FINAL
Site Inspection Report
Raymond F. Rees Training Center
Hermiston, Oregon

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

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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
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CGA	Critical Groundwater Area
CoC	chain of custody
CSM	conceptual site model
DA	Department of the Army
DoD	Department of Defense
DO	dissolved oxygen
DQO	data quality objective
DUA	data usability assessment
ELAP	Environmental Laboratory Accreditation Program
EM	Engineer Manual
ERB	equipment rinsate blank
FedEx	Federal Express
FRB	field reagent blank
FTA	Fire Training Area
GPRS	Ground Penetrating Radar Systems
HDPE	high-density polyethylene
HFPO-DA	hexafluoropropylene oxide dimer acid
IDW	investigation-derived waste
ITRC	Interstate Technology Regulatory Council
LC/MS/MS	liquid chromatography with tandem mass spectrometry
LOQ	limit of quantitation
MIL-SPEC	military specification
MS/MSD	matrix spike/ matrix spike duplicate
NAVD88	North American Vertical Datum 1988
ND	non-detect
NELAP	National Environmental Laboratory Accreditation Program
ng/L	nanograms per liter
NOWA	Northeast Oregon Water Association
NPDES	National Pollutant Discharge Elimination System
OMD	Oregon Military Department
ONG	Oregon National Guard

ORARNG	Oregon Army National Guard
ORDEQ	Oregon Department of Environmental Quality
ORP	oxidation-reduction potential
OSD	Office of the Secretary of Defense
OWRD	Oregon Water Resources Department
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
PWS ID	Public Water Service Identification
PVC	polyvinyl chloride
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RI	Remedial Investigation
RTC	Rees Training Center
RTI	Regional Training Institute
SI	Site Inspection
SL	screening level
SOP	standard operating procedure
TOC	total organic carbon
TPP	Technical Project Planning
UCD	Umatilla Chemical Depot
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 Society
WGS	World Geodetic System
WWTP	wastewater treatment plant

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 two Areas of Interest (AOIs) where PFAS-containing materials may have been used, stored, disposed, or released historically, with a third AOI added after the completion of the PA, during the SI planning (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 Rees Training Center (RTC), formerly named Camp Umatilla, in Hermiston, Oregon and determined further evaluation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is warranted for AOI 1, AOI 2, and AOI 3. RTC will also be referred to as the “facility” throughout this document.

RTC is located in Morrow and Umatilla Counties, approximately one mile northwest of the Interstate 82 and Interstate 84 intersection in the City of Hermiston, Oregon, and approximately eight miles southwest of the City of Umatilla. The installation encompasses 7,500 acres, including a 170-acre cantonment area used to support the Oregon Army National Guard’s (ORARNG) mission of military training. RTC is situated in the southeastern corner of the former Umatilla Chemical Depot, which comprises 19,729 acres and spans west into Morrow County. RTC includes areas for live-fire weapons training, maneuver training, and classroom/simulations training for units up to battalion size. RTC is also home to the 249th Regional Training Institute (RTI).

The PA identified two AOIs for investigation during the SI phase, with a third added during SI planning. SI sampling results from the three 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, and AOI 3.

[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 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 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	Groundwater – Facility Boundary	Future Action
1	Former FTA	●	●	●	Proceed to RI
2	Fire Station	◐	●	N/A	Proceed to RI
3	Former WWTP	●	●	●	Proceed to RI

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 Rees Training Center (RTC) in Hermiston, Oregon. RTC was originally named Camp Umatilla but was renamed to RTC in 2022 (East Oregonian, 2022). RTC 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 RTC (AECOM Technical Services, Inc. [AECOM], 2020) that identified three Areas of Interest (AOIs) where PFAS-containing materials may have been used, stored, disposed, or released historically. 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

RTC is located in Morrow and Umatilla Counties, approximately one mile northwest of the Interstate 82 and Interstate 84 intersection in the City of Hermiston, Oregon, and approximately eight miles southwest of the City of Umatilla (**Figure 2-1**). The installation encompasses 7,500 acres, including a 170-acre cantonment area used to support the Oregon National Guard's (ONG) mission of military training (State of Oregon, 2021; ONG, 2018). RTC is situated in the southeastern corner of the former Umatilla Chemical Depot (UCD), which comprises 19,729 acres and spans west into Morrow County (ONG, 2018).

Since the 1980s, the Oregon Army National Guard (ORARNG) has operated an enclave within the UCD for training and administrative purposes. The fenced-in UCD was formerly an Army Ordnance Depot in operation from 1941 to 2011, designated as a military munitions and supply depot for World War II, developed with ammunition storage igloos, warehouses, administrative buildings and barracks, and miles of railroad (ONG, 2018). In 1962, the purpose of the UCD changed to receiving, storing, issuing, and maintaining chemical munitions, resulting in a name change to Umatilla Army Depot. In 1988, the Base Realignment and Closure (BRAC) Commission listed the UCD for realignment. From 1990 to 1994, the facility reorganized in preparation for eventual closure, shipping all conventional ammunition and supplies to other installations. The UCD, at one time, stored 12 percent (%) of the nation's stockpile of chemical weapons, but no chemical weapons were used, manufactured, or tested at the UCD.

In 1996, the Umatilla Chemical Agent Disposal Facility was constructed to demilitarize chemical weapons stored at the UCD. In 2005, the UCD was placed on the BRAC list again. In 2011, chemical weapon incineration was completed, and the incineration plant was demolished. In 2012, the UCD was closed and transferred to inactive operational status in accordance with the Defense Base Closure and Realignment Act of 1990, Public Law 101–510, as amended, and the National Defense Authorization Act for Fiscal Year 2012, Public Law 112-81 (Doyle, 2018). The UCD was reassigned to the US Army Installation Management Command for management. The US Army Garrison Commander, Joint Base Lewis-McChord, assumed command authority for the UCD and property accountability pending disposal of excess property. Since the UCD's official closure in 2012, a BRAC-contracted caretaker oversees the UCD pending disposal of multiple parcels to new owners (planned for commercial and public development and designated wildlife habitat).

In December 2017, the Adjutant General of the Oregon Military Department (OMD) and the United States Army Corps of Engineers (USACE) signed over 7,500 acres of the former UCD's 19,729 acres to ORARNG to develop Camp Umatilla Oregon (now RTC), an installation accommodating weekend and annual training requirements in addition to military units from other services supporting the ORANRG's federal and state missions in achieving the Army's mission. RTC includes areas for live-fire weapons training, maneuver training, and classroom/simulations training for units up to battalion size. RTC is also home to the 249th Regional Training Institute (RTI) (ONG, 2018).

2.2 Facility Environmental Setting

RTC is located in north central Oregon and is situated on the southern edge of the Columbia Plateau, which extends north into Washington State (approximately three miles to the north of the facility). The Oregon portion of the plateau is made up entirely of lowlands, extending from the western Cascade Mountains to the southeastern Blue Mountains. With a generally flat to gently rolling topography, permeable soil, and minimal precipitation in the region, little to no stormwater runoff occurs on RTC. The surface elevation at the geographic center of RTC is 570 feet above mean sea level (amsl); however, the elevation ranges from 400 feet amsl in the north to 677 feet amsl in the south (ONG, 2018).

The prominent surface feature at RTC is the Coyote Coulee, a valley that cuts across the facility. Land use in the vicinity of RTC is almost exclusively zoned agricultural, with rural-residential areas located to the northwest, in the City of Irrigon, and east, in the City of Hermiston (USACE, 2013).

The majority of land area in all directions surrounding RTC comprises of agricultural land. Additionally, residential structures and light commercial are located to the north and east; and a quarry, quarry-associated industrial facilities, and dispersed residential structures are located to the south. In general, residences within a one-mile radius of RTC are largely dispersed or located within rural neighborhoods (**Figure 2-2**).

2.2.1 Geology

During late Miocene and early Pliocene times (between 14 and 16 million years ago), a fissure volcanic eruption led to a series of flood basalts that engulfed the Pacific Northwest, forming a large igneous province called the Columbia River Basalt Group. The rock group consists of five major basalt flows, including the Steens Basalt, Imnaha Basalt, Grande Ronde Basalt, Wanapum Basalt, and Saddle Mountains Basalt. As the molten rock came to the surface, the Earth's crust gradually sank into the space left by the rising lava, forming the down-warped bedrock surface of the Dalles-Umatilla Syncline. RTC is near the base of the south flanks of this broad syncline. The underlying basalt is composed of layers of separate basaltic lava flows, each of which is as much as 100 feet thick (Whitehead, 1994).

The crust subsidence produced a large, slightly depressed lava plain known as the Columbia Plateau, which covers more than 60,000 square miles. The northwesterly-advancing lava forced the Columbia River into its present course. The Oregon portion of the plateau is made up entirely of lowlands, extending from the eastern slopes of the Cascade Mountains to the southern Blue Mountains.

These basalts are overlain by as much as 200 feet of Pleistocene alluvial gravel deposits. These surface deposits are known as the Ordnance Gravels and are comprised of permeable silts, sands, and gravels, with some cobbles to the west of Coyote Coulee. Much coarser-grained permeable deposits containing considerable quantities of boulders occur along the east wall of the Coulee and toward the east side of RTC (USACE, 2013) (**Figure 2-3**).

Soils mapped at RTC consist of very deep, excessively drained sandy loam and coarse-grained sand. Soil series include Burbank loamy fine sand, Quincy fine sand, and Quincy loamy fine sand. During the SI, rotosonic (sonic) borings were completed to depths ranging between 15 to 95 feet below ground surface (bgs). Soils encountered generally consisted of sand and gravel with varying concentrations of silt. Trace concentrations of clay were observed throughout the borings, with the exception of REES-MW005, where clayey sand (greater than or equal to 15% clay) was encountered from 52 to 55 feet bgs and 65 to 70 feet bgs. Pulverized rock flour, indicative of penetration through cobbles and boulders, was observed in the majority of borings associated with AOI 3, at depths as shallow as 8 feet bgs and up to 47 feet bgs. AOI 3 is approximately 20 to 30 feet lower in elevation than AOI 1 and AOI 2. Samples for grain size analyses were collected at three locations: AOI02-01, REES-MW002 and REES-MW005, and analyzed via American Society for Testing and Materials (ASTM) Method D-422. The results indicate that the soil samples are comprised primarily of gravel (27.99% to 42.25%) with coarse-grained sand (11.38% to 21.49%), medium-grained sand (16.90% to 23.13%), fine-grained sand (10.58% to 11.71%), silt (12.69% to 14.68%), and clay (3.10% to 3.81%).

The observed sand, gravel, and silt encountered during the SI appear consistent with the Pleistocene alluvial gravel deposits mapped beneath the facility. Boring logs are presented in **Appendix E** and grain size results are presented in **Appendix F**.

2.2.2 Hydrogeology

The Columbia Plateau Basaltic Aquifer system is a regional groundwater resource that occupies about 50,600 square miles and extends across a small part of northern Idaho, northeastern Oregon, and a large part of southeastern Washington. The aquifer system is a layered series of fractured basalt formations of the Columbia River Basalt Group, separated by confining units and unconsolidated deposits of loose material, all underlain by pre-Miocene rocks (Whitehead, 1994). The groundwater occurs beneath RTC in a number of distinct hydrogeologic units (USACE, 2013) that are situated as follows:

- A near-surface unconsolidated-deposit aquifer;
- A series of basalt aquifers divided by confining units: Saddle Mountain Basalt, Wanapum Basalt, Grand Ronde Basalt; and
- Pre-Miocene rocks.

Additionally, there is a highly productive permeable unconfined aquifer to the south of RTC that consists of alluvial deposits and the weathered surface of the Elephant Mountain Member, a basaltic flow member of the Saddle Mountain Basalt group. This unit is overlain by approximately 20 to 125 feet of unsaturated alluvial sand and gravel. Nearby well logs and other available information indicate depth to groundwater beneath RTC ranges from approximately 60 to 100 feet bgs, with ambient depth to groundwater ranging from approximately 50 to 120 feet bgs from the unsaturated alluvial sand and gravel overlying the unconfined aquifer (OWRD, 2022; USACE, 2013). Groundwater flow beneath RTC exhibits seasonal variation due to groundwater extraction for irrigation and recharge from agricultural canals in the vicinity. In the summer and fall, groundwater flow direction is generally to the east and south, while in the winter and early spring, groundwater flow direction is generally to the northwest, towards the Columbia River (USACE, 2013) (**Figure 2-3**). Without the influence of irrigation, the overall flow direction of unconfined and confined aquifers is northwest toward the Columbia River. Unconfined alluvial aquifers, and possibly the Saddle Mountain Basalt portion of the confined basalt aquifers, discharge into local streams and rivers via seeps and springs with an ultimate discharge point at the Columbia River (Canestorp, 2007).

RTC is situated within the Oregon Water Resources Department (OWRD) Ordnance Gravel Critical Groundwater Area (CGA) and the Ordnance Basalt CGA, both of which have water allocation restrictions due to overdraft since the 1950s and 1970s, respectively (IRZ Consulting, 2009; OWRD, 2018b). The Ordnance Gravel CGA within Morrow and Umatilla Counties protects an overlying shallow sand and gravel aquifer and comprises approximately 82 square miles. The Ordnance Basalt CGA, situated within Morrow and Umatilla Counties and centered on the former Umatilla Ordnance Depot, protects the underlying Columbia River Basalt aquifer and comprises approximately 175 square miles. Groundwater levels within the Ordnance Gravel and Basalt CGAs declined during groundwater development in the 1950s and 1970s, respectively, but were reportedly stable in recent years (OWRD, 2018b).

Since the early 1970's the OWRD, other state agencies, and local planning groups have been working to increasing water availability in the area. The County Line Water Improvement District, which has been operational since the 1970's and is still ongoing, uses Umatilla River water, recharges through canals, averaging 6,000 acre-feet per year. In 2009, the OWRD, other state agencies, and local planning groups proposed increasing water availability within the Ordnance Gravel and Basalt CGAs through the Umatilla Basin Aquifer Recharge Project. This project would involve pumping surface water from the Columbia River and storing it in the CGA aquifer for use during higher seasonal water demand (IRZ Consulting, LLC, 2009). However, it was found that initial predictions from the project's original feasibility assessment did not reflect actual recharge and discharge characteristics of the target aquifer. Additionally, it was determined that the aquifer restoration project alone was not economically feasible, and numerous state law and agency rules would be needed to successfully implement this project (Schwabe, Williamson & Wyatt, 2016).

In 2013, the Commission dissolved, handing the reins of further water management planning – including refinement of a marketing program – to a new private non-profit, the Northeast Oregon Water Association (NOWA). NOWA is working on a water supply and marketing program that banks water from multiple sources: existing senior water rights, sustainable annual yield allocations within Critical Groundwater Areas, new storage – either surface or underground, and new water rights offset with mitigation (Schwabe, Williamson & Wyatt, 2016). NOWA is in the initial stages of preparing a pilot study that would develop additional water supply infrastructure within the Umatilla basin from the Columbia River. This project requires coordination with USACE, ORARNG, EPA, Oregon Water Resources Department, Oregon Department of Environmental Quality (ORDEQ), and other stakeholders in studying the pros and cons for a recharge program. NOWA and its consultant will perform groundwater modeling and pump testing as early as 2022 and has only done soil testing as of September 2022. Recharge for this project is not expected to begin until the first quarter of 2024 at the earliest.

RTC drinking water is supplied by two groundwater wells (Wells 4 and 5) withdrawing water from a confined basalt aquifer at depths ranging from 679 feet bgs to 709 feet bgs (USACE, 2013) (**Figure 2-3**). The drinking water system serving the UCD Administration Area (Public Water Service Identification [PWS ID] OR4101136) serves at least 25 residential connections and a population of 124 (USACE, 2013). The drinking water system serving the northern portion of the UCD (PWS ID OR4194664) serves up to 10 residential connections and a population of 662 (USACE, 2013). The pumping capacity of these drinking water wells range from 30 to 1,000 gallons per minute, with approximately 20% of the total capacity of the wells being used for domestic water, and the remainder used for fire protection (US Fish and Wildlife Service [USFWS], 2007). According to OMD, plans have been established to utilize three onsite wells and re-drill two additional wells in the immediate future for additional drinking water.

As of 2013, a total of 120 groundwater monitoring wells have been installed at the facility (**Figure 2-3**) (USACE, 2013). Groundwater monitoring well data suggest groundwater flow direction beneath the facility is northward, toward the Columbia River; however, irrigation pumping of the shallow alluvial aquifer causes groundwater in the south and central portions of facility to flow in a southern direction during the summer and fall. Historical disposal practices at the Explosives Washout Lagoons resulted in dissolved-phase explosives constituents in groundwater, which is currently being remediated by a groundwater pump and treat system (**Figure 2-3**). Groundwater flow direction north of the cantonment area is locally affected in the vicinity of treatment system extraction wells and in the vicinity of the treated effluent infiltration field. In general, groundwater within an extraction well's radius of influence flows radially towards extraction and flows radially outward from the infiltration field.

The alluvial and most shallow basalt aquifers are the main sources of domestic water in the region, with many irrigation and municipal wells installed deeper than 500 feet bgs (US Geological Survey [USGS], 2016). Three municipal water supply systems withdraw groundwater for drinking water in the vicinity of RTC and include the City of Hermiston (to the east), City of Umatilla (to the northeast), and City of Irrigon (to the north) (OWRD, 2018a). The City of Hermiston obtains its drinking water supply from groundwater (shallow and deep wells; deep wells withdraw water from the Columbia River Basalt aquifer) and surface water (sourced the Lake Walulla segment of the Columbia River) (City of Hermiston, 2020). The City of Umatilla obtains its drinking water supply from groundwater (four deep basalt wells) located within the city limits, approximately 6 miles to the northwest and hydrologically downgradient of RTC (City of Umatilla, 2019; City of Umatilla, 2008). The City of Irrigon obtains its drinking water supply from two groundwater wells located along the Columbia River, located to the north of RTC (City of Irrigon, 2018). Approximately 1,500 wells are located within a 4-mile radius of RTC and are mostly used for domestic and irrigation purposes (**Figure 2-3**) (USACE, 2013). The Columbia River is a major source of potable and irrigation water in the region, and is also used for recreation, fishing, and the generation of hydroelectric power. The Umatilla River, a tributary to the Columbia River, is principally used for irrigation (USACE, 2013).

The snowmelt water from the Blue Mountains of Eastern Oregon contributes to the recharge of deep basalt aquifers underlying the Columbia River Plateau. Overall, recharge is slow due to low annual precipitation rates in the region, and recharge areas are small relative to the expanse of the Columbia Plateau. Historically, surface water withdrawals from the Columbia River have been greater than recharge in many areas, and restrictions have been placed on groundwater in some parts of this aquifer system as previously described.

Drinking water from water wells at RTC were sampled by the OMD in 2016, 2019, and 2021 and analyzed for selected PFAS, including PFOA, PFOS, PFBS, PFHxS, and PFNA. The data presented in the unvalidated laboratory analytical reports were compared to the OSD SLs and are summarized as follows:

- October 2016: Three water wells (Well 4, Well 5 and Well 6) were sampled on 24 October 2016. Samples were analyzed by USEPA 537 for 23 PFAS compounds. The analytical report indicated that PFOA and PFHxS were detected in all three samples, below the SLs.
- August 2019: Two water wells (Well 4 and Well 5) were sampled on 22 August 2019. Samples were analyzed by USEPA 537 Version 1.1 for 14 PFAS compounds including the relevant compounds. The analytical report for four water samples and one field duplicate indicates the 14 reported PFAS were not detected above limits of quantitation (LOQs) ranging from 1.7 ng/L to 1.9 ng/L.
- December 2021: Two water wells (Well 4 and Well 5) were sampled on 14 December 2021. Samples were analyzed by USEPA 537.1 Version 1.0 for 18 PFAS compounds. The analytical report, reporting indicated that PFOS was detected in one sample, at a concentration below the SLs. All other results were not detected above LOQs ranging from 1.4 ng/L to 1.5 ng/L.

Depths to water measured in December 2022 during the SI ranged from 43.05 to 72.23 feet bgs. Notably, groundwater elevations across the three AOIs ranged from 502.93 feet North American Vertical Datum 1988 (NAVD88) to 504.39 feet NAVD88. Groundwater flow direction was evaluated locally within the eastern portion of the facility (AOI 1 and AOI 2) and western portion of the facility (AOI 3).

At AOI 1 and AOI 2, measured groundwater elevations are highest toward the southwest and shallowly decrease toward the northeast, with an overall elevation change of 1.34 feet between the wells. Thus, groundwater in the vicinity of AOI 1 and AOI 2 appears to flow in the northeast direction. At AOI 3, measured groundwater elevations are highest toward the west-northwest and shallowly decrease toward the east-southeast, with an overall elevation change of 0.04 feet between the wells. Thus, groundwater in the vicinity of AOI 3 appears to flow in the east-southeast direction.

As discussed above, regional groundwater flow beneath RTC exhibits seasonal variation due to groundwater due to irrigation and agriculture, with flow directions to the east and south in summer and fall, and northwest in winter and early spring. Groundwater flow directions assessed within the AOIs trended to some degree toward the east, somewhat consistent with the summer and fall flow direction. However, the synoptic gauging event occurred in December, and the groundwater elevations at the three AOIs varied marginally across the facility. Additionally, AOIs 1 and 2 are located one mile east of AOI 3 and positioned approximately cross-gradient to AOI 3 within the inferred regional groundwater flow. Assessment of the larger-scale groundwater flow direction using the SI data is limited due to the distance between the AOIs and their inferred cross-gradient positions within the regional flow. Groundwater elevation contours for AOI 1 and AOI 2 are presented on **Figure 2-4**, and groundwater elevation contours for AOI 3 are presented on **Figure 2-5**.

2.2.3 Hydrology

Surface waters infiltrate into permeable soils and may run off onto lower surrounding lands; therefore, no standing surface water is found at RTC. The nearest surface water features are the Umatilla River, located approximately 2.5 miles to the east, and the Columbia River, located approximately 3.5 miles to the north of RTC (**Figure 2-6**).

The Umatilla River is an 89-mile tributary of the Columbia River, with headwaters in the Blue Mountains. Draining a basin of 2,450 square miles, the Umatilla River enters the Columbia River in the City of Umatilla, approximately 4.5 miles to the northeast of RTC. The Columbia River is the largest river in the Pacific Northwest. With a drainage area of 258,000 square miles and a length of 1,243 miles, the Columbia River extends into seven US states and a Canadian province (British Columbia). Beginning in the Rocky Mountains of British Columbia, Canada, the Columbia River flows northwest and then south into Washington State, then turns west forming the border between Washington and Oregon, ultimately discharging into the Pacific Ocean further west.

Multiple canal systems surround RTC, including the West Extension Irrigation Canal to the north, High Line Canal to the south, and Westland Canals F, A, and I to the east. These canals remove water from the Umatilla River for irrigation of the local agriculture. The canal systems are greater than two miles from the nearest AOI (AOI 1).

The central part of RTC lacks well-defined drainage patterns. Minimal stormwater runoff is generated at RTC; stormwater generally flows into the numerous shallow depressions found in the flat and gently rolling topography characterized within the region. The most significant depressions are located at the base of the west-facing bluff of Coyote Coulee, which creates a natural divide along a portion of the boundary between Patterson Slough – Lake Umatilla Watershed and the Umatilla River Watershed (**Figure 2-6**). Drainage from several buildings located at the top of the bluff discharges into these depressions. Surface runoff in the area east of Coyote Coulee is toward the southern boundary into a shallow, elongated depression running parallel to the Union Pacific Railroad and Interstate 84 (USACE, 2013).

RTC handles and treats all wastewater produced within the facility; a sewage treatment plant, septic tanks, and drain field systems are located at the facility. RTC operates the wastewater systems in accordance with a National Pollutant Discharge Elimination System (NPDES) permit and two water pollution control permits issued by the ORDEQ (USACE, 2013). Domestic wastewater is run through an oil water separator and routed to the sewage treatment plant at the south-central part of the facility**.** Retention basins are located between AOI 2 and AOI 3. The basins appear to not receive recharge from the aquifers.

2.2.4 Climate

The climate at RTC is characterized as a dry continental. Temperatures are moderated year-round by the Pacific Ocean. High temperatures can reach 100 degrees Fahrenheit (°F) when air from the Pacific is hindered by predominating stagnant, high-pressure systems in the north or east in the summer or early fall. The resulting dry and hot southerly air allows for increased risk of wildfires in the region. Wind in the area tends to be channeled along the Columbia River valley, in conjunction with a prevailing westerly wind, resulting in a prevailing west-southwest wind at RTC (Canestorp, 2007).

The average annual precipitation for Hermiston is 10.4 inches, with the majority of rainfall occurring between the months of November to February (World Climate, 2022). Although summer precipitation is unusual, when it does occur, it is usually in the form of thunderstorms, which can sometimes cause flash flooding (Canestorp, 2007). In the summer months, temperatures reach an average maximum of 89 °F, and in the winter months, temperatures drop to an average low of 26 °F (World Climate, 2022).

2.2.5 Current and Future Land Use

During a BRAC meeting to reassess the land space and training needs of the former UCD, a plan was developed to divide the installation into four parcels: one parcel would be converted into a wildlife conservation refuge; the second parcel would become an industrial zone to aid in the economic growth of the area; the third parcel would be taken over by the Oregon Department of Transportation; and the fourth parcel would be used by the ORARNG as a premier training facility, known as Camp Umatilla Oregon (now RTC). The OMD invested $2 million in infrastructure improvements to the 1940s era installation (Ingersoll, 2018).

RTC is currently used for weekend and annual training requirements for the ONG and other military branches. RTC is home to the ORARNG's 1st Infantry Training Battalion of the 249th RTI and the only certified Army infantry training academy west of the Mississippi River in the continental US (Koester, 2016).

OMD intends to invest in facility improvements including sewer line repairs, a new water distribution system, road realignments, security fencing, administration and office space enhancements, new classrooms, as well as barracks for more than 320 soldiers and dining facility improvements (Ingersoll, 2018). After these improvements, OMD intends to build an infantry training schoolhouse (McDowell, 2018). RTC is anticipated to remain used for military training purposes in the future.

2.2.6 Sensitive Habitat and Threatened/ Endangered Species

The following birds, fishes, insects, and mammals are federally endangered, threatened, proposed, and/ or are listed as candidate species in Umatilla County, Oregon (USFWS, 2023).

