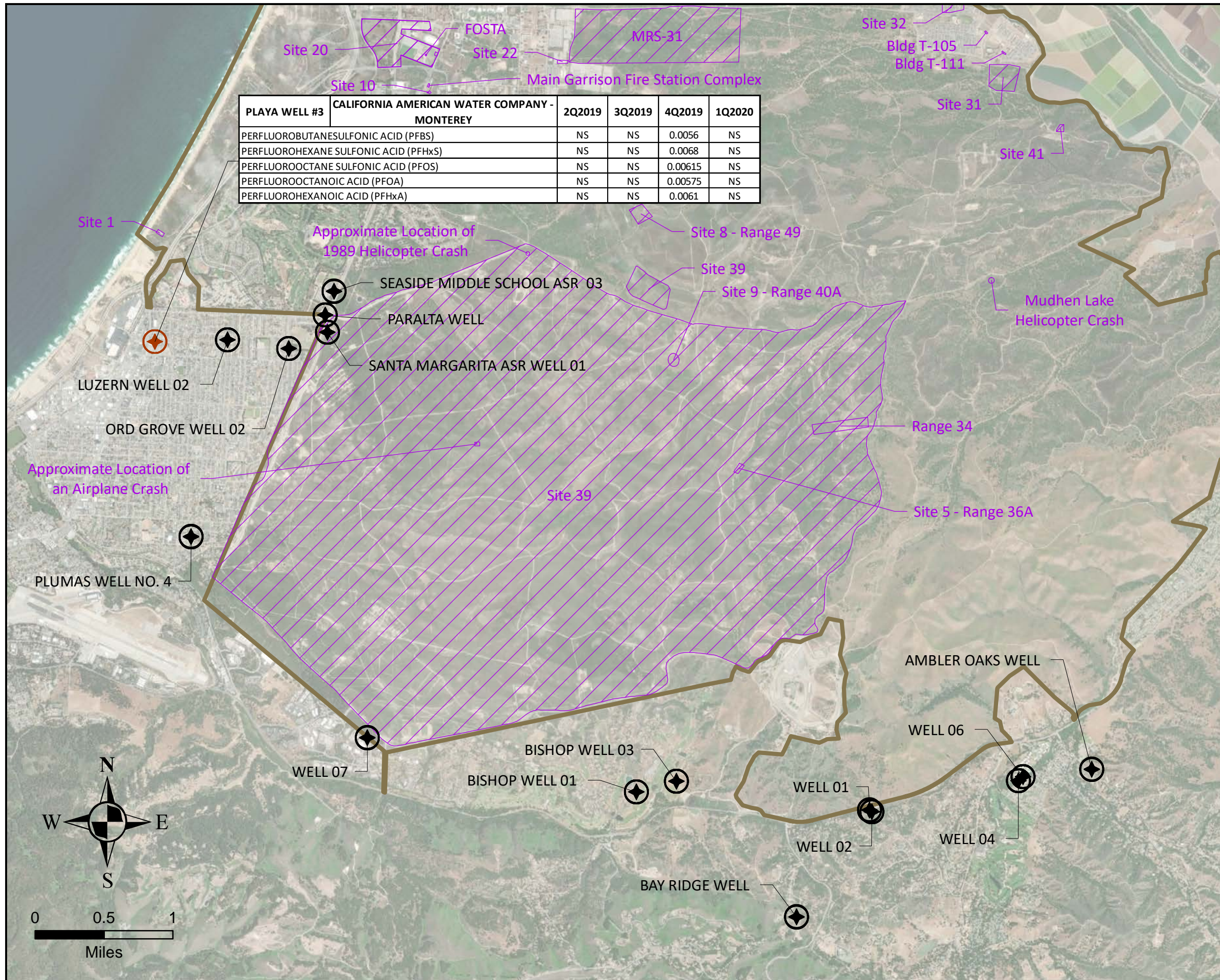
MW-OU1-26-A	PFOA (µg/L)	PFOS (µg/L)
12-May-15	0.034 J-	0.007 J-
20-Jul-15	0.044	0.012
5-Oct-15	0.042	0.015
14-Dec-15	0.039	0.012

EW-OU1-52-A	PFOA (µg/L)	PFOS (µg/L)
12-May-15	0.003 J-	UJ-
20-Jul-15	0.004	ND
5-Oct-15	0.004	ND
14-Dec-15	0.005	ND

PZ-OU1-10-A1	PFOA (µg/L)	PFOS (µg/L)
12-May-15	0.120 J-	UJ-
20-Jul-15	NS	NS
5-Oct-15	NS	NS
14-Dec-15	NS	NS

EW-OU1-53-A	PFOA (µg/L)	PFOS (µg/L)
12-May-15	0.014 J-	UJ-
20-Jul-15	0.013	ND
5-Oct-15	0.009	ND
14-Dec-15	0.013	ND





PLAYA WELL #3	CALIFORNIA AMERICAN WATER COMPANY - MONTEREY	2Q2019	3Q2019	4Q2019	1Q2020
	PERFLUOROBUTANESULFONIC ACID (PFBS)	NS	NS	0.0056	NS
	PERFLUOROHEXANE SULFONIC ACID (PFHxS)	NS	NS	0.0068	NS
	PERFLUOROCTANE SULFONIC ACID (PFOS)	NS	NS	0.00615	NS
	PERFLUOROCTANOIC ACID (PFOA)	NS	NS	0.00575	NS
	PERFLUOROHEXANOIC ACID (PFHxA)	NS	NS	0.0061	NS

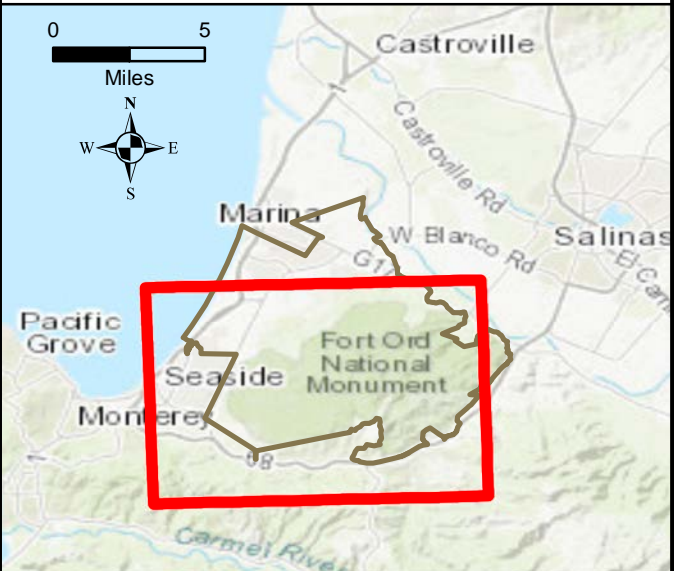
EXPLANATION

- Secondary Assessment Sites
- Former Fort Ord Boundary
- Well type and detected results of PFAS compounds in µg/L**
- Production Well - PFAS compounds not detected
- Production Well - PFOA and PFOS are below USEPA regional screening level (RSL) and DoD screening level

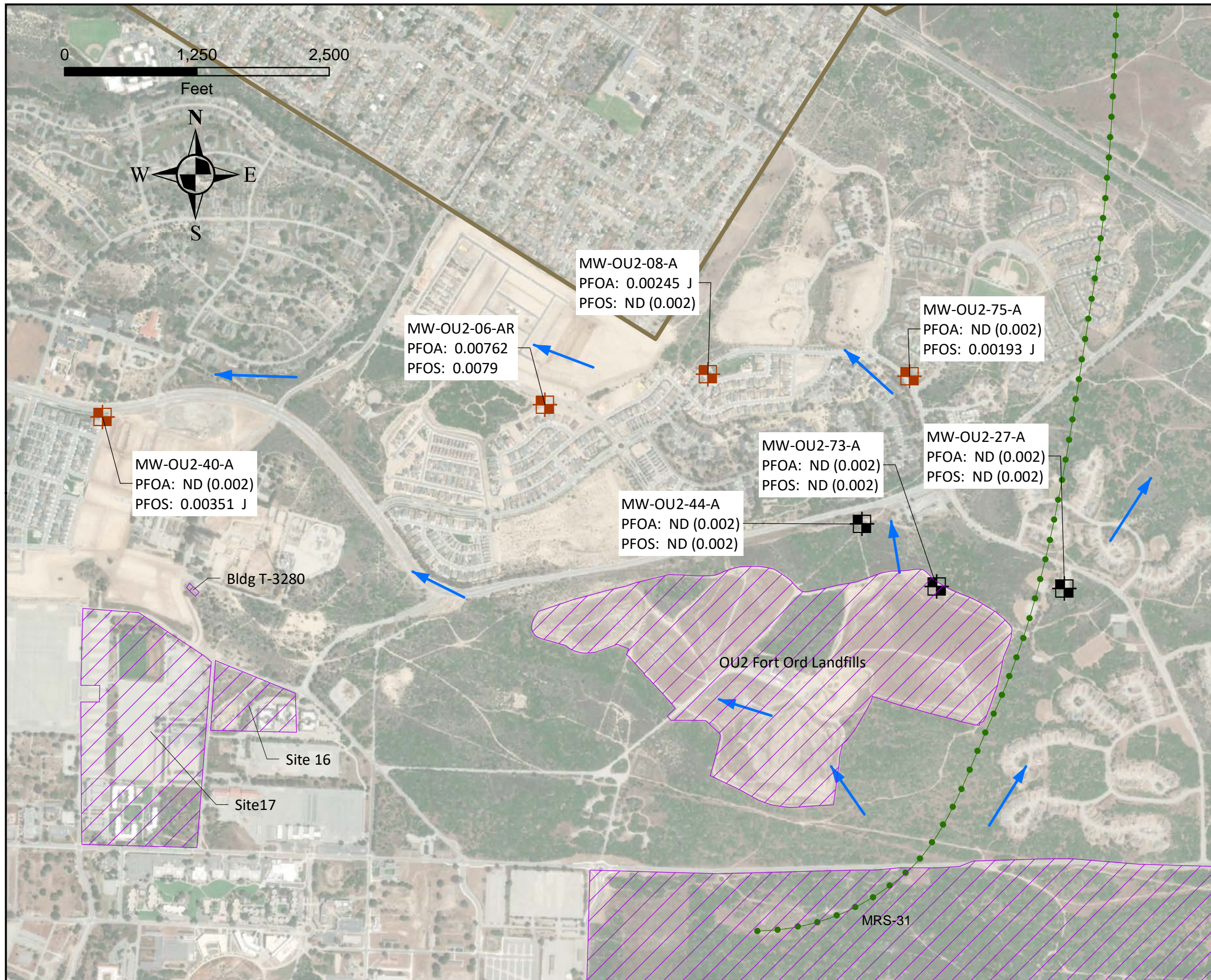
NOTES:
 Main Garrison Fire Station Complex = Bldgs 4400, 4401, and S-4403
 FOSTA = Fort Ord Soil Treatment Area

2Q2019 refers to data collected in the second quarter 2019 (April - June).

Table only shows PFAS compounds with detections. The USEPA RSL for PFOA in drinking water is 0.06 micrograms per liter (µg/L) and the RSL for PFOS in drinking water is 0.04 µg/L. When multiple PFAS are detected, RSLs set at a hazard quotient of 0.1 are used for screening purposes (e.g., the RSL for PFOA would be 0.006 µg/L [0.1 x 0.06 µg/L = 0.006 µg/L]) (DoD, 2022 and USEPA, 2022). DoD screening levels (DoD, 2022) are equivalent to USEPA RSLs (USEPA, 2022).



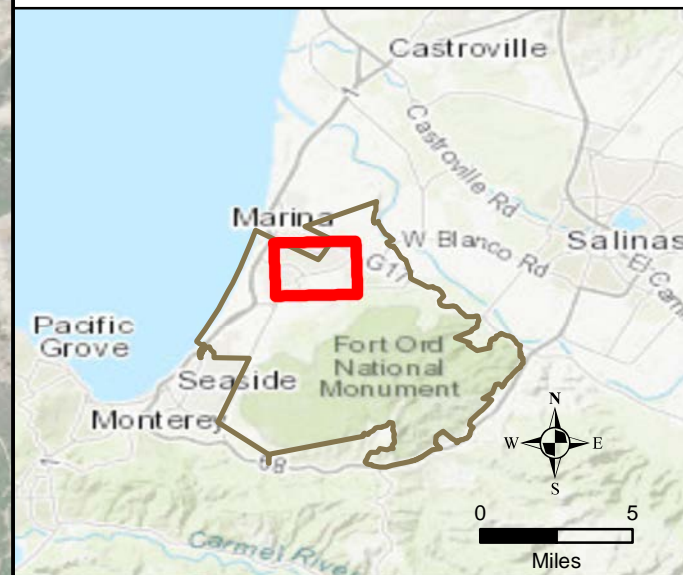
GROUNDWATER MONITORING ANALYTICAL RESULTS AT SUPPLY WELLS
 SOUTHERN FORT ORD, 2019-2020
 PFAS PA Narrative Report
 Former Fort Ord, California



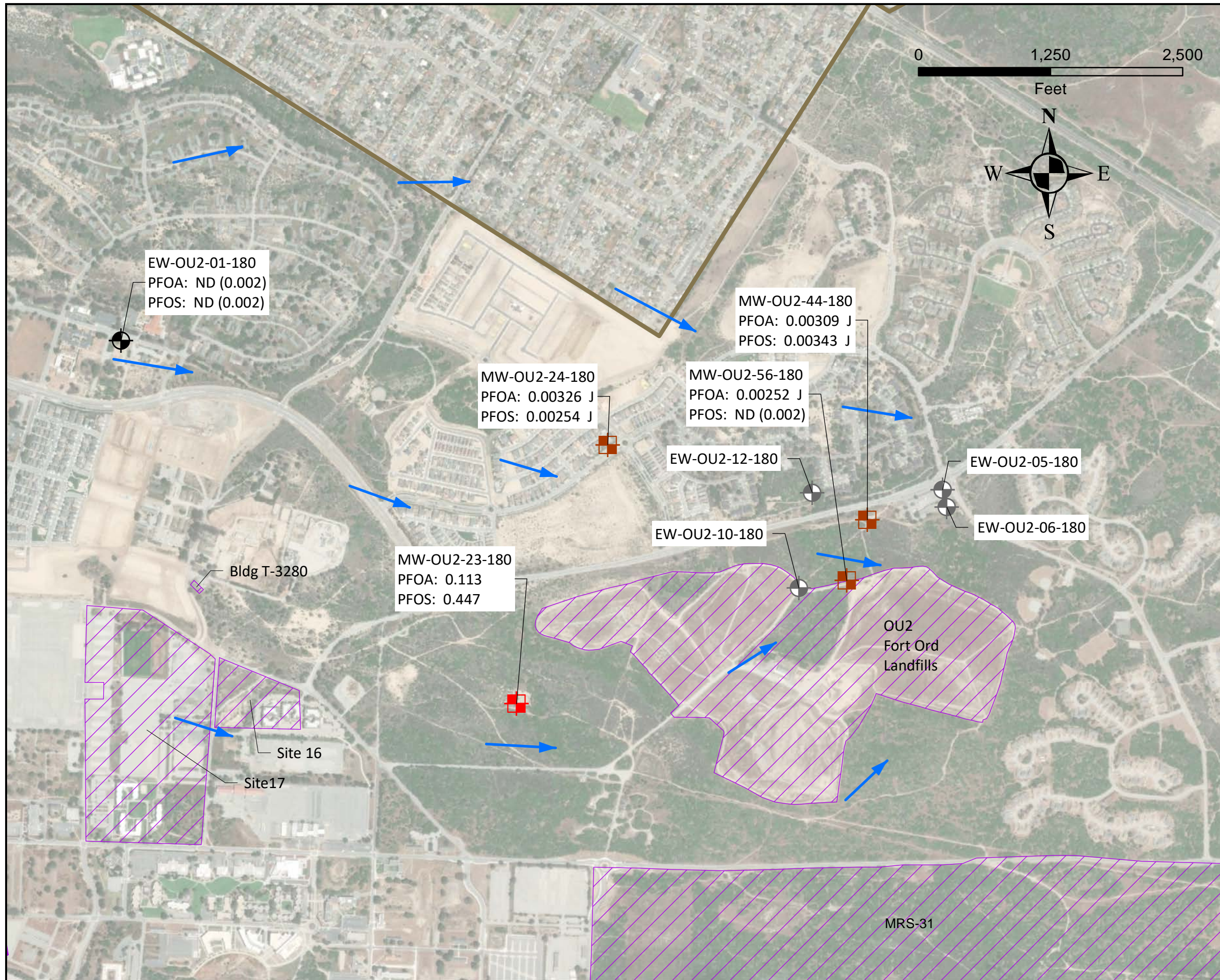
EXPLANATION

- Secondary Assessment Sites
- General Groundwater Flow Direction, A-Aquifer*
- Approximate Location of the A-Aquifer Groundwater Divide
- Former Fort Ord Boundary
- Well Type and PFOA/PFOS Results in µg/L**
- Monitoring Well - PFOA and PFOS not detected
- Monitoring Well - detected concentrations of PFOA or PFOS are below USEPA regional screening level (RSL) and DoD screening level

NOTES:
 *Fourth Quarter 2019 - Third Quarter 2020 OU2 Remedy Monitoring and Operations and Maintenance (Ahtna, 2021)
 PFOA (perfluorooctanoic acid)
 PFOS (Perfluorooctane sulfonate)
 The USEPA RSL for PFOA in drinking water is 0.06 micrograms per liter (µg/L) and the RSL for PFOS in drinking water is 0.04 µg/L. When multiple PFAS are detected, RSLs set at a hazard quotient of 0.1 are used for screening purposes (e.g., the RSL for PFOA would be 0.006 µg/L [0.1 x 0.06 µg/L = 0.006 µg/L]) (DoD, 2022 and USEPA, 2022).
 DoD screening levels (DoD, 2022) are equivalent to USEPA RSLs (USEPA, 2022).



GROUNDWATER MONITORING ANALYTICAL RESULTS AT OU2 A-AQUIFER, 2019
 PFAS PA Narrative Report
 Former Fort Ord, California

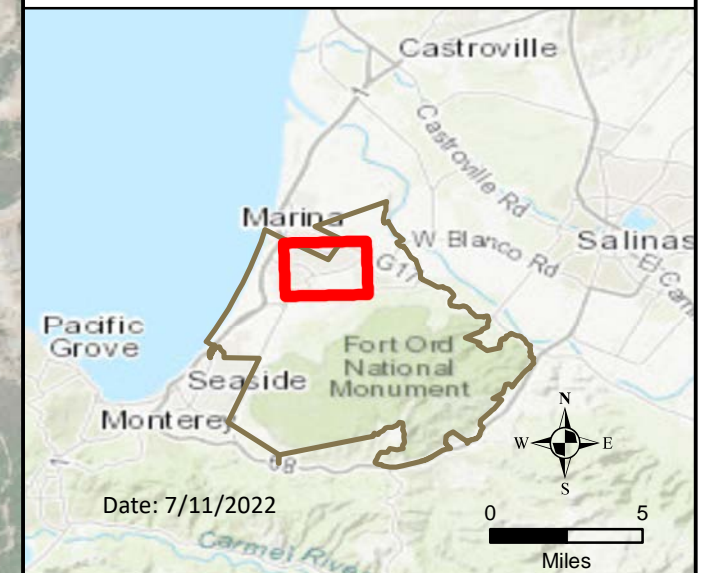


EXPLANATION

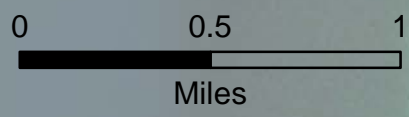
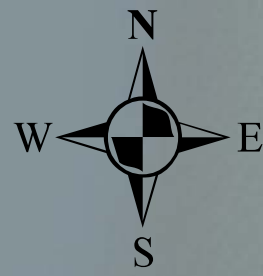
- Secondary Assessment Sites
- General Groundwater Flow Direction, Upper 180-Foot Aquifer*
- Former Fort Ord Boundary
- Well Type and PFOA/PFOS results in µg/L**
- Monitoring Well - detected concentrations of PFOA or PFOS are above USEPA regional screening level (RSL) and DoD screening level
- Monitoring Well - detected concentrations of PFOA or PFOS are below USEPA RSL and DoD screening
- Extraction Well - PFOA and PFOS not detected
- Extraction Well - PFOA and PFOS not sampled

NOTES:

*Fourth Quarter 2019 - Third Quarter 2020 OU2 Remedy Monitoring and Operations and Maintenance (Ahtna, 2021)
PFOA (perfluorooctanoic acid)
PFOS (Perfluorooctane sulfonate)
The USEPA RSL for PFOA in drinking water is 0.06 micrograms per liter (µg/L) and the RSL for PFOS in drinking water is 0.04 µg/L. When multiple PFAS are detected, RSLs set at a hazard quotient of 0.1 are used for screening purposes (e.g., the RSL for PFOA would be 0.006 µg/L [0.1 x 0.06 µg/L = 0.006 µg/L]) (DoD, 2022 and USEPA, 2022).
DoD screening levels (DoD, 2022) are equivalent to USEPA RSLs (USEPA, 2022).



GROUNDWATER MONITORING
ANALYTICAL RESULTS AT OU2
UPPER 180-FOOT AQUIFER, 2019
PFAS PA Narrative Report
Former Fort Ord, California



EXPLANATION

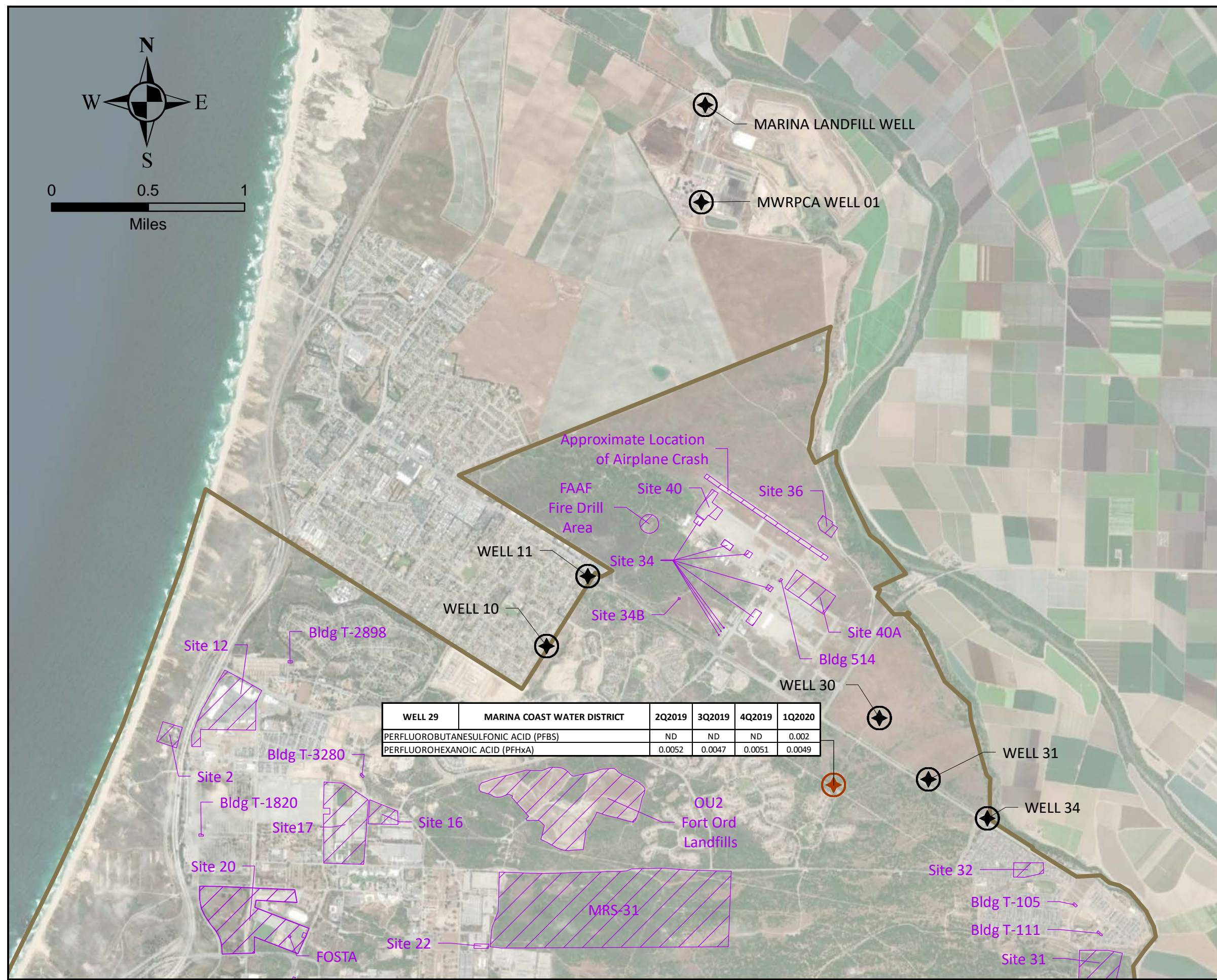
- Secondary Assessment Sites
- Former Fort Ord Boundary
- Well type and detected results of PFAS compounds in µg/L**
- Production Well - PFAS compounds not detected
- Production Well - PFOA and PFOS are below USEPA regional screening level (RSL) and DoD screening level

NOTES:
 *Table only shows PFAS compounds with detections.

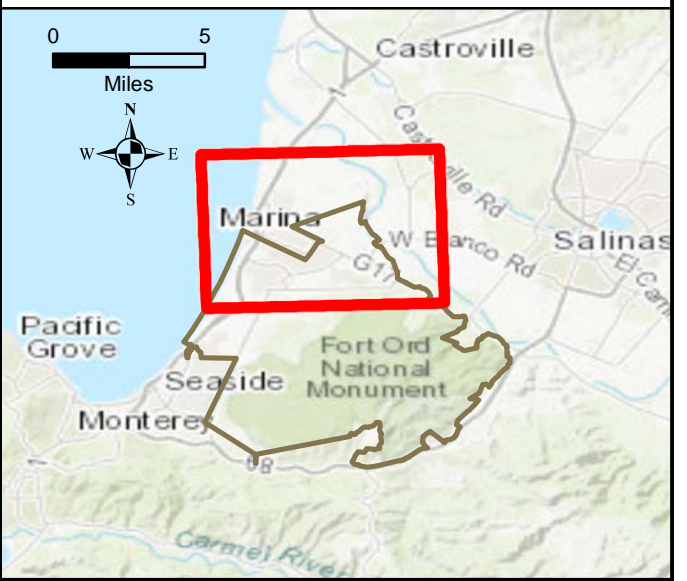
OU2 = Operable Unit 2
 FOSTA = Fort Ord Soil Treatment Area
 FAAF = Former Fritzsche Army Airfield
 2Q2019 refers to data collected in the second quarter 2019 (April - June).

The USEPA RSL for PFOA in drinking water is 0.06 micrograms per liter (µg/L) and the RSL for PFOS in drinking water is 0.04 µg/L. When multiple PFAS are detected, RSLs set at a hazard quotient of 0.1 are used for screening purposes (e.g., the RSL for PFOA would be 0.006 µg/L [0.1 x 0.06 µg/L = 0.006 µg/L]) (DoD, 2022 and USEPA, 2022).

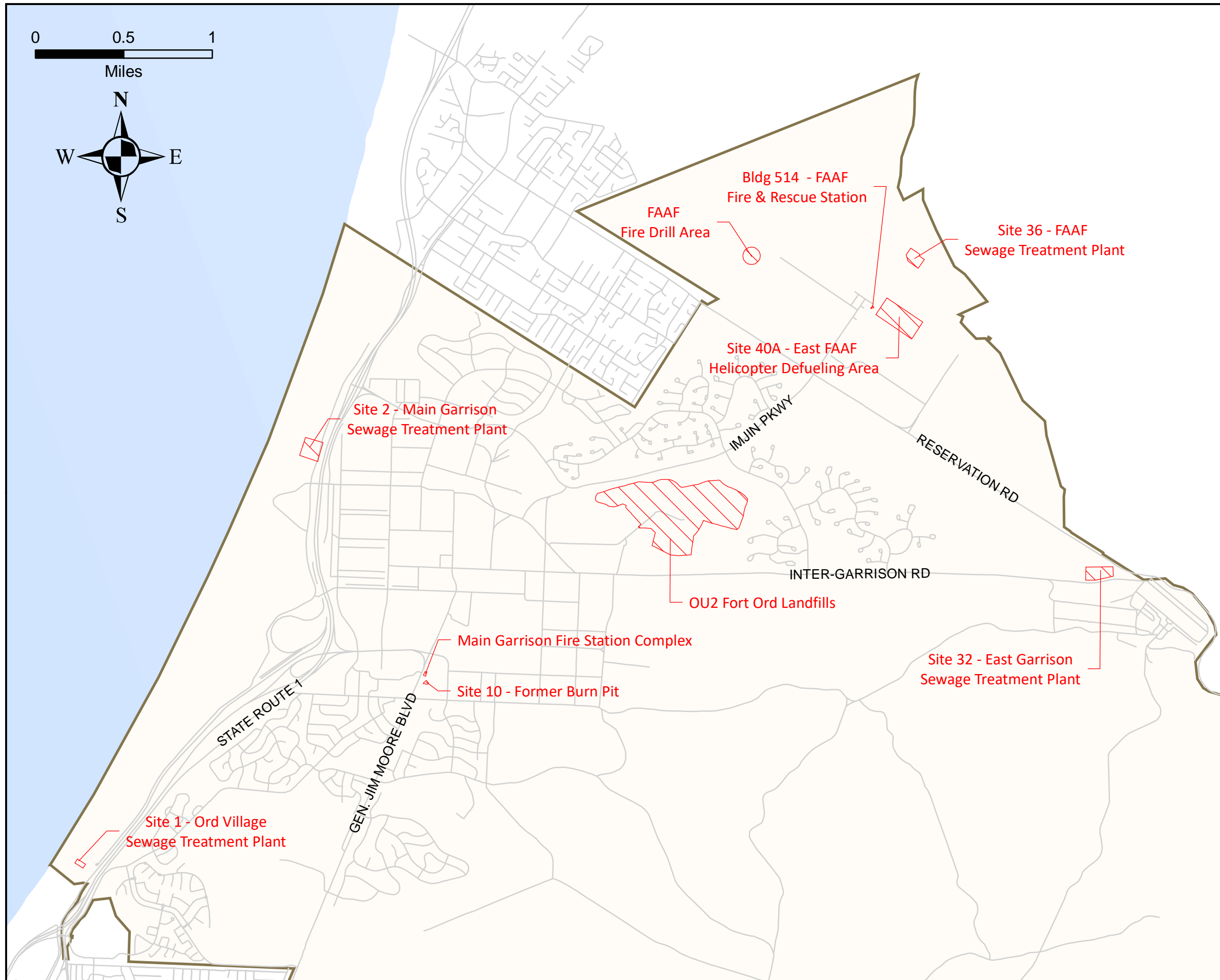
DoD screening levels (DoD, 2022) are equivalent to USEPA RSLs (USEPA, 2022).






WELL 29	MARINA COAST WATER DISTRICT	2Q2019	3Q2019	4Q2019	1Q2020
	PERFLUOROBUTANESULFONIC ACID (PFBS)	ND	ND	ND	0.002
	PERFLUOROHEXANOIC ACID (PFHxA)	0.0052	0.0047	0.0051	0.0049



GROUNDWATER MONITORING ANALYTICAL RESULTS AT SUPPLY WELLS NORTHERN FORT ORD, 2019-2020
 PFAS PA Narrative Report
 Former Fort Ord, California



EXPLANATION

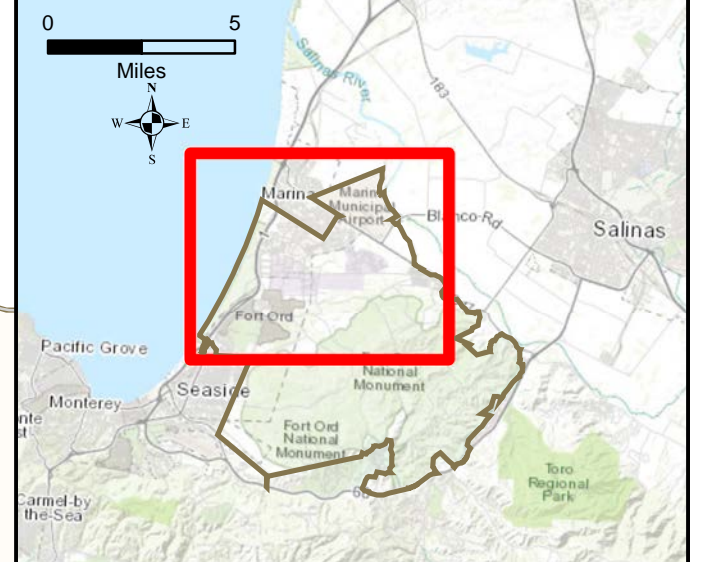
-  Tertiary Assessment Site
-  Former Fort Ord Boundary
-  Roads

NOTE:

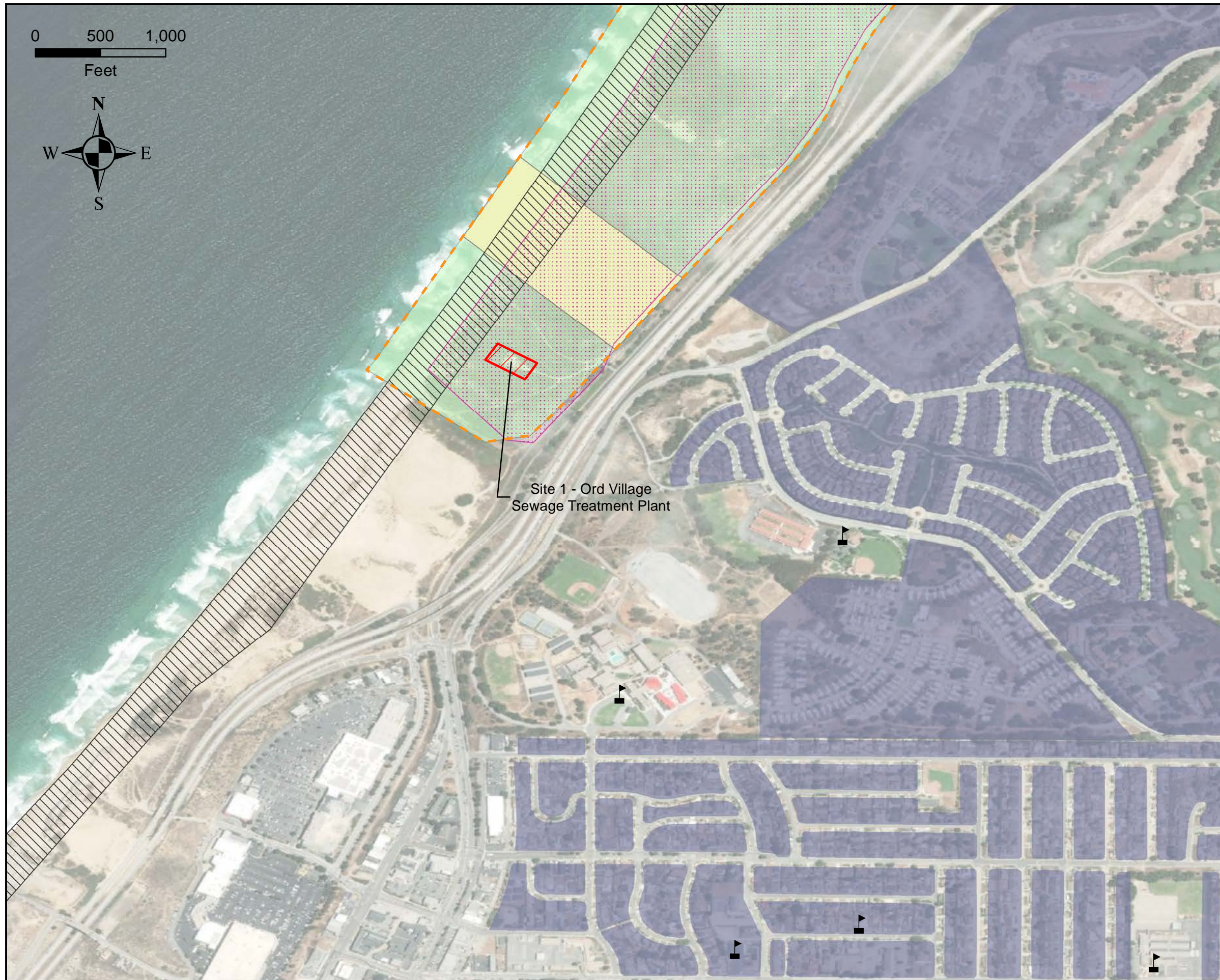
OU2 = Operable Unit 2

FAAF = Fritzsche Army Airfield (Marina Municipal Airport)

Main Garrison Fire Station Complex = Bldgs 4400, 4401, and S-4403









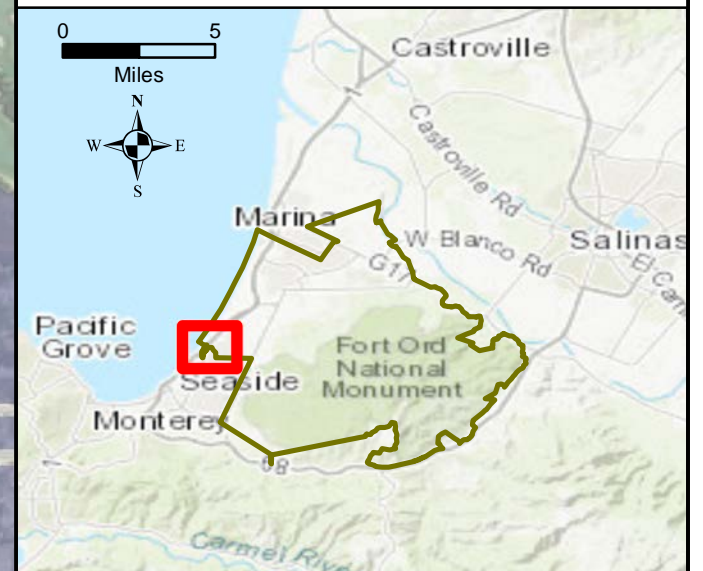
TERTIARY ASSESSMENT SITES
 PFAS PA Narrative Report
 Former Fort Ord, California



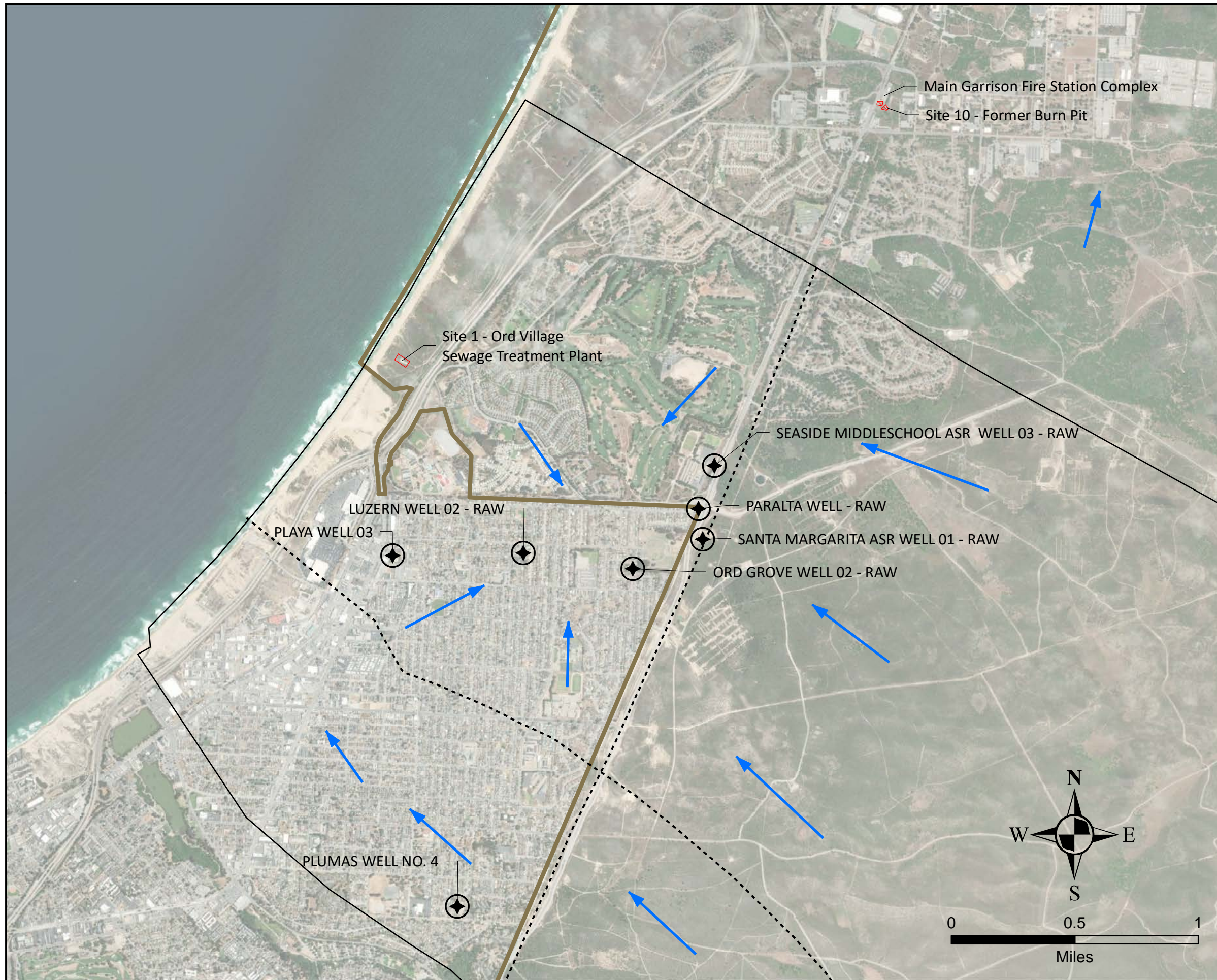
Site 1 - Ord Village
Sewage Treatment Plant

EXPLANATION

-  Tertiary Assessment Site
- Secondary Target Populations**
-  Residential Areas
-  Schools and Daycare Facilities
- Sensitive Environments**
-  Fort Ord Habitat Management Areas
-  Fort Ord Dunes State Park
-  California Native Plant Society - Fort Ord Native Plant Reserve
-  Monterey Spineflower Critical Habitat
-  Snowy Plover Critical Habitat



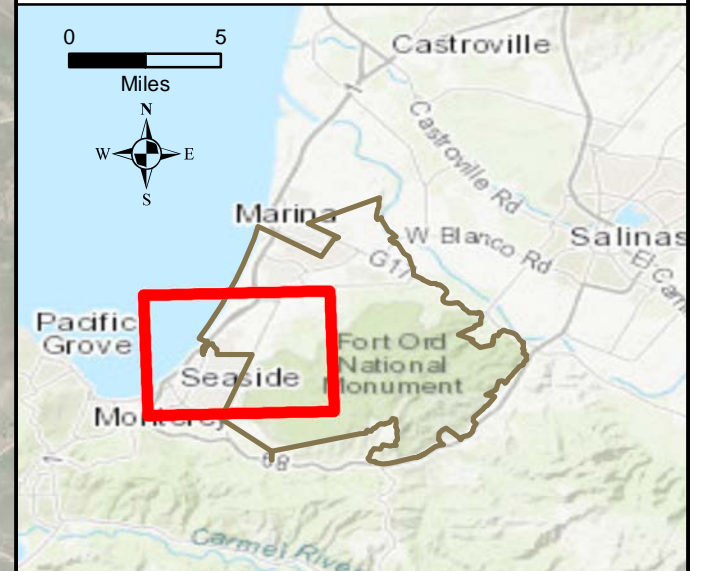
TERTIARY ASSESSMENT SITES
 SITE 1 - ORD VILLAGE STP
 TARGET POPULATIONS AND SENSITIVE ENVIRONMENTS
 PFAS PA Narrative Report
 Former Fort Ord, California



