# FINAL
# Site Inspection Report
# Camp Roberts
# San Miguel, California

Site Inspection for Perfluorooctanoic acid (PFOA), Perfluorooctanesulfonic acid (PFOS), Perfluorohexanesulfonic acid (PFHxS), Perfluorononanoic acid (PFNA), Hexafluoropropylene oxide dimer acid (HFPO-DA), and Perfluorobutanesulfonic acid (PFBS) at ARNG Installations, Nationwide

September 2023

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# Acronyms and Abbreviations

| | |
|---|---|
| % | percent |
| °C | degrees Celsius |
| °F | degrees Fahrenheit |
| µg/kg | micrograms per kilogram |
| AECOM | AECOM Technical Services, Inc. |
| AFFF | aqueous film-forming foam |
| amsl | above mean sea level |
| AOI | Area of Interest |
| ARNG | Army National Guard |
| bgs | below ground surface |
| CAARNG | California Army National Guard |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CoC | chain of custody |
| CR FD | Camp Roberts Fire Department |
| CSL | Chemistry Systems Laboratory |
| CSM | conceptual site model |
| DA | Department of the Army |
| DoD | Department of Defense |
| DO | dissolved oxygen |
| DQO | data quality objective |
| DUA | data usability assessment |
| DWR | Department of Water Resources |
| ELAP | Environmental Laboratory Accreditation Program |
| EM | Engineer Manual |
| ERB | equipment rinsate blank |
| FedEx | Federal Express |
| FTA | Fire Training Area |
| GRPS | Ground Penetrating Radar Systems |
| HDPE | high-density polyethylene |
| HFPO-DA | hexafluoropropylene oxide dimer acid |
| HSA | hollow stem auger |
| IDW | investigation-derived waste |
| ITRC | Interstate Technology Regulatory Council |
| LC/MS/MS | liquid chromatography with tandem mass spectrometry |
| MIL-SPEC | military specification |
| NELAP | National Environmental Laboratory Accreditation Program |
| NOAA | National Oceanic and Atmospheric Administration |
| ng/L | nanograms per liter |
| ORP | oxidation-reduction potential |
| OSD | Office of the Secretary of Defense |
| PA | Preliminary Assessment |
| PFAS | per- and polyfluoroalkyl substances |
| PFBS | perfluorobutanesulfonic acid |

| | |
|---|---|
| PFHxS | perfluorohexanesulfonic acid |
| PFNA | perfluorononanoic acid |
| PFOA | perfluorooctanoic acid |
| PFOS | perfluorooctanesulfonic acid |
| PID | photoionization detector |
| PQAPP | Programmatic UFP-QAPP |
| PVC | polyvinyl chloride |
| QA | quality assurance |
| QAPP | Quality Assurance Project Plan |
| QC | quality control |
| QSM | Quality Systems Manual |
| RI | Remedial Investigation |
| RWQCB | Regional Water Quality Control Board |
| SAIC | Science Applications International Corporation |
| SI | Site Inspection |
| SL | screening level |
| SOP | standard operating procedure |
| TOC | total organic carbon |
| TPP | Technical Project Planning |
| UFP | Uniform Federal Policy |
| US | United States |
| USACE | United States Army Corps of Engineers |
| USCS | Unified Soil Classification System |
| USEPA | United States Environmental Protection Agency |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |

# Executive Summary

The Army National Guard (ARNG) G-9 is performing Preliminary Assessments (PAs) and Site Inspections (SIs) on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) with a focus on the six compounds presented in the memorandum from the Office of the Secretary of Defense (OSD) dated 6 July 2022 (Assistant Secretary of Defense, 2022). The six compounds listed in the OSD memorandum include perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), hexafluoropropylene oxide dimer acid (HFPO-DA)[1], and perfluorobutanesulfonic acid (PFBS). These compounds are collectively referred to as "relevant compounds" throughout the document and the applicable screening levels (SLs) are provided in **Table ES-1**.

The PA identified six Areas of Interest (AOIs) where PFAS-containing materials may have been used, stored, disposed, or released historically (see **Table ES-2** for AOI locations). The objective of the SI is to identify whether there has been a release to the environment from the AOIs identified in the PA and determine whether further investigation is warranted, a removal action is required to address immediate threats, or no further action is required based on SLs for relevant compounds. This SI was completed at the Camp Roberts in San Miguel, California and determined further evaluation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is warranted for AOI 1, AOI 2, AOI 3, and AOI 5; no further evaluation is warranted for AOI 4 and AOI 6 at this time. Camp Roberts will also be referred to as the "facility" throughout this document.

Camp Roberts occupies 42,784 acres of land and is bordered on the west by the unincorporated community of Heritage Ranch and on the east by the unincorporated community of San Miguel. Camp Roberts includes three main types of use areas, including cantonment areas, training areas, and airfield operational areas. Facilities at Camp Roberts are concentrated in two cantonment areas, the Main Garrison and East Garrison. The Main Garrison and East Garrison are located in the northeastern portion of Camp Roberts, near the facility's main gate, and are separated by the Salinas River and US Route 101. Training areas include weapons ranges and impact areas, open areas for heavy and light maneuver training, and land navigation areas. These areas are in the southern, central, and northern portion of the property. Firing ranges occupy areas in the western and central portions of Camp Roberts. The three airfield operational areas include McMillan Airfield, located at the southernmost end of Camp Roberts, the East Garrison Airfield, located towards the northern end of the facility, north of US Route 101, and the Parade Field, which is also used as a landing field for rotary wing aircraft.

The PA identified six AOIs for investigation during the SI phase. SI sampling results from the six AOIs were compared to OSD SLs. **Table ES-2** summarizes the SI results for each AOI. Based on the results of this SI, further evaluation under CERCLA is warranted in a Remedial Investigation (RI) for AOI 1, AOI 2, AOI 3, and AOI 5; no further evaluation is warranted for AOI 4 and AOI 6 at this time.

[1] Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the conceptual site model (CSM) developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of military specification (MIL-SPEC) aqueous film forming foam (AFFF) and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

## Table ES-1: Screening Levels (Soil and Groundwater)

| Analyte[b] | Residential (Soil) (µg/kg)[a] 0-2 feet bgs | Industrial/ Commercial Composite Worker (Soil) (µg/kg)[a] 2-15 feet bgs | Tap Water (Groundwater) (ng/L)[a] |
|---|---|---|---|
| **PFOA** | 19 | 250 | 6 |
| **PFOS** | 13 | 160 | 4 |
| **PFBS** | 1,900 | 25,000 | 601 |
| **PFHxS** | 130 | 1,600 | 39 |
| **PFNA** | 19 | 250 | 6 |

**Notes:**
bgs = below ground surface; µg/kg = micrograms per kilogram; ng/L = nanograms per liter

a.) Assistant Secretary of Defense, 2022. Risk Based Screening Levels in Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. Hazard Quotient (HQ) = 0.1. 6 July 2022.

b.) Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the CSM developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of MIL-SPEC AFFF and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

## Table ES-2: Summary of Site Inspection Findings and Recommendations

| AOI | Potential Release Area | Soil – Source Area | Groundwater – Source Area | Future Action |
|---|---|---|---|---|
| **1** | East Garrison Old Fire Station | ● | ◐ | Proceed to RI |
| | Army Airfield AFFF Storage | ● | N/A | Proceed to RI |
| **2** | East Garrison Old FTA | ● | ● | Proceed to RI |
| **3** | Main Garrison FTA 2 | ◐ | ● | Proceed to RI |
| | Building 7020 | ● | N/A | Proceed to RI |
| **4** | CR FD Fire Station and Shipping Container | ◐ | ◐ | No further action |
| **5** | CR FD Building 3000 Warehouse | ◐ | N/A | No further action |
| | Main Garrison Fueling Station | ● | N/A | Proceed to RI |
| **6** | Tactical Unmanned Aerial Systems (TUAS) Hangar Building 17002 | ◐ | N/A | No further action |
| | NPS Airfield Shed AFFF Storage | ◐ | N/A | No further action |

**Legend:**
N/A = not applicable
● = detected; exceedance of the screening levels
◐ = detected; no exceedance of the screening levels
○ = not detected

# 1. Introduction

## 1.1 Project Authorization

The Army National Guard (ARNG) G-9 is the lead agency in performing Preliminary Assessments (PAs) and Site Inspections (SIs) on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) with a focus on the six compounds presented in the memorandum from the Office of the Secretary of Defense (OSD) dated 6 July 2022 (Assistant Secretary of Defense, 2022). The six compounds listed in the OSD memorandum will be referred to as "relevant compounds" throughout this document and include perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA), hexafluoropropylene oxide dimer acid (HFPO-DA)[1], and perfluorobutanesulfonic acid (PFBS) at ARNG facilities nationwide. The ARNG performed this SI at the Camp Roberts in San Miguel, California. Camp Roberts is also referred to as the "facility" throughout this document.

The SI project elements were performed in compliance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; United States [US] Environmental Protection Agency [USEPA], 1980), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations Part 300; USEPA, 1994), and in compliance with US Department of the Army (DA) requirements and guidance for field investigations.

## 1.2 SI Purpose

A PA was performed at Camp Roberts that identified six Areas of Interest (AOIs) where PFAS-containing materials may have been used, stored, disposed, or released historically (AECOM Technical Services, Inc. [AECOM], 2019). The objective of the SI is to identify whether there has been a release to the environment from the AOIs identified in the PA and determine whether further investigation is warranted, a removal action is required to address immediate threats, or no further action is required based on screening levels (SLs) for the relevant compounds.

[1] Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the conceptual site model (CSM) developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of military specification (MIL-SPEC) aqueous film forming foam (AFFF) and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

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# 2. Facility Background

## 2.1 Facility Location and Description

Camp Roberts is in southern Monterey and northern San Luis Obispo Counties, in central California. The facility is situated along the eastern foothills of the Santa Lucia Mountains, in the valley of the Salinas River, which flows towards the northwest through the property. The facility is about 12 miles north of Paso Robles and 25 miles east of the Pacific Ocean (**Figure 2-1**). The geographic coordinates and surface elevation at the main gate of the facility are 35 47'53"; 120 44'40" and 620 feet above mean sea level (amsl), respectively.

Camp Roberts occupies 42,784 acres of land and is bordered on the west by the unincorporated community of Heritage Ranch and on the east by the unincorporated community of San Miguel. Camp Roberts includes three main types of use areas, including cantonment areas, training areas, and airfield operational areas. Facilities at Camp Roberts are concentrated in two cantonment areas, the Main Garrison and East Garrison. The Main Garrison and East Garrison are located in the northeastern portion of Camp Roberts, near the facility's main gate, and are separated by the Salinas River and US Route 101. Training areas include weapons ranges and impact areas, open areas for heavy and light maneuver training, and land navigation areas. These areas are in the southern, central, and northern portion of the property. Firing ranges occupy areas in the western and central portions of Camp Roberts. The three airfield operational areas include McMillan Airfield, located at the southernmost end of Camp Roberts, the East Garrison Airfield, located towards the northern end of the facility, north of US Route 101, and the Parade Field, which is also used as a landing field for rotary wing aircraft.

Camp Roberts was originally developed as an Army replacement training center in 1941 (Environmental Resources Management Inc. [ERM], 1995). The facility was inactivated and then reverted to caretaker status from 1946 to 1950. After 1950, Camp Roberts was reactivated during the Korean Conflict. Camp Roberts was again inactivated and reverted to caretaker status from 1954 until it was officially closed by the Army in 1970. Although the facility was active during the Vietnam War, it was never officially brought out of inactive status. On 2 April 1971, the California ARNG (CAARNG) received control of the site under a license from the Army to establish a Reserve Component Training Center.

## 2.2 Facility Environmental Setting

Camp Roberts is in a region of rolling hills and steep mountainous valleys between the Pacific Ocean and the Santa Lucia Mountains. Much of the facility is grasslands and oak woodlands. The area surrounding the facility is a mix of agriculture, rural residential, recreation, and open spaces. Surface elevations at Camp Roberts range from 600 feet amsl in the area where higher plains meet the Nacimiento River Basin area to 1,800 feet amsl in steep slope areas of the southwestern portion of the training area (**Figure 2-2**). The Nacimiento River traverses through the Main Garrison and meets the Salinas River near US Route 101, within the boundaries of Camp Roberts. Ephemeral tributary streams of the Nacimiento River are located in the northern portion of the facility.

### 2.2.1 Geology

Camp Roberts is situated in the southern portion of the California Coast Ranges section of the Pacific Border physiographic province, which stretches over 400 miles from the Klamath Mountains in Humbolt County to the Traverse Ranges in Santa Barbara County (FPM Group, Ltd, 2008). The topography of Camp Roberts is characteristic of the Coast Ranges, with terrain varying from low plains and river valleys to steep hills. A series of folds and faults follow a northwest trend

as a result of mountain forming episodes that occurred from the late Pliocene into the mid Pleistocene.

The most prevalent geologic units at Camp Roberts are composed of Quaternary or Late Tertiary semi- to unconsolidated layers of sand, gravel, sandstone, and conglomerate deposits that are consistent with stream (alluvial) depositional environments (**Figure 2-3**). The low and high plains are composed of Quaternary (Recent and Late Pleistocene) alluvium and the Paso Robles Formation, respectively. The Paso Robles Formation accumulated extensively after withdrawal of the Tertiary Sea and is mainly a mixture of semi- to unconsolidated alternating layers of conglomerate and sandstone, with smaller amounts of mudstone (US Geological Survey [USGS], 1974). Other units residing beneath the lower hills in the northern portion of Camp Roberts include alternating layers of massive- to thinly bedded Tertiary mudstones, shales, and sandstones of the Pancho Rico, Santa Margarita, and Tierra Redonda Formations, and an unnamed Cretaceous marine unit (Chemistry Systems Laboratory [CSL], 1983).

The southern Salinas Valley lies mainly on the Salinian block, a structural basement comprised of granitic and high-grade metamorphic rocks (USGS, 1974). The Salinian block is bounded by the San Andreas and Rinconada fault zones, which are approximately 17.5 miles and 8 miles northeast and west of Camp Roberts, respectively. Both faults are active, right-lateral slip faults capable of generating significant earthquakes.

Soil borings completed during the SI found poorly graded sands and silts as the dominant lithology of the unconsolidated sediments below Camp Roberts. The borings were completed at depths between 75 feet to 120.5 feet below ground surface (bgs). Interbedded lenses of cobbles and clays were also observed in the borings ranging from a few inches to approximately 6 feet in thickness. Differences in lithology between boreholes may be due to the lateral variability in deltaic deposits and channelized flow. These observations are consistent with the understood depositional environment of the region. Boring logs are presented in **Appendix E**.

### 2.2.2 Hydrogeology

Camp Roberts lies within the Salinas Valley Groundwater Basin, which is subdivided into the Paso Robles Area Subbasin and the Upper Valley Aquifer Subbasin. Camp Roberts is situated within the Paso Robles Area Subbasin, which is bordered on the north by the Upper Valley Aquifer Subbasin, on the east by the Temblor Range, on the south by the La Panza Range, and on the west by the Santa Lucia Range (California Department of Water Resources [DWR], 2004). The limited amounts of groundwater used from the basin are from mostly unconfined Holocene age alluvium deposits found as deep as 130 feet bgs, but generally less than 30 feet bgs. Although permeability is considered high, limited amounts of groundwater are extracted for use. The most important source of groundwater in the basin is found in Pleistocene age Paso Robles Formation, which reaches a thickness of 2,000 feet (DWR, 2004). Groundwater recharge of the basin is provided by infiltration, seepage from streams, and return flow from irrigation. The estimated annual recharge rate for the Paso Robles Area Sub-basin is 47,000 acre-feet, and specific yield values in the Paso Robles Area Subbasin range from 7-11 percent (%), with an average yield of 9%. The estimated usable storage capacity of the Paso Robles Area Subbasin is estimated to be 1.7 million acre-feet (DWR, 2004).

Groundwater from the Paso Robles Area Subbasin is the main source of water for the facility. Groundwater supply wells located throughout the Salinas Valley region have typical intake depths of over 200 feet (DWR, 2004). Groundwater features are presented on **Figure 2-3**.

Camp Robert's potable water is sourced from groundwater wells situated within the boundaries of the facility. The primary source of drinking water for the facility is provided from wells located in the Main Garrison. These wells include Well Numbers C-3-A, C-4A, and C-5A, which are active wells situated adjacent to the Nacimiento River. Well depths range from 350 feet to 450 feet bgs.

During a 2012 SI, the depth to water at the northwest end of the Main Garrison and at the East Garrison ranged from approximately 82 feet to 85 feet bgs. At the southwest end of the Main Garrison, the depth to water was 29 feet to 36 feet bgs (American Integrated Services, Inc., 2012). Several logs for wells installed near McMillian Airfield recorded static water levels that ranged from 60 feet to 78 feet bgs.

In the southeast area of Camp Roberts, there are three wells, two public supply wells, and one potable well at the Satellite Communication. The Satellite Communication is a US Army Signal Activity - Presidio of Monterey Enclave that is surrounded by Camp Roberts but administratively distinct.

Depths to water measured in May 2021 during this SI ranged from 62.54 feet to 94.91 feet bgs (571.38 feet and 539.28 feet amsl). Groundwater elevations from the SI are presented on **Figure 2-4**. Because depths to water were only measured from four widely spaced locations, one of which appears to be screened in a perched layer (AOI02-01), it is difficult to determine a localized groundwater gradient. As such, groundwater flow directions are assumed to be consistent with those outlined in the Camp Roberts PA (AECOM, 2019). Inferred groundwater flow directions are presented on **Figure 2-3**.

### 2.2.3 Hydrology

Waters flowing through or collecting on land surfaces within the boundaries of Camp Roberts drain through four watersheds: Kemp Canyon-San Antonio, Portuguese Canyon-Salinas River, San Marcos Creek, and the Nacimiento River Watersheds. The Nacimiento River watershed occupies the largest portion of surface areas within Camp Robert's property boundary. Surface water features are presented on **Figure 2-5**.

The major water courses that pass through the cantonment areas of Camp Roberts are the Salinas and the Nacimiento Rivers. All surface water draining from Camp Roberts flows to the Salinas River or one of its tributaries, which include the San Antonio and Nacimiento Rivers and San Marcos Creek. Waters in the Salinas River flow through Monterey County to the Monterey Bay National Marine Sanctuary in the Pacific Ocean.

The Nacimiento River drains approximately 70% of the land surfaces covering Camp Roberts (CSL, 1983). The river flows in a northeastern direction, along the north side of the Main Garrison's developed area, and joins the Salinas River approximately 2 miles north of the facility's main gate. Surface waters from the Main Garrison, the southern portion of Camp Roberts, and McMillan Airfield drain into the Nacimiento River and its smaller tributaries. The Nacimiento River and San Antonio River flow year-round and are controlled by the dams upstream. The Salinas River is seasonal and dries up in the summer months.

Surface waters originating in the East Garrison drain to the Salinas River and its smaller tributaries. The Salinas River is more than 175 miles long and flows from the southeast to the northwest in the vicinity of Camp Roberts. The Salinas River is designated by the National Marine Fisheries Service as a critical habitat for steelhead.

Several seasonal wetlands that include clay flats and vernal pools supporting a fairy shrimp population are situated within Camp Roberts boundaries. There are approximately 64 acres of ponds and reservoirs of which about 35, 24, and 10 acres are classified as wetlands, seasonal wetlands, and clay flats, respectively (Science Applications International Corporation [SAIC], 2011). The majority of stream bank areas situated along the Salinas River are also classified as wetlands.

### 2.2.4 Climate

Camp Roberts is in a Mediterranean climate zone characterized by warm, dry weather from June through September, and mild, rainy weather from November through March. The average annual rainfall is approximately 13 inches, with the majority of the rainfall occurring between late fall and early spring (National Oceanic and Atmospheric Administration [NOAA], 2022). Summer temperatures average 87 degrees Fahrenheit (°F) to 94 ºF, and the daily high temperature can frequently exceed 110 ºF. Winter temperatures average 59ºF to 66ºF during the day, with average nightly temperatures to as low as 33º F. Snowfall at the facility is rare, but frost occurs occasionally.

### 2.2.5 Current and Future Land Use

Camp Roberts serves as a year-round training site for the CAARNG. The cantonment area of the facility is developed with numerous buildings and related infrastructure, including paved and unpaved roadways and parking areas. The cantonment area occupies a small percentage of the total area controlled by the CAARNG. The other, much larger lands are occupied by and used as training ranges. The ranges are generally in vegetated sloping areas, mostly to the west of the cantonment areas. Access to lands under Camp Robert's purview is restricted and inaccessible to the general public in most areas.

The mission of Camp Roberts is to provide training, administrative, and logistical site support to US forces (CAARNG, 2004). Camp Roberts also provides emergency support services for the State of California in the event of an emergency or disaster. Reasonably anticipated future land use is not expected to change from the current land use described above.

### 2.2.6 Sensitive Habitat and Threatened/ Endangered Species

The following amphibians, birds, crustaceans, fish, insects, mammals, plants, reptiles, and snails are federally endangered, threatened, proposed, and/ or are listed as candidate species in Monterey and San Luis Obispo Counties, California (US Fish and Wildlife Service [USFWS], 2021a and 2021b). Although this list includes all species generally found in the region, CAARNG has indicated that only four of these species have been identified at the facility (California Condor, Vernal Pool Fairy Shrimp, Purple Amole, and San Joaquin Kit Fox).