- **Birds:** Yellow-billed Cuckoo, *Coccyzus americanus* (threatened)
- **Fishes:** Bull Trout, *Salvelinus confluentus* (threatened)
- **Insects:** Monarch butterfly, *Danaus plexippus* (candidate)
- **Mammals:** Little brown bat, *Myotis lucifugus* (under review); Gray wolf, *Canis lupus* (endangered)

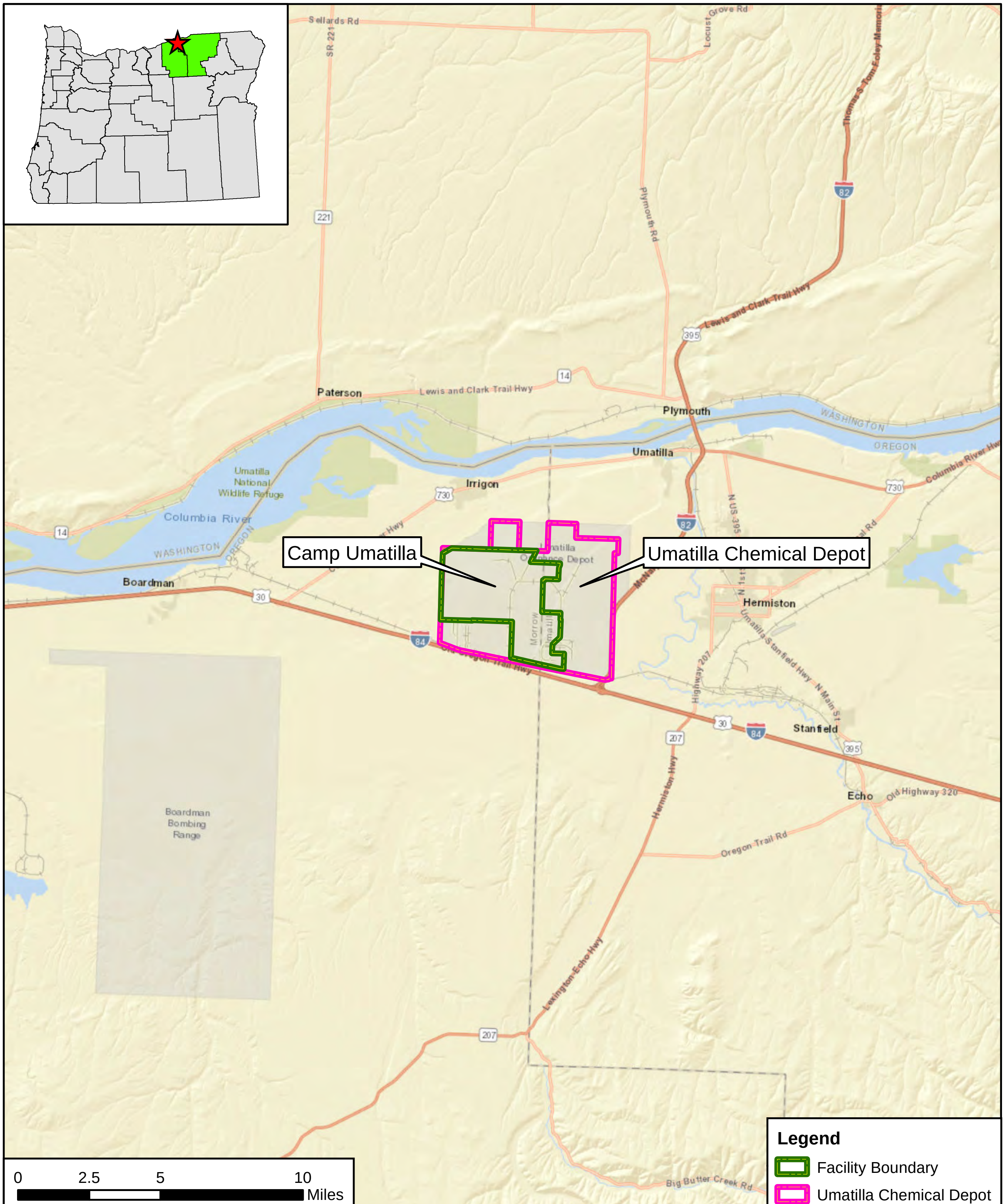
2.3 History of PFAS Use

Two AOIs were identified in the PA where AFFF may have been used, stored, disposed, or released historically at RTC (AECOM, 2020), with a third AOI added after the completion of the PA, during the SI planning.

- AOI 1 – Former Fire Training Areas (FTAs): AFFF may have historically been released at the facility during familiarization training and fire training activities as early as 2003.

- AOI 2 – Fire Station: AFFF releases may also have occurred as early as 1969 from storage of AFFF at the Fire Station.
- AOI 3 – Former Wastewater Treatment Plant (WWTP): Wastewater and storm sewer drainage from the Fire Station historically discharged to the former WWTP area. This AOI added after the completion of the PA, during the SI planning.

The potential release areas were grouped into three AOIs based on preliminary data and presumed groundwater flow directions. A description of each AOI is presented in **Section 3**.



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PROJECT	Site Inspectio at Camp Umatilla, OR			
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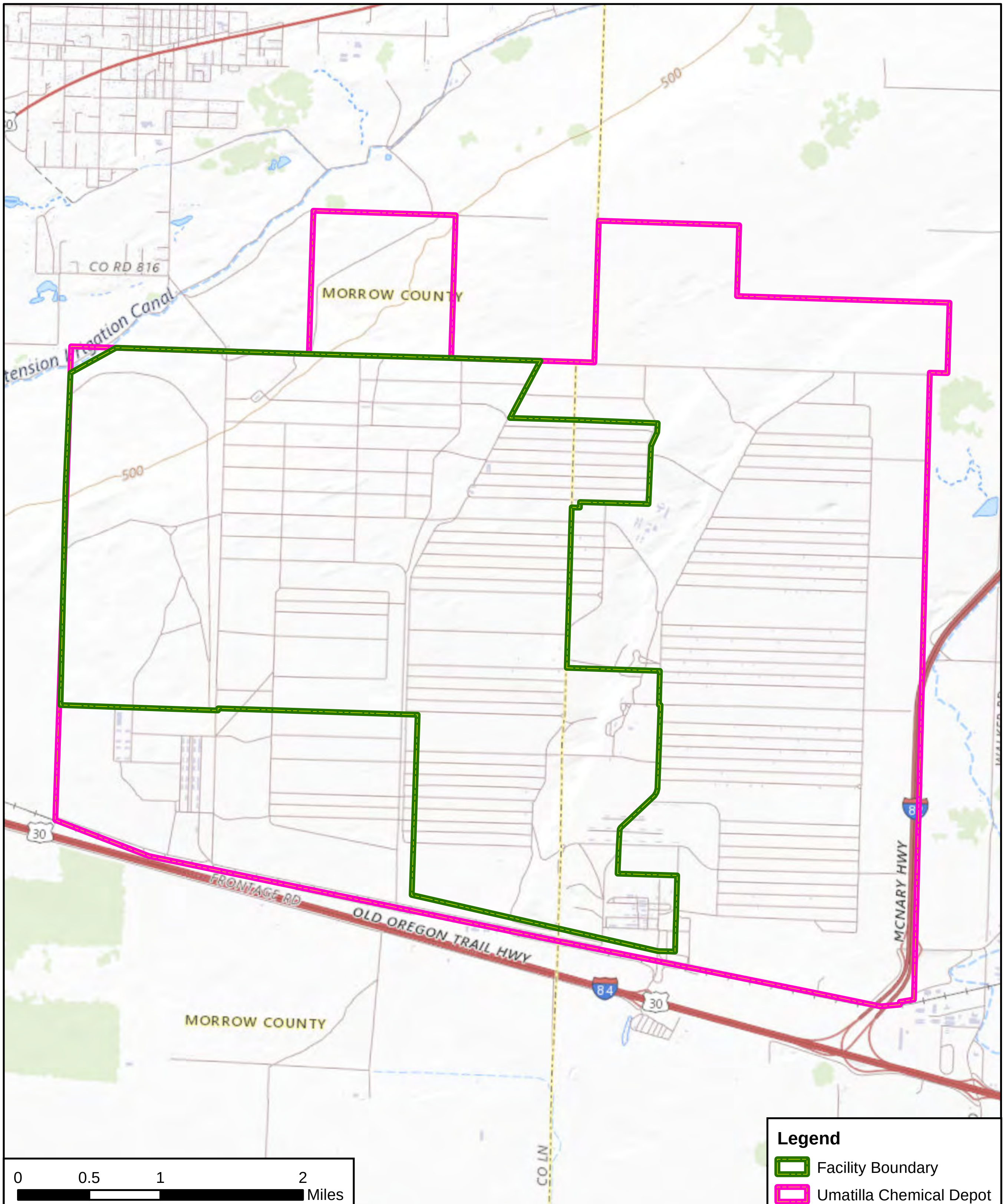
SCALE	1:316,800	CHK BY	VG	6/29/2023
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	6/29/2023

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-1

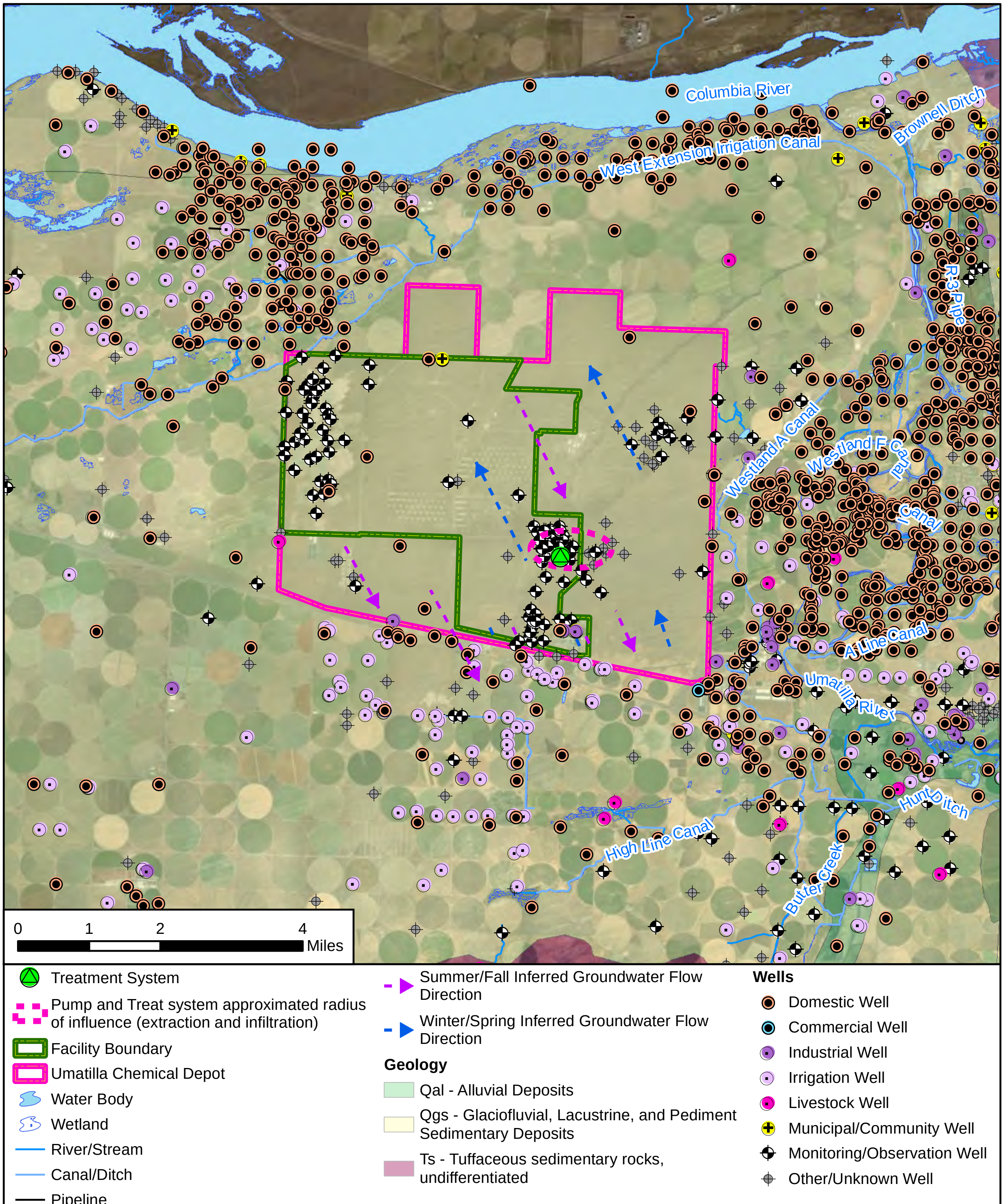


CLIENT	ARNG			
PROJECT	Site Inspection for at Camp Umatilla, OR			
REVISED	6/29/2023	GIS BY	MS	6/29/2023
SCALE	1:63,360	CHK BY	VG	6/29/2023
Base Map: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program,		PM	CM	6/29/2023

Facility Topography

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-2



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PROJECT	Site Inspection at Camp Umatilla, OR			
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SCALE	1:126,720	CHK BY	VG	6/29/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	6/29/2023

Groundwater Features

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Figure 2-3

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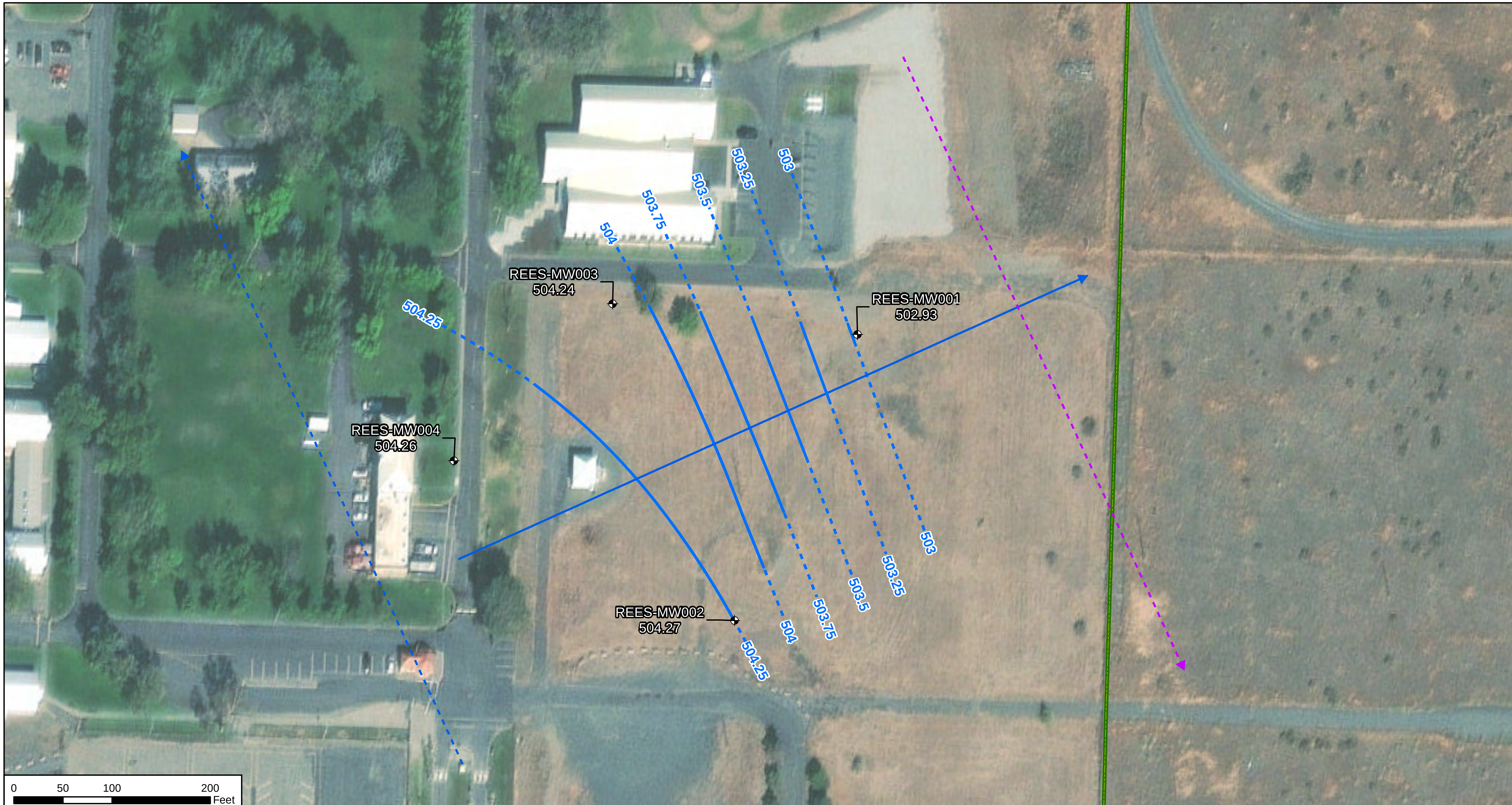

CLIENT	ARNG			
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SCALE	1:1,200	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

Permanent Monitoring Well
Facility Boundary
Groundwater Elevation Contour
Inferred Groundwater Elevation Contour
Groundwater Flow Direction
Summer/Fall Inferred Regional Groundwater Flow Direction
Winter/Spring Inferred Regional Groundwater Flow Direction

Groundwater elevations in ft NAVD88.

N

Groundwater Elevations, Decemeber 2022 - AOI 1 and AOI 2

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Figure 2-4

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,400	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

Permanent Monitoring Well
Facility Boundary
Groundwater Elevation Contour
Inferred Groundwater Elevation Contour
Groundwater Flow Direction
Summer/Fall Inferred Regional Groundwater Flow Direction
Winter/Spring Inferred Regional Groundwater Flow Direction

Groundwater elevations in ft NAVD88.

N

Groundwater Elevations, December 2022 - AOI 3

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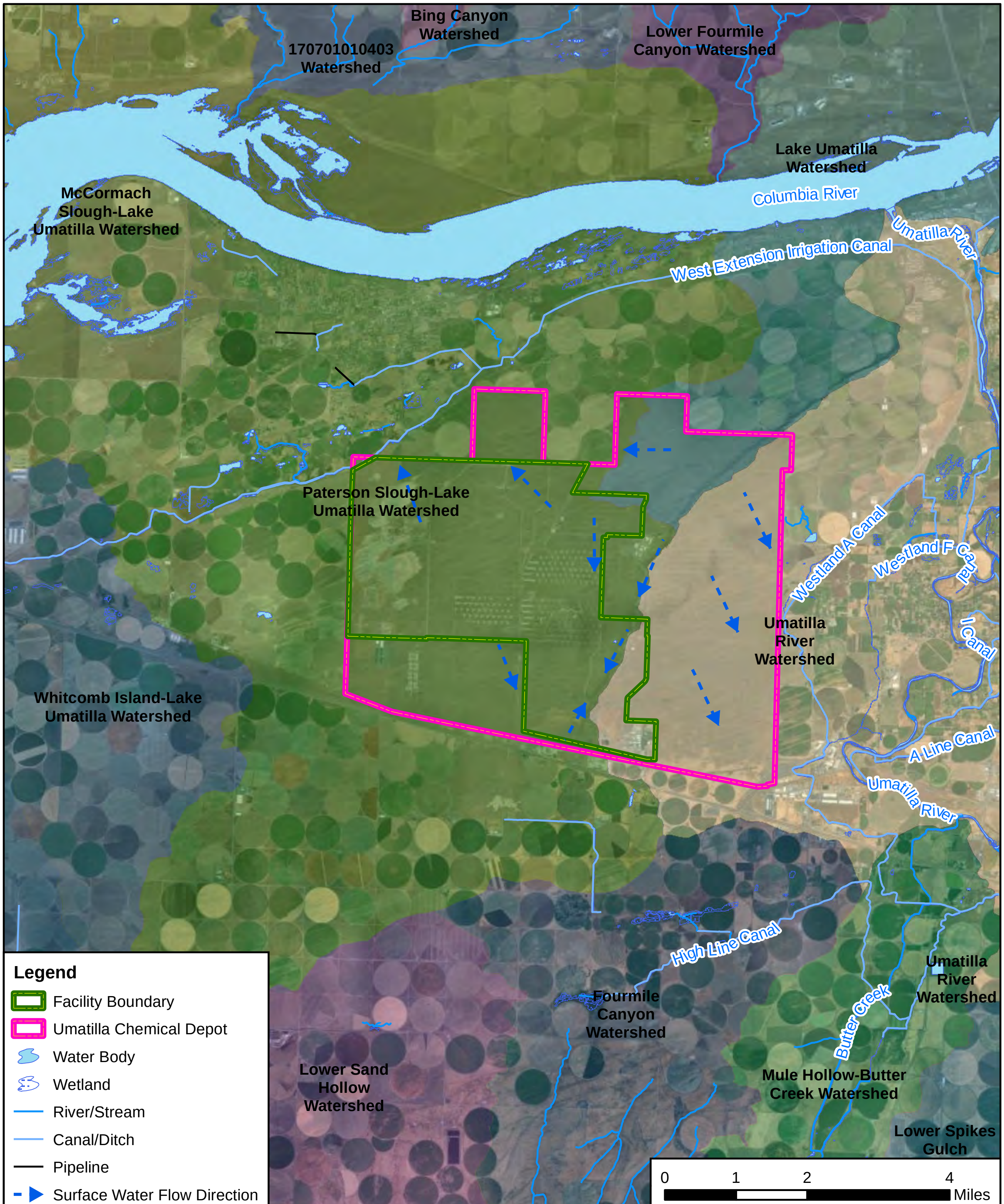
Figure 2-5



CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
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SCALE	1:126,720	CHK BY	VG	6/29/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	6/29/2023

Surface Water Features

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Figure 2-6

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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, two potential release areas were identified at RTC, with a third AOI added after the completion of the PA during the SI planning, and grouped into three AOIs (AECOM, 2020). The potential release areas are shown on **Figure 3-1**.

3.1 AOI 1 Former Fire Training Areas

AOI 1 includes the two Former FTAs within the cantonment area at RTC. The FTAs, designated FTA 01 and Burn Pit, are both locations where activities occurred that involved potential PFAS-containing materials. Interviews with facility personnel confirmed AFFF may have been used at the former FTAs, which are located approximately 300 feet apart from one another. Based on close proximity and similar historical use, the two FTAs were grouped into a single AOI (AOI 1).

FTA 01 was an area designated for fire training and nozzle practice; however, interviewees could not confirm whether the foam used during these trainings contained PFAS. It is estimated that the FTA was used for training occurred between 2003 and 2008; however, the exact duration and time period are unknown.

The Burn Pit area was formerly used regularly throughout the year to conduct controlled burns of wood and other organic debris. Interviewees recall foam being used during the burns to suppress flames; however, they could not confirm if the foam used during the burns contained PFAS.

3.2 AOI 2 Fire Station

AOI 2 is the Fire Station, which was constructed in 1941 (ONG, 2018), within the cantonment area of RTC known to store PFAS-containing materials. During the site visit on 2018, one 5-gallon bucket of concentrated AFFF was observed at the Fire Station. AFFF-capable firetrucks were previously located at RTC, and the AFFF tanks on the firetrucks were refilled using 5-gallon buckets at the Fire Station. Allegedly, there was no designated staging area for refilling AFFF into the firetrucks. Additionally, firetrucks were washed outside the Fire Station. The exact location is unknown; however, the activity likely occurred in the paved area east of the Fire Station or adjacent to a water spigot northeast of the Fire Station. The time period in which AFFF was stored or used at the Fire Station is unknown; however, given the history of AFFF use by the military, AFFF use at the Fire Station could date back to at least 1969 (Interstate Technology and Regulatory Council, 2020). A stormwater conveyance line is located east of Fire Station with catch basins southeast and southwest of the Fire Station building. The Fire Station and a floor drain within the firetruck bay are connected to the sanitary sewer which routes domestic wastewater to the wastewater treatment plant (WWTP) located approximately one mile to the west of the Fire Station (OMD, 2018). Stormwater conveyance lines discharge to a ditch near the WWTP.

3.3 AOI 3 Former Wastewater Treatment Plant

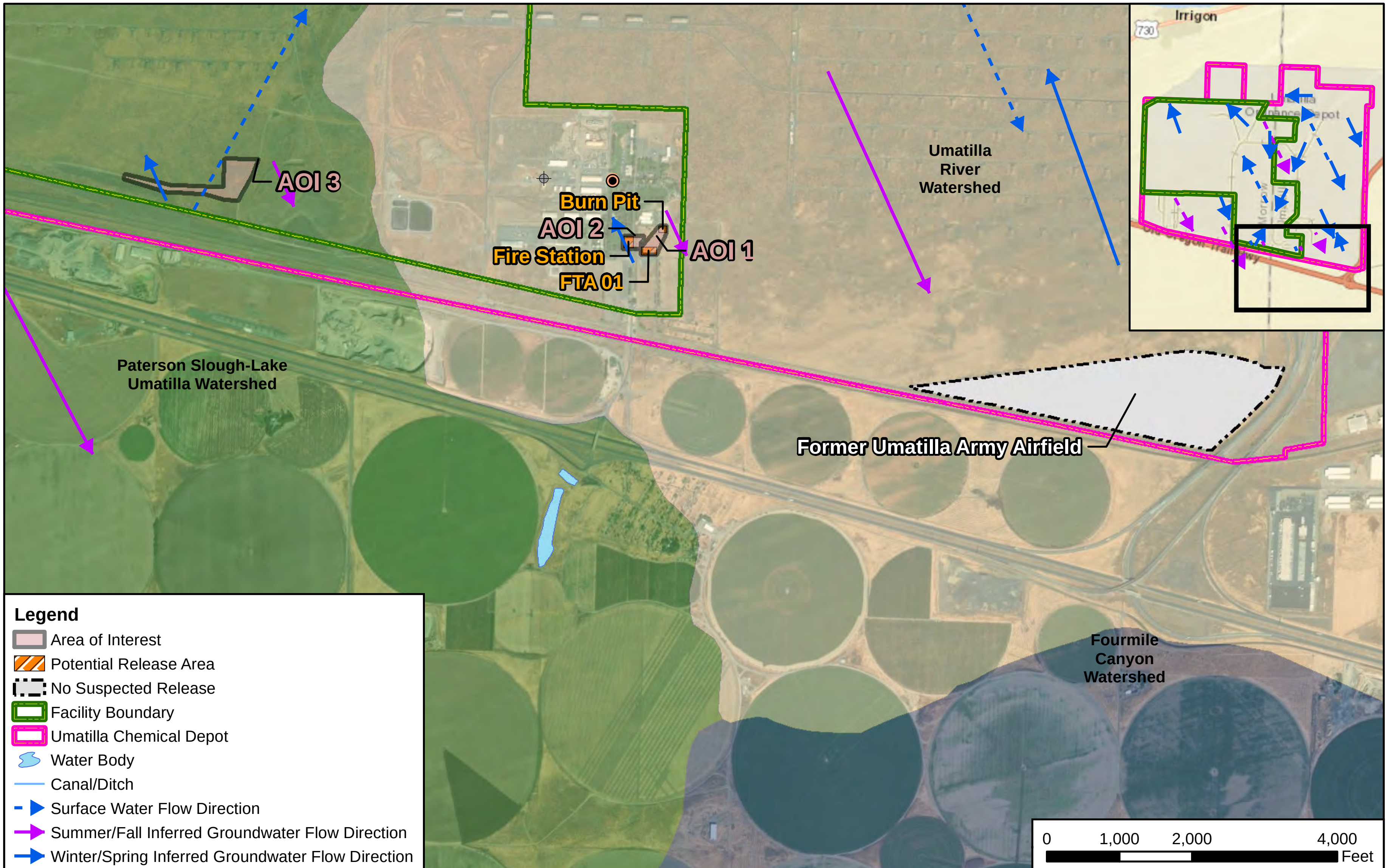
AOI 3 is the former WWTP west of the RTC cantonment area. RTC managed wastewater via septic systems, leach fields, and the WWTP in accordance with NPDES and two Water Pollution Control Facility permits issued by the ORDEQ (USACE, 2013). Domestic wastewater generated in the cantonment area and all steam cleaning wastewater generated throughout the facility was formerly discharged into the underground sanitary sewer piping routed to the WWTP (USACE, 2013; OMD, 2018). Steam-cleaning wastewater was pre-treated through an oil/water separator prior to being routed to the WWTP. The WWTP infrastructure included an Imhoff tank, a standby Imhoff tank, a sludge drying bed, and a tile field percolation system (AMEC, 2012). Wastewater and storm sewer drainage from the Fire Station discharge to the WWTP area. Prior to the WWTP's decommissioning, treated wastewater discharged to the tile field where it dissipated by evapotranspiration and controlled seepage in accordance with discharge permits. Additionally, the stormwater conveyance system servicing the cantonment area discharged to an open ditch near the WWTP USACE, 2013). The former WWTP operated from 1941 to February 2022.