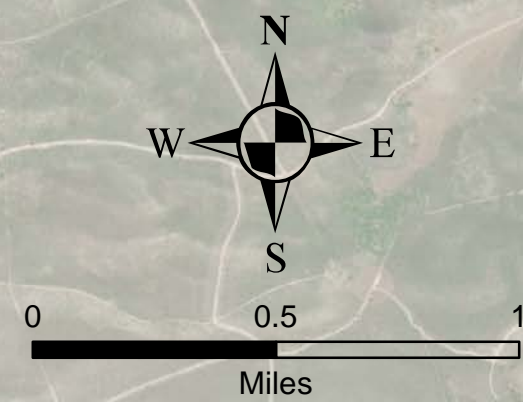
EXPLANATION

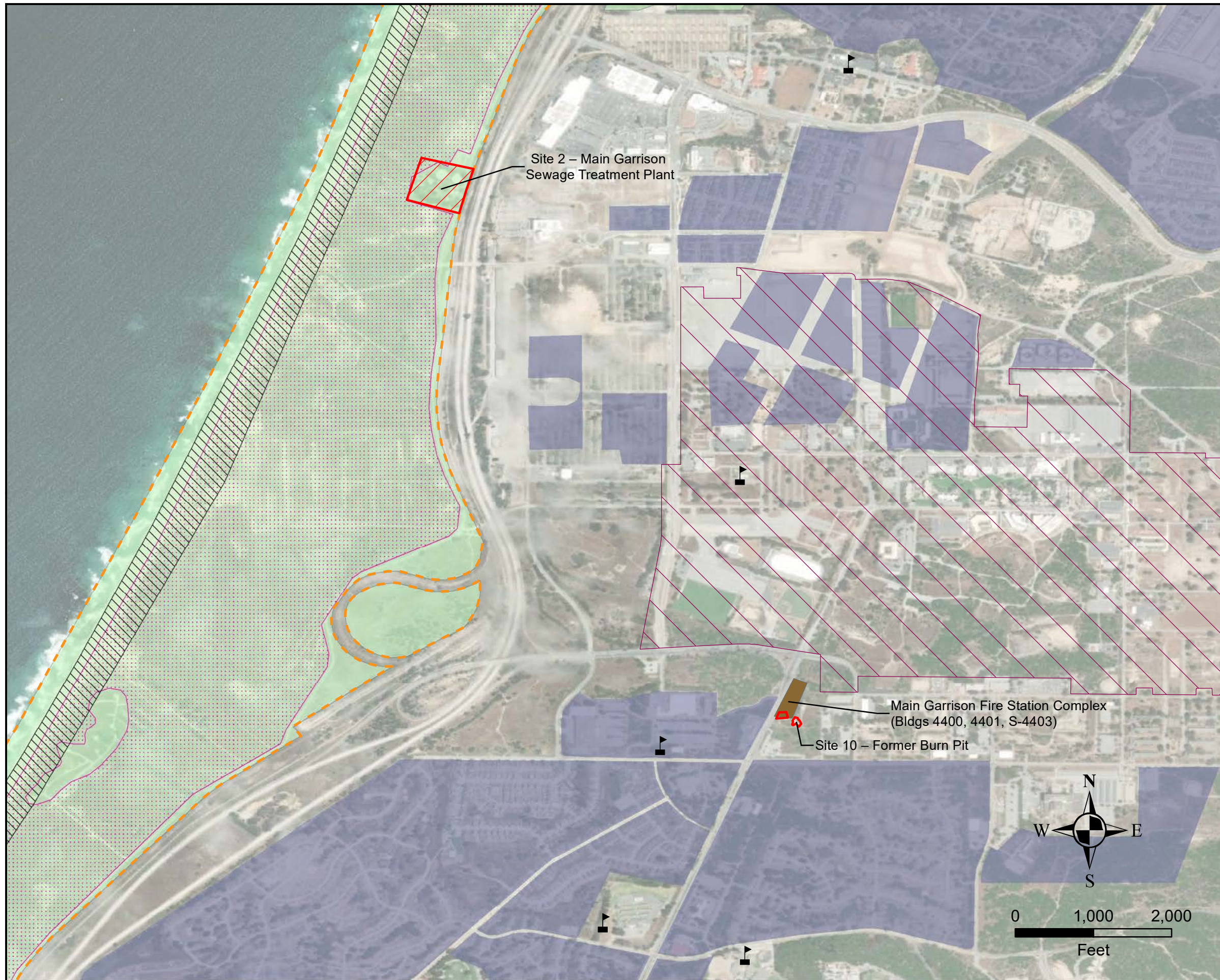
- Tertiary Assessment Sites
- Former Fort Ord Boundary
- Paso Robles Fomation Groundwater Flow Direction
- California American Water District Supply Wells**
- Production well screened in the Paso-Robles Formation

NOTES:
 Main Garrison Fire Station Complex = Bldgs 4400, 4401, and S-4403
 *HydroMetric Groundwater Modeling and Protective Groundwater Elevations, Paso Robles Formation (11/06/2009)



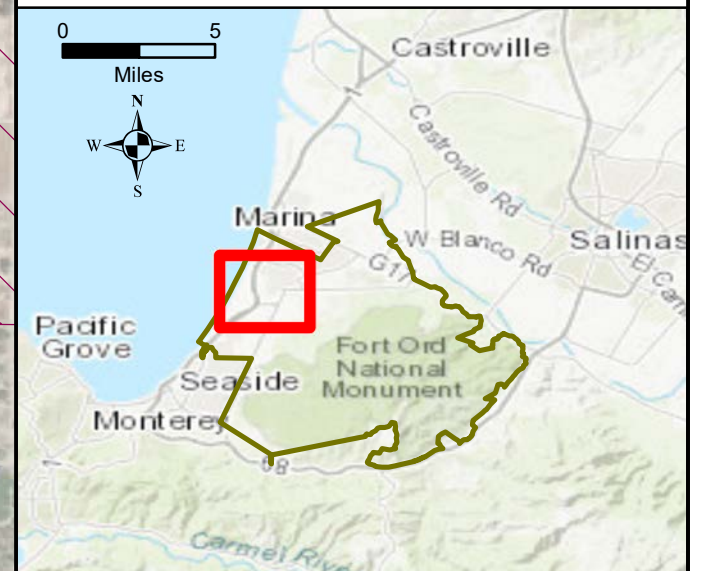
TERTIARY ASSESSMENT SITES
 SITE 1 - ORD VILLAGE SEWAGE TREATMENT PLANT
 TARGET DRINKING WATER SUPPLY WELLS
 PFAS PA Narrative Report
 Former Fort Ord, California



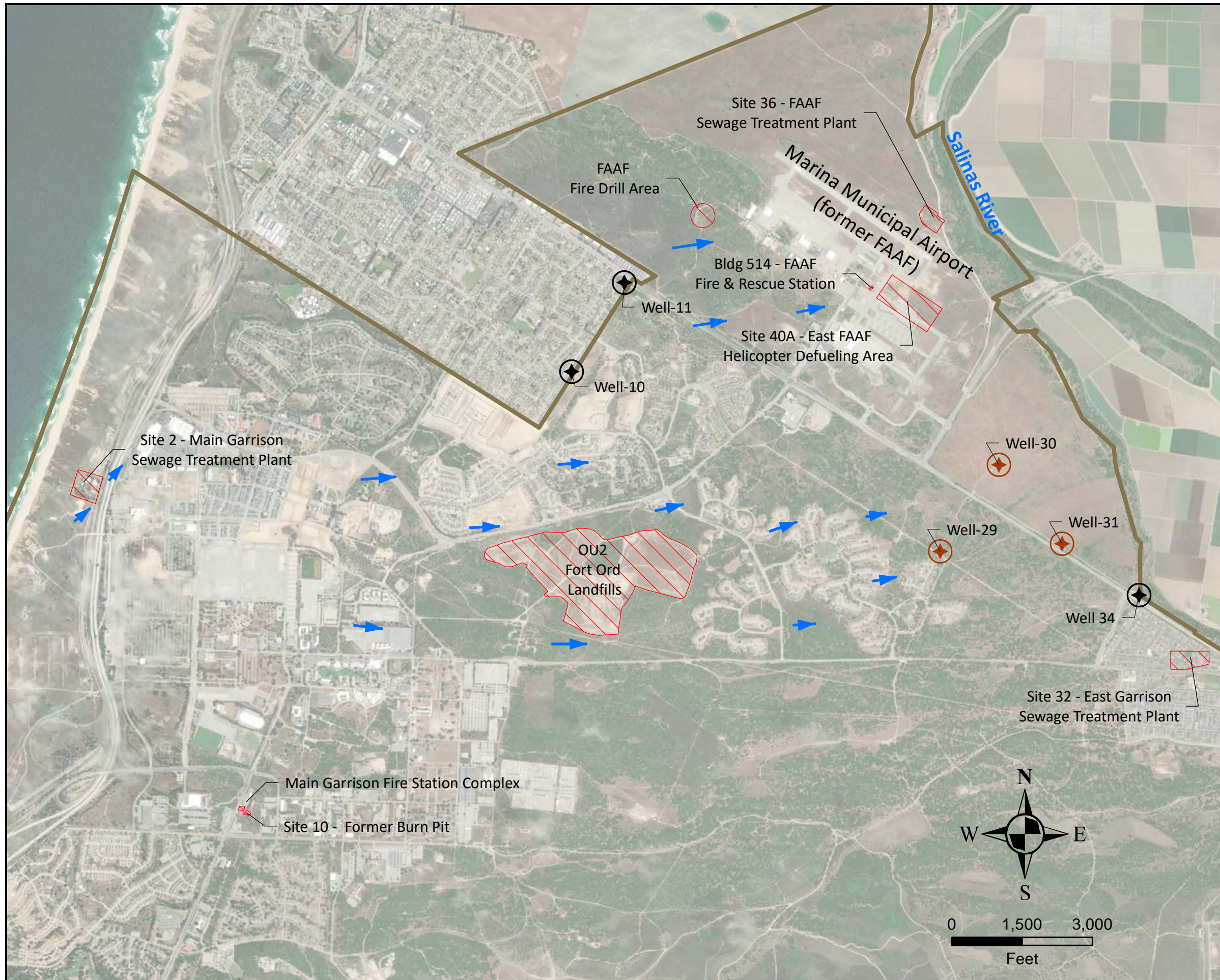


EXPLANATION






- Tertiary Assessment Sites
- Primary Target Populations**
- Fire Station Complex
- Secondary Target Populations**
- Residential Areas
- California State University Monterey Bay
- Schools and Daycare Facilities
- Sensitive Environments**
- Fort Ord Habitat Management Areas
- Fort Ord Dunes State Park
- Monterey Spineflower Critical Habitat
- Snowy Plover Critical Habitat



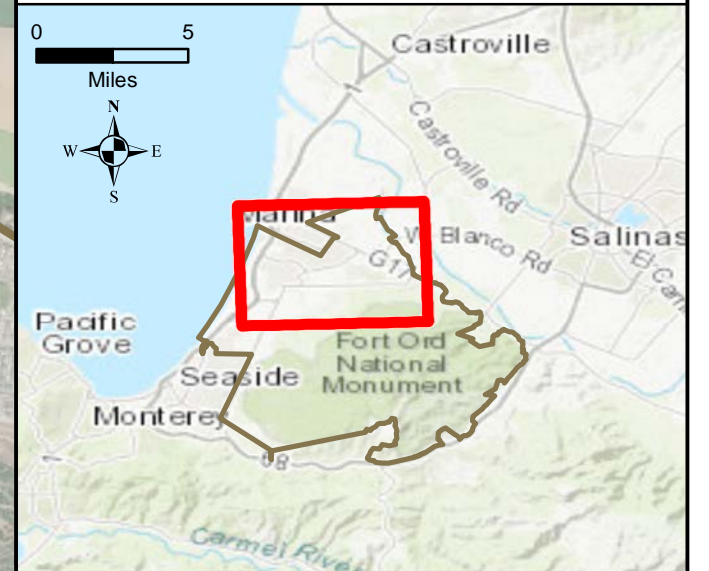
TERTIARY ASSESSMENT SITES
 SITE 2 - MAIN GARRISON STP,
 SITE 10 - FORMER BURN PIT, and
 MAIN GARRISON FIRE STATION
 TARGET POPULATIONS AND SENSITIVE ENVIRONMENTS
 PFAS PA Narrative Report
 Former Fort Ord, California



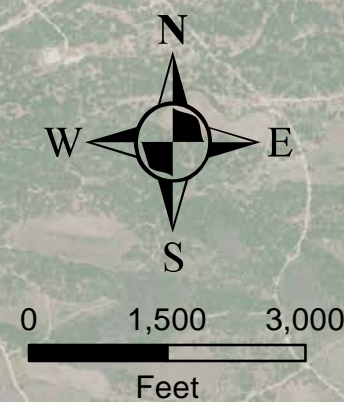
EXPLANATION

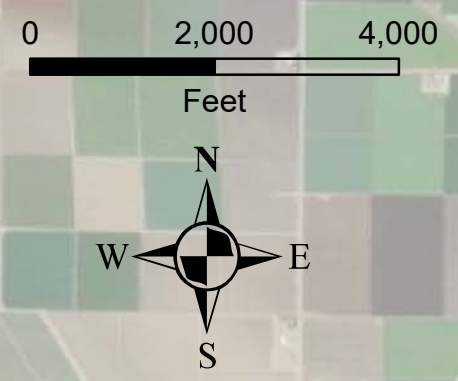
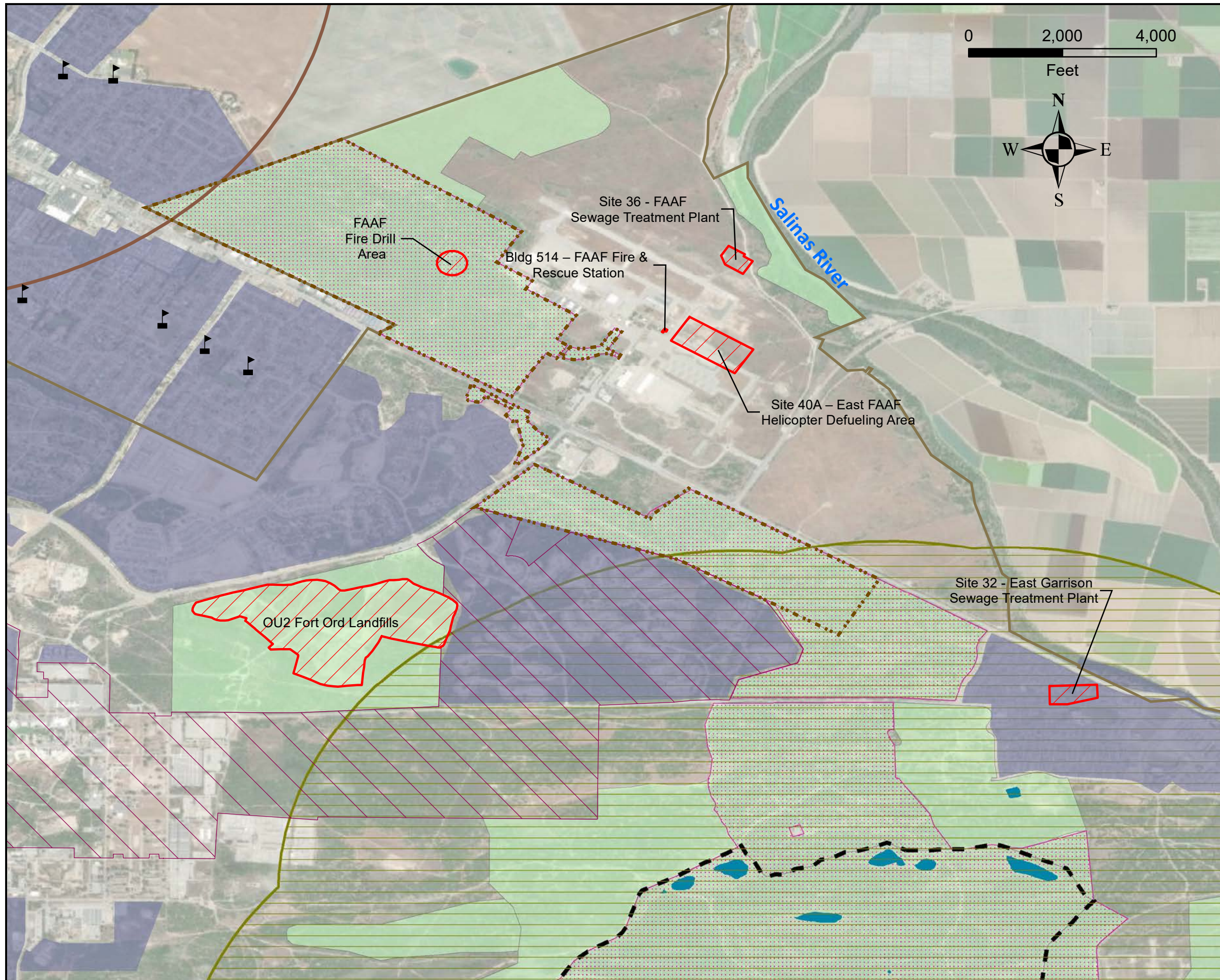
-  Tertiary Assessment Sites
-  General Lower 180-Foot/400-Foot Aquifer Groundwater Flow Direction*
-  Former Fort Ord Boundary
- Marina Coast Water District Supply**
-  Well screened in the Lower 180-Foot/400-Foot Aquifer
-  Well screened in the 900-Foot Aquifer

NOTES:
 *Operable Unit Carbon Tetrachloride Plume Fourth Quarter 2019 - Third Quarter 2020 Groundwater Monitoring Report (Ahtna, 2021)
 FAAF = Fritzsche Army Airfield (Marina Municipal Airport)
 OU2 = Operable Unit 2
 Main Garrison Fire Station Complex = Bldgs 4400, 4401, & S-4403



TERTIARY ASSESSMENT SITES
 TARGET DRINKING WATER SUPPLY WELLS
 PFAS PA Narrative Report
 Former Fort Ord, California

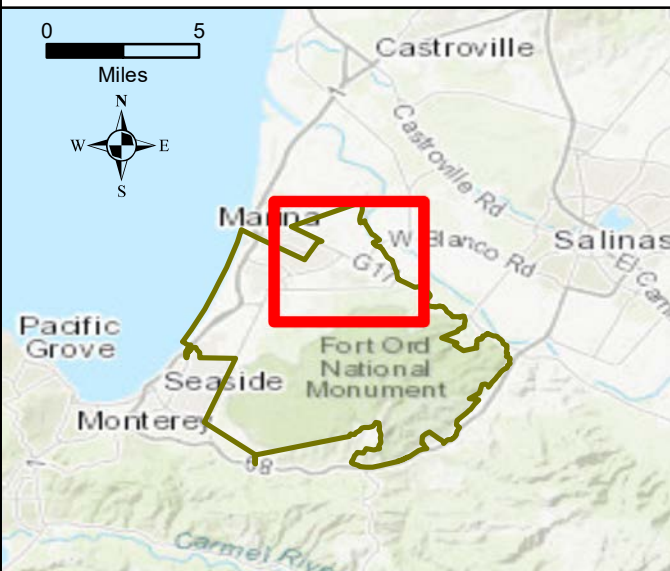




EXPLANATION

- Tertiary Assessment Sites
- Former Fort Ord Boundary
- Secondary Target Populations**
 - Residential Areas
 - California State University Monterey Bay
 - Schools and Daycare Facilities
- Sensitive Environments**
 - Fort Ord Habitat Management Areas
 - Vernal Ponds
 - Fort Ord Natural Reserve
 - Fort Ord National Monument
 - Monterey Spineflower Critical Habitat
 - Snowy Plover Critical Habitat
 - California Department of Fish and Wildlife - Significant Natural Areas
 - Potential Upland Habitat for California Tiger Salamander*

NOTE:
 FAAF = former Fritzsche Army Airfield (Marina Municipal Airport)
 OU2 = Operable Unit 2
 * Based on known and potential breeding habitat present on the former Fort Ord. Not all areas identified may be suitable upland habitat and significant physical barriers may impede migration.



TERTIARY ASSESSMENT SITES
 SITE 32 - EAST GARRISON STP, SITE 36 - FAAF STP,
 FAAF FIRE DRILL AREA, OU2 FORT ORD LANDFILLS,
 SITE 40A - EAST FAAF HELICOPTER DEFUELING AREA, and
 BLDG 514 - FAAF FIRE & RESCUE STATION
 TARGET POPULATIONS AND SENSITIVE ENVIRONMENTS
 PFAS PA Narrative Report
 Former Fort Ord, California

Appendices

Appendix A
Records of Communication

Date:	2/24/2021
Time:	1:30 PM
Type (e.g., email, telephone):	Microsoft Teams video meeting
Person contacted	
Name:	William Collins
Affiliation:	U.S. Army Base Realignment and Closure (BRAC)
Occupation/Former Occupation:	BRAC Environmental Coordinator/BRAC Biologist
Years in Occupation:	1993 to present
Person making the contact	
Name:	Derek Lieberman, Margaret Lindh
Affiliation:	Ahtna Global, LLC

Summary of the Communication and Pertinent Information Obtained

Mr. Collins noted the following during the video conversation:
 AFFF may have been managed by the Directorate of Engineering and Housing, but environmental staff did not monitor or record AFFF storage, use, or disposal.
 Site 1, Ord Village STP - recalled a pipeline rupture in 1994 or 1995 on the north side of the site 10-15 feet up the hillside, but did not know if it was potable water or wastewater.
 Site 16, Pete's Pond - recalled finding some World War II and Korean War-era 2.36-inch rockets onsite during initial investigations in the 1990s.
 Site 22, Auto Craft Shop - Waste oil recycling was performed onsite, along with spill kits and spill awareness training. A mentor was onsite. He recalls the site being very clean and well organized.
 Site 29, DRMO PCB Storage Area (Bldg T-111) - transformers were stored at this site, but not AFFF. He recalled that, in the storage yard next to Bldg T-111, there was a gap in the curb to allow for drainage, but sampling identified no issues with drainage or downgradient contamination.
 Site 31, East Garrison Dump Site - there were no fires on site, just disposal of ash from the incinerator into the ravine.
 Site 34, FAAF Fueling Facility - if any hangar stored AFFF, it likely would have been Bldg 507.
 Site 39, Inland Ranges - No AFFF was stored onsite. For prescribed burns, mostly water was used, along with the occasional use of an animal protein-based firefighting foam. Class A foams were used to pre-treat burn unit containment areas. No foam was used in the 1997 Wolf Hill burn. In 1999, a detonation started a wildfire and some fire retardant was used for containment. Fire retardant was also used in the 2003 Watkins Gate Burn Area (WGBA) fire, but no firefighting foam.
 Site 39, Possible Aircraft Crash Site - does not recall hearing about any crashes. The WGBA prescribed burn was in 2003 and there were no reports of aircraft parts during the munitions response. He has visited the site frequently and recalls seeing a variety of targets, such as old vehicles and boats, but not aircraft targets or wreckage.
 Site 40, Helicopter Defueling Area - he did not recall any fires at this site or AFFF storage or use. He did recall there were a few interim actions performed in the area for TPH contamination.
 Site 41, Crescent Bluff FDA - he recalled excavation of contaminated soil being completed at the site, and that it was apparent the site had not been used in a long time, and there were vernal ponds in the area. The vernal ponds were monitored at the time, but likely are not anymore, though Bart Kowalski, the current BRAC Biologist, would know more.
 FOSTA - he was responsible for managing this facility. After treatment was complete confirmation sampling for TPH was done under the treatment unit liner. All treated soil was taken to the Fort Ord Landfills for disposal.
 OU2, Fort Ord Landfills - no knowledge of fires at the Landfills.
 Mudhen Lake - has no recollection of a helicopter crash at this site.

Action Items or Follow-up Activities, if any

Mr. Collins recalled that another fire chief also worked alongside Jack Riso and retired to Central America, but he could not remember his name (Jim Willison confirmed Chief Dave Leist had retired in Mexico).

Record of Communication

Date: 3/5/2021

Time: 1:30 PM

Type (e.g., email, telephone): in person

Person contacted

Name: Jeff Crechriou

Affiliation: City of Marina

Occupation/Former Occupation: Airport Services Manager

Years in Occupation: 2012 to present

Person making the contact

Name: Derek Lieberman/Margaret Lindh

Affiliation: Ahtna Global, LLC

Summary of the Communication and Pertinent Information Obtained

Mr. Crechriou noted the following during the in-person conversation:

FAAF Fire & Rescue Station: Mr. Crechriou called Doug McCoun, the City of Marina Fire Department chief. Mr. McCoun recalled that one old Army fire truck containing a small amount of AFFF was present onsite when the property was transferred to the City of Marina. All AFFF was contained in the vehicle (there was no storage in the fire station). The truck was used at most once, but the truck was largely nonfunctional. According to Mr. McCoun, the City of Marina Fire Department does not use AFFF. The Fire and Rescue Station was remodeled in 2012.

Site 40A: Mr. Crechriou recalled that a go-cart company had previously used the site. The company had found no evidence of soil contamination at the time.

Action Items or Follow-up Activities, if any

Ahtna Global, LLC

Date:	3/16/2021
Time:	11:00 AM
Type (e.g., email, telephone):	In-person
Person contacted	
Name:	Christine Duymich
Affiliation:	Chenega Support Services, LLC
Occupation/Former Occupation:	Air Quality Planner/Prescribed Burn Manager
Years in Occupation:	2005 - 2017
Person making the contact	
Name:	Derek Lieberman, Margaret Lindh
Affiliation:	Ahtna Global, LLC

Summary of the Communication and Pertinent Information Obtained

Ms. Duymich noted the following during the in-person conversation:

General notes: an aquatic ecosystem-friendly firefighting foam was used by the fire department for the prescribed burn program at the request of the Army's contract biologist. 5-gallon containers of this foam were stored at the East Garrison ammunition supply point (ASP), but did not know if it was Type A or Type B foam. The fire department was concerned about storage of old firefighting foam but she did not know what actions were taken regarding disposal of waste or expired foam, though the fire department or Kevin Siemann, formerly of Gilbane, might know. She also recalled that firefighters had mentioned that, when Fort Ord was still an active installation [before 1994], the fire department was very busy during summer months responding to fires related to Army training activities, and some old houses by the Post Exchange in the current Ord Military Community were burned for firefighter training. She described how SOPs for consolidated shots [for munitions disposal] evolved over time and there was a fire department presence, though she did not know if they carried or deployed foam for these events.

She did not know of any AFFF storage areas at the former Fort Ord; AFFF could have been stored at the Main Garrison Fire Station, though this should be confirmed with the fire department or Jack Riso.

Site 10: did not know of any AFFF use at the site, but firefighter training activities, including vegetation burning, occurred in the leveled-off area to the rear of the Main Garrison Fire Station. She suggested asking POM Fire Department Chief Wilcox, Chief Rivera, or Chief Haggerty about use of AFFF.

Site 34: she did not believe there was any storage of firefighting foam for prescribed burns at the aircraft hangars. There may have been a dip tank located by the aircraft hangars during prescribed burning, but this was unlikely.

Site 39: firefighting foam was used during the prescribed burn at MRS-16 because the fire could not be fully extinguished during mop-up using water. She usually could only observe post-burn conditions from the air and could not access the site on the ground until a few days after prescribed burn events because UXO and fire teams had to clear the area first, so she did not see any stained soils or residual foam at MRS-16, but also noted that the foam dissipated or evaporated almost immediately after application. She had observed application of foam at MRS-16 from the air and had mapped the area where it was applied and suggested looking in the after-action report for the map and MSDS for the foam. She noted this foam may have also been used in Burn Units 18 and 22. She had no knowledge of aircraft crash sites at the former Fort Ord, but suggested checking with the Monterey Regional Airport for records regarding historical aircraft crashes that may have occurred in the Impact Area.

Action Items or Follow-up Activities, if any

Contact POM Fire Department or Kevin Siemann about disposal of old/expired firefighting foam.
 Ask Fire Department personnel about AFFF use at Fort Ord before 1994, during munitions disposal activities, and during training activities at the Main Garrison Fire Station and Site 10.
 Ask Fire Department personnel about AFFF storage at Main Garrison Fire Station.

Action Items or Follow-up Activities, if any
Review burn plans and after-action reports for MRS-16 and Burn Units 18/22. Check with Monterey Regional Airport for crash records.

Date:	4/30/2019
Time:	9:00 AM
Type (e.g., email, telephone):	in-person, email
Person contacted	
Name:	Jack Riso
Affiliation:	Presidio of Monterey Fire Department
Occupation/Former Occupation:	Retired/Fire Chief
Years in Occupation:	1971 - 2011
Person making the contact	
Name:	Derek Lieberman
Affiliation:	Ahtna Environmental, Inc.

Summary of the Communication and Pertinent Information Obtained

Retired POM Fire Department Chief Jack Riso noted the following during the in-person conversation:

Range 36A – Open Detonation Area: to your knowledge no AFFF was used or stored at this location by either the fire department or EOD.

Range 49 – Molotov Cocktail Range: no AFFF was used at this location.

Fire Training Area at Fort Ord Fire Station on General Jim Moore Blvd: during fire prevention week fires were started in the burn pit and extinguished using AFFF. There were typically three or four demonstrations plus one rehearsal each year, with approximately 100 gallons total of AFFF being discharged each year. This activity started likely in the 1960s and continued into the early 1990s, ending at least a couple of years before base closure in 1994.

Building 4492 – Auto Craft Shop and Building T-111 (East Garrison) – DRMO PCB Storage Area: to his knowledge, there was no use or storage of AFFF in buildings for fire suppression systems.

FAAF Buildings 507, 527, 541, 510/524 – aviation hangars: there was an accidental discharge of foam from the fire suppression system in one hangar, but not sure which one. Likely one of the newer hangars along Neeson Road. It is more likely the newer hangars had fire suppression systems that used foam. The fire department serviced the fire extinguishers in the hangars, and to his knowledge none of them ever required recharging, indicating they had never been discharged.

FAAF Helicopter Defueling Area: the fire department was on standby during defueling operations. There were rarely any fuel spills, but sometime in the late 1970s or early 1980s there was a spill of 5,000 to 10,000 gallons of fuel and this was covered with AFFF.

FAAF Former Burn Pit: if this area was used as a burn pit, it was before his time at Fort Ord.

Inland Ranges: water tenders were used for firefighting in this area, not AFFF. There were two helicopter crashes, but no fire associated with these and no AFFF was used. He were not aware of any fixed wing aircraft crashes in the Inland Ranges.

Crescent Bluff Fire Drill Area: he did not recall any firefighter training occurring at this location, though the area could have been used for fire extinguisher training because the burn pits were small.

Fort Ord Landfills: there were at least two instances of consolidated waste, including tires, in the Landfills catching fire in the 1970s or 1980s and the fire being suppressed with AFFF.

Buildings 2722 and 4900: fire trucks were serviced at these facilities, and AFFF remaining in the tanks on the trucks had to be discharged prior to servicing and the AFFF may have been discharged directly to the ground. The fire department did not use AFFF for vehicle fires.

There was a crash landing of an aircraft at FAAF when the landing gear did not deploy, but there was no fire and no AFFF used.

AFFF would occasionally be pumped out of trucks onto the grassy areas adjacent to the fire stations. He estimated 100-200 gallons of AFFF would be discharged during each training event, with training at the FAAF

fire drill area occurring once per quarter. Additionally, there may have been accidental discharges during pump training.

Action Items or Follow-up Activities, if any

In follow-up email correspondence dated 5/8/19 Chief Riso noted:

After the application of AFFF at the fuel spill in the helicopter defueling area, the remainder of the fuel was cleaned up by the application of soil. The fuel was absorbed, the soil was loaded into dump trucks and removed, but not sure where it was placed.

When the new helicopter pads were constructed the defueling was conducted at the end of the pad across from the fire station. The fire department also conducted emergency defuel operations at various locations where the helicopter was but these were few and far between.

In follow-up email correspondence dated 12/16/19 Chief Riso noted:

The former fire house on First Avenue that predated the Main Garrison Fire Station did not store or use AFFF.

AFFF was stored at both the Main Garrison Fire Station and the FAAF Fire and Rescue Station.

Fire engines were worked on at Buildings 2722 and 4900 and AFFF remaining in the tanks on the engines was drained at the Main Garrison Fire Station and some residual AFFF may have been pumped out, but the AFFF tanks only needed work maybe five times over the 40 years of Chief Riso's service.

In follow-up email correspondence dated 1/20/20 Chief Riso noted:

The other former fire houses at Bldg T-105 in East Garrison, Bldg T-2898 on 11th Street, and Bldg T-3280 next to the horse stables that predated the Main Garrison Fire Station did not store or use AFFF.

AFFF was not used in the response to the 1989 helicopter crash involving the AH-1 Cobra attack helicopter and OH-58 Kiowa observation helicopter.

In follow-up email correspondence dated 8/7/20 Chief Riso noted:

There was never an AFFF fire suppression system at the AAFES gas station and no fires occurred at the gas station.

To the best of his knowledge AFFF was never stored at the DRMO facilities in the Main Garrison or the East Garrison.

Fire department AFFF equipment was not serviced at the 707th Maintenance Facility.

Date:	4/8/2021
Time:	1:00 PM
Type (e.g., email, telephone):	telephone, email
Person contacted	
Name:	Jack Riso
Affiliation:	Presidio of Monterey Fire Department
Occupation/Former Occupation:	Retired/Fire Chief
Years in Occupation:	1971 - 2011
Person making the contact	
Name:	Derek Lieberman, Margaret Lindh
Affiliation:	Ahtna Global, LLC

Summary of the Communication and Pertinent Information Obtained

Retired POM Fire Department Chief Jack Riso noted the following during the telephone conversation: AFFF was delivered to the Main Garrison Fire Station in 5- or 10-gallon plastic containers, with some stored in the station or in a CONEX next to the station until needed at either the Main Garrison Fire Station or the FAAF Fire and Rescue Station.

AFFF would periodically be rotated out of the tanks on the fire trucks, with the old AFFF being discharged to the grassy areas next to the hose tower (Bldg. 4401) and the FAAF Fire and Rescue Station.

Historically, AFFF would be considered for use in the event of an aircraft crash where there was a fire, aviation fuel spills for prevention of fire, and training for extinguishing fuel fires at the FAAF FDA and the Site 10 FDA. While some training occurred at the Site 10 FDA, most was at the FAAF FDA.

AFFF was typically not used for vehicle fires except when a vehicle was fully engulfed in flames and there was risk of the fuel tank igniting - this occurred once in the main gate area on Lightfighter Drive, and once on State Route 1. AFFF was not used for wildland fires and was not carried on the wildland engines.

The helicopter defueling area (Site 40A) was located southeast of the FAAF Fire and Rescue Station in the taxi area north of the helicopter parking apron. The fire department used AFFF on the fuel spill there to reduce the potential of fire and attempted to contain the fuel spill, but some ran off into the soil north of the taxi area. Soil was placed on the spill to absorb the fuel and allowed to dry for some period and then hauled off, possibly to the Fort Ord Landfills.

Use of the South Parade Ground (Site 20) as an airfield predated his time at Fort Ord, but no AFFF was ever stored at that site.

At FAAF, the hangar fire suppression systems were serviced by a contractor, but he could not recall who the contractor was. There was an accidental release of foam in one of the hangars probably in the 1980s, but he could not recall which hangar, although he suspected that it may have been one of the newer hangars (Hangar 507 or 527). He noted the foam was very thin on top of the water discharged from the deluge fire suppression system. He recalled that the foam quickly drained out of the hangar onto the pavement after the fire department turned off the system. Some foam may have entered the storm drain system but he did not recall any entering the sanitary sewer system. He did not recall any equipment in the fire suppression systems, such as a bladder tank, that would indicate a foam-based system. Fire suppression systems were also accidentally activated at other FAAF hangars, but these were water only. He had no recollection of nozzle testing with AFFF at the former Nurses Barracks, former bachelor officers' quarters (BOQ), or former Officers' Club.

There was no storage or use of AFFF at the FAAF fueling facilities at Bldgs. 501, 502, and 503.

The fires that occurred at the Fort Ord Landfills lasted several days and AFFF was used because water would not extinguish them.

He did not have any contact information for former Fort Ord Fire Chief Dave Leist.

Action Items or Follow-up Activities, if any

In follow-up email correspondence dated 4/28/21 Chief Riso noted:

AFFF was rotated out of the tanks on fire department vehicles approximately once per year unless there was specific maintenance needed on the tank.

Most AFFF testing, discharge or training at the Main Garrison Station was conducted on the lawn or at the burn pit at the location.

To the best of his recollection the 1989 helicopter crash involving the AH-1 Cobra attack helicopter and OH-58 Kiowa observation helicopter occurred in the Inland Ranges.

Record of Communication

Date: 1/31/2022
 Time: 1:38 PM
 Type (e.g., email, telephone): email

Person contacted

Name: Jack Riso
 Affiliation: Presidio of Monterey Fire Department
 Occupation/Former Occupation: Retired/Fire Chief
 Years in Occupation: 1971 - 2011

Person making the contact

Name: Derek Lieberman, Margaret Lindh
 Affiliation: Ahtna Global, LLC

Summary of the Communication and Pertinent Information Obtained

Retired POM Fire Department Chief Jack Riso noted the following during the email conversation:
 The AFFF tanks on the fire department vehicles were approximately 25 gallons.
 Not all fire department vehicles had AFFF tanks, but vehicles which did carried one tank of AFFF.
 AFFF were not typically completely emptied before being sent for servicing, but depended on the services requested.

Date:	2/22/2021
Time:	1:00 PM
Type (e.g., email, telephone):	In-person
Person contacted	
Name:	Val Valdez
Affiliation:	Chenega Tri-Services
Occupation/Former Occupation:	UXO Safety Officer/Army EOD Technician
Years in Occupation:	1990 to present
Person making the contact	
Name:	Derek Lieberman, Margaret Lindh
Affiliation:	Ahtna Global, LLC

Summary of the Communication and Pertinent Information Obtained

Mr. Valdez noted the following during the in-person conversation:

Site 5, Range 36A, OB/OD Range - he was not aware of AFFF use onsite. During his time in EOD in the 1990s, the site was used every couple of weeks. The primary explosive used for detonations onsite was C-4 [C-4 contains 90% cyclotrimethylenetrinitramine (RDX) and 10% polyisobutylene, a synthetic rubber], which was likely completely consumed in the detonation process. Other items disposed of at Range 36A included picric acid, powder charges, and various types of mortar rounds. Range 36A was mainly used for demolition procedures and as a staging area for ammunition practice. A few fires occurred onsite during his time working on the site (1990s) and the Fort Ord Fire Department was onsite for support, but did not actively extinguish these fires because fire breaks were in place.

Site 8, Range 49, Molotov Cocktail Range - this range was inactive by time he arrived at Fort Ord in 1990.

Site 9, Range 40A, Flame Field Expedients (FFE) Training Area - by time he began working at Fort Ord in 1990, Site 9 was being used intermittently as a small arms firing range by the Range Control Officer, but not for FFE anymore and he did not know if the Fort Ord Fire Department was onsite for FFE training.

Site 39 - firefighting foam [Class A only, not AFFF] was stored and used only during prescribed burns. In his experience, firefighting in the Inland Ranges (including Site 5, 8, 9, and 39) largely used water and fire breaks created with a bulldozer to contain fires. Shaw Environmental, Inc. performed a munitions response in the Watkins Gate Burn Area and, although he did not work with Shaw at the time, he did not recall any reports of aircraft wreckage in Site 39. However, what may have appeared to be aircraft crash wreckage could have been mock-ups used for training exercises or target practice.

Mudhen Lake - no military aircraft parts were found or evidence of an aircraft crash during a munitions response at this site.

Range 34 - this site may also have been used as an FFE training area. By the time he began working at Fort Ord (1990), the site was no longer in use but he observed spent ammunition, 55-gallon drums, and burnt soil onsite. He did not know if the Fort Ord Fire Department was onsite for FFE training.

Action Items or Follow-up Activities, if any

Mr. Valdez suggested other possible interviewees could include Mr. Mike Wheeler, a former member of 49th FORSCOM EOD, and a Mr. Howard Beardsley.

Mr. Valdez recalled some FFE training at Range 34, which was not considered a secondary assessment site. This site may need to be reconsidered based on the conversation with Mr. Valdez.

Date:	3/25/2021
Time:	11:26 AM
Type (e.g., email, telephone):	email
Person contacted	
Name:	Mike Weaver
Affiliation:	Fort Ord Community Advisory Group
Occupation/Former Occupation:	Co-Chair/Local Resident
Years in Occupation:	1951 to present (local resident)
Person making the contact	
Name:	Melissa Broadston on behalf of Bill Collins
Affiliation:	Chenega Tri-Services on behalf of Department of the Army

Summary of the Communication and Pertinent Information Obtained

Mr. Weaver noted the following via email:

He grew up and currently lives in the Corral de Tierra area, across Highway 68 from Fort Ord. He has a view overlooking the eastern hills of Fort Ord and is able to see approximately 1 mile looking west towards the Laguna Seca Racetrack. He recalled that, as a child, infantry training was the norm and "competing armies" would practice sometimes for days and sometimes in the dark and during winter rains. He often heard the sounds of mortars, machine guns, and artillery and the sky was lit up with flares. He observed Army tanks, helicopters, Jeeps, and troop transport trucks during maneuvers.

He did not recall an Army Fire Prevention Week.

He worked at a car dealership in the City of Seaside from 1980 to 1994 and often visited Fort Ord to speak with soldiers regarding paperwork for the purchase of a car. He also recalled visiting Fort Ord as a Cub Scout, which included touring some of the training ranges, inspecting Army tanks, and having lunch with soldiers in the mess hall.

Mr. Weaver said that grass fires occurred regularly from 1951 through the 1970s, sometimes annually or every other year, and could occur in any season. He said these fires often occurred during Army training activities and some fires were set intentionally for training purposes. From his vantage point, he could see fires occurring on the hillsides and hill tops of the eastern portion of Fort Ord. Some of these fires were very large and he saw Army bulldozers and soldiers with shovels cutting fire breaks, and trucks and airplanes hauling and deploying water and fire retardants. He noted the firefighting retardants he saw the Army use were different colors.

Mr. Weaver recalled hearing about helicopter crashes because a friend of his from high school joined the Army and was being trained as a helicopter pilot at Fort Ord.

Action Items or Follow-up Activities, if any

On 3/29/2021 submitted via email follow-up questions to Mr. Weaver regarding Army personnel intentionally setting fires, more details about how aircraft applying foam or retardant to fires, whether other agencies besides the Army were involved in fighting the fires, and more details about the helicopter crashes his high school friend told him about.

Ahtna Global, LLC

Date:	2/24/2021
Time:	8:30 AM
Type (e.g., email, telephone):	Microsoft Teams video meeting
Person contacted	
Name:	Bruce Wilcer
Affiliation:	Ahtna Global, LLC
Occupation/Former Occupation:	Senior Project Manager/Senior Geologist
Years in Occupation:	1987 to present
Person making the contact	
Name:	Derek Lieberman, Margaret Lindh
Affiliation:	Ahtna Global, LLC

Summary of the Communication and Pertinent Information Obtained

Mr. Wilcer noted the following during the video conversation:
 He was unaware of any historical AFFF storage, use, or disposal at the former Fort Ord.
 Site 9, Range 40A, Flame Field Expedients Training Area - he participated in soil sampling for various hydrocarbons.
 Site 10, Burn Pit and Main Garrison Fire Station - he recalled seeing evidence of use but did not see the burn pit actively used and had no knowledge of AFFF storage or use at the site.
 Site 16, Pete's Pond - he recalled this was a disposal site and World War II-era 2.36-inch training rockets were found there.
 Site 29, DRMO PCB Storage Area (Bldg T-111) - no knowledge of AFFF storage, but remembered that lots of chemicals and equipment were stored onsite and were sometimes stored in the exterior yard and exposed to the elements, but there was not much activity onsite from 1991 through 1993.
 Site 32, East Garrison STP - by time he began working onsite, the STP was inactive and overgrown.
 Site 34, FAAF Fueling Facility - he worked on soil remediation and excavation at Buildings 501-503, but was not aware of the presence of AFFF onsite.
 Site 36, FAAF STP - he recalled a few wells onsite which required monitoring. He also recalled that the site was active in the early 1990s and a distinct pesticide "mosquito spray" odor was present onsite.
 Site 39, Inland Ranges - all prescribed burning used water suppression and no chemical suppression that he was aware of. During planning for prescribed burns, discussion was about staging water trucks and water dip tanks for fire suppression.
 Site 39, Possible Aircraft Crash - he did not see the crash site himself, but he discussed it with personnel present on the CERFA helicopter tour, who said the airplane seemed to have crashed nearly vertically, evidenced by the accorded shape of the wreckage. He believed the crash was likely not a mock-up due to this. He did not know if fire had occurred at the crash site; however, many fires in the Inland Ranges were allowed to burn out on their own without intervention by the fire department.
 OU1, FAAF FDA - there were still drums onsite in 1989, but these were for the off-spec fuel, etc. and not AFFF. The FDA was no longer active by this time, so he did not know what methods were used for extinguishing fires.
 OU2, Fort Ord Landfills - he recalled some bulldozer activity onsite during active use as a landfill, but did not remember any fires.

Action Items or Follow-up Activities, if any

Mr. Wilcer recommended speaking with Christopher Smith, formerly a project manager with Harding Lawson Associates, and Harvey Jones, formerly of USACE.

Record of Communication

Date:	3/16/2021
Time:	12:20 PM
Type (e.g., email, telephone):	telephone
Person contacted	
Name:	Dave Wilcox
Affiliation:	Presidio of Monterey Fire Department
Occupation/Former Occupation:	Chief
Years in Occupation:	2005 - present
Person making the contact	
Name:	Derek Lieberman, Margaret Lindh
Affiliation:	Ahtna Global, LLC

Summary of the Communication and Pertinent Information Obtained

POM Fire Department Chief Dave Wilcox noted the following during the telephone conversation:
 General notes: the firefighting foam used at MRS-16 was a Class A foam and not AFFF, which is a Class B foam. The fire department only uses Class A foams for wildland fires. Approximately 3000 gallons of AFFF was stored at the East Garrison ammunition supply point (ASP), but was not used. He was not sure of the source of the AFFF, but the POM Fire Department turned in the AFFF to the Directorate of Public Works Environmental Division for hazardous waste management. There was a fire pit next to the Main Garrison Fire Station where foam was used for training, but he did not recall the type of foam.

