DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
JOINT BASE SAN ANTONIO LACKLAND TEXAS

30 October 2018

MEMORANDUM FOR DISTRIBUTION

FROM: AFCEC/CZOW
550 Hickam Ave
Travis AFB CA 94535

SUBJECT: Final Amendment to the West/Annexes/Basewide Operable Unit (WABOU) Soil Record of Decision (ROD)

1. The attached final Amendment to the WABOU Soil ROD describes fundamental changes to the selected soil remedies for Sites DP039, SD043 and SS046. The previous soil remedy for all three sites (Alternative S2 – Land Use and Access Restrictions) has performed adequately for the last 15 years. However, the soil contamination at Site DP039 was removed as part of the 2008 bioreactor demonstration project, negating the need for these restrictions, and the Air Force wants to conduct more active remedies at Sites SD043 and SS046 in order to reduce its environmental liability and make more unencumbered property available to support the base mission at Travis AFB.

2. If you have any questions concerning this primary document, please contact Mr. Glenn Anderson at (707) 424-4359.

LONNIE A. DUKE
Restoration Program Manager

Attachment:
Final Amendment to the WABOU Soil ROD

Distribution: (see attached)

DISTRIBUTION:

U.S. Environmental Protection Agency
ATTN: Nadia Burke
75 Hawthorne Street, SFD-8-1
San Francisco CA 94105
(One Paper Copy and One CD)

DTSC Region 1
ATTN: Ben Fries
8800 Cal Center Drive
Sacramento CA 95826
(One Paper Copy and One CD)

California Regional Water Quality
Control Board
San Francisco Bay Region
ATTN: Adriana Constantinescu
1515 Clay Street, 14th Floor
Oakland CA 94612
(One Paper Copy and One CD)

TechLaw, Inc.
ATTN: Indira Balkissoon
235 Montgomery Street, Suite 717
San Francisco CA 94104
(One CD)

HQ AFCEC/CZRW
ATTN: Haekyung Kim
3515 S. General McMullen
Building 171
San Antonio TX 78226-2018
(One CD)

AFCEC/CZOW
ATTN: Glenn Anderson
550 Hickam Avenue
Building 248
Travis AFB CA 94535
(One Bound Copy, One Unbound Copy and One CD)

U.S. Army Corps of Engineers
CENWO-PM-HB
ATTN: Sarah J. Miller
1616 Capitol Avenue
Suite 9000
Omaha NE 68102-4901
(One CD)

CH2M HILL
ATTN: Mike Wray
2485 Natomas Park Drive
Suite 600
Sacramento CA 95833
(Letter Only)

TRAVIS AIR FORCE BASE, CALIFORNIA

Final

Amendment to the West/Annexes/Basewide Operable Unit Soil Record of Decision

Environmental Restoration Program Sites DP039, SD043, and SS046

Prepared by:

U.S. Army Corps of Engineers
Omaha District

Air Force Civil Engineer Center

October 2018

Contents

Tables

Figures

Appendixes

SECTION 1

Introduction to the Sites and Statement of Purpose

1.1 Site Name and Location

Facility Name: Travis Air Force Base (AFB)

Site Location: Fairfield, Solano County, California

CERCLIS ID Number: CA5570024575

U.S. Environmental Protection Agency (EPA) SSID Number: 09M7

Operable Unit (OU)/Site: West/Annexes/Basewide Operable Unit (WABOU) Environmental Restoration Program (ERP) sites designated as Sites DP039, SD043, and SS046 (EPA OU 4)

1.2 Statement of Purpose

This Record of Decision Amendment (ROD Amendment) documents fundamental changes to the *Soil Record of Decision for the West/Annexes/Basewide Operable Unit* (WABOU Soil ROD) signed on December 11, 2002 (Travis AFB, 2002). This ROD Amendment is developed in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) 117 and the National Contingency Plan (NCP) in 40 Code of Federal Regulations (CFR) 300.435(c)(2)(ii).

This ROD Amendment changes the soil remedies originally selected in the WABOU Soil ROD (Travis AFB, 2002) for ERP Sites DP039, SD043, and SS046 as follows:

- **Site DP039:** Alternative S2 – Land Use and Access Restrictions is changed to Alternative S1 – No Action
- **Site SD043:** Alternative S2 – Land Use and Access Restrictions is changed to Alternative S5 – Excavation/ Off-base Disposal
- **Site SS046:** Alternative S2 – Land Use and Access Restrictions is changed to Alternative S5 – Excavation/ Off-base Disposal

All the newly selected remedial alternatives (S1 for Site DP039, and S5 for Sites SD043 and SS046) were previously evaluated in the WABOU Soil ROD (Travis AFB, 2002), but were not originally selected for the three (3) sites. The U.S. Air Force (Air Force) chose the previous remedies (listed above) as the most appropriate strategies for addressing potential human health and environmental risks from contaminated soil in the WABOU at that time. However, the Air Force and EPA have determined that the newly selected remedial alternatives as presented in this ROD Amendment are now more appropriate to meet Air Force mission requirements, as described in detail below.

Groundwater underlying the sites is not addressed in this ROD Amendment; however, it is addressed in the *Groundwater Record of Decision* (Groundwater ROD) (Travis AFB, 2014). The locations of Sites DP039, SD043, and SS046 at Travis AFB are shown on Figure 1-1.

The key circumstance requiring this ROD Amendment is that the Air Force desires the flexibility to redevelop these properties (execute new construction projects and activities) without any restrictions. Therefore, the Air Force is taking additional measures toward reducing its environmental liability and ensuring that the Travis AFB property associated with these three (3) ERP sites is available to support

military mission requirements. The changed soil remedial alternatives described in this ROD Amendment will allow for unlimited use and unrestricted exposure to the soil at Sites DP039, SD043, and SS046.

This ROD Amendment will become part of the Travis AFB Administrative Record (AR) file in accordance with the NCP in 40 CFR 300.825(a)(2). The ARs for Air Force facilities are available for public review at the Air Force Civil Engineer Center (AFCEC) AR website: http://afcec.publicadmin-record.us.af.mil/search.aspx and can be viewed using Internet-capable computers at several local libraries. For example, the Vacaville Cultural Center Library is located at 1020 Ulatis Drive, Vacaville, California 95687, and is open during the hours of 10:00 a.m. to 9:00 p.m. Monday through Thursday, Friday, and Saturday from 10:00 a.m. to 5:00 p.m., and Sunday from 1:00 to 5:00 p.m.

The changed soil remedies for Sites DP039, SD043, and SS046 selected in this ROD Amendment were chosen in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and to the extent practicable, the NCP. The decisions are based on the AR for the three (3) sites, including the WABOU Soil ROD (Travis AFB, 2002).

This ROD Amendment is issued by the Air Force as the lead agency. The Air Force is amending the ROD and the remedy for the sites within the WABOU in accordance with CERCLA and the NCP, as required by the Defense Environmental Restoration Program (DERP). The EPA is the lead oversight agency, and the State of California, represented by California Department of Toxic Substances Control (DTSC) and the San Francisco Bay Regional Water Quality Control Board (Water Board), is the support agency. The Air Force and EPA have jointly evaluated and selected the changed soil remedies. The California DTSC and Water Board concur with the changed remedies. The Air Force shall not modify or terminate land use controls (LUCs), implementation actions, or land usage without approval by EPA and the State of California. The Air Force shall seek concurrence before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for them.

The content and organization of this ROD Amendment is presented in accordance with Section 7.0 (Documenting Post-ROD Changes: Minor Changes, Explanations of Significant Differences [ESD], and ROD Amendments), including Highlight 7-2 (Sample Outline and Checklist for ESDs and ROD Amendments), of *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (EPA, 1999).