- **Amphibians:** California tiger Salamander, *Ambystoma californiense* (endangered); California red-legged frog, *Rana draytonii* (threatened); Santa Cruz long-toed salamander, *Ambystoma macrodactylum croceum* (endangered); Arroyo toad, *Anaxyrus californicus* (endangered)

- **Birds:** Short-tailed albatross, *Phoebastria albatrus* (endangered); Yellow-billed Cuckoo, *Coccyzus americanus* (threatened); California condor, *Gymnogyps californianus* (endangered); Least Bell's vireo, *Vireo bellii pusillus* (endangered); Southwestern willow flycatcher, *Empidonax traillii extimus* (endangered); California least tern, *Sterna antillarum browni* (endangered); Western snowy plover, *Charadrius nivosus nivosus* (threatened); No Common Name, Coccyzus americanus ssp. Occidentalis (species of concern); California clapper rail, *Rallus longirostris obsoletus* (endangered); Marbled murrelet, *Brachyramphus marmoratus* (threatened)

- **Conifers and Cycads:** Gowen cypress, *Cupressus goveniana ssp. goveniana* (threatened)

- **Crustaceans:** Conservancy fairy shrimp, *Branchinecta conservation* (endangered); Vernal pool fairy shrimp, *Branchinecta lynchi* (threatened); Longhorn fairy shrimp, *Branchinecta longiantenna* (endangered)

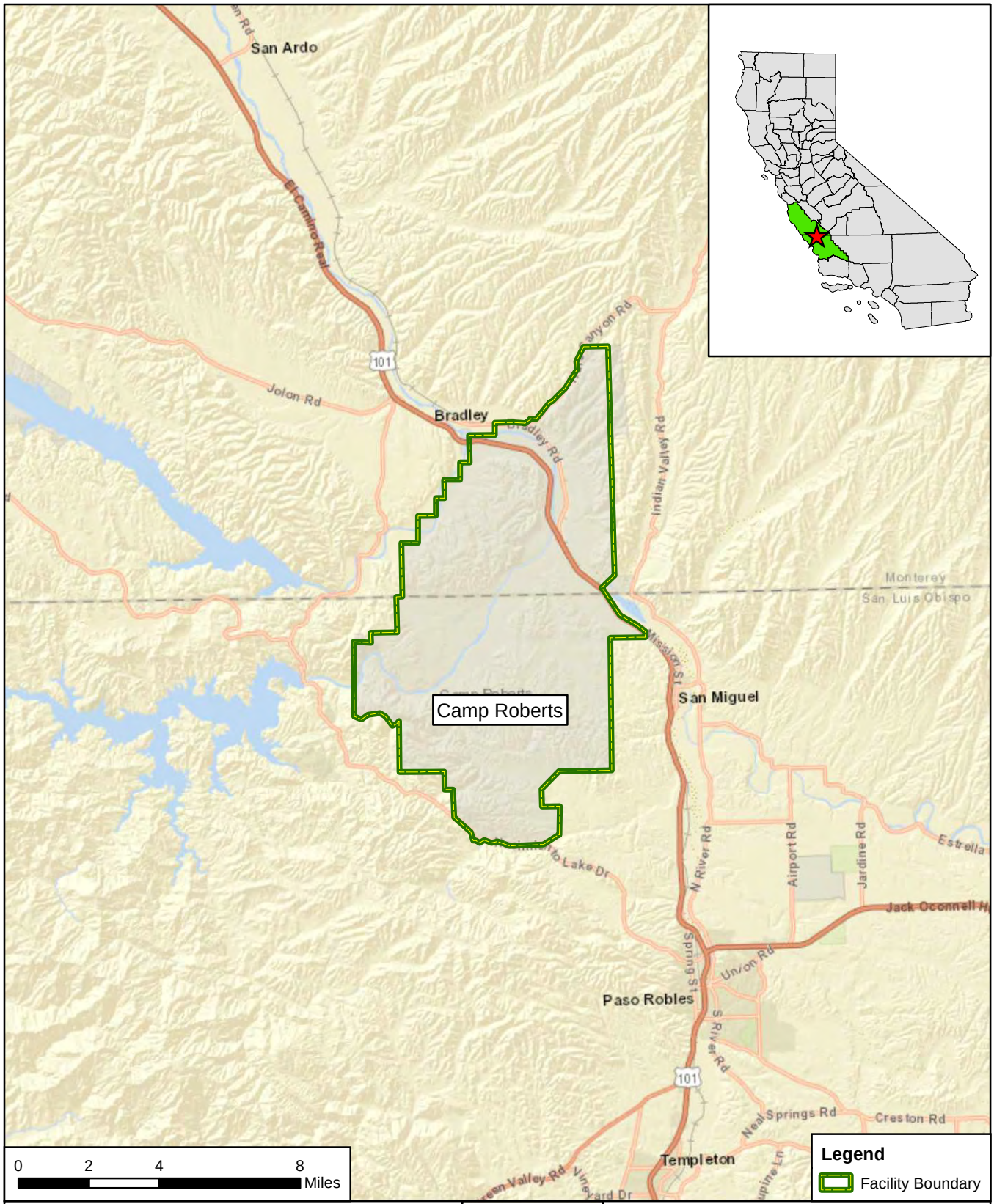
- **Fishes:** Delta smelt, *Hypomesus transpacificus* (threatened); South-Central Coast Steelhead *Ohcorhynchus mykiss* (threatened), Tidewater goby, *Eucyclogobius newberryi* (endangered); longfin smelt, *Spirinchus thaleichthys* (candidate)
- **Flowering Plants:** Santa Cruz tarplant, *Holocarpha macradenia* (threatened); Marsh Sandwort, *Arenaria paludicola* (endangered); San Benito evening-primrose, *Camissonia benitensis* (threatened); Salt marsh bird's-beak, *Cordylanthus maritimus ssp. Maritimus* (endangered); Coastal dunes milk-vetch, *Astragalus tener var. titi* (endangered); Menzies' wallflower, *Erysimum menziesii* (endangered); Beach layia, *Layia carnosa* (endangered); Monterey clover, *Trifolium trichocalyx* (endangered); Monterey gilia, *Gilia tenuiflora ssp. arenaria* (endangered); Monterey spineflower, *Chorizanthe pungens var. pungens* (threatened); Clover (Tidestrom"s) lupine, *Lupinus tidestromii* (endangered); Hickman's potentilla, *Potentilla hickmanii* (endangered); California jewelflower, *Caulanthus californicus* (endangered); Yadon's piperia, *Piperia yadonii* (endangered); Contra Costa goldfields, *Lasthenia conjugens* (endangered); Purple amole, *Chlorogalum purpureum* (threatened); San Joaquin wooly-threads, *Monolopia (=Lembertia) congdonii* (endangered); California seablite, *Suaeda californica* (endangered); Spreading navarretia, *Navarretia fossalis* (threatened); Kern mallow, *Eremalche kernensis* (endangered); Morro manzanita, Arctostaphylos morroensis (threatened); Gambel's watercress, *Rorippa gambellii* (endangered); Indian Knob mountainbalm, *Eriodictyon altissimum* (endangered); La Graciosa thistle, *Cirsium loncholepis* (endangered); Pismo clarkia, *Clarkia speciosa ssp. immaculata* (endangered); Chorro Creek bog thistle, *Cirsium fontinale var. obispoense* (endangered); Nipomo Mesa lupine, *Lupinus nipomensis* (endangered); Gaviota Tarplant, *Deinandra increscens ssp. villosa* (endangered)
- **Insects:** Monarch butterfly, *Danaus plexippus* (candidate); Unsilvered fritillary, *Speyeria adiaste* (resolved taxon); Smith's blue butterfly, *Euphilotes enoptes smithi* (endangered); Kern primrose sphinx moth, *Euproserpinus Euterpe* (threatened)
- **Mammals:** Southern sea otter, *Enhydra lutris nereis* (threatened); Giant kangaroo rat, *Dipodomys ingens* (endangered); San Joaquin kit fox, *Vulpes macrotis mutica* (endangered); Buena Vista Lake ornate Shrew, *Sorex ornatus relictus* (endangered); Tipton kangaroo rat, *Dipodomys nitratoides nitratoides* (endangered); Swift fox, *Vulpes velox* (resolved taxon); Morro Bay kangaroo rat, *Dipodomys heermanni morroensis* (endangered)
- **Reptiles:** Blunt-nosed leopard lizard, *Gambelia silus* (endangered); Leatherback sea turtle, *Dermochelys coriacea* (endangered); Olive ridley sea turtle, *Lepidochelys olivacea* (endangered); Giant garter snake, *Thamnophis gigas* (threatened)
- **Snails:** Morro shoulderband snail, *Helminthoglypta walkeriana* (endangered)

## 2.3 History of PFAS Use

Ten potential release areas were identified at Camp Roberts during the PA and post-PA activities where AFFF may have been used or released historically (AECOM, 2021b). Camp Roberts includes multiple areas where, as early as the 1970s, AFFF may have been used during fire training activities: East Garrison Old Fire Station, East Garrison Old Fire Training Area (FTA), Main Garrison FTA 2. Additionally, AFFF may have been stored in several areas at the facility: Army Airfield AFFF Storage, Camp Roberts Fire Department (CR FD) Fire Station Building 7020, Current CR FD Fire Station (Building 4050) and Shipping Container, CR FD Building 3000 Warehouse and Main Garrison Fueling Point, Tactical Unmanned Aerial Systems (TUAS) Hangar Building 17002, and Naval Postgraduate School (NPS) Airfield Shed. Although there are no documented releases at AFFF storage areas, AFFF may have been released due to incidental spills or leaks. The potential release areas were grouped into six AOIs based on proximity to one another and presumed groundwater flow. A description of each AOI is presented in **Section 3**.

## 2.4 Potable Well Sampling

In March 2017, groundwater from the majority of Camp Roberts' drinking water well network was analyzed for a subset of 18 PFAS compounds. PFAS are a large group of related chemicals, including PFOA, PFOS, PFHxS, PFNA, and PFBS. The samples were collected at spigots from various facilities at Camp Roberts. A tabulated data set is provided in the PA report (AECOM, 2019). The specific chemicals PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in any sample.

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| PROJECT | Site Inspection at Camp Roberts, CA | | | |
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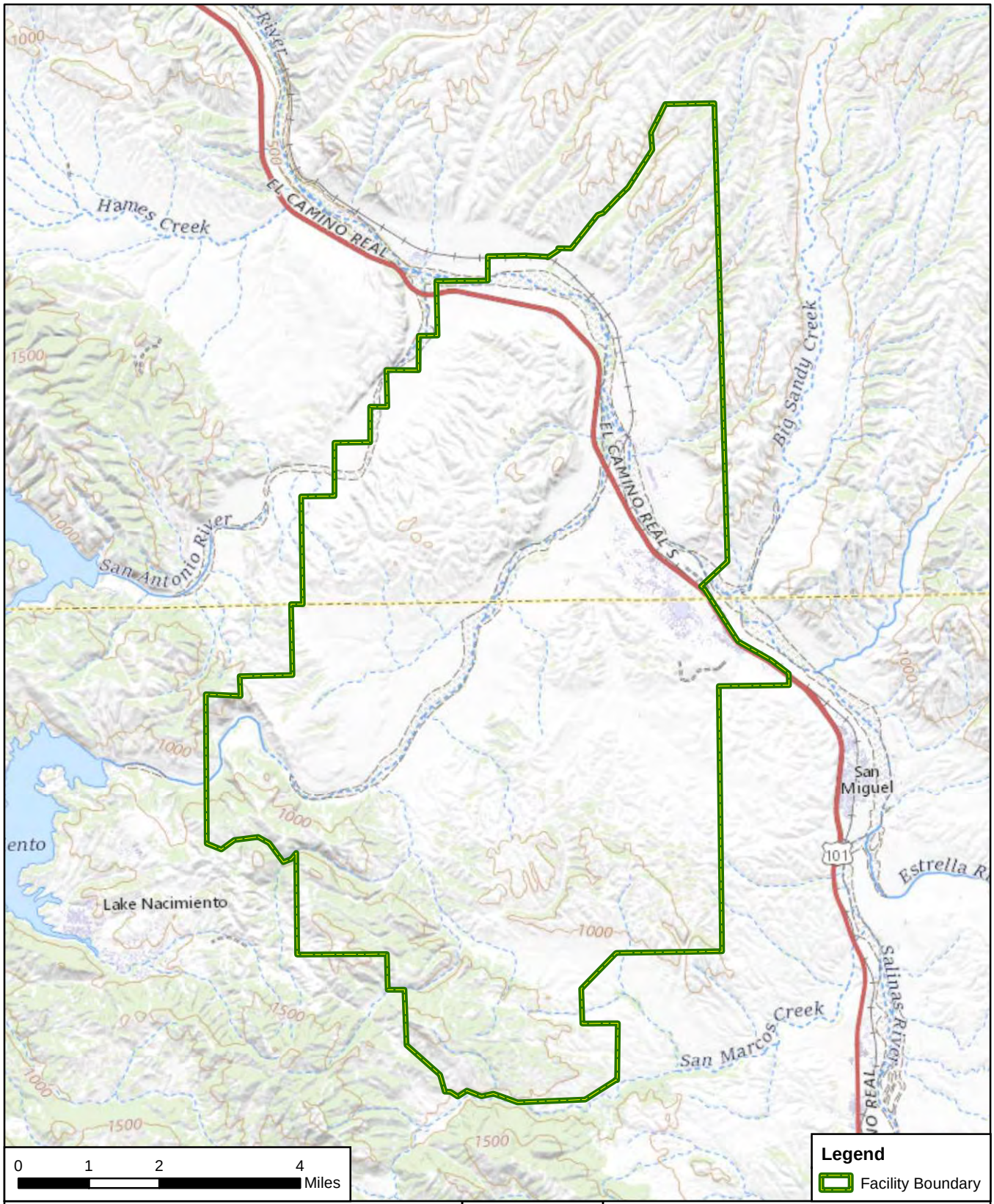
| SCALE | 1:253,440 | CHK BY | SL | 8/2/2022 |
| Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, | | PM | CM | 8/2/2022 |

**Camp Roberts Facility Location**

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

**Figure 2-1**

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| PROJECT | Site Inspection at Camp Roberts, CA | | | |
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| SCALE | 1:126,720 | CHK BY | SL | 8/2/2022 |
| Base Map: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, | | PM | CM | 8/2/2022 |

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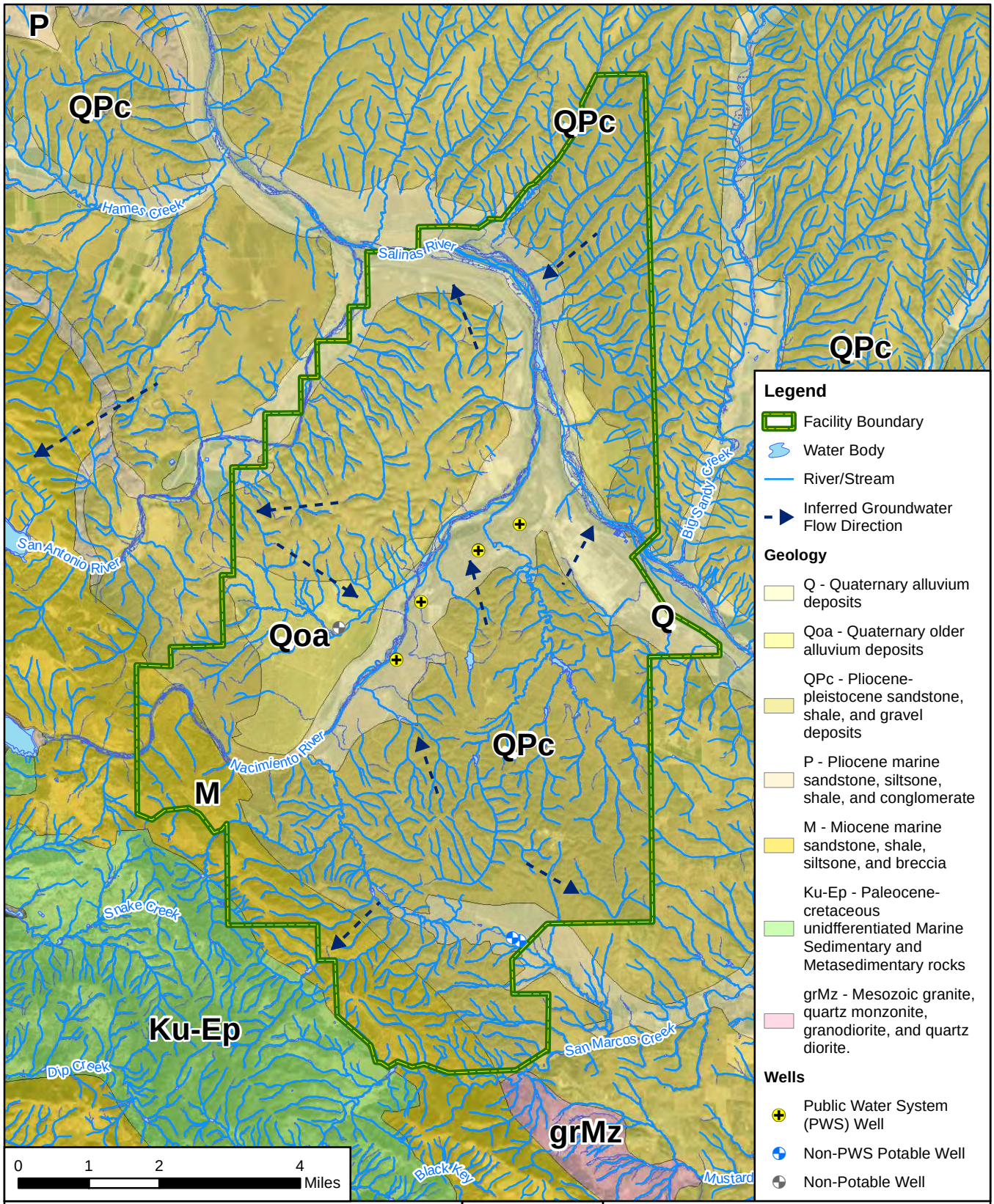
# Facility Topography

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

**Figure 2-2**

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| PROJECT | Site Inspection at Camp Roberts, CA | | | |
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| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/16/2022 |

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**Groundwater Features**

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Germantown, MD 20876

**Figure 2-3**


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| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/16/2022 | GIS BY | MS | 8/16/2022 |
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| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/16/2022 |

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**Groundwater Elevations, May 2021**

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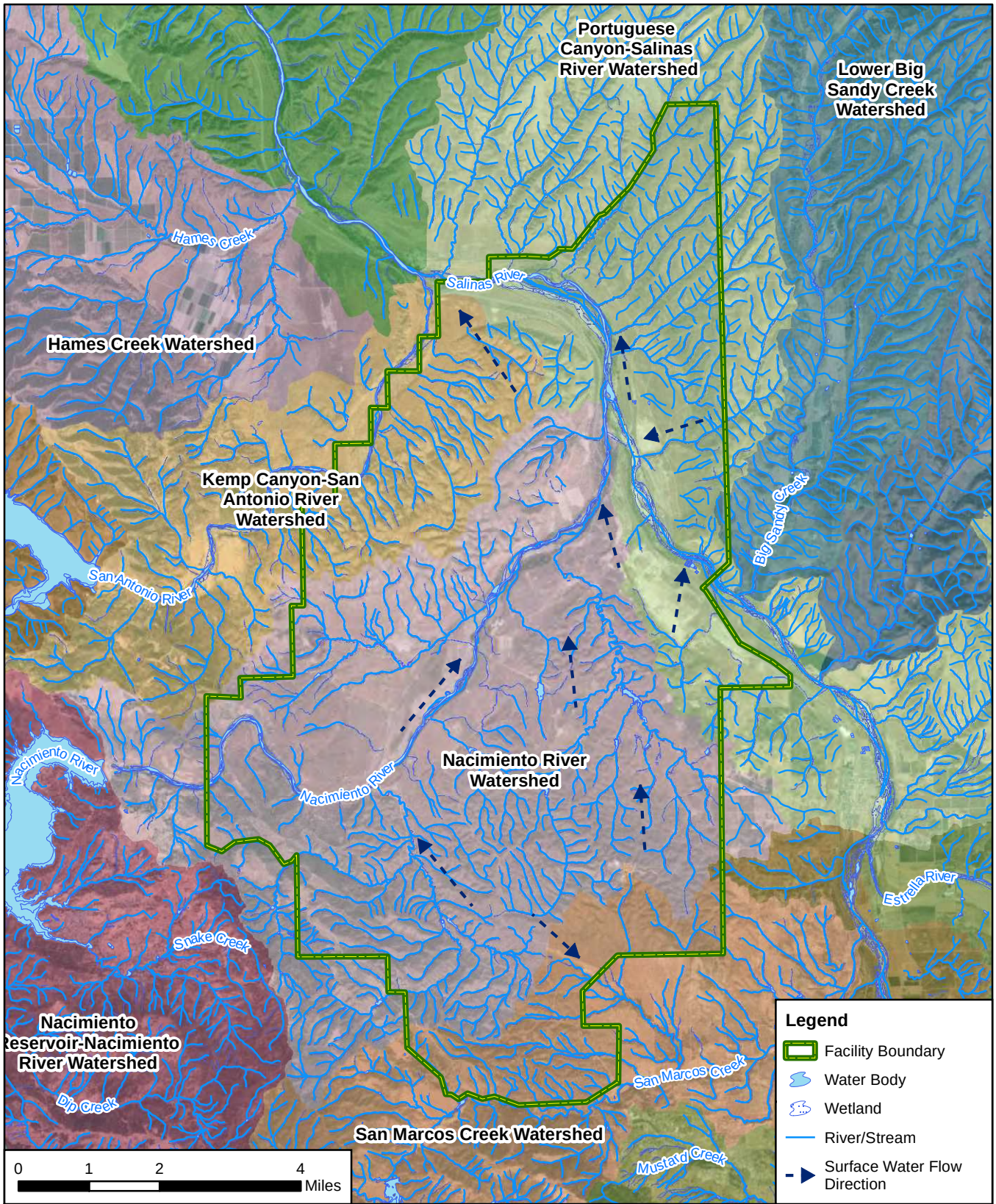
Germantown, MD 20876

**Figure 2-4**

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| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/16/2022 | GIS BY | MS | 8/16/2022 |
| SCALE | 1:126,720 | CHK BY | SL | 8/16/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/16/2022 |

# Surface Water Features

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**Figure 2-5**

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# 3. Summary of Areas of Interest

The PA evaluated areas where PFAS-containing materials may have been used, stored, disposed, or released historically. Based on the PA findings, ten potential release areas were identified at Camp Roberts and grouped into six AOIs (AECOM, 2019 and AECOM, 2021b). AOI 1 through AOI 4 were identified during PA, and two AFFF storage areas were added as new AOIs (AOI 5 – AOI 6) during post-PA activities (AECOM, 2021b). The potential release areas are shown on **Figure 3-1**.

## 3.1 AOI 1 East Garrison Old Fire Station

AOI 1 consists of two potential release areas. These areas are described below.

### 3.1.1 East Garrison Old Fire Station

AOI 1 is the East Garrison Old Fire Station near Camp Roberts Army Airfield. The Old Fire Station was a Fire and Rescue Station associated with the Old FTA (discussed in **Section 3.2**). Although the use of AFFF at this location could not be confirmed, more substantial fire training activities occurred as early as 1976, and AOI 1 could be a potential release area. The timeframe during which the training activities occurred is commensurate with the use of AFFF for fire training purposes.

AOI 1 lies within the Salinas River watershed, and all surface water is drained by tributaries to the Salinas River. PFAS are water soluble and can migrate readily from soil to groundwater or surface water via leaching and run-off. If releases to surface and subsurface soil occurred, migration from surface soil at AOI 1 to groundwater and waters in the Salinas River is possible. Drinking water is supplied by potable wells in the Main Garrison, and two active potable water wells are located downgradient of the East Garrison. In addition, precipitation infiltrating into the gravel-covered areas at AOI 1 may cause migration from surface and subsurface soil to groundwater and surface water.

### 3.1.2 Army Airfield AFFF Storage

The Camp Roberts Army Airfield is located in the East Garrison, which is east of the Salinas River and US Route 101, and includes a 3,656-foot improved surface runway, with 300 feet of “over run” on both ends. The approximate geographic coordinates and elevation of the center of the airfield runway are 35°48'51.44"N; 120°44'36.44"W and 630 feet amsl, respectively. During the PA site visit, four Tri-Max™ 30 crash fire rescue carts were observed to be stored in an area historically used for parking aircraft at the Airfield. Although there are no documented releases of AFFF in this storage area, AFFF may have been released due to incidental spills or leaks.

Surface water and groundwater flow to the west, towards the Salinas River in the East Garrison. No stormwater drainage infrastructure was observed in the areas visited during the PA within the vicinity of the Airfield.

## 3.2 AOI 2 East Garrison Old FTA

AOI 2 is the East Garrison Old FTA. The Old FTA is located south of the Old Fire Station Site in the East Garrison cantonment area of Camp Roberts, to the east of US Route 101, the Salinas River, and the airfield. The approximate geographic coordinates and elevation of the general area are 35°48'57.085” N; 120°44'28.714"W, and 636 feet amsl, respectively. The CR FD reportedly used this area in the East Garrison for fire training exercises. Although the use of AFFF could not be confirmed, more substantial fire training activities occurred as early as 1976, and AOI 2 could

be a potential release area. The timeframe during which the training activities occurred is commensurate with the use of AFFF for fire training purposes.

AOI 2 lies within the Salinas River watershed, and all surface water is drained by tributaries to the Salinas River. If releases to surface and subsurface soil occurred, migration from surface soil at AOI 2 to groundwater and waters in the Salinas River is possible. Drinking water is supplied by potable wells in the Main Garrison, and two active potable water wells are located downgradient of the East Garrison. In addition, precipitation infiltrating into the gravel-covered areas at AOI 2 may cause the migration from surface and subsurface soil to groundwater and surface water.

## 3.3 AOI 3

AOI 3 consists of two potential release areas. The areas are described below.

### 3.3.1 Main Garrison FTA 2 and Building 7020

AOI 3 is the Main Garrison FTA 2 area, including the former CR FD Fire Station Building 7020. The Main Garrison FTA 2 is located in the northwestern portion of the Main Garrison cantonment area, on the east side of Utah Avenue and north of the former CR FD Fire Station Building 7020. The approximate geographic coordinates and elevation of the area is 35°48'06.16"N; 120°45'07.15"W and 640 feet amsl. The former CR FD Fire Station Building 7020 is located at 35°48'3.979"N; 120°45'4.894"W, adjacent to FTA 2. Although the use of AFFF could not be confirmed, more substantial fire training activities occurred prior to 2001, and as such, the area could be a potential release area.

Surface water at AOI 3 flows to the northeast, towards a small drainage ditch that captures and carries water towards the Salinas River. The river is located approximately 0.5 miles to the east of AOI 3. If releases to surface soil at AOI 3 occurred, they had potential to migrate from surface soil to surface water via run-off and to groundwater via leaching. The nearest groundwater wells to AOI 3 are to the west of the AOI. Inferred groundwater flow is to the north/northeast.

## 3.4 AOI 4 CR FD Fire Station and Shipping Container

CR's current Fire Station is Building 4050. The CR FD Fire Station is located mid-way along the southwest-facing boundary of the Parade Field on Arizona Boulevard, between Avenue 11 and Avenue 12; the approximate geographic coordinates are 35°48'51.44"N; 120°44'36.44"W. During the PA site visit, a tactical firefighting truck, which is equipped to carry up to 2,500 gallons of a mixture of water and foam of which 65 gallons constitute Class B AFFF, was observed at the CR FD Fire Station Building.