3.4 Adjacent Sources

One off-facility, potential source was identified adjacent to RTC during the PA and are not associated with ARNG activities. The adjacent potential sources are shown on **Figure 3-1** and described in the following sections for informational purposes only and will not be investigated as part of this SI.

3.4.1 Former Umatilla Army Airfield

Approximately one mile southeast of the facility fire station a former airfield. This airfield was part of the Umatilla Army Depot before the facility was realigned under BRAC in 1988. Based on historic aerial photography and documents, the airstrip was constructed sometime between 1956 and 1964 and was listed as closed in 1998. It is unknown what entities may have potentially used the airfield other than the Army and potential AFFF use, storage, or release at this airfield is also unknown. However, at least one building, potentially a hangar, is located on the northeast side of the airstrip. Hangars typically have fire suppression systems or other types of mobile fire extinguishers to aid in emergency response activities on or near the flightline, which often include the use or storage of AFFF. While detailed information regarding historic use of this airstrip is unavailable, the potential for AFFF to be historically used, stored, or released at this airfield leaves the potential for exposure to PFAS. BRAC is conducting their own CERCLA investigation which will include the Army Airfield in addition to other suspect areas of the former Depot (Ammunition Disposal Area, former landfill and former fire house).



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SCALE	1:24,000	CHK BY	VG	6/29/2023
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	6/29/2023

Areas of Interest

AECOM

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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, 2021a), 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 Umatilla (now RTC) (AECOM, 2020);
- Analytical data collected by OMD in 2016, 2019, and 2021 as part of ARNG drinking water well sampling efforts around the facility:
    - PFOA, PFOS, and PFHxS was detected below the SLs. PFBS and PFNA concentrations were not detected above LOQs;
- 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, 2022a); 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 scope of the SI was vertically bounded as follows: soil from hand auger and sonic borings, surface soil (0 to 2 feet bgs), shallow subsurface soil (2 to 15 feet bgs), deep subsurface soil (30 to 80 feet bgs), and groundwater (43.05 to 72.23 feet bgs). Temporal boundaries were limited to the fall and winter seasons, 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, 2022a).

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 (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, 2022a).

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 Umatilla, Hermiston, Oregon* dated May 2020 (AECOM, 2020);
- *Final Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Addendum, Raymond F. Rees Training Center, Hermiston, Oregon* dated September 2022 (AECOM, 2022a); and
- *Final Site Safety and Health Plan, Raymond F. Rees Training Center, Hermiston, Oregon* dated September 2022 (AECOM, 2022b).

The SI field activities were conducted from 17 October to 17 December 2022 and consisted of consisted of utility clearance, sonic drilling, soil sample collection, permanent monitoring well installation, well development, grab groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2022a), 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:

- One hundred and twenty-three (123) total soil samples from thirteen (13) boring and thirty-four (34) and hand auger locations;
- Eight (8) groundwater samples from eight (8) permanent well locations;
- Forty-one (41) quality assurance (QA)/quality control (QC) samples.

Figure 5-1 provides 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 are provided in **Appendix B2**, a Field Change Request form is provided in **Appendix B3**, and land survey data is provided in **Appendix B4**. 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 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 28 March 2022, 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, ORARNG, USACE, and ORDEQ. 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, 2022a).

A TPP Meeting 3 was held on 15 August 2023 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 placed a ticket with the USA North 811 "Call Before You Dig" Oregon utility clearance provider to notify them of intrusive work between 17 October to 17 December 2022. Facility dig permits were completed and approved prior to the start of field work. 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 17 October 2022 with input from the AECOM field team and RTC 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 and/or air knife to verify utility clearance in shallow subsurface where utilities would typically be encountered.

5.1.3 Source Water and Sampling Equipment Acceptability

One potable water source at RTC were sampled on 9 June 2022 to assess usability for decontamination of drilling equipment. Results of the sample collected a from a spigot (REES-DECON-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 wash rack spigot 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, 2022a). 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

Soil samples were collected via sonic drilling technology and hand auger in accordance with the SI QAPP Addendum (AECOM, 2022a). A Terra Sonic International (TSi) 150CC Sonic Drill Rig was used to collect continuous soil cores to the target depth. A hand auger was used to collect soil from the top five feet of the boring, in accordance with AECOM utility clearance procedures. The soil boring locations are shown on **Figure 5-1** and depths are provided **Table 5-2**.

Three discrete soil samples were collected from the vadose zone for chemical analysis from each of the thirteen (13) sonic soil borings. At each of the thirteen (13) sonic boring locations, one surface soil sample (0 to 2 feet bgs) was collected using a hand auger. At eight of the sonic boring locations, which were completed as permanent monitoring wells, one subsurface soil sample was collected from 13 to 15 feet bgs, and one subsurface soil sample was collect approximately 2 feet above the groundwater table. At the five soil-only sonic boring locations, one subsurface soil sample was collected at the mid-point between the surface and the bottom of the boring, and one subsurface soil sample was collected from the bottom of the boring. Surface soil only samples were collected using a hand auger from thirty-four (34) total locations. In general, one surface soil was collected from 0 to 2 feet bgs at nine (9) of the surface soil sample locations. At the remaining twenty-five (25) locations, up to three discrete samples were generally collected from 0 to 0.5, 0.5 to 1, and 1 to 2 feet bgs, per location.

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 boring logs (**Appendix E**) 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.

During the SI, sonic borings were completed to depths ranging between 15 to 95 feet below ground surface (bgs). Soils encountered generally consisted of sand and gravel with varying concentrations of silt. Trace concentrations of clay were observed throughout the borings, with the except of REES-MW005 which encountered clayey sand (greater than or equal to 15% clay) from 52 to 55 feet bgs and 65 to 70 feet bgs. Pulverized rock flour, indicative of penetration through larger cobbles and boulders, was present in the majority borings located within the vicinity of AOI 3 at depths as shallow as 8 feet bgs up to 47 feet bgs. AOI 3 is approximately 20 to 30 feet lower in elevation than AOI 1 and AOI 2. The observed sand, gravel, and silt encountered during the SI appear consistent with the Pleistocene alluvial gravel deposits mapped beneath the facility.

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), pH (USEPA Method 9045D), and grain size (ASTM Method D-422) in accordance with the SI QAPP Addendum (AECOM, 2022a).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. matrix spike/ matrix spike duplicate (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 (ERBs) 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. Sonic borings were converted to permanent wells in accordance with the SI QAPP Addendum (AECOM, 2022a).

5.3 Permanent Well Installation and Groundwater Sampling

During the SI, eight (8) permanent monitoring wells were installed within or downgradient of potential source areas. The locations of the wells are shown on **Figure 5-1**.

A TSi 150CC Sonic Drill Rig drill rig was used to install four (4) 2-inch diameter monitoring wells. The monitoring wells were constructed with Schedule 40 polyvinyl chloride (PVC), flush threaded 10-foot sections of riser, 0.010-inch slotted well screen, and a threaded bottom cap. The filter pack of 2/12 Monterrey sand was installed at least 1 foot above the top of the well screen. A well seal consisting of hydrated bentonite chips or bentonite grout was placed above the sand pack. All monitoring wells were completed with stickups, with the exception of REES-MW004, which was completed with a flush mount well vault. Wells were installed, completed, and developed accordance with Oregon Administrative Rules (OAR) Chapter 690 Division 240. 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, 2022a). The newly installed monitoring wells were developed no sooner than 24 hours following installation by pumping and surging using a variable speed submersible pump. Samples were collected no sooner than 24 hours following development via low-flow sampling methods using a QED Sample Pro® bladder pump with disposable PFAS-free, HDPE tubing. New tubing was used at each well and the pumps were decontaminated between each well. The wells were purged at a rate determined in the field to reduce draw down prior to sampling. Water quality parameters (e.g., temperature, turbidity, specific conductance, pH, 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. Additionally, a subsample of each groundwater sample was collected in a separate container and a shaker test was completed to identify if there was 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, 2022a).

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 (FRB) 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 17 December 2022. Groundwater elevation measurements were collected from the eight new permanent monitoring wells. Water level measurements were taken from the northern side of the well casing. Groundwater flow contour maps are provided in **Figures 2-4** and **2-5**. Groundwater elevation data is provided in **Table 5-2**.

5.5 Surveying

The northern side of each well casing was surveyed by Oregon-licensed land surveyors following guidelines provided in the SOPs provided in the SI QAPP Addendum (AECOM, 2022a). Survey data from the newly installed wells on the facility were collected on 14 December 2022 in the applicable Universal Transverse Mercator zone projection with World Geodetic System 1984 (WGS84) (horizontal) and NAVD88 (vertical). The surveyed well data are provided in **Appendix B4**.

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, 2022a) and with the DA Guidance for Addressing Releases of PFAS, Q18 (DA, 2018).

Soil IDW (i.e., soil cuttings) generated during the SI activities were contained in labeled, 55-gallon Department of Transportation (DOT)-approved steel drums and left onsite in a designated waste storage area located north of AOI 3. The soil IDW was not sampled and assumes the characteristics of the associated soil samples collected from that source location. ARNG will coordinate waste profiling, transportation, and disposal of the solid IDW under a separate contract.

Liquid IDW generated during SI activities (i.e., purge water, development water, and decontamination fluids) were contained in labeled, 55-gallon DOT-approved steel drums, and left onsite with the soil IDW. The liquid IDW was not sampled and assumes the characteristics of the associated groundwater samples collected from that source location. Containerized liquid IDW will be managed and disposed of by ARNG (either by offsite disposal or onsite disposal with treatment, as appropriate) under a separate contract in accordance with SOP No. 042A (EA, 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

One deviation from the SI QAPP Addendum were identified during review of the field documentation. The deviation is noted below and is documented in a Field Change Request Form (**Appendix B3**):

- At the time of the SI, surface of the former WWTP infiltration area in AOI 3 was covered by coarse gravel and cobbles; therefore, surface soil samples could not be collected. Test pits were excavated at three of the proposed multi-interval surface soil sample locations, and coarse gravel was observed from ground surface to depths greater than 2 feet bgs. With approval from ARNG G-9, three 30-foot sonic boring locations (AOI03-13, AOI03-14, and AOI13-15) were added in lieu of hand collected multi-depth interval surface soil sampling.

  Additionally, during the SI walkthrough, three discrete drainage pathways were observed associated with the stormwater conveyance system, located west of the former WWTP (AOI 3). Based on the observed drainage pathways and inferred surface water flow directions, two additional multi-depth interval surface soil sample locations (AOI03-11 and AOI03-12) were added. These deviations are documented in a Field Change Request Form provided in **Appendix B3**.

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Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, Raymond F. Rees Training Center, Hermiston, Oregon

AOI	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								
AOI 1	REES-MW001-SB-0-1.5	10/19/2022 9:35	0-1.5	X				
	REES-MW001-SB-13-15	12/2/2022 9:10	13-15	X				
	REES-MW001-SB-78-80	12/5/2022 11:40	78-80	X				
	REES-MW001-SB-78-80-D	12/5/2022 11:40	78-80	X				DUP
	REES-MW002-SB-0-2	10/18/2022 10:40	0-2	X				
	REES-MW002-SB-13-15	11/22/2022 8:00	13-15	X	X		X	
	REES-MW002-SB-13-15-D	11/22/2022 8:00	13-15	X	X			DUP
	REES-MW002-SB-78-80	11/22/2022 16:00	78-80	X				
	AOI01-02-SB-0-0.5	10/19/2022 9:00	0-0.5	X				
	AOI01-02-SB-0-0.5-D	10/19/2022 9:00	0.5-1	X				DUP
	AOI01-02-SB-0.5-1	10/19/2022 9:10	0.5-1	X				
	AOI01-03-SB-0-0.5	10/18/2022 13:15	0-0.5	X				
	AOI01-03-SB-0.5-1	10/18/2022 13:20	0.5-1	X				
	AOI01-03-SB-1-1.5	10/18/2022 13:30	1-1.5	X				
	AOI01-04-SB-0-2	10/19/2022 9:50	0-2	X				
	AOI01-04-SB-0-2-MS	10/19/2022 9:50	0-2	X				MS
	AOI01-04-SB-0-2-MSD	10/19/2022 9:50	0-2	X				MSD
	AOI01-05-SB-0-0.5	10/18/2022 12:05	0-0.5	X				
	AOI01-05-SB-0.5-1	10/18/2022 12:10	0.5-1	X				
	AOI01-05-SB-1-2	10/18/2022 12:15	1-2	X				
	AOI01-06-SB-0-0.5	10/18/2022 12:30	0-0.5	X				
	AOI01-06-SB-0-0.5-D	10/18/2022 12:30	0.5-1	X				DUP
	AOI01-06-SB-0.5-1	10/18/2022 12:40	0.5-1	X				
	AOI01-07-SB-0.5-1	10/18/2022 12:05	0.5-1	X				
	AOI01-07-SB-0-0.5	10/18/2022 11:55	0-0.5	X				
	AOI01-07-SB-0-0.5-D	10/18/2022 11:55	0.5-1	X				DUP
	AOI01-07-SB-1-2	10/18/2022 12:15	1-2	X				
	AOI01-08-SB-0-0.5	10/19/2022 8:45	0-0.5	X				
	AOI01-08-SB-0.5-1	10/19/2022 8:50	0.5-1	X				
	AOI01-08-SB-1-1.5	10/19/2022 8:55	1-1.5	X				
	AOI01-09-SB-0-1	10/18/2022 12:55	0-1	X				
	AOI01-10-SB-0-0.5-20221018	10/18/2022 13:45	0-0.5	X				
	AOI01-10-SB-0-0.5-20221019	10/19/2022 9:25	0-0.5	X				
	AOI01-11-SB-0-2	10/18/2022 10:45	0-2	X				
	AOI01-11-SB-0-2-MS	10/18/2022 10:45	0-2	X				MS
	AOI01-11-SB-0-2-MSD	10/18/2022 10:45	0-2	X				MSD
	AOI01-11-SB-7-8	11/29/2022 9:20	7-8	X				
	AOI01-11-SB-7-8-MS	11/29/2022 9:20	7-8	X				MS
	AOI01-11-SB-7-8-MSD	11/29/2022 9:20	7-8	X				MSD
	AOI01-11-SB-13-15	11/29/2022 9:40	13-15	X				
	AOI01-12-SB-0-0.5	10/18/2022 10:00	0-0.5	X				
	AOI01-12-SB-0.5-1	10/18/2022 10:05	0.5-1	X				
	AOI01-12-SB-1-2	10/18/2022 10:10	1-2	X				
	AOI01-13-SB-0.5-1	10/18/2022 10:30	0.5-1	X				
	AOI01-13-SB-0-0.5	10/18/2022 10:25	0-0.5	X				
	AOI01-13-SB-1-2	10/18/2022 10:35	1-2	X				
	AOI01-13-SB-1-2-D	10/18/2022 10:35	1-2	X				DUP
	AOI01-14-SB-0-2	10/18/2022 9:30	0-2	X				
	AOI01-14-SB-0-2-D	10/18/2022 9:30	0-2	X				DUP
	AOI01-15-SB-0-0.5	10/18/2022 10:00	0-0.5	X				
	AOI01-15-SB-0.5-1	10/18/2022 10:10	0.5-1	X				
	AOI01-15-SB-1-2	10/18/2022 10:20	1-2	X				
	AOI01-16-SB-0.5-1	10/17/2022 15:05	0.5-1	X				
	AOI01-16-SB-0-0.5	10/17/2022 15:00	0-0.5	X				
	AOI01-16-SB-1-2	10/17/2022 15:10	1-2	X				
	AOI01-17-SB-0.5-1	10/17/2022 15:25	0.5-1	X				
	AOI01-17-SB-0-0.5	10/17/2022 15:20	0-0.5	X				

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Site Inspection Report, Raymond F. Rees Training Center, Hermiston, Oregon

AOI	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
	AOI01-17-SB-1-2	10/17/2022 15:30	1-2	X				
	AOI01-18-SB-0.5-1	10/17/2022 15:40	0.5-1	X				
	AOI01-18-SB-0-0.5	10/17/2022 15:35	0-0.5	X				
	AOI01-18-SB-0-0.5-D	10/17/2022 15:35	0.5-1	X				DUP
	AOI01-18-SB-1-2	10/17/2022 15:45	1-2	X				
	AOI01-19-SB-0-2	10/17/2022 15:55	0-2	X				
	AOI01-20-SB-0.5-1	10/18/2022 8:25	0.5-1	X				
	AOI01-20-SB-0-0.5	10/18/2022 8:15	0-0.5	X				
	AOI01-20-SB-1-2	10/18/2022 8:35	1-2	X				
	AOI01-21-SB-0-2	10/18/2022 10:25	0-2	X				
	AOI01-22-SB-0.5-1	10/17/2022 16:15	0.5-1	X				
	AOI01-22-SB-0.5-1-D	10/17/2022 16:15	0.5-1	X				DUP
	AOI01-22-SB-0-0.5	10/17/2022 16:10	0-0.5	X				
	AOI01-22-SB-1-2	10/17/2022 16:20	1-2	X				
	AOI01-23-SB-0-2	10/17/2022 16:30	0-2	X				
	AOI01-23-SB-0-2-MS	10/17/2022 16:30	0-2	X				MS
	AOI01-23-SB-0-2-MSD	10/17/2022 16:30	0-2	X				MSD
	AOI01-24-SB-0.5-1	10/17/2022 16:45	0.5-1	X				
	AOI01-24-SB-0-0.5	10/17/2022 16:35	0-0.5	X				
	AOI01-24-SB-1-2	10/17/2022 16:55	1-2	X				
	AOI01-25-SB-0.5-1	10/17/2022 15:45	0.5-1	X				
	AOI01-25-SB-0-0.5	10/17/2022 15:35	0-0.5	X				
	AOI01-25-SB-1-2	10/17/2022 15:55	1-2	X				
	AOI01-26-SB-0.5-1	10/17/2022 15:05	0.5-1	X				
	AOI01-26-SB-0-0.5	10/17/2022 14:55	0-0.5	X				
	AOI01-26-SB-1-2	10/17/2022 15:15	1-2	X				
	AOI01-27-SB-0.5-1	10/18/2022 9:45	0.5-1	X				
	AOI01-27-SB-0-0.5	10/18/2022 9:40	0-0.5	X				
	AOI01-27-SB-1-2	10/18/2022 9:50	1-2	X				
AOI 2	REES-MW003-SB-0-2	11/10/2022 9:00	0-2	X				
	REES-MW003-SB-13-15	11/29/2022 15:40	13-15	X				
	REES-MW003-SB-13-15-D	11/29/2022 15:40	13-15	X				DUP
	REES-MW003-SB-71-73	11/30/2022 16:00	71-73	X				
	REES-MW004-SB-0-2	11/10/2022 8:30	0-2	X				
	REES-MW004-SB-13-15	12/12/2022 16:25	13-15	X				
	REES-MW004-SB-73-75	12/13/2022 12:10	73-75	X				
	AOI02-01-SB-0-2	10/19/2022 10:20	0-2	X				
	AOI02-01-SB-7-8	11/29/2022 14:00	7-8	X				
	AOI02-01-SB-7-8-MS	11/29/2022 14:00	7-8	X				MS
	AOI02-01-SB-7-8-MSD	11/29/2022 14:00	7-8	X				MSD
	AOI02-01-SB-13-15	11/29/2022 14:20	13-15	X	X	X	X	
	AOI02-01-SB-13-15-MS	11/29/2022 14:20	13-15		X	X		MS
	AOI02-01-SB-13-15-MSD	11/29/2022 14:20	13-15		X	X		MSD
	AOI02-04-SB-0-2	10/19/2022 10:40	0-2	X				
	AOI02-04-SB-0-2-D	10/19/2022 10:40	0-2	X				DUP
	REES-MW005-SB-0-2	11/7/2022 10:30	0-2	X				
	REES-MW005-SB-13-15	11/16/2022 13:50	13-15	X	X	X	X	
	REES-MW005-SB-13-15-D	11/16/2022 13:50	13-15	X				DUP
	REES-MW005-SB-50-51	11/16/2022 16:30	50-51	X				
	REES-MW006-SB-0-2	11/7/2022 11:00	0-2	X				
	REES-MW006-SB-13-15	11/18/2022 8:30	13-15	X				
	REES-MW006-SB-54-55	11/18/2022 13:30	54-55	X				
	REES-MW007-SB-0-2	11/7/2022 10:30	0-2	X				
	REES-MW007-SB-13-15	11/10/2022 9:20	13-15	X				
	REES-MW007-SB-48-49	11/10/2022 14:45	48-49	X				
	REES-MW008-SB-0-2	10/18/2022 16:15	0-2	X				
	REES-MW008-SB-13-15	11/15/2022 11:00	13-15	X				
	REES-MW008-SB-44-45	11/15/2022 14:45	44-45	X				

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AOI 3	AOI03-05-SB-0.5-1	10/18/2022 15:55	0.5-1	X				
	AOI03-05-SB-0-0.5	10/18/2022 15:45	0-0.5	X				
	AOI03-05-SB-0-0.5-MS	10/18/2022 15:45	0.5-1	X				MS
	AOI03-05-SB-0-0.5-MSD	10/18/2022 15:45	0.5-1	X				MSD
	AOI03-06-SB-0.5-1	10/18/2022 15:20	0.5-1	X				
	AOI03-06-SB-0-0.5	10/18/2022 15:10	0-0.5	X				
	AOI03-06-SB-1-1.5	10/18/2022 15:30	1-1.5-1	X				
	AOI03-07-SB-0-0.5	10/18/2022 14:40	0-0.5	X				
	AOI03-07-SB-0-1	10/18/2022 14:45	0-1	X				
	AOI03-07-SB-1-2	10/18/2022 14:50	1-2	X				
	AOI03-07-SB-1-2-D	10/18/2022 14:50	1-2	X				DUP
	AOI03-08-SB-0-0.5	10/18/2022 16:10	0-0.5	X				
	AOI03-08-SB-0.5-1	10/18/2022 16:20	0.5-1	X				
	AOI03-08-SB-1-1.5	10/18/2022 16:30	1-1.5	X				
	AOI03-09-SB-0-0.5	10/19/2022 11:30	0-0.5	X				
	AOI03-09-SB-0-0.5-D	10/19/2022 11:30	0.5-1	X				DUP
	AOI03-09-SB-0.5-1	10/19/2022 11:35	0.5-1	X				
	AOI03-09-SB-1-2	10/19/2022 11:40	1-2	X				
	AOI03-10-SB-0-0.5	10/18/2022 15:15	0-0.5	X				
	AOI03-10-SB-0.5-1	10/18/2022 15:20	0.5-1	X				
	AOI03-10-SB-1-2	10/18/2022 15:25	1-2	X				
	AOI03-11-SB-0-0.5	10/18/2022 15:35	0-0.5	X				
	AOI03-11-SB-0.5-1	10/18/2022 15:40	0.5-1	X				
	AOI03-11-SB-1-2	10/18/2022 15:45	1-2	X				
	AOI03-12-SB-0-0.5	10/18/2022 15:55	0-0.5	X				
	AOI03-12-SB-0.5-1	10/18/2022 16:00	0.5-1	X				
	AOI03-12-SB-1-2	10/18/2022 16:05	1-2	X				
	AOI03-13-SB-1-2	11/9/2022 8:30	1-2	X				
	AOI03-13-SB-1-2-MS	11/9/2022 8:30	1-2	X				MS
	AOI03-13-SB-1-2-MSD	11/9/2022 8:30	1-2	X				MSD
	AOI03-13-SB-13-15	11/9/2022 9:10	13-15	X				
	AOI03-13-SB-25-26	11/9/2022 10:15	25-26	X				
	AOI03-14-SB-2.5-4.5	11/8/2022 13:45	2.5-4.5	X				
	AOI03-14-SB-13-15	11/8/2022 14:30	13-15	X				
	AOI03-14-SB-28-30	11/8/2022 15:45	28-30	X				
	AOI03-15-SB-3-5	11/8/2022 9:00	3-5	X				
	AOI03-15-SB-13-14.5	11/8/2022 9:35	13-14.5	X				
	AOI03-15-SB-28-30	11/8/2022 9:45	28-30	X				

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, Raymond F. Rees Training Center, Hermiston, Oregon