1.3 Authorizing Signatures

This signature sheet documents the Air Force approval of the amended remedies selected in this Amendment to the *West/Annexes/Basewide Operable Unit Soil Record of Decision*, Travis Air Force Base, Solano County, California.

Suzanne W Bilbrey — 30 Oct 2018

SUZANNE W. BILBREY, P.E. — Date
Director, Environmental Management Directorate
Air Force Civil Engineer Center

1.3 Authorizing Signatures

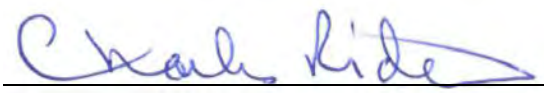
This signature sheet documents the EPA approval of the amended remedies selected in this Amendment to the *West/Annexes/Basewide Operable Unit Soil Record of Decision*, Travis Air Force Base, Solano County, California.

09-28-2018

ANGELES HERRERA — Date
Assistant Director
Federal Facilities and Site Cleanup Branch, Superfund Division
U.S. Environmental Protection Agency, Region IX

1.3 Authorizing Signatures

This signature sheet documents the DTSC concurrence with the amended remedies selected in this Amendment to the *West/Annexes/Basewide Operable Unit Soil Record of Decision*, Travis Air Force Base, Solano County, California.



9/13/18

CHARLES RIDENOUR, P.E. Date
Supervising Hazardous Substances Engineer II
Sacramento Office
Brownfields and Environmental Restoration Program
California Department of Toxic Substances Control

1.3 Authorizing Signatures

This signature sheet documents the Water Board concurrence with the amended remedies selected in this Amendment to the *West/Annexes/Basewide Operable Unit Soil Record of Decision*, Travis Air Force Base, Solano County, California.

Bruce H. Wolfe — Aug. 22, 2018

BRUCE H. WOLFE — Date
Executive Officer
San Francisco Bay Regional Water Quality Control Board

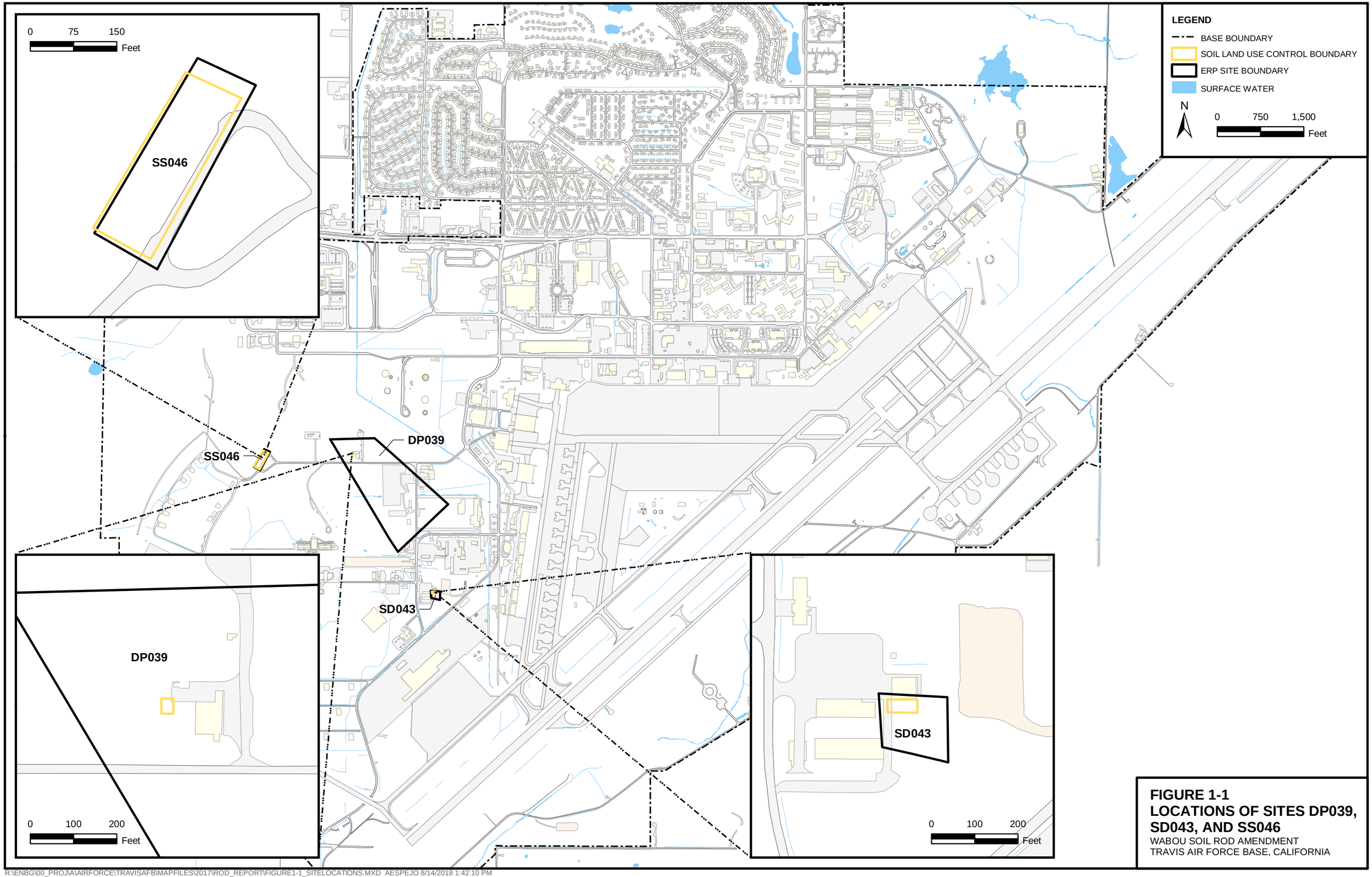


FIGURE 1-1
LOCATIONS OF SITES DP039, SD043, AND SS046
WABOU SOIL ROD AMENDMENT
TRAVIS AIR FORCE BASE, CALIFORNIA

R:\ENBG\00_PROJ\A\AIRFORCE\TRAVISAFB\MAPFILES\2017\ROD_REPORT\FIGURE1-1_SITELOCATIONS.MXD AESPEJO 8/14/2018 1:42:10 PM

SECTION 2

Site Histories, Contamination, and Selected Remedies

This section of the ROD Amendment summarizes the history of soil contamination at Travis AFB ERP Sites DP039, SD043, and SS046, and the soil remedies previously selected in the WABOU Soil ROD (Travis AFB, 2002) to address that contamination. This information is also provided in the WABOU Soil ROD, Part II – Decision Summary.

Overall descriptions of Travis AFB, including a physical description of the Base, land use, ecology, geology, hydrogeology, and surface water, are provided in the WABOU Soil ROD, Part II – Decision Summary, Subsections 1.1 through 1.5. Similarly, an overview of the Travis AFB environmental programs, including the Compliance Branch, the Restoration Branch, and Pollution Prevention Branch, are provided in the WABOU Soil ROD, Part II – Decision Summary, Subsections 2.1, 2.2, and 2.3. A few exceptions to the environmental programs at Travis AFB include the following:

- The Base no longer maintains the Base General Plan; instead, the Base has implemented the Installation Development Plan. Similar in structure and content to the Base General Plan, the IDP summarizes the Travis AFB Comprehensive Planning Process and applies geospatial and written data to allocate resources through project programming, promote airfield safety, and enhance the general health and welfare of the natural and built environment.
- The Restoration Branch no longer oversees the Installation Restoration Program (IRP). The Restoration Branch became a part of the Travis Installation Support Section (ISS) under AFCEC, and the ISS manages the Travis AFB ERP.
- The Groundwater ROD was finalized in June 2014 (Travis AFB, 2014).
- The Restoration Advisory Board no longer meets quarterly, but instead meets semiannually.
- A public meeting for this WABOU Soil ROD Amendment was conducted in April 2015.