A steel storage container located adjacent to the CR FD Building 4050 is used for storing and servicing Tri-Max™ 30 crash fire rescue carts and for storing AFFF. The geographic coordinates of the storage container are 35°47'28.97"N, 120°44'36.19"W. According to CR FD staff interviewed, the crash carts were historically filled with AFFF in an area outside the door of the container. Staff that were interviewed indicated that incidental leaks and spills may have occurred; however, details specific to the filling of carts were not recalled. The area was observed to be gravel covered.

Incidental spills of AFFF could migrate through gravel covered areas into surface soil and subsurface soil to groundwater via leaching. Nearby tributaries may have been impacted by surface water runoff from AOI 4. Surface and groundwater flow are to the north/northeast, towards the Salinas River.

## 3.5 AOI 5 CR FD Building 3000 and Main Garrison Fuel Station

AOI 5 consists of two potential release areas. The areas are described below.

### 3.5.1 CR FD Building 3000 and Main Garrison Fuel Station

AOI 5 includes CR FD Building 3000 Warehouse and Main Garrison Fueling Point, which are located in the southeast corner of the Parade Field, near the intersection of Montana Boulevard and Wyoming Avenue. The approximate geographic coordinates of the approximate center of the area are 35°46'13.06"N; 120°44'02.49"W.

During the PA site visit, 19 5-gallon plastic containers of various brands of AFFF were observed to be stored on shelves in the eastern corner of Building 3000, and one Tri-Max™ 30 crash fire rescue cart was observed at the Fueling Point area. The floor of the warehouse is concrete, but much of the area around Building 3000 is not paved. The Fueling Point area is on concrete slab. Groundwater beneath AOI 5 flows to the east/northeast, towards the Salinas River.

Although no incidental spills of stored AFFF were reported, if spills occurred, AFFF could have migrate to the subsurface through cracks in the concrete or off the concrete to unpaved areas at AOI 5. Precipitation may cause migration from concrete surfaces, surface soil, and subsurface soil to groundwater. Surface waters may have also migrated to Salinas River, which is located approximately 2,000 feet to the south of the warehouse.

## 3.6 AOI 6

AOI 6 consists of two potential release areas. The areas are described below.

### 3.6.1 Hangar Building 17002 and NPS Airfield Shed AFFF Storage

AOI 6 includes Hangar Building 17002 and NPS Airfield Shed, located at the south end of McMillan Airfield, which is in the southern portion of Camp Roberts, between East Perimeter Road and Generals Road. The airfield and related facilities are accessible only to facility operations staff and personnel.

During the PA site visit, two Tri-Max™ 30 crash fire rescue carts were observed to be stored in the Hangar Building 17002, and one 5-gallon bucket of AFFF concentration was observed in the NPS Airfield Shed. AFFF was stored on concrete slab or in paved area.

Surface water and groundwater flow to the south/southeast into tributaries of San Marcos Creek, which eventually empties to the Salinas River. No stormwater drainage infrastructure was observed in the areas visited during the PA.

Although no incidental spills of stored AFFF were reported, AFFF could have migrated to the subsurface through cracks in the concrete or off the concrete to unpaved areas at AOI 6. If AFFF were released, precipitation may have caused migration from concrete surfaces, surface soil, and subsurface soil to groundwater. Surface water in San Marcos Creek may be potentially impacted by PFAS.

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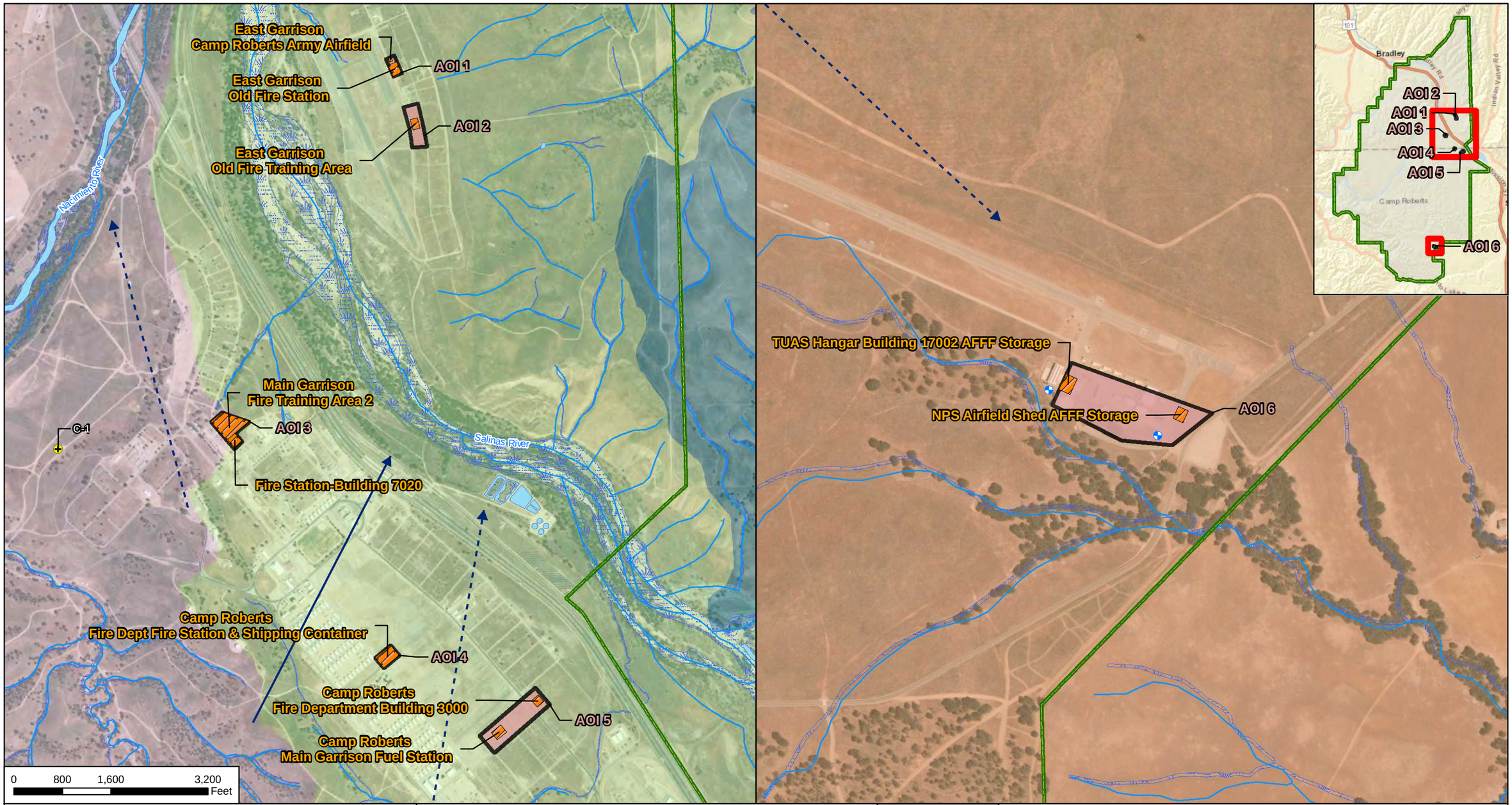


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| Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) | | PM | CM | 8/2/2022 |

- Area of Interest
- Potential Release Area
- Facility Boundary
- Water Body
- Wetland
- River/Stream
- Surface Water Flow Direction
- Inferred Groundwater Flow Direction

**Wells**

- Non-PWS Potable Well
- Public Water System (PWS) Well

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## Areas of Interest

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Germantown, MD 20876

**Figure 3-1**

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# 4. Project Data Quality Objectives

As identified during the Data Quality Objective (DQO) process and outlined in the SI Quality Assurance Project Plan (QAPP) Addendum (AECOM, 2021b), the objective of the SI is to identify whether there has been a release to the environment at the AOIs identified in the PA. For each AOI, ARNG determines if further investigation is warranted, a removal action is required to address immediate threats, or whether no further action is warranted. This SI evaluated groundwater and soil for presence or absence of relevant compounds at each of the sampled AOIs.

## 4.1 Problem Statement

ARNG will recommend an AOI for Remedial Investigation (RI) if related soil and groundwater samples have concentrations of the relevant compounds above the OSD risk-based SLs. The SLs are presented in **Section 6.1** of this report.

## 4.2 Information Inputs

Primary information inputs included:

- The PA for Camp Roberts (AECOM, 2019);
- Previous environmental investigations performed at the facility;
- Analytical data collected as part of a facility potable well sampling event in March 2017 (AECOM, 2019);
- Analytical data from groundwater and soil samples collected as part of this SI in accordance with the site-specific Uniform Federal Policy (UFP)- QAPP Addendum (AECOM, 2021b); and
- Field data collected during the SI, including groundwater elevation and water quality parameters measured at the time of sampling.

## 4.3 Study Boundaries

The scope of the SI was bounded by the property limits of the facility (**Figure 2-2**). Off-facility sampling was not included in the scope of this SI. If future off-facility sampling is required, the proper stakeholders will be notified, and necessary rights of entry will be obtained by ARNG with property owner(s). The SI scope was bounded vertically by the observed depths of the surficial groundwater table. Temporal boundaries were limited to the spring season, which was the earliest available time field resources were available to complete the study.

## 4.4 Analytical Approach

Samples were analyzed by Pace Analytical Gulf Coast, accredited under the Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP; Accreditation Number 74960) and the National Environmental Laboratory Accreditation Program (NELAP; Certificate Number 01955). Data were compared to applicable SLs within this document and decision rules as defined in the SI QAPP Addendum (AECOM, 2021b).

## 4.5 Data Usability Assessment

The Data Usability Assessment (DUA), which is provided in **Appendix A**, is an evaluation at the conclusion of data collection activities that uses the results of both data verification and validation in the context of the overall project decisions or objectives. Using both quantitative and qualitative methods, the assessment determines whether project execution and the resulting data have met installation-specific DQOs. Both sampling and analytical activities are considered to assess whether the collected data are of the right type, quality, and quantity to support the decision-making (Department of Defense [DoD], 2019a; DoD, 2019b; USEPA, 2017).

Based on the DUA, the environmental data collected during the SI were found to be acceptable and usable for this SI evaluation with the qualifications documented in the DUA and its associated data validation reports. These data are of sufficient quality to meet the objectives and requirements of the SI QAPP Addendum (AECOM, 2021b).

# 5. Site Inspection Activities

This section describes the environmental investigation and sampling activities that occurred as part of the SI. The SI sampling approach was based on the findings of the PA and implemented in accordance with the following approved documents:

- *Final Site Inspection Programmatic Uniform Federal Policy-Quality Assurance Project Plan (PQAPP)* dated March 2018 (AECOM, 2018a);
- *Final Programmatic Accident Prevention Plan* dated July 2018 (AECOM, 2018b);
- *Final Preliminary Assessment Report, Camp Roberts, San Miguel, California* (AECOM, 2019);
- *Final Site Safety and Health Plan, Camp Roberts, San Miguel, California* (AECOM, 2021a); and
- *Final Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Addendum, Camp Roberts, San Miguel, California* (AECOM, 2021b).

The SI field activities were conducted from 10 to 27 May 2021 and consisted of utility clearance, hollow stem auger drilling, soil sample collection, permanent monitoring well installation, groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2021b), except as noted in **Section 5.8**.

The following samples were collected during the SI and analyzed for a subset of 18 compounds by liquid chromatography with tandem mass spectrometry (LC/MS/MS) compliant with Quality Systems Manual (QSM) 5.3 Table B-15 to fulfill the project DQOs:

- Twenty-eight (28) soil samples from 20 surface soil and deeper boring locations;
- Four grab groundwater samples from four permanent well locations;
- Seventeen (17) quality assurance (QA)/quality control (QC) samples.

**Figure 5-1** through **Figure 5-3** provide the sample locations for all media across the facility. **Table 5-1** presents the list of samples collected for each media. Field documentation is provided in **Appendix B**. A Log of Daily Notice of Field Activity was completed throughout the SI field activities, which is provided in **Appendix B1**. Sampling forms and well development forms are provided in **Appendix B2**, land survey data are provided in **Appendix B3**. Additionally, a photographic log of field activities is provided in **Appendix C**.

## 5.1 Pre-Investigation Activities

In preparation for the SI field activities, project team members participated in Technical Project Planning (TPP) meetings, performed utility clearance, and sampled decontamination source water. Details for each of these activities are presented below.

### 5.1.1 Technical Project Planning

The US Army Corps of Engineers (USACE) TPP Process, Engineer Manual (EM) 200-1-2 (USACE, 2016) defines four phases to project planning: 1.) defining the project phase; 2.) determining data needs; 3.) developing data collection strategies; and 4.) finalizing the data collection plan. The process encourages stakeholder involvement in the SI, beginning with defining overall project objectives, including DQOs, and formulating a sampling approach to address the AOIs identified in the PA.

A combined TPP Meeting 1 and 2 was held on 10 February 2021, prior to SI field activities. The combined TPP Meeting 1 and 2 was conducted in general accordance with EM 200-1-2. The stakeholders for this SI include the ARNG, CAARNG, USACE, California Regional Water Quality Control Board (RWQCB) – Central Coast Region. Stakeholders were provided the opportunity to make comments on the technical sampling approach and methods at the combined TPP Meeting 1 and 2. The outcome of the combined TPP Meeting 1 and 2 was memorialized in the SI QAPP Addendum (AECOM, 2021b).

A TPP Meeting 3 was held after the field event to discuss the results of the SI. Meeting minutes for TPP 3 are included in **Appendix D** of this report. Future TPP meetings will provide an opportunity to discuss the results and findings, and future actions, where warranted.

### 5.1.2 Utility Clearance

AECOM's drilling subcontractor, Cascade Technical Services, LLC. placed a ticket with the DigAlert utility clearance provider to notify them of intrusive work on 5 May 2021. Additionally, AECOM contracted Ground Penetrating Radar Systems (GPRS), a private utility location service, to perform utility clearance. GPRS performed utility clearance of the proposed boring locations on 10 May 2021 with input from the AECOM field team and Camp Roberts facility staff. General locating services and ground-penetrating radar were used to complete the clearance. Additionally, the first 5 feet of each boring were pre-cleared using a hand auger to verify utility clearance in shallow subsurface where utilities would typically be encountered.

### 5.1.3 Source Water and Sampling Equipment Acceptability

A potable water source at Camp Roberts was sampled on 18 March 2021 to assess usability for decontamination of drilling equipment. Results of the sample collected (CR-PW-01) confirmed this source to be acceptable for use in this investigation; therefore, it was used throughout the field activities. Specifically, the samples were analyzed by LC/MS/MS compliant with QSM 5.3 Table B-15. The results of the decontamination water sample associated with the decontamination water source used during the SI are provided in **Appendix F**. A discussion of the results is presented in the DUA (**Appendix A**).

Materials that were used within the sampling zone were confirmed as acceptable for use in the sampling environment. The checklist of acceptable materials for use in the sampling environment was provided in the Standard Operating Procedures (SOPs) appendix to the SI QAPP Addendum (AECOM, 2021b). Prior to the start of field work each day, a Sampling Checklist was completed as an additional layer of control. The checklist served as a daily reminder to each field team member regarding the allowable materials within the sampling environment.

## 5.2 Soil Borings and Soil Sampling

Borings were installed in grass areas where applicable, to avoid disturbing concrete or asphalt surfaces. Shallow and deep borings were advanced via hollow stem auger (HSA) drilling, in accordance with the SI QAPP Addendum (AECOM, 2021b). A split-spoon sampler was used to collect soil samples at the target depths. A hand auger was used to collect surface soil samples and soil from the top 5 feet of soil borings, in accordance with AECOM utility clearance procedures. The soil boring locations are shown on **Figure 5-1** through **Figure 5-3**, and depths are provided on **Table 5-2** and **Table 5-3**. During the SI field work, AECOM was informed that the location of proposed AOI04-01 might be in conflict with a future building. As a result, the drilling location of AOI04-01 was shifted to a new location within 50 feet of the proposed location.

In general, three discrete soil samples were collected from the vadose zone for chemical analysis from each soil boring: one surface soil sample (0 to 2 feet bgs), one subsurface soil sample approximately 1 foot above the groundwater table, and one subsurface soil sample at 10 feet bgs.

The soil cores were continuously logged for lithological descriptions by an AECOM field geologist using the Unified Soil Classification System (USCS). A photoionization detector (PID) was used to screen the breathing zone during boring activities as part of personal safety requirements. Observations and measurements were recorded on sampling forms (**Appendix B2**) and in a non-treated field logbook (i.e., composition notebook). Depth interval, recovery thickness, PID concentrations, moisture, relative density, color (using a Munsell soil color chart), and texture (using the USCS) were recorded. The boring logs are provided in **Appendix E**.

Soil borings completed during the SI found poorly graded sands and silts as the dominant lithology of the unconsolidated sediments below Camp Roberts. The borings were completed at depths between 75 feet to 120.5 feet below ground surface (bgs). Interbedded lenses of cobbles and clays were also observed in the borings ranging from a few inches to approximately 6 feet in thickness. These observations are consistent with the understood depositional environment of the region.

Each soil sample was collected into laboratory-supplied PFAS-free high-density polyethylene (HDPE) bottles and labeled using a PFAS-free marker or pen. Samples were packaged on ice and transported via Federal Express (FedEx) under standard chain of custody (CoC) procedures to the laboratory and analyzed by LC/MS/MS compliant with QSM 5.3 Table B-15, total organic carbon (TOC) (USEPA Method 9060A), and pH (USEPA Method 9045D) in accordance with the SI QAPP Addendum (AECOM, 2021b).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. MS/MSDs were collected at a rate of 5% and analyzed for the same parameters as the accompanying samples. In instances when non-dedicated sampling equipment was used, such as a hand auger for the shallow soil samples, equipment rinsate blanks were collected at a rate of 5% and analyzed for the same parameters as the soil samples. A temperature blank was placed in each cooler to ensure that samples were preserved at or below 6 degrees Celsius (°C) during shipment.

Following completion of soil sampling, HSA borings were converted to permanent monitoring wells, as described in **Section 5.3**.

## 5.3 Permanent Well Installation and Groundwater Sampling

During the SI, four permanent monitoring wells were installed within or downgradient of potential source areas. The locations of the wells are shown on **Figure 5-1** and **Figure 5-2**.

A CME 85 HSA drill rig was used to install four 2-inch diameter monitoring wells. The monitoring wells were constructed using 5- or 10-feet sections of 2-inch Schedule 40 poly-vinyl chloride (PVC) screen with sufficient 2-inch PVC casing to reach ground surface. Filter pack was placed around the well screen to at least 2 feet above the top of the well screen. To prevent vertical flow within the boring from affecting the screened interval, a minimum 3-feet thick layer of bentonite chips was installed immediately above the filter sand. Then, the remaining annular space around the well was grouted using a grout composed of neat cement and granular bentonite. The bentonite grout was allowed to set for 24 hours prior to well completion in accordance with the SI QAPP Addendum (AECOM, 2021b). Each monitoring well was completed with a concrete well pad consisting of a Portland cement/sand mixture and with a flush mount cover. Well installation details were recorded on the well construction forms (**Appendix E**). The screen interval of each of the groundwater monitoring wells is provided in **Table 5-3**.

Development and sampling of wells was completed in accordance with the SI QAPP Addendum (AECOM, 2021b). The newly installed monitoring wells were developed no sooner than 24 hours following installation by pumping and surging using a variable speed submersible pump. The wells were purged at a rate determined in the field to reduce draw down during development. Water quality parameters (e.g., temperature, specific conductance, pH, dissolved oxygen [DO], and oxidation-reduction potential, [ORP]) were measured using a water quality meter and recorded on the field sampling form (**Appendix B2**). Water levels were measured to the nearest 0.01 inch and recorded. Samples were collected no sooner than 24 hours following development using HDPE Hydrasleeves™ in accordance with the SI QAPP Addendum (AECOM, 2021b). Since the Hydrasleeve™ is a PFAS-free and disposable passive sampler, this sampling method minimized the potential for cross contamination, negated the need for decontamination, and minimized the amount of purge water generated. A subsample of each groundwater sample was collected in a separate container, and a shaker test was completed to identify if there were any foaming. No foaming was noted in any of the groundwater samples.

Each sample was collected into laboratory-supplied PFAS-free HDPE bottles and labeled using a PFAS-free marker or pen. Samples were packaged on ice and transported via FedEx under standard CoC procedures to the laboratory and analyzed by LC/MS/MS compliant with QSM 5.3 Table B-15 in accordance with the SI QAPP Addendum (AECOM, 2021b).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. MS/MSDs were collected at a rate of 5% and analyzed for the same parameters as the accompanying samples. One field reagent blank was collected in accordance with the PQAPP (AECOM, 2018a). A temperature blank was placed in each cooler to ensure that samples were preserved at or below 6°C during shipment.

## 5.4 Synoptic Water Level Measurements

A synoptic groundwater gauging event was performed on 27 May 2021. Groundwater elevation measurements were collected from the four new permanent monitoring wells. Water level measurements were taken from the northern side of the well casing. A groundwater elevation map is provided in **Figure 2-4**. Groundwater elevation data are provided in **Table 5-3**.

## 5.5 Surveying

The northern side of each well casing was surveyed by California-licensed land surveyors following guidelines provided in the SOPs provided in the SI QAPP Addendum (AECOM, 2021b). Survey data from the newly installed wells on the facility were collected on 27 May 2021 in North American Datum 1983 (2011) State Plane California Zone IV. The surveyed well data are provided in **Appendix B3**.

## 5.6 Investigation-Derived Waste

As of the date of this report, the disposal of investigation-derived waste (IDW) is not regulated federally. IDW generated during the SI is considered non-hazardous waste and was managed in accordance with the SI QAPP Addendum (AECOM, 2021b) and with the DA Guidance for Addressing Releases of PFAS, Q18 (DA, 2018).

Soil IDW generated during SI activities was containerized in properly labeled 55-gallon drums. The IDW was stored inside a building designated by Camp Roberts Environmental Manager and CAARNG. ARNG will coordinate waste profiling, transportation, and disposal of the solid IDW.

Liquid IDW generated during SI activities (i.e. purge water, development water, and decontamination fluids) were containerized in properly-labeled 55-gallon drums and stored inside

a building designated by CAARNG. The liquid IDW was not sampled and assumes the characteristics of the associated groundwater samples collected from that source location. Based on laboratory results, containerized liquid IDW will be managed and disposed by ARNG under a separate contract for Treating Liquid Investigation-Derived Material (Purge water, drilling water, and decontamination fluids) (EA Engineering, Science, and Technology, Inc., 2021).

Other solids such as spent personal protective equipment, plastic sheeting, tubing, rope, unused monitoring well construction materials, and other environmental media generated during the field activities were disposed of at a licensed solid waste landfill.

## 5.7 Laboratory Analytical Methods

Samples were analyzed by LC/MS/MS compliant with QSM 5.3 Table B-15 at Pace Analytical Gulf Coast in Baton Rouge, Louisiana, a DoD ELAP and NELAP certified laboratory. Soil samples were also analyzed for TOC using USEPA Method 9060A and pH by USEPA Method 9045D.

## 5.8 Deviations from SI QAPP Addendum

Two deviations from the SI QAPP Addendum were identified during review of the field documentation.

- During the SI field work, AECOM was informed that the location of proposed AOI04-01 might be in conflict with a future building. As a result, the drilling location of AOI04-01 was shifted to a new location within 50 feet of the proposed location.
- Due to drilling conditions during SI field work, augers were only able to be advanced 3 feet into the water bearing zone at AOI01-01. As a result, a 5 foot well screen was installed instead of a 10 foot well screen at well location AOI01-01.