AOI	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
Groundwater Samples								
AOI 1	REES-MW001-GW	12/16/2022 8:55	NA	x				
	REES-MW002-GW	12/5/2022 12:50	NA	x				
	REES-MW002-GW-D	12/5/2022 12:50	NA	x				DUP
	REES-MW002-GW-MS	12/5/2022 12:50	NA	x				MS
	REES-MW002-GW-MSD	12/5/2022 12:50	NA	x				MSD
AOI 2	REES-MW003-GW	12/5/2022 10:20	NA	x				
	REES-MW004-GW	12/17/2022 12:15	NA	x				
AOI 3	REES-MW005-GW	12/4/2022 10:10	NA	x				
	REES-MW006-GW	12/4/2022 12:50	NA	x				
	REES-MW007-GW	12/17/2022 13:50	NA	x				
	REES-MW008-GW	12/4/2022 11:30	NA	x				
Quality Control Samples								
NA	REES-DECON-01	6/9/2022 9:35	NA	x				Water source
	REES-ERB-01	10/18/2022 11:00	NA	x				Hand Auger
	REES-ERB-02	10/18/2022 11:50	NA	x				Hand Auger
	REES-ERB-03	10/19/2022 8:10	NA	x				Hand Auger
	REES-ERB-04	10/19/2022 8:15	NA	x				Hand Auger
	REES-ERB-05	11/29/2022 14:10	NA	x				Drill Bit
	REES-ERB-06	12/2/2022 7:45	NA	x				Drill Bit
	REES-ERB-07	12/5/2022 11:25	NA	x				Bladder Pump
	REES-ERB-08	12/12/2022 15:30	NA	x				Drill Bit
	REES-FRB-01	10/19/2022 8:20	NA	x				

Notes:
AOI = Area of Interest
ASTM = American Society for Testing and Materials
bgs = below ground surface
D or DUP = duplicate
ERB = equipment rinsate blank
FRB = field reagent blank
LC/MS/MS = Liquid Chromatography Mass Spectrometry
MS/MSD = matrix spike/ matrix spike duplicate
NA = not applicable
QSM = Quality Systems Manual
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

Table 5-2
Soil Boring Depths
Site Inspection Report, Raymond F. Rees Training Center, Hermiston, Oregon

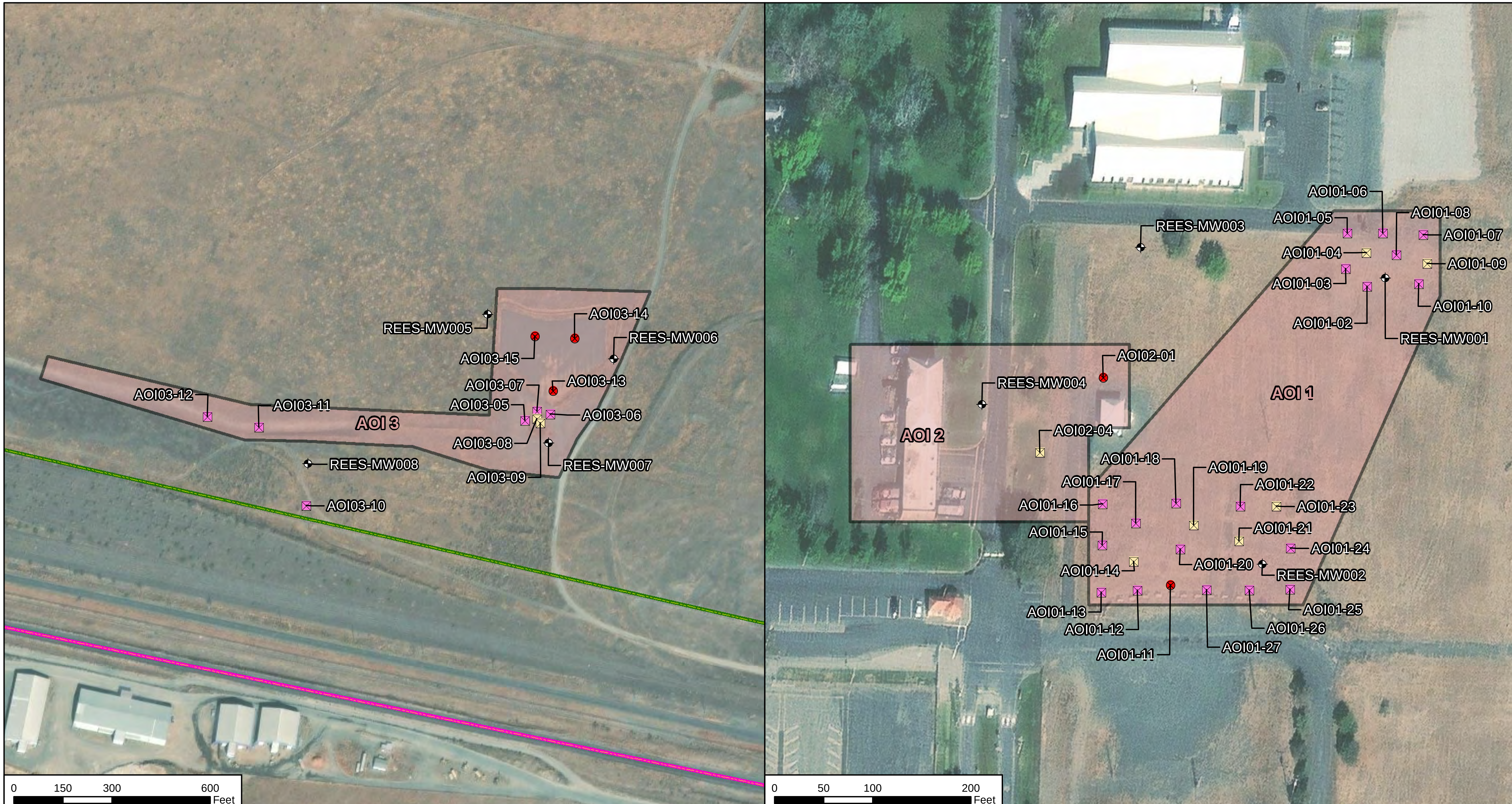
Area of Interest	Boring Location	Soil Boring Depth (feet bgs)
1	REES-MW001	95
	REES-MW002	95
	AOI01-11	15
2	REES-MW003	90
	REES-MW004	95
	AOI02-01	15
3	REES-MW005	67
	REES-MW006	70
	REES-MW007	65
	REES-MW008	63
	AOI03-13	27
	AOI0I3-14	30
	AOI03-15	30

Notes:
bgs = below ground surface
ID = identification

Table 5-3
Permanent Well Screen Intervals, and Groundwater Elevations
Site Inspection Report, Raymond F. Rees Training Center, Hermiston, Oregon

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	REES-MW001	95	75-95	577.33	574.53	74.40	71.60	502.93
	REES-MW002	95	75-95	576.88	574.47	72.61	70.20	504.27
2	REES-MW003	90	70-90	578.34	575.38	74.10	71.14	504.24
	REES-MW004	95	75-95	576.22	576.49	71.96	72.23	504.26
3	REES-MW005	67	47-67	550.42	548.13	46.06	43.77	504.36
	REES-MW006	70	50-70	556.99	554.44	52.64	50.09	504.35
	REES-MW007	65	45-65	555.78	553.39	51.43	49.04	504.35
	REES-MW008	63	42.7-62.7	549.96	547.44	45.57	43.05	504.39

Notes:
bgs = below ground surface
btoc = below top of casing
NA = not applicable
NAVD88 = North American Vertical Datum 1988



CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	6/29/2023	GIS BY	MS	6/29/2023
SCALE	1:1,200	CHK BY	VG	6/29/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	6/29/2023

Legend

- Permanent Monitoring Well
- Soil Boring
- Surface Soil Sample - Multi
- Surface Soil Sample - Single
- Area of Interest
- Facility Boundary
- Umatilla Chemical Depot

N

Site Inspection Sample Locations

AECOM 12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-1

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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 6.5**. **Table 6-2** through **Table 6-5** present results in soil or groundwater for the relevant compounds. Results are also presented on **Figure 6-1** through **Figure 6-24**. 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 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) 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, pH, and grain size, which are important for evaluating transport through the soil medium. **Appendix F** contains the results of the TOC, pH, and grain size 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: Former FTAs. The soil and groundwater results are summarized on **Table 6-2** through **Table 6-5**. Soil and groundwater results for AOI 1 are presented on **Figures 6-1**, **6-3**, **6-5**, **6-7**, **6-9**, **6-11**, **6-13**, **6-15**, **6-17**, **6-19**, **6-21**, and **Figure 6-23**.

6.3.1 AOI 1 Soil Analytical Results

Figures 6-1, **6-5**, **6-9**, **6-13**, and **6-17** present the ranges of detections in surface soil at AOI 1. **Figures 6-3**, **6-7**, **6-11**, **6-15**, and **6-19** present the ranges of detections in intermediate and deep soil at AOI 1. **Table 6-2** through **Table 6-4** summarize the soil results.

Surface soil (0 to 2 feet bgs) was sampled from boring locations AOI01-01 through AOI01-27, REES-MW001, and REES-MW002. Shallow subsurface soil (7 to 15 feet bgs) was sampled from boring locations AOI01-11, REES-MW001, and REES-MW002. Deep subsurface soil (78 to 80 feet bgs) was sampled from boring locations REES-MW001 and REES-MW002. PFOS was detected in surface soil exceeding the SL; PFNA was detected in surface and shallow subsurface exceeding the SL.

In surface soil at AOI 1, the five relevant compounds were detected. PFOS and PFNA were detected at concentrations exceeding the SLs. Exceedances were measured as follows:

- PFOS exceeded the 13 microgram per kilogram (µg/kg) SL at AOI01-11, AOI01-12, AOI01-24, AOI01-25, AOI01-26, and AOI01-27. Concentrations exceeding the SL ranged between 18.2 J+ µg/kg and 1,090 µg/kg, with the maximum concentration reported at AOI01-27. Several of these concentrations also exceed the industrial soil SL of 160 µg/kg.

- PFNA exceeded the 19 µg/kg SL at AOI01-03, AOI01-08, AOI01-15, AOI01-20, and REES-MW001. Concentrations exceeding the SL ranged between 19.7 µg/kg and 52.8 µg/kg, with the maximum concentration reported at REES-MW001.

PFOA, PFBS, and PFHxS were detected at concentrations below the SLs. The maximum detected compound was PFHxS at AOI01-27 at 99.0 µg/kg.

In shallow subsurface soil, the five relevant compounds were detected. PFNA was detected at a concentration equivalent to the SL at 250 J µg/kg, at REES-MW001 (13 to 15 feet bgs). No other detections of PFNA were measured at AOI 1. PFOA, PFOS, PFBS, and PFHxS were detected at concentrations below the SLs. The maximum detected compound was PFHxS at AOI01-11 (13 to 15 feet bgs) at 64.9 µg/kg.

In deep subsurface soil, PFNA was detected at one location, REES-MW001 (78 to 80 feet bgs), at a concentration of 0.120 J µg/kg. No other detections of the five relevant compounds were measured.

6.3.2 AOI 1 Groundwater Analytical Results

Figure 6-21 and **Figure 6-23** present the ranges of detections in groundwater at AOI 1. **Table 6-5** summarizes the groundwater results. At AOI 1, groundwater was sampled from permanent monitoring wells REES-MW001 and REES-MW002.

In groundwater at AOI 1, the five relevant compounds were detected; PFOS and PFNA exceeded the SLs. PFOS exceeded the 4 nanogram per liter (ng/L) SL at REES-MW002 at a concentration of 9.05 J ng/L. PFNA exceeded the 6 ng/L SL at both well locations, at concentrations of 18.8 J ng/L (REES-MW001) and 17.7 J ng/L (REES-MW002). No other exceedances of the groundwater SLs were reported.

PFOA, PFBS, and PFHxS were detected below the SLs; the maximum detected concentration was PFHxS at 3.44 J ng/L (REES-MW002).

6.3.3 AOI 1 Conclusions

Based on the results of the SI, PFOS and PFNA were detected in soil and groundwater above the SLs. Based on the exceedances of the SLs in soil and groundwater, 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: Fire Station. The results in soil and groundwater are summarized on **Table 6-2** through **Table 6-5**. Soil and groundwater results for AOI 2 are presented on **Figures 6-1**, **6-3**, **6-5**, **6-7**, **6-9**, **6-11**, **6-13**, **6-15**, **6-17**, **6-19**, **6-21**, and **Figure 6-23**.

6.4.1 AOI 2 Soil Analytical Results

Figures 6-1, **6-5**, **6-9**, **6-13**, and **6-17** present the ranges of detections in surface soil at AOI 2. **Figures 6-3**, **6-7**, **6-11**, **6-15**, and **6-19** present the ranges of detections in intermediate and deep soil at AOI 2. **Table 6-2** through **Table 6-4** summarize the soil results.

Surface soil (0 to 2 feet bgs) was sampled from boring locations AOI02-01, AOI02-04, REES-MW003, and REES-MW004. Shallow subsurface soil (7 to 15 feet bgs) was sampled from boring locations AOI02-01, REES-MW003, and REES-MW004. Deep subsurface soil (71 to 75 feet bgs) was sampled from boring locations REES-MW003 and REES-MW004. PFOA, PFOS, PFHxS, and PFNA were detected in soil at concentrations below the SLs; PFBS was not detected.

In surface soil at AOI 2, PFOA, PFOS, PFHxS, and PFNA were detected at concentrations below the SLs. The maximum detected compound was PFOS at AOI02-04 at 7.93 µg/kg. PFBS was not detected in surface soil.

In shallow subsurface soil, the five relevant compounds were detected below their respective SLs. The maximum detected compound was PFHxS at AOI02-01 (7 to 8 feet bgs) at 0.201 J µg/kg.

In deep subsurface soil, PFOA, PFOS, PFHxS, and PFNA were detected; PFOS was the highest detected concentration at 0.181 J µg/kg at REES-MW003 (71 to 73 feet bgs). PFBS was not detected.

6.4.2 AOI 2 Groundwater Analytical Results

Figure 6-21 and **Figure 6-23** present the ranges of detections in groundwater at AOI 2. **Table 6-5** summarizes the groundwater results. At AOI 2, groundwater was sampled from permanent monitoring wells REES-MW003 and REES-MW004.

In groundwater at AOI 2, the five relevant compounds were detected; PFOS and PFNA exceeded the SLs. PFOS exceeded the 4 ng/L SL at a concentration of 7.27 J ng/L (REES-MW004). PFNA exceeded the 6 ng/L SL at concentrations of 33.1 J ng/L (REES-MW003) and 51.2 J ng/L (REES-MW004). No other exceedances of the SLs were reported.

PFOA, PFBS, and PFHxS were detected below the SLs; the maximum detected concentration was PFBS at 19.8 J ng/L (REES-MW004).

6.4.3 AOI 2 Conclusions

PFOA, PFOS, PFHxS, and PFNA were detected in soil at concentrations below the SLs. PFOS and PFNA were detected in groundwater above the SLs. Based on the exceedances of the SLs in 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: former WWTP. The results in soil and groundwater are presented in **Table 6-2** through **Table 6-5**. Soil and groundwater results for AOI 3 are presented on **Figures 6-2**, **6-4**, **6-6**, **6-8**, **6-10**, **6-12**, **6-14**, **6-16**, **6-18**, **6-20**, **6-22**, and **Figure 6-24**.

6.5.1 AOI 3 Soil Analytical Results

Figures 6-2, **6-6**, **6-10**, **6-14**, and **6-18** present the ranges of detections in surface soil at AOI 3. **Figures 6-4**, **6-8**, **6-12**, **6-16**, and **6-20** present the ranges of detections in intermediate and deep soil at AOI 3. **Table 6-2** through **Table 6-4** summarize the soil results.

Surface soil (0 to 2 feet bgs) was sampled from boring locations AOI03-05 through AOI03-13 and REES-MW005 through REES-MW008. Shallow subsurface soil (2.5 to 15 feet bgs) was sampled from boring locations AOI03-13 through AOI03-15 and REES-MW005 through REES-MW008. Deep subsurface soil (25 to 55 feet bgs) was sampled from boring locations AOI03-13 through AOI03-15 and REES-MW005 through REES-MW008. PFOA, PFOS, and PFNA exceeded the SLs in soil. PFHxS and PFBS were detected in soil at concentrations below the SLs.

In surface soil at AOI 3, the five relevant compounds were detected. PFOA, PFOS, and PFNA were detected at concentrations exceeding the SLs at location AOI03-09. Exceedances were measured as follows:

- PFOA exceeded the 19 µg/kg SL at AOI03-09 with a maximum concentration of 65.9 J+ µg/kg (0 to 0.5 feet bgs).
- PFOS exceeded the residential soil SL of 13 µg/kg SL at AOI03-09 with a maximum concentration of 342 µg/kg (1 to 2 feet bgs). Several of these concentrations also exceed the PFOS industrial soil SL of 160 µg/kg.

- PFNA exceeded the 19 µg/kg SL at AOI03-09 with a maximum concentration of 38.1 µg/kg (1 to 2 feet bgs).

PFBS and PFHxS were detected at in surface soil concentrations below the SLs. The maximum detected compound was PFHxS at AOI03-09 with a concentration of 21.5 µg/kg.

In shallow subsurface soil, PFOS, PFHxS, and PFNA were detected at concentrations below the SLs. Detections were observed at AOI03-13, AOI03-14, and AOI03-15. The maximum detected concentration was PFOS at AOI03-15 (3 to 5 feet bgs) at 0.310 J µg/kg. PFOA and PFBS were not detected in shallow subsurface soil

In deep subsurface soil, PFOA, PFOS, PFBS, and PFNA were detected. Detections were observed at AOI03-14 and REES-MW006. The maximum detection occurred at AOI03-14 for PFOS, with a concentration of 1.32 µg/kg. PFHxS was not detected at AOI 3.

6.5.2 AOI 3 Groundwater Analytical Results

Figure 6-22 and **Figure 6-24** present the ranges of detections in groundwater at AOI 3. **Table 6-5** summarizes the groundwater results. Groundwater was sampled from permanent monitoring wells REES-MW005, REES-MW006, REES-MW007, and REES-MW008.

In groundwater at AOI 3, the five relevant compounds were detected; PFOS and PFNA exceeded the SLs. PFOS exceeded the 4 ng/L SL with concentrations of 4.06 J ng/L (REES-MW005) and 48.0 J ng/L (REES-MW008). PFNA exceeded the 6 ng/L SL with concentrations of 14.3 J ng/L (REES-MW0005), 94.3 J ng/L (REES-MW007), and 32.2 J ng/L (REES-MW008).

PFOA, PFBS, and PFHxS were detected below the SLs; the maximum detected concentration was PFHxS at 6.95 J ng/L (REES-MW007).

6.5.3 AOI 3 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFNA were detected in soil above the SLs. PFOS and PFNA 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.

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Table 6-2
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, Raymond F. Rees Training Center

	Area of Interest	AOI01																			
	Sample ID	AOI01-02-SB-0-0.5		AOI01-02-SB-0-0.5-D		AOI01-02-SB-0.5-1		AOI01-03-SB-0-0.5		AOI01-03-SB-0.5-1		AOI01-03-SB-1-1.5		AOI01-04-SB-0-2		AOI01-05-SB-0-0.5		AOI01-05-SB-0.5-1		AOI01-05-SB-1-2	
	Sample Date	10/19/2022		10/19/2022		10/19/2022		10/18/2022		10/18/2022		10/18/2022		10/19/2022		10/18/2022		10/18/2022		10/18/2022	
	Depth	0-0.5 ft		0-0.5 ft		0.5-1 ft		0-0.5 ft		0.5-1 ft		1-1.5 ft		0-2 ft		0-0.5 ft		0.5-1 ft		1-2 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	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PFHxS	130	ND	U	ND	U	ND	U	0.293	J+	0.284	J+	0.380	J+	0.055	J	ND	U	ND	U	ND	U
PFNA	19	13.2		14.1		8.05		3.00		19.7		22.3		ND	U	0.055	J	ND	U	ND	U
PFOA	19	0.084	J	0.087	J	ND	U	ND	U	0.253	J	0.228	J	0.239	J	0.144	J	ND	U	ND	U
PFOS	13	1.70		1.67		1.05		2.23	J+	2.29	J+	2.84	J+	0.200	J	0.062	J	0.066	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
J+ = Estimated concentration, biased high
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. LOD values are presented in Appendix F
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, Raymond F. Rees Training Center

	Area of Interest	AOI01																			
	Sample ID	AOI01-06-SB-0-0.5		AOI01-06-SB-0-0.5-D		AOI01-06-SB-0.5-1		AOI01-06-SB-0.5-1 RE		AOI01-07-SB-0-0.5		AOI01-07-SB-0-0.5-D		AOI01-07-SB-0.5-1		AOI01-07-SB-1-2		AOI01-08-SB-0-0.5		AOI01-08-SB-0.5-1	
	Sample Date	10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/19/2022		10/19/2022	
	Depth	0-0.5 ft		0-0.5 ft		0.5-1 ft		0.5-1 ft		0-0.5 ft		0-0.5 ft		0.5-1 ft		1-2 ft		0-0.5 ft		0.5-1 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	ND	U	ND	U	ND	U			0.043	J	0.031	J	0.041	J	ND	U	ND	U	ND	U
PFHxS	130	ND	U	ND	U	ND	U			ND	U	ND	U	0.113	J	0.103	J	0.037	J	0.112	J
PFNA	19	10.0		9.21				7.10	J	1.66		1.35		9.51		6.63		1.11		14.9	
PFOA	19	ND	U	ND	U	ND	U			ND	U	ND	U	0.094	J	0.170	J	ND	U	0.240	J
PFOS	13	0.239	J	0.205	J	ND	U			0.613	J	0.541	J	0.889	J	0.466	J	0.085	J	0.160	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.

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J+ = Estimated concentration, biased high
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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. LOD values are presented in Appendix F
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, Raymond F. Rees Training Center

	Area of Interest	AOI01																			
	Sample ID	AOI01-08-SB-1-1.5		AOI01-09-SB-0-1		01-10-SB-0-0.5-20221		01-10-SB-0-0.5-20221		AOI01-11-SB-0-2		AOI01-12-SB-0-0.5		AOI01-12-SB-0.5-1		AOI01-12-SB-1-2		AOI01-13-SB-0-0.5		AOI01-13-SB-0.5-1	
	Sample Date	10/19/2022		10/18/2022		10/18/2022		10/19/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022	
	Depth	1-1.5 ft		0-1 ft		0-0.5 ft		0-0.5 ft		0-2 ft		0-0.5 ft		0.5-1 ft		1-2 ft		0-0.5 ft		0.5-1 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	ND	U	ND	U	ND	U	ND	U	0.249	J	0.063	J	0.028	J	0.031	J	0.028	J	0.022	J
PFHxS	130	0.052	J	ND	U	ND	U	ND	U	23.1	J	0.857	J	1.31		3.20	J+	0.345	J	0.324	J
PFNA	19	26.4		ND	U	5.46		3.96		9.93	J+	0.505	J	11.2		3.84	J+	3.11		11.1	
PFOA	19	0.515	J	ND	U	0.103	J	ND	U	1.37		0.605	J	0.586	J	2.52		0.199	J	0.411	J
PFOS	13	0.061	J	0.216	J+	0.112	J	0.164	J	429	J+	52.6		311		24.5	J+	4.27		1.74	

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.

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J = Estimated concentration
J+ = Estimated concentration, biased high
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. LOD values are presented in Appendix F
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, Raymond F. Rees Training Center

	Area of Interest	AOI01																			
	Sample ID	AOI01-13-SB-1-2		AOI01-13-SB-1-2-D		AOI01-14-SB-0-2		AOI01-14-SB-0-2-D		AOI01-15-SB-0-0.5		AOI01-15-SB-0.5-1		AOI01-15-SB-1-2		AOI01-16-SB-0-0.5		AOI01-16-SB-0.5-1		AOI01-16-SB-1-2	
	Sample Date	10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/17/2022		10/17/2022		10/17/2022	
	Depth	1-2 ft		1-2 ft		0-2 ft		0-2 ft		0-0.5 ft		0.5-1 ft		1-2 ft		0-0.5 ft		0.5-1 ft		1-2 ft	
Analyte	**OSD Screening Level [a]**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**			**Result**	**Qual**	**Result**	**Qual**
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
PFBS	1900	0.024	J	0.019	J	0.025	J	0.024	J	0.028	J	ND	U	0.038	J	ND	U	ND	U	ND	UJ
PFHxS	130	0.499	J	0.416	J	0.266	J	0.329	J	0.150	J	0.194	J	0.231	J	0.063	J+	0.116	J	0.079	J+
PFNA	19	1.76		1.06		1.20		1.47		20.2		6.52		5.49		3.75	J+	0.440	J	0.044	J+
PFOA	19	0.181	J	0.137	J	0.277	J	0.346	J	0.107	J	0.127	J	0.190	J	0.103	J+	0.134	J	ND	UJ
PFOS	13	0.252	J	0.595	J	0.255	J	0.414	J	1.88	J+	0.384	J+	0.577	J+	0.400	J+	ND	U	ND	UJ

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
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µg/kg	micrograms per kilogram

Table 6-2
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, Raymond F. Rees Training Center

	Area of Interest	AOI01																			
	Sample ID	AOI01-17-SB-0-0.5		AOI01-17-SB-0.5-1		AOI01-17-SB-1-2		AOI01-18-SB-0-0.5		AOI01-18-SB-0-0.5-D		AOI01-18-SB-0.5-1		AOI01-18-SB-1-2		AOI01-19-SB-0-2		AOI01-20-SB-0-0.5		AOI01-20-SB-0.5-1	
	Sample Date	10/17/2022		10/17/2022		10/17/2022		10/17/2022		10/17/2022		10/17/2022		10/17/2022		10/17/2022		10/18/2022		10/18/2022	
	Depth	0-0.5 ft		0.5-1 ft		1-2 ft		0-0.5 ft		0-0.5 ft		0.5-1 ft		1-2 ft		0-2 ft		0-0.5 ft		0.5-1 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	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	0.041	J
PFHxS	130	0.155	J	0.141	J	ND	U	0.448	J	0.397	J	1.05		0.364	J	0.340	J	0.107	J	0.893	J
PFNA	19	1.63		0.231	J	ND	U	2.98		2.75		2.66		0.314	J	3.77		10.2		34.3	
PFOA	19	0.079	J	ND	U	ND	U	0.093	J	0.079	J	0.193	J	0.085	J	0.294	J	0.147	J	0.406	J
PFOS	13	0.155	J	ND	U	ND	U	2.73		2.43		1.57		0.359	J	0.057	J	2.80		4.54	

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.