The following subsections provide brief histories of Sites DP039, SD043, and SS046; summaries of the soil contamination present at each site; and a history of the process used to select the remedies currently in place at the sites to address this soil contamination.

2.1 Summary of Site Histories

The following subsections provide brief site history summaries for Sites DP039, SD043, and SS046. These summaries are also provided in Sections 3.3.1, 3.3.3, and 3.3.8 of the WABOU Soil ROD (Travis AFB, 2002).

2.1.1 Site DP039 (Building 755)

Historically, Building 755 was the Travis AFB Battery and Electric Shop. The main site features included Building 755 and a battery acid neutralization sump.

Until 1978, the gravel-filled acid neutralization sump received battery acid from a battery and electric shop housed within Building 755. The sump was excavated and backfilled in 1993. Building 755 was demolished in September 2009. As a result of the historical practice of discharging solutions from lead-acid batteries from Building 755 into the sump, an unknown amount of lead residue was deposited

into the sump. When the sump was decommissioned and later excavated, a small amount of residual lead-contaminated soil was inadvertently distributed around the top of the former sump area.

In accordance with the WABOU Soil ROD (Travis AFB, 2002), since approximately 2003, Travis AFB has implemented Alternative S2 – Land Use and Access Restrictions as the selected remedial action for soil at the site. Residual lead concentrations in the site surface soil were less than the industrial cleanup level, but exceeded the residential cleanup level. Therefore, LUCs were selected as the remedy for Site DP039 to prevent the site from being used for residential purposes.

During late 2008, an in situ bioreactor (also referred to as a subgrade biogeochemical reactor) was designed and installed at the location of the former acid neutralization sump under an Air Force Center for Engineering and the Environment technology demonstration project. This bioreactor was installed to address residual trichloroethene (TCE) and its daughter products in groundwater at Site DP039. The bioreactor excavation took place in three (3) phases: (1) excavation of lead-contaminated surface soil, (2) off-base landfill disposal of lead-contaminated soil, and (3) excavation of deep subsurface soil for bioreactor installation. The entire area of lead-contaminated soil was addressed during construction of the bioreactor. The top 0.5 foot of soil from the bioreactor excavation footprint and 10 feet north and west of the bioreactor excavation were segregated and placed in a 20-cubic-yard soil bin. Soil excavation did not extend beyond the footprint of the bioreactor to the east because of the presence of a large concrete pad. Further soil excavation to the south was limited by the presence of a concrete pad and the well vault for groundwater extraction well EW782x39. Confirmation samples were collected from the north, west, south, and east sides of the excavation footprint, and the analytical results from these samples were statistically evaluated and indicated that elevated lead concentrations were successfully removed, and lead contamination did not extend beyond the footprint of the excavation (CH2M HILL, 2015). The *Technical Report for the Sustainable Bioreactor Demonstration at Site DP039* (CH2M HILL, 2011) provides a full description of the bioreactor construction.

Remedial actions for groundwater are addressed in the Groundwater ROD (Travis AFB, 2014), and the bioreactor is a component of the groundwater remedial action at Site DP039. The groundwater LUCs specified in the Groundwater ROD (Travis AFB, 2014) will remain in place to protect the bioreactor from disturbances and the groundwater from unacceptable use.

2.1.2 Site SD043 (Building 916)

Building 916 is an emergency electrical power facility located in the west-central portion of the WABOU. Diesel-powered generators are housed inside the building. A fenced and graveled electrical transformer area was formerly located at the southwest exterior corner of the building. This fenced area contained three (3) liquid-filled transformers on top of a concrete pad. In 1992, one (1) of the transformers leaked onto the concrete pad and ground surface. The transformers and concrete pad were subsequently removed in 1993.

According to the WABOU Soil ROD (Travis AFB, 2002), polychlorinated biphenyl (PCB)-1254 was detected in soil near the former transformer pad. Thus, since approximately 2003, Travis AFB has implemented Alternative S2 – Land Use and Access Restrictions as the selected remedial action for soil at the site. Soil contaminant concentrations were less than the industrial cleanup level, but exceeded the residential cleanup level. Therefore, LUCs were selected as the remedy for Site SD043 to prevent the site from being used for residential purposes.

In 2003, a new concrete pad with a generator was constructed in the vicinity of the 1992 spill area. The construction, which occurred partially within the boundaries of the LUC area, resulted in an increase in the footprint of the controlled area to incorporate the new concrete pad beneath the generator. The expanded controlled area also included the soil within 10 feet to the east, south, and west of the

concrete pad. The *Annual Report on the Status of Land Use Controls on Restoration Sites in 2004* (Travis AFB, 2005) and the *Annual Report on the Status of Land Use Controls on Restoration Sites in 2015* (Travis AFB, 2016) contain detailed discussions of the site changes and LUCs at Site SD043.

In 2016 and 2017, a data gap investigation was conducted to support risk management decisions based on an updated assessment of the risk to human health considering a residential exposure scenario. Results from the data gap investigation facilitated the reassessment of whether additional remedial actions are necessary to remove the current LUCs for soil at Site SD043. Surface and subsurface soil samples were collected to determine the current extent of PCB-1254 in soil after the construction of the new concrete pad in 2003 that may have potentially displaced contaminated soil. Results from the soil samples collected during the data gap investigation were also used to compare the PCB-1254 concentrations against the current residential screening level since the detection limit for the original data set is not sufficiently sensitive. Results of the data gap investigation indicated that PCB-1254 is present at concentrations that pose an unacceptable risk to human health under a residential land use scenario (CH2M HILL, 2018).

Remedial actions for groundwater underlying this site are addressed in the Groundwater ROD (Travis AFB, 2014).

2.1.3 Site SS046 (RMSA)

The Railhead Munitions Staging Area (RMSA) is located in the north-central portion of the WABOU, north of Ellis Drive. The site consists of a railroad track and concrete pad that formerly served as a railhead at the south terminus of a spur off the Northern Sacramento Railroad. This site served as a weapons-handling facility from 1953 to 1962.

According to the WABOU Soil ROD (Travis AFB, 2002), historical practices at the site resulted in soil contaminated with carcinogenic polycyclic aromatic hydrocarbons (cPAHs) (benzo(a)pyrene, benzo(b)fluoranthene, benzo(a)anthracene, and benzo(k)fluoranthene) and metals in the vicinity of the railroad tracks and surrounding the concrete pad. Thus, since approximately 2003, Travis AFB has implemented Alternative S2 – Land Use and Access Restrictions as the selected remedial action for soil at the site. Soil contaminant concentrations were less than the industrial cleanup level, but exceeded the residential cleanup level. Therefore, soil LUCs have been enforced to prevent the site from being used for residential purposes.

In 2016 and 2017, a data gap investigation was conducted to support risk management decisions based on an updated assessment of the risk to human health considering a residential exposure scenario. Results from the data gap investigation facilitated the assessment of whether additional remedial actions were necessary to remove the current LUCs for soil at Site SS046. Because the original samples were analyzed using detection limits that are greater than the current residential screening levels, surface and subsurface soil samples were collected to reassess the extent of cPAH contamination in soil. Also, results from the soil samples were used to support an evaluation of human health risk under the residential scenario. Results of the data gap investigation indicated that metals, cPAHs, and a semivolatile organic compound (SVOC) (pentachlorophenol) are present at concentrations that pose an unacceptable risk to human health based on residential and industrial land use scenarios (CH2M HILL, 2018).

According to the WABOU Soil ROD, there are no impacts to groundwater underlying Site SS046 (Travis AFB, 2002).