Action Items or Follow-up Activities, if any

Further research into AFFF storage at the ASP.

Record of Communication

Date:	3/4/2021
Time:	2:00 PM
Type (e.g., email, telephone):	in-person
Person contacted	
Name:	Rick Wilcoxson/Rey Uncangco
Affiliation:	Fort Ord Works
Occupation/Former Occupation:	Tooling & Technical Services/Quality
Years in Occupation:	1998 to present
Person making the contact	
Name:	Derek Lieberman/Margaret Lindh
Affiliation:	Ahtna Global, LLC

Summary of the Communication and Pertinent Information Obtained

Mr. Wilcoxson noted the following during the in-person conversation:
 Mr. Wilcoxson worked in Hangar 527 from 1998 to 2013 and did not see any evidence of a foam-based fire suppression system there. According to him, the fire suppression systems at all the hangars were water-based deluge systems that were original to the buildings, though the system at Hangar 510 had been updated in 2019 to a water-based wet pipe system. He did not recall any fires occurring at the hangars. He also recalled that Hangar 510 had been used for servicing and painting of Apache attack helicopters.

Mr. Uncangco noted the following during the in-person conversation:
 Mr. Uncangco started working at the FAAF hangars in the late 1990s. According to him, all the hangar fire suppression systems were water-based and connected to the former 300,000-gallon elevated water storage tank located across Imjin Road. At Hangar 527, he did not recall any AFFF storage. He did recall that some active fire training had occurred at Hangar 527, but the fire training exercises were water-based. He also recalled a fire suppression system discharge event at Hangar 527, which filled the hangar with approximately 3 feet of standing water.

Action Items or Follow-up Activities, if any

Ahtna Global, LLC

Record of Communication

Date:	2/25/2021
Time:	9:00 AM
Type (e.g., email, telephone):	Telephone conference call
Person contacted	
Name:	Jim Willison
Affiliation:	U.S. Army Presidio of Monterey
Occupation/Former Occupation:	Retired/Director of Public Works
Years in Occupation:	1984 - 2020
Person making the contact	
Name:	Derek Lieberman, Margaret Lindh
Affiliation:	Ahtna Global, LLC

Summary of the Communication and Pertinent Information Obtained

Mr. Willison noted the following during the telephone conversation:
 Environmental staff did not monitor AFFF storage, use, or disposal, but the Safety Office may have. He did not know of any sites where there were AFFF spills, but noted the burn pits at OU1 and Site 10 and the FAAF runway area. He also recalled former Fort Ord Fire Department chief Dave Leist operating around the same time as Jack Riso. Mr. Leist currently lives in Mexico, but his son works in the Seaside Fire Department and may be helpful in finding contact information.
 Site 2, Main Garrison STP - recalled that the STP was operated by Mr. Harold Field, not aware of any chemical issues, leaks, or spills.
 Site 16, Pete's Pond - recalled finding a suspicious drum suspected to be filled with mustard agent, which turned out to be a training item, as well as various World War II and Korean War-era rockets. He also recalled the site filling with water during the winter.
 Site 20, South Parade Ground - this site had been a motor pool since he started working at Fort Ord in 1984.
 Site 22, Auto Craft Shop - the facility was for soldiers to work on their own vehicles and hazardous waste (mostly oils and lubricants) were monitored onsite. He did not recall the type of fire suppression system in the facility but did not believe any AFFF was stored onsite.
 Site 29, DRMO PCB Storage Area (Bldg T-111) - the site was used to store transformers and the floor was treated in case there was a leak, but he did not recall other hazardous materials storage.
 Site 31, East Garrison Dump Site - recalled waste material consisted of mostly furniture, green waste, etc. and that ash from the incinerator was dumped onsite.
 Site 34, FAAF Fueling Facility - recalled that one hangar, though he was unsure which one, housed a spray paint booth, but did not recall any fueling stations or AFFF storage at the hangars.
 Site 39, Inland Ranges Prescribed Burning - recalled only water tanks and trucks used for prescribed burns, no foam.
 Site 39, Possible Aircraft Crash Site - recalled seeing some old wreckage in the Parker Flats area, but not sure whether it was a vehicle, aircraft, or boat and whether or not it was a mockup.
 OU1 - recalled some work at the site as part of the RI/FS, but did not know if AFFF was used onsite.
 OU2, Fort Ord Landfills - in 1984 the Army was just starting to understand issues at the Landfills, there were rumors about disposal of expired chemicals, etc.

Action Items or Follow-up Activities, if any

Contact Harold Field regarding Main Garrison STP. Mr. Willison stated that Mr. Field may have died, but he was not certain.
 Contact Dave Leist.

Record of Communication

Date: 2/24/2021
 Time: 10:00 AM
 Type (e.g., email, telephone): Telephone

Person contacted

Name: Gail Youngblood
 Affiliation: U.S. Army Base Realignment and Closure (BRAC)
 Occupation/Former Occupation: Retired/BRAC Environmental Coordinator
 Years in Occupation: 1989-2012

Person making the contact

Name: Derek Lieberman
 Affiliation: Ahtna Global, LLC

Summary of the Communication and Pertinent Information Obtained

Ms. Youngblood noted the following during the telephone conversation:
 To her knowledge, environmental staff at the former Fort Ord did not monitor or record storage, use, or disposal of aqueous film-forming foam (AFFF).
 She had no personal knowledge of AFFF storage, use, or disposal at the sites being evaluated for the Preliminary Assessment (PA), except that AFFF was not stored or used at Site 39 during prescribed burn events.
 The fuel spill incident at Site 40A [East FAAF Helicopter Defueling Area] was described to her and she said the soil used to absorb the fuel and AFFF was probably disposed of at the closest location that was convenient, most likely somewhere at FAAF.
 Christine Duymich, formerly of Chenega supporting the BRAC Office, had maintained an office at the Main Garrison Fire Station and may have some knowledge of the fire department’s historical storage, use, or disposal of AFFF, particularly at Site 10.
 Treated soil from the FAAF Fire Drill Area may have been used as fill material during construction of the Ammunition Supply Point (ASP) in the East Garrison because this was the only major construction going on at the time, but it seems unlikely because there was already excess soil on site.
 She had no recollection of any aircraft crash sites at the former Fort Ord.
 She had no recollection of disposal of PFAS-containing materials in any landfills at the former Fort Ord.
 She had no recollection of a fire at the OU2 Fort Ord Landfills.
 She had no knowledge of sewage treatment plant (STP) operations or of spills, leaks, overflows, or other accidental discharges at STPs.
 She had no knowledge of dried sewage sludge from STPs being used as soil conditioner in various areas across Fort Ord but felt this was unlikely.
 She suggested speaking with Leo Laska, who was the Director of Engineering and Housing in the late 1980s and early 1990s.

Action Items or Follow-up Activities, if any

Contact Christine Duymich for information about fire department storage, use, or disposal of AFFF.
 Provide Ms. Youngblood with a list of topics for possible interview with Mr. Laska.

Appendix B
Site Reconnaissance Notes and Photographs

Site No: 1	Site Name:	Ord Village Sewage Treatment Plant
Date/Time: 2/14/2021	Weather: 55°F, Overcast	
Personnel Present:	Derek Lieberman	
Physical Features and Site Description:	No apparent sources. A sewage lift station operated by the Marina Coast Water District is present onsite. The site is accessible by a gravel path to allow for maintenance activities at the sewage lift station. A locked chain-link fence surrounds the site. Thick brush is present on the north, south, and west boundaries of the site.	
Other:		

Site No: 2	Site Name:	Main Garrison Sewage Treatment Plant
Date/Time: 1/7/2021, 1430	Weather: 57°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	No apparent source. Some sewage treatment plant infrastructure remains. Graffiti present onsite indicates that trespassing may have occurred after site closure. Asphalt-lined sludge drying beds have been removed and the area regraded. Loose pipes, wood planks, and tree trimmings are present onsite. Currently Ponding Area 2 acts as the primary stormwater basin, with Ponding Area 1 acting as an overflow basin.	
Other:		

Site No: 5	Site Name:	Range 36A, EOD
Date/Time: 1/21/2021, 1024	Weather: 65°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh, Chris Light (UXO escort)	
Physical Features and Site Description:	No apparent sources. No structures or buildings present onsite. Surrounding area is native chaparral. 2 acres in size, dimensions of roughly 200 feet by 400 feet. The site currently consists of trees, brush, and vegetation along the north, south, and east sides of the site and unpaved Impossible Canyon Road along the west side of the site.	
Other:	Chris Light, the UXO escort who has worked on and off at the former Fort Ord since base closure, indicated that primarily C4 and TNT explosives were detonated onsite.	

Site No: 8	Site Name:	Range 49, Molotov Cocktail Range
Date/Time: 1/21/2021, 1142	Weather: 65°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	No apparent sources. No structures present onsite. Site largely overgrown with a few clearings likely where the foxholes had been. Site is located in a depression, so stormwater is retained onsite. No stained or burnt soil was observed. The armored vehicle bodies were no longer present onsite.	
Other:		

Site No: 9	Site Name:	Range 40A, Flame Field Expedients Training Area
Date/Time: 1/21/2021, 1122	Weather: 65°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh, Chris Light (UXO escort)	
Physical Features and Site Description:	A large water storage tank used for prescribed burns is present in the former Range 40 open crawl area. This storage tank was installed after base closure. A wood and concrete wall separates the Range 40 crawl area and the Range 40A FFE area. Site currently is mostly flat, with a few shallow depressions and sparse vegetation.	
Other:	Chris Light stated that a UXO surface sweep had occurred in 2018. He also indicated that the area was likely used for handheld fire extinguisher training. A tank target had also been present onsite for training exercises (has been removed by 1/21/2021).	

Site No: 10	Site Name:	Burn Pit
Date/Time: 3/19/2021, 1115	Weather: 55 °F, Light rain	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	No apparent sources. The fire department hose tower Building 4401 and station Building 4400 are present to the northwest of the site. The site is sandy with sparse vegetation. A small amount of broken asphalt is present onsite. Areas of dead ice plants indicate that vegetation control measures may be underway. Stormwater runoff likely runs southwest towards a shallow depression.	
Other:		

Site No: 12	Site Name:	Lower Meadow Disposal Area
Date/Time: 1/7/2021, 1300	Weather: 57°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	<p>No apparent sources. Site is currently a parking lot for The Dunes on Monterey Bay retail center. Site has been entirely regraded and paved. The predominant topography reflects a morphology typical of the dune sand deposits that underlie Sites 2 and 12. In these areas, the ground surface slopes gently to the west, draining toward the Monterey Bay. The Dunes on Monterey Bay Retail Center, a 375,000 square-foot retail center owned by Shea Properties and leased by Commercial Retail Associates. The site now includes several big-box stores and a large parking area.</p>	
Other:		

Site No: 16	Site Name:	DOL Maintenance Yard and Promontory
Date/Time: 1/7/2021, 1500	Weather: 57°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	<p>No apparent sources. A stormwater discharge structure is present in adjacent Pete's Pond Extension. The Promontory was not in use during the site visit due to CSUMB COVID-19 restrictions. Onsite structures now only include the Promontory dormitory and a few small outbuildings used for maintenance of the dormitory. The stormwater system now includes plastic pipes installed after the site had been transferred to CSUMB. Site has been regraded and paved. The site is lightly vegetated in landscape areas, with some erosion control netting and rip rap present along the slopes of the site. An erosion channel (including rip rap) indicates that stormwater runoff currently flows into Pete's Pond Extension.</p>	
Other:		

Site No: 17	Site Name:	Disposal Area, 1400 Block Motor Pool
Date/Time: 1/7/2021, 1530	Weather: 57°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	No apparent sources or buildings present onsite. All buildings onsite have been demolished and site is currently vacant. A stormwater ditch, likely constructed during Fort Ord operation, runs the length of 5th Avenue. The ditch is trapezoidal, with an approximate 4 foot top width, 2 foot bottom width, and 2 foot depth.	
Other:		

Site No: 20 and FOSTA	Site Name:	South Parade Ground, 3800 and 519th Motor Pools, FOSTA
Date/Time: 1/7/2021, 0800	Weather: 57°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	No apparent sources. CSUMB athletic fields currently present onsite. All historical Army structures have been demolished. Drainage channel, concrete lined, runs east to west from General Jim Moore Blvd to 2nd Avenue and discharges west of 2nd Avenue into stormwater structure. Some portions of former airfield, parade ground, motor pools converted to athletic fields and associated parking.	
Other:		

Site No: 22	Site Name:	4400/4500 Block Motor Pool, Building 4492 Auto Craft Shop
Date/Time: 3/5/2021, 1128	Weather: 60°F, Partially cloudy	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	No apparent sources. The building is currently owned and operated as CSUMB Building No. 37 and includes interior offices for CSUMB facilities and maintenance personnel. A tenant improvement (TI) was performed in the late 2010s. No evidence of a fire suppression system other than wall-mounted fire extinguishers was found onsite. A drain pipe leads from the western parking lot offsite to the west.	
Other:		

Site No: 29	Site Name:	DRMO Building T-111
Date/Time: 1/21/2021, 1345	Weather: 65°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	No apparent sources. Building T-111 is connected to a concrete-paved courtyard to the northeast. The courtyard is surrounded by chainlink fence. The building is still present, but the windows and doors are boarded up. A sign stating that PCBs were stored onsite is affixed to the door. Crates of clay roof tiles are being stored in the courtyard. A stormwater channel from the courtyard leads toward the adjacent Sloat Street.	
Other:		

Site No: 31	Site Name:	Former Dump Site
Date/Time: 1/21/2021, 1400	Weather: 65°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	<p>No apparent sources. A small former Army building is present onsite. Site located within and adjacent to a ravine that is oriented from west to east and is about 60 feet deep. The slope is very steep, with a gradient of about 50%. The surface soil on this slope is loose. The slope is vegetated mostly with grasses, with several small patches of coast live oak trees. An ephemeral stream is located on the ravine floor, but stream flow only occurs during heavy rains. The site encompasses an approximately 900-foot-long section of the western side of the ravine. The site is currently undeveloped but is located close to the East Garrison development.</p>	
Other:		

Site No: 32	Site Name:	East Garrison Sewage Treatment Plant
Date/Time: 1/21/2021, 1546	Weather: 65°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	<p>No apparent sources. Site is now a park in a residential neighborhood. Site has been entirely regraded and redeveloped.</p>	
Other:		

Site No: 34	Site Name:	FAAF Fueling Facility - Buildings 501, 502, 503
Date/Time: 3/5/2021, 1600	Weather: 60°F, Partly cloudy	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	No apparent sources. Buildings 501 and 503 are no longer present onsite. Building 502 is padlocked and in use by UCMBEST. The rest of the site is an empty lot used as a staging yard for construction equipment. No evidence of locations of Buildings 501 and 503. A pile of construction rubble is currently near the expected location of Building 503.	
Other:		

Site No: 34	Site Name:	Hangar 507
Date/Time: 1/8/2021, 1000	Weather: 59°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	New, approximately 1 year old, sprung structure present on parking apron east of Hangar 507. Construction materials are stockpiled in a low point north of the sprung structure. The UCMBEST center, which includes commercial uses and two small schools, is located to the southwest of the site. Hangar 507 is currently split into two suites: the CIRPAS Airborne Research Facility operated by the Naval Postgraduate School in Suite A and a Joby Aviation facility in Suite B. No Trespassing signs are posted on the hangar but Suite A was accessed with permission. No evidence of an AFFF fire suppression system was found at the site.	
Other:		

Site No: 34	Site Name:	Building 510
Date/Time: 3/4/2021, 1400	Weather: 55°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh, Rick Wilcoxson	
Physical Features and Site Description:	<p>The area to the south of Hangar 510 is likely an infiltration basin receiving runoff from the area around Hangar 510. According to Mr. Rick Wilcoxson of Fort Ord Works who was present for the site visit, an oil-water separator is still present at the rear of the building. Hangar 510 is currently occupied by Fort Ord Works. There is no evidence of previous AFFF fire suppression systems. According to Mr. Wilcoxson, the fire suppression system was updated in the late 2010s from a water-based deluge system to a wet-pipe system.</p>	
Other:		

Site No: 34	Site Name:	Building 524
Date/Time: 1/8/2021, 1130	Weather: 59°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	<p>A potential infiltration area is present to the west of the building. Due to security concerns by the current occupant Joby Aviation, the building interior could not be accessed. Photos of the fire suppression system were provided by Joby Aviation. The fire suppression system is a deluge system and there is no evidence of an AFFF system.</p>	
Other:	<p>According to Amy Gross, Sustainability Lead at Joby Aviation, there is no onsite use of AFFF and no evidence of previous AFFF use in the fire suppression system.</p>	

Site No: 34	Site Name: Building 527
Date/Time: 1/8/2021, 1145	Weather: 59°F, Sunny
Personnel Present:	Derek Lieberman, Margaret Lindh
Physical Features and Site Description:	No apparent source areas. A potential stormwater infiltration area is present to the east of the building. Due to security concerns by the current occupant Joby Aviation, the building interior could not be accessed. Joby Aviation provided photos of the fire suppression system. The fire suppression system is a deluge system and there is no evidence of previous AFFF use in the system.
Other:	According to Amy Gross, Sustainability Lead at Joby Aviation, there is no onsite use of AFFF and no evidence of previous AFFF use in the fire suppression system.

Site No: 34	Site Name: Hangar 533
Date/Time: 3/5/2021, 1430	Weather: 59°F, Sunny
Personnel Present:	Derek Lieberman, Margaret Lindh, Jeff Crechriou
Physical Features and Site Description:	No apparent sources. The current occupant is Skydive Monterey Bay. No evidence of AFFF fire suppression systems. Stormwater discharges to apron and joins ephemeral stream to the northwest of the site.
Other:	

Site No: 34B	Site Name:	Former Burn Pit
Date/Time: 1/8/2021, 1300	Weather: 59°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	No apparent source. No buildings or structures onsite or nearby. Cut shrubs have been thrown into the pit. The pit is located in a low point, so no stormwater likely discharges offsite.	
Other:		

Site No: 36	Site Name:	FAAF Sewage Treatment Plant
Date/Time: 3/5/2021, 1507	Weather: 59°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh, Jeff Crechriou	
Physical Features and Site Description:	No apparent sources. A Marina Coast Water District (MCWD) lift station remains by the site boundary. The site is well vegetated with grass, trees, and dense shrub. The former evaporation pond area is now a depression.	
Other:		

Site No: 39	Site Name: Inland Ranges
Date/Time: 1/21/2021, 1051	Weather: 65°F, Sunny
Personnel Present:	Derek Lieberman, Margaret Lindh, Chris Light (UXO escort)
Physical Features and Site Description:	No apparent sources, buildings or structures onsite or in surrounding area. Aircraft wreckage reported in 1993 was not found. The topography consists of low rolling hills in the western and central portions, and more rugged terrain comprising several canyons and ridges to the east. The site is currently part of the Army-managed portion of the Fort Ord National Monument and is closed to the public due to munitions hazards.
Other:	Chris Light, UXO escort present for the site reconnaissance visit, mentioned that a UXO surface sweep was conducted in 2003 in the Watkins Gate Burn Area where there was reported small aircraft wreckage (Chris was not present for surface sweep or work in Fort Ord UXO at that time). No aircraft crash wreckage was present.

Site No: 40	Site Name: West FAAF Helicopter Defueling Area
Date/Time: 3/5/2021, 1445	Weather: 59°F, Sunny
Personnel Present:	Derek Lieberman, Margaret Lindh, Jeff Crechriou
Physical Features and Site Description:	No apparent sources. Site is northeast of Hangar 533. No buildings are on the site currently. A fire hydrant operated by the City of Marina Fire Department is present onsite. Gravel and broken concrete is also present onsite. Stormwater runoff drains to a ditch to the northwest of the site.
Other:	

Site No: 40A	Site Name:	East FAAF Helicopter Defueling Area
Date/Time: 3/5/2021, 1400	Weather: 59°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh, Jeff Crechriou	
Physical Features and Site Description:	No apparent sources. A few structures and equipment owned and operated by hangar tenants are present on northwest side of lot. Lot is gravel with possible drainage to a swale to the northwest. Stormwater runoff may also discharge to a northwest-southeast drainage channel which empties runoff from the paved hangar area to a low area to the southeast.	
Other:		

Site No: 41	Site Name:	Crescent Bluff Fire Drill Area
Date/Time: 1/21/2021, 1452	Weather: 65°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	No apparent sources, buildings or structures present onsite or in surrounding area. Three excavation areas (southern, central, and northern) remain onsite and unfilled. These basins likely collect stormwater runoff, indicated by the presence of water depth gages in each excavation.	
Other:		

Site No: NA	Site Name: Building 514, FAAF Fire & Rescue Station
Date/Time: 1/8/2021, 1100	Weather: 59°F, Sunny
Personnel Present:	Derek Lieberman, Margaret Lindh
Physical Features and Site Description:	A small outbuilding is present to the west of Building 514 (Fire & Rescue Station). No apparent sources. The current address is 3260 Imjin Road, Marina, CA 93933. It is occupied by the City of Marina Fire Department as Fire Station #2. The fire and rescue station was remodelled in 2012.
Other:	

Site No: NA	Site Name: Building T-105, East Garrison Fire House
Date/Time: 1/21/2021, 1331	Weather: 65°F, Sunny
Personnel Present:	Derek Lieberman, Margaret Lindh
Physical Features and Site Description:	The site is currently a vacant lot, with a small former Army chapel to the northwest of the site. The surrounding area is the East Garrison residential development.
Other:	

Site No: NA	Site Name: Building T-1820, Main Garrison Fire House - South
Date/Time: 1/7/2021, 0900	Weather: 57°F, Sunny
Personnel Present:	Derek Lieberman, Margaret Lindh
Physical Features and Site Description:	No apparent sources. Building T-1820 still present, but site is overgrown. "Door Blocked" sign is still present on the building. Presence of graffiti and opened cans of catfood indicate site has likely been used since formal site closure. The doors on Building T-1820 have been removed and walls are broken along the southwest edge of the building. Remaining windows are boarded up.
Other:	

Site No: NA	Site Name: Building T-2898, Main Garrison Fire House - North
Date/Time: 1/7/2021, 0945	Weather: 57°F, Sunny
Personnel Present:	Derek Lieberman, Margaret Lindh
Physical Features and Site Description:	Site is currently an empty lot. No buildings or structures are present onsite. A vacant church is present to the south of the site. A sewer inlet and a capped pipe (likely a potable water line) are still present onsite. Some minor litter is present onsite, likely windblown. The site is elevated, so stormwater runoff likely traveled to the depression on the north side of the lot.
Other:	

Site No: NA	Site Name:	Building T-3280, Main Garrison Fire House - East
Date/Time: 1/7/2021, 1045	Weather: 57°F, Sunny	
Personnel Present:	Derek Lieberman, Margaret Lindh	
Physical Features and Site Description:	<p>No apparent sources. Building T-3280 is still present onsite. To the north of the site is the Marina Equestrian Center. An empty gravel lot is present to the east of Building T-3280. The site currently is vacant, with the windows and doors are boarded up. Chainlink fence surrounds the site. The area surrounding the site is lightly vegetated with grass, trees, and bushes.</p>	
Other:		

Site No: NA	Site Name:	Main Garrison Fire Station (Building 4400)
Date/Time: 3/19/2021, 1430	Weather: 55°F, Light Rain	
Personnel Present:	Derek Lieberman, Margaret Lindh, Dave Wilcox	
Physical Features and Site Description:	<p>No apparent sources. Building 4403, built in the early 2000s, is present to the north of the site. The fire department hose tower, Building 4401, is present to the south of the site. Site 10 is present to the southeast of the site. The office, kitchen, and sleeping quarters have been remodelled over the years, but the garage area is largely original. No evidence of AFFF storage observed in the garage area. A few concrete hazmat storage boxes, which appear to have been constructed while Fort Ord was an active installation, are present at the building rear. A concrete stormwater ditch carries runoff from the north side of the fire station north along Gen. Jim Moore Blvd. to a concrete basin and depression at the intersection of Gen. Jim Moore Blvd. and Lightfighter Drive.</p>	
Other:	<p>Chief Wilcox indicated that AFFF may have been stored in the concrete boxes historically but there had been no storage of AFFF at the fire station during his time there.</p>	

Site No: NA	Site Name: Mudhen Lake
Date/Time: 1/21/2021, 0932	Weather: 65°F, Sunny
Personnel Present:	Derek Lieberman, Margaret Lindh
Physical Features and Site Description:	No apparent sources. No buildings or structures are present. A plaque on site indicates that the lake was at least partially engineered by the Army in 1960. Standing water was present in the lake during the site visit, with some waterfowl present.
Other:	

Site No: NA	Site Name: Former Operable Unit 1 - FAAF Fire Drill Area
Date/Time: 1/8/2021, 1145	Weather: 57°F, Sunny
Personnel Present:	Derek Lieberman, Margaret Lindh
Physical Features and Site Description:	No apparent source. A concrete pad previously used for groundwater remediation efforts was still present onsite. The area is now overgrown. The site is located in a depression, so it is unlikely that any runoff occurred onsite.
Other:	

Site No: NA	Site Name: Operable Unit 2 - Fort Ord Landfills
Date/Time: 1/7/2021, 1630	Weather: 57°F, Sunny
Personnel Present:	Derek Lieberman, Margaret Lindh
Physical Features and Site Description:	No apparent sources. The landfill areas are covered with light vegetation. The landfill is currently closed and not receiving any waste. The OU2 groundwater treatment plant and a few outbuildings and structures are located onsite. Surrounding areas include various residential communities. The site is located south of Imjin Parkway from the Abrams Park residential community and southwest of the Preston Park residential community. To the east of the site is the Schoonover Park residential community and to the southwest of the site is the CSUMB campus.
Other:	



Photo 1: View of the former Ord Village STP, facing west



Photo 3: Sign at entry gate, facing west



Photo 2: Southern boundary of the site, facing west

Site 1
 Ord Village Sewage Treatment Plant



Photo 1: Former sludge drying bed area, facing west



Photo 2: Ponding Area 1, facing west

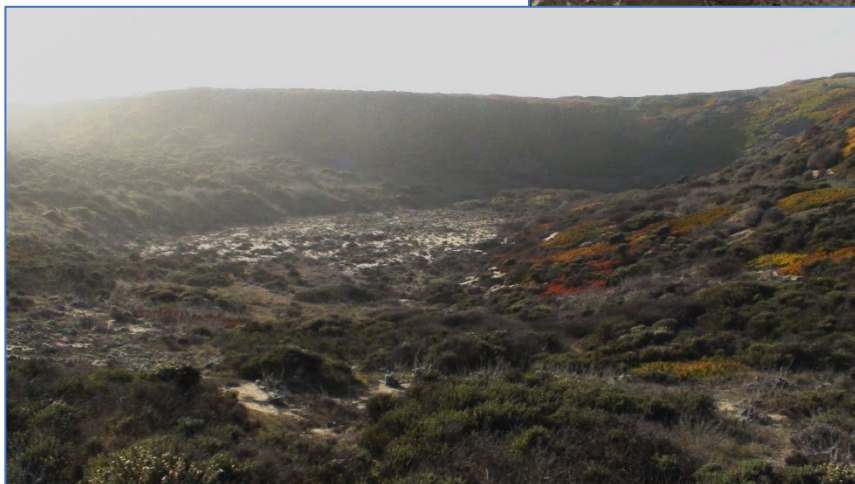


Photo 4: Ponding Area 3, facing west



Photo 3: Ponding Area 2, facing northeast



Photo 1: Range 36A, facing south



Photo 3: View of Range 36A from intersection of Riso Ridge Road and Hawkeye Road, facing north



Photo 2: Range 36A, facing southwest

Site 5
Range 36A, EOD

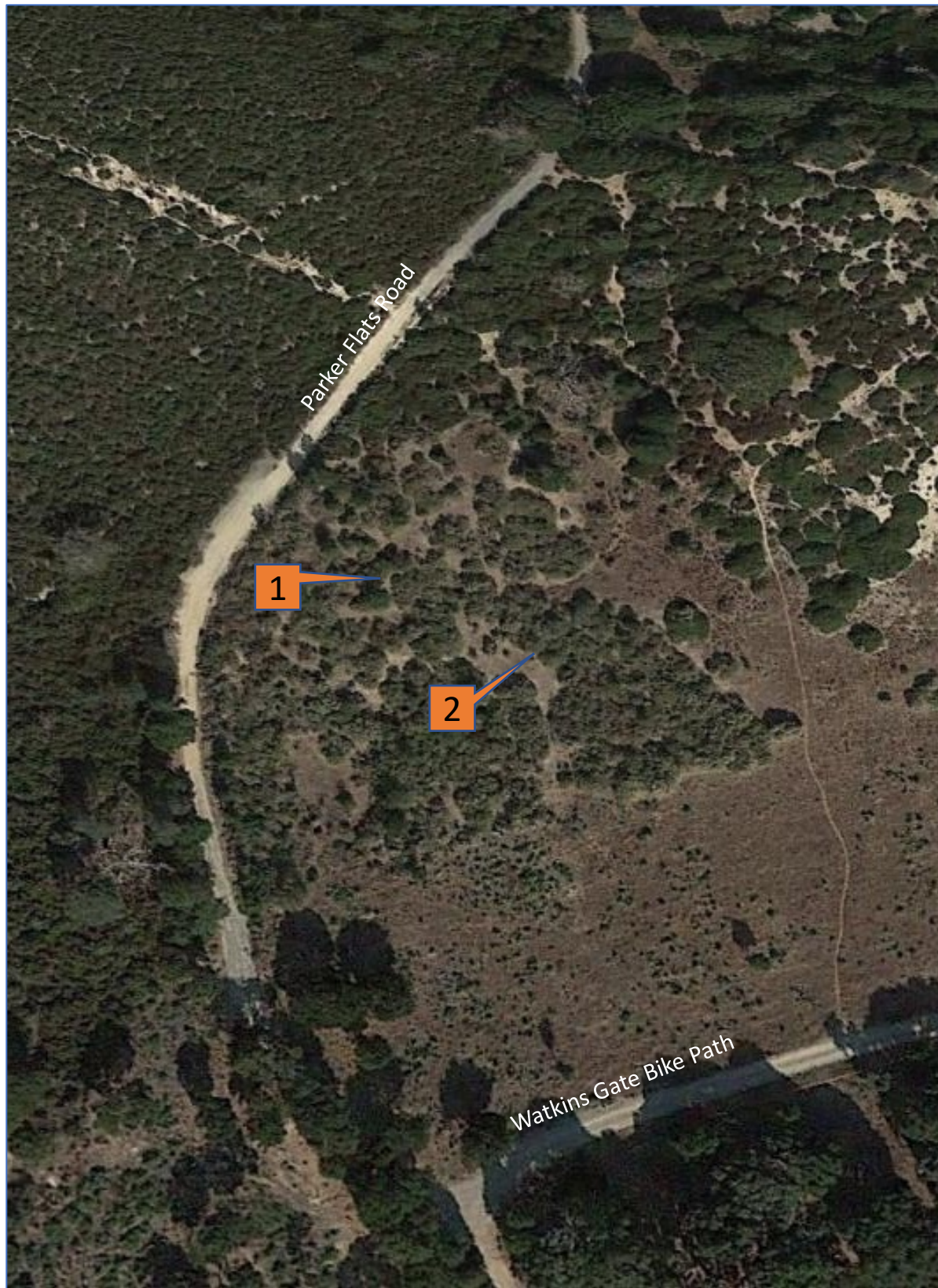


Photo 1: Range 49, facing east



Photo 2: Approximate location of foxholes, facing northeast



Photo 3: Range 40A, facing east

Photo 1: Retaining wall separating Range 40 (low-crawl area) and Range 40A, facing west



Photo 2: East edge of Range 40A, facing west



Bureau of Land Management compound

Range 40
Low-Crawl
Training
Area

Range 40A
FFE Training
Area

1

2

3





AAFES gas station

Main Garrison Fire Station

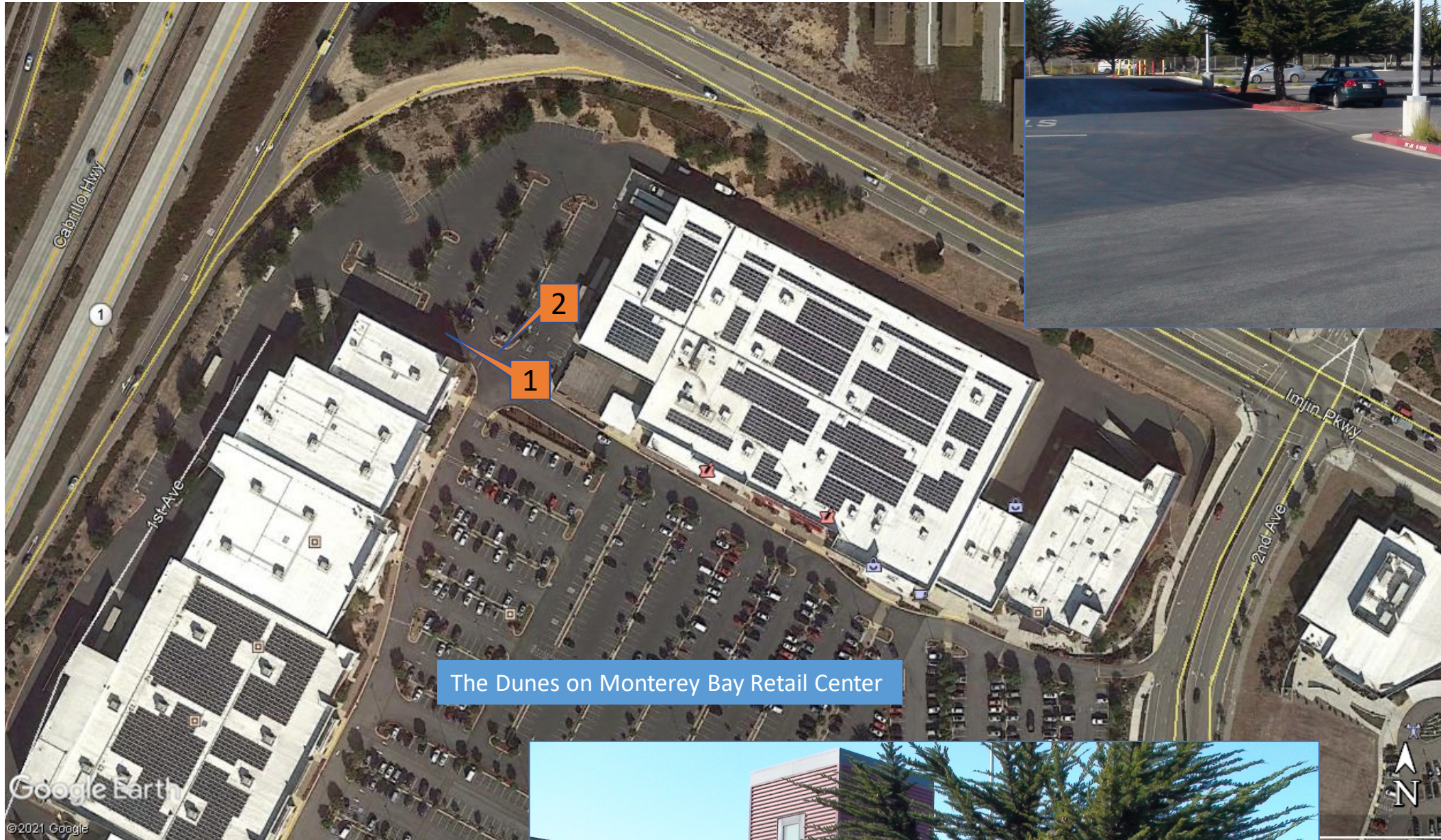


AAFES gas station

Photo 1: Burn pit area, facing southwest



Photo 2: Burn pit area and drainage route, facing northeast



The Dunes on Monterey Bay Retail Center



Photo 1: Lower Meadow Disposal Area, facing northwest



Photo 2: Lower Meadow Disposal Area, facing southwest

Site 12
Lower Meadow Disposal Area
DOL Automotive Yard



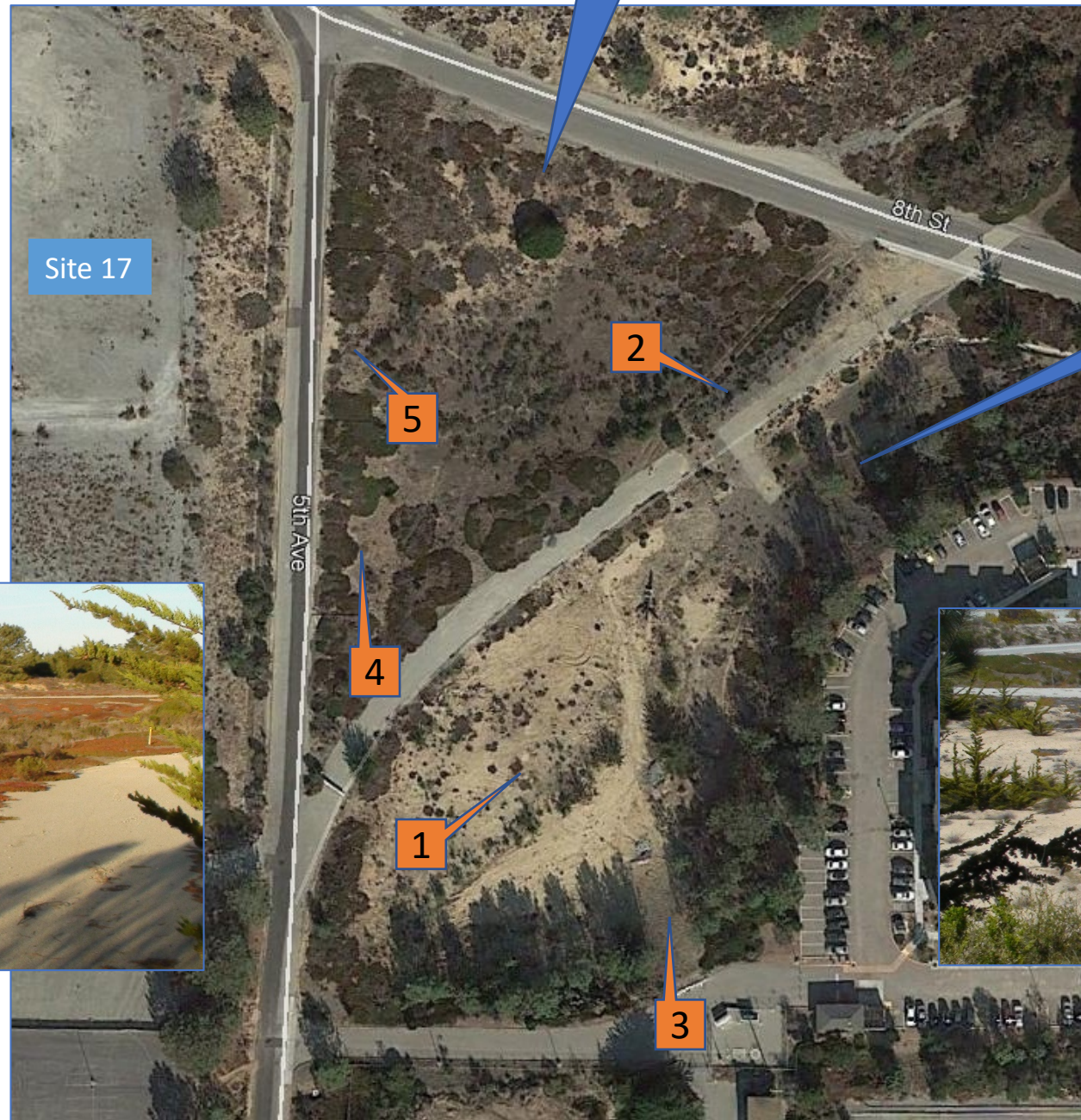
Photo 1: Pete's Pond Extension, facing northeast



Photo 2: Stormwater outlet from Pete's Pond Extension to Pete's Pond, facing southeast



Photo 5: Stormwater outlet from Site 17 to Pete's Pond, facing northwest



Pete's Pond

Pete's Pond Extension



Photo 3: Pete's Pond Extension drainage area, facing north



Photo 4: Pete's Pond, facing north

Site 16
Pete's Pond and Pete's Pond Extension

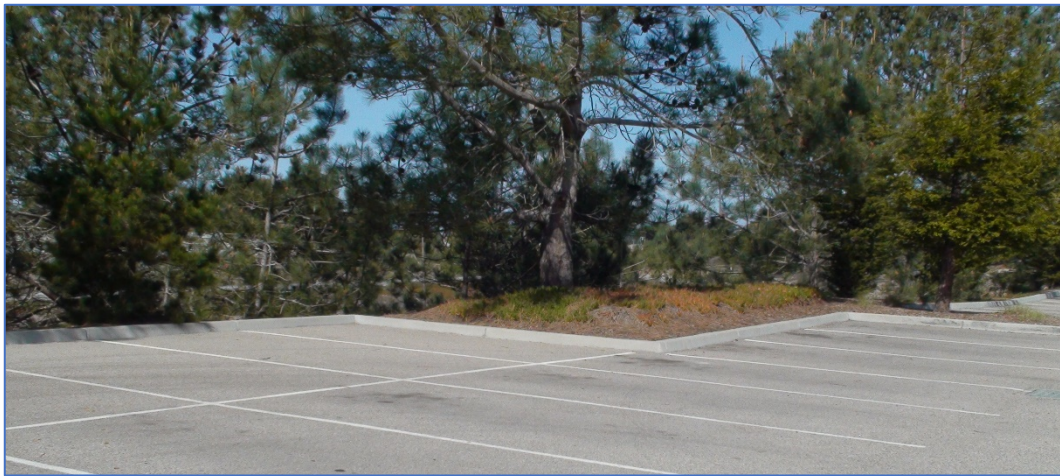


Photo 1: Top of slope above Pete's Pond Extension, facing northwest

Photo 2: Area of former Bldg 4903 south of Promontory, facing west

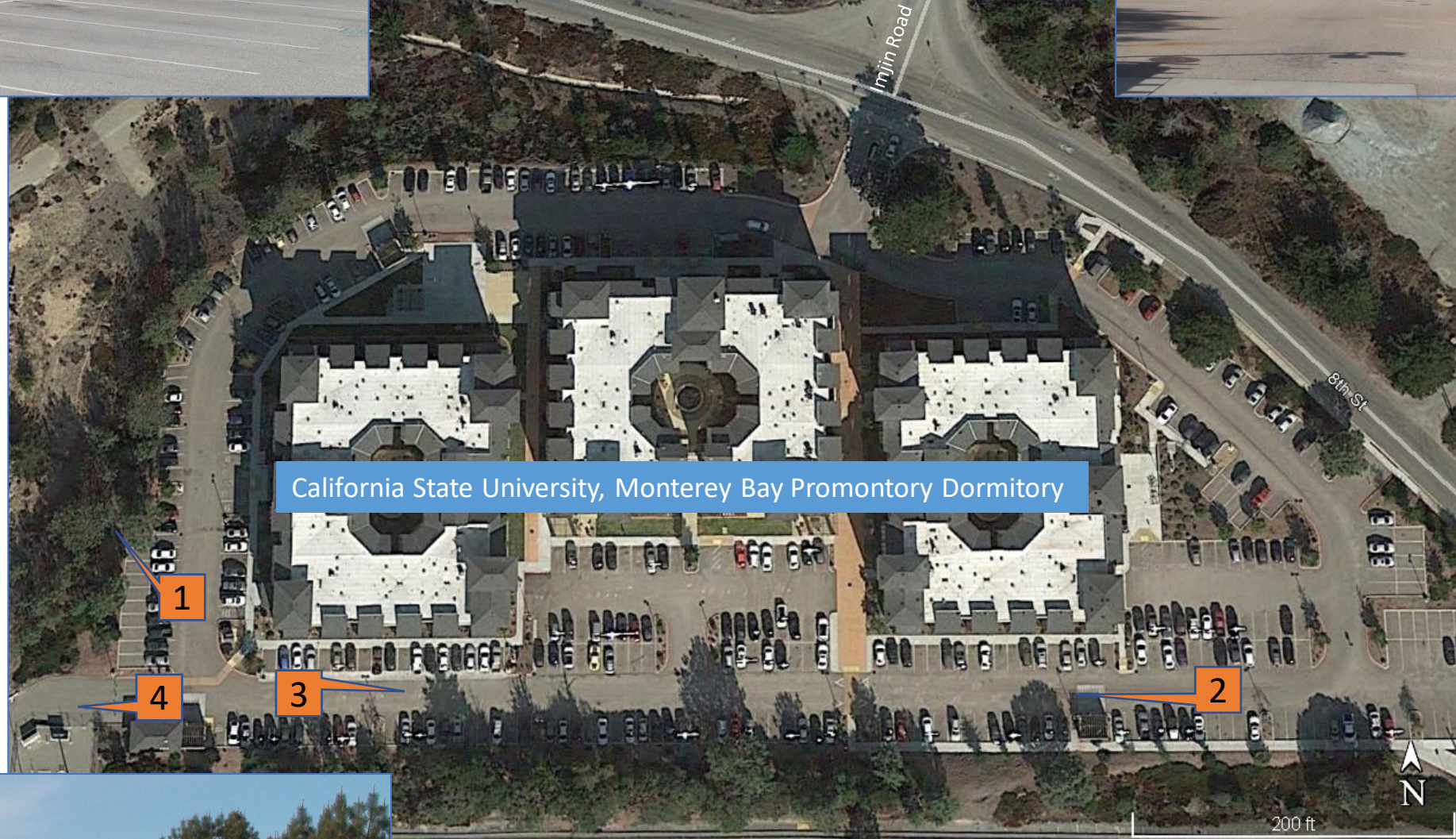


Photo 4: Sewage pump station area southwest of Promontory, facing west



Photo 3: Area of former wash rack south of Promontory, facing east



Photo 1: Stormwater drainage ditch on 5th Avenue (discharges to Pete's Pond), facing north