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LCMSMS	liquid chromatography with tandem mass spectrometry
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QSM	Quality Systems Manual
Qual	interpreted qualifier
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µg/kg	micrograms per kilogram

Table 6-2
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, Raymond F. Rees Training Center

	Area of Interest	AOI01																			
	Sample ID	AOI01-20-SB-1-2		AOI01-21-SB-0-2		AOI01-22-SB-0-0.5		AOI01-22-SB-0.5-1		AOI01-22-SB-0.5-1-D		AOI01-22-SB-1-2		AOI01-23-SB-0-2		AOI01-24-SB-0-0.5		AOI01-24-SB-0.5-1		AOI01-24-SB-1-2	
	Sample Date	10/18/2022		10/18/2022		10/17/2022		10/17/2022		10/17/2022		10/17/2022		10/17/2022		10/17/2022		10/17/2022		10/17/2022	
	Depth	1-2 ft		0-2 ft		0-0.5 ft		0.5-1 ft		0.5-1 ft		1-2 ft		0-2 ft		0-0.5 ft		0.5-1 ft		1-2 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	0.029	J	0.052	J	ND	U	ND	U	ND	U	ND	U	ND	U	0.027	J	ND	UJ	0.030	J+
PFHxS	130	0.537	J	0.934		0.142	J	0.552	J	0.664	J	0.374	J	2.18	J+	5.48		3.17	J+	3.39	J+
PFNA	19	7.83		0.107	J	1.74		0.241	J	0.175	J	0.426	J	1.35		4.97		1.17	J+	0.325	J+
PFOA	19	0.228	J	ND	U	ND	U	0.093	J	0.097	J	ND	U	0.175	J	0.652	J	0.280	J+	0.184	J+
PFOS	13	0.194	J	0.871	J	1.59		0.099	J	0.070	J	0.250	J	5.33	J+	20.1		4.90	J+	1.06	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.

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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, Raymond F. Rees Training Center

	Area of Interest	AOI01																			
	Sample ID	AOI01-25-SB-0-0.5		AOI01-25-SB-0.5-1		AOI01-25-SB-1-2		AOI01-26-SB-0-0.5		AOI01-26-SB-0.5-1		AOI01-26-SB-1-2		AOI01-27-SB-0-0.5		AOI01-27-SB-0.5-1		AOI01-27-SB-1-2		REES-MW001-SB-0-1.5	
	Sample Date	10/17/2022		10/17/2022		10/17/2022		10/17/2022		10/17/2022		10/17/2022		10/18/2022		10/18/2022		10/18/2022		10/19/2022	
	Depth	0-0.5 ft		0.5-1 ft		1-2 ft		0-0.5 ft		0.5-1 ft		1-2 ft		0-0.5 ft		0.5-1 ft		1-2 ft		0-1.5 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	0.195	J	0.128	J	0.168	J	0.130	J	0.067	J	0.040	J	0.642	J	0.452	J	0.634	J	ND	U
PFHxS	130	1.34		2.27		4.73		1.46		8.28		3.87	J+	10.3		82.1		99.0		0.093	J
PFNA	19	2.24	J+	2.17		0.517	J	0.526	J	1.35		0.053	J+	0.296	J	1.63	J	1.91	J	52.8	
PFOA	19	0.209	J+	0.379	J	0.232	J	0.497	J	1.80		0.292	J+	1.33		6.25	J	7.20	J	0.302	J
PFOS	13	18.2	J+	18.4		3.22		97.9		26.3		1.85	J+	159		724		1090		7.11	

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.

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PFHxS	perfluorohexanesulfonic acid
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Acronyms and Abbreviations

AOI	Area of Interest
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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. LOD values are presented in Appendix F
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, Raymond F. Rees Training Center

	Area of Interest	AOI01		AOI02										AOI03							
	Sample ID	REES-MW002-SB-0-2		AOI02-01-SB-0-2		AOI02-04-SB-0-2		AOI02-04-SB-0-2-D		REES-MW003-SB-0-2		REES-MW004-SB-0-2		AOI03-05-SB-0-0.5		AOI03-05-SB-0.5-1		AOI03-06-SB-0-0.5		AOI03-06-SB-0.5-1	
	Sample Date	10/18/2022		10/19/2022		10/19/2022		10/19/2022		11/10/2022		11/10/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022	
	Depth	0-2 ft		0-2 ft		0-2 ft		0-2 ft		0-2 ft		0-2 ft		0-0.5 ft		0.5-1 ft		0-0.5 ft		0.5-1 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	0.059	J+	ND	U	ND	U	ND	UJ	ND	U	ND	U	ND	U	ND	UJ	ND	U	0.021	J
PFHxS	130	1.30	J+	0.065	J+	0.472	J	0.317	J+	ND	U	0.134	J	0.092	J+	0.198	J+	ND	U	0.097	J
PFNA	19	0.223	J+	0.222	J+	1.72		1.05	J+	0.087	J	0.980	J	0.198	J+	0.372	J+	0.019	J	0.020	J
PFOA	19	0.126	J+	ND	UJ	2.90		1.69	J+	ND	U	0.501	J	ND	UJ	0.184	J+	ND	U	ND	U
PFOS	13	5.19	J+	0.231	J+	7.93		7.47	J+	ND	U	5.54		1.18	J+	0.977	J+	ND	U	2.92	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.

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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. LOD values are presented in Appendix F
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, Raymond F. Rees Training Center

	Area of Interest	AOI03																			
	Sample ID	AOI03-06-SB-1-1.5		AOI03-07-SB-0-0.5		AOI03-07-SB-0-1		AOI03-07-SB-1-2		AOI03-07-SB-1-2-D		AOI03-08-SB-0-0.5		AOI03-08-SB-0.5-1		AOI03-08-SB-1-1.5		AOI03-09-SB-0-0.5		AOI03-09-SB-0-0.5-D	
	Sample Date	10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/19/2022		10/19/2022	
	Depth	1-1.5 ft		0-0.5 ft		0-1 ft		1-2 ft		1-2 ft		0-0.5 ft		0.5-1 ft		1-1.5 ft		0-0.5 ft		0-0.5 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	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	0.020	J	ND	U	0.024	J	0.959	J+
PFHxS	130	ND	U	ND	U	0.050	J	ND	U	0.037	J	ND	U	0.059	J	0.041	J	0.822	J	10.3	
PFNA	19	ND	U	0.032	J	0.027	J	0.022	J	0.020	J	0.045	J	0.355	J	0.220	J	2.87		17.2	J+
PFOA	19	ND	U	0.088	J	0.096	J	ND	U	ND	U	0.162	J	0.705	J	0.430	J	4.86		65.9	J+
PFOS	13	ND	U	2.22		1.68	J+	1.21	J+	1.17	J+	2.02	J+	12.7		6.87	J+	24.6		181	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.

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ft	feet
HQ	hazard quotient
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ND	analyte not detected above the LOD. LOD values are presented in Appendix F
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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, Raymond F. Rees Training Center

	Area of Interest	AOI03																			
	Sample ID	AOI03-09-SB-0.5-1		AOI03-09-SB-1-2		AOI03-10-SB-0-0.5		AOI03-10-SB-0.5-1		AOI03-10-SB-1-2		AOI03-11-SB-0-0.5		AOI03-11-SB-0.5-1		AOI03-11-SB-1-2		AOI03-12-SB-0-0.5		AOI03-12-SB-0.5-1	
	Sample Date	10/19/2022		10/19/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022		10/18/2022	
	Depth	0.5-1 ft		1-2 ft		0-0.5 ft		0.5-1 ft		1-2 ft		0-0.5 ft		0.5-1 ft		1-2 ft		0-0.5 ft		0.5-1 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	0.214	J	0.870	J	0.055	J+	0.075	J+	ND	U	ND	U	0.064	J+	ND	U	0.070	J+	ND	U
PFHxS	130	2.98		21.5		0.325	J+	0.765	J+	0.408	J+	0.351	J+	0.407	J+	0.032	J	0.433	J+	ND	U
PFNA	19	7.88		38.1		0.332	J	0.269	J	0.190	J	0.114	J	0.098	J	0.100	J	0.277	J	0.062	J
PFOA	19	14.1		33.1		0.394	J	0.376	J	0.282	J	ND	U	ND	U	ND	U	ND	U	ND	U
PFOS	13	72.3		342		0.873	J+	1.61	J+	0.776	J+	1.89	J+	2.02	J+	0.094	J	2.44	J+	0.070	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
J+ = Estimated concentration, biased high
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. LOD values are presented in Appendix F
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, Raymond F. Rees Training Center

	Area of Interest	AOI03											
	Sample ID	AOI03-12-SB-1-2		AOI03-13-SB-1-2		REES-MW005-SB-0-2		REES-MW006-SB-0-2		REES-MW007-SB-0-2		REES-MW008-SB-0-2	
	Sample Date	10/18/2022		11/09/2022		11/10/2022		11/07/2022		11/07/2022		10/18/2022	
	Depth	1-2 ft		1-2 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**
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)													
PFBS	1900	ND	U	0.047	J	ND	U	ND	U	ND	U	ND	U
PFHxS	130	ND	U	0.051	J	ND	U	ND	U	ND	U	ND	U
PFNA	19	0.135	J	0.154	J	ND	U	ND	U	ND	U	ND	U
PFOA	19	ND	U	0.593	J	ND	U	ND	U	ND	U	ND	U
PFOS	13	0.250	J+	1.61	J	ND	U	0.050	J	0.100	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
J+ = Estimated concentration, biased high
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. LOD values are presented in Appendix F
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, Raymond F. Rees Training Center

	Area of Interest	AOI01										AOI02							
	Sample ID	AOI01-11-SB-7-8		AOI01-11-SB-13-15		REES-MW001-SB-13-15		REES-MW002-SB-13-15		REES-MW002-SB-13-15-D		AOI02-01-SB-7-8		AOI02-01-SB-13-15		REES-MW003-SB-13-15		REES-MW003-SB-13-15-D	
	Sample Date	11/29/2022		11/29/2022		12/02/2022		11/22/2022		11/29/2022		11/29/2022		11/29/2022		11/29/2022		11/29/2022	
	Depth	7-8 ft		13-15 ft		13-15 ft		13-15 ft		13-15 ft		7-8 ft		13-15 ft		13-15 ft		13-15 ft	
Analyte	**OSD Screening Level [a]**	**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	25000	1.15		3.37		0.032	J	0.030	J	0.032	J	ND	U	ND	U	ND	UJ	0.035	J
PFHxS	1600	51.0	J	64.9		0.884	J	ND	U	ND	U	0.201	J	ND	U	0.037	J+	0.043	J
PFNA	250	ND	U	ND	U	250	J	ND	U	ND	U	0.022	J	ND	U	0.024	J+	0.039	J
PFOA	250	2.86		0.910	J	28.7	J	ND	U	ND	U	ND	U	ND	U	ND	UJ	ND	U
PFOS	160	0.072	J	ND	U	0.146	J	ND	U	ND	U	0.071	J	ND	U	0.066	J+	0.105	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
J+ = Estimated concentration, biased high
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.

Notes
ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

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. LOD values are presented in Appendix F
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, Raymond F. Rees Training Center

	Area of Interest	AOI02		AOI03															
	Sample ID	REES-MW004-SB-13-15		AOI03-13-SB-13-15		AOI03-14-SB-2.5-4.5		AOI03-14-SB-13-15		AOI03-15-SB-3-5		AOI03-15-SB-13-14.5		REES-MW005-SB-13-15		REES-MW005-SB-13-15-D		REES-MW006-SB-13-15	
	Sample Date	12/12/2022		11/09/2022		11/08/2022		11/08/2022		11/08/2022		11/08/2022		11/16/2022		11/16/2022		11/18/2022	
	Depth	13-15 ft		13-15 ft		2.5-4.5 ft		13-15 ft		3-5 ft		13-14.5 ft		13-15 ft		13-15 ft		13-15 ft	
Analyte	OSD Screening Level [a]	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	25000	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	UJ
PFHxS	1600	0.058	J	ND	U	0.057	J	ND	U	ND	U	ND	U	ND	U	ND	U	ND	UJ
PFNA	250	0.122	J	0.022	J	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	UJ
PFOA	250	0.139	J	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	UJ
PFOS	160	0.059	J	0.103	J	ND	U	ND	U	0.310	J	0.080	J	ND	U	ND	U	ND	UJ

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
J+ = Estimated concentration, biased high
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.

Notes
ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

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. LOD values are presented in Appendix F
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, Raymond F. Rees Training Center

	Area of Interest	AOI03			
	Sample ID	REES-MW007-SB-13-15		REES-MW008-SB-13-15	
	Sample Date	11/10/2022		11/15/2022	
	Depth	13-15 ft		13-15 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)					
PFBS	25000	ND	U	ND	U
PFHxS	1600	ND	U	ND	U
PFNA	250	ND	U	ND	U
PFOA	250	ND	U	ND	U
PFOS	160	ND	U	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 industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers
J = Estimated concentration
J+ = Estimated concentration, biased high
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.

Notes
ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

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. LOD values are presented in Appendix F
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, Raymond F. Rees Training Center

Area of Interest	AOI01						AOI02				AOI03			
Sample ID	REES-MW001-SB-78-80		REES-MW001-SB-78-80-D		REES-MW002-SB-78-80		REES-MW003-SB-71-73		REES-MW004-SB-73-75		AOI03-13-SB-25-26		AOI03-14-SB-28-30	
Sample Date	12/05/2022		12/05/2022		11/22/2022		11/30/2022		12/13/2022		11/09/2022		11/08/2022	
Depth	78-80 ft		78-80 ft		78-80 ft		71-73 ft		73-75 ft		25-26 ft		28-30 ft	
Analyte	**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	ND	U	ND	U	ND	U	ND	U	ND	UJ	ND	U	ND	U
PFHxS	ND	U	ND	U	ND	U	ND	U	0.077	J+	ND	U	ND	U
PFNA	0.120	J	ND	U	ND	U	ND	U	0.137	J+	ND	U	0.119	J
PFOA	ND	U	ND	U	ND	U	ND	U	0.153	J+	ND	U	0.358	J
PFOS	ND	U	ND	U	ND	U	0.181	J	0.096	J+	ND	U	1.32	

Interpreted Qualifiers
J = Estimated concentration
J+ = Estimated concentration, biased high
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.

Notes
ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

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
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD. LOD values are presented in Appendix F
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
µg/kg	micrograms per kilogram

Table 6-4
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Deep Subsurface Soil
Site Inspection Report, Raymond F. Rees Training Center

Area of Interest	AOI03									
Sample ID	AOI03-15-SB-28-30		REES-MW005-SB-50-51		REES-MW006-SB-54-55		REES-MW007-SB-48-49		REES-MW008-SB-44-45	
Sample Date	11/08/2022		11/16/2022		11/18/2022		11/10/2022		11/15/2022	
Depth	28-30 ft		50-51 ft		54-55 ft		48-49 ft		44-45 ft	
Analyte	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)										
PFBS	ND	U	ND	U	0.023	J+	ND	U	ND	U
PFHxS	ND	U	ND	U	ND	UJ	ND	U	ND	U
PFNA	ND	U	ND	U	ND	U	ND	U	ND	U
PFOA	ND	U	ND	U	ND	U	ND	U	ND	U
PFOS	ND	U	ND	U	ND	U	ND	U	ND	U

Interpreted Qualifiers
J = Estimated concentration
J+ = Estimated concentration, biased high
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.

Notes
ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

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
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD. LOD values are presented in Appendix F
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, Raymond F. Rees Training Center

	Area of Interest	AOI01						AOI02				AOI03							
	Sample ID	REES-MW001-GW		REES-MW002-GW		REES-MW002-GW-D		REES-MW003-GW		REES-MW004-GW		REES-MW005-GW		REES-MW006-GW		REES-MW007-GW		REES-MW008-GW	
	Sample Date	12/16/2022		12/05/2022		12/05/2022		12/05/2022		12/17/2022		12/04/2022		12/04/2022		12/17/2022		12/04/2022	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Water, LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)																			
PFBS	601	1.27	J	1.09	J	1.71	J	9.13	J	19.8	J	ND	UJ	ND	UJ	2.09	J	ND	UJ
PFHxS	39	ND	UJ	ND	UJ	3.44	J	4.03	J	12.1	J	1.33	J	ND	UJ	6.95	J	4.87	J
PFNA	6	18.8	J	17.7	J	15.5	J	33.1	J	51.2	J	14.3	J	3.69	J	94.3	J	32.2	J
PFOA	6	ND	UJ	ND	UJ	1.29	J	1.14	J	2.12	J	1.14	J	0.982	J	4.45	J	1.34	J
PFOS	4	1.32	J	1.63	J	9.05	J	3.62	J	7.27	J	4.06	J	2.11	J	3.24	J	48.0	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.

Notes
ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

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. LOD values are presented in Appendix F
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

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PFOA Detections in Soil - AOI01 and AOI02 Surface

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/18/2023	GIS BY	MS	4/18/2023
SCALE	1:2,160	CHK BY	VG	4/18/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/18/2023

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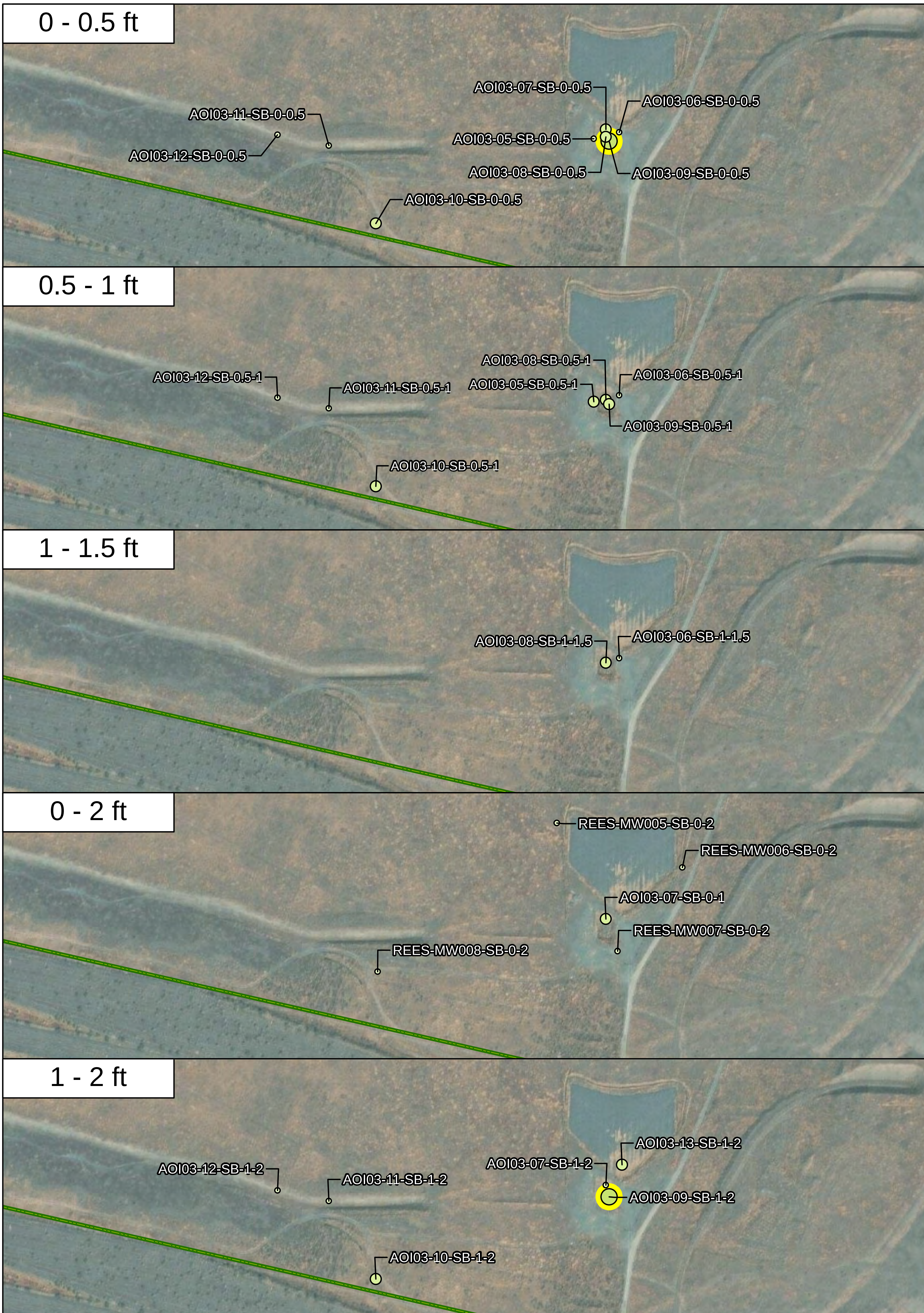
Figure 6-1



Legend

Facility Boundary

Umatilla Chemical Depot

PFOA Results (µg/Kg)

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

N

0 150 300 600 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.

PFOA Detections in Soil - AOI03 Surface

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	5/17/2023	GIS BY	MS	5/17/2023
SCALE	1:3,600	CHK BY	VG	5/17/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	5/17/2023

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Figure 6-2

Legend

Facility Boundary

Umatilla Chemical Depot

PFOA Results (µg/Kg)

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

N

0 90 180 360 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.

PFOA Detections in Soil - AOI01 and AOI02 Intermediate and Deep

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,160	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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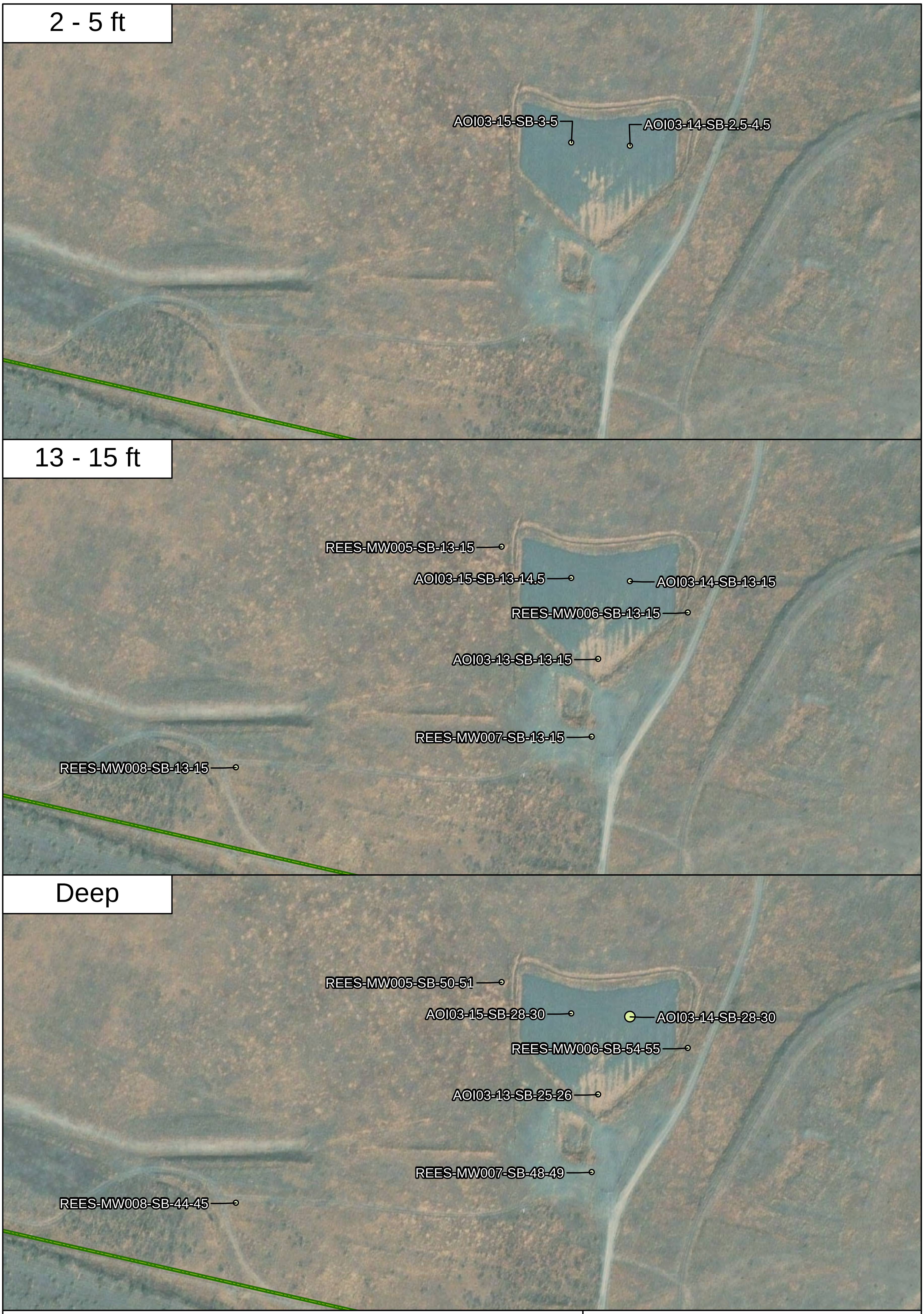
Figure 6-3



Legend

Facility Boundary

Umatilla Chemical Depot

PFOA Results (µg/Kg)

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

N

0 100 200 400 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.