2.2 Summary of Site Contamination

To adequately evaluate the sites for closure, the Air Force reevaluated the site data to assess data quality for determining risk to human health in a residential land use scenario. The Air Force determined that the original remedial investigation (RI) data for Sites SD043 and SS046 did not have sufficiently low method detection limits when compared against current residential risk-based screening levels (RBSLs). Thus, new data were collected at Sites SD043 and SS046 during the 2016 data gap investigation to verify the current extent of soil contamination and to reevaluate human health risk under a residential exposure scenario. Results from the evaluation of the new data, along with historical data, were used to support the risk management decision for these sites.

Summary descriptions of the nature and extent of contaminants in soil currently present at Sites DP039, SD043, and SS046 are discussed in the following subsections and also summarized in Table 2-1. During the WABOU RI (CH2M HILL, 1997), sediment and surface water samples were collected at Site SD043 and analyzed for volatile organic compounds (VOCs), SVOCs, total petroleum hydrocarbons (TPH), pesticides/PCBs, and metals, and soil gas samples were collected at Sites DP039 and SS046 and analyzed for VOCs. Several chlorinated VOCs (primarily TCE), aromatic VOCs (primarily benzene, toluene, ethylbenzene, and xylenes [BTEX]), and PCB-1254 were detected in one (1) or more samples. However, no analytes were identified as chemicals of concern (COCs) in sediment, surface water, or soil gas according to the WABOU RI (CH2M HILL, 1997) and WABOU Soil ROD (Travis AFB, 2002). Groundwater underlying the sites is not addressed in this ROD Amendment, because it has been addressed in the Groundwater ROD (Travis AFB, 2014). The current extent of groundwater contamination and an evaluation of the performance of the groundwater remedies are summarized in the *2016 Annual Groundwater Remediation Implementation Status Report* (GRISR) (CH2M HILL, 2017), which is the annual groundwater monitoring and operations and maintenance (O&M) report.

2.2.1 Site DP039 Soil Contamination

According to the WABOU Soil ROD (Travis AFB, 2002), surface soil around the edges of the former sump area contained high concentrations of lead residue. However, following the installation of the Site DP039 bioreactor that supports the groundwater remedy, no soil contamination is currently present at Site DP039 at concentrations requiring remediation to protect human health and the environment.

As described in *Site DP039 Lead-contaminated Soil Excavation Technical Memorandum* (CH2M HILL, 2015), lead concentrations in soil have been reduced by excavation activities that occurred after finalization of the WABOU Soil ROD (Travis AFB, 2002). After the ROD was finalized in 2002 and prior to late 2008, the maximum lead concentration in the site surface soil was located at former boring 28-SS05 at a concentration of 7,040 J (estimated concentration, data flag) milligrams per kilogram (mg/kg).
In December 2008, excavation of lead-contaminated surface soil (top 0.5 foot of soil) at the site was conducted concurrently with the installation of the bioreactor technology demonstration project.
Four (4) surface soil confirmation samples (28-SS-18 to 28-SS-21) were then collected on the north, east, south, and west boundaries of the bioreactor to verify that lead concentrations exceeding the cleanup level had been removed. Surface soil confirmation sample locations are shown on Figure 2-1 along with historical soil sampling locations. The concentrations of lead in surface soil confirmation samples ranged from 28 to 180 mg/kg, with only one (1) sample result of 180 mg/kg exceeding the lead California Human Health Screening Level (CHHSL) (Office of Environmental Health Hazard Assessment [OEHHA], 2009) value of 80 mg/kg under the residential exposure scenario. However, as later explained in Section 2.3.1.2 of this document, the lead exposure point concentration (EPC) calculated at a 95 percent upper confidence limit (UCL) for Site DP039 is 63.4 mg/kg, which is less than the CHHSL value of 80 mg/kg, resulting in acceptable risk under a residential exposure scenario (CH2M HILL, 2015).

2.2.2 Site SD043 Soil Contamination

According to the WABOU Soil ROD (Travis AFB, 2002), PCB-1254 is the COC at Site SD043. Concentrations of PCB-1254 were present in soil near the former leaking transformer area ranging in concentration from 0.051 to 2.0 mg/kg (Travis AFB, 2002), with the highest concentration detected in boring SB05 at 10 feet below ground surface (bgs). PCB-1254 concentrations were detected in surface soil in two (2) borings only during the RI (SH08 at 0.17 mg/kg and SH10 at 0.047 mg/kg). Historical PCB-1254 concentrations in surface soil do not exceed the residential cleanup level for PCB-1254.

During the 2016 data gap investigation (CH2M HILL, 2018), surface and subsurface soil samples were collected from seven (7) boring locations (SB2460x43 through SB2466x43). All samples were analyzed for PCB-1254. PCB-1254 concentrations did not exceed the residential cleanup level (0.24 mg/kg) (Table 4-1) at any location sampled in 2016. The maximum concentration detected during the data gap investigation was 0.069 mg/kg in the surface soil sample collected at SB2461x43. Soil boring SB2461x43 was also sampled to confirm historically elevated PCB-1254 detections at boring SB05 collected during the RI. The maximum PCB-1254 concentration detected at boring SB05 was 2.0 mg/kg at a depth of 10 feet bgs. PCB-1254 was not detected in the subsurface soil samples collected at SB2461x43 during the data gap investigation; consequently, the historical high concentration detected at boring SB05 during the RI was not confirmed. This historical concentration in boring SB05 exceeded the residential cleanup level, along with exceedances in historical soil borings SH05 (1.7 mg/kg at 4 feet bgs) and SH08 (0.38 mg/kg at 4 feet bgs).

Thus, PCB-1254 concentrations in surface soil do not exceed the residential cleanup level. However, historical PCB-1254 concentrations in subsurface soil do exceed the residential cleanup level. Figure 2-2 shows the historical and the 2016 data gap investigation sampling locations.

The soil remedy to address the PCB-1254 contamination at Site SD043 is based on the analytical results from historical soil borings SB05, SH05, and SH08, located southwest of Building 916 where PCB-1254 concentrations exceed the residential cleanup level. The results from the 2016 data gap investigation were used to clarify the extent of the excavation footprint for this remedy. The excavation will be conducted to a depth of approximately 10 feet bgs and will result in approximately 40 cubic yards of contaminated soil removed (target volume). Figure 2-2 presents the excavation area, target volume, and boring locations that contain the impacted soil.

2.2.3 Site SS046 Soil Contamination

According to the WABOU Soil ROD (Travis AFB, 2002), cPAHs (benzo(a)pyrene, benzo(b)fluoranthene, benzo(a)anthracene, and benzo(k)fluoranthene) are the COCs at Site SS046. Concentrations of cPAHs are present in soil near the railroad tracks. A detection of benzo(b)fluoranthene in surface soil at 2.3 J- (estimated concentration, biased low) mg/kg in boring SB05 was the highest concentration detected (CH2M HILL, 1997).

During the 2016 data gap investigation (CH2M HILL, 2018), surface and subsurface soil samples were collected from four (4) boring locations (SB2467x46 through SB2470x46). Samples were analyzed for cPAHs. Results from surface and subsurface soil samples indicate that there were no cPAH concentrations that exceeded the residential cleanup levels in any of the samples collected in 2016. However, results from soil samples collected at historical borings SB05 and SB06 exceed the current residential cleanup levels for cPAHs. At SB05, benzo(a)pyrene (0.61 J- mg/kg), benzo(b)fluoranthene (2.3 J- mg/kg), and benzo(a)anthracene (2 J- mg/kg) detected in surface soil exceeded the current residential cleanup levels. At SB06, the benzo(a)pyrene concentration detected in surface soil (0.27 J- mg/kg) and at 6.5 feet bgs (0.19 J- mg/kg) exceeded the current residential cleanup level. The locations of cPAH detections, including historical cPAH detections, are shown on Figure 2-3.