Photo 2: former disposal area, facing northwest



Photo 3: Stormwater drain inlet (discharges to drainage ditch on 5th Avenue), facing east



Pete's Pond



Photo 1: Baseball field (former hangar area), facing east



Photo 2: Parking lot and soccer field (former airfield area), facing southwest



Photo 5: Storm drain inlet structure west of 2nd Avenue, facing west



Photo 3: Drainage channel, facing northwest



Photo 4: Former FOSTA area, facing southeast

Photo 1: Building 4492 exterior and former wash rack, facing southeast

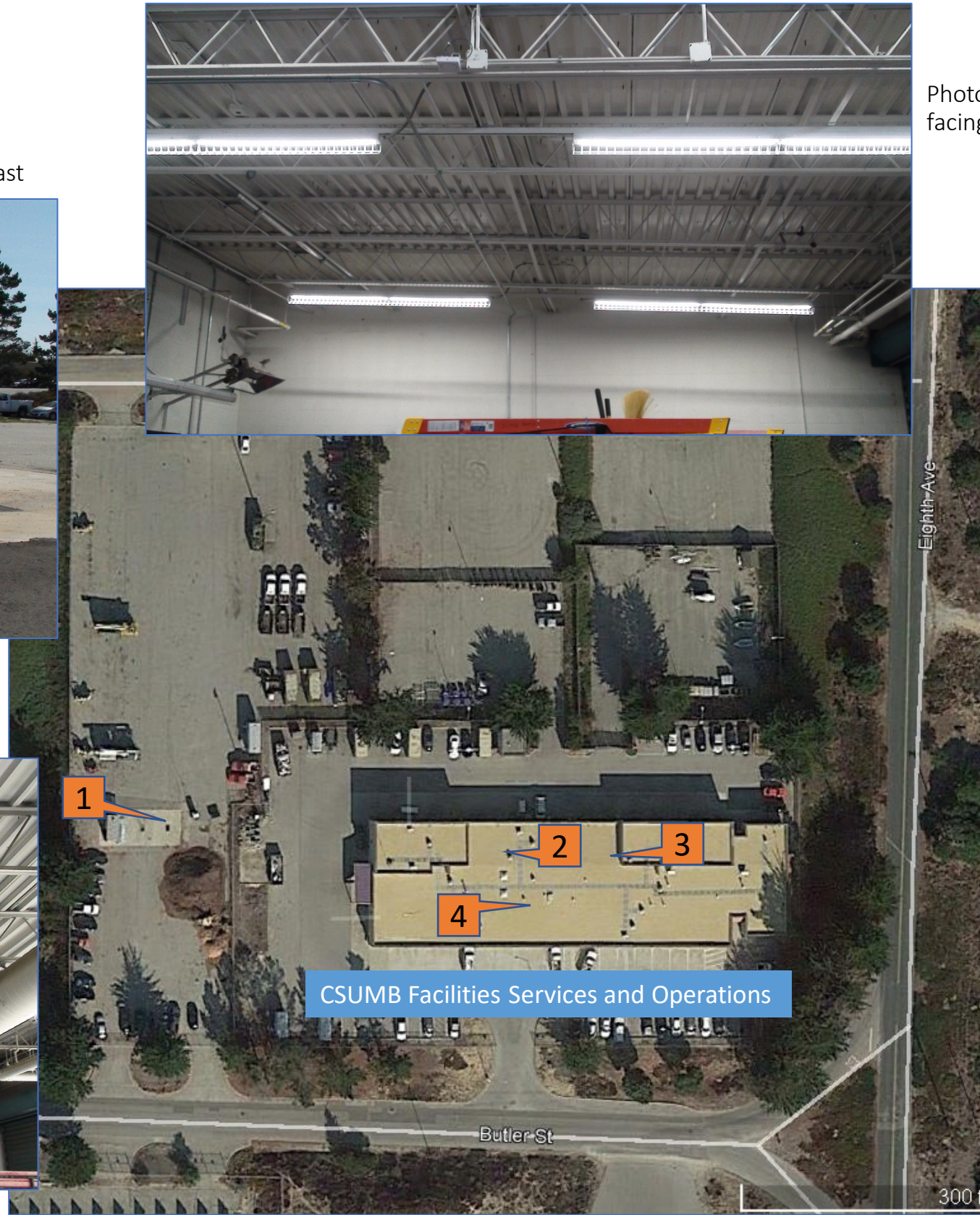
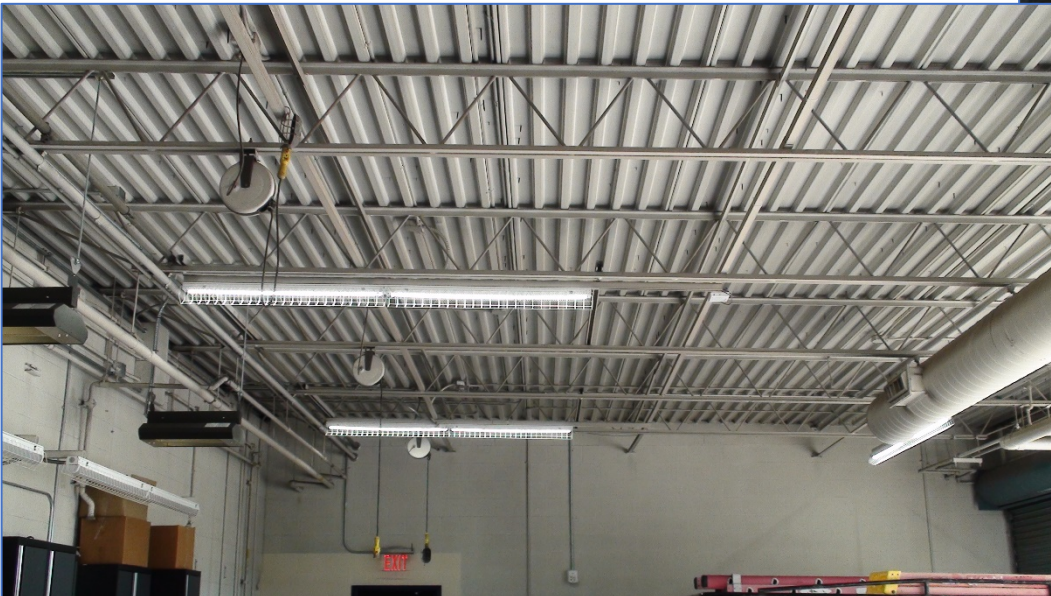


Photo 2: North garage area ceiling, facing west

Photo 3: North garage area floor drain, facing west



Photo 4: South garage area ceiling, facing east



CSUMB Facilities Services and Operations

Site 22
4400/4500 Block Motor Pool
Building 4492 Auto Craft Shop



Photo 1: North side of Building T-111 and adjoining concrete-surfaced yard, facing south



Photo 2: South side of Building T-111, facing east





Photo 1: View into ravine at former dump site location, facing south



Photo 2: Northern drainage area adjacent to Reservation Road, facing north

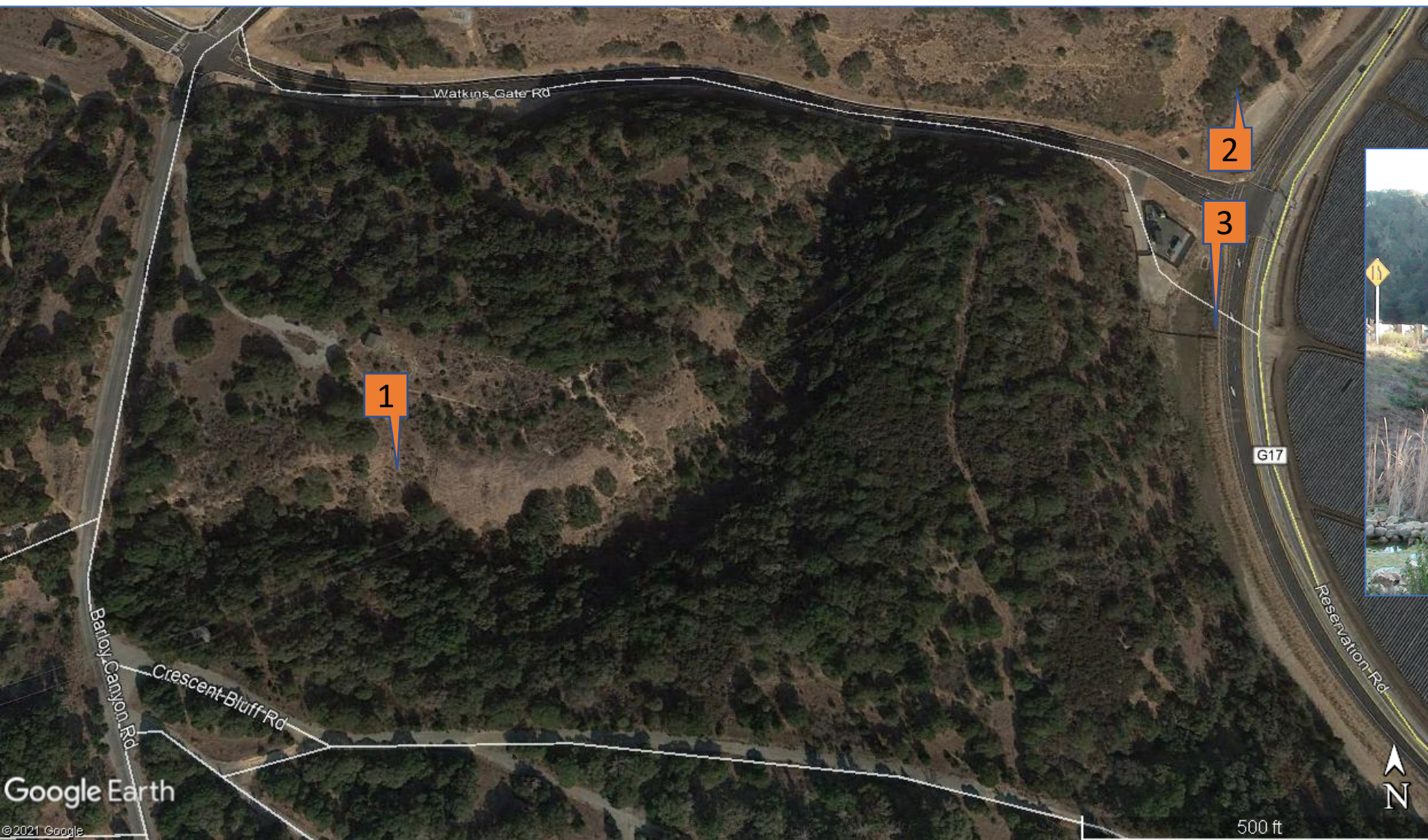


Photo 3: Southern drainage area adjacent to Reservation Road, facing south



Photo 1: View of former sludge drying bed area, facing east



Photo 2: Overview of former East Garrison Sewage Treatment Plant area, facing southeast



Photo 3: Area west of Building 502, indicating onsite drainage, facing south



Photo 4: Former Building 503 area, facing west

Photo 1: Former fueling island area east of building area, facing north



Photo 2: Building 502, facing north





Photo 1: Western exterior of Building 507, facing east



Photo 2: Parking lot west of Building 507 adjacent to Imjin Road, facing north

Southern storm drain inlet



Photo 3: Southern storm drain inlet west of Building 507, facing west

Sprung structure

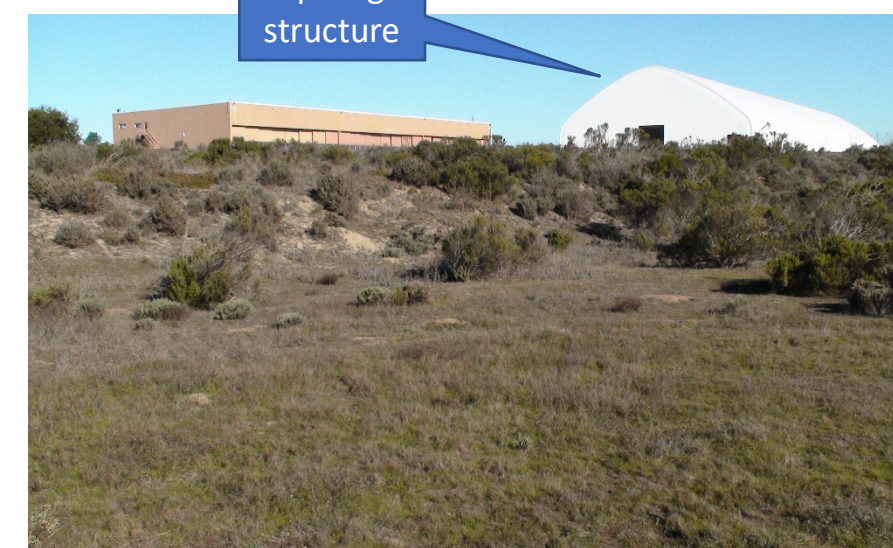


Photo 6: View of Building 507 from low point downslope of hangar, facing north



Photo 4: Northern storm drain inlet west of Building 507, facing west



Photo 5: Eastern exterior of Building 507, facing northwest

Photo 1: Fire suppression deluge valve system, facing west



Photo 2: Fire suppression system control panels, facing west



Photo 3: Water-based deluge system sprinkler, facing south



Photo 4: Hydronic heating system blower unit



Photo 5: Hydronic heating system pipe

Photo 1: Building 510 and suspected infiltration basin (foreground), facing north



Photo 2: Fire suppression system control panel, facing south



Photo 3: Wet-pipe fire suppression system valve, facing west



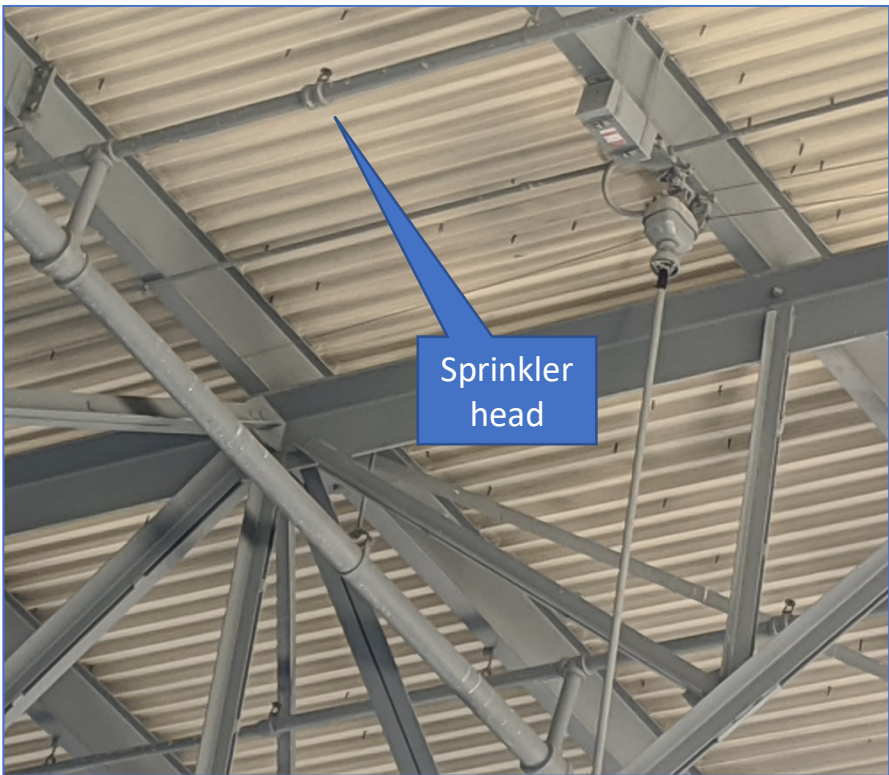
Photo 5: Hangar area wet-pipe sprinkler system



Photo 4: Workshop area wet-pipe sprinkler system



Infiltration basin



Sprinkler head

Photo 1: Hangar area deluge fire suppression sprinkler system



Photo 2: Building 524 with potential infiltration area, facing east



Photo 4: Fire suppression deluge sprinkler system, facing southeast



Infiltration area

Building 524

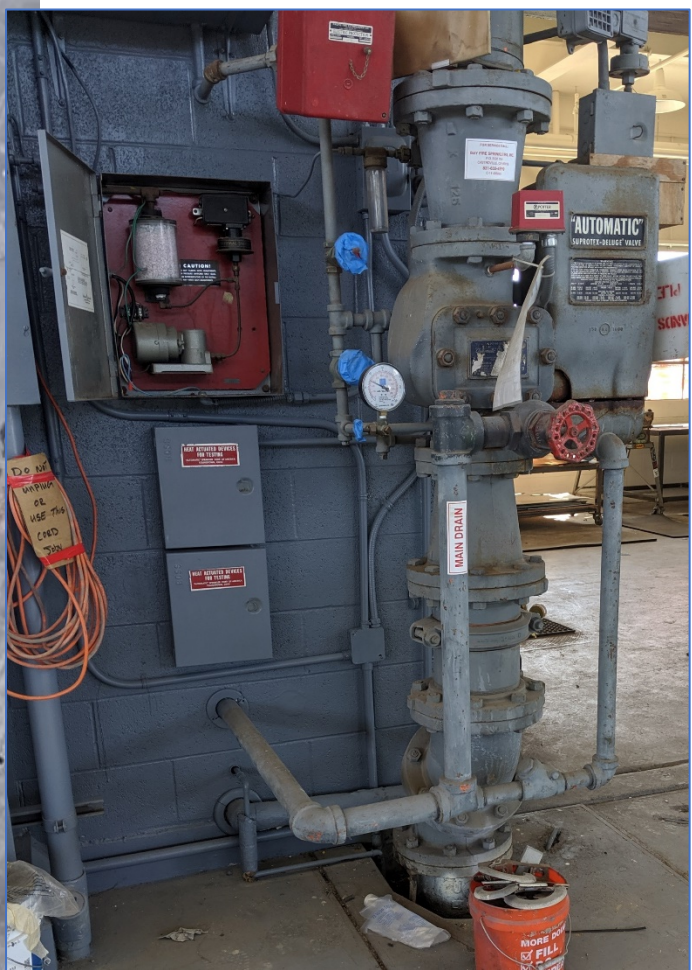


Photo 3: Fire suppression system deluge valve, facing southeast

Google Earth
©2021 Google



Photo 1: Building 527 and potential infiltration area, facing east



Photo 2: Building 527 and potential infiltration area, facing northwest

Photo 3: Wet-pipe fire suppression system valve, facing north

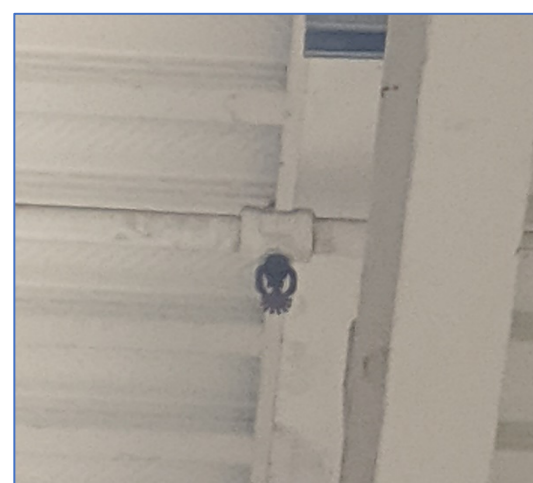
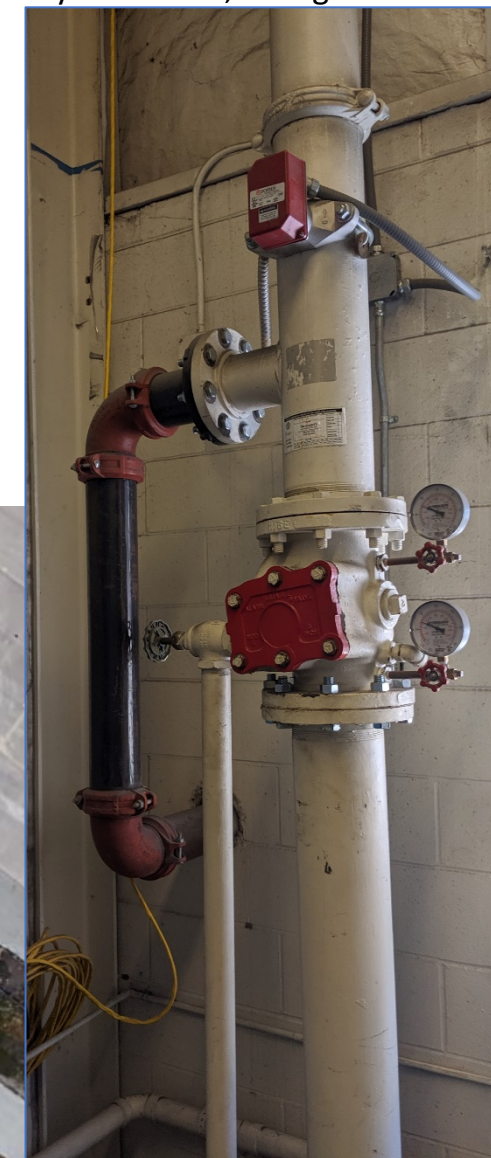


Photo 5: Hangar area fire suppression system sprinkler



Photo 4: Fire suppression system deluge valves, facing northwest

Site 34
Building 527



Photo 1: Exterior of Building 533, facing north

Photo 2: Fire suppression system deluge valve, facing west

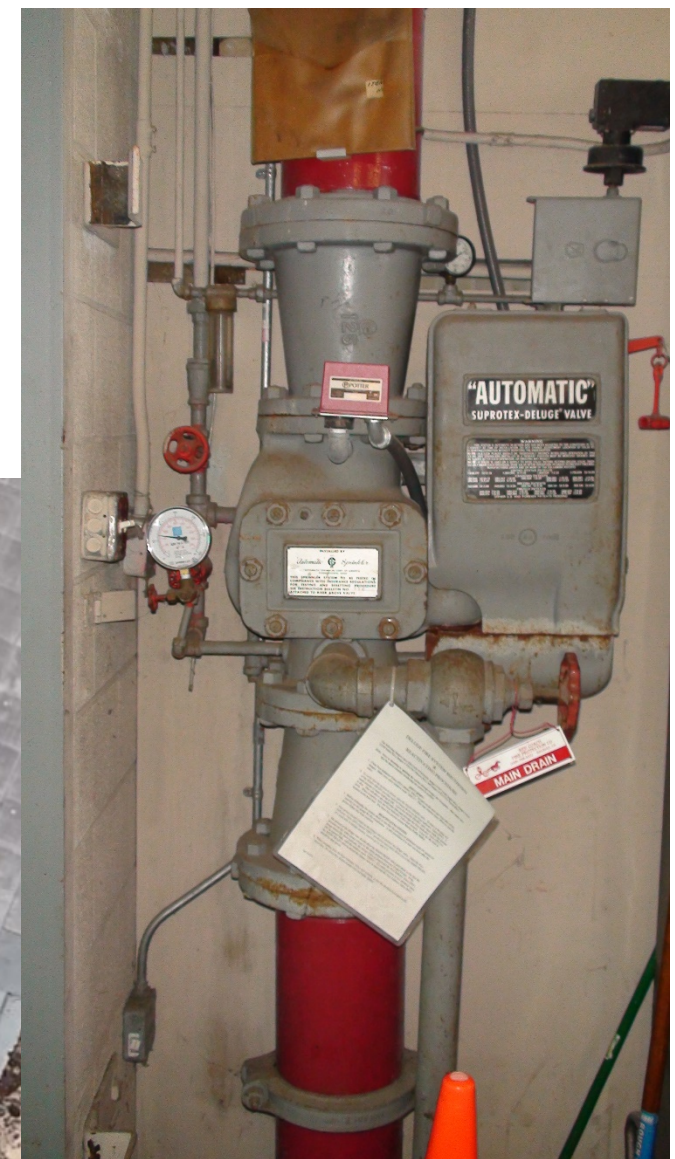


Photo 4: Hangar area fire suppression deluge sprinkler system

Sprinkler head



Photo 3: Hangar area fire suppression deluge sprinkler system

Photo 1: Former burn pit area, facing south



Cut vegetation placed by property owner

Photo 2: Former burn pit area, facing west



Former burn pit

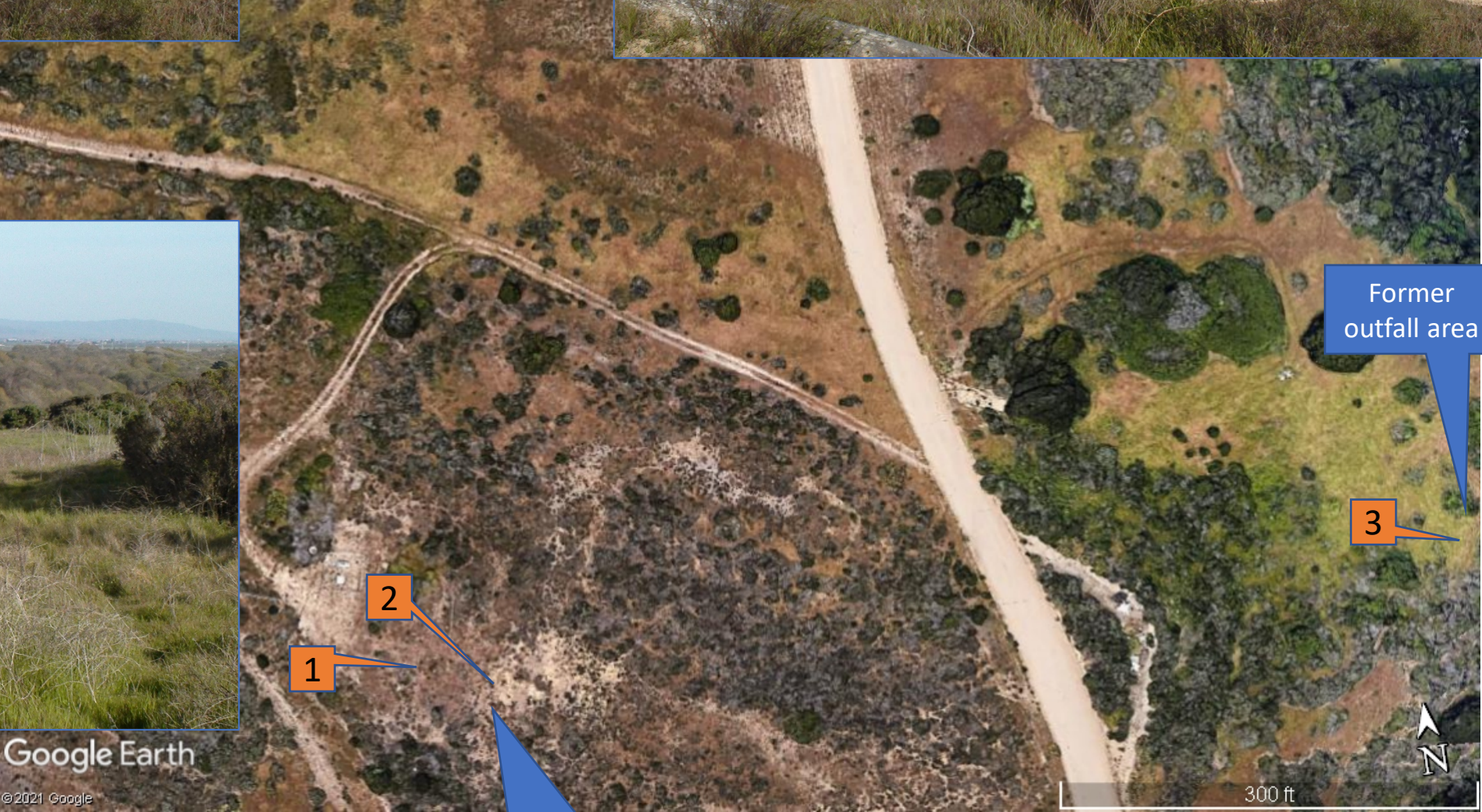
Photo 1: Former sludge drying bed area, facing east



Photo 2: Former sludge drying bed area, facing southeast



Photo 3: Former outfall area, facing east



Former sludge drying bed area

Former outfall area

Site 36
FAAF Sewage Treatment Plant

Photo 1: Possible crash site southwest of the intersection of Broadway Road and Evolution Road, facing south



Photo 2: Possible crash site southwest of the intersection of Broadway Road and Evolution Road, facing east

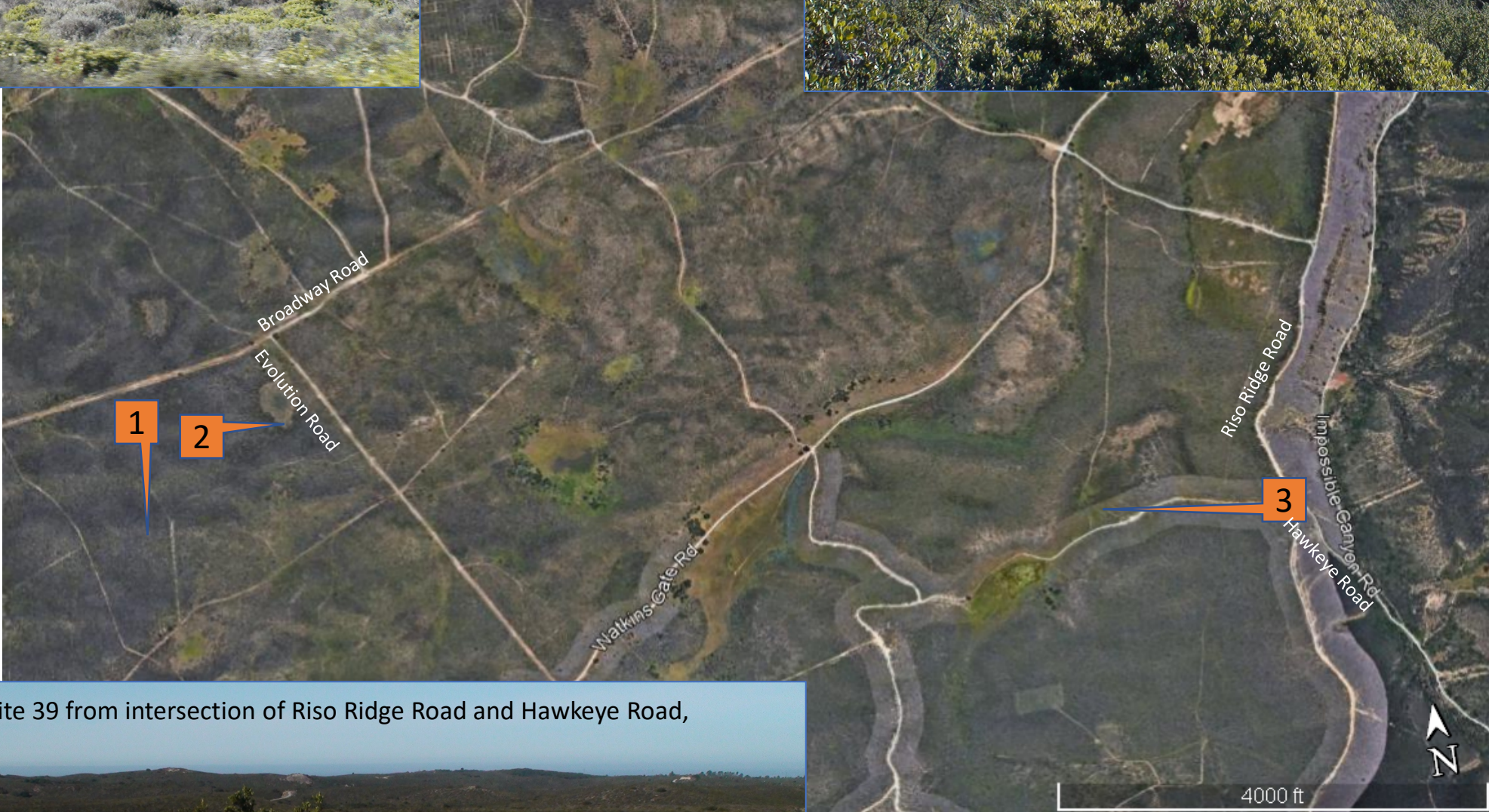


Photo 3: View of Site 39 from intersection of Riso Ridge Road and Hawkeye Road, facing west



Photo 1: Western edge of defueling area, facing northeast



Photo 2: Western edge of defueling area, facing north



Photo 4: Stormwater drainage ditch, facing south toward Building 533



Photo 3: Drainage area west of helicopter defueling area, facing west



Photo 1: Southeast side of helicopter defueling area, facing east



Photo 2: Drainage swale, facing northeast

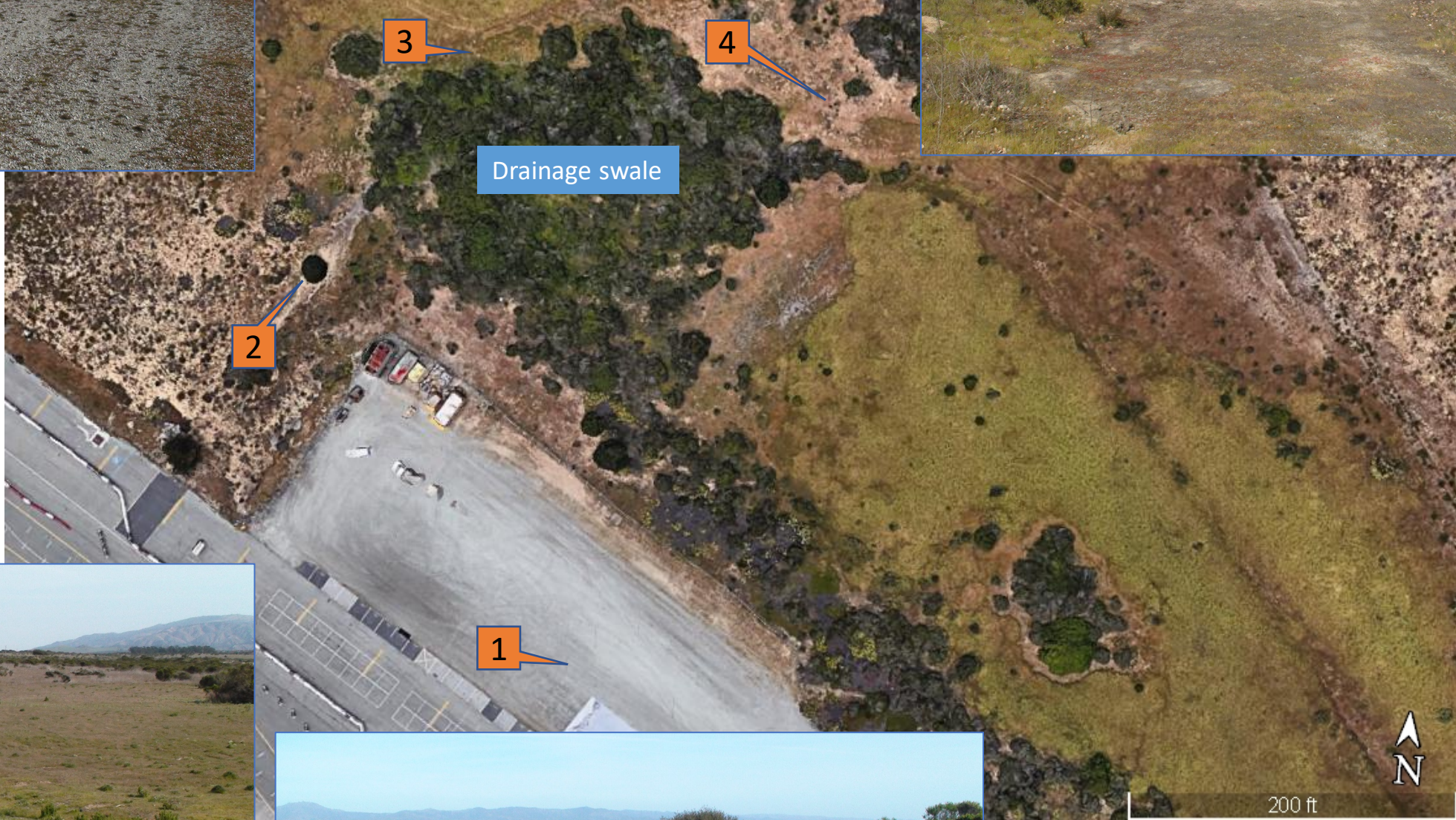


Photo 4: Drainage swale, facing southeast



Photo 3: Drainage swale, facing east

Photo 1: View across former burn pit, facing east

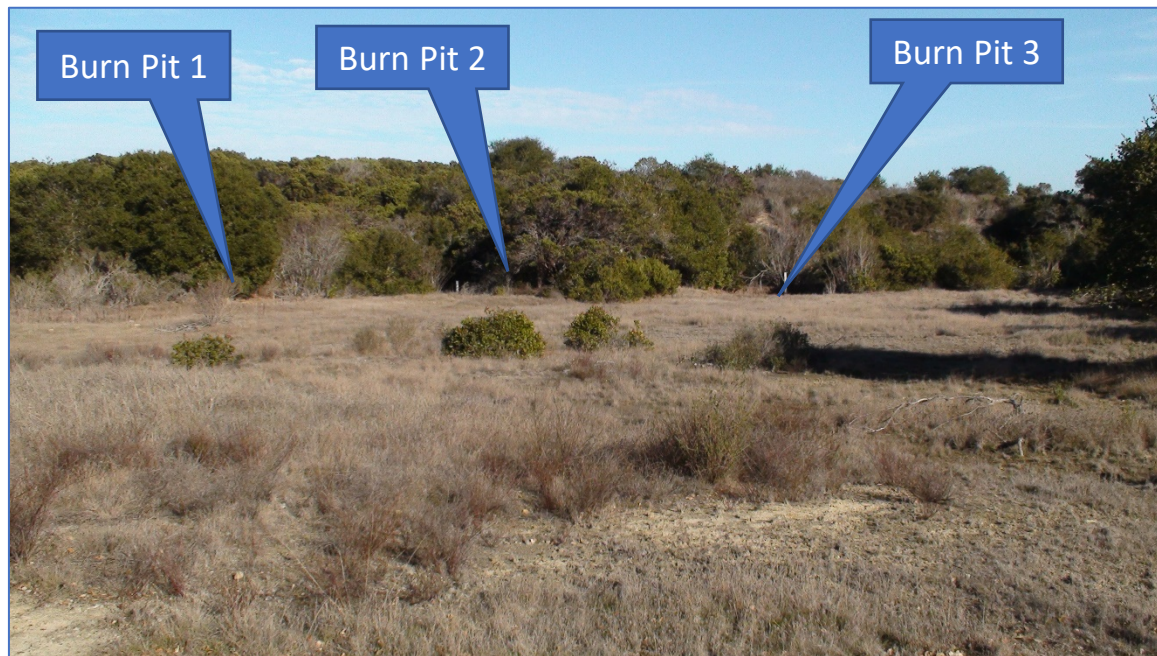


Photo 2: Central former Burn Pit 2 excavation with depth gauge, facing east

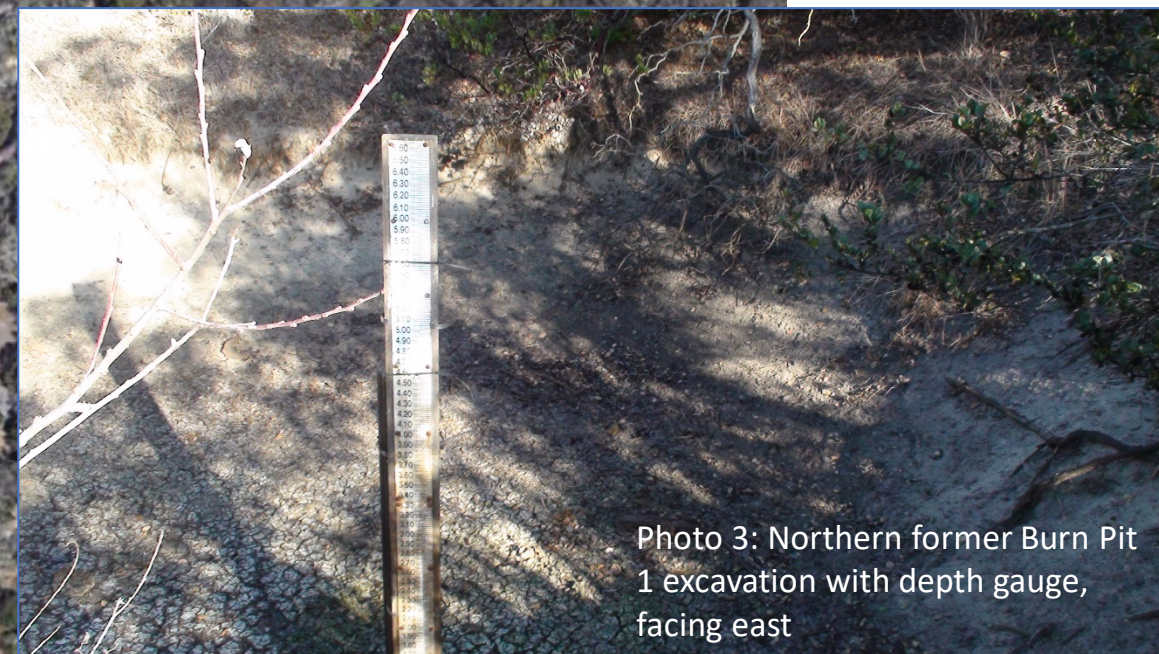


Photo 3: Northern former Burn Pit 1 excavation with depth gauge, facing east



Photo 4: Southern former Burn Pit 3 excavation, facing east

Photo 1: Grassy area south of station, facing southwest



Photo 2: North side of station, facing south



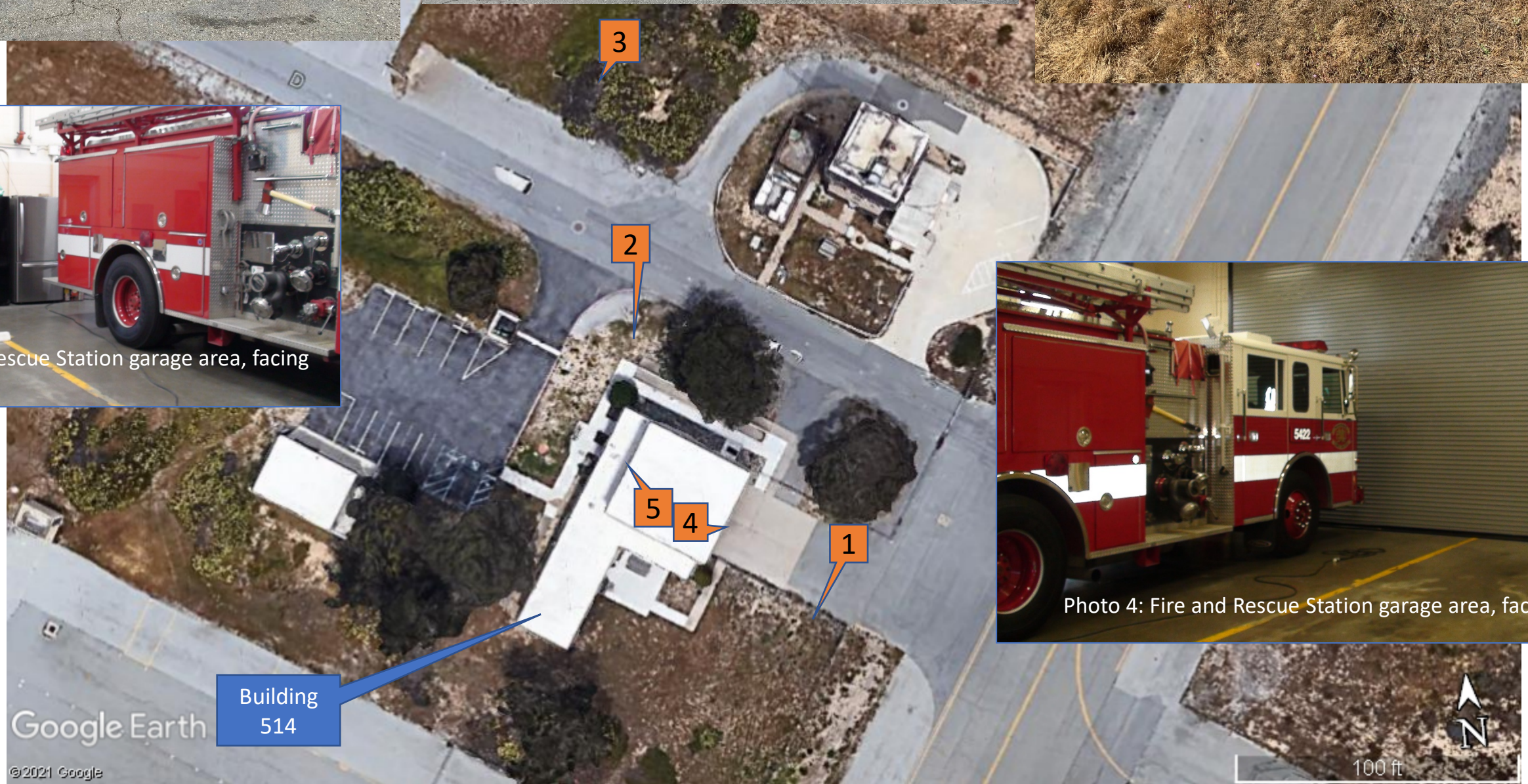
Photo 3: Discharge into drainage area, facing southwest



Photo 5: Fire and Rescue Station garage area, facing northwest



Photo 4: Fire and Rescue Station garage area, facing southeast



Building 514

Building 514, Fritzsche Army Airfield Fire & Rescue Station



Photo 1: Vacant lot west of intersection of Chapel Hill Road and Sherman Street, former location of Building T-105, facing northwest

Photo 1: Exterior view of Building T-1820, facing north



Photo 2: Exterior view of Building T-1820, facing southwest



Photo 4: Exterior view of storm drain inlet near 2nd Avenue, facing east



Photo 3: Interior view of Building T-1820, facing southwest

Photo 1: Lot and site of former Building T-2898, facing northeast

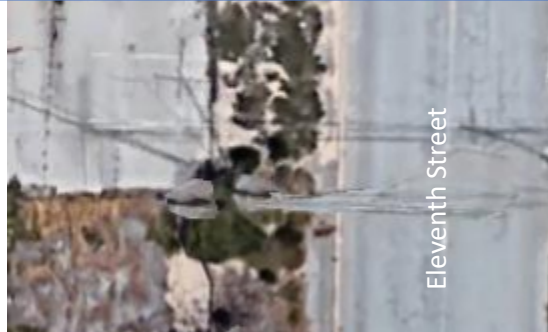


Photo 2: Depression at north end of lot, facing southwest



Photo 1: Exterior view of Building T-3280, facing east



Photo 2: Exterior view of Building T-3280, facing northwest



Photo 3: Exterior view of Building T-3280, facing north

Photo 4: Interior view of drop ceiling blocking garage doors, facing west



Photo 1: Building 4400 front, facing south



Photo 2: Building 4400 rear, facing north



Hose tower



Photo 4: Building 4403, facing north

Photo 3: Building 4401 hose tower, facing south

Photo 1: Mudhen Lake, facing southwest



Photo 2: Mudhen Lake, facing east



Photo 3: Stormwater overflow area west of Mudhen Lake, facing west



Google Earth
©2021 Google

Stormwater overflow area



Photo 4: Plaque by Mudhen Lake, indicating construction of dike separating east and west sides

Mudhen Lake

Photo 1: Burleson Consulting, Inc. biologist staging plants at Range 34, facing west



Photo 2: Burleson Consulting, Inc. biologist installing plants at Range 34, facing north



Photo 3: Installation of coir fabric at Range 34, facing east



* Photos sourced from the *Former Fort Ord Site 39 Habitat Restoration 2019 Annual Report* (Burleson, 2020).