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**Table 5-1**
**Site Inspection Samples by Medium**
**Site Inspection Report, Camp Roberts, San Miguel, California**

| Sample Identification | Sample Collection Date/Time | Sample Depth (feet bgs) | LC/MS/MS compliant with QSM 5.3 Table B-15 | TOC (USEPA Method 9060A) | pH (USEPA Method 9045D) | Grain Size (ASTM D-422) | Comments |
|---|---|---|---|---|---|---|---|
| **Soil Samples** | | | | | | | |
| AOI01-01-SB-00-02 | 5/13/2021 11:10 | 0-2 | x | | | | |
| AOI01-01-SB-10-11 | 5/13/2021 13:48 | 10-11 | x | | | | |
| AOI01-01-SB-118-119 | 5/14/2021 14:35 | 118-119 | x | | | | |
| AOI01-02-SB-00-02 | 5/13/2021 12:15 | 0-2 | x | | | | |
| AOI01-03-SB-00-02 | 5/14/2021 13:00 | 0-2 | x | | | | |
| AOI01-04-SB-00-02 | 5/13/2021 13:05 | 0-2 | x | x | x | | |
| AOI02-01-SB-00-02 | 5/11/2021 12:15 | 0-2 | x | | | | |
| AOI02-01-SB-10-11 | 5/11/2021 14:30 | 10-11 | x | | | | |
| AOI02-01-SB-72-73 | 5/12/2021 10:05 | 72-73 | x | | | | |
| AOI02-02-SB-00-02 | 5/12/2021 15:45 | 0-2 | x | x | x | | |
| AOI02-03-SB-00-02 | 5/12/2021 16:15 | 0-2 | x | | | | |
| AOI02-04-SB-00-02 | 5/12/2021 16:42 | 0-2 | x | | | | |
| AOI02-05-SB-00-02 | 5/12/2021 17:01 | 0-2 | x | | | | |
| AOI02-06-SB-00-02 | 5/12/2021 17:16 | 0-2 | x | | | | |
| AOI03-01-SB-00-02 | 5/17/2021 15:50 | 0-2 | x | x | x | | |
| AOI03-01-SB-00-02-D | 5/17/2021 15:50 | 0-2 | x | | | | Field Duplicate |
| AOI03-01-SB-00-02-MS | 5/17/2021 15:50 | 0-2 | x | | | | MS |
| AOI03-01-SB-00-02-MSD | 5/17/2021 15:50 | 0-2 | x | | | | MSD |
| AOI03-01-SB-10-11 | 5/18/2021 9:50 | 10-11 | x | | | | |
| AOI03-01-SB-91-92 | 5/19/2021 9:30 | 91-92 | x | | | | |
| AOI03-02-SB-00-02 | 5/17/2021 16:45 | 0-2 | x | | | | |
| AOI03-03-SB-00-02 | 5/17/2021 17:10 | 0-2 | x | | | | |
| AOI04-01-SB-00-02 | 5/20/2021 8:20 | 0-2 | x | | | | |
| AOI04-01-SB-09-10 | 5/20/2021 11:15 | 9-10 | x | | | | |
| AOI04-01-SB-84-85 | 5/21/2021 8:45 | 84-85 | x | | | | |
| AOI04-02-SB-00-02 | 5/20/2021 16:25 | 0-2 | x | x | x | | |
| AOI04-02-SB-00-02-MS | 5/20/2021 16:25 | 0-2 | x | | | | MS |
| AOI04-02-SB-00-02-MSD | 5/20/2021 16:25 | 0-2 | x | | | | MSD |
| AOI04-03-SB-00-02 | 5/20/2021 16:45 | 0-2 | x | | | | |
| AOI04-03-SB-00-02-D | 5/20/2021 16:45 | 0-2 | x | | | | Field Duplicate |
| AOI05-01-SB-00-02 | 5/21/2021 11:02 | 0-2 | x | | | | |
| AOI05-02-SB-00-02 | 5/21/2021 10:35 | 0-2 | x | x | x | | |
| AOI06-01-SB-00-02 | 5/19/2021 14:43 | 0-2 | x | | | | |
| AOI06-02-SB-00-02 | 5/19/2021 14:10 | 0-2 | x | x | x | | |
| AOI06-02-SB-00-02-D | 5/19/2021 14:10 | 0-2 | x | x | x | | Field Duplicate |
| **Groundwater Samples** | | | | | | | |
| AOI01-01-GW | 5/27/2021 10:15 | 115-120 | x | | | | |
| AOI02-01-GW | 5/27/2021 9:45 | 64-74 | x | | | | |
| AOI02-01-GW-MS | 5/27/2021 9:45 | 64-74 | x | | | | MS |
| AOI02-01-GW-MSD | 5/27/2021 9:45 | 64-74 | x | | | | MSD |
| AOI03-01-GW | 5/27/2021 9:00 | 91.5-101.5 | x | | | | |
| AOI03-01-GW-D | 5/27/2021 9:00 | 91.5-101.5 | x | | | | Field Duplicate |
| AOI04-01-GW | 5/27/2021 8:30 | 85-95 | x | | | | |

**Table 5-1**
**Site Inspection Samples by Medium**
**Site Inspection Report, Camp Roberts, San Miguel, California**

| Sample Identification | Sample Collection Date/Time | Sample Depth (feet bgs) | LC/MS/MS compliant with QSM 5.3 Table B-15 | TOC (USEPA Method 9060A) | pH (USEPA Method 9045D) | Grain Size (ASTM D-422) | Comments |
|---|---|---|---|---|---|---|---|
| **Quality Control Samples** | | | | | | | |
| CR-ERB-01 | 5/18/2021 8:35 | x | x | | | | Stainless Steel Bowl |
| CR-ERB-02 | 5/18/2021 9:15 | x | x | | | | Hand Auger |
| CR-ERB-03 | 5/18/2021 10:00 | x | x | | | | Split Spoon (core) |
| CR-ERB-04 | 5/21/2021 11:25 | x | | | | | Lost During Transportation |
| CR-ERB-05 | 5/26/2021 7:30 | x | x | | | | Poly Rope |
| CR-FRB-01 | 5/18/2021 8:30 | x | x | | | | |
| CR-PW-01 | 3/18/2021 12:30 | x | x | | | | Decon Source |
| | | | | | | | |

**Notes:**
ASTM = American Society for Testing and Materials
bgs = below ground surface
ERB = equipment rinsate blank
FD = field duplicate
FRB = field reagent blank
LC/MS/MS = Liquid Chromatography Mass Spectrometry
MS/MSD = matrix spike/ matrix spike duplicate
QSM = Quality Systems Manual
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

**Table 5-2**
**Soil Boring Depths**
**Site Inspection Report, Camp Roberts, California**

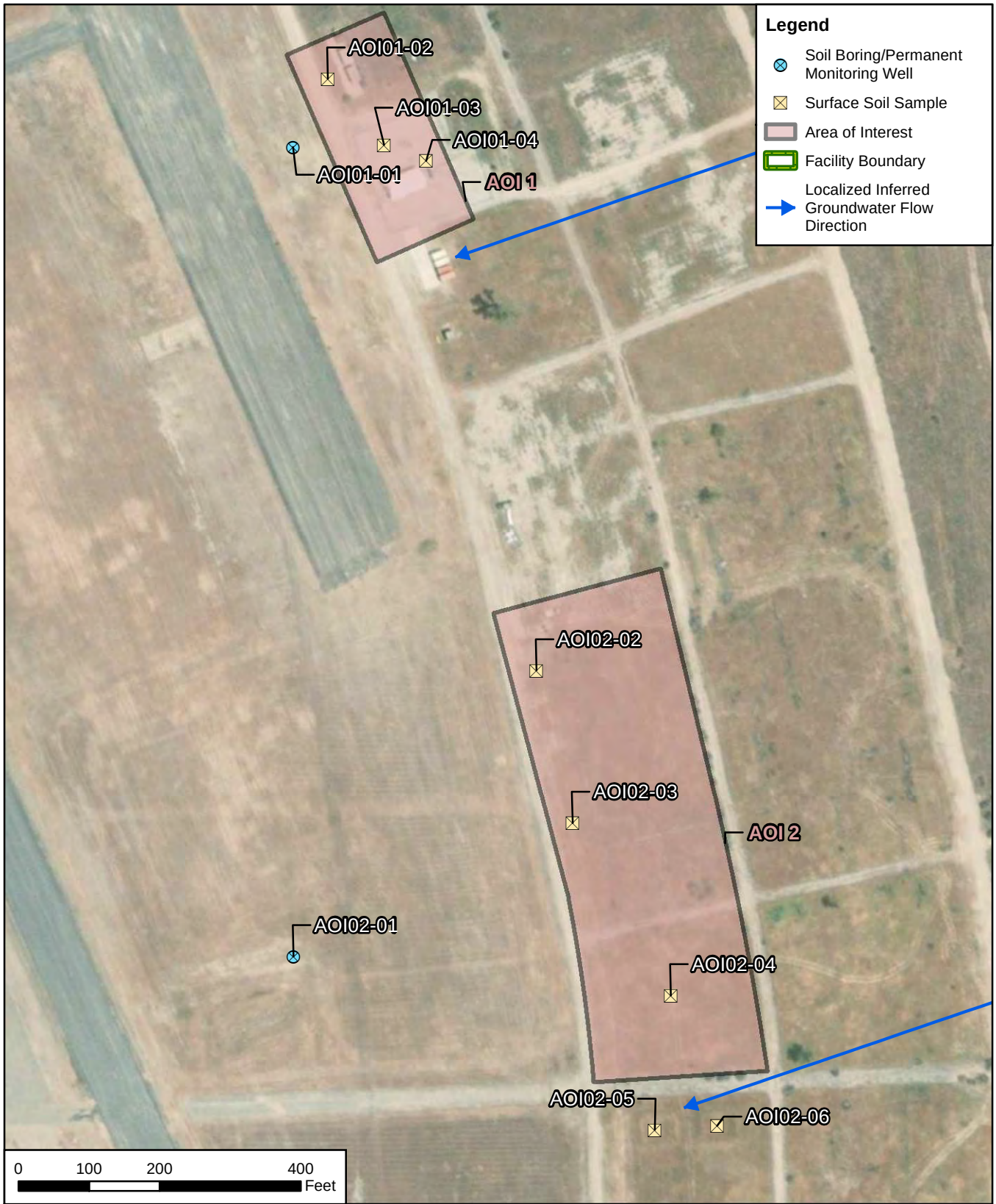
| Area of Interest | Boring Location | Soil Boring Depth (feet bgs) |
|---|---|---|
| 1 | AOI01-02 | 2 |
| | AOI01-02 | 2 |
| | AOI01-03 | 2 |
| | AOI01-04 | 2 |
| 2 | AOI02-02 | 2 |
| | AOI02-03 | 2 |
| | AOI02-04 | 2 |
| | AOI02-05 | 2 |
| | AOI02-06 | 2 |
| 3 | AOI03-02 | 2 |
| | AOI03-03 | 2 |
| 4 | AOI04-02 | 2 |
| | AOI04-03 | 2 |
| 5 | AOI05-01 | 2 |
| | AOI05-02 | 2 |
| 6 | AOI06-01 | 2 |
| | AOI06-02 | 2 |

**Notes:**
bgs = below ground surface
1. Boring locations presented on this table are hand augered surface soil locations.

**Table 5-3**
**Permanent Monitoring Well Screen Intervals and Groundwater Elevations**
**Site Inspection Report, Camp Roberts, California**

| Area of Interest | Boring Location | Soil Boring Depth (feet bgs) | Permanent Well Screen Interval (feet bgs) | Top of Casing Elevation (feet NAVD88) | Ground Surface Elevation (feet NAVD88) | Depth to Water (feet btoc) | Depth to Water (feet bgs) | Groundwater Elevation (feet NAVD88) |
|---|---|---|---|---|---|---|---|---|
| 1 | AOI01-01 | 119 | 115-120 | 633.68 | 634.19 | 94.40 | 94.91 | 539.28 |
| 2 | AOI02-01 | 73 | 64-74 | 633.48 | 633.92 | 62.10 | 62.54 | 571.38 |
| 3 | AOI03-01 | 92 | 91.5-101.5 | 638.48 | 639.01 | 86.95 | 87.48 | 551.53 |
| 4 | AOI04-01 | 85 | 85-95 | 638.44 | 638.97 | 75.75 | 76.28 | 562.69 |

**Notes:**
bgs = below ground surface
btoc = below top of casing
NAVD88 = North American Vertical Datum 1988



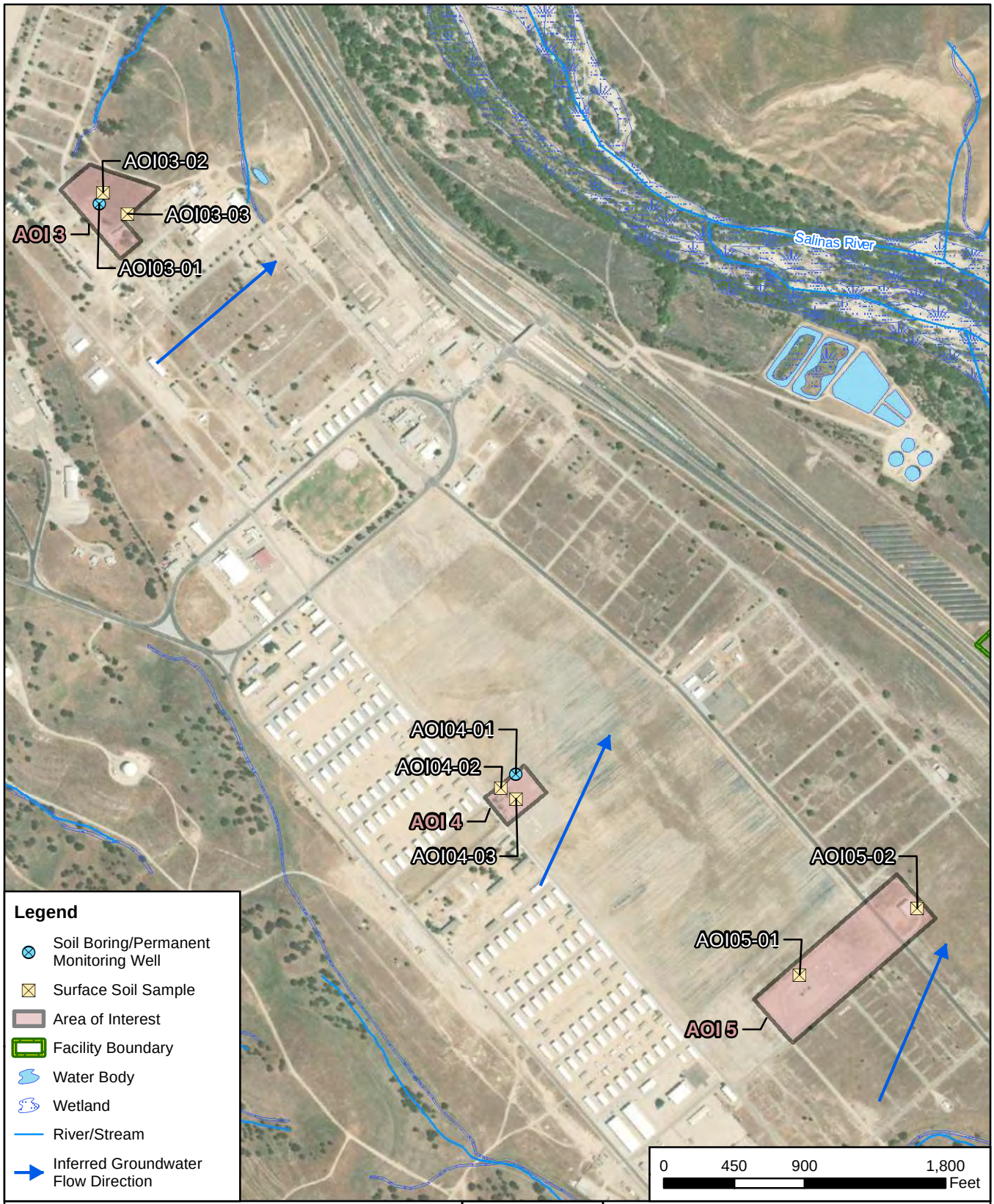

| | | | | |
|---|---|---|---|---|
| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/2/2022 | GIS BY | MS | 8/2/2022 |
| SCALE | 1:2,400 | CHK BY | SL | 8/2/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/2/2022 |

N

**Site Inspection Sample Locations - AOI 1, AOI 2**

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

**Figure 5-1**




| | | | | |
|---|---|---|---|---|
| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/22/2022 | GIS BY | MS | 8/22/2022 |
| SCALE | 1:10,800 | CHK BY | SL | 8/22/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/22/2022 |

N

**Site Inspection Sample Locations - AOI 3, AOI 4, AOI 5**

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

**Figure 5-2**


| | | | | |
|---|---|---|---|---|
| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/2/2022 | GIS BY | MS | 8/2/2022 |
| SCALE | 1:2,400 | CHK BY | SL | 8/2/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/2/2022 |

N

**Site Inspection Sample Locations - AOI 6**

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

**Figure 5-3**

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# 6. Site Inspection Results

This section presents the analytical results of the SI. The SLs used in this evaluation are presented in **Section 6.1**. A discussion of the results for each AOI is provided in **Section 6.3** through **Section 6.8**. **Table 6-2** through **Table 6-5** present results in soil or groundwater for the relevant compounds. Tables that contain all results are provided in **Appendix F**, and the laboratory reports are provided in **Appendix G**.

## 6.1 Screening Levels

The DoD has adopted a policy to retain facilities in the CERCLA process based on risk-based SLs for soil and groundwater, as described in a memorandum from the OSD dated 6 July 2022 (Assistant Secretary of Defense, 2022). The ARNG program under which this SI was performed follows this DoD policy. Should the maximum site concentration for sampled media exceed the SLs established in the OSD memorandum, the AOI will proceed to the next phase under CERCLA. The SLs established in the OSD memorandum apply to the five compounds presented on **Table 6-1** below.

**Table 6-1: Screening Levels (Soil and Groundwater)**

| Analyte[b] | Residential (Soil) (µg/kg)[a] 0-2 feet bgs | Industrial/ Commercial Composite Worker (Soil) (µg/kg)[a] 2-15 feet bgs | Tap Water (Groundwater) (ng/L)[a] |
|---|---|---|---|
| **PFOA** | 19 | 250 | 6 |
| **PFOS** | 13 | 160 | 4 |
| **PFBS** | 1,900 | 25,000 | 601 |
| **PFHxS** | 130 | 1,600 | 39 |
| **PFNA** | 19 | 250 | 6 |

**Notes:**
bgs = below ground surface; µg/kg = micrograms per kilogram; ng/L = nanograms per liter

a.) Assistant Secretary of Defense, 2022. Risk Based Screening Levels in Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. Hazard Quotient (HQ) = 0.1. 6 July 2022.

b.) Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the CSM developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of MIL-SPEC AFFF and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

The data in the subsequent sections are compared against the SLs presented in **Table 6-1**. The SLs for groundwater are based on direct ingestion. The SLs for soil are based on incidental ingestion and are applied to the depth intervals reasonably anticipated to be encountered by the receptors identified at the facility: the residential scenario is applied to surface soil results (0 to 2 feet bgs) and the industrial/commercial worker scenario is applied to shallow subsurface soil results (2 to 15 feet bgs). The SLs are not applied to deep subsurface soil results (>15 feet bgs) because 15 feet is the anticipated limit of construction activities.

## 6.2 Soil Physicochemical Analyses

To provide basic soil parameter information, soil samples were analyzed for TOC and pH, which are important for evaluating transport through the soil medium. **Appendix F** contains the results of the TOC and pH sampling.

The data collected in this investigation will be used in subsequent investigations, where appropriate, to assess fate and transport. According to the Interstate Technology Regulatory Council (ITRC), several important partitioning mechanisms include hydrophobic and lipophobic effects, electrostatic interactions, and interfacial behaviors. At relevant environmental pH values, certain PFAS are present as organic anions and are therefore relatively mobile in groundwater (Xiao et al., 2015), but tend to associate with the organic carbon fraction that may be present in soil or sediment (Higgins and Luthy 2006; Guelfo and Higgins, 2013). When sufficient organic carbon is present, organic carbon normalized distribution coefficients ($K_{oc}$ values) can help in evaluating transport potential, though other geochemical factors (for example, pH and presence of polyvalent cations) may also affect PFAS sorption to solid phases (ITRC, 2018).

## 6.3 AOI 1

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 1: East Garrison Old Fire Station and Army Airfield AFFF Storage. The soil and groundwater results are summarized on **Table 6-2** through **Table 6-5**. Soil and groundwater results are presented on **Figure 6-1** through **Figure 6-9**.

### 6.3.1 AOI 1 Soil Analytical Results

Soil was sampled from surface soil (0 to 2 feet bgs) from boring locations AOI01-01 through AOI01-04. Soil was also sampled from shallow subsurface soil (10 to 11 feet bgs) and deep subsurface soil (118 to 119 feet bgs) from boring location AOI01-01. **Table 6-2** through **Table 6-4** summarize the soil results. **Figure 6-1** through **Figure 6-7** present the ranges of detections in soil.

PFOS was detected above the SL of 13 micrograms per kilogram (µg/kg) in surface soil at all four locations, with concentrations ranging from 19.6 J µg/kg to 443 J µg/kg. PFOA, PFHxS, PFNA, and PFBS were detected at concentrations below their respective SLs in surface soil at all four locations. The maximum concentrations were PFOA at 16.7 J µg/kg; PFHxS at 60.2 J µg/kg; PFNA at 3.04 J µg/kg; and PFBS at 8.59 J µg/kg. PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in shallow subsurface soil or deep subsurface soil.

### 6.3.2 AOI 1 Groundwater Analytical Results

Groundwater was sampled from permanent monitoring well location AOI01-01. **Table 6-5** summarizes the groundwater results. **Figure 6-8** and **Figure 6-9** present the ranges of detections in groundwater. PFOS and PFBS were detected at concentrations below their respective SLs in groundwater, with concentrations of 1.50 J ng/L and 1.30 J ng/L, respectively. PFOA, PFHxS, and PFNA were not detected in groundwater.

### 6.3.3 AOI 1 Conclusions

Based on the results of the SI, PFOS was detected in soil at concentrations above the SL. No compounds exceeded the SLs in groundwater. Based on the exceedances of the SLs in soil, further evaluation at AOI 1 is warranted.

## 6.4 AOI 2

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 2: East Garrison Old FTA. The results in soil and groundwater are summarized on **Table 6-2** through **Table 6-5**. Soil and groundwater results are presented on **Figure 6-1** through **Figure 6-9**.

### 6.4.1 AOI 2 Soil Analytical Results

Soil was sampled from surface soil (0 to 2 feet bgs) at boring locations AOI02-01 through AOI02-06. Soil was also sampled from shallow subsurface soil (10 to 11 feet bgs) and deep subsurface soil (72 to 73 feet bgs) from boring location AOI02-01. **Table 6-2** through **Table 6-4** summarize the soil results. **Figure 6-1** through **Figure 6-7** present the ranges of detections in soil.

PFOS was detected in soil at concentrations above its respective SL in surface soil. PFOS was detected above the SL of 13 µg/kg at locations AOI02-03 and AOI02-04, with concentrations of 103 J µg/kg and 584 J µg/kg, respectively. PFOA, PFHxS, PFNA, and PFBS were detected at concentrations below their respective SLs in surface soil with the following maximum concentrations:

- PFOA was detected at locations AOI02-02 through AOI02-06, with a maximum concentration of 0.429 J µg/kg.
- PFHxS was detected at all six locations, a maximum concentration of 1.52 J µg/kg.
- PFNA was detected at four of the six locations, with a maximum concentration of 1.13 J µg/kg.
- PFBS was detected at locations AOI02-03 and AOI02-04, with a maximum concentration of 0.090 J µg/kg.

PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in shallow subsurface soil or deep subsurface soil.

### 6.4.2 AOI 2 Groundwater Analytical Results

Groundwater was sampled from permanent monitoring well location AOI02-01. **Table 6-5** summarizes the groundwater results. **Figure 6-8** and **Figure 6-9** present the ranges of detections in groundwater.

PFOS and PFHxS were detected at concentrations above their respective SLs in groundwater. PFOS was detected above the SL of 4 ng/L, with a concentration of 15.7 J ng/L. PFHxS was detected above the SL of 39 ng/L, with a concentration of 85.6 J ng/L. PFOA and PFBS were detected at concentrations below their respective SLs in groundwater, with concentrations of 3.29 J ng/L and 11.4 J ng/L, respectively. PFNA was not detected in groundwater.

### 6.4.3 AOI 2 Conclusions

Based on the results of the SI, PFOS was detected in soil at concentrations above the SL. PFOS and PFHxS were detected in groundwater at concentrations above their respective SLs. Based on the exceedances of the SLs in soil and groundwater, further evaluation at AOI 2 is warranted.

## 6.5 AOI 3

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 3: Main Garrison FTA 2 and Building 7020. The results in soil and groundwater are presented

in **Table 6-2** through **Table 6-5**. Soil and groundwater results are presented on **Figure 6-1** through **Figure 6-9**.