PFOA Detections in Soil - AOI03 Intermediate and Deep

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/12/2023	GIS BY	MS	4/12/2023
SCALE	1:2,400	CHK BY	VG	4/12/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/12/2023

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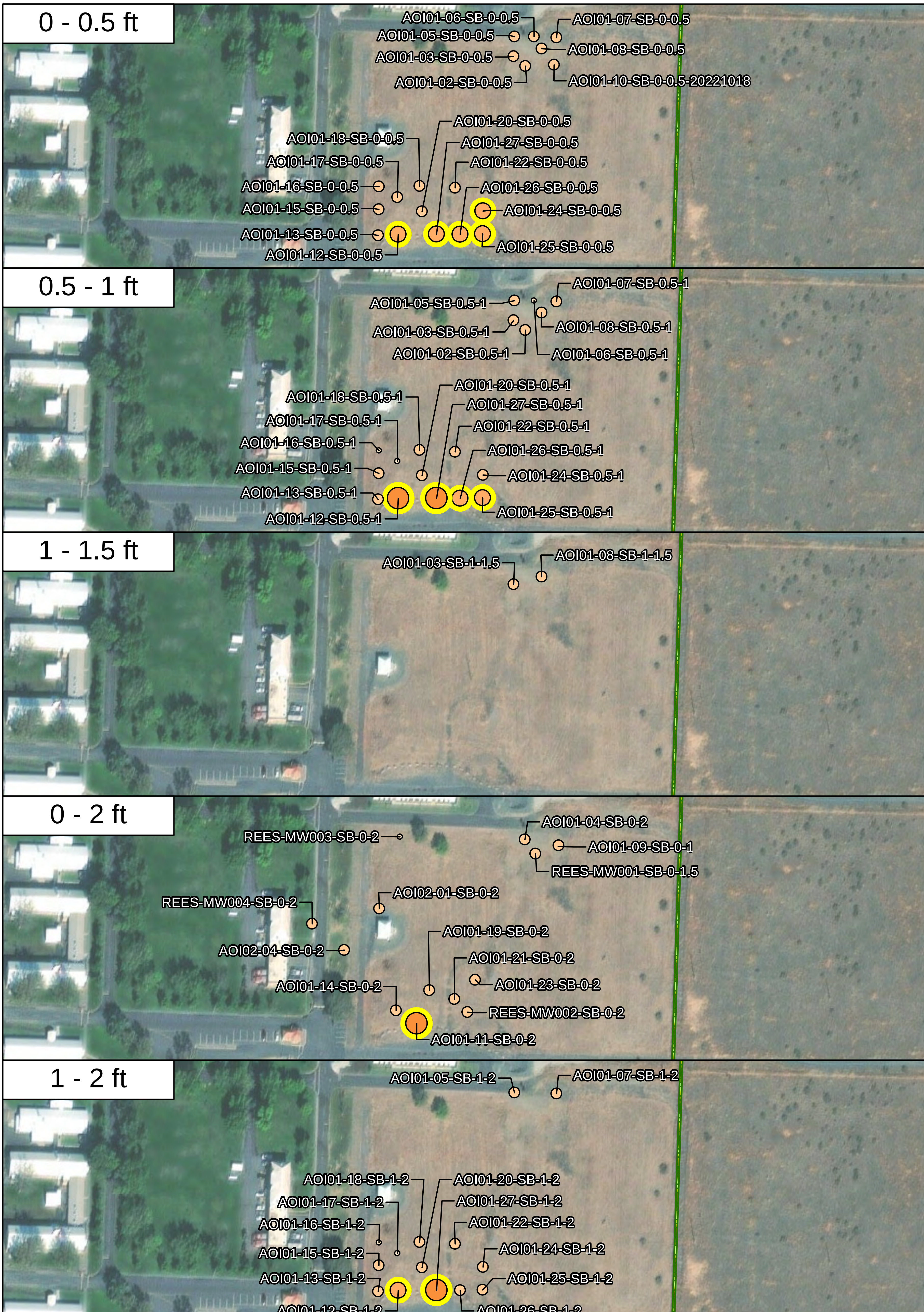
Figure 6-4



Legend

Facility Boundary

Umatilla Chemical Depot

PFOS Results (µg/Kg)

- ND
- >ND - 13
- >13 - 160
- >160 - 1,600
- >1,600

N

0 90 180 360 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.

PFOS Detections in Soil - AOI01 and AOI02 Surface

CLIENT	ARNG		
PROJECT	Site Inspection at Camp Umatilla, OR		
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,160	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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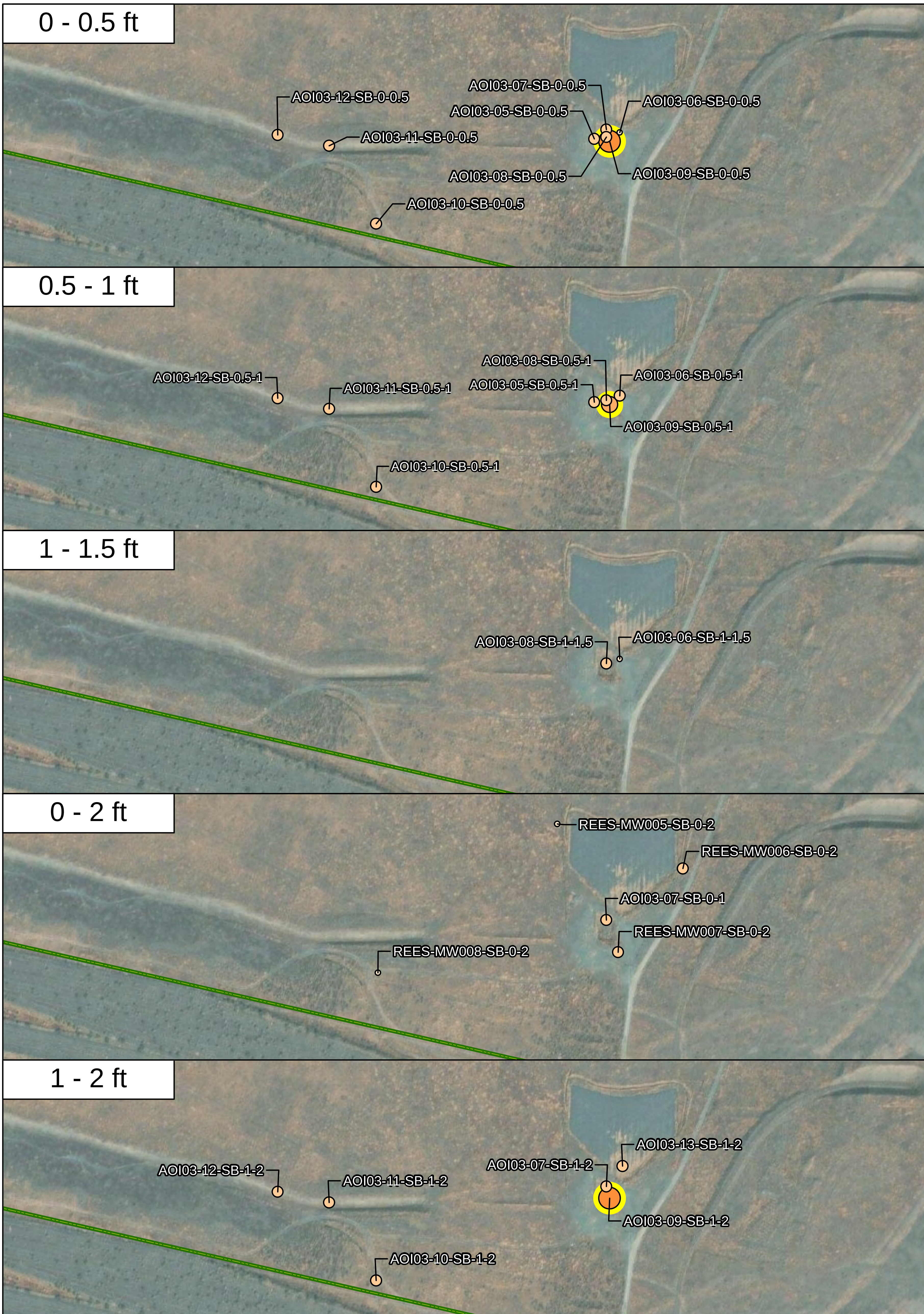
Figure 6-5



Legend

Facility Boundary

Umatilla Chemical Depot

PFOS Results (µg/Kg)

- ND
- >ND - 13
- >13 - 160
- >160 - 1,600
- >1,600

N

0 150 300 600 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.

PFOS Detections in Soil - AOI03 Surface

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	5/17/2023	GIS BY	MS	5/17/2023
SCALE	1:3,600	CHK BY	VG	5/17/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	5/17/2023

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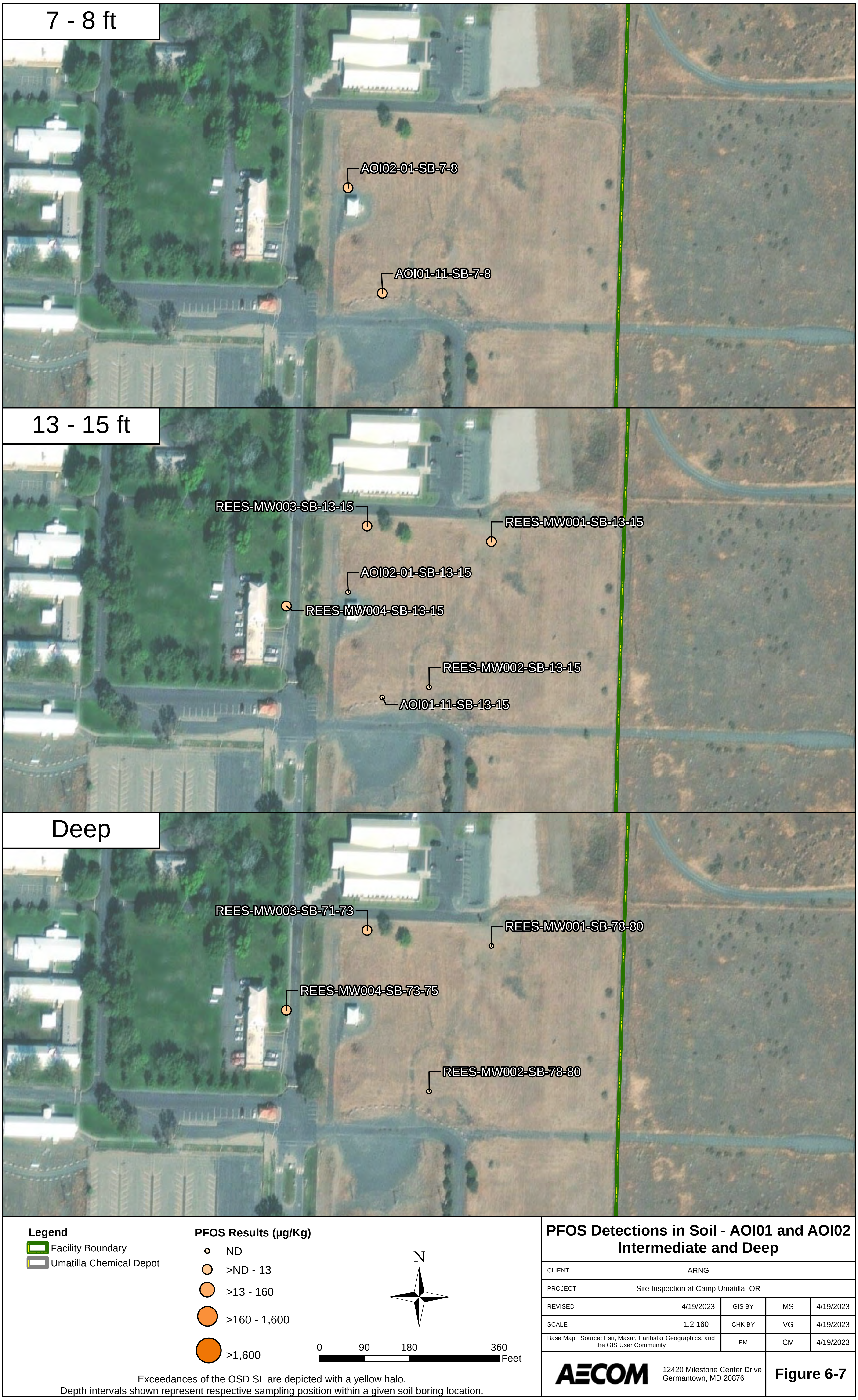
Figure 6-6



PFOS Detections in Soil - AOI01 and AOI02 Intermediate and Deep

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,160	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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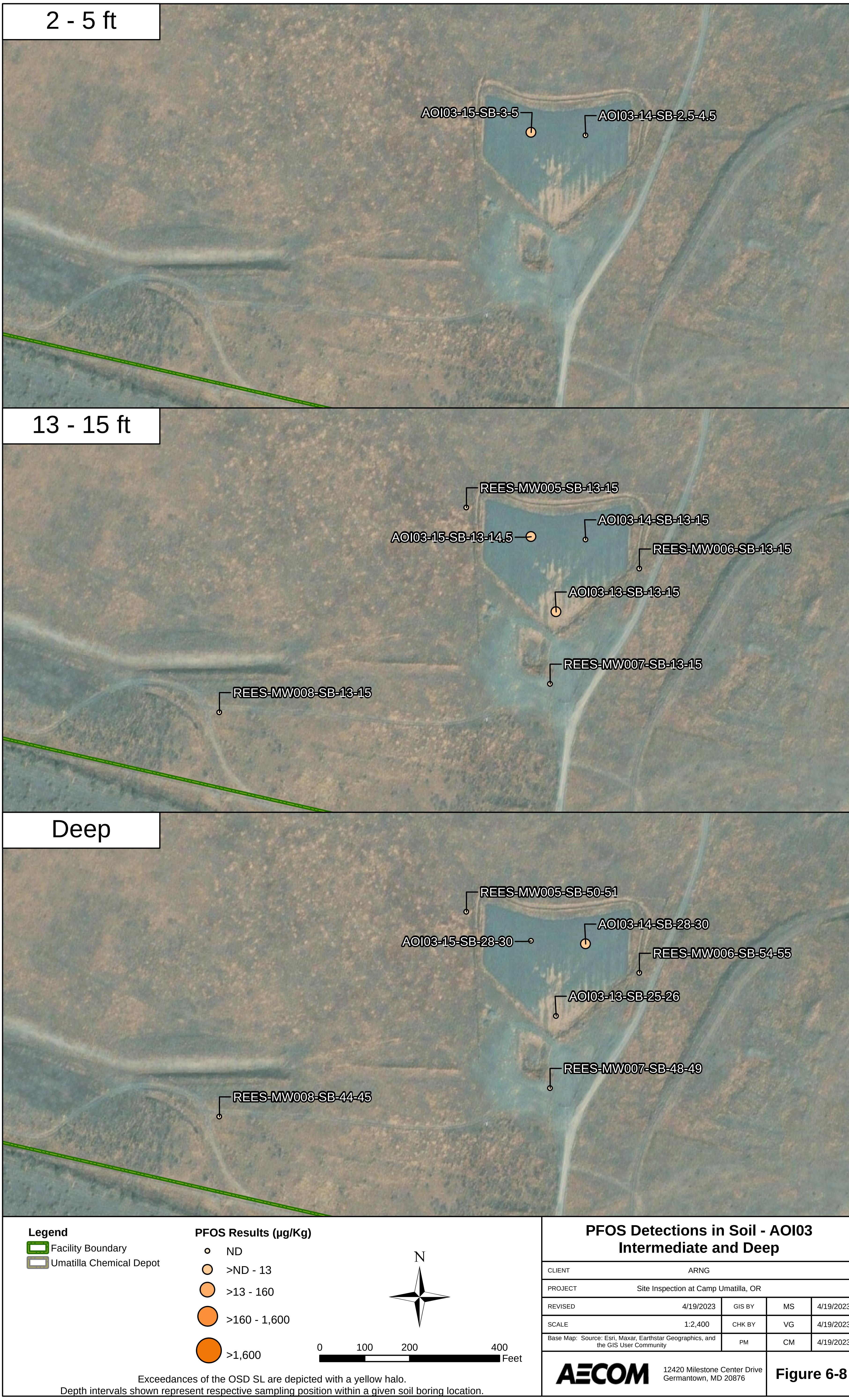
Figure 6-7



PFOS Detections in Soil - AOI03 Intermediate and Deep

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,400	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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Figure 6-8

Legend

Facility Boundary

Umatilla Chemical Depot

PFBS Results (µg/Kg)

- ND
- >ND - 10
- >10 - 1,900
- >1,900 - 25,000
- >25,000

N

0 90 180 360 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.

PFBS Detections in Soil - AOI01 and AOI02 Surface

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,160	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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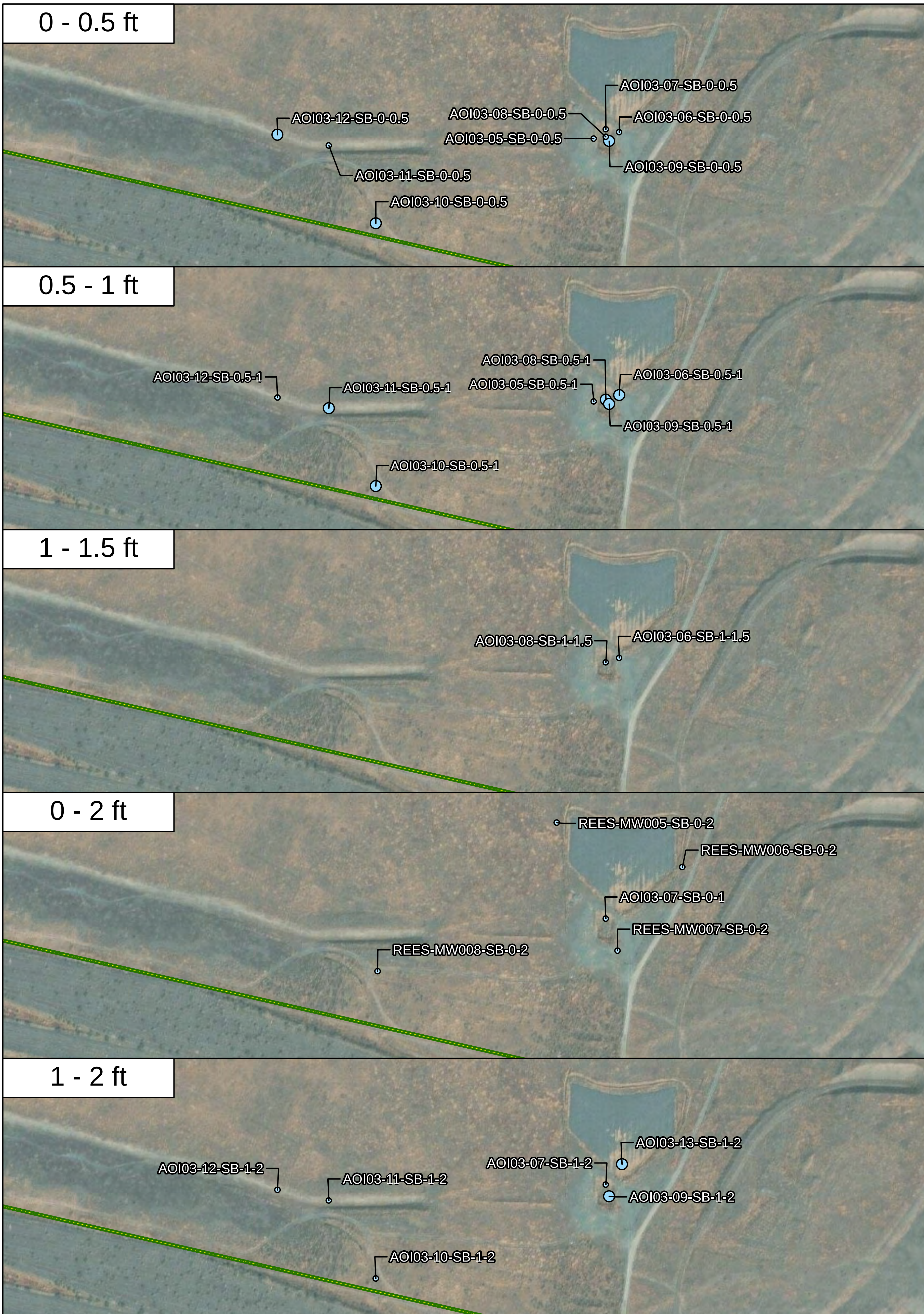
Figure 6-9



Legend

- Facility Boundary
- Umatilla Chemical Depot

PFBS Results (µg/Kg)

- ND
- >ND - 10
- >10 - 1,900
- >1,900 - 25,000
- >25,000

N

0 150 300 600 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.

PFBS Detections in Soil - AOI03 Surface

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	5/17/2023	GIS BY	MS	5/17/2023
SCALE	1:3,600	CHK BY	VG	5/17/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	5/17/2023

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Figure 6-10

Legend

Facility Boundary

Umatilla Chemical Depot

PFBS Results (μg/Kg)

- ND
- >ND - 10
- >10 - 1,900
- >1,900 - 25,000
- >25,000

N

0 90 180 360 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.

PFBS Detections in Soil - AOI01 and AOI02 Intermediate and Deep

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,160	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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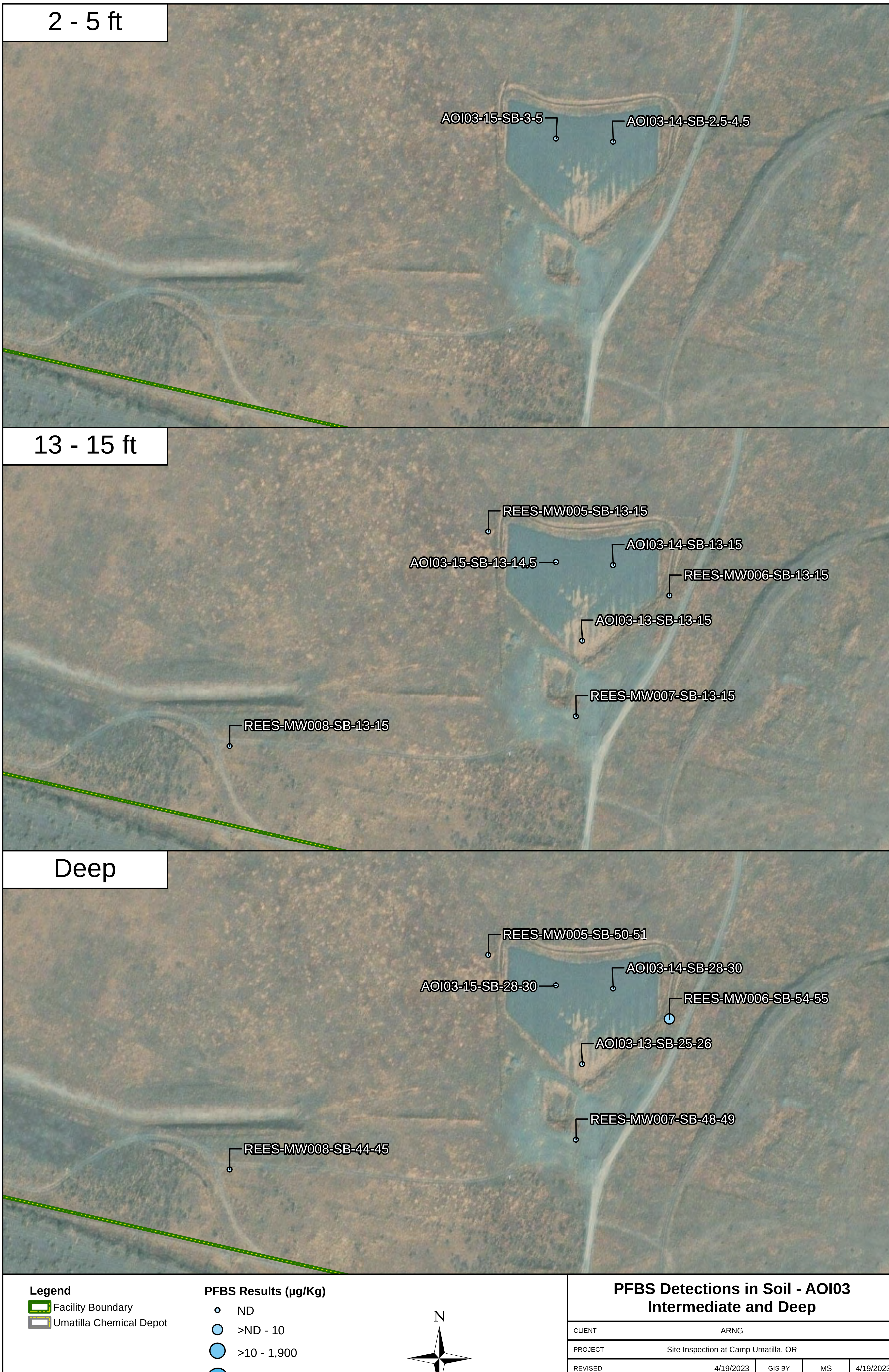
Figure 6-11



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

PFBS Detections in Soil - AOI03 Intermediate and Deep

CLIENT	ARNG		
PROJECT	Site Inspection at Camp Umatilla, OR		
REVISED	4/19/2023	GIS BY: MS	4/19/2023
SCALE	1:2,400	CHK BY: VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM: CM	4/19/2023

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Figure 6-12

Legend

Facility Boundary

Umatilla Chemical Depot

PFHxS Results (µg/Kg)

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

N

0 90 180 360 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.

PFHxS Detections in Soil - AOI01 and AOI02 Surface

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,160	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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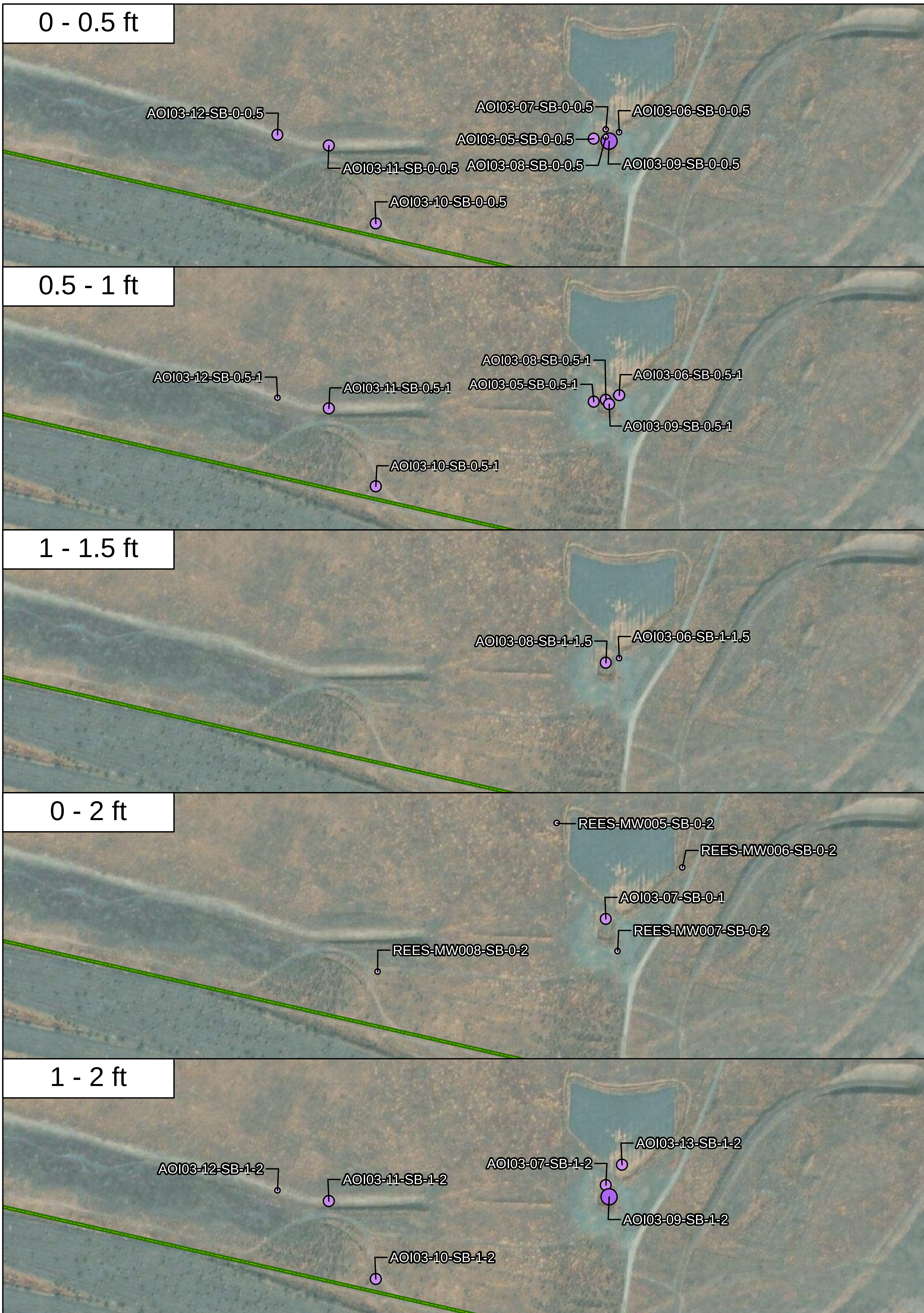
Figure 6-13



Legend

Facility Boundary

Umatilla Chemical Depot

PFHxS Results (µg/Kg)

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

N

0 150 300 600 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.