Photo 4: Range 34, taken April 2019, facing west



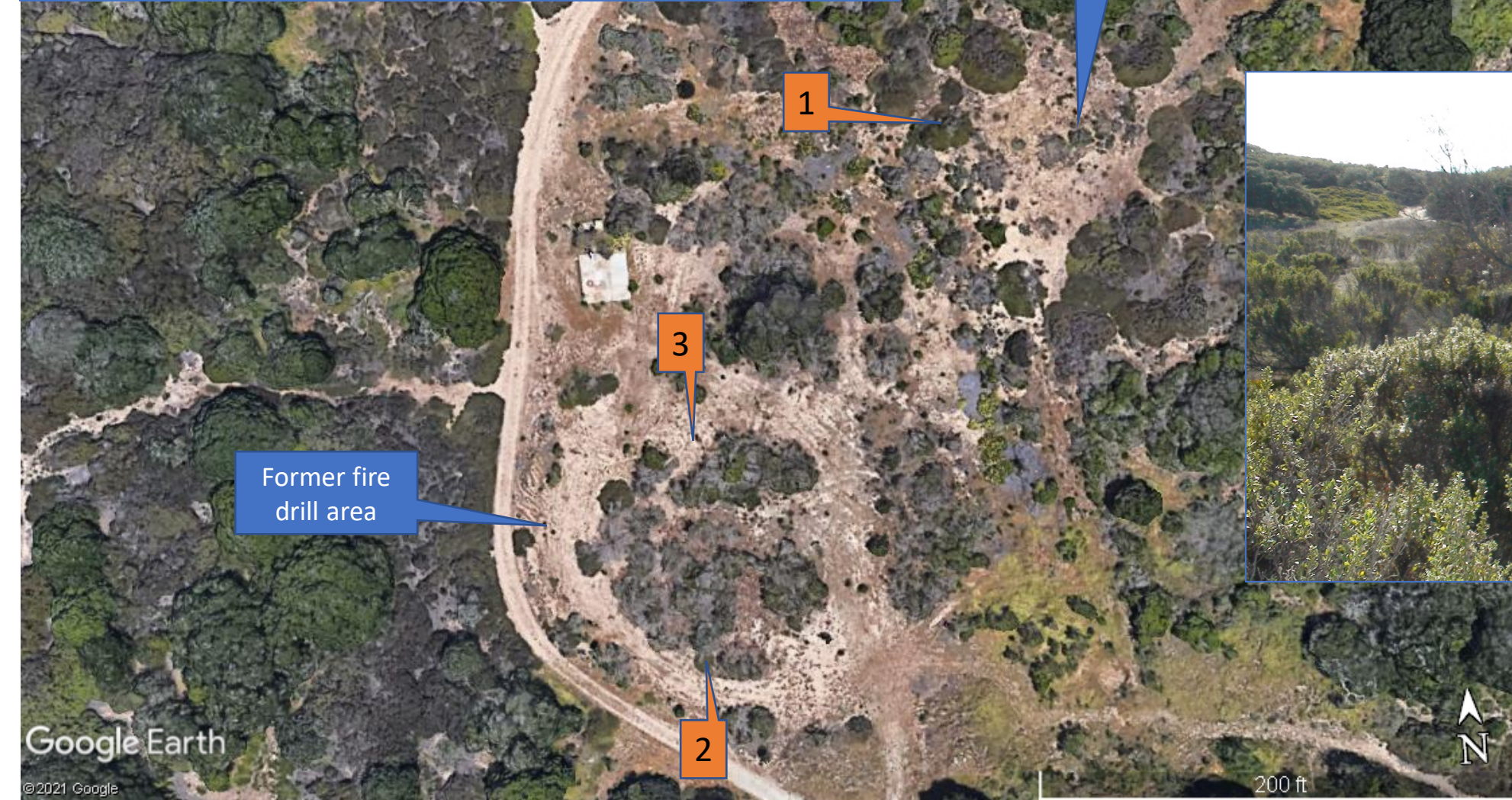
Range 34*

Photo 1: Former drum unloading area, facing east

Photo 2: Former fire drill area, facing north



Former drum unloading area



Former fire drill area



Photo 3: Former fire drill area, facing south

Photo 1: Area B, facing east



Photo 2: Area C, facing east



OU2 Groundwater Treatment Plant

OU2 Groundwater Treatment Plant

Photo 3: Area D, facing southeast



Barn Owl nest box

Photo 4: Area E, facing northeast

Photo 5: Area F, facing east



OU2, Fort Ord Landfills

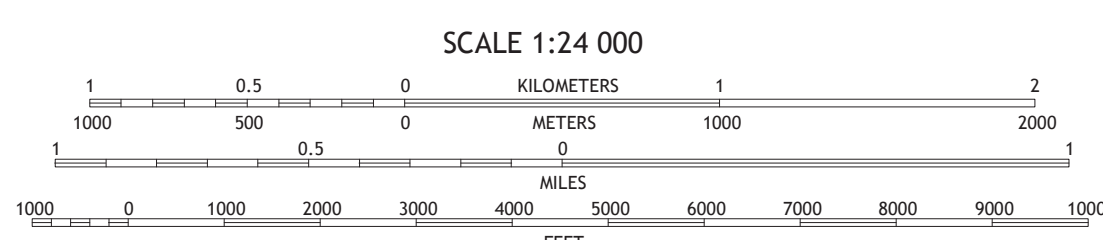
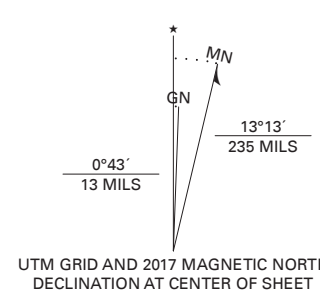
Appendix C

USGS Topographic Maps



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid/Universal Transverse Mercator, Zone 10S
This map is not a legal document. Boundaries may be
generalized for this map scale. Private lands within government
reservations may not be shown. Obtain permission before
entering private lands.

Imagery.....NAIP, May 2016 - October 2016
Roads.....U.S. Census Bureau, 2016
Names.....GNIS, 1981-2018
Hydrography.....National Hydrography Dataset, 2001-2018
Contours.....National Elevation Dataset, 2008
Boundaries.....Multiple sources; see metadata file, 2016-2017
Public Land Survey System.....BLM, 2018
Wetlands.....FWS National Wetlands Inventory, 2005



ADJOINING QUADRANGLES

1	2
3	4
5	6
7	

- 1 Moss Landing
- 2 Prunedale
- 3 Monterey OE N
- 4 Salinas
- 5 Monterey
- 6 Seaside
- 7 Spreckels

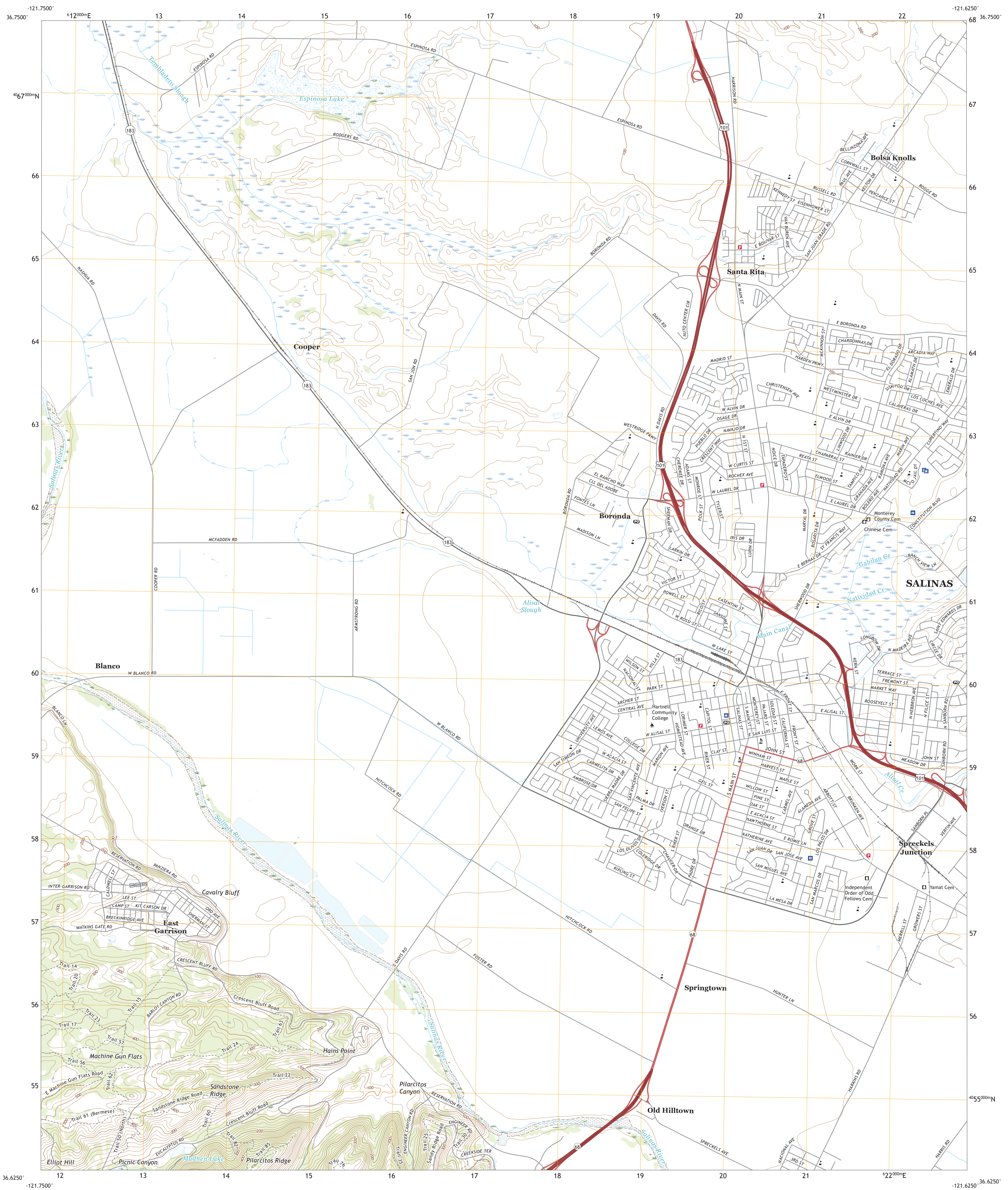
ROAD CLASSIFICATION

Expressway	Local Connector
Secondary Hwy	Local Road
Ramp	4WD
Interstate Route	US Route
	State Route

MARINA, CA
2018



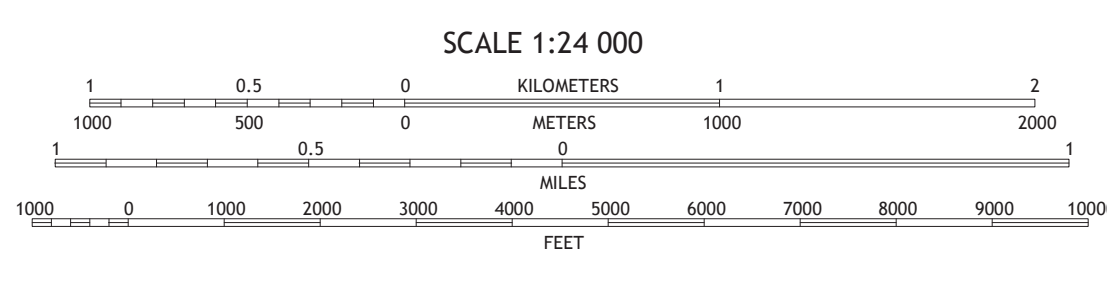
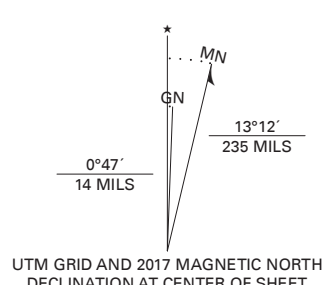
NSN 7540-01-603-5698
NGA REF. NO. USGS X 2.4 K 2.77 0 1



Produced by the United States Geological Survey

North American Datum of 1983 (NAD83) World Geodetic System of 1984 (WGS84) Projection and 1 000-meter grid/Universal Transverse Mercator, Zone 10S This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery: NAIP, May 2016 - October 2016 U.S. Census Bureau, 2016 Names: GNS, 1981 - 2018 Hydrography: National Hydrography Dataset, 2002 - 2018 Contours: National Elevation Dataset, 2008 Boundaries: Multiple sources; see metadata file 2016 - 2017 Public Land Survey System: BLM, 2018 Wetlands: FWS National Wetlands Inventory, 2005



ROAD CLASSIFICATION table with symbols for Expressway, Secondary Hwy, Ramp, Interstate Route, Local Connector, Local Road, 4WD, US Route, and State Route.

ADJOINING QUADRANGLES grid showing a 3x3 grid of map sheets with sheet 4-5 highlighted in red.

SALINAS, CA 2018





Produced by the United States Geological Survey

North American Datum of 1983 (NAD83) World Geodetic System of 1984 (WGS84) Projection and 1 000-meter grid/Universal Transverse Mercator, Zone 10S This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Table with 2 columns: Feature Name and Date/Source. Includes Imagery (NAIP, May 2016 - October 2016), Roads (U.S. Census Bureau, 2016), Names (GNIS, 1981 - 2018), Hydrography (National Hydrography Dataset, 2001 - 2018), Contours (National Elevation Dataset, 2008), Boundaries (Multiple sources; see metadata file, 2016 - 2017), Public Land Survey System (BLM, 2018), Wetlands (FWS National Wetlands Inventory, 2005).

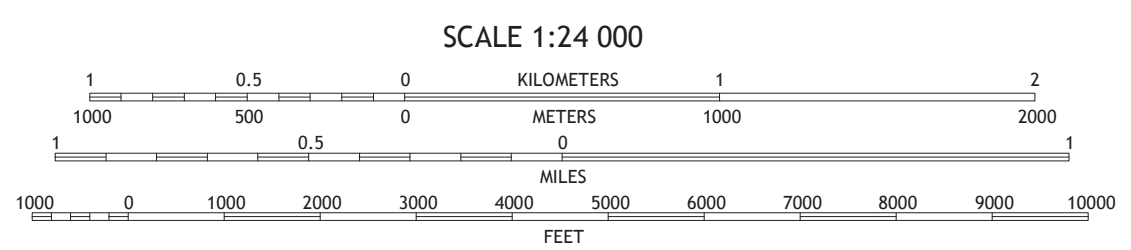
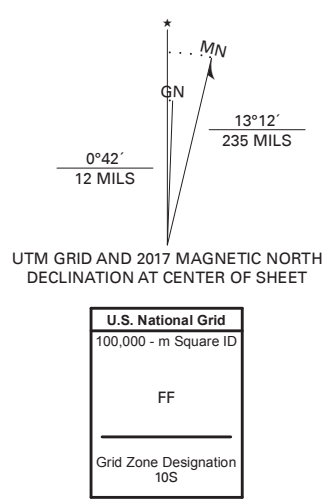
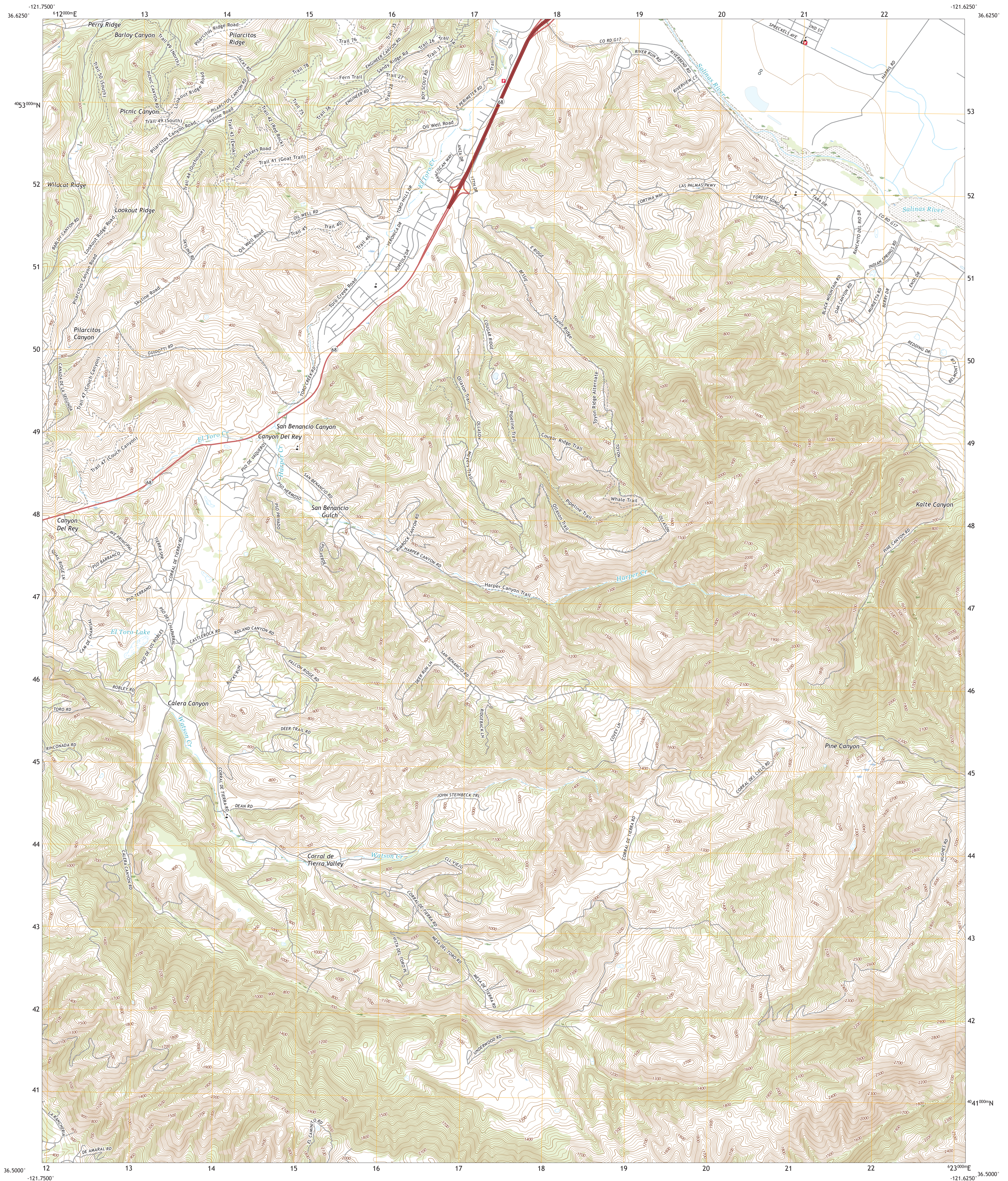


Table with 3 columns: Adjoning Quadrangles (1, 2, 3, 4, 5, 6, 7, 8) and their corresponding names (1 Monterey DE N, 2 Marina, 3 Salinas, 4 Monterey, 5 Spreckels, 6 Soberanes Point, 7 Mount Carmel, 8 Carmel Valley).

ROAD CLASSIFICATION legend table with symbols for Expressway, Secondary Hwy, Ramp, Interstate Route, Local Connector, Local Road, 4WD, US Route, and State Route.

CONTOUR INTERVAL 20 FEET NORTH AMERICAN VERTICAL DATUM OF 1988 This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011. A metadata file associated with this product is draft version 0.6.18

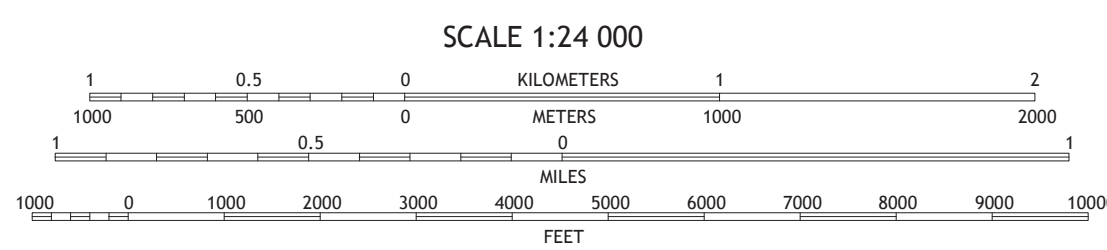
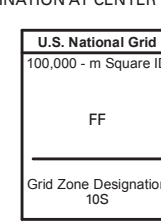
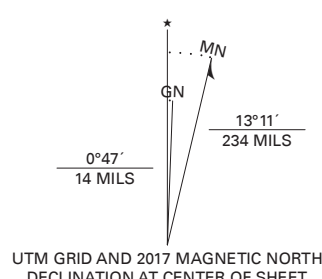




Produced by the United States Geological Survey

North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84), Projection and
1 000-meter grid/Universal Transverse Mercator, Zone 10S
This map is not a legal document. Boundaries may be
generalized for this map scale. Private lands within government
reservations may not be shown. Obtain permission before
entering private lands.

ImageryNAIP, May 2016 - October 2016
RoadsU.S. Census Bureau, 2016
NamesGNIS, 1981 - 2018
HydrographyNational Hydrography Dataset, 2001 - 2017
ContoursNational Elevation Dataset, 2008
BoundariesMultiple sources: see metadata file 2016 - 2017
Public Land Survey SystemBLM, 2018
WetlandsFWS National Wetlands Inventory 2005



CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the
National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18



1	2	3
4	5	6
7	8	

ADJOINING QUADRANGLES

- 1 Marina
- 2 Salinas
- 3 Natividad
- 4 Seaside
- 5 Chualar
- 6 Mount Carmel
- 7 Carmel Valley
- 8 Rana Creek

ROAD CLASSIFICATION

Expressway	Local Connector
Secondary Hwy	Local Road
Ramp	4WD
Interstate Route	US Route
	State Route



Appendix D
Real Property Records for Hangars 507, 510, 524, 527, and 533

1. FACILITY NO. 510 Ft Ord		2. DESIGNATION Mnt Hangar AVUM		3. CATEGORY CODE 211 10		4. DESIGNED CAPACITY		5. TOTAL AREA 21,947	
6. UNIT OF MEASURE SF			7. DRAWING NO. 53-15-16			8. MAP NO.		9. <input type="checkbox"/> LEASED <input checked="" type="checkbox"/> OWNED LEASE NO.	
10. AIR CONDITIONING			16. FIRE PROTECTION			18. TYPE OF CONSTRUCTION			
a. TYPE			a. NUMBER radio fire alarm			<input checked="" type="checkbox"/> PERM <input type="checkbox"/> SEMI-PERM <input type="checkbox"/> TEMP			
b. CAPACITY			b. TYPE transmitter			19. BUILDING DIMENSIONS			
c. SQ YD AIR COND			17. MATERIALS			a. MAIN BLDG 128'4" x 135'8"			
11. HEATING			a. FOUNDATION Reinf Conc			b. OFFSETS 120' x 17'10" 2nd Floor			
a. SOURCE Convectors & Unit heaters			b. FLOOR Reinf Conc			c. WINGS 91'4" x 17'10"			
b. FUEL Nat. Gas			c. WALLS Conc Block & mtl siding			d. BASEMENT 10'8" x 12'8"			
12. HOT WATER FACILITIES			d. ROOF 3 Ply Built-up			e. ATTIC 18'4" x 10'			
a. CAPACITY			e. SURFACE			20. TYPE OF CARD			
b. TEMPERATURE RISE			f. BASE			<input checked="" type="checkbox"/> BLDG <input type="checkbox"/> MISC STR			
13. NO. USABLE FLOORS 2			14. OTHER MEASUREMENTS			<input type="checkbox"/> UTIL DIST SYS <input type="checkbox"/> RAILROAD			
						<input type="checkbox"/> LAND <input type="checkbox"/> SURFACED AREAS			
15. UTILITY CONNECTIONS					21. REMARKS				
	NUMBER	SIZE	CAPACITY		Automatic Sprinkling System Hanger Fire Alarm System Restrictor Vents on Feed Pipes <i>Sand separator</i> <i>oil/water separator</i> CONTRACT DA-04-203 ENG-5347 2nd & Final				
a. WATER	3	1 2", 2 6"							
b. SEWER	3	4"							
c. ELECTRICITY	1	3 #250MCM & 1 3"							
d. GAS	1	3"							
e. STEAM	18	13 3", 5 4"							
f. CONDENSATE									

DA FORM 2877
1 NOV 54

* GPO : 1965 O-759-639

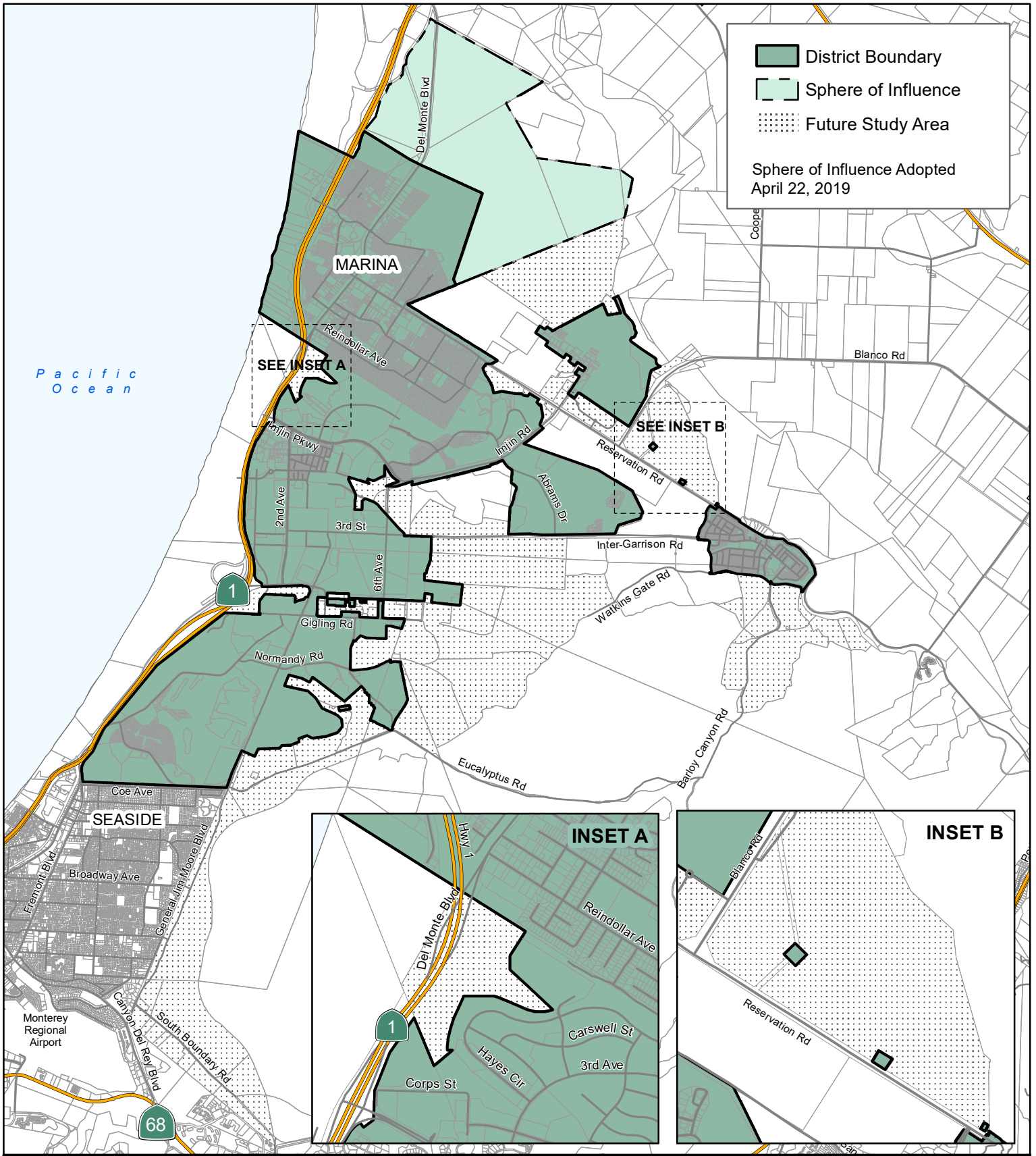
REPLACES DA FORMS 5-46, 5-47, 5-49, 5-50,
5-51, AND 5-52, WHICH ARE OBSOLETE.

REAL PROPERTY RECORD
(AR 735-27)

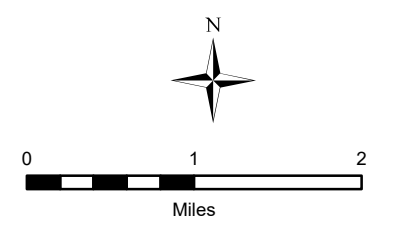
CATEGORY CODE	DESIGNATION	FACILITY NO.
---------------	-------------	--------------

22. COST DATA				
VOUCHER NO	DATE COMPLETED	DESCRIPTION OF CHANGE	COST OF CHANGE	TOTAL COST
933-60	24 Nov 59	For transfer of property listed above Est. Cost		\$455,314
1935-60	24 Feb 60	Hanger Fire Alarm System - Est. Cost	+\$126	455,740
2323-60		Final Cost Statement on Hanger - \$455,943	+\$629	456,369
1908-61	7 Jun 61	Revised Final Cost Statement		
		Hanger - \$462,464	+\$6,521	
		Alarm Sys - \$ 352	- 71	
			+\$6,447	\$462,816
95-78	10 May 78	Installation of a hoist flange (capacity 2 tons) on overhead beam. \$2,548.00.		\$465,364.00
143-83	26 Apr 83	CAPITAL DECREASE; Removal of 1 ea toilet, sink, urinal, steam radiator & steal-framed window. -\$370.00		\$464,994.00
76-90	24 Oct 89	Cap Imprv: Install shower and emergency eyewash with activation alarms. 77-06204-6P. +\$2200. est.		\$467,194.00
CATEGORY CODE	DESIGNATION	FACILITY NO.		

Appendix E
Marina Coast Water District and California American Water Service
Area Maps



LAFCO of Monterey County
 LOCAL AGENCY FORMATION COMMISSION



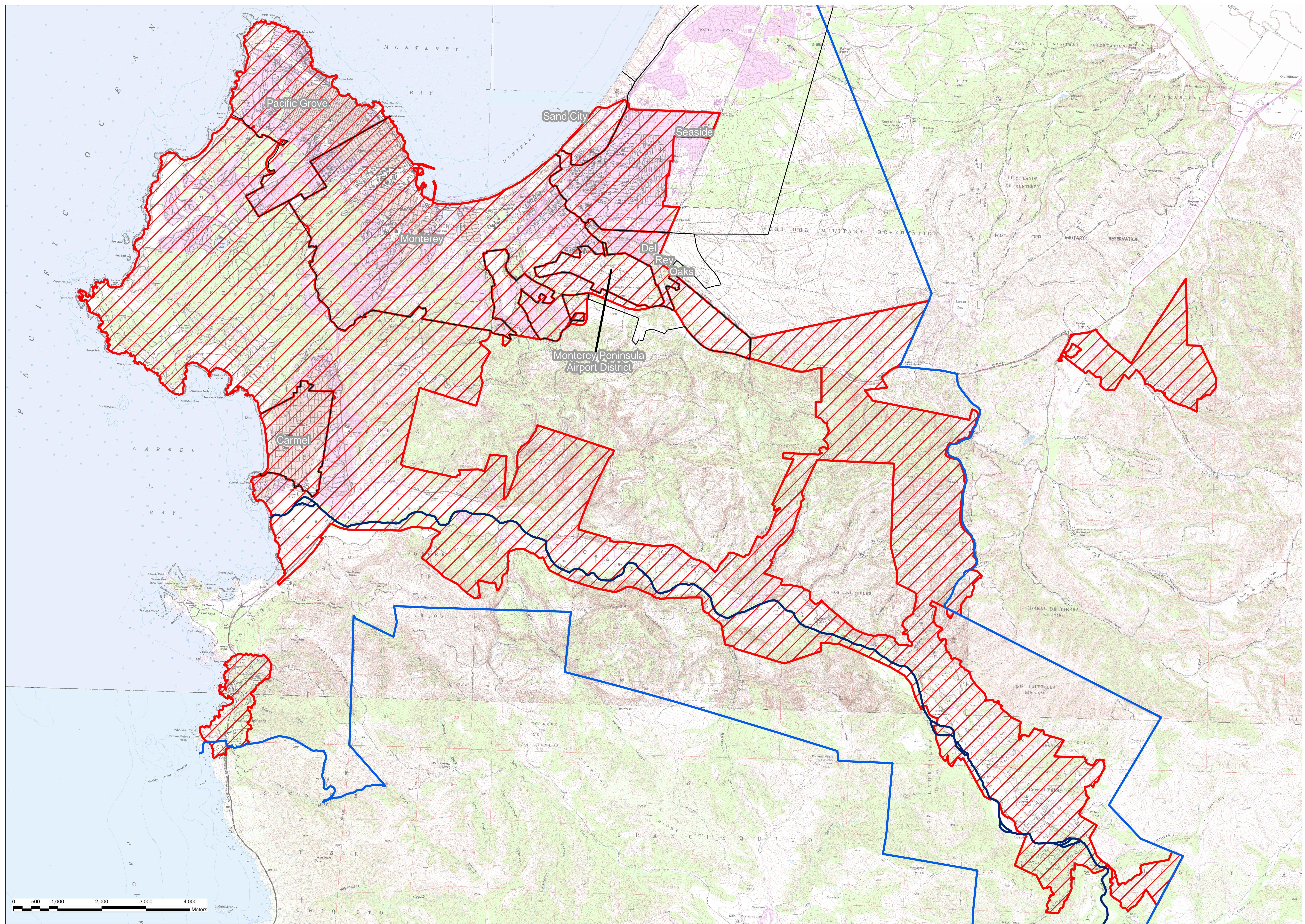
COUNTY WATER DISTRICTS

**MARINA COAST
 WATER DISTRICT**

Last LAFCO-Approved change: 4/22/2019
 Map Produced: 10/31/2019

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 Telephone (831) 754-5838

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 Salinas, CA 93901
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S:/Water_Demand/CalAm_bound/ServiceArea.mxd

Cal Am Service Area

Preliminary Map of Service Boundaries

 Cal Am Service Boundaries

 Carmel River

 Parcel Boundaries

 MPWMD Boundary



The digital map is intended for regional evaluation purposes and not for site-specific evaluation. Information in this data set is preliminary in nature and subject to revision. Conclusions drawn from such information, whether from individual use or aggregate use with other data, are the responsibility of the User. All products, digital, written or otherwise, which are derived from this data, shall provide full acknowledgement to the Monterey Peninsula Water Management District.

Created by: Eric Sandoval

Date: February 17, 2006

Sheet 1 of 1

Data Layers: Parcels, Monterey County; Monterey, Spreckels, Marina, Salinas, Carmel Valley, Mt. Carmel, Soberanes Point and Seaside 24K Topographic Quadrangles, USGS; Carmel River Hydro RR3, EPA

Coordinate System: State Plane, NAD 83, California zone IV, feet

Appendix F
Responses to Comments on the Draft Report submitted by the U.S.
Environmental Protection Agency (USEPA)

Responses to Comments on the Draft Report submitted by the U.S. Environmental Protection Agency (USEPA)¹

GENERAL COMMENTS

General Comment 1. Guidance: The Draft Preliminary Assessment Narrative Report, Per- and Polyfluoroalkyl Substances, Former Fort Ord, California, dated September 2021 (PFAS PA) appears to follow the EPA 2005 *Federal Facilities Remedial Preliminary Assessment Summary Guide* (PA Guidance). Please include a citation to this guidance as the basis for the PA. If a different guidance was used, please cite that.

Response to General Comment 1: *The U.S. Environmental Protection Agency (USEPA) 2005 Federal Facilities Remedial Preliminary Assessment Summary Guide was not used in the development of the Draft Preliminary Assessment Narrative Report, Per- and Polyfluoroalkyl Substances, Former Fort Ord, California (PA Narrative Report). The Guidance for Performing Preliminary Assessments Under CERCLA (USEPA PA Guidance), dated September 1991, was used as guidance and is cited in Section 1.0.*

General Comment 2. Well survey: According to PA Guidance Chapter 3.3.2 (and the associated Groundwater Targets Completion Checklist), a well survey should be conducted, extending 4 miles from the site boundary. The PFAS PA includes information about municipal wells, but it is unclear if a full survey was conducted. If this survey was conducted, please reference it. If not, it should be completed. Information about private wells, if any, should be included.

Response to General Comment 2: *As stated in Section 1.2.3, the hydrogeology at the former Fort Ord is well characterized; therefore, actual groundwater migration pathways were used to determine the distances between sites and wells instead of the general 4-mile radius from the USEPA PA Guidance. A well survey extending 4 miles from the site boundary would include wells that could not be affected by potential per- and polyfluoroalkyl substances (PFAS)-impacted groundwater at the former Fort Ord due to local hydrogeologic conditions. Therefore, the PA Narrative Report was not revised per the comment.*

General Comment 3. Beginning date of AFFF use: The PFAS PA uses a date of 1972 as the starting point for when aqueous film-forming foam (AFFF) was used at the former Fort Ord, but it is unclear if AFFF could have been used prior to this date based on the Military Specification for AFFF, dated December 1969. Since the 1972 date is used to remove sites from further investigation (e.g., Site 34B: Former Burn Pit), please revise the PFAS PA to provide justification that explains how it was determined that AFFF use at the former Fort Ord began in 1972.

Response to General Comment 3: *The Army Guidance for Addressing Releases of Per- and Polyfluoroalkyl Substances (PFAS) (Army PFAS Guidance), dated September 2018, states the primary mechanism for releases of PFAS at U.S. Department of the Army (Army) installations is through the historical use of aqueous film-forming foam (AFFF) after 1972 and is referenced in Section 1.1.1. The original Military Specification for AFFF, dated 1969, states "This specification has been concurred in by interested commands of the Navy Department and the Marine Corps," indicating only the Navy and Marine Corps began using AFFF in 1969. The PA Narrative Report was not revised per the comment.*

¹ In a letter dated December 3, 2021 (see Administrative Record No. BW-2904.3). The comments are reproduced here as provided to the Army and there have been no changes to spelling, grammar, or punctuation.

General Comment 4. 2020 PFOA/PFOS Technical Summary Report: Section 3, Primary Assessment Site Selection and Results, and Table 1, Primary Assessment Sites, do not provide the rationale to explain why specific sites were not retained for the secondary assessment. EPA believes that much of the preliminary primary assessment work was done in the Technical Summary Report – Perfluorooctanoic Acid and Perfluorooctane Sulfonate, Basewide Review of Historical Activities and Groundwater Monitoring at Operable Unit 2 (AEI, 2020) (Technical Summary Report), but it is not described in the PFAS PA.

Please revise the PFAS PA Section 3 and Table 1 to include the rationale for why sites were not retained for secondary assessment using information or citations from the Technical Summary Report as applicable. The Army should also consider whether new information has come to light since the initial candidate list was pared down from the 103 sites to the 39 sites evaluated in the PFAS PA that would require additional sites be retained for the secondary assessment.

Also, please address the discrepancy in the list of sites recommended for further investigation in the Technical Summary Report against the list recommended for further investigation in Section 6.3 Tertiary Assessment. In particular, the Site 36 FAAF Sewage Treatment Plant was previously recommended for further sampling as follows and no new information about the site was included in the PFAS PA appears to discount the need for this:

“No excavation occurred in the area of the Imhoff tank and only limited excavation occurred in the evaporation ponds; therefore, soil sampling for PFAS analysis from the surface down to 10 feet below ground surface in the footprints of the former Imhoff tank and evaporation ponds is recommended to evaluate for residual PFAS. Additionally, because the A-Aquifer in this area discharges to the ground surface as seepage from the bluffs above the Salinas River (HLA, 1995d, Volume II), shallow soil should be collected from the bluff face (Figure 21).” (Technical Summary Report, Section 3.5, Page 34)

Response to General Comment 4: *As described in the Technical Summary Report – Perfluorooctanoic Acid and Perfluorooctane Sulfonate, Basewide Review of Historical Activities and Groundwater Monitoring at Operable Unit 2 (Technical Summary Report; Administrative Record No. OU2-722B), “...the PA will include full evaluations of locations where releases of PFAS may have occurred and which merit evaluation per the Army PFAS Guidance.” Consistent with the Army’s responses to USEPA’s comments on the Technical Summary Report, this PA Narrative Report acts as a stand-alone document and does not use as a basis the conclusions drawn in the Technical Summary Report. This PA Narrative Report includes full evaluations of locations which merit evaluation per the Army PFAS Guidance and where releases of PFAS are suspected to have occurred. Sites were reevaluated independently of the Technical Summary Report’s evaluations and conclusions.*

As stated in Section 3.2, sites or subsites were eliminated from further assessment because the site was determined to not be one of the site types that merit evaluation per the Army PFAS Guidance. Based on an independent reevaluation as a part of the PA Narrative Report following USEPA PA Guidance and Army PFAS guidance, Site 36 was eliminated from further investigation because no known quantities of PFAS-containing materials were stored or used onsite and there are no known or suspected AFFF discharge events at the FAAF in which AFFF could have entered the sanitary sewer system. Further discussion of Site 36 is included in the response to General Comment 8.

General Comment 5. PFAS sources: The PFAS PA addresses the potential for some PFAS contamination from sources other than AFFF. While the list of possible sources evaluated may be consistent with Army policy, is not consistent with the latest scientific information on PFAS, and the universe of potential sources will likely only grow in the future. Because of this, the Army should include the caveat to the PFAS PA that if new source areas are identified or suspected that they will be evaluated and investigated, either in the SI, or a later phase of the CERCLA process.

Response to General Comment 5: *Per the current Army PFAS Guidance, the primary mechanism for releases of PFAS is considered to be through the historical use of AFFF. Other known sources of environmental releases include mist suppressants for chrome plating operations and landfills and wastewater treatment plants that may have inadvertently accepted PFAS-containing material.*

This PA Narrative Report remains consistent with current DoD and Army policy and guidance regarding PFAS and was not revised per the comment; however, should DoD and Army policy and guidance be updated, future versions of the PA Narrative Report and documents relevant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process for PFAS at the former Fort Ord will be drafted accordingly.