### 6.5.1 AOI 3 Soil Analytical Results

Soil was sampled from surface soil (0 to 2 feet bgs) at boring locations AOI03-01 through AOI03-03. Soil was also sampled from shallow subsurface soil (10 to 11 feet bgs) and deep subsurface soil (91 to 92 feet bgs) from AOI03-01. **Table 6-2** through **Table 6-4** summarize the soil results. **Figure 6-1** through **Figure 6-7** present the ranges of detections in soil.

PFOS was detected above the SL of 13 µg/kg in surface soil at AOI03-03 with a concentration of 44.7 J µg/kg. PFOA PFHxS, PFNA, and PFBS were detected at concentrations below their respective SLs in surface soil with the following maximum concentrations:

- PFOA and PFHxS were detected at all three locations, with maximum concentrations of 5.80 J µg/kg and 40.1 J µg/kg, respectively.
- PFNA was detected at locations AOI03-01 and AOI03-03, with a maximum concentration of 0.065 J µg/kg in the field duplicate sample (AOI03-01-SB-00-02D).
- PFBS was detected at locations AOI03-01 and AOI03-03, with a maximum concentration of 1.30 J µg/kg.

PFOA, PFOS, PFHxS, and PFBS were detected at concentrations below their respective SLs in shallow subsurface soil at location AOI03-01 with the following concentrations: PFOA at 3.60 J µg/kg; PFOS at 0.179 J µg/kg; PFHxS at 12.5 J µg/kg; PFBS at 0.273 J µg/kg. PFNA was not detected in shallow subsurface soil. PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in deep subsurface soil.

### 6.5.2 AOI 3 Groundwater Analytical Results

Groundwater was sampled from permanent monitoring well location AOI03-01. **Table 6-5** summarizes the groundwater results. **Figure 6-8** and **Figure 6-9** present the ranges of detections in groundwater.

PFOA and PFHxS were detected at concentrations above their respective SLs in groundwater. PFOA was detected above the SL of 4 ng/L with a maximum concentration of 8.09 J ng/L. PFHxS was detected above the SL of 39 ng/L, with a maximum concentration of 79.5 J ng/L. PFOS and PFBS were detected below the respective SLs in groundwater, with concentrations of 3.50 J ng/L and 9.70 J ng/L, respectively. PFNA was not detected in groundwater.

### 6.5.3 AOI 3 Conclusions

Based on the results of the SI, PFOS was detected in soil above the SL. PFOA and PFHxS were detected in groundwater at concentrations above their respective SLs. Based on the exceedances of the SLs in soil and groundwater, further evaluation at AOI 3 is warranted.

## 6.6 AOI 4

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 4: CR FD Fire Station and Shipping Container. The results in soil and groundwater are presented in **Table 6-2** through **Table 6-5**. Soil and groundwater results are presented on **Figure 6-1** through **Figure 6-9**.

### 6.6.1 AOI 4 Soil Analytical Results

Soil was sampled from surface soil (0 to 2 feet bgs) at boring locations AOI04-01, AOI04-02, and AOI04-03. Soil was also sampled from the shallow subsurface (9 to 10 feet bgs) and deep subsurface (84 to 85 feet bgs) from boring location AOI04-01. **Table 6-2** through **Table 6-4** summarize the soil results. **Figure 6-1** through **Figure 6-7** present the ranges of detections in soil.

PFOA, PFOS, PFHxS, PFNA, and PFBS were detected below their respective SLs in surface soil at all three locations, with the following maximum concentrations: PFOA at 1.38 µg/kg; PFOS at 7.60 J µg/kg; PFHxS at 2.44 µg/kg; PFNA at 0.728 J µg/kg; and PFBS at 0.080 J µg/kg.

PFOS, PFHxS, and PFNA were detected below their respective SLs in shallow subsurface soil at location AOI04-01, with concentrations of 0.238 J µg/kg, 0.086 J µg/kg, and 0.031 J µg/kg, respectively. PFOA and PFBS were not detected in shallow subsurface soil. PFOA, PFOS, PFHxs, PFNA, and PFBS were not detected in deep subsurface soil.

### 6.6.2 AOI 4 Groundwater Analytical Results

Groundwater was sampled from permanent monitoring well locations AOI04-01. **Table 6-5** summarizes the groundwater results. **Figure 6-8** and **Figure 6-9** present the ranges of detections in groundwater.

PFOS was detected below the SL of 4 ng/L, with a concentration of 1.08 J ng/L. PFOA, PFHxS, PFNA, and PFBS were not detected in groundwater.

### 6.6.3 AOI 4 Conclusions

Based on the results of the SI, PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in soil at concentrations below their respective SLs. PFOS was detected in groundwater at a concentration below the SL. No other compounds were detected in groundwater. Therefore, further evaluation is not warranted at AOI 4.

## 6.7 AOI 5

This section presents the analytical results for soil in comparison to SLs for AOI 5: CR FD Building 3000 and Main Garrison Fuel Station. **Table 6-2** summarizes the soil results. **Figure 6-1** through **Figure 6-7** present the ranges of detections in soil.

### 6.7.1 AOI 5 Soil Analytical Results

Soil was sampled from surface soil (0 to 2 feet bgs) from boring locations AOI05-01 and AOI05-02. PFOS was detected above the SL of 13 µg/kg in surface soil at AOI05-02, with a concentration of 49.3 µg/kg. PFOA, PFHxS, PFNA, and PFBS were detected at concentrations below their respective SLs in surface soil. PFOA and PFBS were detected at location AOI05-02, with concentrations of 0.840 J µg/kg and 0.110 J µg/kg, respectively. PFHxS and PFNA were detected at both locations, with maximum concentrations of 4.19 µg/kg and 0.121 J µg/kg, respectively.

### 6.7.2 AOI 5 Conclusions

Based on the results of the SI, PFOS was detected in soil at a concentration above the SL. Based on the exceedance of the SL in soil, further evaluation at AOI 5 is warranted.

## 6.8 AOI 6

This section presents the analytical results for soil in comparison to SLs for AOI 6: Hangar Building 17002 and NPS Airfield Shed AFFF Storage. **Table 6-2** summarizes the soil results. **Figure 6-4** and **Figure 6-7** present the ranges of detections in soil.

### 6.8.1 AOI 6 Soil Analytical Results

Soil was sampled from surface soil (0 to 2 feet bgs) from boring locations AOI06-01 and AOI06-02. PFOS, PFHxS, and PFNA were detected at concentrations below their respective SLs in surface soil. PFOS was detected at both locations with a maximum concentration of 0.109 J µg/kg. PFHxS and PFNA were detected at location AOI06-02, with concentrations of 0.049 J µg/kg and 0.036 J µg/kg, respectively.

### 6.8.2 AOI 6 Conclusions

Based on the results of the SI, PFOS, PFHxS, and PFNA were detected in soil at concentrations below their respective SLs. Therefore, further evaluation is not warranted at AOI 6.

**Table 6-2**
**PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil**
**Site Inspection Report, Camp Roberts**

| Area of Interest | | AOI01 | | | | | | | | AOI02 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | | AOI01-01-SB-00-02 | | AOI01-02-SB-00-02 | | AOI01-03-SB-00-02 | | AOI01-04-SB-00-02 | | AOI02-01-SB-00-02 | | AOI02-02-SB-00-02 | | AOI02-03-SB-00-02 | | AOI02-04-SB-00-02 | | AOI02-05-SB-00-02 | | AOI02-06-SB-00-02 | |
| Sample Date | | 05/13/2021 | | 05/13/2021 | | 05/14/2021 | | 05/13/2021 | | 05/11/2021 | | 05/12/2021 | | 05/12/2021 | | 05/12/2021 | | 05/12/2021 | | 05/12/2021 | |
| Depth | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | |
| **Analyte** | **OSD Screening Level [a]** | **Result** | **Qual** | **Result** | **Qual** | **Result** | **Qual** | **Result** | **Qual** | **Result** | **Qual** | **Result** | **Qual** | **Result** | **Qual** | **Result** | **Qual** | **Result** | **Qual** | **Result** | **Qual** |
| Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg) | | | | | | | | | | | | | | | | | | | | | |
| PFBS | 1900 | 8.59 | J | 0.127 | J | 0.299 | J | 0.045 | J | ND | UJ | ND | UJ | 0.090 | J | 0.030 | J | ND | UJ | ND | UJ |
| PFHxS | 130 | 60.2 | J | 4.02 | J | 7.13 | J | 2.28 | J | 0.033 | J | 0.340 | J | 1.52 | J | 1.04 | J | 0.791 | J | 0.744 | J |
| PFNA | 19 | 1.32 | J | 2.65 | J | 3.04 | J | 0.154 | J | ND | UJ | 0.129 | J | 1.13 | J | 0.082 | J | ND | UJ | 0.030 | J |
| PFOA | 19 | 16.7 | J | 3.21 | J | 3.53 | J | 3.78 | J | ND | UJ | 0.126 | J | 0.429 | J | 0.424 | J | 0.188 | J | 0.260 | J |
| PFOS | 13 | 443 | J | 173 | J | 94.1 | J | 19.6 | J | ND | UJ | 2.75 | J | 103 | J | 584 | J | 1.99 | J | 9.93 | J |

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on residential scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

UJ = The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

| | |
|---|---|
| PFBS | perfluorobutanesulfonic acid |
| PFHxS | perfluorohexanesulfonic acid |
| PFNA | perfluorononanoic acid |
| PFOA | perfluorooctanoic acid |
| PFOS | perfluorooctanesulfonic acid |

Acronyms and Abbreviations

| | |
|---|---|
| AOI | Area of Interest |
| D | duplicate |
| DL | detection limit |
| ft | feet |
| HQ | hazard quotient |
| ID | identification |
| LCMSMS | liquid chromatography with tandem mass spectrometry |
| LOD | limit of detection |
| ND | analyte not detected above the LOD |
| OSD | Office of the Secretary of Defense |
| QSM | Quality Systems Manual |
| Qual | interpreted qualifier |
| SB | soil boring |
| USEPA | United States Environmental Protection Agency |
| µg/kg | micrograms per kilogram |

**Table 6-2**
**PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil**
**Site Inspection Report, Camp Roberts**

| Area of Interest | | AOI03 | | | | | | | | AOI04 | | | | | | | | AOI05 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | | AOI03-01-SB-00-02 | | AOI03-01-SB-00-02D | | AOI03-02-SB-00-02 | | AOI03-03-SB-00-02 | | AOI04-01-SB-00-02 | | AOI04-02-SB-00-02 | | AOI04-03-SB-00-02 | | AOI04-03-SB-00-02D | | AOI05-01-SB-00-02 | | AOI05-02-SB-00-02 | |
| Sample Date | | 05/17/2021 | | 05/17/2021 | | 05/17/2021 | | 05/17/2021 | | 05/20/2021 | | 05/20/2021 | | 05/20/2021 | | 05/20/2021 | | 05/21/2021 | | 05/21/2021 | |
| Depth | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | | 0-2 ft | |
| Analyte | OSD Screening Level [a] | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual |
| Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg) | | | | | | | | | | | | | | | | | | | | | |
| PFBS | 1900 | 0.054 | J | 0.063 | J | ND | UJ | 1.30 | J | 0.029 | J | 0.080 | J | 0.056 | J | 0.062 | J | ND | U | 0.110 | J |
| PFHxS | 130 | 4.27 | J | 5.03 | J | 0.306 | J | 40.1 | J | 0.480 | J | 1.40 | | 2.44 | | 2.21 | | 0.060 | J | 4.19 | |
| PFNA | 19 | 0.046 | J | 0.065 | J | ND | UJ | 0.053 | J | 0.728 | J | 0.428 | J | 0.065 | J | 0.084 | J | 0.044 | J | 0.121 | J |
| PFOA | 19 | 0.224 | J | 0.276 | J | 0.155 | J | 5.80 | J | 1.38 | | 0.651 | J | 0.430 | J | 0.392 | J | ND | U | 0.840 | J |
| PFOS | 13 | 5.17 | J | 5.94 | J | 0.088 | J | 44.7 | J | 5.45 | | 7.60 | J | 2.25 | | 2.74 | | 1.18 | | 49.3 | |

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on residential scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

UJ = The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

| | |
|---|---|
| PFBS | perfluorobutanesulfonic acid |
| PFHxS | perfluorohexanesulfonic acid |
| PFNA | perfluorononanoic acid |
| PFOA | perfluorooctanoic acid |
| PFOS | perfluorooctanesulfonic acid |

Acronyms and Abbreviations

| | |
|---|---|
| AOI | Area of Interest |
| D | duplicate |
| DL | detection limit |
| ft | feet |
| HQ | hazard quotient |
| ID | identification |
| LCMSMS | liquid chromatography with tandem mass spectrometry |
| LOD | limit of detection |
| ND | analyte not detected above the LOD |
| OSD | Office of the Secretary of Defense |
| QSM | Quality Systems Manual |
| Qual | interpreted qualifier |
| SB | soil boring |
| USEPA | United States Environmental Protection Agency |
| µg/kg | micrograms per kilogram |

**Table 6-2**
**PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil**
**Site Inspection Report, Camp Roberts**

| | Area of Interest | AOI06 | | | | | |
|---|---|---|---|---|---|---|---|
| | Sample ID | AOI06-01-SB-00-02 | | AOI06-02-SB-00-02 | | AOI06-02-SB-00-02D | |
| | Sample Date | 05/19/2021 | | 05/19/2021 | | 05/19/2021 | |
| | Depth | 0-2 ft | | 0-2 ft | | 0-2 ft | |
| Analyte | OSD Screening Level [a] | Result | Qual | Result | Qual | Result | Qual |
| **Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)** | | | | | | | |
| PFBS | 1900 | ND | U | ND | U | ND | U |
| PFHxS | 130 | ND | U | 0.049 | J | ND | U |
| PFNA | 19 | ND | U | 0.036 | J | ND | UJ |
| PFOA | 19 | ND | U | ND | U | ND | U |
| PFOS | 13 | 0.073 | J | 0.109 | J | ND | U |

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on residential scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

UJ = The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

| | |
|---|---|
| PFBS | perfluorobutanesulfonic acid |
| PFHxS | perfluorohexanesulfonic acid |
| PFNA | perfluorononanoic acid |
| PFOA | perfluorooctanoic acid |
| PFOS | perfluorooctanesulfonic acid |

Acronyms and Abbreviations

| | |
|---|---|
| AOI | Area of Interest |
| D | duplicate |
| DL | detection limit |
| ft | feet |
| HQ | hazard quotient |
| ID | identification |
| LCMSMS | liquid chromatography with tandem mass spectrometry |
| LOD | limit of detection |
| ND | analyte not detected above the LOD |
| OSD | Office of the Secretary of Defense |
| QSM | Quality Systems Manual |
| Qual | interpreted qualifier |
| SB | soil boring |
| USEPA | United States Environmental Protection Agency |
| µg/kg | micrograms per kilogram |

**Table 6-3**
**PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Shallow Subsurface Soil**
**Site Inspection Report, Camp Roberts**

| | **Area of Interest** | AOI01 | | AOI02 | | AOI03 | | AOI04 | |
|---|---|---|---|---|---|---|---|---|---|
| | **Sample ID** | AOI01-01-SB-10-11 | | AOI02-01-SB-10-11 | | AOI03-01-SB-10-11 | | AOI04-01-SB-09-10 | |
| | **Sample Date** | 05/13/2021 | | 05/11/2021 | | 05/18/2021 | | 05/20/2021 | |
| | **Depth** | 10-11 ft | | 10-11 ft | | 10-11 ft | | 9-10 ft | |
| **Analyte** | **OSD Screening Level [a]** | **Result** | **Qual** | **Result** | **Qual** | **Result** | **Qual** | **Result** | **Qual** |
| Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg) | | | | | | | | | |
| PFBS | 25000 | ND | UJ | ND | UJ | 0.273 | J | ND | U |
| PFHxS | 1600 | ND | UJ | ND | UJ | 12.5 | J | 0.086 | J |
| PFNA | 250 | ND | UJ | ND | UJ | ND | UJ | 0.031 | J |
| PFOA | 250 | ND | UJ | ND | UJ | 3.60 | J | ND | U |
| PFOS | 160 | ND | UJ | ND | UJ | 0.179 | J | 0.238 | J |

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

UJ = The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

| | |
|---|---|
| PFBS | perfluorobutanesulfonic acid |
| PFHxS | perfluorohexanesulfonic acid |
| PFNA | perfluorononanoic acid |
| PFOA | perfluorooctanoic acid |
| PFOS | perfluorooctanesulfonic acid |

Acronyms and Abbreviations

| | |
|---|---|
| AOI | Area of Interest |
| DL | detection limit |
| ft | feet |
| HQ | hazard quotient |
| ID | identification |
| LCMSMS | liquid chromatography with tandem mass spectrometry |
| LOD | limit of detection |
| ND | analyte not detected above the LOD |
| OSD | Office of the Secretary of Defense |
| QSM | Quality Systems Manual |
| Qual | interpreted qualifier |
| SB | soil boring |
| USEPA | United States Environmental Protection Agency |
| µg/kg | micrograms per kilogram |

**Table 6-4**
**PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Deep Subsurface Soil**
**Site Inspection Report, Camp Roberts**

| Area of Interest | AOI01 | | AOI02 | | AOI03 | | AOI04 | |
|---|---|---|---|---|---|---|---|---|
| Sample ID | AOI01-01-SB-118-119 | | AOI02-01-SB-72-73 | | AOI03-01-SB-91-92 | | AOI04-01-SB-84-85 | |
| Sample Date | 05/14/2021 | | 05/12/2021 | | 05/19/2021 | | 05/21/2021 | |
| Depth | 118-119 ft | | 72-73 ft | | 91-92 ft | | 84-85 ft | |
| **Analyte** | **Result** | **Qual** | **Result** | **Qual** | **Result** | **Qual** | **Result** | **Qual** |
| **Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)** | | | | | | | | |
| PFBS | ND | UJ | ND | UJ | ND | U | ND | U |
| PFHxS | ND | UJ | ND | UJ | ND | U | ND | U |
| PFNA | ND | UJ | ND | UJ | ND | U | ND | U |
| PFOA | ND | UJ | ND | UJ | ND | U | ND | U |
| PFOS | ND | UJ | ND | UJ | ND | U | ND | U |

Interpreted Qualifiers

U = The analyte was not detected at a level greater than or equal to the adjusted DL

UJ = The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

| | |
|---|---|
| PFBS | perfluorobutanesulfonic acid |
| PFHxS | perfluorohexanesulfonic acid |
| PFNA | perfluorononanoic acid |
| PFOA | perfluorooctanoic acid |
| PFOS | perfluorooctanesulfonic acid |

Acronyms and Abbreviations

| | |
|---|---|
| AOI | Area of Interest |
| DL | detection limit |
| ft | feet |
| ID | identification |
| LCMSMS | liquid chromatography with tandem mass spectrometry |
| LOD | limit of detection |
| ND | analyte not detected above the LOD |
| QSM | Quality Systems Manual |
| Qual | interpreted qualifier |
| SB | soil boring |
| µg/kg | micrograms per kilogram |

**Table 6-5**
**PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Groundwater**
**Site Inspection Report, Camp Roberts**

| Area of Interest | | AOI01 | | AOI02 | | AOI03 | | AOI03 | | AOI04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | | AOI01-01-GW | | AOI02-01-GW | | AOI03-01-GW | | AOI03-01-GWD | | AOI04-01-GW | |
| Sample Date | | 05/27/2021 | | 05/27/2021 | | 05/27/2021 | | 05/27/2021 | | 05/27/2021 | |
| Analyte | OSD Screening Level [a] | Result | Qual | Result | Qual | Result | Qual | Result | Qual | Result | Qual |
| Water, LCMSMS compliant with QSM 5.3 Table B-15 (ng/l) | | | | | | | | | | | |
| PFBS | 601 | 1.30 | J | 11.4 | J | 9.70 | J | 8.82 | J | ND | UJ |
| PFHxS | 39 | ND | UJ | 85.6 | J | 79.5 | J | 74.5 | J | ND | UJ |
| PFNA | 6 | ND | UJ | ND | UJ | ND | UJ | ND | UJ | ND | UJ |
| PFOA | 6 | ND | UJ | 3.29 | J | 8.09 | J | 7.54 | J | ND | UJ |
| PFOS | 4 | 1.50 | J | 15.7 | J | 3.50 | J | 3.38 | J | 1.08 | J |

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022 Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

Interpreted Qualifiers

J = Estimated concentration

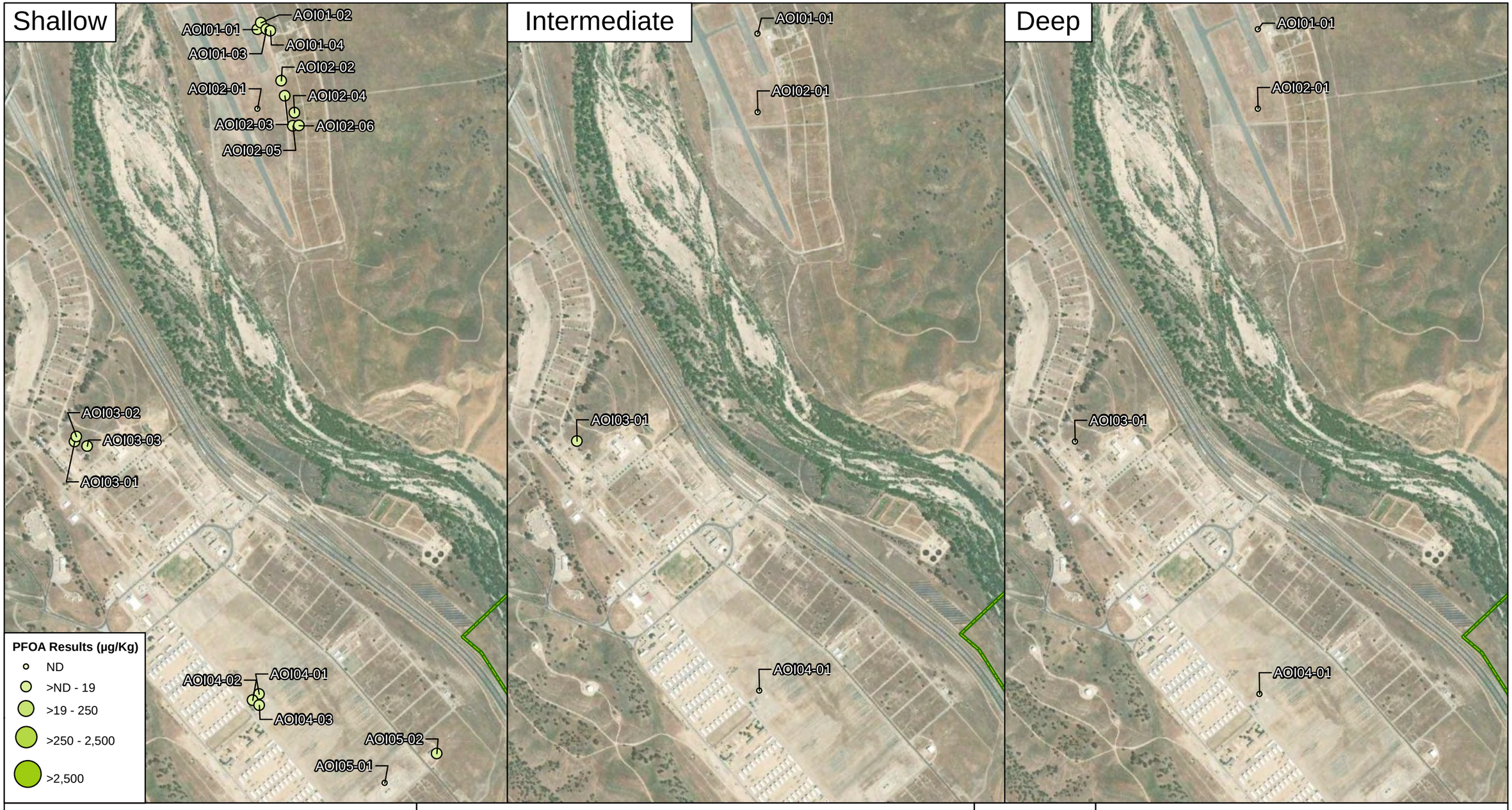
UJ = The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

| | |
|---|---|
| PFBS | perfluorobutanesulfonic acid |
| PFHxS | perfluorohexanesulfonic acid |
| PFNA | perfluorononanoic acid |
| PFOA | perfluorooctanoic acid |
| PFOS | perfluorooctanesulfonic acid |