According to the updated human health risk assessment (HHRA), which is presented in more detail in Section 2.3.1.2, the cPAHs were confirmed as site COCs, and arsenic and pentachlorophenol were also identified as site COCs. Arsenic concentrations were detected above background in historical soil borings SB02, SB03, and SB04. A pentachlorophenol concentration was detected above residential screening levels in historical boring SB05. In addition, elevated concentrations of lead were detected above the residential CHHSL in soil borings SB02, SB03, and SB05; therefore, lead was also identified as a site COC. Note that chromium was also identified as a risk contributor but was not included as a COC because chromium was conservatively assessed based on the assumption it is 100 percent hexavalent chromium, and chromium was considered non-site related. For example, the chromium EPC (40.22 mg/kg) calculated in the risk assessment was less than the background concentration (43.8 mg/kg).

Based on the results of the 2016 data gap investigation and historical soil concentrations, the proposed excavation area for the contaminants in soil includes historical soil borings SB02, SB03, SB04, and SB05, where concentrations of site contaminants exceed the residential cleanup level and background concentrations. Excavations will be conducted at five (5) locations to an approximate depth of 0.5 foot bgs at each location along the railroad tracks and beneath the concrete. The volume of contaminated soil removed will be approximately 32 cubic yards (target volume). Figure 2-3 presents the excavation area, volume of soil to be removed, and boring locations that contain the impacted soil.

TABLE 2-1
Summary of Nature and Extent of Current Contamination
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Site	Source of Contamination	Types and Characteristics of Contamination	COCs	Detected Concentration Range (mg/kg)		Approximate Target Volume[a]	Comments
				Minimum	Maximum		
DP039[b]	The former Base Battery and Electric Shop. Historical practices conducted prior to 1978 in Building 755 resulted in lead battery acid solutions being discharged from the building into an exterior sump.	Metal, chronic toxicity, immobile	Lead	28	180	Additional excavation is not necessary.	Lead-contaminated surface soil was excavated in 2008 during installation of the bioreactor technology demonstration. Residual concentrations of lead in surface soil are at a 95 percent UCL concentration of 63.4 mg/kg (CH2M HILL, 2015).
SD043[c]	An emergency electrical power facility. A fenced and graveled electrical transformer area was formerly located at the southwest exterior corner of Building 916. This fenced area contained three (3) liquid-filled transformers on top of a concrete pad. In 1992, one (1) of the transformers developed a leak onto the concrete pad and ground surface.	PCBs, carcinogenic, immobile	PCB-1254	0.021	2.0	Area = 100 feet^2 Depth = 10 feet	The electrical transformers and concrete pad were removed in 1993.

TABLE 2-1
Summary of Nature and Extent of Current Contamination
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Site	Source of Contamination	Types and Characteristics of Contamination	COCs	Detected Concentration Range (mg/kg)		Approximate Target Volume[a]	Comments
				Minimum	Maximum		
SS046[c]	The RMSA consisting of an unused railroad track and concrete pad that formerly served as a railhead at the south terminus of a spur off the Northern Sacramento Railroad. This site served as a weapons handling facility from 1953 to 1962.	cPAHs, carcinogenic, immobile	Benzo(a)pyrene	0.00098	0.61 J-	Area: 1,725 feet^2 Depth: 0.5 foot	Based on results from previous investigations, soil concentrations greater than cleanup levels are located in discrete locations along the railroad tracks and at one (1) location beneath the concrete pad, as shown on Figure 2-3. To ensure that contaminated soil from site-related activities only is excavated, the excavation area will not extend beyond the northeast border of the SB04 footprint, as shown on Figure 2-3.
			Benzo(b)fluoranthene	0.0028	2.3 J-		
			Benzo(a)anthracene	0.0012	2 J-		
			Benzo(k)fluoranthene	0.11	2.2 J-		
			Pentachlorophenol	0.25	4.4		
		Metals, chronic toxicity, immobile	Arsenic	6.3	24.8		
			Lead	3.1	298		

[a] Target volume is the estimated volume to be removed during the excavation effort.
[b] Source: *Site DP039 Lead-contaminated Soil Excavation Technical Memorandum* (CH2M HILL, 2015).
[c] Source: WABOU Soil ROD, Section 5.3.3 and Table II-3-2 (Travis AFB, 2002) and *Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046*, Attachment 2 (CH2M HILL, 2018).

Note:

J- = estimated concentration, biased low

2.3 Summary of Site Risks

The following sections summarize the HHRA and ecological risk assessment (ERA). A detailed HHRA and ERA were presented in the WABOU RI Report (CH2M HILL, 1997) and summarized in the WABOU Soil ROD (Travis AFB, 2002). An evaluation of the risk from lead (human health) was assessed following completion of remedial actions at Site DP039 (CH2M HILL, 2015). The HHRAs for Sites SD043 and SS046 were updated in 2017 (CH2M HILL, 2018) as a result of a data gap investigation conducted in 2016 to evaluate the current extent of soil contamination and to support reevaluation of human health risks to consider a residential exposure scenario.

2.3.1 Human Health Risk Assessment

The HHRA estimates the risks that a site poses to human health if no additional action is taken, provides the basis for taking action, and identifies the contaminants and exposure pathways, if any, that need to be addressed by the remedial action.

2.3.1.1 Approach

The HHRA consists of the following basic components. Additional detailed information by site can be found in Attachment 2 of the *Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046* (CH2M HILL, 2018).

- **Selection of Chemicals of Potential Concern (COPC) –** Identifies the constituents for inclusion in the human health risk quantification process (i.e., chemicals detected at least once in soil).
- **Exposure Assessment –** Identifies the pathways by which potential human exposures could occur, describes how they are evaluated, and evaluates the magnitude, frequency, and duration of the exposures.
- **Toxicity Assessment –** Summarizes the toxicity of the selected COPCs and the relationship between the magnitude of exposure and the occurrence of adverse health effects.
- **Risk Characterization –** Integrates information from the exposure and toxicity assessments to characterize the risks to human health from potential exposure to the selected soil COPCs. Numerical estimates of potential carcinogenic (cancer) risks and noncarcinogenic (noncancer) health effects are calculated.
- **Uncertainties Analysis –** Summarizes the basic assumptions used in the HHRA and the limitations of data and methodology.

The data used in these risk assessments were deemed to be of sufficient quality and quantity for their intended use. In accordance with EPA guidance, the following are considered in identifying COPCs:

- Identification of detected chemicals
- Comparison with background concentrations
- Evaluation of essential nutrients
- Frequency of detection and other indications of limited presence

A 95 percent UCL on the mean was calculated for COPCs with a sufficient number of data points, using the latest version of the EPA's ProUCL software (EPA, 2016). The lower of the 95 percent UCL and the maximum concentration was used as the EPC.

Metals present at concentrations greater than their naturally occurring level were retained as COPCs. However, a metal detected in environmental media at a concentration greater than its background value may still occur naturally at the site and not be a consequence of a historical release. In that case, further evaluation of the detected metal concentrations is necessary to determine whether remedial action is warranted.

The exposure areas are where individuals within or near the site might contact constituents in environmental media. The exposure scenario reflects the future potential use of the site. The current land use at each site is industrial, and land use at the sites is expected to remain industrial in the foreseeable future. Although residential land use is not likely within the foreseeable future, a hypothetical future residential scenario was evaluated to support risk management decisions. The hypothetical future residential scenario assumes a resident could be exposed to site-related constituents in soil through incidental ingestion, dermal contact, particulate inhalation, outdoor inhalation, and indoor inhalation/vapor intrusion.