General Comment 6. Previously excavated areas: The PFAS PA eliminates several soil areas from further investigation because removal actions for other contaminants have been performed at the sites. For example, Section 5.1.3, Soil Pathway, states, “Because 1,451 cubic yards of contaminated soils were already removed as part of previous site remediation, it is unlikely any PFAS [per- and polyfluoroalkyl substances]-impacted soil remains near the ground surface at Site 10.” In addition, Section 4.6.1, Site 12: DOL Automotive Yard, states that no additional investigation at Outfall 15 is recommended because excavation of soil impacted by pesticides, metals, volatile organic compounds, and petroleum hydrocarbons was already performed.

However, PFAS can be highly mobile in the environment, especially in groundwater and surface water, so it is unclear if PFAS contamination extends beyond the excavated footprint of the other contaminants. Therefore, confirmation sampling of the previous excavation areas for PFAS is necessary. Please revise the PFAS PA to recommend confirmation sampling of previously excavated areas to determine if PFAS are present.

Response to General Comment 6: *The PA Narrative Report was revised to recommend soil sampling outside the vertical limits of previous excavation areas for sites where a potential significant release of PFAS is suspected (e.g., Site 10 – Former Burn Pit and the Fritzsche Army Airfield [FAAF] Fire Drill Area). The PA Narrative Report was also revised to recommend soil sampling outside the vertical limits of previous excavation areas for Site 2 – Main Garrison Sewage Treatment Plant because this facility could have received waste streams with relatively small amounts of PFAS-containing materials from multiple sites across Fort Ord that could have accumulated over time. No further investigation is recommended at Site 12, Site 16, or Outfall 15 because there is no evidence of significant PFAS releases at these sites. Soil sampling at sites with previous excavations but no known or suspected PFAS releases at the site and no pathway to human or environmental receptors would be inconsistent with guidance.*

General Comment 7. Secondary areas of concern: The PFAS PA does not always indicate that sampling of secondary areas of concern (e.g., drainage ditches and outfalls, groundwater seepage areas) should be included in future investigations. Since PFAS can be highly mobile in the environment, these

secondary areas should be evaluated for PFAS contamination and included in sampling as part of the forthcoming site inspection (SIs) or additional investigations. Several examples of these secondary areas are included in the Specific Comments below. Please revise the PFAS PA to indicate the secondary areas of potential PFAS contamination will be investigated as part of the forthcoming SI.

Response to General Comment 7: *The investigation of secondary areas of concern is outside the scope of the SI. The SI will be consistent with the Guidance for Performing Site Inspections Under CERCLA (USEPA SI Guidance), dated September 1992. The goal of the SI will be to obtain information not readily accessible during the PA to better determine the need for further investigation under CERCLA, not to fully characterize the site or secondary areas of concern. If data collected during the SI indicates a PFAS release has occurred and PFAS may have entered secondary areas of concern, further sampling and analysis may be conducted as a part of a remedial investigation (RI). The PA Narrative Report was not revised per the comment.*

General Comment 8. Wastewater treatment plants: The PFAS PA indicates wastewater treatment plants (WWTPs) should not be investigated further because sewage sludge where PFAS may have been concentrated was removed from the sites and low concentrations of PFAS are expected based on mostly residential use. However, PFAS can be found in a variety of household uses, such as personal care products (as noted in the footnote on page 2 of the PFAS PA) and in cleaning products. Since PFAS confirmation sampling from the sludge areas has not been performed and it is unclear if groundwater was impacted at places where unlined or cracked evaporation ponds were used (e.g., Site 2: Main Garrison Sewage Treatment Plant and Site 36: FAAF Sewage Treatment Plant), these sites should be included as areas with suspected PFAS releases. Please revise the PFAS PA to include further investigation of the WWTPs.

Response to General Comment 8: *Per the Army PFAS Guidance, the historical use of AFFF was the primary mechanism for releases of PFAS at Army installations; however, it is noted that WWTPs that have inadvertently accepted PFAS-containing materials are a potential source of environmental releases of PFAS. Based on the operational history of the four former WWTPs at the former Fort Ord, the PA Narrative Report was revised to recommend further investigation at Site 2 – Main Garrison Sewage Treatment Plant because this WWTP was active from the mid-1930s until it was closed in 1990, a period of expanded and widespread use of PFAS, and served as the primary WWTP for the former Fort Ord, treating an average 2.8 million gallons per day from residential, light industrial, and commercial sources.*

Further investigation is not warranted for Site 1, the Ord Village Sewage Treatment Plant. This WWTP was active from the 1950s through 1964. While processes to commercially produce PFAS were first developed in the 1940s and the use of PFAS in household products began in the 1950s, the expanded and widespread use of PFAS began in the late 1960s with the development and widespread use of AFFF.² Because this WWTP was only active prior to this time, it is unlikely significant amounts of PFAS were released at Site 1.

Further investigation is not warranted for Site 32, the East Garrison Sewage Treatment Plant. This WWTP was active from the 1940s through 1997, but only received low volumes of wastewater from the East Garrison, totaling approximately 2,000 to 5,000 gallons per day. Because the flow rates at this WWTP

² Interstate Technology Regulatory Council (ITRC), 2020. *Aqueous Film-Forming Foam*. August. https://pfas-1.itrcweb.org/wp-content/uploads/2020/10/afff_508_093020.pdf

were very low during its years of operation and there are no known historical sources of PFAS in the East Garrison, it is unlikely significant amounts of PFAS were released at Site 32.

Further investigation is not warranted for Site 36, the FAAF Sewage Treatment Plant. This WWTP was active from the late 1950s through March 1991, but only received wastewater from FAAF and the nearby U.S. Army Reserve Center with an average flow rate of 16,500 gallons per day. Because the flow rate at Site 36 remained low during its years of operation and there are no known significant historical sources of PFAS at FAAF or the U.S. Army Reserve Center, it is unlikely significant amounts of PFAS were released at Site 36.

General Comment 9. Known AFFF discharge sites: The PFAS PA does not include sufficient information to eliminate evaluation of sites that received known discharges of AFFF. According to the PFAS PA, rinse water containing AFFF from the tanks on fire department vehicles that had already been drained was discharged at Site 12, DOL Automotive Yard, and Site 16, DOL Maintenance Yard. These discharges are indicated to have possibly flowed to the Lower Meadow Disposal Area and Pete's Pond Extension as surface runoff or through the storm drain system. The PFAS PA concludes that these would have been residual amounts of AFFF and recommends no further investigation of these sites, but it is unclear how big the tanks were, how many tanks would have been rinsed, and how completely the tanks would have been emptied. Additionally, several rinses may have been required to flush out the AFFF. Please revise the PFAS PA to include further investigation of Site 12, Site 16, the Lower Meadow Disposal Area, and Pete's Pond Extension, as these sites received known discharges of AFFF.

Response to General Comment 9: Follow-up correspondence with site personnel determined the firefighting vehicles equipped with AFFF systems had a single 25-gallon AFFF tank. The PA Narrative Report was revised to include this information. As stated in the PA Narrative Report, only residual amounts AFFF may have remained in the tanks if the AFFF tanks themselves or connected systems required servicing because the AFFF tanks were completely drained at the Main Garrison Fire Station prior to servicing.

No further investigation is recommended at Site 12 and Site 16. While fire department vehicle tanks containing residual amounts of AFFF were rinsed at Site 12 and Site 16, this practice was infrequent (a total of five times in 40 years between both sites), the tanks were relatively small and were emptied at the Main Garrison Fire Station before servicing, and potentially impacted rinse water primarily entered an onsite oil-water separator. The waste oil from the oil-water separators was retained in underground storage tanks (USTs) prior to disposal by an offsite contractor.³ The water from the oil-water separator entered the sanitary sewer system and was treated at the Main Garrison Sewage Treatment Plant, which is now recommended for further investigation (see Response to General Comment 8). Therefore, it is unlikely that significant concentrations of PFAS accumulated at Site 12 and Site 16 and no further investigation is recommended. The PA Narrative Report was revised to include this information.

General Comment 10. Next steps terminology: The terminology used for the next steps of the investigation process are inconsistent and unclear in the PFAS PA Section 5.0, Tertiary Assessment Pathway and Environmental Hazard Assessment for Selected Sites, recommends additional groundwater investigation at three of the six sites evaluated in the tertiary assessment (i.e., Site 10, Operable Unit [OU] 1, and OU 2). However, the groundwater conclusions for the other three sites (i.e., Site 40A,

³ See Administrative Record No. BW-2427.

Building 514, and Building 4400) state that “a groundwater investigation may be warranted.” It is unclear why additional investigation is not recommended for these sites and what criteria will be used to determine if groundwater will be investigated at these sites. In addition, Section 6.0, Summary and Conclusions, uses the same terminology, but Section 6.3.4, Building 4400, Main Garrison Fire Station, recommends additional groundwater investigation instead of stating that it may be necessary as noted in Section 5.4.1, Groundwater Pathway. Please revise the PFAS PA to consistently recommend additional groundwater investigation at all six sites.

Response to General Comment 10: *The PA Narrative Report was revised per the comment.*

General Comment 11. Metal plating: The PFAS PA determined that chromium plating operations were not present at the former Fort Ord (see Section 3.2, Results), but PFAS were used in many aspects of plating operations for multiple metals and not just for mist suppression during chromium electroplating. As reported in Table 4-1, Potential major manufacturing sources of PFAS releases to the environment, in the April 2020 Interstate Technology and Regulatory Council (ITRC) Fact Sheet, History and Use of PFAS, PFAS were also used in copper, nickel, and tin electroplating, as well as other metal plating and etching processes (e.g., for corrosion prevention). However, Section 1.1.1, PFAS Background, discusses only mist suppression in chromium electroplating operations, and Section 1.2.1., Primary Assessment Methodology, indicates that historical sites at the former Fort Ord were evaluated for chromium electroplating operations only. Therefore, additional evaluation of sites for other metal electroplating, metal plating, and finishing operations is necessary. Please revise the PFAS PA to evaluate the historical sites for any metal plating and finishing operations.

Response to General Comment 11: *There is no evidence of any metal plating operations at the former Fort Ord. However, the PA Narrative Report is consistent with the Army PFAS Guidance as written regarding plating operations and was not revised.*

General Comment 12. Groundwater elevation contour labeling: The figures do not include the units for the groundwater elevation contours. For example, Figure 13, Secondary Assessment Sites Groundwater Overview, Main Garrison Area, includes both positive and negative values for the groundwater elevations, suggesting the elevation values are feet above mean sea level, but this is not specified. Please revise the PFAS PA figures to include the units for the groundwater elevations.

Response to General Comment 12: *The PA Narrative Report figures were revised per the comment.*

SPECIFIC COMMENTS

Specific Comment 1. Section 2.0, Fort Ord Description: Consistent with the PA Guidance, Chapter 3.2 and associated Site and Source Characterization Completion Checklist), nearby communities with environmental justice concerns should be identified.

Response to Specific Comment 1: *There are no statements in the USEPA PA Guidance, which was used in the development of the PA Narrative Report, suggesting nearby communities with environmental justice concerns should be identified. Regardless, the Army has worked and continues to work with the regulatory agencies, including USEPA, on engagement with local organizations regarding nearby communities with environmental justice concerns. These include the Fort Ord Environmental Justice Network (FOEJN) and the Fort Ord Community Advisory Group (FOCAG) and, in accordance with CERCLA, documents pertaining to environmental cleanup actions under CERCLA are publicly available and*

distributed to local organizations upon request for review and comment (e.g., see Appendix I, Responses to Comments submitted by FOCAG). The PA Narrative Report was not revised per the comment.

Specific Comment 2. Section 4.1.1, Site 8: Range 49, Molotov Cocktail Range Secondary Assessment, Pages 14 to 15: The potential presence of PFAS in the materials used at the site is not discussed. The handmade explosives used at the site are indicated to contain detergent, and since commercial cleaning products were known to contain PFAS, it is unclear if these explosives could be a source of PFAS. Please revise this section to clarify if the detergent used in the explosives could be a source of PFAS.

Response to Specific Comment 2: *Specific data regarding the chemical composition of the handmade explosives used at Site 8 was not recorded; however, such improvised explosive devices (IEDs) are made from commonly available materials and must contain a fuel (e.g., gasoline or oil) and an oxidizer.⁴ The “detergents” reportedly used at Range 49 were likely the oxidizing agent and would have had to be readily available; therefore, the primary active ingredients would have been compounds such as hydrogen peroxide or oleum (fuming sulfuric). PFAS are used as detergents or impregnating agents in numerous industrial applications, such as paper and packaging (food and non-food applications), as well as textile finishing, due to the inert and repellent characteristics they provide to surfaces they coat,⁵ but are not a common component in the types of household detergents that could be used in IEDs. The PA Narrative Report was revised to include this information.*

Specific Comment 3: Section 4.1.6, Operable Unit 1: FAAF Fire Drill Area Secondary Assessment, Page 21, and Section 5.5.3, Soil Pathway, Pages 77 to 78: These sections discuss 4,000 cubic yards of soil from the site that was removed, transported to a borrow source area, and used as fill in construction projects at the former Fort Ord, but it is unclear if it is known where at the facility this soil was used. Soil in the Drill Area and borrow area should be tested for PFAS. If no soil remains, samples could be taken at these original locations, and at additional sites where the fill soil was known to be used. Please revise the PFAS PA to state where the soil removed from this site was used at the former Fort Ord and propose further investigation.

Response to Specific Comment 3: *The PA Narrative Report was revised to state there are no records indicating where the soil removed from the borrow area was used and to recommend additional soil sampling in the former FAAF Fire Drill Area. Soil in the borrow area is not recommended for PFAS analysis because site reconnaissance and a review of historical aerial photographs of the soil borrow area indicate over 10,000 cubic yards of soil was removed from the borrow area between April 1991, after soil remediation at the Fire Drill Area was completed, and July 1992 (i.e., at least 6,000 cubic yards of clean native soil was removed in addition to the 4,000 cubic yards of treated soil). The PA Narrative Report was revised to include this information.*

Specific Comment 4: Section 4.2.1, Site 29: Defense Reutilization and Marketing Office Secondary Assessment, Page 25: The first paragraph on this page indicates that transformers were emptied into a field onsite, and that PFAS were historically used in transformer fluids, but the Secondary Assessment Conclusions do not discuss this potential release of PFAS. Although the text states that the concentrations of PFAS in transformer fluids is very low and polychlorinated biphenyls (PCBs) were not detected in site soil, it is unclear if the transformer fluid that was dumped contained PCBs. It is possible

⁴ Department of Homeland Security; https://www.dhs.gov/xlibrary/assets/prep_ied_fact_sheet.pdf

⁵ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4592498/>

that the transformer fluid that was discharged did not contain PCBs and used PFAS instead, resulting in a PFAS release onsite when the transformer fluids were discharged to site soil. Please revise the Secondary Assessment Conclusions to discuss the potential PFAS contamination from transformer fluids and to further investigate this site for a suspected PFAS release to site soil.

Response to Specific Comment 4: *There is no evidence to suggest that PFAS were used as a replacement for PCBs in transformer oil. As noted in the PA Narrative report, PFAS may have been present in pre-1999 transformer oil but at very low concentrations. Although the production of PCBs was banned in the United States in 1979, PCB-containing transformer oil was still widely used for years after 1979 and remains present at many sites today. As noted in the PA Narrative Report, transformers were reportedly emptied in the field before being recycled prior to 1982, indicating these were older transformers that would have likely had the PCB-containing transformer oil. However, no PCBs were detected in the soil when the site was investigated in 1994, indicating transformer oil disposal, if it actually occurred, was minimal or insignificant. Therefore, it is unlikely significant amounts of PFAS were released at Site 29 and no further investigation at Site 29 is recommended. Additionally, per current Army and DoD guidance, the primary mechanism for releases of PFAS is through the historical use (post-1972) of AFFF, not releases of transformer oil. The PA Narrative Report was not revised per the comment.*

Specific Comment 5. Section 4.3.2, Mudhen Lake Possible Aircraft Crash Site Secondary Assessment, Page 32: Additional information to support the statement regarding the primary concern associated with the aircraft crash is necessary. The text states, “the description in the CERFA report indicates the primary concern is a fuel spill and does not indicate any fire associated with this crash.” However, since it is unclear when this crash occurred, it is unclear if evidence for a fire may not have been notable during the 1993 helicopter survey. Please revise this statement to clarify why a fire from this crash was not a concern.

Response to Specific Comment 5: *The PA Narrative Report does not state that fire from a possible aircraft crash at Mudhen Lake was not a concern. The PA Narrative Report only notes that, according to the CERFA report, the primary concern was a fuel spill and the CERFA report does not indicate any evidence of fire associated with this crash. Additionally, as indicated in the PA Narrative Report, there may not have been a crash at Mudhen Lake at all.*

It was not fire department policy to use AFFF at fires occurring in remote locations, such as Mudhen Lake. Fires were instead managed using water tenders, clear cutting, or allowing fires to burn out. AFFF was not used for wildland fires and was not carried on wildland engines. The secondary assessment conclusions for Mudhen Lake were revised to include this information.

Specific Comment 6. Section 4.5.3, Site 40A: East FAAF Helicopter Defueling Area Secondary Assessment, Page 42: It is unclear when defueling operations began at Site 40A. The text states that operations were moved from Site 40 to Site 40A, but it is unclear when this occurred. Please revise this section to state when helicopter defueling operations began at Site 40A.

Response to Specific Comment 6: *The exact date that operations were moved from Site 40 to Site 40A is uncertain; however, according to interviews with site personnel, this occurred when the new helicopter pads were constructed in the mid- to late 1970s. The former Fort Ord was a center for instruction of basic and advanced infantryman until 1975, when the 7th Infantry Division, including an aviation brigade,*

occupied Fort Ord, so it is likely defueling operations moved to Site 40A around this time. The PA Narrative Report was revised to include this information.

Specific Comment 7. Section 4.6.1, Site 12: DOL Automotive Yard, and Section 4.8.1, Site 12: Lower Meadow Disposal Area Secondary Assessment, Pages 43 to 44 and 50 to 51: These sections do not clearly describe the features of Site 12 that may be impacted by contaminants. The first paragraph in each section states that the Lower Meadow received runoff from the DOL Automotive Yard through several pipes such as Outfall 31 at the southeast corner of the Lower Meadow. However, the number and locations of other outfalls are not discussed. In Section 4.6.1, it is mentioned that Outfall 15 received contaminated surface water, but it is unclear if there were any other outfall that also could have received contaminated surface water. Please revise this section to clarify the number and locations of the outfalls that discharged surface water from the DOL Automotive Yard to the Lower Meadow.

Response to Specific Comment 7: *The text was revised to provide more information about Site 12 features, including pipes that discharged from the DOL Automotive Yard to the Lower Meadow. Most available historical documents only state there were “several” drain pipes, including Outfall 31, at the southeast corner of the Lower Meadow and there were two additional pipes on the east slope of the Lower Meadow. However, the Remedial Action Work Plan notes that the Outfall 31 area included:⁶*

- *Two 30-inch diameter corrugated metal pipes at the southeast corner of the Lower Meadow that discharged stormwater collected from the DOL Automotive Yard (one of these is Outfall 31) and the associated storm drain catch basin.*
- *A 13-inch diameter pipe at the southeast corner of the Lower Meadow.*
- *A 12-inch diameter corrugated metal pipe and 6-inch diameter pipe on the east slope of the Lower Meadow, approximately 100 feet north of Outfall 31, and associated storm drain catch basin.*

The two catch basins were connected by an 8-inch diameter corrugated metal pipe, with storm water discharging from the southern catch basin to a 42-inch diameter pipe leading to Outfall 15, which is the only ultimate discharge point for stormwater originating from Site 12.⁷

Specific Comment 8. Section 4.6.2, Site 16: DOL Maintenance Yard Secondary Assessment, Page 46: The Secondary Assessment Conclusions states that any AFFF discharged to the oil-water separator would have been skimmed off and disposed with the petroleum product, but it is not stated where the skimmed material was disposed. Please revise this section to clarify where the AFFF would have been disposed if skimmed off with the petroleum product in the oil-water separator.

Response to Specific Comment 8: *Waste oil from the oil water separators was stored in USTs prior to disposal by an offsite contractor.⁸ The PA Narrative Report was revised to clarify this.*

Specific Comment 9. Section 4.7.1, Site 5: Range 36A, Explosive Ordnance Disposal Secondary Assessment Pages 47 to 48: The Site Description states that plastic/polymer-bonded explosives may contain PFAS and were used at Range 36A, but this is not discussed further and is not discussed in the Secondary Assessment Conclusions. Instead, the text states that due to the sporadic use of the site, it is

⁶ See Administrative Record No. BW-1520D.

⁷ See Administrative Record No. BW-1283A.

⁸ See Administrative Record No. BW-2427.

likely that total explosives use was low. However, it is not currently known how low use would need to be to rule out this area being a concern. While the intensity of explosives used at Range 36A may impact the level of PFAS present, we do not have documentation about the extent of that impact. Please revise Section 4.7.1 to discuss the potential presence of PFAS in site media due to the use of plastic/polymer-bonded explosives and recommend further investigation of this site.

Response to Specific Comment 9: *The PA Narrative Report states that plastic/polymer-bonded explosives may have been used for detonations at Range 36A because there is no specific evidence of their use. However, any PFAS release that may have occurred at Range 36A has no pathway to receptors. There are no nearby drinking water supply wells or surface water bodies which may have been impacted. The site is currently undeveloped and is publicly inaccessible and remote, preventing human exposure through shallow soil. Additionally, per current Army and DoD guidance, the primary mechanism for releases of PFAS is through the historical use (post-1972) of AFFF, not plastic/polymer-bonded explosives. Further investigation for PFAS at Range 36A is not recommended and the PA Narrative Report was not revised per the comment.*

Specific Comment 10. Section 4.8.3, Site 17: Disposal Area, 1400 Block Motor Pool Secondary Assessment, Pages 53 to 54: The Secondary Assessment Conclusions indicate it is unlikely any PFAS-containing material was present onsite based on the age of the waste; however, this site is stated to have been a disposal area for hospital and medical wastes from the Fort Ord hospital, which was active from the 1940s through 1969. Footnote 2 on page 2 of the PFAS PA states that PFAS can be found in a range of products and processes including medical products since the 1950s, so it is unclear if these wastes from the hospital would have contained PFAS. Please revise this section to discuss the potential for PFAS to be in the medical waste from the Fort Ord hospital that was disposed at the site.

Response to Specific Comment 10: *While the Fort Ord hospital did operate at a location near Site 17 through 1969, dated debris (e.g., glass bottles and newspapers) observed at the Site 17 Disposal Area during the RI ranged from 1935 to 1951, which predates widespread usage of PFAS in medical devices and products. Additionally, the suspected medical waste encountered during the RI consisted of glass vials and ampules, not products that could contain PFAS.⁹ During the remedial action for Sites 16 and 17, no medical waste was encountered during excavation or handling of soil and debris, though one ampule was uncovered at Site 17 and found to contain a saline solution through laboratory analysis.¹⁰ The PA Narrative Report was revised to include this information. Accordingly, the secondary assessment conclusion for Site 17 remains that it is unlikely any PFAS-containing material was present onsite based on the age of the waste.*

Specific Comment 11. Section 4.8.5, Fort Ord Soil Treatment Area Secondary Assessment, Pages 56 to 57: The Secondary Assessment Conclusions states that plastic sheeting was used to manage the stockpiles and there is no evidence of a release, but the text in the Site Operational History and Waste Characteristics section discusses confirmation sampling that detected petroleum hydrocarbons in the soil berms and foundation layer after the high-density polyethylene liner was removed. Therefore, it is unclear if releases to soil occurred even though plastic sheeting was used. Please revise this section to discuss the potential release of PFAS to the berm soils and foundation layer.

⁹ See Administrative Record No. BW-1283A.

¹⁰ See Administrative Record No. BW-2021A.

Response to Specific Comment 11: As described in the PA Narrative Report, the polyethylene sheeting was used to manage soil stockpiles awaiting treatment to the west and outside of the Fort Ord Soil Treatment Area (FOSTA) and the FOSTA itself was lined with 40-mil high density polyethylene. To clarify, petroleum hydrocarbons were detected at concentrations above cleanup criteria in soil in the equipment decontamination area adjacent to the FOSTA, not in the foundation layer or berms for the FOSTA itself. There was no potential release of PFAS to the FOSTA foundation layer or berm soils. The PA Narrative Report was revised to include this information.

Specific Comment 12. Section 5.2.3, Soil Pathway, Page 71: The drainage area north of Site 40A is indicated to require further investigation for PFAS-impacted soil, but the previous section discussed two areas where runoff from the site was discharged. The storm drain line that discharges at an outfall approximately 450 feet east of the FAAF Fire & Rescue Station should also be investigated. Please revise this section to include the storm drain line and outfall that also received runoff from Site 40A as an area to be investigated for PFAS-impacted soil.

Response to Specific Comment 12: Surface runoff from Site 40A and the storm drain line 450 feet east of the FAAF Fire & Rescue Station both discharge to the same topographic low, which is depicted in the reconnaissance photographs for Site 40A in Appendix B. Section 5.3.3 (formerly Section 5.2.3) of the PA Narrative Report was revised to clarify this.

Specific Comment 13. Section 5.3.3, Soil Pathway, Page 73: Soil sampling for PFAS analysis at an unpaved area south of the former Fire & Rescue Station is recommended, but it is unclear if this is the location where the AFFF from the firefighting vehicles was discharged. In addition, it is unclear if the topographic low area to the north of the site that received runoff requires investigation. Please revise this section to clarify if the location of the discharged AFFF is known and is the area noted for soil investigation. Please also discuss if the soil north of the site in the topographic low area should be investigated due to runoff from the site.

Response to Specific Comment 13: The location of the discharged AFFF is known to be the grassy area to the south of the former Fire & Rescue Station. The text in Section 4.2.3 and Section 5.3.3 (formerly Section 5.2.3) was revised to clarify this. The topographic low area to the north of the site does not require investigation. The site topography indicates this area receives runoff from the north and west sides of the Fire & Rescue Station, not the south side where AFFF was discharged. The text was revised to clarify this.

Specific Comment 14. Section 5.4.3, Soil Pathway, Page 75: Soil sampling for PFAS analysis at an unpaved area west of Building 4401 is recommended, but it is unclear if this is the location where the AFFF from the firefighting vehicles was discharged. In addition, it is unclear if the vegetated depression a few hundred feet southwest of the site that received runoff requires investigation. Please revise this section to clarify if the location of the discharged AFFF is the area noted for soil investigation. Please also discuss if the soil in the vegetated depression southwest of the site should be investigated due to runoff from the site.

Response to Specific Comment 14: It is clearly stated in Sections 4.2.7 and 5.5.1 that AFFF was discharged in the area on the west side of Building 4401. The PA Narrative Report was corrected to state surface water runoff from the Main Garrison Fire Station flows primarily to the north. Therefore, the vegetated depression southwest of the site is not recommended for investigation.

Appendix G
Responses to Comments on the Draft Report submitted by the
California Department of Toxic Substance Control (DTSC)

Responses to Comments on the Draft Report submitted by the Department of Toxic Substance Control (DTSC)¹

Comment 1. Operable Unit 1: Fritzsche Army Airfield (FAAF) Fire Drill Area. Additional investigation is warranted to investigate potential impacts to various construction sites at Fort Ord where fill materials were used that originated from the Fritzsche Army Airfield (FAAF) Fire Drill Area. The area was used from 1972 until 1985 for training activities to extinguish fires at least once a quarter where 100 to 200 gallons of aqueous film-forming foam (AFFF) were used. The Report notes that approximately 4,000 cubic yards of soil was removed, transported to a borrow source, and then used for fill in construction projects at former Fort Ord. The Report states that further investigation is warranted at this location; however, the construction projects that utilized fill from the borrow source should be identified and the soil at those sites should be analyzed for PFAS. Use of fill material impacted by PFAS could result in migration of PFAS from soil to groundwater at multiple locations throughout former Fort Ord.

Response to Comment 1: *There are no known records indicating which construction projects at the former Fort Ord used fill from the borrow area. The Preliminary Assessment Narrative Report, Per- and Polyfluoroalkyl Substances, Former Fort Ord, California (PA Narrative Report) was revised to state there are no records indicating where the soil removed from the borrow area was used and to recommend additional soil sampling in the FAAF Fire Drill Area.*

Comment 2. Wastewater Treatment Plants. Revisions to the report are warranted to include investigation of wastewater treatment plants (WWTPs) in the tertiary site assessments. The Report notes that WWTP should be excluded from further investigations because sewage sludge where PFAS may have been concentrated was removed from the sites, and lower concentrations of PFAS are to be expected from residential usage. However, since PFAS can be found in a variety of household items, and the potential for PFAS to migrate from the sludge areas through unlined or cracked evaporation ponds exists, tertiary assessment should be performed at the WWTPs. The Report should be revised to state that the Main Garrison Sewage Treatment Plant, East Garrison Sewage Treatment Plant, and Site 36: FAAF Sewage Treatment Plant will be included in the tertiary assessment.

Response to Comment 2: *Per the Army Guidance for Addressing Releases of Per- and Polyfluoroalkyl Substances (PFAS) (Army PFAS Guidance), the historical use of aqueous film-forming foam (AFFF) was the primary mechanism for releases of PFAS at U.S. Department of the Army (Army) installations; however, it is noted that WWTPs that have inadvertently accepted PFAS-containing materials are a potential source of environmental releases of PFAS. Based on the operational history of the four former WWTPs at the former Fort Ord, the PA Narrative Report was revised to recommend further investigation at Site 2, the Main Garrison Sewage Treatment Plant, because this WWTP was active from the mid-1930s until it was closed in 1990, a period of expanded and widespread use of PFAS, and served as the primary WWTP for the former Fort Ord, treating an average 2.8 million gallons per day from residential, light industrial, and commercial sources.*

Further investigation is not warranted for Site 1, the Ord Village Sewage Treatment Plant. This WWTP was active from the 1950s through 1964. While processes to commercially produce PFAS were first

¹ In a letter dated January 14, 2022 (see Administrative Record No. BW-2904.5). The comments are reproduced here as provided to the Army and there have been no changes to spelling, grammar, or punctuation.

developed in the 1940s and the use of PFAS in household products began in the 1950s, the expanded and widespread use of PFAS began in the late 1960s with the development and widespread use of AFFF.² Because this WWTP was only active prior to this time, it is unlikely significant amounts of PFAS were released at Site 1.

Further investigation is not warranted for Site 32, the East Garrison Sewage Treatment Plant. This WWTP was active from the 1940s through 1997, but only received low volumes of wastewater from the East Garrison, totaling approximately 2,000 to 5,000 gallons per day. Because the flow rates at this WWTP were very low during its years of operation and there are no known historical sources of PFAS in the East Garrison, it is unlikely significant amounts of PFAS were released at Site 32.

Further investigation is not warranted for Site 36, the FAAF Sewage Treatment Plant. This WWTP was active from the late 1950s through March 1991, but only received wastewater from FAAF and the nearby U.S. Army Reserve Center with an average flow rate of 16,500 gallons per day. Because the flow rate at Site 36 remained low during its years of operation and there are no known significant historical sources of PFAS at FAAF or the U.S. Army Reserve Center, it is unlikely significant amounts of PFAS were released at Site 36.

Comment 3. Site 29: Defense Reutilization and Marketing Office. The Report should be revised to include Site 29: Defense Reutilization and Marketing Office (DRMO) as part of the tertiary assessment. The Report notes transformers were emptied into the field adjacent to the DRMO prior to recycling and testing in the area did not detect PCBs in soil samples collected. PFAS was also commonly used in transformer fluid and while concentrations were historically very low, the soil samples collected were not analyzed for PFAS and, therefore, this area should be included in the tertiary assessment. The site was determined to never have stored AFFF to the best of Retired Presidio of Monterey Fire Department Chief Riso's knowledge; however, unless records can be provided that state all of the transformer oil released into the area adjacent to the DRMO throughout the operational history at former Fort Ord did not contain PFAS, the DRMO should be included in the tertiary site assessment.

Response to Comment 3: *Although the production of polychlorinated biphenyls (PCBs) was banned in the United States in 1979, PCB-containing transformer oil was still widely used for years after 1979 and remains present at many sites today. As noted in the PA Narrative Report, transformers were reportedly emptied in the field before being recycled prior to 1982, indicating these were older transformers that would have likely had the PCB-containing transformer oil. However, no PCBs were detected in the soil when the site was investigated in 1994, indicating transformer oil disposal, if it actually occurred, was minimal or insignificant. Therefore, it is unlikely significant amounts of PFAS were released at Site 29 and no further investigation at Site 29 is recommended. Additionally, per current Army and Department of Defense (DoD) guidance, the primary mechanism for releases of PFAS is through the historical use (post-1972) of AFFF, not releases of transformer oil. The PA Narrative Report was not revised per the comment.*

Comment 4: AFFF Storage Areas. The Report should be revised to include East Garrison Fire House, Main Garrison Fire House – South, Main Garrison Fire House –North, and Main Garrison Fire House – East in the tertiary assessment. The buildings are identified in Table 1. Primary Assessment Sites for AFFF Storage but have not been identified for tertiary assessment, and each of their respective Sections

² Interstate Technology Regulatory Council (ITRC), 2020. *Aqueous Film-Forming Foam*. August. https://pfas-1.itrcweb.org/wp-content/uploads/2020/10/aff_508_093020.pdf

(4.2.2, 4.2.4, and 4.2.6) state that no AFFF was historically stored in these areas. Revisions to the Report are necessary to state why these are identified as AFFF storage areas if there is no evidence that AFFF storage has occurred, and to provide documentation to support these claims. The Report provides interviews for regarding of AFFF Storage; however, it is noted in Appendix A, by William Collins, Base Realignment and Closure (BRAC) Environmental Coordinator/BRAC Biologist, that environmental staff did not monitor or record AFFF storage, use or disposal, and Chief Riso noted that AFFF would occasionally be pumped out of trucks onto grassy areas adjacent to fire stations.

Response to Comment 4: *All identified former Fort Ord fire stations and fire houses were selected for secondary assessment based on the Army PFAS Guidance, which lists fire stations as areas where fire suppression infrastructure exists or existed and therefore merit consideration and evaluation for possible AFFF storage, use, or disposal.*

There is no evidence of AFFF storage, use, or disposal at the East Garrison Fire House, the Main Garrison Fire House – South, Main Garrison Fire House – North, and Main Garrison Fire House – East. Interviews with site personnel state that no AFFF was stored, used, or disposed of at any of these facilities. Site reconnaissance visits found no evidence of AFFF storage tanks or structures at any of the remaining former fire houses. Furthermore, as indicated in the PA Narrative Report, the East Garrison Fire House, Main Garrison Fire House – South, Main Garrison Fire House – North, and Main Garrison Fire House – East are suspected to have been abandoned in 1953 with the construction of the Main Garrison Fire Station and were no longer being used as firefighting facilities post-1972, which is when AFFF was first deployed by the Army.

The grassy areas where AFFF was reportedly discharged were confirmed to be at the Main Garrison Fire Station and the FAAF Fire & Rescue Station. These grassy areas are recommended for further investigation as discussed in Section 6.0. The PA Narrative Report was not revised per the comment.

Comment 5. Site 16: DOL Maintenance Yard and Pete’s Pond. The Report should be revised to include Site 16 in the tertiary assessment. The Report notes that the area was used for servicing fire fighting vehicles, which may have included flushing of tanks containing AFFF. The runoff from these activities that did not reach the oil/water separator was drained into Pete’s Pond Extension. The Report additionally notes that intermittent sewage overflows from the pump station at Building 4906 drained into this area. The servicing of fire fighting vehicles and the intermittent sewage overflows shows that a release of PFAS in this area has likely occurred and these areas should be included in the tertiary assessment.

Response to Comment 5: *No further investigation is recommended at Site 16. While fire department vehicles with tanks containing residual amounts of AFFF were rinsed at Site 16, this practice was infrequent (a total of five times in 40 years, including servicing that occurred at Site 12), and follow-up correspondence with site personnel determined the firefighting vehicles equipped with AFFF systems had a single 25-gallon AFFF tank. The PA Narrative Report was revised to include this information. As stated in the PA Narrative Report, only residual amounts AFFF may have remained in the tanks if the AFFF tanks themselves or connected systems required servicing because the AFFF tanks were completely drained at the Main Garrison Fire Station prior to servicing, and potentially impacted rinse water primarily entered an onsite oil-water separator. The waste oil from the oil-water separators was retained in underground*

storage tanks (USTs) prior to disposal by an offsite contractor.³ The water from the oil-water separator entered the sanitary sewer system and was treated at the Main Garrison Sewage Treatment Plant, which is now recommended for further investigation. Additionally, because sewage overflows from the lift station at Building 4906 were infrequent and are not correlated with firefighting vehicle servicing events at Site 16, it is unlikely these overflows would result in a release of PFAS to the environment.

Comment 6. Site 5: Range 36A, Explosive Ordinance Disposal. The Report should be revised to include Site 5: Range 36A for tertiary assessment. The Report notes that plastic/polymer-bonded explosives were used at Range 36A and these explosives may contain PFAS. Absent of documentation stating that the plastic/polymer-bonded explosives did not contain PFAS throughout the operational history of Range 36A, this location should be included in the list of sites for tertiary assessment.

Response to Comment 6: *The PA Narrative Report states that plastic/polymer-bonded explosives may have been used for detonations at Range 36A because there is no specific evidence of their use. However, any PFAS release that may have occurred at Range 36A has no pathway to receptors. There are no nearby drinking water supply wells or surface water bodies which may have been impacted. The site is currently undeveloped and is publicly inaccessible and remote, preventing human exposure through shallow soil. Additionally, per current Army and DoD guidance, the primary mechanism for releases of PFAS is through the historical use (post-1972) of AFFF, not plastic/polymer-bonded explosives. Further investigation for PFAS at Range 36A is not recommended and the PA Narrative Report was not revised per the comment.*

Comment 7. Site 40A, Building 14 FAAF, and Building 4400. Section 5.2, Section 5.3. and Section 5.4 should be revised to state that groundwater sampling will be conducted at Site 40A, Building 14 FAAF, and Building 4400. The groundwater pathway for the tertiary assessment for these locations states that groundwater sampling may be warranted based on the likelihood that AFFF was used in these areas. The likely use of AFFF in these areas deems additional groundwater sampling as necessary and the words may be warranted should be removed from the report.

Response to Comment 7: *The PA Narrative Report was revised to state that groundwater investigations are recommended downgradient of Site 40A, Building 514 FAAF Fire & Rescue Station, and Building 4400 Main Garrison Fire Station.*

³ See Administrative Record No. BW-2427.

Appendix H
Responses to Comments on the Draft Report submitted by the
California Regional Water Quality Control Board – Central Coast
Region (CCRWQCB)

Responses to Comments on the Draft Report submitted by the California Regional Water Quality Control Board – Central Coast Region (CCRWQCB)¹

Comment 1. Section 1.1.1, PFAS Background – Please revise the text include a reference to the California State Water Resources Control Board (SWRCB) Department of Drinking Water (DDW) notification and response levels for perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and perfluorobutane sulfonic acid (PFBS)². The SWRCB DDW PFAS notification levels for PFOA and PFOS are 5.1 parts per trillion (ppt) (0.0051 parts per billions [ppb]) and 6.5 ppt (0.0065 ppb), respectively. The response levels for PFOA and PFOS are 10 ppt (0.010 ppb) and 40 ppt (0.040 ppb), respectively. The SWRCB DDW also has a notification level of 5 ppb and a response levels of 0.5 ppb for PFBS in drinking water.

The SWRCB DDW values should be used as screening levels in the event that future decisions are based on a lower level than the current 70 ppt (0.07 ppb) combined PFOA and PFOS lifetime Health Advisory Level issued by the United States Environmental Protection Agency (USEPA); the Department of Defense (DOD) calculated tap water screening levels of 0.40 ppb for PFOA and PFOS and 400 ppb for PFBS; or the DOD screening levels for PFOA, PFOS, and PFBS of 0.04 ppb, 0.04 ppb, and 40 ppb, respectively, when multiple PFAS are detected at a site.

Additionally, it should be noted that the Office of Environmental Health Hazard Assessment (OEHHA) issued a public notice for proposed Public Health Goals (PHG) in drinking water for PFOS (1 ppt) and PFOA (0.007 ppt)³. While these levels are proposed at this time, they are relevant as a PHG is the amount of a chemical in drinking water at which adverse health effects are not expected to occur from a lifetime of exposure.

Response to Comment 1: *Per U.S. Department of the Army (Army) policy, information regarding California notification levels and response levels is not relevant in a Preliminary Assessment (PA) and is only evaluated after an unacceptable risk has been established under federal standards in the remedial investigation/feasibility study stage of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Preliminary Assessment Narrative Report, Per- and Polyfluoroalkyl Substances, Former Fort Ord, California (PA Narrative Report) was not revised per the comment.*

Comment 2a. Section 2.4, Fort Ord Geology and Hydrogeology – This section indicates that the 900-Foot Aquifer is penetrated by the deep Marina Coast Water District (MCWD) drinking water supply wells. In the paragraph prior to this reference it describes the 180-Foot Lower Aquifer and 400-Foot Lower Aquifer. Please also include reference to the MCWD drinking water supply wells that draw water from these aquifers.

Response to Comment 2a: *The PA Narrative Report was revised per the comment.*

¹ In a letter dated December 9, 2021 (see Administrative Record No. BW-2904.4). The comments are reproduced here as provided to the Army and there have been no changes to spelling, grammar, or punctuation.

² More information on the notification and response levels for PFOA, PFOS, and PFBS in drinking water can be found at: <https://www.waterboards.ca.gov/pfas/>

³ OEHHA's public notice for the proposed PFOA and PFOS Public Health Goals is available at : <https://oehha.ca.gov/media/downloads/crn/pfoa-scrnr072221.pdf> .

Comment 2b. Section 2.4, Fort Ord Geology and Hydrogeology – The last paragraph indicates that seawater intrusion or groundwater contamination has not been identified in the Seaside Basin aquifers. Please also include discussion of the current status of seawater intrusion in the Monterey Subbasin.

Response to Comment 2b: *The PA Narrative Report was revised per the comment.*

Comment 3. Section 4.0, Secondary Assessments for Selected Sites – Please assess whether any secondary assessment sites (e.g., Site 5, 8, and 9, and Range 34) used or disposed of any military flares and/or ignition sources used as propellants that contained magnesium/Teflon/Viton (MTV), which is partially comprised of PFAS. If it is determined that there are areas where these types of flares or ignition sources have been used or disposed of, they have the potential to release PFAS into the environment and should be further assessed.

Response to Comment 3: *There is no evidence military flares or ignition sources containing MTV were used at Sites 5, 8, 9, or Range 34. MTV is primarily used in flares for aircraft countermeasure (decoy) systems as a deterrent to infrared-guided (heatseeking) air-to-air or surface-to-air missiles. The former Fort Ord served primarily as a training and staging facility for infantry troops and the historical use of the sites described in the secondary assessment indicate such flares were not used. MTV is also used as an igniter for solid propellant in rocket motors; however, the types of rockets used historically at Fort Ord used black powder igniters and not MTV. The exception is the M22 Anti-Tank Weapon Effect Signature Simulator (ATWESS) Cartridge which was a pyrotechnic item used to simulate the sound, flash, and smoke generated when firing an anti-tank missile or rocket. The M22 contained a pellet of magnesium-Teflon composition to provide the flash and smoke effect and 60 milligrams of loose magnesium-Teflon powder to provide the sound effect but did not contain any Viton. According to the Fort Ord Military Munitions Response Program (MMRP) database, munitions responses at the former Fort Ord found:*

- *Nine M22 cartridges at Munitions Response Site (MRS)-16, which is consistent with the last documented use of the area before base closure as an anti-armor training area designed to train troops engaged with attacking armored vehicles (see Administrative Record No. BW-2300L).*
- *Six M22 cartridges at MRS-31, which is consistent with the historical use of the area for troop training with pyrotechnic munitions (see Administrative Record No. OE-0121).*
- *Three M22 cartridges in MRS-53 and MRS-53EXP (Parker Flats), which is consistent with the last documented uses of the area before base closure as an anti-armor training area and a tube-launched, optically-tracked, wire-guided (TOW) missile tracking area (see Administrative Record No. OE-0523N).*

This indicates very limited use of the M22 ATWESS that would not have resulted in any significant release of PFAS. Regardless, the PA Narrative Report was not revised per the comment because, per current Army and DoD guidance, the primary mechanism for releases of PFAS is through the historical use (post-1972) of aqueous film-forming foam (AFFF) and that remains the focus of the PA Narrative Report.

Comment 4. Section 4.2.1, Site 29: Defense Reutilization and Marketing Office (DRMO) Secondary Assessment – This section indicates the following: “a former employee reported that, before 1982, transformers were emptied into the field adjacent to the DRMO hazardous storage area before recycling the steel. During a site visit in December 1991, soil discoloration and slight hydrocarbon odors were noted near the western boundary of the field near storage piles of chain-link fencing material. However, no [polychlorinated biphenyls] PCBs were detected in the soil during a 1994 site characterization study.