Acronyms and Abbreviations

| | |
|---|---|
| AOI | Area of Interest |
| D | duplicate |
| DL | detection limit |
| GW | groundwater |
| HQ | hazard quotient |
| ID | identification |
| LCMSMS | liquid chromatography with tandem mass spectrometry |
| LOD | limit of detection |
| ND | analyte not detected above the LOD |
| OSD | Office of the Secretary of Defense |
| QSM | Quality Systems Manual |
| Qual | interpreted qualifier |
| USEPA | United States Environmental Protection Agency |
| ng/l | nanogram per liter |




| | | | | |
|---|---|---|---|---|
| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/11/2022 | GIS BY | MS | 8/11/2022 |
| SCALE | 1:16,800 | CHK BY | SL | 8/11/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/11/2022 |

**Legend**

Facility Boundary

0 700 1,400 2,800 Feet

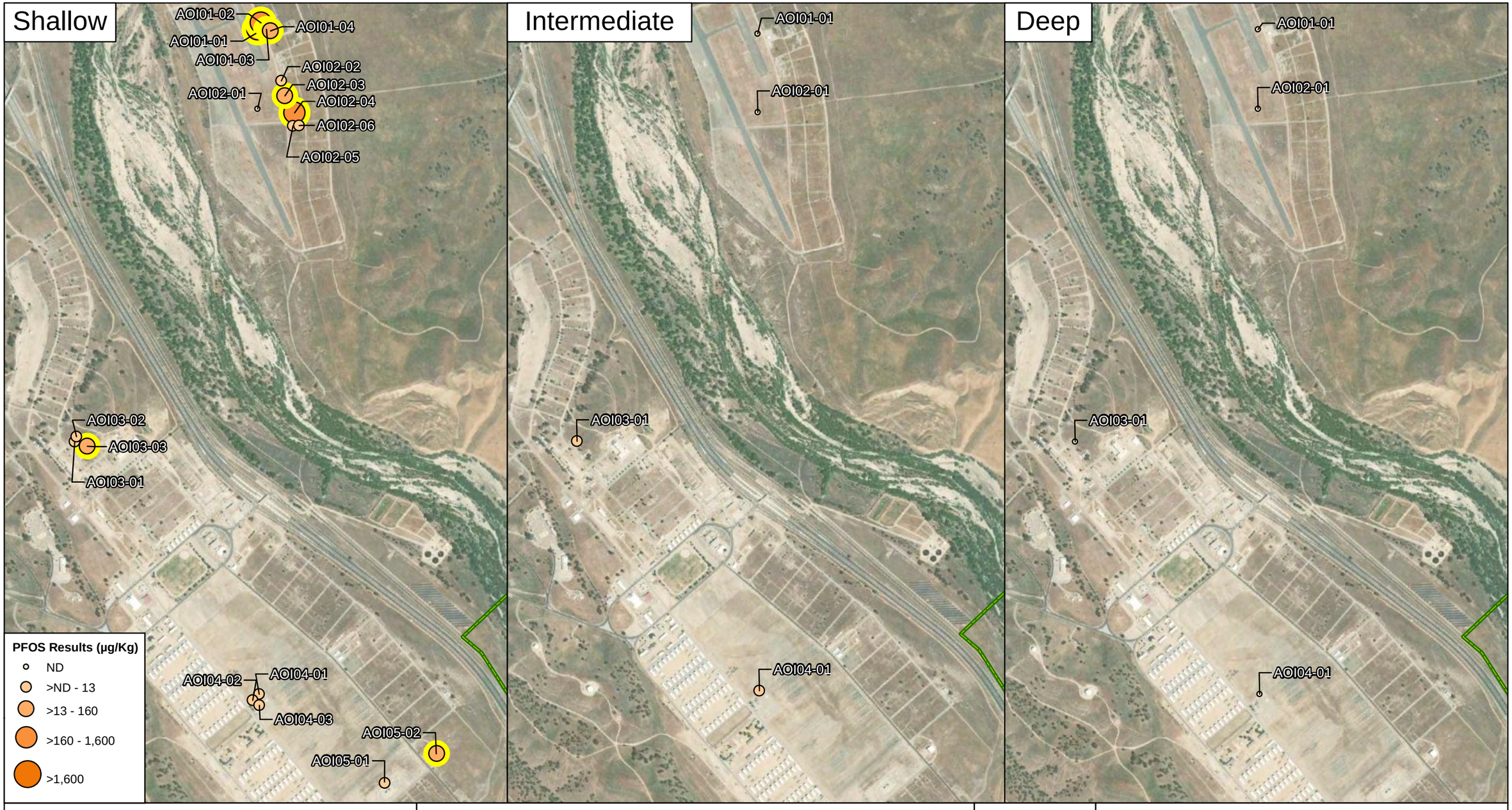
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

## PFOA Detections in Soil - AOI 1 thru AOI 5

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

**Figure 6-1**




| | | | | |
|---|---|---|---|---|
| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/11/2022 | GIS BY | MS | 8/11/2022 |
| SCALE | 1:16,800 | CHK BY | SL | 8/11/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/11/2022 |

**Legend**

Facility Boundary

0 700 1,400 2,800 Feet

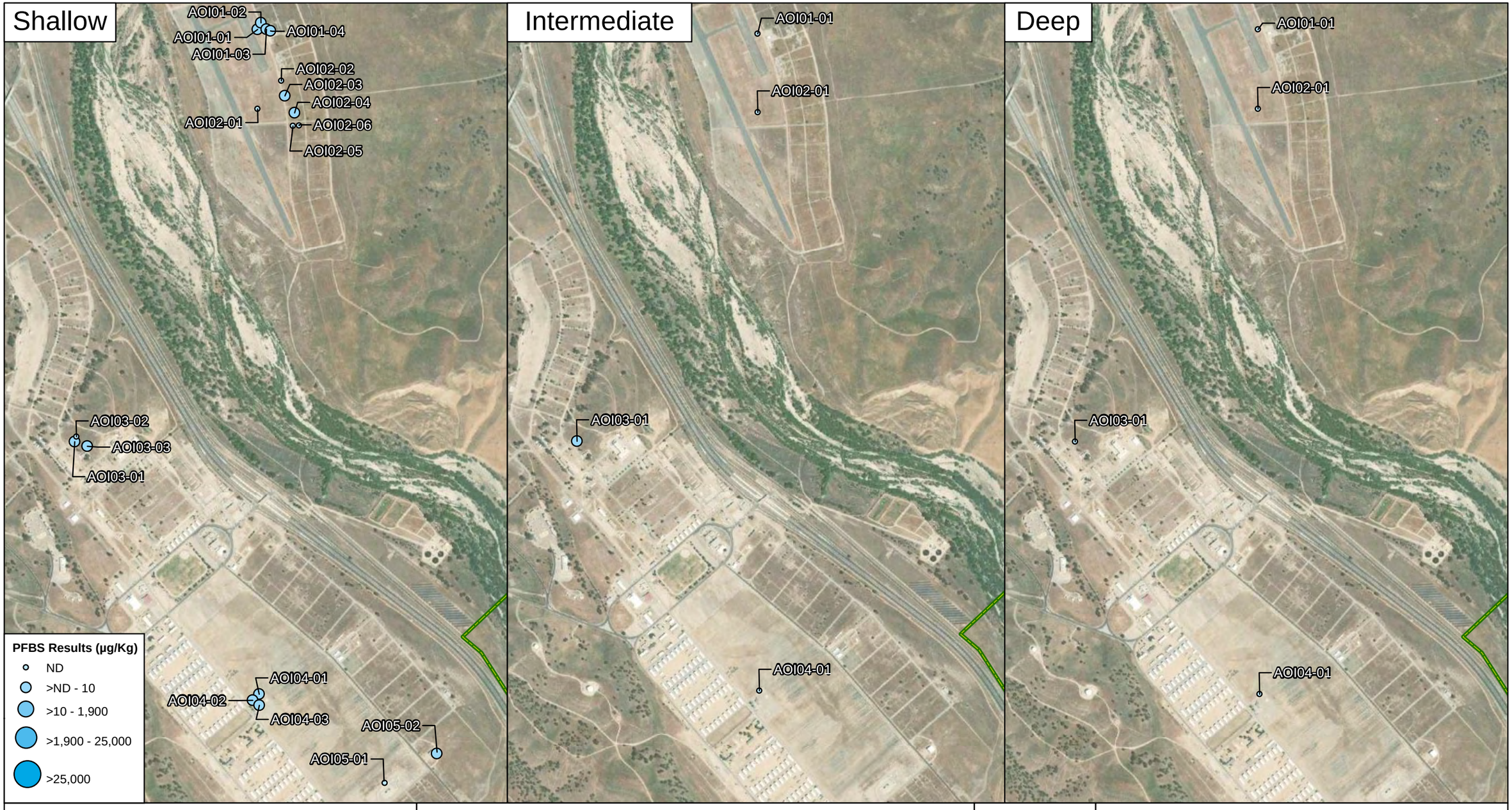
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

# PFOS Detections in Soil - AOI 1 thru AOI 5

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

**Figure 6-2**




| | | | | |
|---|---|---|---|---|
| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/11/2022 | GIS BY | MS | 8/11/2022 |
| SCALE | 1:16,800 | CHK BY | SL | 8/11/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/11/2022 |

**Legend**

Facility Boundary

0 700 1,400 2,800 Feet

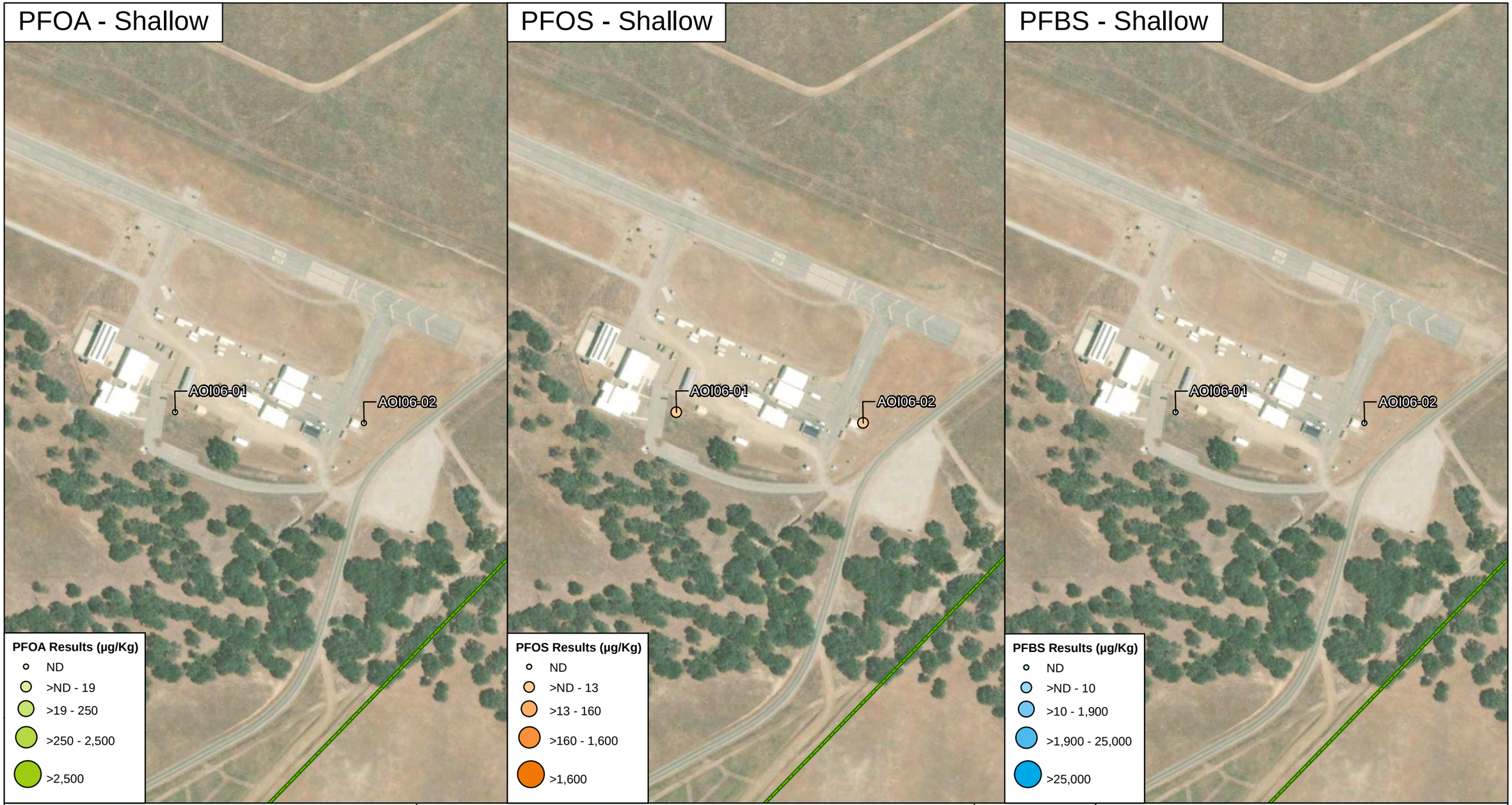
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

# PFBS Detections in Soil - AOI 1 thru AOI 5

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

**Figure 6-3**




| | | | | |
|---|---|---|---|---|
| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/16/2022 | GIS BY | MS | 8/16/2022 |
| SCALE | 1:3,000 | CHK BY | SL | 8/16/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/16/2022 |

**Legend**

Facility Boundary

0 125 250 500 Feet

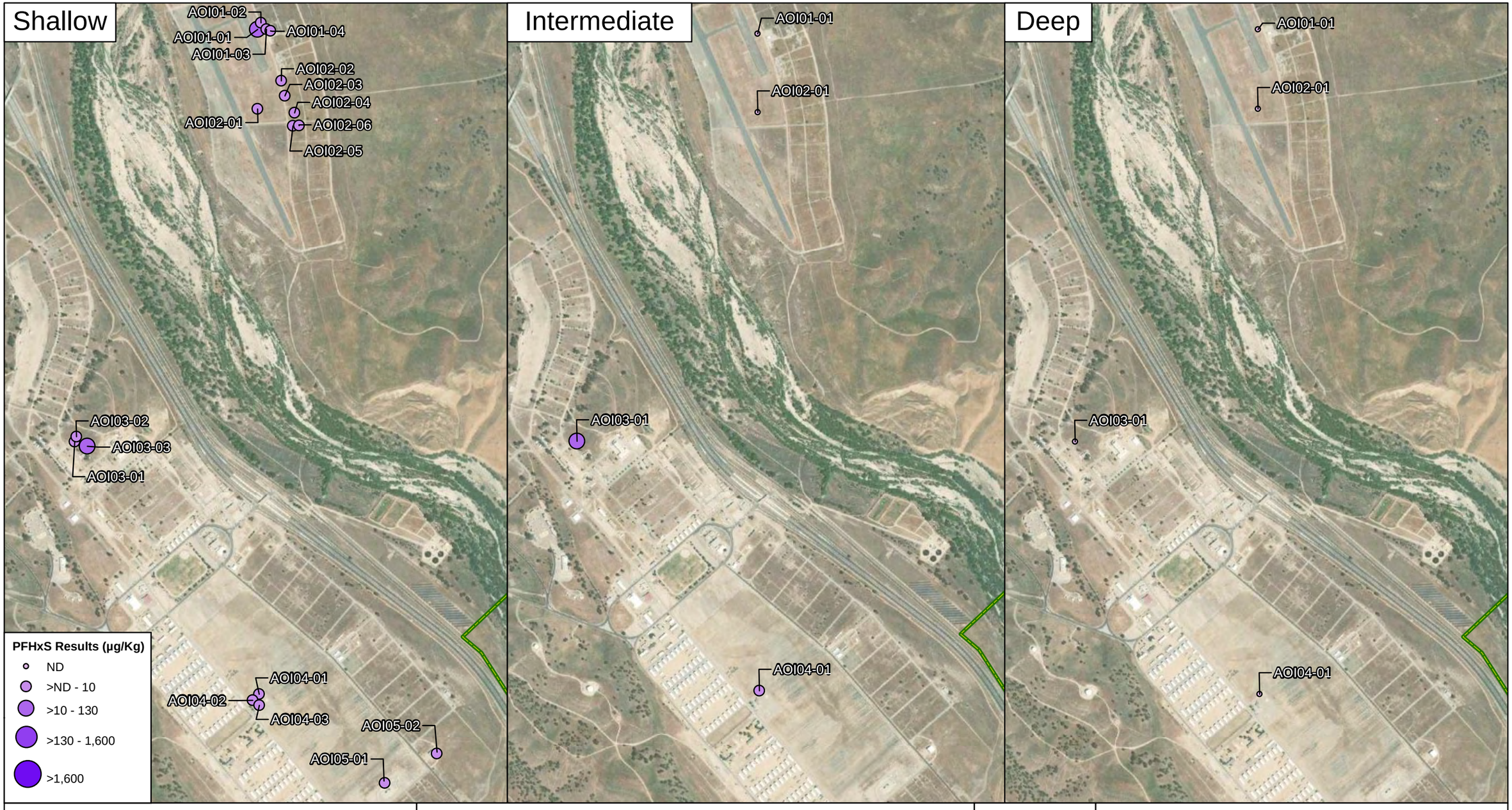
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

**PFOA, PFOS, and PFBS Detection in Soil - AOI 6**

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

**Figure 6-4**




| | | | | |
|---|---|---|---|---|
| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/11/2022 | GIS BY | MS | 8/11/2022 |
| SCALE | 1:16,800 | CHK BY | SL | 8/11/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/11/2022 |

**Legend**

Facility Boundary

0 700 1,400 2,800 Feet

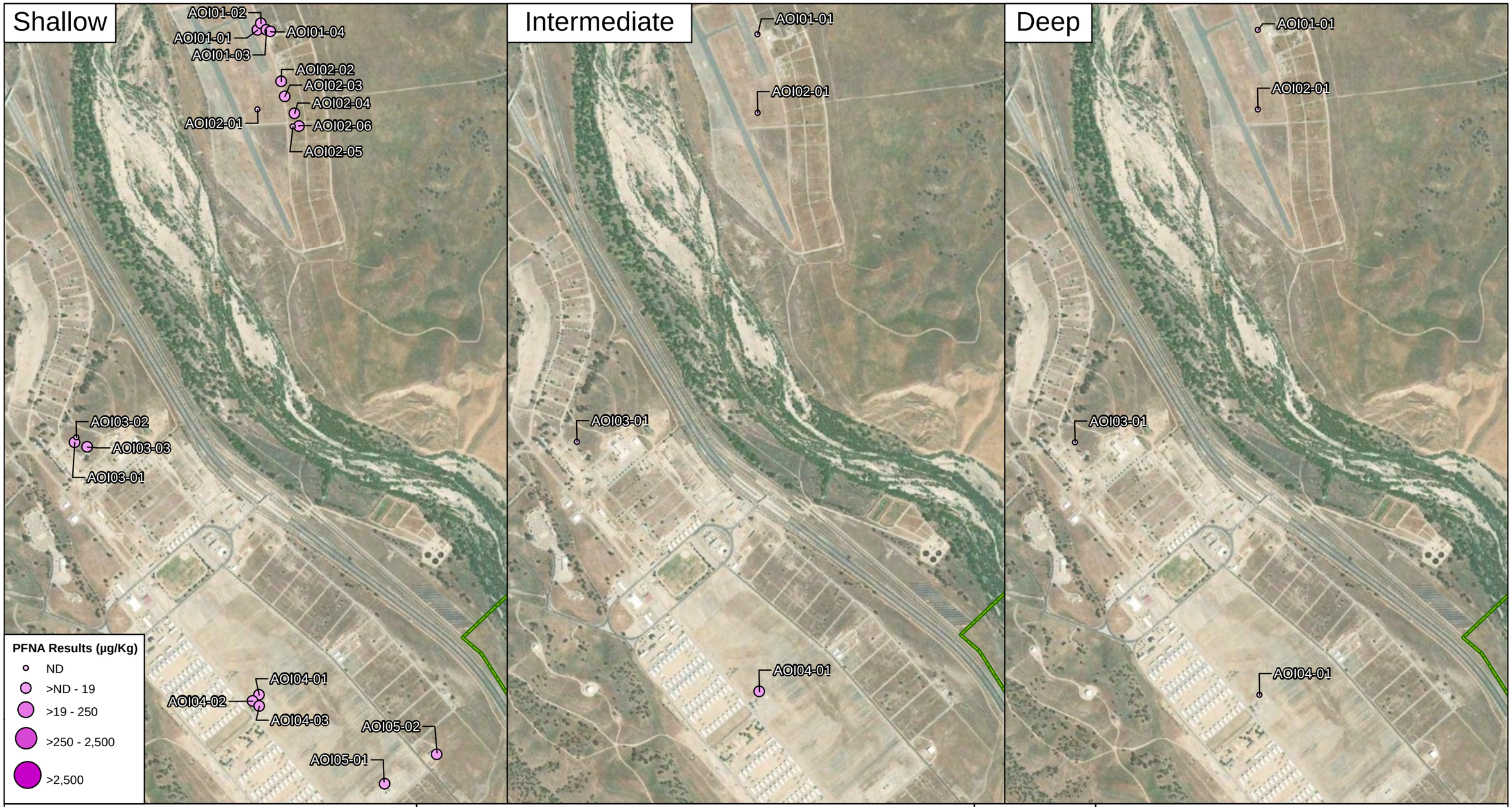
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

**PFHxS Detections in Soil - AOI 1 thru AOI 5**

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

**Figure 6-5**




| | | | | |
|---|---|---|---|---|
| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/11/2022 | GIS BY | MS | 8/11/2022 |
| SCALE | 1:16,800 | CHK BY | SL | 8/11/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/11/2022 |