COPCs can be divided into two (2) broad groups (carcinogens and noncarcinogens) on the basis of their tendency to cause cancer or adverse noncancer health effects. Estimates of potential cancer risks and noncancer health effects for each COPC are calculated for each exposure scenario and medium of interest. Cumulative risks, including risk from all COPCs for each exposure scenario and medium of interest, are also calculated. Because carcinogenic (cancer) and noncarcinogenic (noncancer) COPCs act differently, the levels of risk from exposure are expressed differently. Cancer risk is expressed as the probability that, over a lifetime, exposure to the site-related constituent will cause cancer. Noncancer hazard is expressed in terms of a ratio of the dose relative to an acceptable threshold dose above which adverse health effects may result.

The dose-response relationship for cancer effects is expressed as a cancer slope factor (CSF). The data used for estimating the dose-response relationship were used in lifetime animal studies or human occupational or epidemiological studies, where excess cancer risk has been associated with exposure to the chemical. In the HHRA, potential cancer risk is referred to as the potential excess lifetime cancer risk (ELCR), because it would be in addition to the risk of cancer from other sources, such as exposure to too much sun.

An ELCR of one (1) in one million means that there is a one (1)-in-one-million probability that exposure to the constituent will cause cancer. ELCRs were estimated using the following formula:

$$ELCR = CDI \times CSF$$

Where:

ELCR = Excess lifetime cancer risk (unitless probability)
CDI = Chronic daily intake averaged over a lifetime (milligrams per kilogram per day [mg/kg-day])
CSF = Cancer slope factor $(mg/kg\text{-}day)^{-1}$

For convenience, ELCR values are usually expressed using scientific notation, where one (1) in one million is expressed as 1×10^{-6} or 1E-06. The higher the ELCR value, the greater the probability that exposure to the contaminant will cause cancer.

For noncancer health effects, the body's protective mechanisms must be overcome before an adverse effect is manifested. If exposure is high enough and these protective mechanisms (or thresholds) are exceeded, adverse health effects can occur. The dose-response relationship for noncancer effects is expressed as a reference dose (RfD). An RfD represents the constituent level that an individual may be exposed to that is not expected to cause any harmful effects. The ratio of the CDI divided by the RfD is expressed as the hazard quotient (HQ). HQs were estimated by using the following formula:

$$HQ = CDI/RfD$$

Where:

HQ = Hazard quotient; ratio of exposure to toxicity
CDI = Chronic daily intake averaged over a lifetime
RfD = Reference dose

A hazard index (HI) is generated by adding the HQs for all COPCs and pathways that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium to which an individual may reasonably be exposed. An HI less than or equal to 1 indicates that adverse effects are unlikely from additive exposure to constituents (i.e., exposure is less than the RfD). An HI greater than 1 indicates that adverse noncancer health effects may occur from exposures. A higher HI does not indicate a greater probability of health effects.

These ELCR and HI estimates do not account for potential noncancer health effects from lead. EPA has no consensus toxicity factors (i.e., a noncancer RfD or a CSF) for inorganic lead, so it is not possible to calculate risk for lead as is done for other chemicals. EPA considers lead to be a special case because of the difficulty in identifying the classic threshold needed to develop an RfD. For this HHRA, potential risks from lead were evaluated by comparing the lead EPC in soil to the residential and industrial CHHSLs of 80 and 320 mg/kg, respectively (OEHHA, 2009), and the EPA residential and industrial risk screening levels of 400 and 800 mg/kg, respectively (EPA, 2018). The results of the comparison to the more stringent CHHSLs are used to determine if lead is a COC. The Air Force updated the previous risk assessment calculations that supported the selected remedies for Sites DP039, SD043, and SS046 to support risk-management decisions. The evaluation of human health risk associated with lead in soil at Site DP039 is presented in the *Site DP039 Lead-contaminated Soil Excavation Technical Memorandum* (CH2M HILL, 2015). The risk calculations for Sites SD043 and SS046 were updated using historical data, new input parameters, and relevant soil sampling data. Specifically, the HHRA calculations were revised to address changes in the soil concentration data set and changes in the HHRA inputs, including the addition of risk calculations for a future residential exposure scenario. The details of the updated HHRA for Sites SD043 and SS046 are presented in Attachment 2 (*Human Health Risk Assessment Update Technical Memorandum, Sites SD033, SD043, and SS046*) of the *Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046* (CH2M HILL, 2018).

2.3.1.2 Summary of Risk Estimates

A summary of the human health risk estimates for Sites DP039, SD043, and SS046 is presented in Table 2-2. Risks were estimated for the potential future residential and current industrial exposure scenarios from 0 to 2 feet bgs (surface soil) and 0 to 10 feet bgs (surface soil and subsurface soil combined and referred to as mixed-zone soil). For Site DP039, comparison of the lead EPC to the residential lead CHHSL value is evaluated using the results from the lead excavation and confirmation sampling (CH2M HILL, 2015). An updated HHRA for Sites SD043 and SS046 was conducted using the results of the 2016 data gap investigation (CH2M HILL, 2018). The key aspects of the current site risks are summarized in the following sections.

Site DP039. Following excavation of surface soil during construction of the bioreactor at Site DP039, lead contamination in soil has been reduced to concentrations that are considered acceptable under the residential exposure scenario (CH2M HILL, 2015). Four (4) confirmation soil samples were collected and analyzed for lead. Concentrations ranged from 28 to 180 mg/kg. Only one (1) confirmation soil sample had a lead concentration (180 mg/kg) greater than the residential CHHSL value of 80 mg/kg. However, the EPC for the surface soil lead data from the site after removal of soil during excavation, a 95 percent UCL concentration of 63.4 mg/kg, is less than the residential CHHSL value (80 mg/kg). Therefore, potential risks to human health and the environment are currently acceptable under a residential land use, and no additional remedial action is necessary to allow for unlimited use and unrestricted exposure at the site. The *Site DP039 Lead-contaminated Soil Excavation Technical Memorandum* (CH2M HILL, 2015) provides additional detailed information on the HHRA for the site.

Based on the WABOU RI Report (CH2M HILL, 1997) and WABOU Soil ROD (Travis AFB, 2002), no other COCs were identified in surface or subsurface soil at the site. The ELCR for the future trench worker in subsurface soil ranged from 9×10^{-8} to 2×10^{-7}, which is less than the cancer risk level of 1×10^{-6}. Likewise, the HIs for the future trench worker in subsurface soil are less than 1 and below the noncancer risk level of 1.

Site SD043. According to the updated HHRA, which includes existing site data and data from soil samples collected during the 2016 data gap investigation, there is unacceptable risk associated with PCB-1254 in soil at Site SD043. The updated HHRA for Site SD043 (CH2M HILL, 2018) provides additional detailed descriptions of the HHRA for the site.

For the hypothetical future residential land use scenario with exposure to surface soil and mixed-zone soil, the cumulative ELCR is 6×10^{-6} and 7×10^{-6}, respectively, excluding bis-2(ethylhexyl)phthalate in mixed-zone soil. Bis-2(ethylhexyl)phthalate was not considered a primary risk driver, because the detection frequency for this common laboratory contaminant was low, with detections only in 16 percent of the samples collected in mixed-zoned soil. PCB-1254 is the primary risk driver in surface and mixed-zone soils. The corresponding noncancer HIs for the site are 0.3 (surface soil) and 0.6 (mixed-zone soil).

For the industrial/commercial worker scenario, the cumulative ELCR for surface soil is 1×10^{-6}. No primary contributors to the cancer risk were identified since all potential contaminants have an individual cancer risk less than 1×10^{-6}. The noncancer HI for the industrial/commercial worker scenario for surface soil at the site is 0.03.