PFAS and PFAS related compounds were historically used in transformer fluids but in very low concentrations and were no longer used by 1999.” Although PCBs were not detected in soil during historical assessment activities, unless further information can be provided to rule out a potential release, this area should be considered for tertiary assessment as there was a documented release of transformer fluid and therefore, there is the potential for PFAS or PFAS related compounds to have been released to the environment.

Response to Comment 4: *Although the production of PCBs was banned in the United States in 1979, PCB-containing transformer oil was still widely used for years after 1979 and remains present at many sites today. As noted in the PA Narrative Report, transformers were reportedly emptied in the field before being recycled prior to 1982, indicating these were older transformers that would have likely had the PCB-containing transformer oil. However, no PCBs were detected in the soil when the site was investigated in 1994, indicating transformer oil disposal, if it actually occurred, was minimal or insignificant. Therefore, it is unlikely significant amounts of PFAS were released at Site 29 and no further investigation at Site 29 is recommended. Additionally, per current Army and DoD guidance, the primary mechanism for releases of PFAS is through the historical use (post-1972) of AFFF, not releases of transformer oil. The PA Narrative Report was not revised per the comment.*

Comment 5: Section 4.4.3, Site 34: Fritzsche Army Airfield (FAAF) Hangars Secondary Assessment – Building 507 was recommended for PFAS assessment in the September 3, 2020, *Technical Summary Report, Perfluorooctanoic Acid and Perfluorooctane Sulfonate, Basewide Review of Historical Activities and Groundwater Monitoring at Operable Unit 2* (Technical Summary Report)⁴ because of the presence of a suspected foam suppression system and the reported discharge of potential aqueous film-forming foam (AFFF) at one hangar (Building 507). The new information provided to rule this area out for further assessment indicates: 1) that what was suspected to be part of a foam suppression system in the hangar was determined to be a heating unit; 2) interviews with site personnel indicated all of the hangars were originally constructed with water-based deluge fire suppression systems, some of which were modified to water-based wet pipe systems but not foam-based systems; and 3) that the foam release was not characteristic of AFFF as it was a very thin layer of foam on top of water and not expansive.

The April 30, 2019 record of communication with Former Fire Chief Jack Riso provided in Appendix A indicates that there was an accidental discharge of foam from the fire suppressant system in one of the hangars. It was assumed it would be one of the newer hangars as they would be more likely to have fire suppression systems that used foam. While there may not be evidence of AFFF-based fire suppression systems in the FAAF hangars, it is still possible that AFFF were used and information needs to be provided on what type of foam, if not AFFF, may have been released in order to rule out the need for further investigation in this area. If there is not enough information, this area should be included in the tertiary assessment phase as there is the potential for a release of PFAS to the environment.

Response to Comment 5: *There is no additional information to corroborate the reported discharge of AFFF or other type of foam from a fire suppression system at Site 34. Interviews with other site personnel and real property records indicate there were no AFFF-based fire suppression systems in any of the FAAF hangars. Furthermore, there is no physical evidence and no indication in the real property records of the*

⁴ The Technical Summary Report – PFAS

https://documents.geotracker.waterboards.ca.gov/esi/uploads/geo_report/3924154460/DOD100196700.PDF

addition, modification, or removal of an AFFF-based fire suppression system at any of the FAAF hangars. While it is unclear what the composition of the released foam at the reported event was, if it occurred, it is highly unlikely it was AFFF because there is no evidence to support the hypothesis of an AFFF system in place at any of the FAAF hangars. Therefore, the PA Narrative Report was not revised per the comment.

Comment 6. Section 4.6.1, Site 12: Directorate of Logistics (DOL) Automotive Yard Secondary Assessment and Section 4.8.1, Site 12: Lower Meadow Disposal Area Secondary Assessment – The Report indicates that surface water containing PFAS could have been discharged from Outfall 15 to a closed depression within the dunes where contaminated soil was excavated in 1997 and 1998. Additionally, the Report also indicates that several pipes discharged into the Lower Meadow, including Outfall 31 which was located at the southeast corner. Although the discharges of PFAS from historical activities at Site 12 are reportedly small and intermittent, PFAS investigation activities should be performed in these areas as it is reported that PFAS was released to the environment. Therefore, please revise the Report to include Site 12 in the PFAS tertiary assessment activities.

Response to Comment 6: *No further investigation is recommended at Site 12. While fire department vehicles with tanks containing residual amounts of AFFF were rinsed at Site 12, this practice was infrequent (a total of five times in 40 years, including servicing that occurred at Site 16), and follow-up correspondence with site personnel determined the firefighting vehicles equipped with AFFF systems had a single 25-gallon AFFF tank. The PA Narrative Report was revised to include this information. As stated in the PA Narrative Report, only residual amounts AFFF may have remained in the tanks if the AFFF tanks themselves or connected systems required servicing because the AFFF tanks were completely drained at the Main Garrison Fire Station prior to servicing. Additionally, potentially impacted rinse water primarily entered an onsite oil-water separator, not the storm drain system. The waste oil from the oil-water separator was retained in underground storage tanks (USTs) prior to disposal by an offsite contractor.⁵ The water from the oil-water separator entered the sanitary sewer system and was treated at the Main Garrison Sewage Treatment Plant (STP), which is now recommended for further investigation. Therefore, it is unlikely that significant concentrations of PFAS accumulated at Outfall 15 or the Lower Meadow and no further investigation is recommended for these sites.*

Comment 7. Section 4.6.2, Site 16: DOL Maintenance Yard Secondary Assessment and Section 4.8.2, Site 16: Pete's Pond and Pete's Pond Extension Secondary Assessment – This area was reportedly used for servicing of fire department vehicles which may have included flushing of tanks and systems containing residual AFFF on an infrequent basis. The runoff from these activities was discharged into an adjacent oil/water separator and drainage from the DOL maintenance yard that did not reach the oil/water separator or sanitary sewer system drained to Pete's Pond Extension, a topographic depression northwest of the yard and adjacent to Pete's Pond. Additionally, the Report indicates there were intermittent sewage overflows from the pump station at Building 4906. Although these events have reportedly been infrequent, this area should be included in the PFAS investigation as there have likely been releases of PFAS to the environment through runoff containing residual AFFF from servicing of fire department vehicles and from sewage overflows containing PFAS from household products in wastewater. Please revise the Report to include Site 16 in the tertiary assessment.

⁵ See Administrative Record No. BW-2427.

Response to Comment 7: No further investigation is recommended at Site 16. While fire department vehicles with tanks containing residual amounts of AFFF were rinsed at Site 16, this practice was infrequent (a total of five times in 40 years, including servicing that occurred at Site 12), and follow-up correspondence with site personnel determined the firefighting vehicles equipped with AFFF systems had a single 25-gallon AFFF tank. The PA Narrative Report was revised to include this information. As stated in the PA Narrative Report, only residual amounts AFFF may have remained in the tanks if the AFFF tanks themselves or connected systems required servicing because the AFFF tanks were completely drained at the Main Garrison Fire Station prior to servicing. As noted in the comment, potentially impacted rinse water primarily entered an onsite oil-water separator. The waste oil from the oil-water separators was retained in USTs prior to disposal by an offsite contractor.⁶ The water from the oil-water separator entered the sanitary sewer system and was treated at the Main Garrison STP, which is now recommended for further investigation. A review of sanitary sewer maps for the former Fort Ord shows the sewer system upstream of the lift station at Building 4906 only served the DOL Maintenance Yard and the adjacent Directorate of Engineering and Housing (DEH) Yard (Site 15) but did not serve any residential areas where PFAS-containing household products may have been released to the sewer.⁷ Additionally, because sewage overflows from the lift station at Building 4906 were infrequent and are not correlated with firefighting vehicle servicing events at Site 16, it is unlikely these overflows would result in a release of PFAS to the environment.

Comment 8. Section 4.9.2, Site 2: Main Garrison Sewage Treatment Plant (STP) Secondary Assessment

- The Report indicates that the Main Garrison STP received most of the residential and industrial wastewater during its years of operation and had three unlined sewage ponding areas and ten asphalt-lined sludge drying beds, which were demolished and removed in 1997. The Report also indicates that it is unlikely that the sludge and asphalt contained significant concentrations of PFAS because: a) there were no industrial processes at the former Fort Ord that generated PFAS; and b) the possible sources of PFAS in the sludge include discharges of AFFF at the DOL Automotive Yard and the DOL Maintenance Yard that could have entered the sanitary sewer system were minimal and infrequent. Based on this information, no further action was recommended at this site. However, wastewater treatment plants (WWTPs) are considered PFAS sources due to the presence of common household and cleaning products containing PFAS in municipal sewage, industrial wastewater sources, septic materials, and firefighting wastewaters in effluent and sludge. It is also noted in the Report that AFFF discharged from the DOL Automotive Yard and DOL Maintenance yards are possible sources of PFAS in the sludge. Although the discharges of AFFF from the DOL Automotive and Maintenance Yard's were reportedly insignificant and primarily contained in the oil-water separators at each site, there is still the possibility for a release of PFAS to the environment from these activities. Please revise the Report to include Site 2 in the tertiary assessment.

Response to Comment 8: Site 2 was included in the tertiary assessment per the comment. Per the Army PFAS Guidance, the historical use of AFFF was the primary mechanism for releases of PFAS at Army installations; however, it is noted that WWTPs that have inadvertently accepted PFAS-containing materials are a potential source of environmental releases of PFAS. The Main Garrison STP was active from the mid-1930s until it was closed in 1990, a period of expanded and widespread use of PFAS, and

⁶ See Administrative Record No. BW-2427.

⁷ See Administrative Record No. BW-1283A, Volume II.

served as the primary WWTP for the former Fort Ord, treating an average 2.8 million gallons per day from residential, light industrial, and commercial sources.

Comment 9. Section 4.9.3, Site 32: East Garrison STP Secondary Assessment – The Report indicates that the East Garrison STP received municipal wastewater and operated until 1997. After 1997, sewage entered the East Garrison STP through the Doten tank, and the suspended solids were settled out through a series of holding tanks. Liquid sewage was released through an overflow valve to a diversion box out onto the ground directly north of the diversion box, where the liquid ponded. Approximately 3,000 gallons of effluent water was released via the diversion box each day to the sludge bed next to the Doten tanks. The sludge material settled out in the Doten tanks was removed and transported to the regional treatment plant in Marina. The Report indicates that there are no known sources of PFAS at this site however, WWTPs that receive municipal wastewater are known sources of PFAS due to the presence of PFAS in many household products. Since the liquid sewage was released into the ground, it is possible that PFAS was released into the environment at the East Garrison STP. Therefore, please revise the to include Site 32 in the tertiary assessment.

Response to Comment 9: *Further investigation is not warranted for Site 32, the East Garrison STP. To clarify, this WWTP was active from the 1940s through 1997 and did not operate after 1997. As described in the PA Narrative Report, this WWTP was decommissioned in 1997, including an interim action to remove the sewage sludge and contaminated soil. When operational, the East Garrison STP only received low volumes of wastewater from the East Garrison, totaling approximately 2,000 to 5,000 gallons per day. Additionally, review of sanitary sewer maps for the former Fort Ord shows the East Garrison STP only served the East Garrison and did not serve any residential areas where PFAS-containing household products may have been released to the sewer.⁸ Because the flow rates at this WWTP were very low during its years of operation and there are no known significant historical sources of PFAS in the East Garrison, it is unlikely significant amounts of PFAS were released at Site 32.*

Comment 10. Section 4.9.4, Site 36: FAAF STP Secondary Assessment – The FAAF STP was previously recommended for additional PFAS assessment in the September 3, 2020, Technical Summary Report as there was a reported discharge of potential AFFF at one of the FAAF hangars which may have resulted in AFFF entering the sanitary sewer system. However, this area is not recommended for tertiary assessment in the Report. The Report indicates that there are no known or suspected AFFF discharge events at the FAAF in which AFFF could have entered the sanitary sewer system and based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment.

As indicated above in Comment 5, additional information is needed in order to substantiate eliminating the FAAF hangars from the PFAS investigation activities and therefore, AFFF could have entered the FAAF sanitary sewer system from a release at the FAAF hangars. Additionally, WWTPs are considered sources of PFAS due to the presence of common household products in municipal sewage, industrial wastewater sources, septic materials, and firefighting wastewaters in effluent and sludge. The Report also indicates that the Imhoff tank experienced overflows from the oil-water separators and the evaporation ponds had cracks in the bottom, so it is possible that wastewater containing PFAS

⁸ See Administrative Record No. BW-1283A, Volume II.

percolated into the ground in this area. Therefore, please revise the Report to include Site 36 in the tertiary assessment.

Response to Comment 10: *Further investigation is not warranted for Site 36, the FAAF STP. This WWTP was active from the late 1950s through March 1991, but only received wastewater from FAAF and the nearby U.S. Army Reserve Center with an average flow rate of 16,500 gallons per day. As indicated in the Response to Comment 5, there is no evidence any of the hangars or other aviation assets at the former FAAF had foam-based fire suppression systems that used AFFF. Because the flow rate at Site 36 remained low during its years of operation and there are no known significant historical sources of PFAS at FAAF or the U.S. Army Reserve Center, it is unlikely significant amounts of PFAS were released. Therefore, the PA Narrative Report was not revised per the comment.*

Comment 11. Section 5.0, Tertiary Assessment Pathway and Environmental Hazard Assessment for Selected Sites - Please update the recommendations to the site-specific sections to include soil sampling in previously excavated areas to confirm that PFAS in soil was sufficiently removed (e.g., Site 10, Former Burn Pit Area and any additional sites added following incorporation of agency comments).

Response to Comment 11: *The PA Narrative Report was revised to recommend soil sampling outside the vertical limits of previous excavation areas for sites where a potential significant release of PFAS is suspected (e.g., Site 10 – Former Burn Pit and the FAAF Fire Drill Area). The PA Narrative Report was also revised to recommend soil sampling outside the vertical limits of previous excavation areas for Site 2 – Main Garrison Sewage Treatment Plant because this facility could have received waste streams with relatively small amounts of PFAS-containing materials from multiple sites across Fort Ord that could have accumulated over time.*

Comment 12: Section 5.2, Site 40A: East Helicopter Defueling Area Tertiary Assessment –

Comment 12a. Section 5.2.1, Groundwater Pathway – This section indicates that a groundwater investigation *may be warranted* at Site 40A. Based on the likelihood that AFFF was used in this area, the possibility that soil sampling may not identify the source, and the mobility and persistence of PFAS in groundwater, please update this section to indicate that a groundwater investigation will be performed at Site 40A.

Additionally, this section should be updated to include groundwater investigation in the vicinity of the stormwater outfall located 450 feet east of the FAAF Fire and Rescue Station (referenced in Section 5.2.2) where surface water impacted with PFAS may have infiltrated to groundwater.

Response to Comment 12a. *The PA Narrative Report was revised to state that a groundwater investigation is recommended downgradient of Site 40A.*

Surface runoff from Site 40A and the storm drain line 450 feet east of the FAAF Fire & Rescue Station both discharge to the same topographic low, which is depicted in the reconnaissance photographs for Site 40A in Appendix B. Section 5.3.3 (formerly Section 5.2.3) of the PA Narrative Report was revised to clarify this.

Comment 12b. Section 5.2.3, Soil Pathway – This section indicates that soil sampling will be performed in the topographic low to the north of Site 40A. Please also include soil sampling in

the stormwater outfall area located 450 feet east of the FAAF Fire and Rescue Station as stormwater containing PFAS may have impacted soil in this area as well.

Response to Comment 12b. *Surface runoff from Site 40A and the storm drain line 450 feet east of the FAAF Fire & Rescue Station both discharge to the same topographic low, which is depicted in the reconnaissance photographs for Site 40A in Appendix B. Section 5.3.3 (formerly Section 5.2.3) of the PA Narrative Report was revised to clarify this.*

Comment 13: Section 5.3, FAAF Fire & Rescue Station Tertiary Assessment –

Comment 13a. 5.3.1 Groundwater Pathway – This section indicates that because of the mobility of PFAS in the soil pathway, a groundwater investigation *may be warranted* in the downgradient area between the former FAAF Fire and Rescue Station and the former Fort Ord boundary to the east. Based on the likelihood that AFFF was used in this area and released to the environment, the possibility that soil sampling may not identify the source, and the mobility and persistence of PFAS in groundwater, please updated this section to indicate that a groundwater investigation will be performed at Building 514 Fire and Rescue Station.

Additionally, the Report indicates that stormwater runoff from the site likely discharges to a low point to the north of the FAAF Fire and Rescue Station. Therefore, please update the report to include this area in the groundwater investigation as surface water impacted with PFAS may have infiltrated to groundwater.

Response to Comment 13a. *The PA Narrative Report was revised to state that a groundwater investigation is recommended downgradient of the Fire & Rescue Station.*

The location of the discharged AFFF is known to be the grassy area to the south of the former Fire & Rescue Station. The text in Section 4.2.3 and Section 5.3.3 (formerly Section 5.2.3) was revised to clarify this. The topographic low area to the north of the site does not require investigation. The site topography indicates this area receives runoff from the north and west sides of the Fire & Rescue Station, not the south side where AFFF was discharged. The text was revised to clarify this.

Comment 13b. Section 5.3.3, Soil Pathway – This section indicates that soil sampling will be performed in the unpaved area south of the former Fire & Rescue Station. Please also include soil sampling in the area to the north of the FAAF Fire and Rescue Station where the Report indicates that stormwater runoff from the site likely discharges as stormwater containing PFAS may have impacted soil in this area as well.

Response to Comment 13b: *The location of the discharged AFFF is known to be the grassy area to the south of the former Fire & Rescue Station. The text in Section 4.2.3 and Section 5.3.3 (formerly Section 5.2.3) was revised to clarify this. The topographic low area to the north of the site does not require investigation. The site topography indicates this area receives runoff from the north and west sides of the Fire & Rescue Station, not the south side where AFFF was discharged. The text was revised to clarify this.*

Comment 14: Section 5.4, Building 4400 Main Garrison Fire Station Tertiary Assessment –

Comment 14a. Section 5.4.1, Groundwater Pathway – This section indicates that groundwater sampling *may be warranted* at the Main Garrison Fire Station. Based on the likelihood that AFFF was used in this area, the possibility that soil sampling may not identify the source, and the mobility and persistence of PFAS in groundwater, please update this section to indicate that a groundwater investigation will be performed at the Main Garrison Fire Station.

Response to Comment 14a: *The PA Narrative Report was revised to state that a groundwater investigation is recommended downgradient of the Main Garrison Fire Station.*

Comment 14b. Section 5.4.3, Soil Pathway – This section indicates that soil sampling will be performed in the unpaved area west of Building 4401. Please include soil sampling in the vegetated depression a few hundred feet southwest of the site where stormwater runoff from the site primarily flows as stormwater containing PFAS may have impacted soil in this area as well.

Response to Comment 14b: *The PA Narrative Report was corrected to state surface water runoff from the Main Garrison Fire Station flows primarily to the north. Therefore, the vegetated depression southwest of the site is not recommended for investigation.*

Comment 15: Section 6.2, Secondary Assessment –

Comment 15a. Bullet 4 – This bullet indicates that there is no evidence that AFFF was used in the fire suppression systems for any aviation hangars or other buildings. As indicated above in Comment 5, additional information needs to be provided to rule out a release of AFFF from one of the FAAF hangars as it was reported a release of AFFF from one of the FAAF hangars as it was reported that there was a layer of foam on top of the water during a release. Please revise this bullet to indicate that there is no evidence that AFFF was used in the fire suppression systems for any aviation hangars or other buildings although at least one of the FAAF hangars there was a report of a thin layer of foam on top of the water during a release from the fire suppression system.

Response to Comment 15a: *As stated in the response to Comment 5, the reported discharge of foam from a fire suppression system at one of the FAAF hangars cannot be corroborated. Interviews with other site personnel and real property records indicate there were no foam-based fire suppression systems in any of the FAAF hangars. Furthermore, there is no physical evidence and no indication in the real property records of the addition, modification, or removal of a foam-based fire suppression system at any of the FAAF hangars. While it is unclear what the composition of the released foam at the reported event was, if it occurred, it is highly unlikely it was AFFF because there is no evidence to support the hypothesis of an AFFF system in place at any of the FAAF hangars. Therefore, the PA Narrative Report was not revised per the comment.*

Comment 15b. Bullet 9 – This bullet indicates that there is no evidence that former WWTPs received significant waste streams containing PFAS. However, WWTPs are sources of PFAS in the environment due to the presence of PFAS in common household and cleaning products. Please revise this bullet to indicate that former WWTPs likely did not receive significant waste streams of PFAS from AFFF use at the former Fort Ord however, WWTPs are considered sources of PFAS

due to the presence of common household and cleaning products in municipal sewage, industrial wastewater sources, septic materials, and firefighting wastewaters in effluent and sludge.

Response to Comment 15b: *The bullet point was revised to state one former WWTP could have inadvertently accepted PFAS-containing materials starting in the 1950s for consistency with the Army PFAS Guidance.*

Comment 16. Section 6.3, Tertiary Assessment – Please update this section to incorporate the Central Coast Water Board’s comments on Section 4 and 5 (e.g., additional sites recommended for tertiary assessment, confirmation soil sampling at tertiary assessment areas previously excavated, and groundwater sampling at all sites including areas identified as stormwater discharge points).

Response to Comment 16: *The PA Narrative Report was revised to include Site 2, Main Garrison STP as a tertiary assessment site and to recommend additional soil sampling at Site 10, Former Burn Pit, and the FAAF Fire Drill Area.*

Comment 17. Section 6.5.3, FAAF Fire Drill Area – Please include reference to Operable Unit 1 (OU1) in the name of this area so that it is consistent with references in Section 4.0, Section 5.0, figures, and tables.

Response to Comment 17: *The terms “Operable Unit 1” and “OU1” refer specifically to the actions taken, COCs analyzed, and conclusions stated as a part of historical OU1 operations and eventual closure, which does not include current PFAS assessments. This PA Narrative Report refers to this site as the former FAAF Fire Drill Area for all non-OU1-related activities at the site. The PA Narrative Report was revised to clarify this distinction between OU1 and the former FAAF Fire Drill Area.*

Appendix I
Responses to Comments and Questions on the Draft Report submitted
by the Fort Ord Community Advisory Group (FOCAG)

Responses to Comments and Questions on the Draft Report submitted by the Fort Ord Community Advisory Group (FOCAG)¹

COMMENT 1: Ahtna, LLC is the contractor chosen by the Army to write this document's narrative. Ahtna, LLC maintains a local office near Monterey. The FOCAG notes that Ahtna, LLC has been writing all the documents dealing with toxic substances located on, in, or under this National Superfund Site. The procedure has been that Ahtna writes a document then submits it to Army Engineers located in Sacramento as well as representatives for the USEPA, California DTSC, the California Regional Water Quality Control Board, and, the FOCAG. The recipients are tasked with finding errors or asking for clarification, making comments, that the Army Engineers often get to answer.

RESPONSE TO COMMENT 1: *Ahtna Global, LLC (Ahtna) is one of many contractors that have performed environmental work for the U.S. Army Corps of Engineers (USACE) at the former Fort Ord over the last few decades and have prepared documents related to former Fort Ord environmental investigation and cleanup activities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), including the Preliminary Assessment (PA) Narrative Report for Per- and Polyfluoroalkyl Substances (PFAS). In accordance with the Fort Ord Federal Facility Agreement (FFA; Administrative Record No. BW-0119), draft documents are submitted to the U.S. Department of the Army (Army, including USACE), U.S. Environmental Protection Agency (USEPA), California Department of Toxic Substances Control (DTSC), California Regional Water Quality Control Board – Central Coast Region (CCRWQCB), and members of the public who have expressed interest in receiving such documents for review and comment. The Army and its contractor prepare written responses to the comments, which are typically appended to the next version of the document.*

COMMENT 2: Reading this document one finds many retired Army personnel or people that worked for the Army at Fort Ord being interviewed regarding PFAS. From the FOCAG perspective, we recall when the Army couldn't officially remember there was Army tank training on former Fort Ord. We recall when they were very vague about the presence of CDEC on former Fort Ord, even though Fort Ord was the Western headquarters for CDEC. We recall when questioned about where the Army records regarding toxic substances (while the Base was still open) disappeared too? Where were they sent to? We received vague answers.

RESPONSE TO COMMENT 2: *Per the USEPA's "Guidance for Performing Preliminary Assessments Under CERCLA," interviews of site personnel are a means of gathering information concerning past disposal practices and environmental problems. The interviews conducted for the PA indicated some personnel were familiar with historical activities at the former Fort Ord that may have resulted in releases of PFAS to the environment and some personnel were not, as may be expected for any site where a PA is being conducted. Similarly, some personnel may be more or less aware of historical tank training or the presence of the Combat Developments Experimentation Command (CDEC) at the former Fort Ord depending on their areas of responsibility.*

As shown in Section 7.0 of the PA Narrative Report, many of the documents referenced were prepared prior to the closure of Fort Ord in September 1994. These documents include information from many

¹ In a letter dated October 29, 2021 (see Administrative Record No. BW-2904.2). The comments are reproduced here as provided to the Army and there have been no changes to spelling, grammar, or punctuation.

types of historical sources that was collected, researched, and incorporated. These documents are available in the Fort Ord Administrative Record and include sufficient information from before Fort Ord closed to assess whether sites at the former Fort Ord were of the types with the greatest likelihood of PFAS releases (fire training areas, aircraft crash sites, aviation hangars, landfills, etc.).

A review of historical records indicates CDEC used facilities at Fort Ord for administrative functions and CDEC field experiments were conducted at Fort Hunter Liggett. The United States Army Combat Developments Experimentation Command (USACDEC) Experimentation Manual states that the CDEC used Fort Ord “only rarely” for field experimentation as Fort Hunter Liggett was preferred due to the isolation from urban populations and dark night skies making it a “excellent site” for combat training experimentation.² Additionally, documents in the Fort Ord Administrative Record that reference CDEC experiments indicate these activities took place at Fort Hunter Liggett:

- *Update of the Initial Installation Assessments of Fort Ord and Subinstallations, Presidio of Monterey and Fort Hunter Liggett*³
- *Environmental Restoration Program Planning Guide for Fort Ord, Fort Hunter Liggett and, Presidio of Monterey, Monterey, California*⁴
- *Draft Site Investigations Fort Ord and Fort Hunter Liggett Part 1- Report*⁵
- *Final Site Investigation Report, Fort Ord and Fort Hunter Liggett, California, Part I – Text*⁶
- *Final Land Use Baseline Study of Fort Ord*⁷

Per the USACDEC Experimentation Manual, the mission of the CDEC was combat development testing and training development testing, and the listed CDEC experiments indicate a focus on military tactics and hardware functionality in various environments using conventional weapons. There was one experiment at Fort Ord that Fort Hunter Liggett was not suited for: testing of a laser guidance system in foggy conditions. Experimental firefighting techniques and retardants were not within the CDEC mission scope and there is no evidence such experiments were conducted at the former Fort Ord.

COMMENT 3: The FOCAG recalls asking that the groundwater below the City of Marina be tested, and encountered resistance. Officials thought toxic plumes could not have spread that far. When testing was done, it was proven that toxic chemicals had spread both below and beyond the City boundaries. We note that toxics do not recognize political boundaries.

RESPONSE TO COMMENT 3: The Army acknowledges environmental contaminants can migrate via different media past political boundaries and has conducted remedial investigations and continues to monitor and implement remedial actions for such contamination both inside and outside the boundaries of the former Fort Ord in accordance with CERCLA. Additionally, the Marina Coast Water District (MCWD) and the California American Water (CalAm) provide drinking water at the former Fort Ord and surrounding areas that is sourced from several supply wells in the Fort Ord area. None of these supply wells are within the identified chemical of concern plume areas. MCWD and CalAm regularly test their

² USACDEC Experimentation Manual dated Oct. 1981. <https://apps.dtic.mil/dtic/tr/fulltext/u2/a124297.pdf>.

³ Administrative Record No. BW-0013.

⁴ Administrative Record No. BW-0042.

⁵ Administrative Record No. BW-0091.

⁶ Administrative Record No. BW-0099.

⁷ Administrative Record No. BW-2414.

wells for various chemicals, including PFAS, and the drinking water meets all state and federal standards. The most recent MCWD consumer confidence report is available at https://www.mcwd.org/docs/ccr/mcwd_ccr_2020_rev_English_Final.pdf and the most recent CalAm water quality report is available at https://www.amwater.com/ccr/Monterey_2020.pdf.

COMMENT 4: Thus it was with great interest reading this Ahtna narrative regarding former Fort Ord Army personnel, and memories that either did not include PFAS, or minimal amounts. The FOCAG finds this interesting because “no memories” means pretty much closing much of the investigation for PFAS on former Fort Ord.

RESPONSE TO COMMENT 4: As stated in the Response to Comment 2, the interviews conducted for the PA indicated some personnel were familiar with historical activities at the former Fort Ord that may have resulted in releases of PFAS to the environment and some personnel were not, as may be expected. However, secondary assessment sites were analyzed using multiple lines of evidence, including the review of available records, site reconnaissance visits, comprehensive target surveys, and interviews with current or former site personnel. Sites which were determined, through multiple lines of evidence, to have no known or suspected significant releases of PFAS onsite were not recommended for additional investigation. No sites were removed based solely on one source of evidence or the recollections (or lack thereof) of the interviewed personnel.

Additionally, PFAS investigation at the former Fort Ord is on-going. The purpose of this PA was to collect information concerning conditions at sites at the former Fort Ord sufficient to assess potential threats posed to human health and the environment and determine the need for additional CERCLA action. Additional site inspection and investigation will be conducted. Site inspection information, including details regarding future groundwater and soil sampling, will be described in the upcoming Draft PFAS Site Inspection and Quality Assurance Project Plan which will be made available to the regulatory agencies and interested members of the public for review.

COMMENT 5: Some of us grew up here, next to this Army Infantry Training Base, the second largest one in the United States of America. Some of us recall when water wells were being shut down on the Base. We were told it was due to saltwater intrusion. Was it saltwater intrusion? Or was it discovered that toxic chemicals had leached into the groundwater? What happened was that water wells were moved further and further inland.

RESPONSE TO COMMENT 3: In 1940 and 1941, there were nine water supply wells constructed in the Main Garrison area. Two of these were never used and most of the others pumped sand and produced water with high chloride concentrations (i.e., evidence of seawater intrusion). Seven of the water supply wells were decommissioned in 1951 or 1952, and the last two were decommissioned in 1989. From 1942 until 1984, additional water supply wells were constructed further inland to mitigate the seawater intrusion problem. Most of these have been decommissioned, with only water supply wells 29, 30, and 31 (also referred to as FO-29, FO-30, and FO-31) remaining. Most wells constructed at the Former Fort Ord since 1989 have been for groundwater monitoring and groundwater extraction and treatment, not for water supply. Because seawater intrusion can damage groundwater remediation equipment, the Army measures chloride concentrations annually to ensure groundwater extraction and treatment activities do not make seawater intrusion worse (e.g., see Administrative Record No. BW-2894B).

COMMENT 4: Today the water wells serving the former Fort Ord and immediate surrounding areas are located near Reservation Road. The three water wells serving up drinking water were labelled Wells #29, #30 and #31. When the water quality in a well exceeded State and /or Federal standards the water from all three was blended to make the water potable. There has since also been a big bore deep well that has been dug into the 900-ft aquifer. This is ancient water that no one knows how much is there. These are the source wells for the Marina Coast Water District.

I bring these water well issues up because we find in the this Draft P/A Narrative document Appendix E, a map of the Marina Coast Water District service area. We also find in Table 6 of this document proof that PFHxA was discovered in Well #29. PFHxA has also been discovered in California American’s Water Well called Playa Well #03. (Note, a different CPUC defined Service Area). This well serves the City of Seaside. Table 6 reveals the results of water quality testing for year 2019. The FOCAG wonders why there are no current results especially from the wells near the landfills?

RESPONSE TO COMMENT 4: *There are four active drinking water supply wells owned and operated by the Marina Coast Water District (MCWD) that are screened in the 900-Foot Aquifer. Water source blending is a common and lawful practice, though with some additional requirements, in many communities for various reasons.⁸ Though the MCWD water supply system operates as a blended system, there is no evidence this is because any particular well has exceeded state or federal drinking water standards. To the contrary, the Army and MCWD test water supply wells 29, 30, and 31 at least every three months and there has been no indication these wells are not meeting drinking water standards. The Army reports the results of this testing in quarterly groundwater monitoring reports (e.g., see Administrative Record Nos. OUCTP-0096B and OUCTP-0100). Annual Consumer Confidence Reports for MCWD going back to 2001 are available at: https://www.mcwd.org/qa_ccr.html. For further information about MCWD water quality, please contact an MCWD representative.*

This PA Narrative Report was developed using analytical data available as of the date the draft report was issued. Information available after that date will be incorporated into future reports, such as the PFAS Site Inspection Narrative Report.

Additional groundwater sampling and analyses for PFAS at MCWD wells and California American Water wells, including Playa Well #03, will continue quarterly under the State of California State Water Resources Control Board Division of Drinking Water General Order Requiring Monitoring for PFAS.⁹ Groundwater sampling results for select PFAS compounds will be included in the MCWD Annual Consumer Confidence Report and California American Water’s Annual Consumer Confidence Report.¹⁰ The Army also plans to sample wells at the former Fort Ord for PFAS analysis in 2022. Additional information regarding future Army PFAS sampling and analysis will be included in the upcoming PFAS Site Inspection Work Plan and Quality Assurance Project Plan.

⁸ Additional water sampling requirements for multiple source systems are described in 40 C.F.R § 141.703.

⁹ General Order 2020-003-DDW can be found here:

https://www.waterboards.ca.gov/board_decisions/adopted_orders/drinking_water/2020/pfas_go_2020_0003_ddw/pfas_go_2020_0003_ddw.pdf.

¹⁰ California American Water Annual Consumer Confidence Reports are available at:

<https://www.amwater.com/caaw/Water-Quality/Water-Quality-Reports/>.

COMMENT 5: As a child, growing up next to Fort Ord, the war game training maneuvers included lots and lots of flares during the night time. These maneuvers could go on for days. Please see attached link regarding PFAS in military flares; <https://cswab.org/demilitarization-of-military-flares-as-an-uncontrolled-source-of-pfas/>

Have Fort Ord training range lands been tested for PFAS?

RESPONSE TO COMMENT 5: *The linked article addresses disposing of large quantities of flares, not the use of flares as a part of training events. There are no known sites at the former Fort Ord which involved the disposal of large quantities of flares.*

The Fort Ord training ranges have not been tested for PFAS and are not currently recommended for PFAS monitoring. Per the Army guidance for addressing releases of PFAS, the primary mechanism for releases of PFAS at Army installations is through the historical use (post-1972) of aqueous film-forming foam (AFFF). Therefore, use of AFFF was investigated as the primary mechanism for PFAS releases at Fort Ord. However, should Army policy and guidance be updated, future versions of the PA Narrative Report and documents relevant to the CERCLA process for PFAS at the former Fort Ord will be drafted accordingly.

COMMENT 6: We cannot blame former Fort Ord for all the water contamination troubles. Have Monterey and Marina Airports, Monterey County fire departments, CalFire switched to PFAS-free foam? This is something the FOCAG would like to know. See attached link;

<https://www.ewg.org/news-insights/news/2021/09/faa-will-likely-miss-looming-deadline-letting-airports-switch-pfas-free>

RESPONSE TO COMMENT 6: *Note that the linked article pertains to Federal Aviation Administration requirements for airports using firefighting foams that do not contain PFAS. The article does not address non-airport fire departments or other fire agencies such as the California Department of Forestry and Fire Protection (CAL FIRE).*

Please contact the respective representatives for the Monterey Regional Airport, Marina Municipal Airport, Monterey County fire departments, and CAL FIRE for further information about their use of AFFF and transitioning to firefighting foams that do not contain PFAS.

COMMENT 7: Also, attached is an article regarding the US EPA considers placing limits on 'forever chemicals' in drinking water [07/14/2021]

<https://www.theguardian.com/environment/2021/jul/14/epa-pfas-compounds-drinking-water>

RESPONSE TO COMMENT 7: *Since the issuance date of the Draft PA Narrative Report and the publish date of the linked article, the USEPA announced its PFAS Strategic Roadmap, which includes establishing a national primary drinking water regulation for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). More information about the USEPA's PFAS Strategic Roadmap can be found at: <https://www.epa.gov/pfas/pfas-strategic-roadmap-epas-commitments-action-2021-2024#ow>.*

Appendix J
Responses to Comments on the Draft Final Report submitted by the
U.S. Environmental Protection Agency (USEPA)

Responses to Comments on the Draft Final Report submitted by the U.S. Environmental Protection Agency (USEPA)¹

GENERAL COMMENTS

No USEPA Evaluations of the Responses to General Comments 1 through 3 were provided. The U.S. Department of the Army (Army) assumes USEPA accepts the Responses to General Comments 1 through 3.

General Comment 4. 2020 PFOA/PFOS Technical Summary Report: Section 3, Primary Assessment Site Selection and Results, and Table 1, Primary Assessment Sites, do not provide the rationale to explain why specific sites were not retained for the secondary assessment. EPA believes that much of the preliminary primary assessment work was done in the Technical Summary Report – Perfluorooctanoic Acid and Perfluorooctane Sulfonate, Basewide Review of Historical Activities and Groundwater Monitoring at Operable Unit 2 (AEI, 2020) (Technical Summary Report), but it is not described in the PFAS PA.

Please revise the PFAS PA Section 3 and Table 1 to include the rationale for why sites were not retained for secondary assessment using information or citations from the Technical Summary Report as applicable. The Army should also consider whether new information has come to light since the initial candidate list was pared down from the 103 sites to the 39 sites evaluated in the PFAS PA that would require additional sites be retained for the secondary assessment.

Also, please address the discrepancy in the list of sites recommended for further investigation in the Technical Summary Report against the list recommended for further investigation in Section 6.3 Tertiary Assessment. In particular, the Site 36 FAAF Sewage Treatment Plant was previously recommended for further sampling as follows and no new information about the site was included in the PFAS PA appears to discount the need for this:

“No excavation occurred in the area of the Imhoff tank and only limited excavation occurred in the evaporation ponds; therefore, soil sampling for PFAS analysis from the surface down to 10 feet below ground surface in the footprints of the former Imhoff tank and evaporation ponds is recommended to evaluate for residual PFAS. Additionally, because the A-Aquifer in this area discharges to the ground surface as seepage from the bluffs above the Salinas River (HLA, 1995d, Volume II), shallow soil should be collected from the bluff face (Figure 21).” (Technical Summary Report, Section 3.5, Page 34)

Response to General Comment 4: As described in the Technical Summary Report – Perfluorooctanoic Acid and Perfluorooctane Sulfonate, Basewide Review of Historical Activities and Groundwater Monitoring at Operable Unit 2 (Technical Summary Report; Administrative Record No. OU2-722B), “...the PA will include full evaluations of locations where releases of PFAS may have occurred and which merit

¹ In a letter dated May 2, 2022 (see Administrative Record No. BW-2904A.2). The comments are reproduced here as provided to the Army and there have been no changes to spelling, grammar, or punctuation. In its comments on the Draft Final Report, USEPA provided evaluations of the Army responses to USEPA comments on the Draft Report (Appendix F). For clarity, the USEPA comments on the Draft Report and the Army responses are reproduced here. Based on this, the Army assumes USEPA accepts the Army’s responses to General Comments 1, 2, 3, 6, 9, 10, and 12 on the Draft Report and the Army’s responses to Specific Comments 1, 2, 3, 5, 6, 8, and 10 through 14 on the Draft Report.

evaluation per the Army PFAS Guidance.” Consistent with the Army’s responses to USEPA’s comments on the Technical Summary Report, this PA Narrative Report acts as a stand-alone document and does not use as a basis the conclusions drawn in the Technical Summary Report. This PA Narrative Report includes full evaluations of locations which merit evaluation per the Army PFAS Guidance and where releases of PFAS are suspected to have occurred. Sites were reevaluated independently of the Technical Summary Report’s evaluations and conclusions.

As stated in Section 3.2, sites or subsites were eliminated from further assessment because the site was determined to not be one of the site types that merit evaluation per the Army PFAS Guidance.

Based on an independent reevaluation as a part of the PA Narrative Report following USEPA PA Guidance and Army PFAS guidance, Site 36 was eliminated from further investigation because no known quantities of PFAS-containing materials were stored or used onsite and there are no known or suspected AFFF discharge events at the FAAF in which AFFF could have entered the sanitary sewer system. Further discussion of Site 36 is included in the response to General Comment 8.

USEPA Evaluation of the Response to General Comment 4: The response partially addresses the comment. The explanation in the response that the Draft Final Preliminary Assessment Narrative Report, Per- and Polyfluoroalkyl Substances, Former Fort Ord, California, dated March 2022 (the PA Narrative Report), is a stand-alone document and sites were reevaluated independently of the evaluations and conclusions in the Technical Summary Report – Perfluorooctanoic Acid and Perfluorooctane Sulfonate, Basewide Review of Historical Activities and Groundwater Monitoring at Operable Unit 2 (AEI, 2020 - the Technical Summary Report), should be described in the PA Narrative Report for clarity. Please revise the PA Narrative Report to incorporate the information provided in the response to remove the ambiguity.

Army Response to USEPA Evaluation of the Response to General Comment 4: A footnote was added to Section 1.2.1 of the Draft Final Preliminary Assessment Narrative Report, Per- and Polyfluoroalkyl Substances, Former Fort Ord, California (the PA Narrative Report) per the comment.

General Comment 5. PFAS sources: The PFAS PA addresses the potential for some PFAS contamination from sources other than AFFF. While the list of possible sources evaluated may be consistent with Army policy, is not consistent with the latest scientific information on PFAS, and the universe of potential sources will likely only grow in the future. Because of this, the Army should include the caveat to the PFAS PA that if new source areas are identified or suspected that they will be evaluated and investigated, either in the SI, or a later phase of the CERCLA process.

Response to General Comment 5: *Per the current Army PFAS Guidance, the primary mechanism for releases of PFAS is considered to be through the historical use of AFFF. Other known sources of environmental releases include mist suppressants for chrome plating operations and landfills and wastewater treatment plants that may have inadvertently accepted PFAS-containing material.*

This PA Narrative Report remains consistent with current DoD and Army policy and guidance regarding PFAS and was not revised per the comment; however, should DoD and Army policy and guidance be updated, future versions of the PA Narrative Report and documents relevant to the Comprehensive

Environmental Response, Compensation, and Liability Act (CERCLA) process for PFAS at the former Fort Ord will be drafted accordingly.

USEPA Evaluation of the Response to General Comment 5: The response does not address the comment. The response states that if U.S. Department of Defense (DoD) and Army policy and guidance are updated, future versions of the PA Narrative Report will be drafted accordingly; however, this implies that no action will be taken if new source areas for PFAS contamination are identified or suspected, until such time policy and guidance are updated, which is unacceptable. Newly identified or suspected source areas can also fall within current policy and guidance (e.g., findings in the Evaluation of the Department of Defense's Actions to Control Contaminant Effects from Perfluoroalkyl and Polyfluoroalkyl Substances at Department of Defense Installations (DODIG-2021-105), July 23, 2021), and the PA Narrative Report should state if new source areas are identified or suspected and that they will be investigated either during the Site Inspection (SI) or a later phase of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process. In addition, the response appears inconsistent with the response to General Comment 7, which states, "If data collected during the SI indicates a PFAS release has occurred and PFAS may have entered secondary areas of concern, further sampling and analysis may be conducted as a part of a remedial investigation (RI)." The original comment is retained. Please revise the PA Narrative Report to indicate that if new source areas are identified or suspected, they will be evaluated and investigated, either in the SI or a later phase of the CERCLA process.

Army Response to USEPA Evaluation of the Response to General Comment 5: *The DoD Inspector General's Report No. DODIG-2021-105 recommends DoD consider PFAS exposure caused by DoD activities from PFAS-containing materials other than AFFF and DoD agreed with this recommendation; however, this report is not currently considered policy or guidance. While the DoD Office of the Inspector General (OIG) considers the recommendation to be resolved, the recommendation is still open pending OIG verification that DoD has implemented the agreed-upon action. Accordingly, Section 1.1 of the PA Narrative Report was revised to note other sources of PFAS may be considered in future phases of the CERCLA process pending new DoD guidance in response to the recommendations in Report No. DODIG-2021-105. Otherwise, the PA Narrative Report shall remain consistent with current policy and guidance.*

No USEPA Evaluation of the Response to General Comment 6 was provided. The Army assumes USEPA accepts the Response to General Comment 6.

General Comment 7. Secondary areas of concern: The PFAS PA does not always indicate that sampling of secondary areas of concern (e.g., drainage ditches and outfalls, groundwater seepage areas) should be included in future investigations. Since PFAS can be highly mobile in the environment, these secondary areas should be evaluated for PFAS contamination and included in sampling as part of the forthcoming site inspection (SIs) or additional investigations. Several examples of these secondary areas are included in the Specific Comments below. Please revise the PFAS PA to indicate the secondary areas of potential PFAS contamination will be investigated as part of the forthcoming SI.

Response to General Comment 7: *The investigation of secondary areas of concern is outside the scope of the SI. The SI will be consistent with the Guidance for Performing Site Inspections Under CERCLA (USEPA SI Guidance), dated September 1992. The goal of the SI will be to obtain information not readily*

accessible during the PA to better determine the need for further investigation under CERCLA, not to fully characterize the site or secondary areas of concern. If data collected during the SI indicates a PFAS release has occurred and PFAS may have entered secondary areas of concern, further sampling and analysis may be conducted as a part of a remedial investigation (RI). The PA Narrative Report was not revised per the comment.