**Legend**

Facility Boundary

0 700 1,400 2,800 Feet

Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

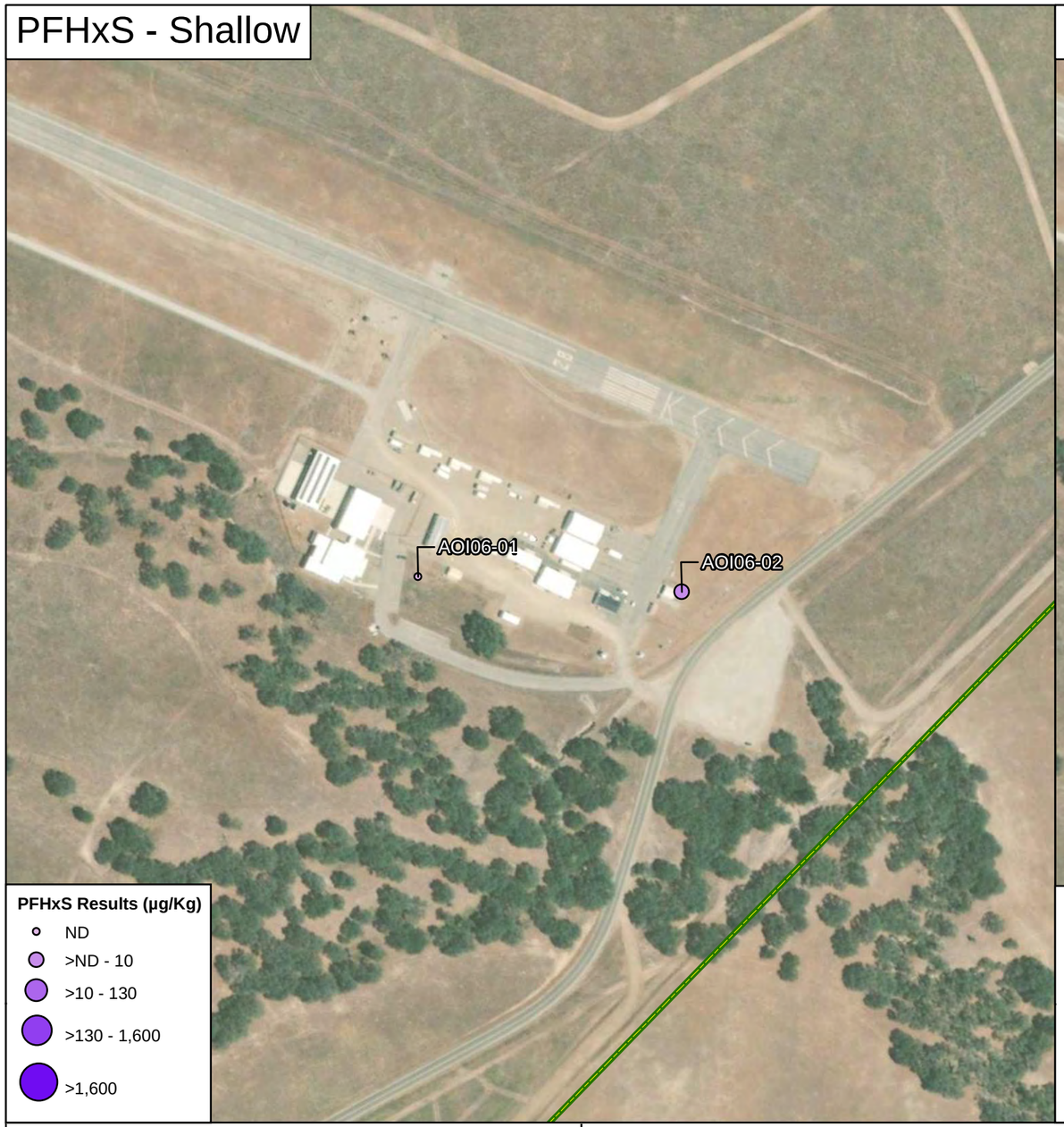
N

## PFNA Detections in Soil - AOI 1 thru AOI 5

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

**Figure 6-6**

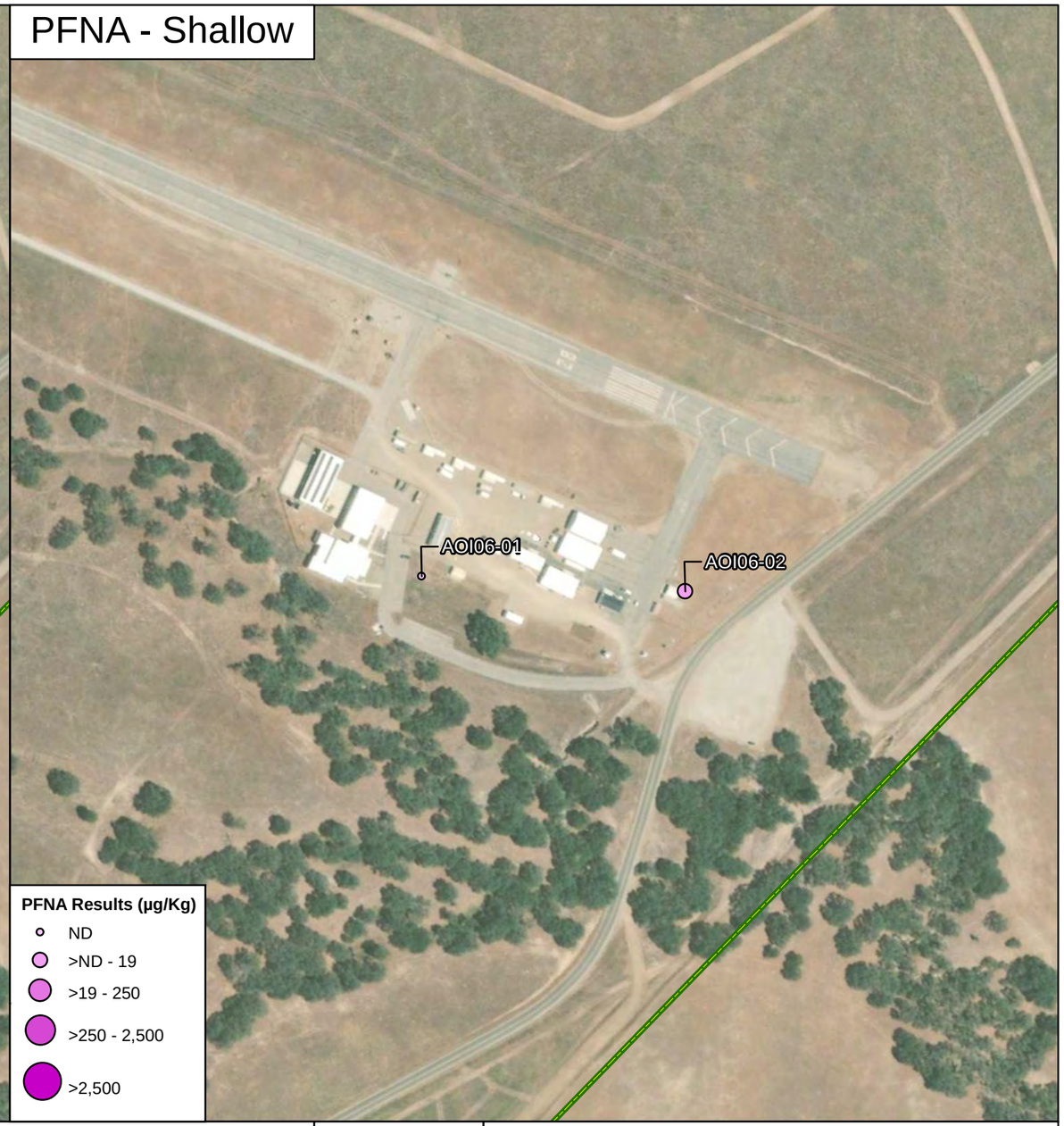
PFHxS - Shallow




**PFHxS Results (µg/Kg)**

- ND
- >ND - 10
- >10 - 130
- >130 - 1,600
- >1,600

PFNA - Shallow




**PFNA Results (µg/Kg)**

- ND
- >ND - 19
- >19 - 250
- >250 - 2,500
- >2,500

| | | | | |
|---|---|---|---|---|
| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/16/2022 | GIS BY | MS | 8/16/2022 |
| SCALE | 1:3,000 | CHK BY | SL | 8/16/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/16/2022 |

**Legend**

Facility Boundary

0 125 250 500 Feet

Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

## PFHxS and PFNA Detection in Soil - AOI 6

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Germantown, MD 20876

**Figure 6-7**

PFOA

PFOS

PFBS

AOI01-01

AOI02-01

AOI03-01

AOI04-01

**PFOA Results (ng/L)**

- ND
- >ND - 6
- >6 - 40
- >40 - 70
- >70

**PFOS Results (ng/L)**

- ND
- >ND - 4
- >4 - 40
- >40 - 70
- >70

**PFBS Results (ng/L)**

- ND
- >ND - 100
- >100 - 601
- >601 - 2,000
- >2,000

| | | | | |
|---|---|---|---|---|
| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 10/5/2022 | GIS BY | MS | 10/5/2022 |
| SCALE | 1:15,369 | CHK BY | SL | 10/5/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 10/5/2022 |

**Legend**

- Surface Water Flow Direction
- Localized Inferred Groundwater Flow Direction

0 650 1,300 2,600 Feet

N

Exceedances of the OSD SL are depicted with a yellow halo.

# PFOA, PFOS, and PFBS Detections in Groundwater

AECOM

12420 Milestone Center Drive
Germantown, MD 20876

**Figure 6-8**

PFHxS

AOI01-01

AOI02-01

AOI03-01

AOI04-01

**PFHxS (ng/L)**

- ND
- >ND - 39
- >39 - 100
- >100 - 1,000
- >1,000

PFNA

AOI01-01

AOI02-01

AOI03-01

AOI04-01

**PFNA Results (ng/L)**

- ND
- >ND - 6
- >6 - 100
- >100 - 1,000
- >1,000

| | | | | |
|---|---|---|---|---|
| CLIENT | ARNG | | | |
| PROJECT | Site Inspection at Camp Roberts, CA | | | |
| REVISED | 8/11/2022 | GIS BY | MS | 8/11/2022 |
| SCALE | 1:15,369 | CHK BY | SL | 8/11/2022 |
| Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | | PM | CM | 8/11/2022 |

**Legend**

- Surface Water Flow Direction
- Localized Inferred Groundwater Flow Direction

0 650 1,300 2,600 Feet

N

Exceedances of the OSD SL are depicted with a yellow halo.

# PFHxS and PFNA Detections in Groundwater

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Germantown, MD 20876

**Figure 6-9**

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# 7. Exposure Pathways

The CSMs for each AOI, revised based on the SI findings, are presented on **Figure 7-1** through **Figure 7-6**. Please note that while the CSM discussion assists in determining if a receptor may be impacted, the decision to move from SI to RI or interim action is determined based upon exceedances of the SLs for the relevant compounds and whether the release is more than likely attributable to the DoD. A CSM presents the current understanding of the site conditions with respect to known and suspected sources, potential transport mechanisms and migration pathways, and potentially exposed human receptors. A human exposure pathway is considered potentially complete when the following conditions are present:

1. Contaminant source;
2. Environmental fate and transport;
3. Exposure point;
4. Exposure route; and
5. Potentially exposed populations.

If any of these elements are missing, the pathway is incomplete. The CSM figures use an empty circle symbol to represent an incomplete exposure pathway. Areas with an incomplete pathway generally warrant no further action. However, the pathway is considered potentially complete if the relevant compounds are detected, in which case the CSM figure uses a half-filled circle symbol to represent a potentially complete exposure pathway. Additionally, a completely filled circle symbol is used to indicate when a potentially complete exposure pathway has detections of relevant compounds above the SLs. Areas with an identified potentially complete pathway that have detections of the relevant compounds above the SLs may warrant further investigation. Although the CSMs indicate whether potentially complete exposure pathways may exist, the recommendation for future study in an RI or no action at this time is based on the comparison of the SI analytical results for the relevant compounds to the SLs.

In general, the potential routes of exposure to the relevant compounds are ingestion and inhalation. Human exposure via the dermal contact pathway may occur, and current risk practice suggests it is an insignificant pathway compared to ingestion; however, exposure data for dermal pathways are sparse and continue to be the subject of toxicological study. The receptors evaluated are consistent with those listed in USEPA guidance for risk screening (USEPA, 2001). Receptors at the facility include site workers (e.g., facility staff and visiting soldiers), construction workers, trespassers, residents outside the facility boundary, and recreational users outside of the facility boundary.

## 7.1 Soil Exposure Pathway

The SI results in soil were used to determine whether a potentially complete pathway exists between the source and potential receptors at AOI 1, AOI 2, AOI 3, AOI 4, AOI 5, and AOI 6 based on the aforementioned criteria.

### 7.1.1 AOI 1

AFFF may have been released at AOI 1 during fire training activities at the East Garrison Old Fire Station or via incidental spills related to the Army Airfield AFFF Storage.

PFOS was detected in surface soil at concentrations above the SL at AOI 1. PFOA, PFHxS, PFNA, and PFBS were detected at concentrations below their respective SLs in surface soil at

AOI 1. Site workers and construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers and future construction workers are potentially complete. PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in subsurface soil at AOI 1. Therefore, the subsurface soil exposure pathways are incomplete. The CSM for AOI 1 is presented on **Figure 7-1**.

### 7.1.2 AOI 2

As early as 1976, AFFF may have been released at AOI 2 during fire training activities at the East Garrison Old FTA. PFOS was detected in surface soil at concentrations above the SL at AOI 2. PFOA, PFHxS, PFNA, and PFBS were detected at concentrations below their respective SLs in surface soil at AOI 2. Site workers and construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers and future construction workers are potentially complete. PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in subsurface soil at AOI 2. Therefore, the subsurface soil exposure pathways are incomplete. The CSM for AOI 2 is presented on **Figure 7-2**.

### 7.1.3 AOI 3

As early as 1971, AFFF may have been released at AOI 3 during fire training activities at the Main Garrison FTA 2 and in the vicinity of CR FD Fire Station Building 7020. PFOS was detected in surface soil at concentrations above the SL at AOI 3. PFOA, PFHxS, PFNA, and PFBS were detected at concentrations below their respective SLs in surface soil at AOI 3. Site workers and construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers and future construction workers are potentially complete. PFOA, PFOS, PFHxS, and PFBS were detected in subsurface soil at AOI 3 at concentrations below their respective SLs. Future construction workers could contact constituents in subsurface soil via incidental ingestion, and therefore, the subsurface soil exposure pathway is potentially complete. Therefore, the subsurface soil exposure pathways are incomplete. The CSM for AOI 3 is presented on **Figure 7-3**.

### 7.1.4 AOI 4

AFFF may have been released at AOI 4 via incidental spills due to AFFF storage at the Current CR FD Fire Station and Shipping Container. PFOA, PFOS, PFHxS, PFNA, and PFBS were detected at concentrations below their respective SLs in surface soil at AOI 4. Site workers and construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers and construction workers are potentially complete. PFOS, PFHxS, and PFNA were detected in subsurface soil at AOI 4 at concentrations below their respective SLs. Future construction workers could contact constituents in subsurface soil via incidental ingestion, and therefore, the subsurface soil exposure pathway is potentially complete. Therefore, the subsurface soil exposure pathways are incomplete. The CSM for AOI 4 is presented on **Figure 7-4**.

### 7.1.5 AOI 5

AFFF may have been released at AOI 5 via incidental spills due to AFFF storage at the CR FD Building 3000 Warehouse and Main Garrison Fueling Point. PFOS was detected in surface soil at concentrations above the SL at AOI 5. PFOA, PFHxS, PFNA, and PFBS were detected at concentrations below their respective SLs in surface soil at AOI 5. Site workers and construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers and construction workers are

potentially complete. Subsurface soil was not sampled at AOI 5, therefore; this exposure pathway was not evaluated. The CSM for AOI 5 is presented on **Figure 7-5**.

### 7.1.6 AOI 6

AFFF may have been released at AOI 6 via incidental spills due to AFFF storage at the TUAS Hangar Building 17002 Warehouse and NPS Airfield Shed. PFOS, PFHxS, and PFNA were detected in surface soil at concentrations below their respective SLs at AOI 6. Site workers and construction workers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers and construction workers are potentially complete. Subsurface soil was not sampled at AOI 5, therefore; this exposure pathway was not evaluated. The CSM for AOI 6 is presented on **Figure 7-6**.

## 7.2 Groundwater Exposure Pathway

The SI results in groundwater were used to determine whether a potentially complete pathway exists between the source and potential receptors based on the aforementioned criteria.

### 7.2.1 AOI 1

PFOS and PFBS were detected below their respective SLs in groundwater samples collected at AOI 1. The ingestion exposure pathway for future construction workers is considered incomplete, because groundwater is deeper than 15 feet bgs and construction worker contact is unlikely.

Drinking water is supplied by potable wells in the Main Garrison, and two active potable water wells are located downgradient of the East Garrison. Based on an assumed northwestern groundwater flow direction, the AOIs are upgradient of potable wells. Because the facility drinking water supply wells may be impacted by potential releases at the AOIs, the exposure pathway for groundwater to onsite receptors is potentially complete. However, in March 2017, groundwater from the majority of Camp Roberts' well network was analyzed for a subset of 18 PFAS compounds. PFOA, PFOS, PFHxS, PFNA and PFBS were not detected in any sample (AECOM, 2019). No off-facility potable wells are located within a four-mile radius of Camp Roberts (**Figure 2-3**). The CSM for AOI 1 is presented on **Figure 7-1**.

### 7.2.2 AOI 2

PFOS and PFHxS were detected above their respective SLs in groundwater samples collected at AOI 2. PFOA and PFBS were detected in groundwater at concentrations below their respective SLs. The ingestion exposure pathway for future construction workers is considered incomplete, because groundwater is deeper than 15 feet bgs and construction worker contact is unlikely.

Because the facility drinking water supply wells may be impacted by potential releases at the AOIs, the exposure pathway for groundwater to onsite receptors is potentially complete. However, as discussed in **Section 7.2.1**, PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in the Camp Roberts potable well network during a March 2017 PFAS sampling event. The CSM for AOI 2 is presented on **Figure 7-2**.

### 7.2.3 AOI 3

PFOA and PFHxS were detected above their respective SLs in groundwater samples collected at AOI 2. PFOS and PFBS were detected in groundwater at concentrations below their respective SLs. The ingestion exposure pathway for future construction workers is considered incomplete, because groundwater is deeper than 15 feet bgs and construction worker contact is unlikely.

The nearest drinking water wells are to the west of AOI 3, and because groundwater is assumed to flow to the northwest, the supply wells are potentially downgradient of AOI 3. Because the drinking water supply wells may be impacted by potential releases at the AOIs, the exposure pathway for groundwater to onsite receptors is potentially complete. However, as discussed in **Section 7.2.1**, PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in the Camp Roberts potable well network during a March 2017 PFAS sampling event. The CSM for AOI 3 is presented on **Figure 7-3**.

### 7.2.4 AOI 4

PFOS was detected below the respective SL in the groundwater sample collected at AOI 4. The ingestion exposure pathway for future construction workers is considered incomplete, because groundwater is deeper than 15 feet bgs and construction worker contact is unlikely.

Based on the assumed northwestern groundwater flow direction, AOI 4 is potentially upgradient of potable wells. Because the drinking water supply wells may be impacted by potential releases at the AOIs, the exposure pathway for groundwater to onsite receptors is potentially complete. However, as discussed in **Section 7.2.1**, PFOA, PFOS, PFHxS, PFNA and PFBS were not detected in the Camp Roberts potable well network during a March 2017 PFAS sampling event. The CSM for AOI 4 is presented on **Figure 7-4**.

## 7.3 Surface Water and Sediment Exposure Pathway

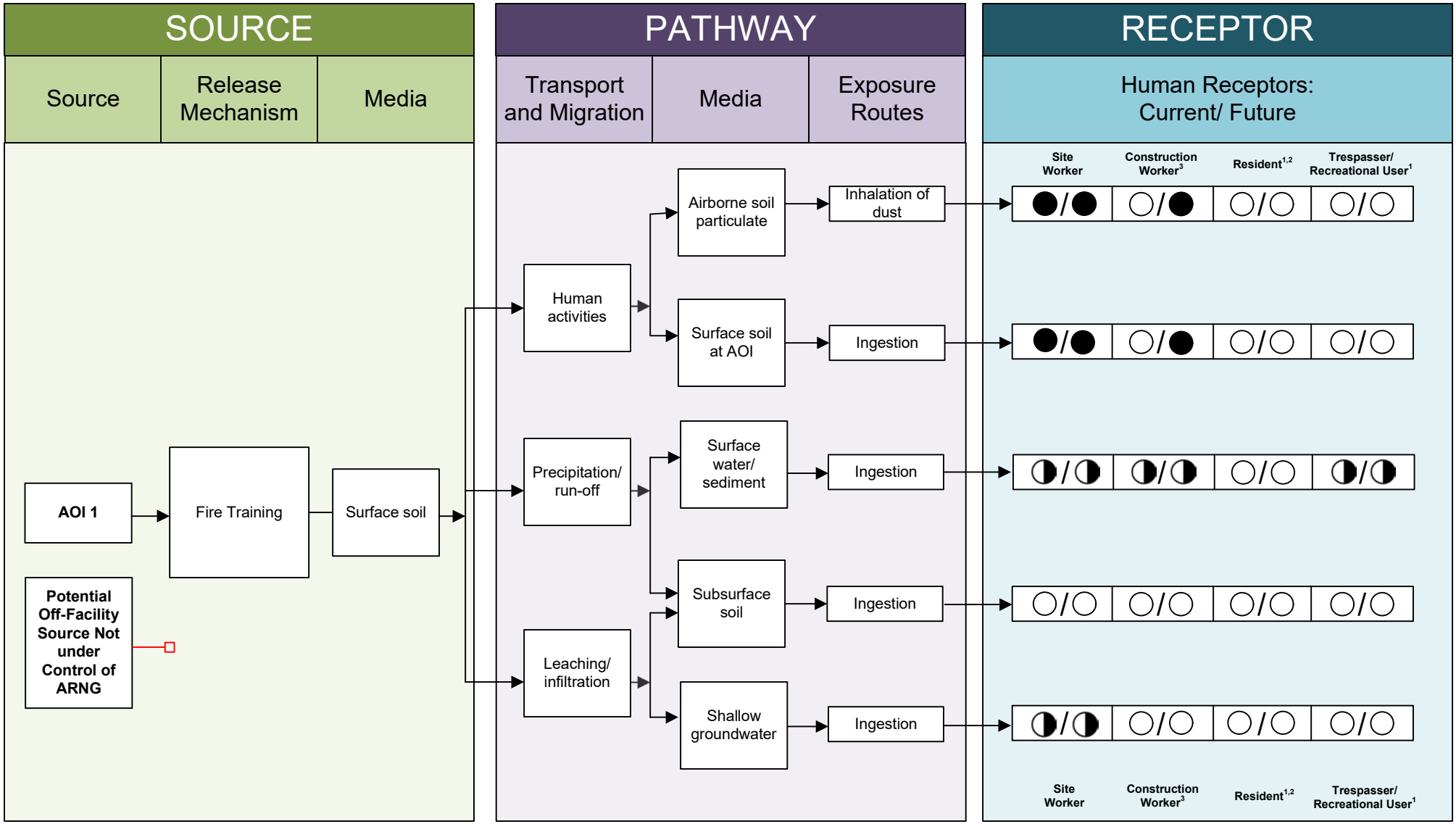
The SI results in soil and groundwater, in combination with knowledge of the fate and transport properties of PFAS, were used to determine whether a potentially complete pathway exists between the source and potential receptors.

### 7.3.1 AOI 1 - AOI 4

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. Because PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in soil and groundwater at AOI 1 through AOI 4, it is possible that those compounds may have migrated from soil and groundwater to the Salinas River via groundwater discharge or surface water flow. Therefore, the surface water and sediment ingestion exposure pathway is considered potentially complete for site workers and construction workers. All surface water draining from Camp Roberts flows to the Salinas River or one of its tributaries, which include the San Antonio and Nacimiento Rivers and San Marcos Creek. Waters in the Salinas River flow through Monterey County to the Monterey Bay National Marine Sanctuary in the Pacific Ocean. Due to potential recreational use of the Salinas River, the surface water and sediment ingestion exposure pathway for off-facility recreational users is considered potentially complete. The CSMs for AOI 1 through AOI 4 are presented on **Figure 7-1** through **Figure 7-4**, respectively.

### 7.3.2 AOI 5 & AOI 6

Because PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in soil at AOI 5 and AOI 6, it is possible that those compounds may have migrated from soil to the Salinas River via surface water flow. Therefore, the surface water and sediment ingestion exposure pathway is considered potentially complete for site workers and construction workers. All surface water draining from Camp Roberts flows to the Salinas River or one of its tributaries, which include the San Antonio and Nacimiento Rivers and San Marcos Creek. Waters in the Salinas River flow through Monterey County to the Monterey Bay National Marine Sanctuary in the Pacific Ocean. Due to potential recreational use of the Salinas River, the surface water and sediment ingestion exposure pathway for off-facility recreational users is considered potentially complete.