No COCs are identified at Site SD043 in surface or mixed-zone soils based on the noncancer HIs for the future residential scenario and for the industrial/commercial worker. However, site-related cumulative ELCRs for the hypothetical future residential scenario are greater than 1×10^{-6}. Therefore, remedial action is necessary to address PCB-1254 and to achieve unlimited use and unrestricted exposure for the site.

Site SS046. According to the updated HHRA, which includes existing site data, data from soil samples collected during the 2016 data gap investigation, and changes to the HHRA inputs, new COCs are identified along with the cPAHs. However, the cPAHs detected during the 2016 data gap investigation were at concentrations that did not exceed the residential screening levels. Thus, only the historical detections of cPAHs exceeded the residential screening levels and are identified as COCs. The new COCs identified include lead, arsenic, and pentachlorophenol.

Lead was identified as a COC in surface and mixed-zone soil at Site SS046 based on comparison to the lead CHHSL (80 mg/kg) for the residential exposure scenario. Arsenic, pentachlorophenol, and cPAHs are identified as COCs in surface soil and pentachlorophenol in mixed-zone soil under a residential exposure scenario.

Based on a hypothetical future residential land use scenario and current and planned future industrial land use (industrial/commercial worker), cPAHs, pentachlorophenol, and arsenic in soil pose an unacceptable risk to human health. The estimated cumulative ELCR associated with residential exposure to surface soil (0 to 2 feet bgs) and mixed-zone soil (0 to 10 feet bgs) is 2×10^{-4} and 1×10^{-4}, respectively, and the corresponding noncancer HIs are 3 and 2. The primary risk contributors are chromium, arsenic, and pentachlorophenol for surface soil, and chromium and pentachlorophenol for mixed-zone soil. However, chromium is not considered to be site related and not a COC because the EPC is less than the background concentration. Also, because total chromium results were considered to be representative of hexavalent chromium, the risk assessment results were very conservative. Without chromium, the estimated cumulative ELCR under the residential exposure scenario for surface soil is 3×10^{-5} and for mixed-zone soil is 4×10^{-6}. When evaluating the noncancer HIs for both the surface and mixed-zone soils, no specific target organ HQ exceeds 1.

The estimated cumulative ELCR for surface soil under the industrial exposure scenario is 1×10^{-5}. However, when excluding chromium, the estimated cumulative ELCR is 7×10^{-6}. The noncancer HI is 0.3. The primary contributor to risk is arsenic.

The ELCR and HI estimates do not account for potential noncancer health effects from lead. The current lead EPC is presented in Table 2-2. For surface soil (0 to 2 feet bgs) and mixed-zone soil (0 to 10 feet bgs), the current lead EPCs (132 and 109 mg/kg, respectively) exceed the CHHSL of 80 mg/kg for the residential exposure scenario, but do not exceed the industrial CHHSL of 320 mg/kg. Based on this evaluation, lead is identified as a COC in surface and mixed-zone soils at Site SS046.

TABLE 2-2
Human Health Risk Assessment Summary – Cancer and Noncancer Risk
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Site and Exposure Scenario	Soil COC/ Risk Driver	EPC[a] (mg/kg)	Cumulative ELCR[b]	HI[c]
Site DP039 – Building 755	Lead	63.4[d]	---[e]	---[e]
SD043 – Building 916				
Hypothetical future resident – surface soil (0 to 2 feet bgs)	PCB-1254	0.36	6×10^{-6}	0.3
Hypothetical future resident – mixed-zone soil (0 to 10 feet bgs)	PCB-1254	0.67	9×10^{-6}	0.6
Hypothetical future resident – mixed-zone soil (0 to 10 feet bgs) (without bis-2(ethylhexyl)phthalate)	PCB-1254	0.67	7×10^{-6}	0.6
Industrial/commercial worker – surface soil (0 to 2 feet bgs)	PCB-1254	0.36	1×10^{-6}	0.03

TABLE 2-2
Human Health Risk Assessment Summary – Cancer and Noncancer Risk
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Site and Exposure Scenario	Soil COC/ Risk Driver	EPC[a] (mg/kg)	Cumulative ELCR[b]	HI[c]
Site SS046 – RMSA				
Hypothetical future resident – surface soil (0 to 2 feet bgs)	Lead Arsenic Pentachlorophenol Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene Benzo(k)fluoranthene	132.1 15.6 4.29 0.112 0.397 0.73 0.382	2×10^{-4}	3 (individual target organ segregated HIs < 1)
Hypothetical future resident – surface soil (0 to 2 feet bgs) (without chromium)	---	---	3×10^{-5}	3 (individual target organ segregated HIs < 1)
Hypothetical future resident – mixed-zone soil (0 to 10 feet bgs)	Lead Arsenic Pentachlorophenol Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene Benzo(k)fluoranthene	109.1 14.66 1.82 0.065 0.212 0.352 0.208	1×10^{-4}	2 (individual target organ segregated HIs < 1)
Hypothetical future resident – mixed-zone soil (0 to 10 feet bgs) (without chromium)	---	---	4×10^{-6}	2 (individual target organ segregated HIs < 1)
Industrial/commercial worker – surface soil (0 to 2 feet bgs)	Lead Arsenic Pentachlorophenol Benzo(a)pyrene Benzo(b)fluoranthene Benzo(a)anthracene Benzo(k)fluoranthene	132.1 15.6 4.29 0.112 0.397 0.73 0.382	1×10^{-5}	0.3
Industrial/commercial worker – surface soil (0 to 2 feet bgs) (without chromium)	---	---	7×10^{-6}	0.3

[a] EPC calculated as a result of the updated HHRA for Sites SD043 and SS046. Source: *Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046*, Attachment 2 (CH2M HILL, 2018).

[b] ELCR posed by contaminant under residential and industrial worker exposure scenarios. The potential risk posed by a carcinogenic compound is expressed as a probability value (e.g., 2×10^{-6}). Soil cleanup levels for carcinogenic chemicals equate to a cancer risk of 1×10^{-6} for the residential exposure scenario. Source: *Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046*, Attachment 2 (CH2M HILL, 2018).

[c] Estimated noncancer risk posed by contaminant under residential and industrial worker exposure scenarios indicated by an HI. Source: *Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046*, Attachment 2 (CH2M HILL, 2018).

[d] The EPC for lead was calculated using all the surface soil lead data at the site after excavation was conducted. Concentrations of lead in the surface soil after excavation ranged from 28 to 180 mg/kg. Source: Table 1 of the *Site DP039 Lead-contaminated Soil Excavation Technical Memorandum* (CH2M HILL, 2015).

[e] There is no estimated ELCR for the lead soil COC. Lead is regulated based on developmental toxicity. The EPC for lead (63.4 mg/kg) does not exceed the lead CHHSL of 80 mg/kg.

2.3.2 Ecological Risk Assessment

The ERA quantitatively and/or qualitatively evaluates the likelihood that adverse ecological effects (e.g., mortality, reproductive failure) will occur as a result of a release at the site, provides risk managers with information needed to achieve their ecological management goals, and identifies contaminants that need to be addressed by the remedial action, if necessary.

2.3.2.1 Approach

In the WABOU RI Report (CH2M HILL, 1997), the ERA evaluated potential threats to the environment in the absence of any remedial action. The ERA used a tiered approach to support the investigation of, and the remedial action decisions for, the WABOU soil sites, as follows:

- The Tier 1 assessment was qualitative in nature and identified the chemicals, habitats, and potential ecological receptors at each soil site.
- The Tier 2 assessment was a screening process that quantified potential risks to ecological receptors by comparing the following values for each target species:
  - The EPC is a chemical concentration to which a target species may be exposed at a site. The calculation of the EPC takes into account the number and chemical concentration of samples collected at the site.
  - Critical toxicity values (CTVs) are generated for each target species. The CTV is a chemical- and receptor-specific value that is expressed as a chemical concentration in soil and is derived from a selected exposure medium and pathway. It is based on reference toxicity values (RTVs) for plants and animals reported in toxicological databases, wildlife toxicological reviews, or scientific literature, as well as results of site-specific bioassays. CTVs are derived from the target species RTVs, bioaccumulation factors, species-specific exposure factors, and dietary compositions of target species. The CTVs are conservative values, because they assume animals will be resident within the area of each soil site, although the sites often are smaller than the home range (which is especially true for birds).
- The Tier 3 assessment validated the results of the Tier 2 assessment, using bioassays, to better define the potential risks and reduce uncertainties.