USEPA Evaluation of the Response to General Comment 7: The response addresses the comment; however, the response was not incorporated into the PA Narrative Report. It is noted that Section 1.1, Purpose and Scope of the Preliminary Assessment, describes subject matter that is outside of the PA Narrative Report Scope and would be an appropriate location to describe the information provided in the response. Please revise the PA Narrative Report to include the information provided in the response for completeness and clarity.

Army Response to USEPA Evaluation of the Response to General Comment 7: Section 1.1 of the PA Narrative Report was revised per the comment.

General Comment 8. Wastewater treatment plants: The PFAS PA indicates wastewater treatment plants (WWTPs) should not be investigated further because sewage sludge where PFAS may have been concentrated was removed from the sites and low concentrations of PFAS are expected based on mostly residential use. However, PFAS can be found in a variety of household uses, such as personal care products (as noted in the footnote on page 2 of the PFAS PA) and in cleaning products. Since PFAS confirmation sampling from the sludge areas has not been performed and it is unclear if groundwater was impacted at places where unlined or cracked evaporation ponds were used (e.g., Site 2: Main Garrison Sewage Treatment Plant and Site 36: FAAF Sewage Treatment Plant), these sites should be included as areas with suspected PFAS releases. Please revise the PFAS PA to include further investigation of the WWTPs.

Response to General Comment 8: Per the Army PFAS Guidance, the historical use of AFFF was the primary mechanism for releases of PFAS at Army installations; however, it is noted that WWTPs that have inadvertently accepted PFAS-containing materials are a potential source of environmental releases of PFAS. Based on the operational history of the four former WWTPs at the former Fort Ord, the PA Narrative Report was revised to recommend further investigation at Site 2 – Main Garrison Sewage Treatment Plant because this WWTP was active from the mid-1930s until it was closed in 1990, a period of expanded and widespread use of PFAS, and served as the primary WWTP for the former Fort Ord, treating an average 2.8 million gallons per day from residential, light industrial, and commercial sources.

Further investigation is not warranted for Site 1, the Ord Village Sewage Treatment Plant. This WWTP was active from the 1950s through 1964. While processes to commercially produce PFAS were first developed in the 1940s and the use of PFAS in household products began in the 1950s, the expanded and widespread use of PFAS began in the late 1960s with the development and widespread use of AFFF.² Because this WWTP was only active prior to this time, it is unlikely significant amounts of PFAS were released at Site 1.

² Interstate Technology Regulatory Council (ITRC), 2020. *Aqueous Film-Forming Foam*. August. https://pfas-1.itrcweb.org/wp-content/uploads/2020/10/aff_508_093020.pdf

Further investigation is not warranted for Site 32, the East Garrison Sewage Treatment Plant. This WWTP was active from the 1940s through 1997, but only received low volumes of wastewater from the East Garrison, totaling approximately 2,000 to 5,000 gallons per day. Because the flow rates at this WWTP were very low during its years of operation and there are no known historical sources of PFAS in the East Garrison, it is unlikely significant amounts of PFAS were released at Site 32.

Further investigation is not warranted for Site 36, the FAAF Sewage Treatment Plant. This WWTP was active from the late 1950s through March 1991, but only received wastewater from FAAF and the nearby U.S. Army Reserve Center with an average flow rate of 16,500 gallons per day. Because the flow rate at Site 36 remained low during its years of operation and there are no known significant historical sources of PFAS at FAAF or the U.S. Army Reserve Center, it is unlikely significant amounts of PFAS were released at Site 36.

USEPA Evaluation of the Response to General Comment 8: The response partially addresses the comment by recommending further investigation at Site 2 – Main Garrison Sewage Treatment Plant which was the primary wastewater treatment plant (WWTP) for the Former Fort Ord.

However, EPA believes that further investigation must be done at Site 36 (FAAF [Fritzsche Army Airfield] Sewage Treatment Plant) and Site 32, the East Garrison Sewage Treatment Plant, and that further investigation may be needed at Site 1, the Ord Village Sewage Treatment Plant. The Army did not include these sites because the sources of the wastewater entering the plants were partly or entirely residential, inflows were low, and duration of use while PFAS was in use varied. However, there is a lack of PFAS data to determine at what point a WWTP can be considered a non-source area. EPA is aware of preliminary data collected by the state of California showing elevated levels of PFAS contamination at WWTPs even when those plants only processed low flows of residential waste.

We believe that Site 36 should be investigated because it processed an average of 16,500 gallons per day which is not insignificant when observed across two to three decades of operation. Waste received by Site 36 could have also included AFFF from the airfield or hangars, even in small amounts, as well as waste containing PFAS from cleaning products from the U.S. Army Reserve Center. Site 32 received lower volumes of residential wastewater, 2,000 to 5,000 gallons per day, but was active from the 1940s through 1997, processing wastewater when PFAS containing household products were in use for roughly four decades, longer than Site 2. Site 1 was active from the 1950s through 1964, and the use of PFAS in household products began in the 1950s. Absent definitive information about WWTPs and what types of duration, flow rates, and sources lead to actionable levels of PFAS contamination, none of these sites can be definitively ruled out at this time. However, a phased approach where Sites 2, 36, and 32 are sampled first, and Site 1 is sampled second, as needed, is acceptable.

Please revise the PA Narrative Report to include investigation of Site 36 and Site 32 and then Site 1, if elevated levels of PFAS are found at Sites 36 and 32 and/or if data becomes available showing that WWTPs receiving a similar flow and waste stream over a similar duration should be investigated for PFAS.

Army Response to USEPA Evaluation of the Response to General Comment 8: *Based on the information available, investigations at Site 1, Site 32, and Site 36 are not warranted at this time.*

The California Water Code Section 13267 and 13383 Order for the Determination of the Presence of Per- and Polyfluoroalkyl Substances at Publicly Owned Treatment Works, Order WQ 2020-0015-DWQ (the Order) only requires facilities with design capacity at or exceeding one million gallons per day (mgd) to conduct and report PFAS sampling and analysis. Facilities with a design capacity under one mgd are outside of the scope of the Order. Therefore, conclusions regarding elevated concentrations of PFAS in groundwater associated with the Site 1, Site 32, or Site 36 WWTPs, which had flows that were orders of magnitude less than one mgd, cannot be made based on only a preliminary review of data from Publicly Owned Treatment Works with flows of one mgd or greater and these sites cannot be included in the SI based on this. The only WWTP at the former Fort Ord with flows at or exceeding one mgd is Site 2, the Main Garrison Sewage Treatment Plant. However, it is acknowledged that Site 1, Site 32, and Site 36 are a site type that merits evaluation per the Army PFAS Guidance and the PA Narrative Report was revised to include these sites in the tertiary assessment so they may be considered in a future phase of the CERCLA process if available evidence indicates additional investigation is appropriate.

No USEPA Evaluations of the Responses to General Comments 9 and 10 were provided. The Army assumes USEPA accepts the Responses to General Comments 9 and 10.

General Comment 11. Metal plating: The PFAS PA determined that chromium plating operations were not present at the former Fort Ord (see Section 3.2, Results), but PFAS were used in many aspects of plating operations for multiple metals and not just for mist suppression during chromium electroplating. As reported in Table 4-1, Potential major manufacturing sources of PFAS releases to the environment, in the April 2020 Interstate Technology and Regulatory Council (ITRC) Fact Sheet, History and Use of PFAS, PFAS were also used in copper, nickel, and tin electroplating, as well as other metal plating and etching processes (e.g., for corrosion prevention). However, Section 1.1.1, PFAS Background, discusses only mist suppression in chromium electroplating operations, and Section 1.2.1., Primary Assessment Methodology, indicates that historical sites at the former Fort Ord were evaluated for chromium electroplating operations only. Therefore, additional evaluation of sites for other metal electroplating, metal plating, and finishing operations is necessary. Please revise the PFAS PA to evaluate the historical sites for any metal plating and finishing operations.

Response to General Comment 11: *There is no evidence of any metal plating operations at the former Fort Ord. However, the PA Narrative Report is consistent with the Army PFAS Guidance as written regarding plating operations and was not revised.*

USEPA Evaluation of the Response to General Comment 11: The response addresses the comment; however, the statement, “There is no evidence of any metal plating operations at the former Fort Ord” should be incorporated into the PA Narrative Report. For clarification, please revise the PA Narrative Report to include this statement.

Army Response to USEPA Evaluation of the Response to General Comment 11: *Section 3.2 of the PA Narrative Report was revised per the comment.*

No USEPA Evaluation of the Response to General Comment 12 was provided. The Army assumes USEPA accepts the Response to General Comment 12.

SPECIFIC COMMENTS

No USEPA Evaluations of the Responses to Specific Comments 1 through 3 were provided. The Army assumes USEPA accepts the Responses to Specific Comments 1 through 3.

Specific Comment 4: Section 4.2.1, Site 29: Defense Reutilization and Marketing Office Secondary Assessment, Page 25: The first paragraph on this page indicates that transformers were emptied into a field onsite, and that PFAS were historically used in transformer fluids, but the Secondary Assessment Conclusions do not discuss this potential release of PFAS. Although the text states that the concentrations of PFAS in transformer fluids is very low and polychlorinated biphenyls (PCBs) were not detected in site soil, it is unclear if the transformer fluid that was dumped contained PCBs. It is possible that the transformer fluid that was discharged did not contain PCBs and used PFAS instead, resulting in a PFAS release onsite when the transformer fluids were discharged to site soil. Please revise the Secondary Assessment Conclusions to discuss the potential PFAS contamination from transformer fluids and to further investigate this site for a suspected PFAS release to site soil.

Response to Specific Comment 4: *There is no evidence to suggest that PFAS were used as a replacement for PCBs in transformer oil. As noted in the PA Narrative report, PFAS may have been present in pre-1999 transformer oil but at very low concentrations. Although the production of PCBs was banned in the United States in 1979, PCB-containing transformer oil was still widely used for years after 1979 and remains present at many sites today. As noted in the PA Narrative Report, transformers were reportedly emptied in the field before being recycled prior to 1982, indicating these were older transformers that would have likely had the PCB-containing transformer oil. However, no PCBs were detected in the soil when the site was investigated in 1994, indicating transformer oil disposal, if it actually occurred, was minimal or insignificant. Therefore, it is unlikely significant amounts of PFAS were released at Site 29 and no further investigation at Site 29 is recommended. Additionally, per current Army and DoD guidance, the primary mechanism for releases of PFAS is through the historical use (post-1972) of AFFF, not releases of transformer oil. The PA Narrative Report was not revised per the comment.*

USEPA Evaluation of the Response to Specific Comment 4: The response addresses the comment; however, the information provided in the response was not included in the PA Narrative Report. Please revise the PA Narrative to include the more-detailed discussion provided in the response as it relates to PCBs, PFAS, transformer oil and historical investigation at Site 29.

Army Response to USEPA Evaluation of the Response to Specific Comment 4: *Section 4.2.1 of the PA Narrative Report was revised per the comment.*

No USEPA Evaluations of the Responses to Specific Comments 5 and 6 were provided. The Army assumes USEPA accepts the Responses to Specific Comments 5 and 6.

Specific Comment 7. Section 4.6.1, Site 12: DOL Automotive Yard, and Section 4.8.1, Site 12: Lower Meadow Disposal Area Secondary Assessment, Pages 43 to 44 and 50 to 51: These sections do not clearly describe the features of Site 12 that may be impacted by contaminants. The first paragraph in each section states that the Lower Meadow received runoff from the DOL Automotive Yard through several pipes such as Outfall 31 at the southeast corner of the Lower Meadow. However, the number and locations of other outfalls are not discussed. In Section 4.6.1, it is mentioned that Outfall 15

received contaminated surface water, but it is unclear if there were any other outfall that also could have received contaminated surface water. Please revise this section to clarify the number and locations of the outfalls that discharged surface water from the DOL Automotive Yard to the Lower Meadow.

Response to Specific Comment 7: *The text was revised to provide more information about Site 12 features, including pipes that discharged from the DOL Automotive Yard to the Lower Meadow. Most available historical documents only state there were “several” drain pipes, including Outfall 31, at the southeast corner of the Lower Meadow and there were two additional pipes on the east slope of the Lower Meadow. However, the Remedial Action Work Plan notes that the Outfall 31 area included:*³

- *Two 30-inch diameter corrugated metal pipes at the southeast corner of the Lower Meadow that discharged stormwater collected from the DOL Automotive Yard (one of these is Outfall 31) and the associated storm drain catch basin.*
- *A 13-inch diameter pipe at the southeast corner of the Lower Meadow.*
- *A 12-inch diameter corrugated metal pipe and 6-inch diameter pipe on the east slope of the Lower Meadow, approximately 100 feet north of Outfall 31, and associated storm drain catch basin.*

*The two catch basins were connected by an 8-inch diameter corrugated metal pipe, with storm water discharging from the southern catch basin to a 42-inch diameter pipe leading to Outfall 15, which is the only ultimate discharge point for stormwater originating from Site 12.*⁴

USEPA Evaluation of the Response to Specific Comment 7: The response addresses the comment. However, please incorporate the description of the connection between the two basins and the 8-inch and 42-inch diameter pipes leading to Outfall 15, as provided in the response, into the PA Narrative Report.

Army Response to USEPA Evaluation of the Response to Specific Comment 7: *Section 4.6.1 and Section 4.8.1 of the PA Narrative Report were revised per the comment.*

No USEPA Evaluation of the Response to Specific Comment 8 was provided. The Army assumes USEPA accepts the Response to Specific Comment 8.

Specific Comment 9. Section 4.7.1, Site 5: Range 36A, Explosive Ordnance Disposal Secondary Assessment Pages 47 to 48: The Site Description states that plastic/polymer-bonded explosives may contain PFAS and were used at Range 36A, but this is not discussed further and is not discussed in the Secondary Assessment Conclusions. Instead, the text states that due to the sporadic use of the site, it is likely that total explosives use was low. However, it is not currently known how low use would need to be to rule out this area being a concern. While the intensity of explosives used at Range 36A may impact the level of PFAS present, we do not have documentation about the extent of that impact. Please revise Section 4.7.1 to discuss the potential presence of PFAS in site media due to the use of plastic/polymer-bonded explosives and recommend further investigation of this site.

Response to Specific Comment 9: *The PA Narrative Report states that plastic/polymer-bonded explosives may have been used for detonations at Range 36A because there is no specific evidence of their use.*

³ See Administrative Record No. BW-1520D.

⁴ See Administrative Record No. BW-1283A.

However, any PFAS release that may have occurred at Range 36A has no pathway to receptors. There are no nearby drinking water supply wells or surface water bodies which may have been impacted. The site is currently undeveloped and is publicly inaccessible and remote, preventing human exposure through shallow soil. Additionally, per current Army and DoD guidance, the primary mechanism for releases of PFAS is through the historical use (post-1972) of AFFF, not plastic/polymer-bonded explosives. Further investigation for PFAS at Range 36A is not recommended and the PA Narrative Report was not revised per the comment.

USEPA Evaluation of the Response to Specific Comment 9: The response addresses the comment; however, the statement that there is “no specific evidence” that plastic/polymer-bonded explosives were used, and the statements, “any PFAS release that may have occurred at Range 36A has no pathway to receptors. There are no nearby drinking water supply wells or surface water bodies which may have been impacted. The site is currently undeveloped and is publicly inaccessible and remote, preventing human exposure through shallow soil,” as provided in the response, should be described in the text. Please revise the PA Narrative Report text to include these statements provided in the response.

Army Response to USEPA Evaluation of the Response to Specific Comment 9: *Section 4.7.1 of the PA Narrative Report was revised per the comment.*

No USEPA Evaluations of the Responses to Specific Comments 10 through 14 were provided. The Army assumes USEPA accepts the Responses to Specific Comments 10 through 14.

Appendix K
Responses to Comments on the Draft Final Report submitted by the
California Department of Toxic Substance Control (DTSC)

Responses to Comments on the Draft Final Report submitted by the California Department of Toxic Substance Control (DTSC)¹

Comment 1. Operable Unit 1: Fritzsche Army Airfield (FAAF) Fire Drill Area. Additional investigation is warranted to investigate potential impacts to various construction sites at Fort Ord where fill materials were used that originated from the Fritzsche Army Airfield (FAAF) Fire Drill Area. The area was used from 1972 until 1985 for training activities to extinguish fires at least once a quarter where 100 to 200 gallons of aqueous film-forming foam (AFFF) were used. The Report notes that approximately 4,000 cubic yards of soil was removed, transported to a borrow source, and then used for fill in construction projects at former Fort Ord. The Report states that further investigation is warranted at this location; however, the construction projects that utilized fill from the borrow source should be identified and the soil at those sites should be analyzed for PFAS. Use of fill material impacted by PFAS could result in migration of PFAS from soil to groundwater at multiple locations throughout former Fort Ord.

Response to Comment 1: *There are no known records indicating which construction projects at the former Fort Ord used fill from the borrow area. The Preliminary Assessment Narrative Report, Per- and Polyfluoroalkyl Substances, Former Fort Ord, California (PA Narrative Report) was revised to state there are no records indicating where the soil removed from the borrow area was used and to recommend additional soil sampling in the FAAF Fire Drill Area.*

DTSC Evaluation of Response to Comment No. 1: Addressed.

Army Response to DTSC Evaluation of Response to Comment No.1: *Acknowledged.*

Comment 2. Wastewater Treatment Plants. Revisions to the report are warranted to include investigation of wastewater treatment plants (WWTPs) in the tertiary site assessments. The Report notes that WWTP should be excluded from further investigations because sewage sludge where PFAS may have been concentrated was removed from the sites, and lower concentrations of PFAS are to be expected from residential usage. However, since PFAS can be found in a variety of household items, and the potential for PFAS to migrate from the sludge areas through unlined or cracked evaporation ponds exists, tertiary assessment should be performed at the WWTPs. The Report should be revised to state that the Main Garrison Sewage Treatment Plant, East Garrison Sewage Treatment Plant, and Site 36: FAAF Sewage Treatment Plant will be included in the tertiary assessment.

Response to Comment 2: *Per the Army Guidance for Addressing Releases of Per- and Polyfluoroalkyl Substances (PFAS) (Army PFAS Guidance), the historical use of aqueous film-forming foam (AFFF) was the primary mechanism for releases of PFAS at U.S. Department of the Army (Army) installations; however, it is noted that WWTPs that have inadvertently accepted PFAS-containing materials are a potential source of environmental releases of PFAS. Based on the operational history of the four former WWTPs at the former Fort Ord, the PA Narrative Report was revised to recommend further investigation at Site 2, the Main Garrison Sewage Treatment Plant, because this WWTP was active from the mid-1930s until it was closed in 1990, a period of expanded and widespread use of PFAS, and served as the primary*

¹ In a letter dated May 6, 2022 (see Administrative Record No. BW-2904A.4). The comments are reproduced here as provided to the Army and there have been no changes to spelling, grammar, or punctuation. In its comments on the Draft Final Report, DTSC provided evaluations of the Army responses to DTSC comments on the Draft Report (Appendix G). For clarity, the DTSC comments on the Draft Report and the Army responses are reproduced here.

WWTP for the former Fort Ord, treating an average 2.8 million gallons per day from residential, light industrial, and commercial sources.

Further investigation is not warranted for Site 1, the Ord Village Sewage Treatment Plant. This WWTP was active from the 1950s through 1964. While processes to commercially produce PFAS were first developed in the 1940s and the use of PFAS in household products began in the 1950s, the expanded and widespread use of PFAS began in the late 1960s with the development and widespread use of AFFF.² Because this WWTP was only active prior to this time, it is unlikely significant amounts of PFAS were released at Site 1.

Further investigation is not warranted for Site 32, the East Garrison Sewage Treatment Plant. This WWTP was active from the 1940s through 1997, but only received low volumes of wastewater from the East Garrison, totaling approximately 2,000 to 5,000 gallons per day. Because the flow rates at this WWTP were very low during its years of operation and there are no known historical sources of PFAS in the East Garrison, it is unlikely significant amounts of PFAS were released at Site 32.

Further investigation is not warranted for Site 36, the FAAF Sewage Treatment Plant. This WWTP was active from the late 1950s through March 1991, but only received wastewater from FAAF and the nearby U.S. Army Reserve Center with an average flow rate of 16,500 gallons per day. Because the flow rate at Site 36 remained low during its years of operation and there are no known significant historical sources of PFAS at FAAF or the U.S. Army Reserve Center, it is unlikely significant amounts of PFAS were released at Site 36.

DTSC Evaluation of Response to Comment 2: Addressed, but additional actions are recommended.

The Report has been revised to include additional sampling at Site 2: Main Garrison Treatment Plant. GSU understands that the results of the Preliminary Assessment Narrative Report will be used to prepare a Remedial Investigation (RI) for Per- and Polyfluoroalkyl Substances (PFAS) at Fort Ord. GSU recommends that if PFAS is detected at the Main Garrison Treatment Plant that the remaining Wastewater Treatment Plants are selected for additional investigation for the RI Report.

Army Response to DTSC Evaluation of Response to Comment 2: *It is acknowledged that Site 1, Site 32, and Site 36 are a site type that merits evaluation per the Army PFAS Guidance and the PA Narrative Report was revised to include these sites in the tertiary assessment so they may be considered in a future phase of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process if available evidence indicates additional investigation is appropriate.*

Comment 3. Site 29: Defense Reutilization and Marketing Office. The Report should be revised to include Site 29: Defense Reutilization and Marketing Office (DRMO) as part of the tertiary assessment. The Report notes transformers were emptied into the field adjacent to the DRMO prior to recycling and testing in the area did not detect PCBs in soil samples collected. PFAS was also commonly used in transformer fluid and while concentrations were historically very low, the soil samples collected were

² Interstate Technology Regulatory Council (ITRC), 2020. *Aqueous Film-Forming Foam*. August. https://pfas-1.itrcweb.org/wp-content/uploads/2020/10/aff_508_093020.pdf

not analyzed for PFAS and, therefore, this area should be included in the tertiary assessment. The site was determined to never have stored AFFF to the best of Retired Presidio of Monterey Fire Department Chief Riso's knowledge; however, unless records can be provided that state all of the transformer oil released into the area adjacent to the DRMO throughout the operational history at former Fort Ord did not contain PFAS, the DRMO should be included in the tertiary site assessment.

Response to Comment 3: *Although the production of polychlorinated biphenyls (PCBs) was banned in the United States in 1979, PCB-containing transformer oil was still widely used for years after 1979 and remains present at many sites today. As noted in the PA Narrative Report, transformers were reportedly emptied in the field before being recycled prior to 1982, indicating these were older transformers that would have likely had the PCB-containing transformer oil. However, no PCBs were detected in the soil when the site was investigated in 1994, indicating transformer oil disposal, if it actually occurred, was minimal or insignificant. Therefore, it is unlikely significant amounts of PFAS were released at Site 29 and no further investigation at Site 29 is recommended. Additionally, per current Army and Department of Defense (DoD) guidance, the primary mechanism for releases of PFAS is through the historical use (post-1972) of AFFF, not releases of transformer oil. The PA Narrative Report was not revised per the comment.*

DTSC Evaluation of Response to Comment No. 3: Addressed.

Army Response to DTSC Evaluation of Response to Comment No. 3: Acknowledged.

Comment 4: AFFF Storage Areas. The Report should be revised to include East Garrison Fire House, Main Garrison Fire House – South, Main Garrison Fire House – North, and Main Garrison Fire House – East in the tertiary assessment. The buildings are identified in Table 1. Primary Assessment Sites for AFFF Storage but have not been identified for tertiary assessment, and each of their respective Sections (4.2.2, 4.2.4, and 4.2.6) state that no AFFF was historically stored in these areas. Revisions to the Report are necessary to state why these are identified as AFFF storage areas if there is no evidence that AFFF storage has occurred, and to provide documentation to support these claims. The Report provides interviews for regarding of AFFF Storage; however, it is noted in Appendix A, by William Collins, Base Realignment and Closure (BRAC) Environmental Coordinator/BRAC Biologist, that environmental staff did not monitor or record AFFF storage, use or disposal, and Chief Riso noted that AFFF would occasionally be pumped out of trucks onto grassy areas adjacent to fire stations.

Response to Comment 4: *All identified former Fort Ord fire stations and fire houses were selected for secondary assessment based on the Army PFAS Guidance, which lists fire stations as areas where fire suppression infrastructure exists or existed and therefore merit consideration and evaluation for possible AFFF storage, use, or disposal.*

There is no evidence of AFFF storage, use, or disposal at the East Garrison Fire House, the Main Garrison Fire House – South, Main Garrison Fire House – North, and Main Garrison Fire House – East. Interviews with site personnel state that no AFFF was stored, used, or disposed of at any of these facilities. Site reconnaissance visits found no evidence of AFFF storage tanks or structures at any of the remaining former fire houses. Furthermore, as indicated in the PA Narrative Report, the East Garrison Fire House, Main Garrison Fire House – South, Main Garrison Fire House – North, and Main Garrison Fire House – East are suspected to have been abandoned in 1953 with the construction of the Main Garrison Fire Station and were no longer being used as firefighting facilities post-1972, which is when AFFF was first deployed by the Army.

The grassy areas where AFFF was reportedly discharged were confirmed to be at the Main Garrison Fire Station and the FAAF Fire & Rescue Station. These grassy areas are recommended for further investigation as discussed in Section 6.0. The PA Narrative Report was not revised per the comment.

DTSC Evaluation of Response to Comment No. 4: Addressed, but additional recommendations are noted below.

The Report should be revised to provide additional clarity that the locations that were identified as AFFF Storage Areas in Table 1 were more accurately “potential AFFF storage areas,” and the lack of records or evidence for AFFF storage at these locations does not warrant further investigation.

Army Response to DTSC Evaluation of Response to Comment No. 3: Section 4.2 and Table 1 of the PA Narrative Report were revised per the recommendation.

Comment 5. Site 16: DOL Maintenance Yard and Pete’s Pond. The Report should be revised to include Site 16 in the tertiary assessment. The Report notes that the area was used for servicing fire fighting vehicles, which may have included flushing of tanks containing AFFF. The runoff from these activities that did not reach the oil/water separator was drained into Pete’s Pond Extension. The Report additionally notes that intermittent sewage overflows from the pump station at Building 4906 drained into this area. The servicing of fire fighting vehicles and the intermittent sewage overflows shows that a release of PFAS in this area has likely occurred and these areas should be included in the tertiary assessment.

Response to Comment 5: No further investigation is recommended at Site 16. While fire department vehicles with tanks containing residual amounts of AFFF were rinsed at Site 16, this practice was infrequent (a total of five times in 40 years, including servicing that occurred at Site 12), and follow-up correspondence with site personnel determined the firefighting vehicles equipped with AFFF systems had a single 25-gallon AFFF tank. The PA Narrative Report was revised to include this information. As stated in the PA Narrative Report, only residual amounts AFFF may have remained in the tanks if the AFFF tanks themselves or connected systems required servicing because the AFFF tanks were completely drained at the Main Garrison Fire Station prior to servicing, and potentially impacted rinse water primarily entered an onsite oil-water separator. The waste oil from the oil-water separators was retained in underground storage tanks (USTs) prior to disposal by an offsite contractor.³ The water from the oil-water separator entered the sanitary sewer system and was treated at the Main Garrison Sewage Treatment Plant, which is now recommended for further investigation. Additionally, because sewage overflows from the lift station at Building 4906 were infrequent and are not correlated with firefighting vehicle servicing events at Site 16, it is unlikely these overflows would result in a release of PFAS to the environment.

DTSC Evaluation of Response to Comment No. 5: Addressed.

Army Response to DTSC Evaluation of Response to Comment No. 5: Acknowledged.

Comment 6. Site 5: Range 36A, Explosive Ordinance Disposal. The Report should be revised to include Site 5: Range 36A for tertiary assessment. The Report notes that plastic/polymer-bonded explosives were used at Range 36A and these explosives may contain PFAS. Absent of documentation stating that

³ See Administrative Record No. BW-2427.

the plastic/polymer-bonded explosives did not contain PFAS throughout the operational history of Range 36A, this location should be included in the list of sites for tertiary assessment.

Response to Comment 6: *The PA Narrative Report states that plastic/polymer-bonded explosives may have been used for detonations at Range 36A because there is no specific evidence of their use. However, any PFAS release that may have occurred at Range 36A has no pathway to receptors. There are no nearby drinking water supply wells or surface water bodies which may have been impacted. The site is currently undeveloped and is publicly inaccessible and remote, preventing human exposure through shallow soil. Additionally, per current Army and DoD guidance, the primary mechanism for releases of PFAS is through the historical use (post-1972) of AFFF, not plastic/polymer-bonded explosives. Further investigation for PFAS at Range 36A is not recommended and the PA Narrative Report was not revised per the comment.*

DTSC Evaluation of Response to Comment No. 6: Addressed.

Army Response to DTSC Evaluation of Response to Comment No. 6: Acknowledged.

Comment 7. Site 40A, Building 14 FAAF, and Building 4400. Section 5.2, Section 5.3. and Section 5.4 should be revised to state that groundwater sampling will be conducted at Site 40A, Building 14 FAAF, and Building 4400. The groundwater pathway for the tertiary assessment for these locations states that groundwater sampling may be warranted based on the likelihood that AFFF was used in these areas. The likely use of AFFF in these areas deems additional groundwater sampling as necessary and the words may be warranted should be removed from the report.

Response to Comment 7: *The PA Narrative Report was revised to state that groundwater investigations are recommended downgradient of Site 40A, Building 514 FAAF Fire & Rescue Station, and Building 4400 Main Garrison Fire Station.*

DTSC Evaluation of Response to Comment No. 7: Addressed.

Army Response to DTSC Evaluation of Response to Comment No. 7: Acknowledged.

Appendix L
Responses to Comments on the Draft Final Report submitted by the
California Regional Water Quality Control Board - Central Coast
Region (CCRWQCB)

Responses to Comments on the Draft Final Report submitted by the California Regional Water Quality Control Board – Central Coast Region (Water Board)¹

No Water Board responses to the Responses to Comments 1 through 2b on the Draft Report were provided. The U.S. Department of the Army (Army) assumes the Water Board accepts the Responses to Comments 1 through 2b.

Comment 3. Section 4.0, Secondary Assessments for Selected Sites – Please assess whether any secondary assessment sites (e.g., Site 5, 8, and 9, and Range 34) used or disposed of any military flares and/or ignition sources used as propellants that contained magnesium/Teflon/Viton (MTV), which is partially comprised of PFAS. If it is determined that there are areas where these types of flares or ignition sources have been used or disposed of, they have the potential to release PFAS into the environment and should be further assessed.

Response to Comment 3: *There is no evidence military flares or ignition sources containing MTV were used at Sites 5, 8, 9, or Range 34. MTV is primarily used in flares for aircraft countermeasure (decoy) systems as a deterrent to infrared-guided (heatseeking) air-to-air or surface-to-air missiles. The former Fort Ord served primarily as a training and staging facility for infantry troops and the historical use of the sites described in the secondary assessment indicate such flares were not used. MTV is also used as an igniter for solid propellant in rocket motors; however, the types of rockets used historically at Fort Ord used black powder igniters and not MTV. The exception is the M22 Anti-Tank Weapon Effect Signature Simulator (ATWESS) Cartridge which was a pyrotechnic item used to simulate the sound, flash, and smoke generated when firing an anti-tank missile or rocket. The M22 contained a pellet of magnesium-Teflon composition to provide the flash and smoke effect and 60 milligrams of loose magnesium-Teflon powder to provide the sound effect but did not contain any Viton. According to the Fort Ord Military Munitions Response Program (MMRP) database, munitions responses at the former Fort Ord found:*

- *Nine M22 cartridges at Munitions Response Site (MRS)-16, which is consistent with the last documented use of the area before base closure as an anti-armor training area designed to train troops engaged with attacking armored vehicles (see Administrative Record No. BW-2300L).*
- *Six M22 cartridges at MRS-31, which is consistent with the historical use of the area for troop training with pyrotechnic munitions (see Administrative Record No. OE-0121).*
- *Three M22 cartridges in MRS-53 and MRS-53EXP (Parker Flats), which is consistent with the last documented uses of the area before base closure as an anti-armor training area and a tube-launched, optically-tracked, wire-guided (TOW) missile tracking area (see Administrative Record No. OE-0523N).*

This indicates very limited use of the M22 ATWESS that would not have resulted in any significant release of PFAS. Regardless, the PA Narrative Report was not revised per the comment because, per current

¹ In a letter dated May 3, 2022 (see Administrative Record No. BW-2904A.3). The comments are reproduced here as provided to the Army and there have been no changes to spelling, grammar, or punctuation. In its comments on the Draft Final Report, the Water Board provided additional comments based on the Army's responses to Water Board comments on the Draft Report (Appendix H). For clarity, the Water Board comments on the Draft Report and the Army responses are reproduced here. Based on this, the Army assumes the Water Board accepts the Army's responses to Comments 1, 2, 4 through 8, and 11 through 17.

Army and DoD guidance, the primary mechanism for releases of PFAS is through the historical use (post-1972) of aqueous film-forming foam (AFFF) and that remains the focus of the PA Narrative Report.

Comment 1: Response to Water Board Comment 3, Section 4.0, Secondary Assessments for Selected Sites – The response indicates that M22 Anti-Tank Weapon Effect Signature Simulator (ATWESS) Cartridges used at former Fort Ord during training contained a pellet of magnesium-Teflon composition and 60 milligrams of loose magnesium-Teflon powder. Munitions responses found limited use of the M22 ATWESS at Munitions Response Site (MRS)-16, MRS-31, and MRS-53 and therefore would not have resulted in any significant release of PFAS. The Report was not revised per the Central Coast Water Board’s comment as per current Army and Department of Defense (DOD) guidance, the primary mechanism for releases of PFAS is through the historical use of aqueous film-forming foam (AFFF) and that remains the focus of the Report.

Water Board Response: It is understood that the current Army and DoD guidance focuses on releases of PFAS through the historical use of AFFF and is not considering other mechanisms for releases of PFAS in the Report. Since it appears that the potential for PFAS impacts to the environment using M22 ATWESS has been limited, at this time we concur with not including these areas in current Site Inspection phase. However, for transparency, please update the report to include this evaluation in the body of the text with the caveat that if in the future additional guidance to support investigation of areas where munitions containing PFAS were used is provided by the Army, DOD, or regulatory agencies, these areas may require further evaluation for PFAS impacts.

Army Response to Water Board Response: Section 4.7 of the PA Narrative Report was revised to include information regarding the potential use of PFAS-containing munitions in the secondary assessment. Section 1.1 of the PA Narrative Report was revised to note that potential sources of PFAS other than those listed in Section 1.1 may be considered in future phases of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process pending promulgation of DoD or Army guidance in response to the recommendations provided in the Evaluation of the Department of Defense’s Actions to Control Contaminant Effects from Perfluoroalkyl and Polyfluoroalkyl Substances at Department of Defense Installations.

No Water Board responses to the Responses to Comments 4 through 8 on the Draft Report were provided. The Army assumes the Water Board accepts the Responses to Comments 4 through 8.

Comment 9. Section 4.9.3, Site 32: East Garrison STP Secondary Assessment – The Report indicates that the East Garrison STP received municipal wastewater and operated until 1997. After 1997, sewage entered the East Garrison STP through the Doten tank, and the suspended solids were settled out through a series of holding tanks. Liquid sewage was released through an overflow valve to a diversion box out onto the ground directly north of the diversion box, where the liquid ponded. Approximately 3,000 gallons of effluent water was released via the diversion box each day to the sludge bed next to the Doten tanks. The sludge material settled out in the Doten tanks was removed and transported to the regional treatment plant in Marina. The Report indicates that there are no known sources of PFAS at this site however, WWTPs that receive municipal wastewater are known sources of PFAS due to the presence of PFAS in many household products. Since the liquid sewage was released into the ground, it is possible that PFAS was released into the environment at the East Garrison STP. Therefore, please revise the to include Site 32 in the tertiary assessment.

Response to Comment 9: Further investigation is not warranted for Site 32, the East Garrison STP. To clarify, this WWTP was active from the 1940s through 1997 and did not operate after 1997. As described in the PA Narrative Report, this WWTP was decommissioned in 1997, including an interim action to remove the sewage sludge and contaminated soil. When operational, the East Garrison STP only received low volumes of wastewater from the East Garrison, totaling approximately 2,000 to 5,000 gallons per day. Additionally, review of sanitary sewer maps for the former Fort Ord shows the East Garrison STP only served the East Garrison and did not serve any residential areas where PFAS-containing household products may have been released to the sewer.² Because the flow rates at this WWTP were very low during its years of operation and there are no known significant historical sources of PFAS in the East Garrison, it is unlikely significant amounts of PFAS were released at Site 32.

Comment 2: Response to Water Board Comment 9, Section 4.9.3, Site 32: East Garrison Sewage Treatment Plant (STP) Secondary Assessment – The response indicates that further investigation is not warranted for Site 32 because of very low flow rates during the years of operation, the STP was only used for wastewater from toilets and showers at East Garrison, there are no known significant historical sources of PFAS at East Garrison, and that it is unlikely significant amounts of PFAS were released.

Water Board Response: On July 9, 2020, the State Water Board issued [Investigative Orders to Publicly Owned Treatment Works \(POTW\)](#) that receive PFAS in their influent wastewater flow and then potentially distributed out of the POTW in the effluent wastewater, biosolids, and reverse osmosis concentrate. Preliminary review of the data collected from statewide POTWs as part of this Investigative Order suggest that low flow, residential/domestic wastewater appears to coincide with elevated concentrations of PFAS in groundwater. Additionally, the data shows PFAS impacts from all types of wastewater, including residential/commercial and residential/commercial/industrial inputs. Please revise the Report to include Site 32 in the Site Inspection Phase as this STP reportedly received low flow wastewater from toilets and showers and based on the statewide data collected, it is likely PFAS has been released into the environment in this area.

Army Response to Water Board Response: The Water Code Section 13267 and 13383 Order for the Determination of the Presence of Per- and Polyfluoroalkyl Substances at Publicly Owned Treatment Works, Order WQ 2020-0015-DWQ (the Order) only requires facilities with design capacity at or exceeding one million gallons per day (mgd) to conduct and report the described PFAS sampling and analysis. Facilities with a design capacity under one mgd are outside of the scope of the Order. Site 32, the former East Garrison Sewage Treatment Plant (STP), only received 2,000 to 5,000 gallons per day when it was operational (Weston, 1990). Conclusions regarding elevated concentrations of PFAS in groundwater associated with Site 32 or other STPs with flows that are orders of magnitude less than one mgd cannot be made based on only a preliminary review of data from POTW with flows of one mgd or greater and Site 32 cannot be included in the Site Inspection (SI) based on this. However, it is acknowledged that Site 32 is a site type that merits evaluation per the Army PFAS Guidance and the PA Narrative Report was revised to include Site 32 in the tertiary assessment. Therefore, Site 32 may be considered in a

² See Administrative Record No. BW-1283A, Volume II.

future phase of the CERCLA process if available evidence indicates additional investigation is appropriate.

Comment 10. Section 4.9.4, Site 36: FAAF STP Secondary Assessment – The FAAF STP was previously recommended for additional PFAS assessment in the September 3, 2020, Technical Summary Report as there was a reported discharge of potential AFFF at one of the FAAF hangars which may have resulted in AFFF entering the sanitary sewer system. However, this area is not recommended for tertiary assessment in the Report. The Report indicates that there are no known or suspected AFFF discharge events at the FAAF in which AFFF could have entered the sanitary sewer system and based on the information available, potential storage, use, or disposal of PFAS-containing materials at the site does not pose a potential threat of release to the environment.

As indicated above in Comment 5, additional information is needed in order to substantiate eliminating the FAAF hangars from the PFAS investigation activities and therefore, AFFF could have entered the FAAF sanitary sewer system from a release at the FAAF hangars. Additionally, WWTPs are considered sources of PFAS due to the presence of common household products in municipal sewage, industrial wastewater sources, septic materials, and firefighting wastewaters in effluent and sludge. The Report also indicates that the Imhoff tank experienced overflows from the oil-water separators and the evaporation ponds had cracks in the bottom, so it is possible that wastewater containing PFAS percolated into the ground in this area. Therefore, please revise the Report to include Site 36 in the tertiary assessment.

Response to Comment 10: *Further investigation is not warranted for Site 36, the FAAF STP. This WWTP was active from the late 1950s through March 1991, but only received wastewater from FAAF and the nearby U.S. Army Reserve Center with an average flow rate of 16,500 gallons per day. As indicated in the Response to Comment 5, there is no evidence any of the hangars or other aviation assets at the former FAAF had foam-based fire suppression systems that used AFFF. Because the flow rate at Site 36 remained low during its years of operation and there are no known significant historical sources of PFAS at FAAF or the U.S. Army Reserve Center, it is unlikely significant amounts of PFAS were released. Therefore, the PA Narrative Report was not revised per the comment.*

Comment 3: Response to Water Board Comment 10, Section 4.9.4, Site 36: FAAF Sewage Treatment Plant Secondary Assessment – The response indicates that further investigation is not warranted for Site 36 as it only received wastewater from the Fritzsche Army Airfield (FAAF) and the nearby U.S. Army Reserve Center with an average flow rate of 16,500 gallons, there is no evidence that any of the hangars or other aviation assets at the former FAAF had foam-based fire suppression systems that used AFFF, and therefore it is unlikely significant amounts of PFAS were released.

Water Board Response: As noted above in Comment 2, the State Water Board issued Investigative Orders to Publicly Owned Treatment Works (POTW) that receive PFAS in their influent wastewater flow and then potentially distributed out of the POTW in the effluent wastewater, biosolids, and reverse osmosis concentrate. Preliminary review of the data collected from POTWs statewide as part of this Investigative Order suggest that low flow, residential/domestic wastewater appears to coincide with elevated concentrations of PFAS in groundwater. Additionally, the data shows PFAS impacts from all types of wastewater including residential/commercial and residential/commercial/industrial inputs. Please revise the Report to

include Site 36 in the Site Inspection phase as it received wastewater from residential and industrial inputs and based on the statewide data collected it is likely PFAS has been released into the environment in this area.

Army Response to Water Board Response: *The Order only requires facilities with design capacity at or exceeding one mgd to conduct and report the described PFAS sampling and analysis. Therefore, conclusions regarding elevated concentrations of PFAS in groundwater associated with Site 36 or other STPs with flows that are orders of magnitude less than one mgd cannot be made based on only a preliminary review of data from POTW with flows of one mgd or greater and Site 36 cannot be included in the SI based on this. However, it is acknowledged that Site 36 is a site type that merits evaluation per the Army PFAS Guidance and the PA Narrative Report was revised to include Site 36 in the tertiary assessment. Therefore, Site 36 may be considered in a future phase of the CERCLA process if available evidence indicates additional investigation is appropriate. Please note there were no residential facilities at FAAF or the U.S. Army Reserve Center.*

No Water Board responses to the Responses to Comments 11 through 17 were provided. The Army assumes the Water Board accepts the Responses to Comments 11 through 17.

Additional Comment 1: Based on the preliminary review of data collected from the statewide POTWs, PFAS investigation may also be warranted at Site 1, Ord Village STP, as it received residential wastewater for approximately 14 years although, the estimated volume of wastewater received is not provided in the Report. Therefore, please revise the Report to include the estimated daily volume of wastewater received during the years of operation, if available. Additionally, please update the Report to indicate that following a review of the PFAS investigation results from Site 32, which also received residential waste (toilets and showers from East Garrison), Site 1 will be evaluated for inclusion in the PFAS Site Inspection Phase.

Response to Additional Comment 1: *The preliminary review of data collected from the statewide POTWs does not warrant PFAS investigation at Site 1. The volume of wastewater received at Site 1, Ord Village STP, is not reported in the literature referenced in the PA Narrative Report; however, based on a review of historical aerial photographs, the Ord Village STP served a residential area of approximately 800 households. From the mid-1950s to the mid-1960s, the average household size was 3.3 persons.³ The average daily water use for a typical residential home is approximately 60 gallons per capita per day;⁴ therefore, the Ord Village STP could have received approximately 160,000 gallons per day. The PA Narrative Report was revised to include this information. It is acknowledged that Site 1 is a site type that merits evaluation per the Army PFAS Guidance and the PA Narrative Report was revised to include Site 1 in the tertiary assessment. Therefore, Site 1 may be considered in a future phase of the CERCLA process if a PFAS investigation at Site 32 is determined to be warranted and if available evidence indicates additional investigation at Site 1 is appropriate.*

Additional Comment 2: Because of the significance of the Army's PFAS investigative efforts, the Central Coast Water Board recommends the Army submit all future site inspection laboratory data electronically to the State Water Resources Control Board's GeoTracker database to increase transparency to all

³ <https://www.bls.gov/mlr/1990/03/art1full.pdf>

⁴ Tchobanoglous, George. Wastewater Engineering: Treatment, Disposal, and Reuse. Metcalf & Eddy, Inc. – 3rd ed.

stakeholders. More information regarding Electronic Submittal of Information to GeoTracker is available at: https://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/

Response to Additional Comment 2: *The Army will submit laboratory analytical data generated during the PFAS SI to GeoTracker.*