PFHxS Detections in Soil - AOI03 Surface

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	5/17/2023	GIS BY	MS	5/17/2023
SCALE	1:3,600	CHK BY	VG	5/17/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	5/17/2023

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Figure 6-14

Legend

Facility Boundary

Umatilla Chemical Depot

PFHxS Results (µg/Kg)

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

N

0 90 180 360 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.

PFHxS Detections in Soil - AOI01 and AOI02 Intermediate and Deep

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,160	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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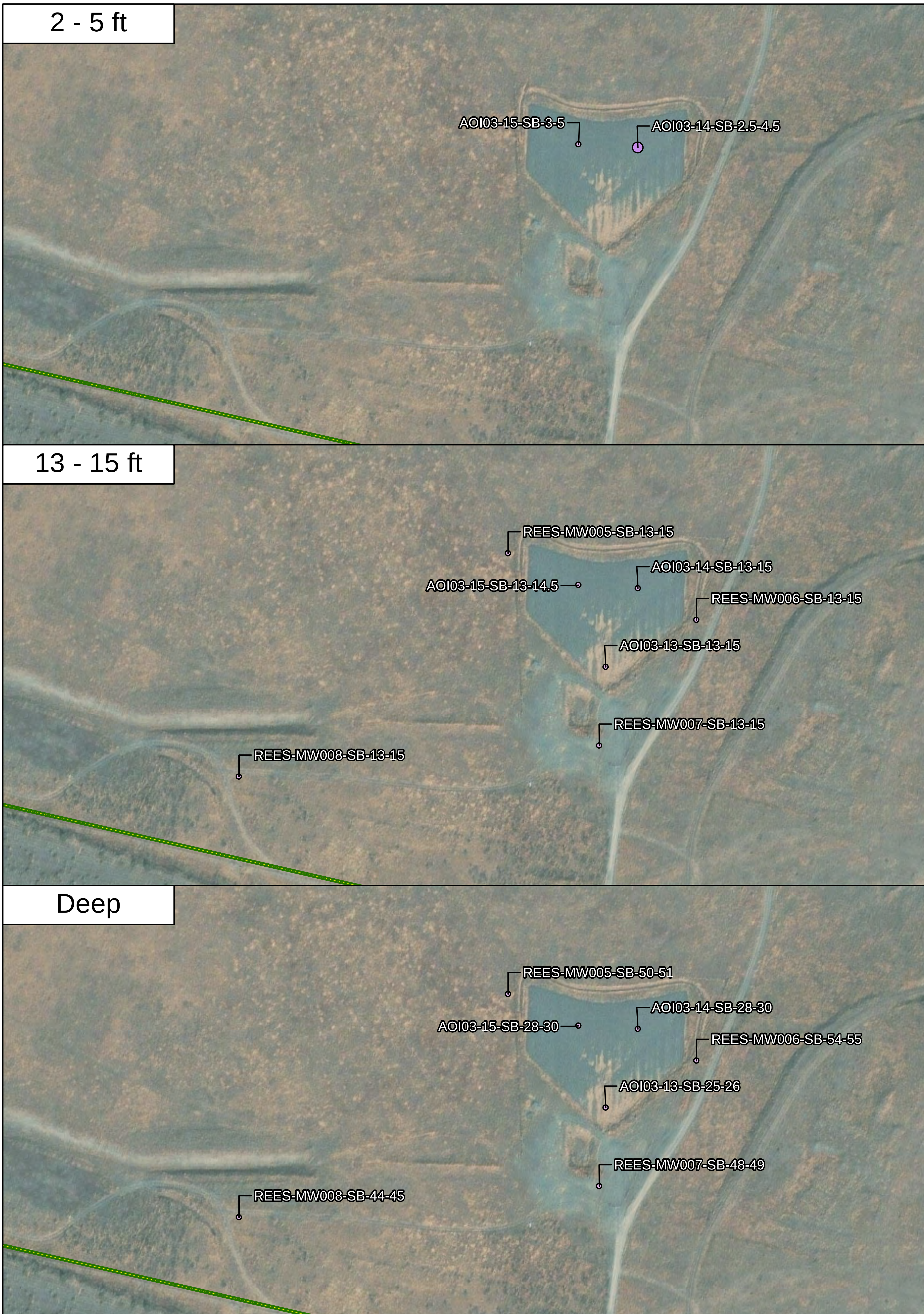
Figure 6-15



Legend

- Facility Boundary
- Umatilla Chemical Depot

PFHxS Results (µg/Kg)

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

N

0 100 200 400 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.

PFHxS Detections in Soil - AOI03 Intermediate and Deep

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,400	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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Figure 6-16

Legend

Facility Boundary
Umatilla Chemical Depot

PFNA Results (µg/Kg)

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

N

0 90 180 360 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.

PFNA Detections in Soil - AOI01 and AOI02 Surface

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,160	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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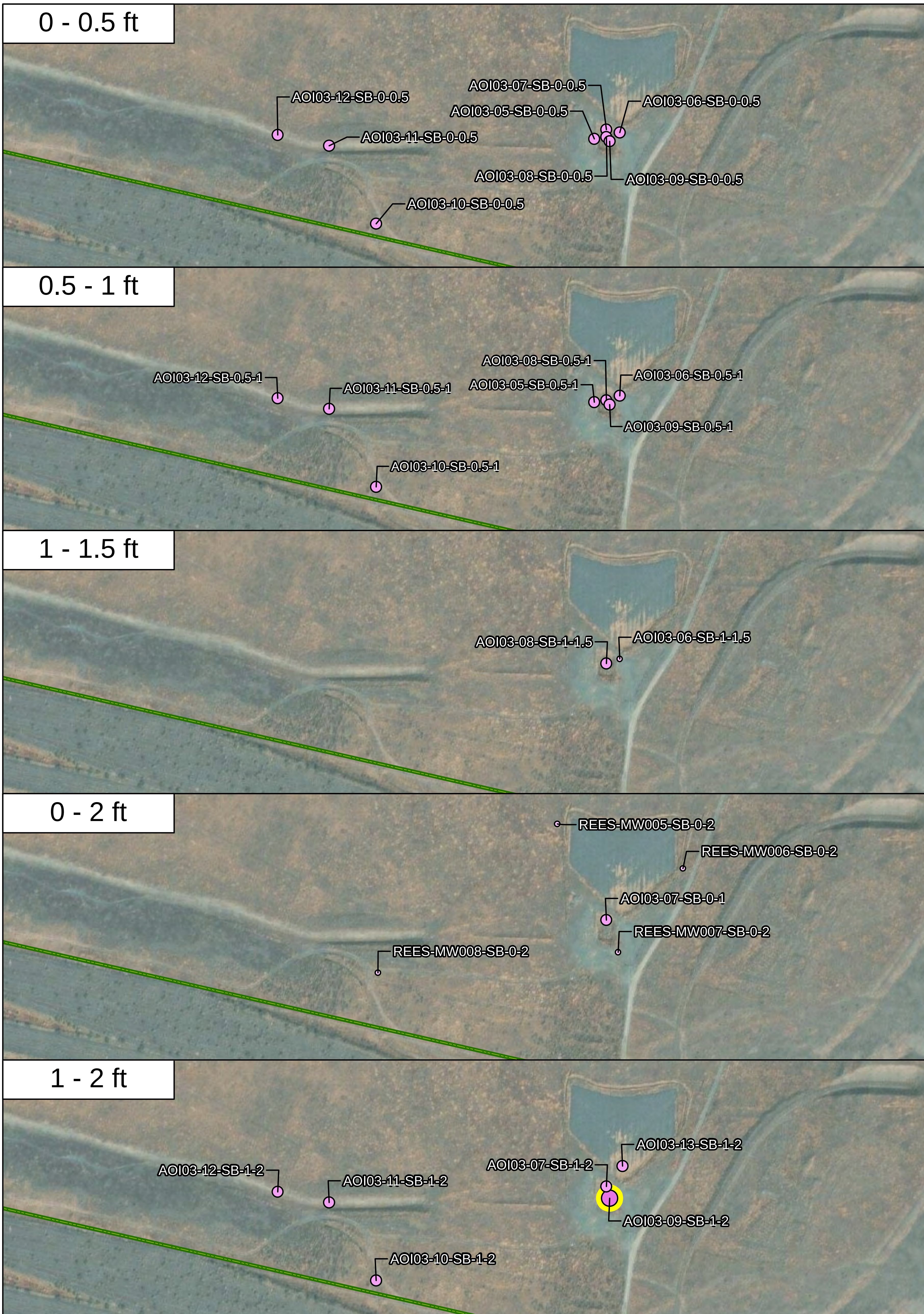
Figure 6-17



Legend
- Facility Boundary
- Umatilla Chemical Depot

PFNA Results (µg/Kg)
- ND
- >ND - 19
- >19 - 250
- >250 - 2,500
- >2,500

N

0 150 300 600 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.

PFNA Detections in Soil - AOI03 Surface

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	5/17/2023	GIS BY	MS	5/17/2023
SCALE	1:3,600	CHK BY	VG	5/17/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	5/17/2023

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Figure 6-18

PFNA Detections in Soil - AOI01 and AOI02 Intermediate and Deep

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,160	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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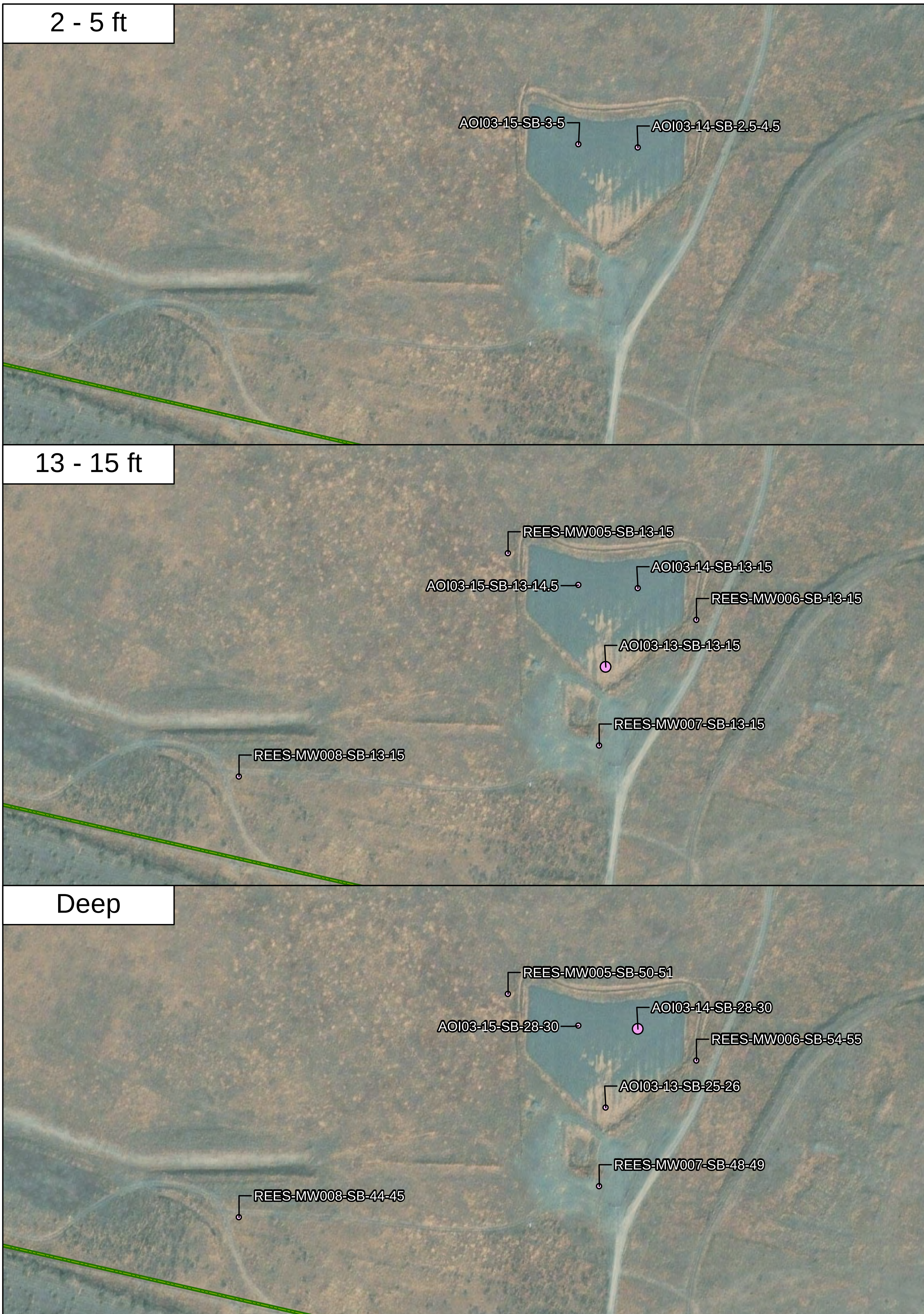
Figure 6-19



Legend

Facility Boundary

Umatilla Chemical Depot

PFNA Results (µg/Kg)

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

N

0 100 200 400 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.

PFNA Detections in Soil - AOI03 Intermediate and Deep

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:2,400	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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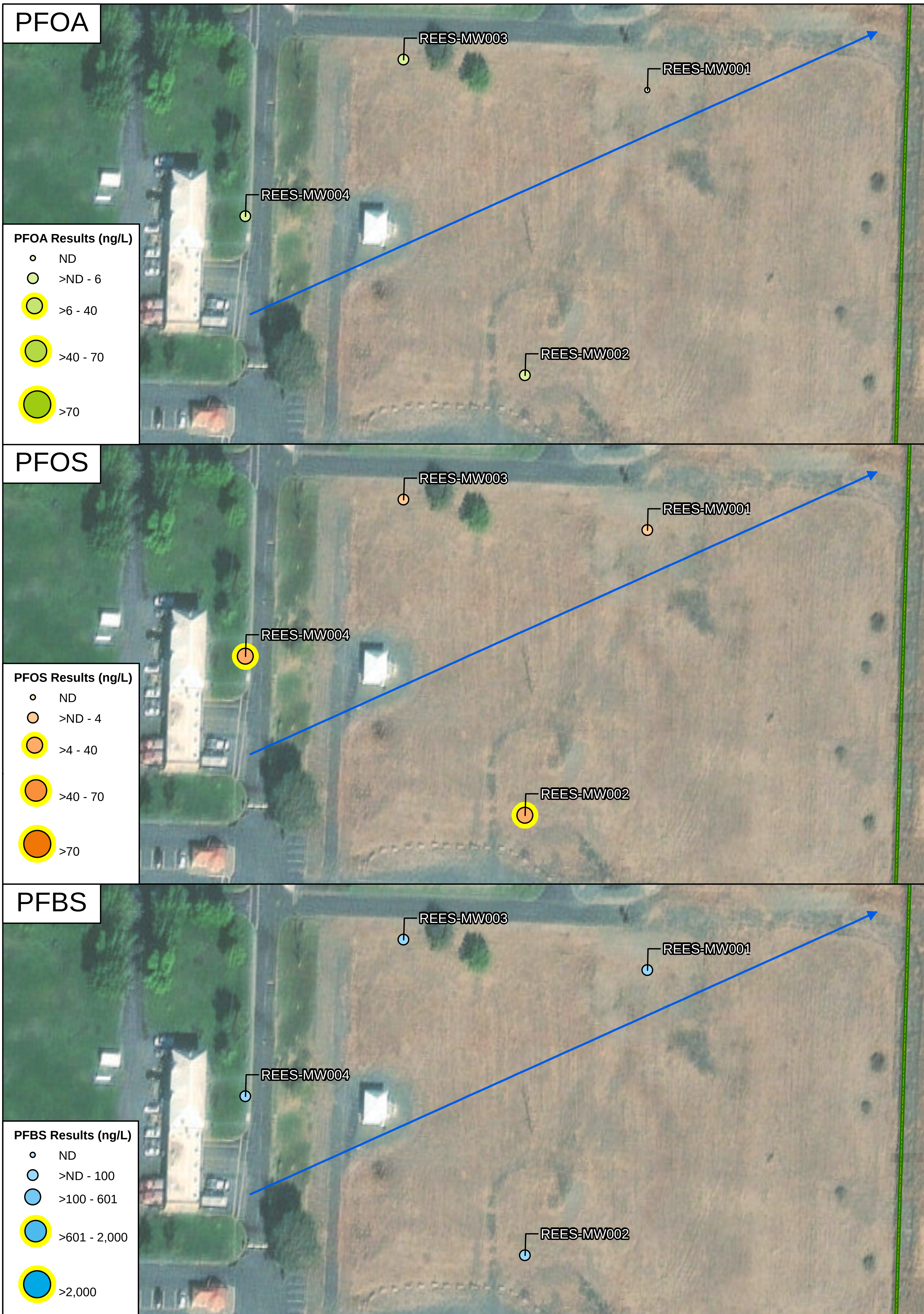
Figure 6-20



Legend
- Facility Boundary
- Umatilla Chemical Depot
- Groundwater Flow Direction

N

0 50 100 200 Feet

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

PFOA, PFOS, and PFBS Detections in Groundwater - AOI01 and AOI02

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:1,200	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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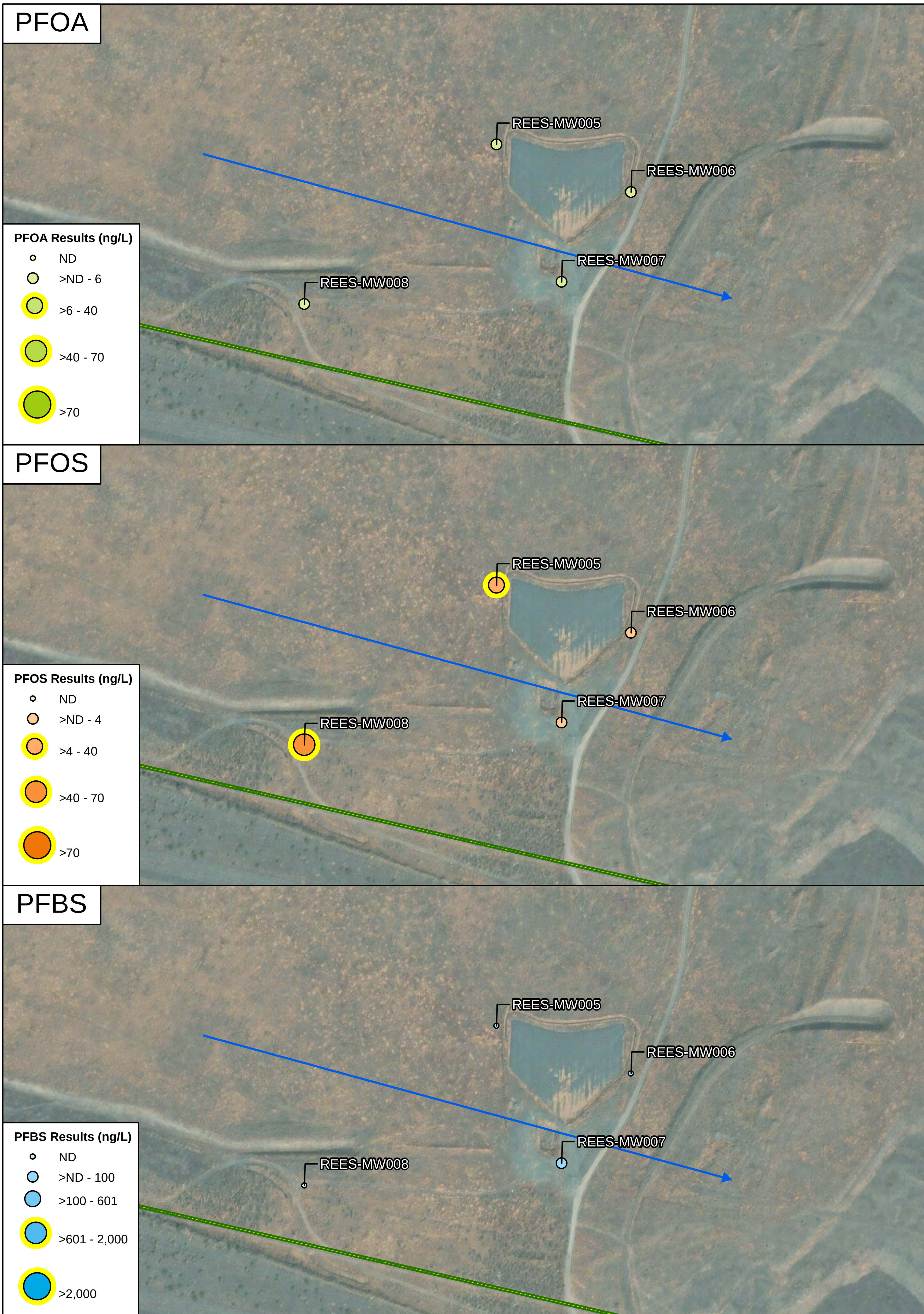
Figure 6-21



Legend

- Facility Boundary
- Umatilla Chemical Depot
- Groundwater Flow Direction

N

0 140 280 560 Feet

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

PFOA, PFOS, and PFBS Detections in Groundwater - AOI03

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:3,360	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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Figure 6-22