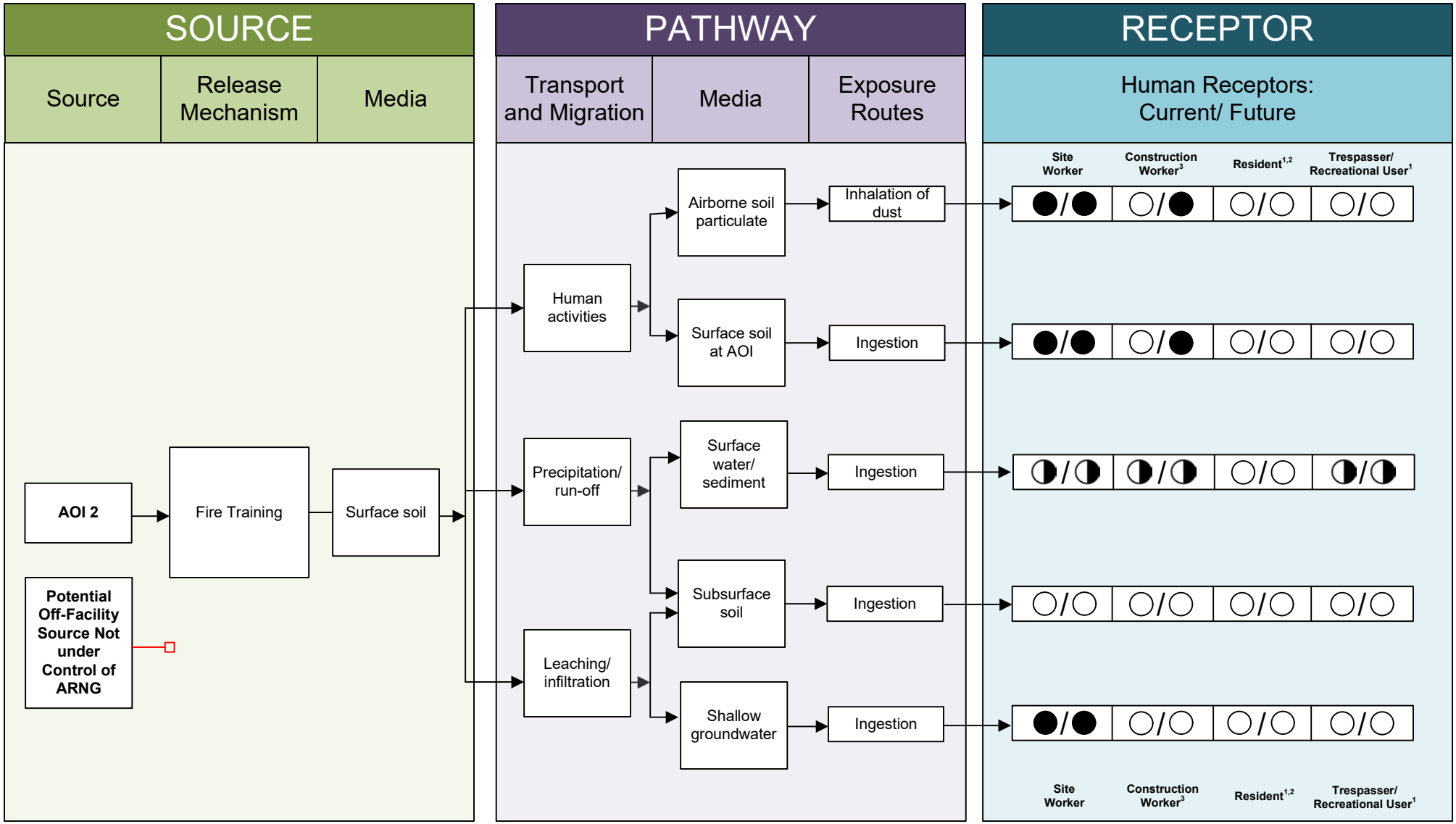

**LEGEND**

- Flow-Chart Stops
- Flow-Chart Continues
- Partial/ Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

**Notes:**

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. No current active construction at the facility.

**Figure 7-1**
Conceptual Site Model, AOI 1
Camp Roberts



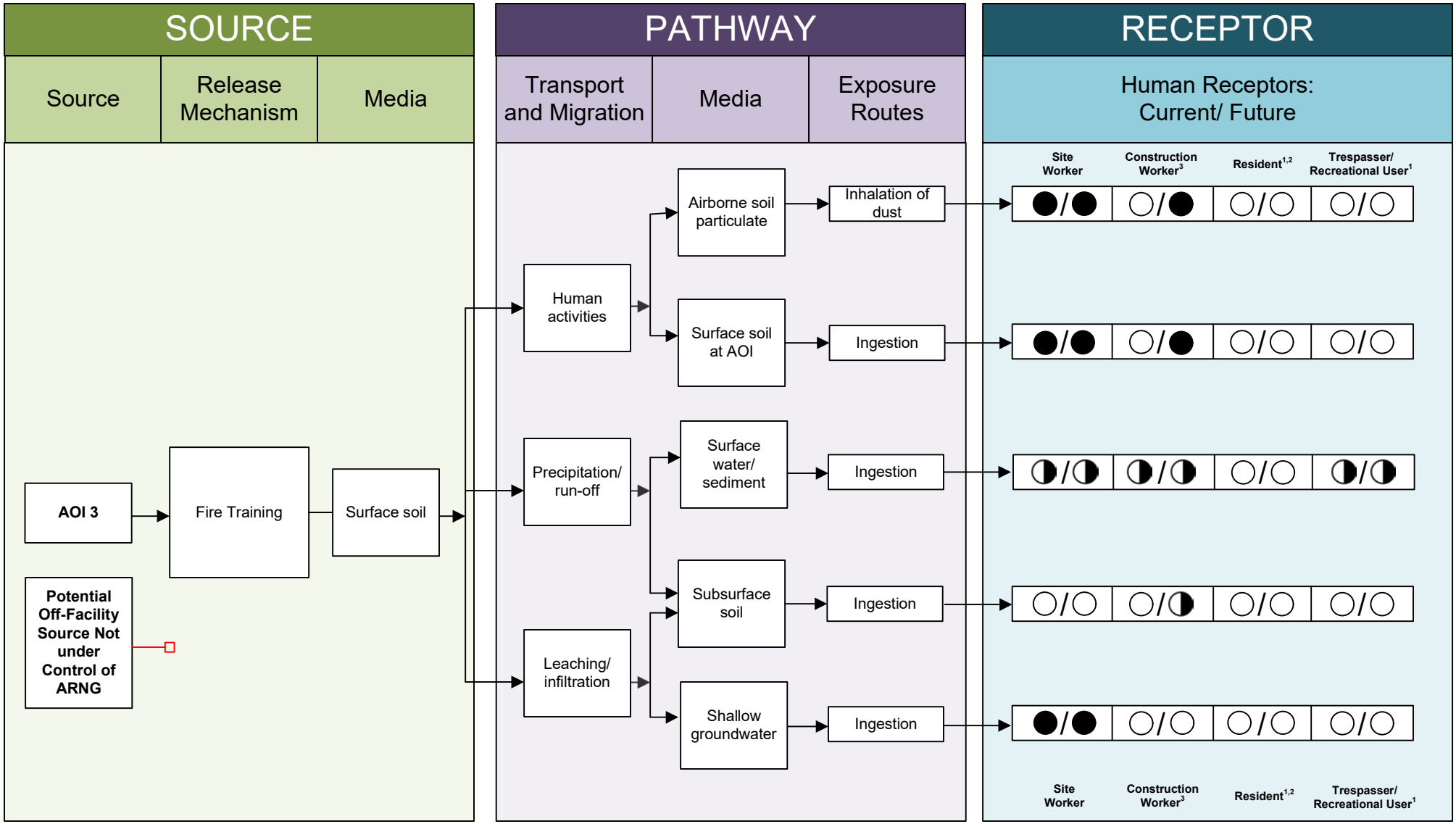

**LEGEND**

- Flow-Chart Stops
- Flow-Chart Continues
- Partial/ Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

**Notes:**

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. No current active construction at the facility.

**Figure 7-2**
Conceptual Site Model, AOI 2
Camp Roberts



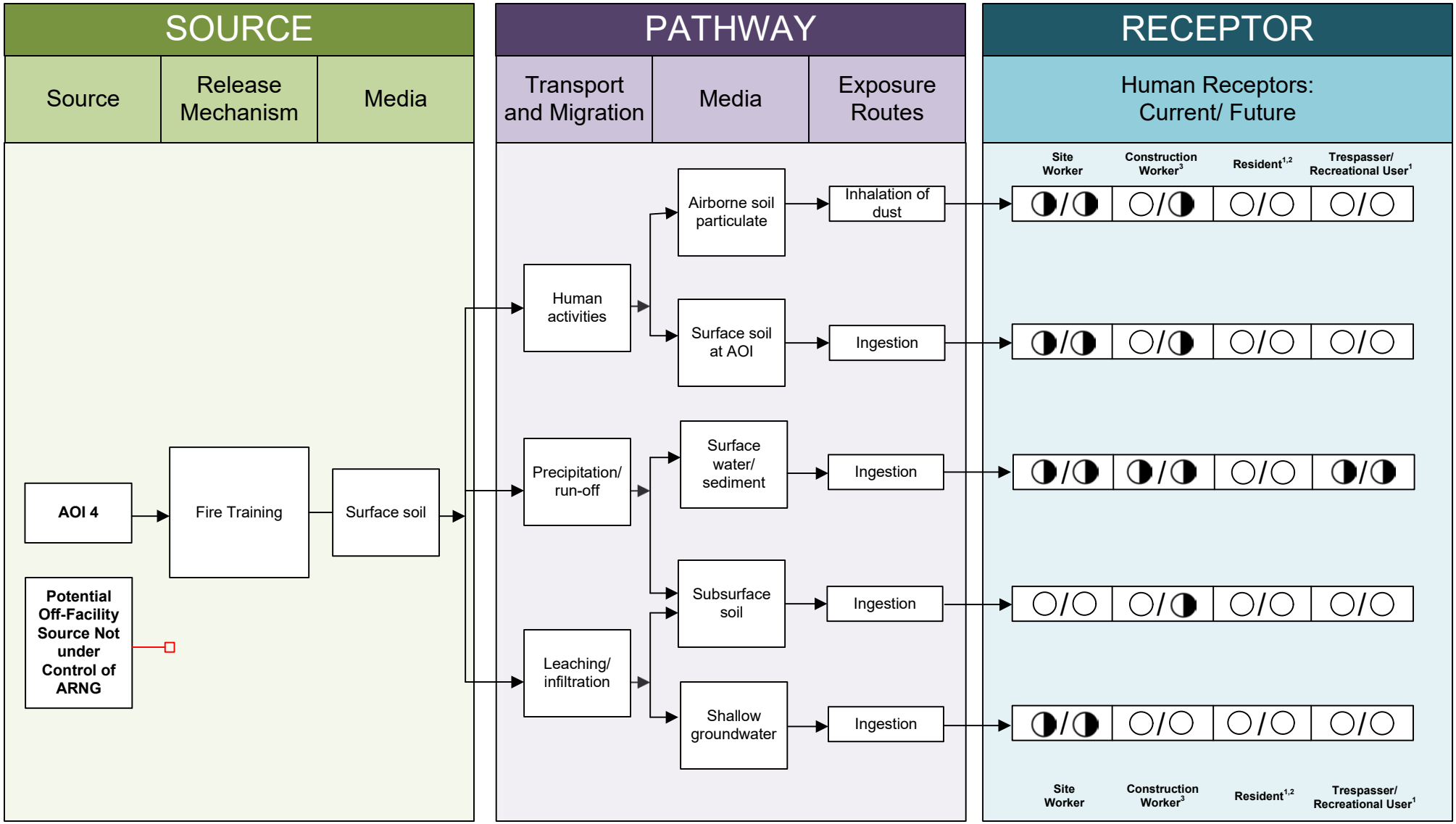

**LEGEND**

- Flow-Chart Stops
- Flow-Chart Continues
- Partial/ Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

**Notes:**

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. No current active construction at the facility.

**Figure 7-3**
Conceptual Site Model, AOI 3
Camp Roberts



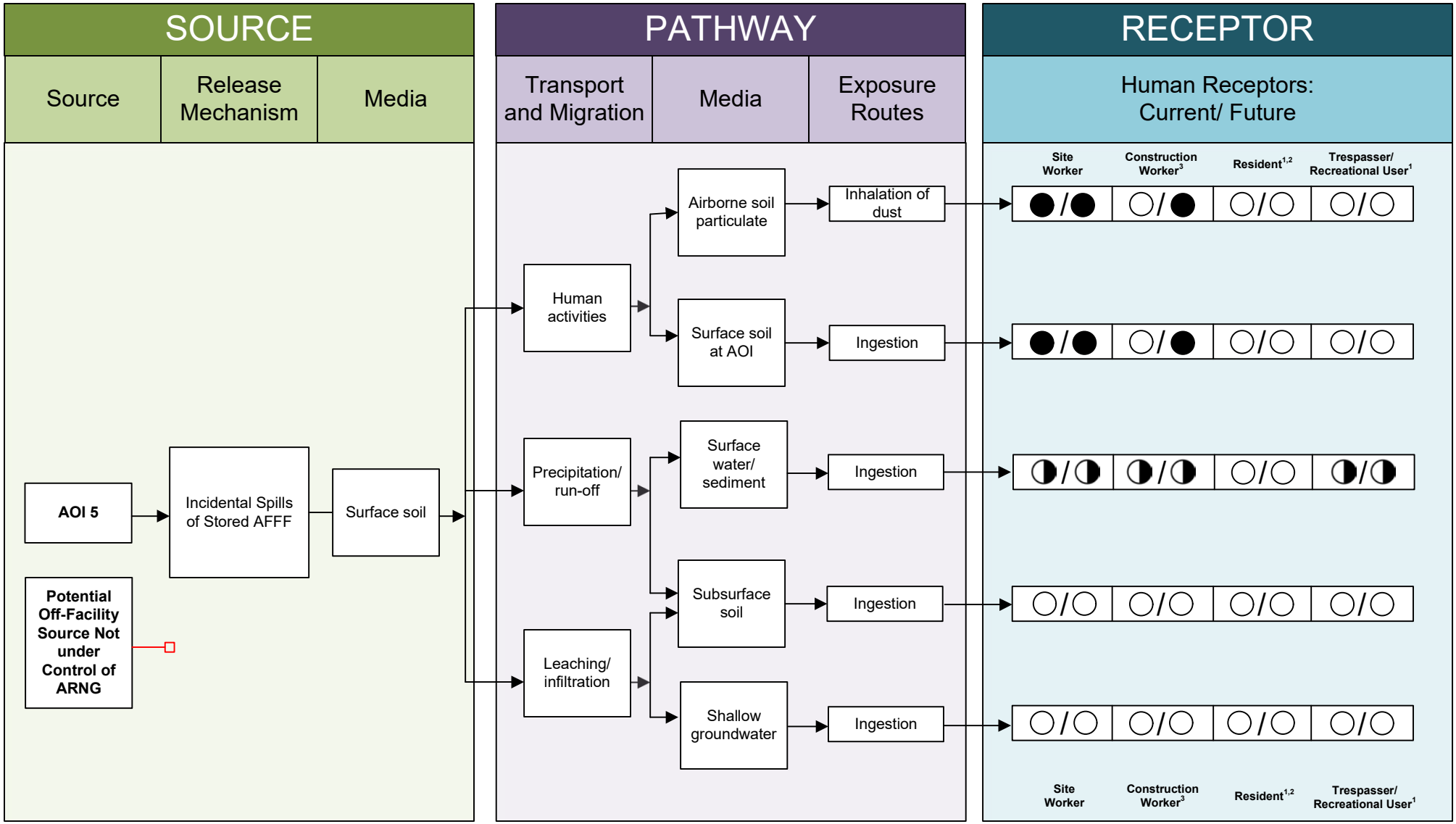

**LEGEND**

- Flow-Chart Stops
- Flow-Chart Continues
- Partial/ Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

**Notes:**

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. No current active construction at the facility.

**Figure 7-4**
Conceptual Site Model, AOI 4
Camp Roberts




**LEGEND**

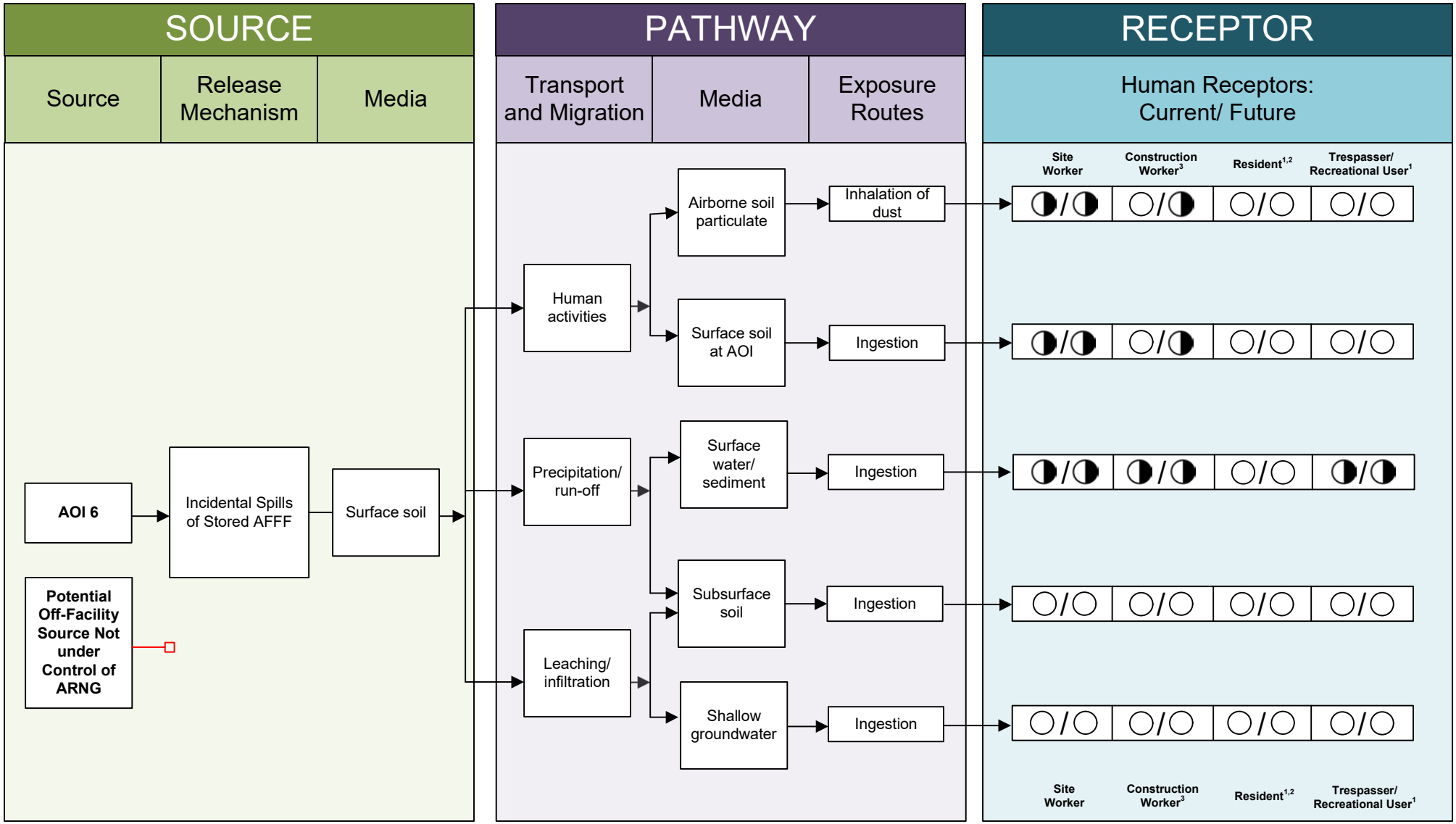
- Flow-Chart Stops
- Flow-Chart Continues
- Partial/ Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

**Notes:**

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. No current active construction at the facility.

**Figure 7-5**
Conceptual Site Model, AOI 5
Camp Roberts

AECOM




**LEGEND**

- Flow-Chart Stops
- Flow-Chart Continues
- Partial/ Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

**Notes:**

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. No current active construction at the facility.

**Figure 7-6**
Conceptual Site Model, AOI 6
Camp Roberts

# 8. Summary and Outcome

This section summarizes SI activities and findings. The most significant findings are summarized in this section and are reproduced directly or abstracted from information contained in this report. The outcome provides general and comparative interpretations of the findings relative to the SLs.

## 8.1 SI Activities

The SI field activities were conducted from 10 to 27 May 2021 and consisted of utility clearance, hollow stem auger drilling, soil sample collection, permanent monitoring well installation, groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2021b), except as previously noted in **Section 5.8**.

To fulfill the project DQOs set forth in the approved SI QAPP Addendum (AECOM, 2021b), samples were collected and analyzed for a subset of 18 compounds by LC/MS/MS compliant with QSM 5.3 Table B-15 as follows.

- Twenty-eight (28) soil samples from 20 surface soil and deeper boring locations;
- Four grab groundwater samples from four permanent well locations;
- Seventeen (17) QA/QC samples.

An SI is conducted when the PA determines an AOI exists based on probable use, storage, and/or disposal of PFAS-containing materials. The SI includes multi-media sampling at AOIs to determine whether or not a release has occurred. The SI may conclude further investigation is warranted, a removal action is required to address immediate threats, or no further action is required. Additionally, the CSMs were refined to assess whether a potentially complete pathway exists between the source and potential receptors for potential exposure at the AOIs, which are described in **Section 7**.

## 8.2 Outcome

Based on the results of this SI, further evaluation under CERCLA is warranted in an RI for AOI 1, AOI 2, AOI 3, and AOI 5; no further evaluation is warranted for AOI 4 and AOI 6 at this time (see **Table 8-1**). Based on the CSMs developed and revised in light of the SI findings, there is potential for exposure to drinking water receptors from AOI 2 and AOI 3 from sources on the facility resulting from historical DoD activities. Sample analytical concentrations collected during the SI were compared against the project SLs in soil and groundwater, as described in **Table 6-1**. A summary of the results of the SI data relative to the SLs is as follows:

- At AOI 1:
    - PFOS in soil exceeded the SL of 13 µg/kg, with a maximum concentration of 443 J µg/kg at location AOI01-01.
    - The detected concentrations of PFOS and PFBS in groundwater at AOI 1 were below their respective SLs. PFOA, PFHxS, and PFNA were not detected in groundwater at AOI 1.
    - Based on the exceedances of the SL in soil, further evaluation of AOI 1 is warranted in the RI.

- At AOI 2:
    - PFOS in soil exceeded the SL of 13 µg/kg, with a maximum concentration of 584 J µg/kg at location AOI02-04.
    - PFOS and PFHxS in groundwater exceeded their respective SLs. PFOS exceeded the SL of 4 ng/L, with a concentration of 15.7 J ng/L at location AOI02-02. PFHxS exceeded the SL of 39 ng/L, with a concentration of 85.6 J ng/L at location AOI02-02.
    - Based on the exceedances of the SLs in soil and groundwater, further evaluation of AOI 2 is warranted in the RI.
- At AOI 3:
    - PFOS in soil exceeded the SL of 13 µg/kg, with a maximum concentration of 44.7 J µg/kg at location AOI03-03.
    - PFOA and PFHxS in groundwater exceeded their respective SLs. PFOA exceed the SL of 6 ng/L, with a maximum concentration of 8.09 J ng/L at location AOI03-01. PFHxS exceed the SL of 39 ng/L, with a maximum concentration of 79.5 J ng/L at location AOI03-01.
    - Based on the exceedances of the SLs in soil and groundwater, further evaluation of AOI 3 is warranted in the RI.
- At AOI 4:
    - The detected concentrations of PFOA, PFOS, PFHxS, PFNA, and PFBS in soil at AOI 4 were below their respective SLs.
    - The detected concentration of PFOS in groundwater at AOI 4 was below the SL.
    - Based on the results of the SI, no further evaluation of AOI 4 is warranted.
- At AOI 5:
    - PFOS in soil exceeded the SL of 13 µg/kg, with a maximum concentration of 49.3 µg/kg at location AOI05-02. Based on the results of the SI, further evaluation of AOI 5 is warranted in the RI.
- At AOI 6:
    - The detected concentrations of PFOS, PFHxS, and PFNA in soil at AOI 6 were below their respective SLs. PFOA and PFBS were not detected in soil. Based on the results of the SI, no further evaluation of AOI 6 is warranted.

Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the CSM developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of MIL-SPEC AFFF and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

**Table 8-1** summarizes the SI results for soil and groundwater used to determine if an AOI should be considered for further investigation under CERCLA and undergo an RI.

## Table 8-1: Summary of Site Inspection Findings and Recommendations

| AOI | Potential Release Area | Soil – Source Area | Groundwater – Source Area | Future Action |
|---|---|---|---|---|
| 1 | East Garrison Old Fire Station | ● | ◐ | Proceed to RI |
| | Army Airfield AFFF Storage | ● | N/A | Proceed to RI |
| 2 | East Garrison Old FTA | ● | ● | Proceed to RI |
| 3 | Main Garrison FTA 2 | ◐ | ● | Proceed to RI |
| | Building 7020 | ● | N/A | Proceed to RI |
| 4 | CR FD Fire Station and Shipping Container | ◐ | ◐ | No further action |
| 5 | CR FD Building 3000 | ◐ | N/A | No further action |
| | Main Garrison Fuel Station | ● | N/A | Proceed to RI |
| 6 | TUAS Hangar Building 17002 | ◐ | N/A | No further action |
| | NPS Airfield Shed AFFF Storage | ◐ | N/A | No further action |

**Legend:**
N/A = not applicable
● = detected; exceedance of the screening levels
◐ = detected; no exceedance of the screening levels
○ = not detected

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# 9. References

AECOM. 2018a. *Final Site Inspection Programmatic Uniform Federal Policy-Quality Assurance Project Plan, Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites ARNG Installations, Nationwide Contract No. W912DR-12-D-0014/ W912DR17F0192*. 9 March.

AECOM. 2018b. *Final Programmatic Accident Prevention Plan, Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) Impacted Sites ARNG Installations, Nationwide Contract No. W912DR-12-D-0014/W912DR17F0192.* July.

AECOM. 2019. *Final Preliminary Assessment Report, Camp Roberts, California*. November.

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