Legend

Facility Boundary

Umatilla Chemical Depot

Groundwater Flow Direction

N

0 50 100 200 Feet

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

PFHxS and PFNA Detections in Groundwater - AOI01 and AOI02

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:1,200	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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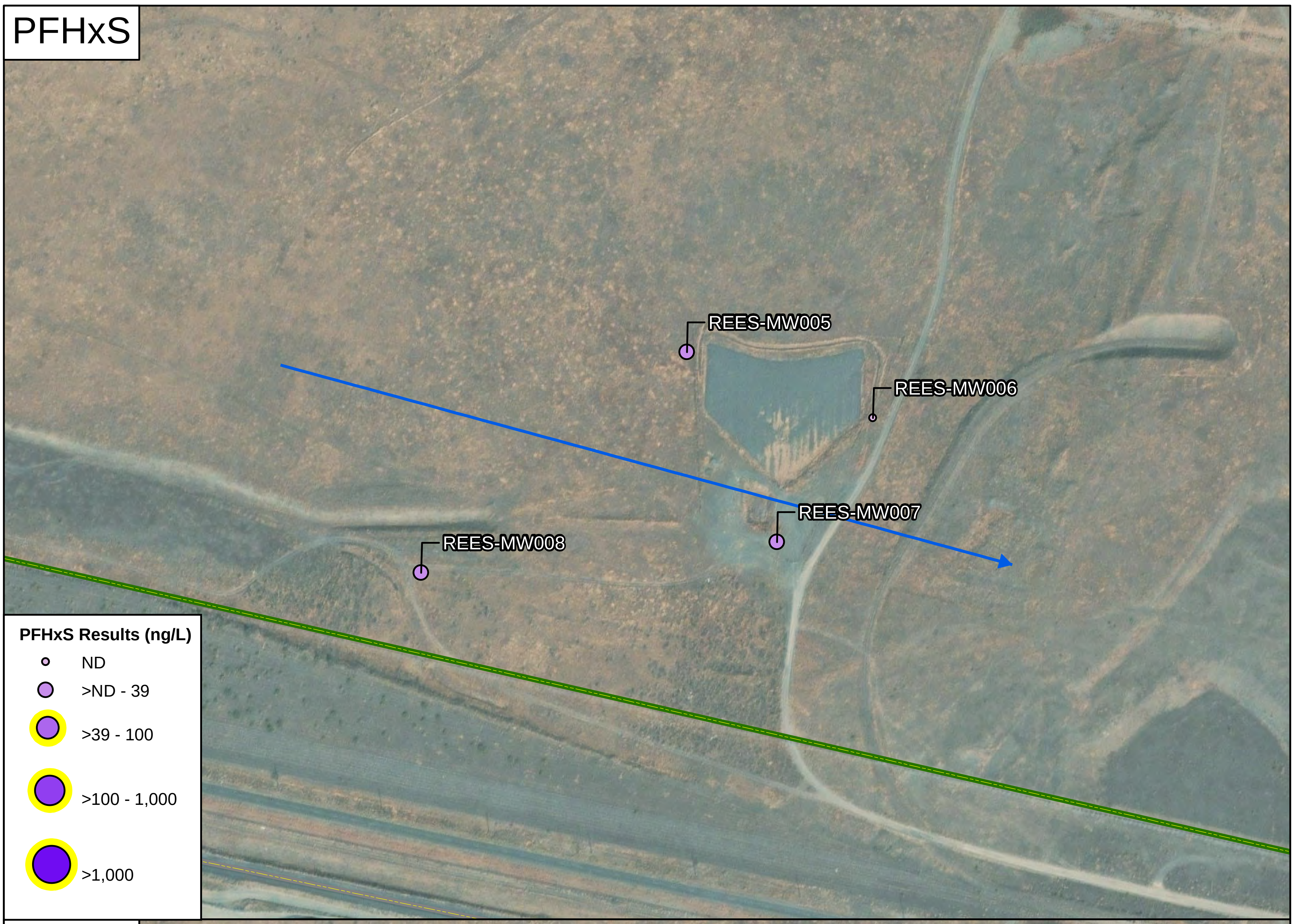
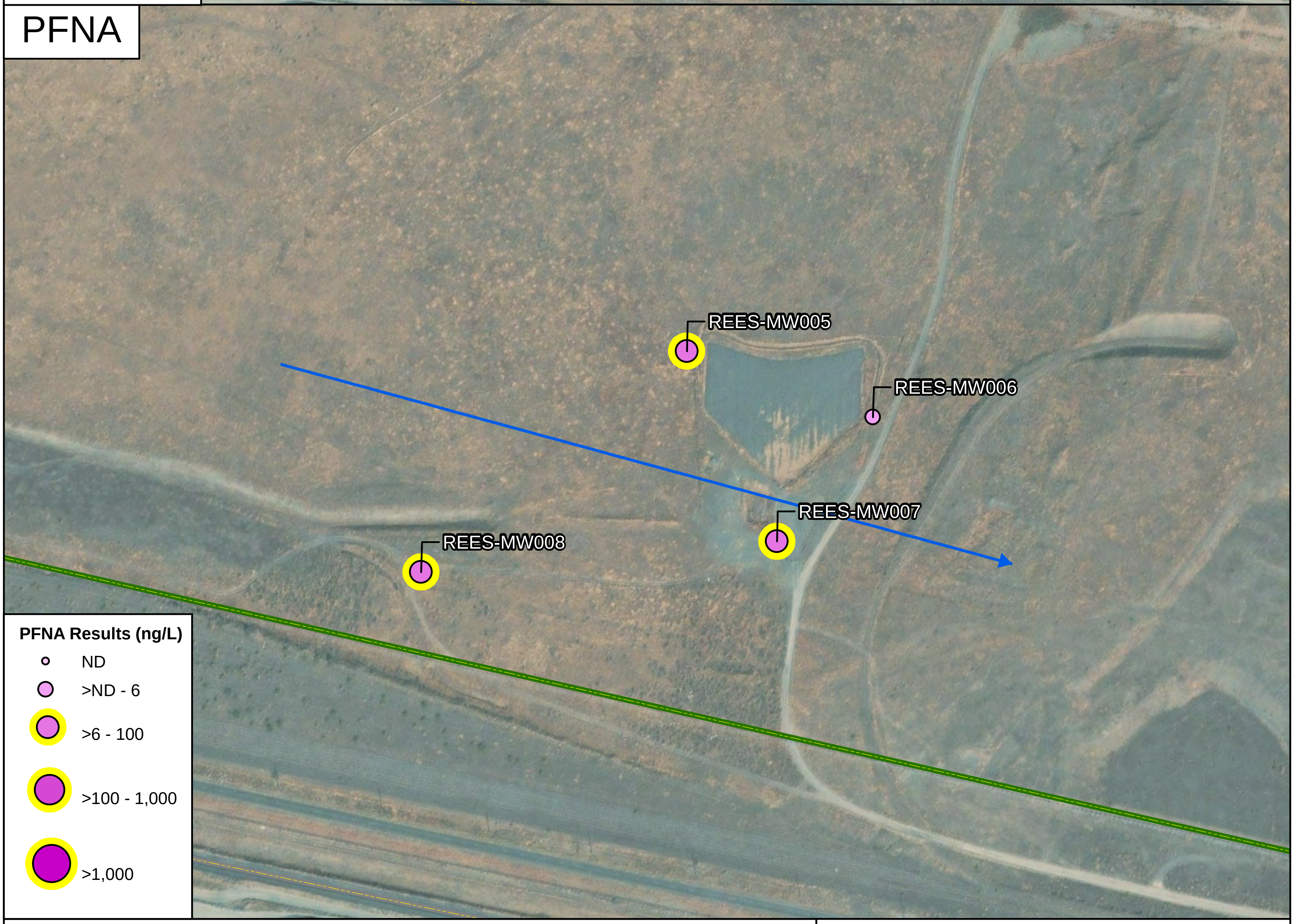
Figure 6-23





Legend

- Facility Boundary
- Umatilla Chemical Depot
- Groundwater Flow Direction

N

0 140 280 560 Feet

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

PFHxS and PFNA Detections in Groundwater - AOI03

CLIENT	ARNG			
PROJECT	Site Inspection at Camp Umatilla, OR			
REVISED	4/19/2023	GIS BY	MS	4/19/2023
SCALE	1:3,360	CHK BY	VG	4/19/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	4/19/2023

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Figure 6-24

7. Exposure Pathways

The conceptual site models (CSMs) for each AOI, revised based on the SI findings, are presented on **Figure 7-1** through **Figure 7-3**. 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 a 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, and AOI 3 based on the aforementioned criteria. Construction was observed at the facility during the SI; however, construction was not observed in the vicinity of the AOIs.

7.1.1 AOI 1

AOI 1 includes the Former FTAs, where AFFF may have historically during familiarization training and fire training activities as early as 2003.

Relevant compounds were detected in surface soil at AOI 1; PFNA exceeded the residential SLs and PFOS exceeded the residential and industrial SLs. Site workers, future construction workers, and trespassers 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. There are no adjacent residential structures or recreational facilities; therefore, the incidental ingestion and inhalation of dust exposure pathways for the off-facility residential and recreational user receptors are considered incomplete.

Relevant compounds were detected in shallow subsurface soil at AOI 1; PFNA exceeded the industrial/commercial composite worker SL. The construction worker exposure scenario assumes excavation occurs at depths at or above 15 feet bgs. Future construction workers could contact constituents in subsurface soil via incidental ingestion; therefore, the subsurface soil exposure pathway for construction workers is potentially complete. The CSM for AOI 1 is presented on **Figure 7-1**.

7.1.2 AOI 2

AOI 2 is the Fire Station, where AFFF releases may also have occurred as early as 1969 from the storage of AFFF.

Relevant compounds were detected in surface soil at AOI 2 at concentrations below the SLs. Site workers, future construction workers, and trespassers 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. The incidental ingestion and inhalation of dust exposure pathways for the off-facility residential and recreational user receptors are considered incomplete for the same reasons established for AOI 1.

Relevant compounds were detected in subsurface soil at AOI 2 at concentrations below the SLs. Future construction workers could contact constituents in subsurface soil via incidental ingestion; therefore, the subsurface soil exposure pathway for construction workers is potentially complete. The CSM for AOI 2 is presented on **Figure 7-2**.

7.1.3 AOI 3

AOI 3 is the former WWTP, where wastewater and storm sewer drainage from the Fire Station historically discharged to the former WWTP area.

Relevant compounds were detected in surface soil at AOI 3; PFOA and PFNA exceeded the residential SLs and PFOS exceeded the residential and industrial SLs. Site workers and future 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. Access to AOI 3 is gated and there are no adjacent residential structures or recreational facilities; therefore, the incidental ingestion and inhalation of dust exposure pathways for the trespasser, residential, and recreational user receptors are considered incomplete.

Relevant compounds were detected in subsurface soil at AOI 3 at concentrations below the SLs. Future construction workers could contact constituents in subsurface soil via incidental ingestion; therefore, the subsurface soil exposure pathway for construction workers is potentially complete. The CSM for AOI 3 is presented on **Figure 7-3**.

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

Relevant compounds were detected in groundwater samples collected at AOI 1; PFOS and PFNA were detected above the SLs. Due to the presence of numerous public and domestic drinking water wells within a 4-mile radius of AOI 1 and seasonal variation of groundwater flow direction, the pathway for exposure to off-facility residents and recreational users via ingestion of groundwater is considered potentially complete. Due to the presence of on-facility drinking water wells with detections of PFOS (below the SL), the pathway for exposure to site workers via ingestion of groundwater is also considered potentially complete.

Depths to water measured at AOI 1 in December 2022 during the SI were greater than 70 feet bgs. The construction worker exposure scenario assumes excavation occurs at depths at or above 15 feet bgs. Therefore, the ingestion exposure pathway for future construction workers is considered incomplete. The CSM for AOI 1 is presented on **Figure 7-1**.

7.2.2 AOI 2

Relevant compounds were detected in groundwater samples collected at AOI 2; PFOS and PFNA were detected above the SLs. The exposure to off-facility residents, recreational users, and site workers are considered potentially complete for the same reasons established for AOI 1.

Depths to water measured in December 2022 during the SI were greater than 71 feet bgs. Therefore, the ingestion exposure pathway for future construction workers is considered incomplete. The CSM for AOI 2 is presented on **Figure 7-2**.

7.2.3 AOI 3

Relevant compounds were detected in groundwater samples collected at AOI 3; PFOS, and PFNA were detected above the SLs. The exposure to off-facility residents, recreational users, and site workers are considered potentially complete for the same reasons established for AOI 1.

Depths to water measured in December 2022 during the SI were greater than 43 feet bgs. Therefore, the ingestion exposure pathway for future construction workers is considered incomplete. The CSM for AOI 3 is presented on **Figure 7-3**.

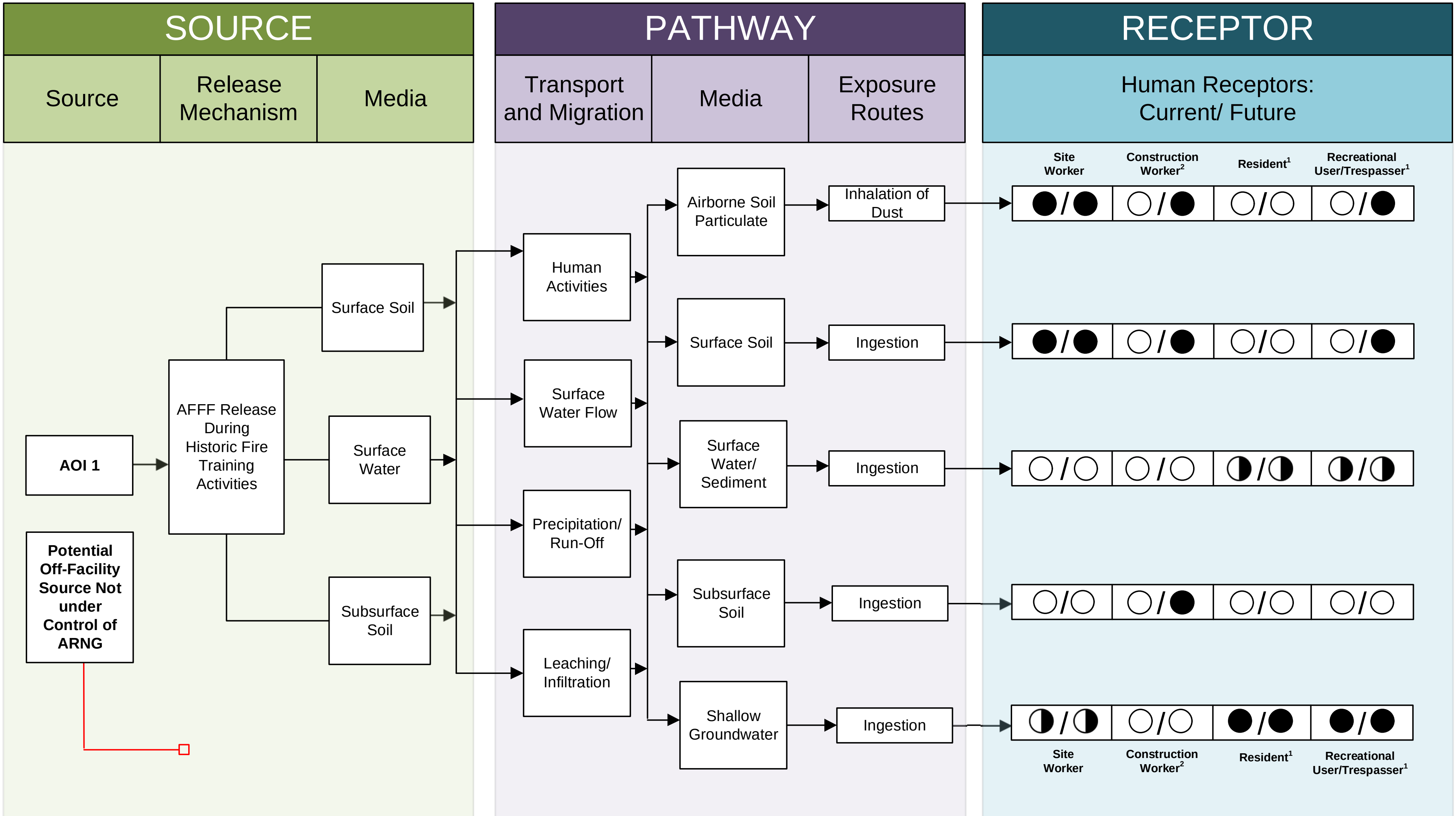
7.3 Surface Water and Sediment Exposure Pathway

Surface water and sediment samples were not collected during the SI; therefore, data from 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, 2, and 3

PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. Because relevant compounds were detected in soil and groundwater at all three AOIs, and unconfined alluvial aquifers discharge into local streams and rivers via seeps and springs with an ultimate discharge point at the Columbia River, it is possible that these compounds may have migrated from groundwater to the nearby drainage features (canals, Umatilla River, and Columbia River). Due to the recreational use of these waterbodies and drinking water use of the Columbia River, the surface water and sediment exposure pathway for off-facility residents and recreational users is considered potentially complete.

Surface water does not appear to discharge from the aquifers into the anthropogenic wastewater basins within the facility boundary; therefore, the surface water and sediment ingestion pathway for site workers and construction workers is considered incomplete. The CSMs for AOI 1, AOI 2, and AOI 3 are presented on **Figure 7-1**, **Figure 7-2**, and **Figure 7-3**, respectively.



LEGEND

Flow-Chart Stops

Flow-Chart Continues

Partial/ Possible Flow

Incomplete Pathway

Potentially Complete Pathway

Potentially Complete Pathway with Exceedance of SL

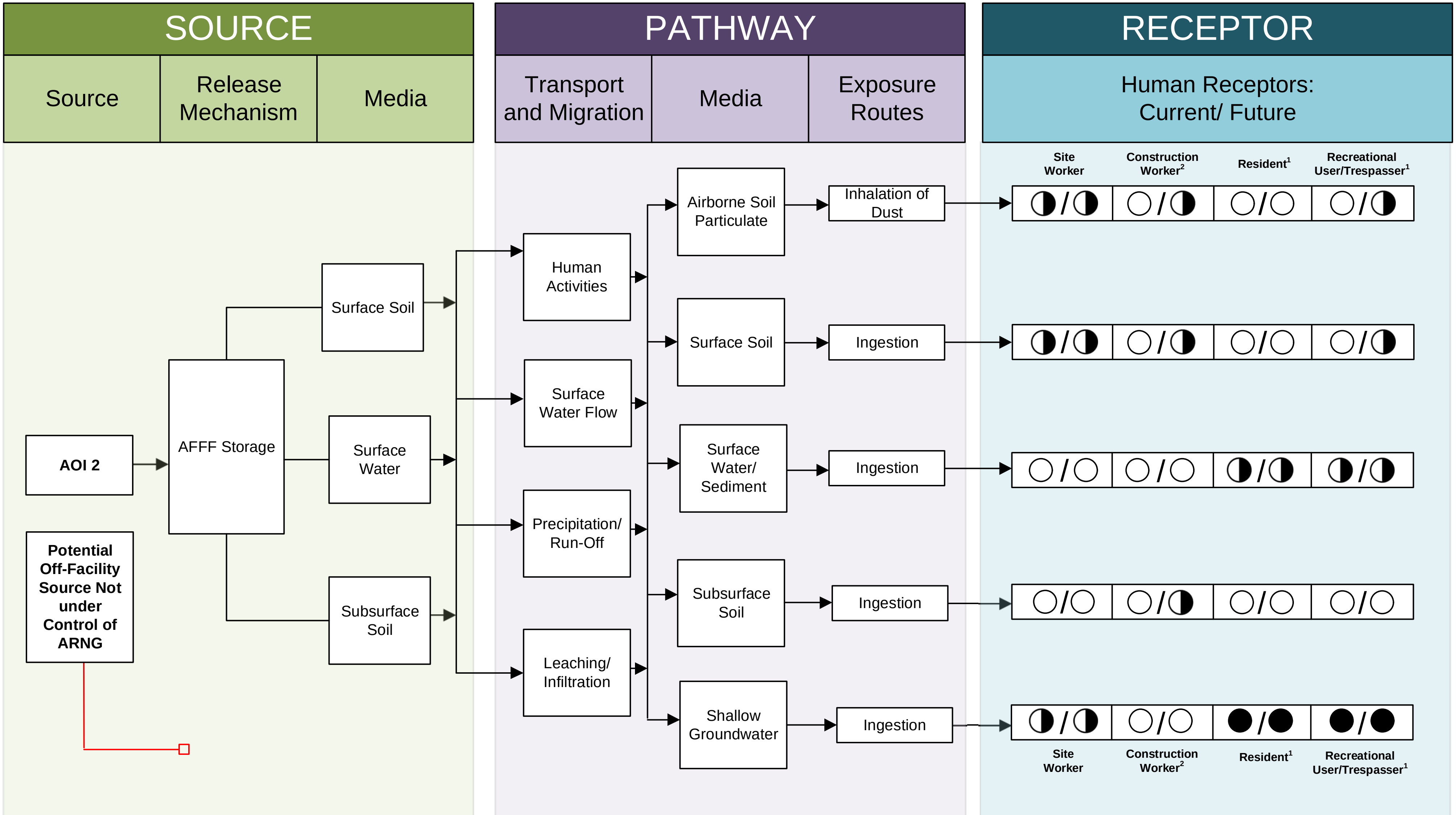
AECOM

NOTES

1. The resident and recreational users refer to off-site receptors.

2. Construction was not observed within the boundary of AOI 1 during SI field activities.

Figure 7-1
Conceptual Site Model, AOI 1
Raymond F. Rees Training Center, Hermiston, Oregon



LEGEND

Flow-Chart Stops

Flow-Chart Continues

Partial/ Possible Flow

Incomplete Pathway

Potentially Complete Pathway

Potentially Complete Pathway with Exceedance of SL

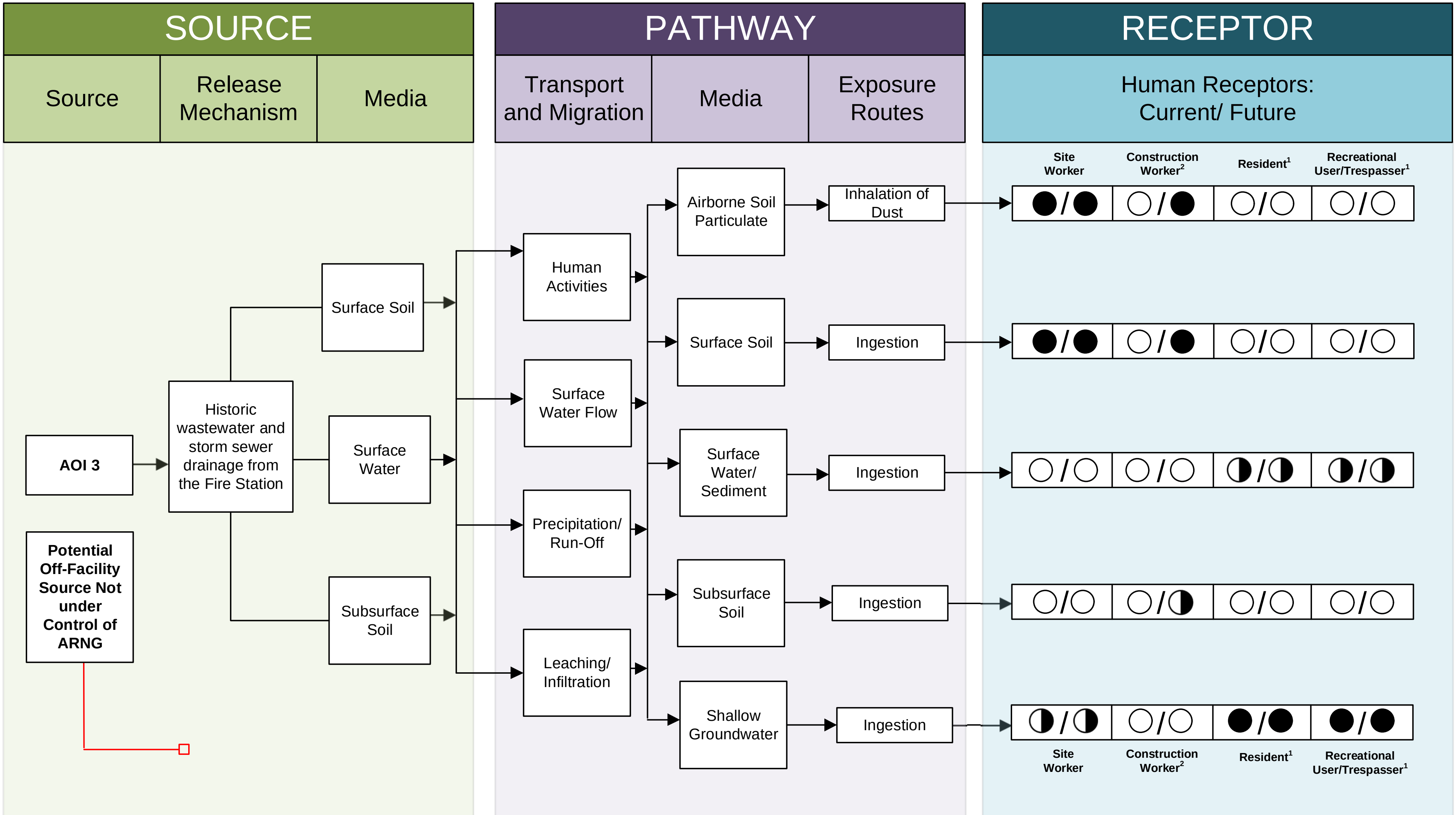
AECOM

NOTES

1. The resident and recreational users refer to off-site receptors.

2. Construction was not observed within the boundary of AOI 2 during SI field activities.

Figure 7-2
Conceptual Site Model, AOI 2
Raymond F. Rees Training Center, Hermiston, Oregon



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. Construction was not observed within the boundary of AOI 3 during SI field activities.

Figure 7-3
Conceptual Site Model, AOI 3
Raymond F. Rees Training Center, Hermiston, Oregon

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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 17 October to 17 December 2022 and consisted of utility clearance, sonic drilling, soil sample collection, permanent monitoring well installation, well development, grab groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2022a), except as previously noted in **Section 5.8**.

To fulfill the project DQOs set forth in the approved SI QAPP Addendum (AECOM, 2022a), 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.

- One hundred and twenty-three (123) total soil samples from thirteen (13) boring and thirty-four (34) hand auger locations;
- Eight (8) groundwater samples from eight (8) permanent well locations;
- Forty-one (41) 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, and AOI 3 (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 1, 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 and PFNA in soil exceeded the SLs. PFOS exceeded the 13 µg/kg SL in surface soil at AOI01-11, AOI01-12, AOI01-24, AOI01-25, AOI01-26, and AOI01-27, with a maximum detected concentration of 1,090 µg/kg at AOI01-27. PFNA exceeded the 19 µg/kg SL at AOI01-03, AOI01-08, AOI01-15, AOI01-20, and REES-MW001, with a maximum detected concentration of 52.8 µg/kg at REES-MW001. PFNA was detected at a concentration the same as the SL of 250 µg/kg in shallow subsurface soil at REES-MW001 (13 to 15 feet bgs). PFOA, PFBS, and PFHxS were detected below the SLs.

  - PFOS and PFNA in groundwater exceeded the SLs. PFOS exceeded the 4 ng/L SL at REES-MW002 at a concentration of 9.05 J ng/L. PFNA exceeded the 6 ng/L SL at both REES-MW001 and REES-MW002, with a maximum concentration of 18.8 J ng/L at REES-MW001. PFOA, PFBS, and PFHxS were detected below the SLs.

- At AOI 2:
  - PFOA, PFOS, PFHxS, and PFNA were detected in soil at concentrations below the SLs; PFBS was not detected.
  - PFOS and PFNA in groundwater exceeded the SLs. PFOS exceeded the 4 ng/L SL at REES-MW004 at a concentration of 7.27 J ng/L. PFNA exceeded the 6 ng/L SL at REES-MW003 and REES-MW004, with a maximum concentration and 51.2 ng/L (REES-MW004). PFOA, PFBS, and PFHxS were detected below the SLs.
- At AOI 3:
  - PFOA, PFOS, and PFNA in soil exceeded the SLs. All exceedances were observed in surface soil at AOI03-09. PFOA exceeded the 19 µg/kg SL with a maximum concentration of 65.9 J+ µg/kg. PFOS exceeded the 13 µg/kg SL with a maximum detected concentration of 342 µg/kg at AOI03-09 at a depth of 1 to 2 feet bgs. PFNA exceeded the 19 µg/kg SL with a maximum detected concentration of 38.1 µg/kg. PFBS and PFHxS were detected below the SLs.
  - PFOS and PFNA in groundwater exceeded the SLs. PFOS exceeded the 4 ng/L SL at REES-MW005 and REES-MW008, with a maximum concentration of 48.0 J ng/L at REES-MW008. PFNA exceeded the 6 ng/L SL at REES-MW005, REES-MW007, and REES-MW008, with a maximum concentration of 94.3 J ng/L at REES-MW007. PFOA, PFBS, and PFHxS were detected below the SLs.

Regional groundwater flow beneath RTC exhibits seasonal variation due to groundwater due to irrigation and agriculture, with flow directions to the east and south in summer and fall, and northwest in winter and early spring. Groundwater flow directions assessed within the AOIs trended to some degree toward the east, somewhat consistent with the summer and fall flow direction. However, the synoptic gauging event occurred in December, and the groundwater elevations at the three AOIs varied marginally across the facility. Additionally, AOIs 1 and 2 are located one mile east of AOI 3 and positioned approximately cross-gradient to AOI 3 within the inferred regional groundwater flow. Assessment of the larger scale groundwater flow direction using the SI data is limited due to the distance between the AOIs and their inferred cross-gradient positions within the regional flow.

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	Groundwater – Facility Boundary	Future Action
1	Former FTA	●	●	●	Proceed to RI
2	Fire Station	◐	●	N/A	Proceed to RI
3	Former WWTP	●	●	●	Proceed to RI

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

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