The risk characterization is to evaluate the evidence linking site contaminants with potential adverse ecological effects. This link is established by combining the exposure assessment, ecological effects assessment, toxicological data, and site chemical data through quantitative and qualitative evaluations. In the WABOU ERA, quantification of the potential ecological risk posed by a contaminant to a target species was conducted using an HQ approach, the ratio of the exposure level for the contaminant to a chemical-receptor concentration. The formula for the HQ is as follows:

$$HQ = EPC/CTV$$

The magnitude of the HQ provides a broad determination of the potential ecological toxicity/risk for a chemical, but is not an exact estimation of risk. Because of the uncertainties associated with the CTV calculation process, the WABOU ERA expresses potential risk as measured by the HQ as follows:

- No or low risk: < 1
- Low to medium risk: 1 to 10
- Medium to high risk: 10 to 100
- Very high risk: > 100

Section 3.2.2 of the WABOU Soil ROD (Travis AFB, 2002) presents additional information on the ERA process and results.

2.3.2.2 Summary of Risk Estimates

The following sections briefly summarize the ERA results and conclusions for Sites DP039, SD043, and SS046. Additional discussion regarding the ERA is provided in Sections 3.2 and 5.3 in the WABOU Soil ROD (Travis AFB, 2002).

Site DP039. Prior to excavating the lead-contaminated soil during the installation of the Site DP039 bioreactor, the WABOU RI (CH2M HILL, 1997) concluded that no chemicals were expected to adversely affect terrestrial plants or wildlife. In addition, the WABOU Soil ROD (Travis AFB, 2002) also concluded that lead residue did not pose an unacceptable risk to ecological receptors. Once the Site DP039 bioreactor was installed, lead-contaminated soil was removed from the site. Lead was not identified as a chemical of ecological concern (COEC) at this site.

Site SD043. Based on the ERA conducted during the WABOU RI (CH2M HILL, 1997), no COECs were identified in surface soil (0 to 0.25 foot bgs) or subsurface soil (0.25 to 4 feet bgs) at the site. However, three (3) potential COECs in subsurface soils had HQs slightly greater than 1, except dibenzo(a,h)anthracene which had HQs up to 17, indicating that potential toxicity was low to medium. Nevertheless, dibenzo(a,h)anthracene was not retained as a COEC because estimates of risk were based on a single detection at the site, and exposure to mammals and birds was expected to be low. Thus, according to the WABOU RI and ROD, there are no COECs associated with this site.

Site SS046. As indicated in the WABOU Soil ROD (Travis AFB, 2002), cadmium, lead, benzo(a)pyrene, benzo(k)fluoranthene, fluoranthene, pentachlorophenol, phenanthrene, and pyrene were the COECs for this site. Ecological risks were evaluated for several ecological receptors including plants, terrestrial invertebrates, deer mice, ornate shrews, western meadowlarks, and burrowing owls at this site. HQs for birds were less than 10 for all chemicals, but those for cadmium and benzo(a)pyrene in mammals were higher. Plants were considered the most sensitive receptors for pentachlorophenol.

According to the *Evaluation of Ecological Protection for Remedial Actions in the WABOU Soil ROD* (CH2M HILL, 2001), because of the size of the contaminated portion of the site (represents less than 0.02 percent of the typical foraging range for a burrowing owl), the potential limited use of onsite habitats, and the goal of protecting populations of common species rather than individuals within a species, it was concluded that there is no potential unacceptable ecological risk at this site. This is particularly true, because the site is small in relation to the amount of available similar habitat on-base and in the surrounding region, and the COECs will not adversely affect populations of these species. A detailed description of this ecological evaluation is presented in The *Evaluation of Ecological Protection for Remedial Actions in the WABOU Soil ROD* (CH2M HILL, 2001).

2.4 Original Remedy Selection

Prior to this ROD Amendment, remedies to address the contaminated soil at Sites DP039, SD043, and SS046 were identified, evaluated, selected, and implemented in accordance with CERCLA requirements. Descriptions of the historical remedy selection process are summarized in the WABOU Soil ROD (Travis AFB, 2002) as follows:

- **WABOU RI** – A summary of the WABOU RI Report (CH2M HILL, 1997), including the nature and extent of contamination, risk assessments, and site descriptions, is provided in the WABOU Soil ROD, Part II – Decision Summary, Subsections 3.1, 3.2, and 3.3. Descriptions of Sites DP039, SD043, and SS046 are provided in Subsections 3.3.1, 3.3.3, and 3.3.8.

- **WABOU Feasibility Study (FS)** – The WABOU FS Report (CH2M HILL, 1998), including evaluations of potential remedies for Sites DP039, SD043, and SS046, is summarized in the WABOU Soil ROD, Part II – Decision Summary, Subsections 4.1 through 4.4. As summarized in Table II-4-1 of the WABOU Soil ROD (Travis AFB, 2002), seven (7) potential soil remedial alternatives were evaluated in the FS, including the following:

  - Alternative S1 – No Action
  - Alternative S2 – Land Use and Access Restrictions
  - Alternative S3 – Containment: Capping
  - Alternative S4 – Excavation/Treatment/On-base Consolidation
  - Alternative S5 – Excavation/Off-base Disposal
  - Alternative S6 – Excavation/On-base Consolidation
  - Alternative S7 – In-situ Treatment/Capping

  The preferred soil alternatives determined during the FS to best satisfy the CERCLA evaluation criteria for the conditions at Sites DP039, SD043, and SS046 are summarized as follows:

  - Alternative S2 – Land Use and Access Restrictions (Site DP039)
  - Alternative S6 – Excavation/On-base Consolidation (Site SD043)
  - Alternative S2 – Land Use and Access Restrictions and Alternative S6 – Excavation/ On-base Consolidation (Site SS046)

- **WABOU Proposed Plan** – Following completion of the WABOU FS Report (CH2M HILL, 1998), the preferred soil remedies for Sites DP039, SD043, and SS046 were submitted for public review and comment in the *WABOU Proposed Plan for Soil Cleanup* (Travis AFB, 1998). Statements regarding the State and public acceptance of the preferred remedies for these sites are provided in the WABOU Soil ROD, Section 5.5.5. Comments received from the public on the remedy approaches are provided in the WABOU Soil ROD, Part III – Responsiveness Summary (Travis AFB, 2002).

- **WABOU Soil ROD** – The soil remedial actions originally selected for WABOU soil sites are provided in the WABOU Soil ROD, Part II – Decision Summary, Subsections 5.1 through 5.8, and are briefly listed below:

  - Alternative S2 – Land Use and Access Restrictions (Site DP039)
  - Alternative S2 – Land Use and Access Restrictions (Site SD043)
  - Alternative S2 – Land Use and Access Restrictions (Site SS046)

  Discussion regarding significant changes to the selected remedies that occurred after the finalization of the *WABOU Proposed Plan for Soil Cleanup* (Travis AFB, 1998) is provided in the WABOU Soil ROD, Part II – Decision Summary, Subsection 5.8. These soil land use and access restrictions have been enforced in accordance with the requirements described in the WABOU Soil ROD (Travis AFB, 2002), and documented in the Annual LUC Reports since 2004.

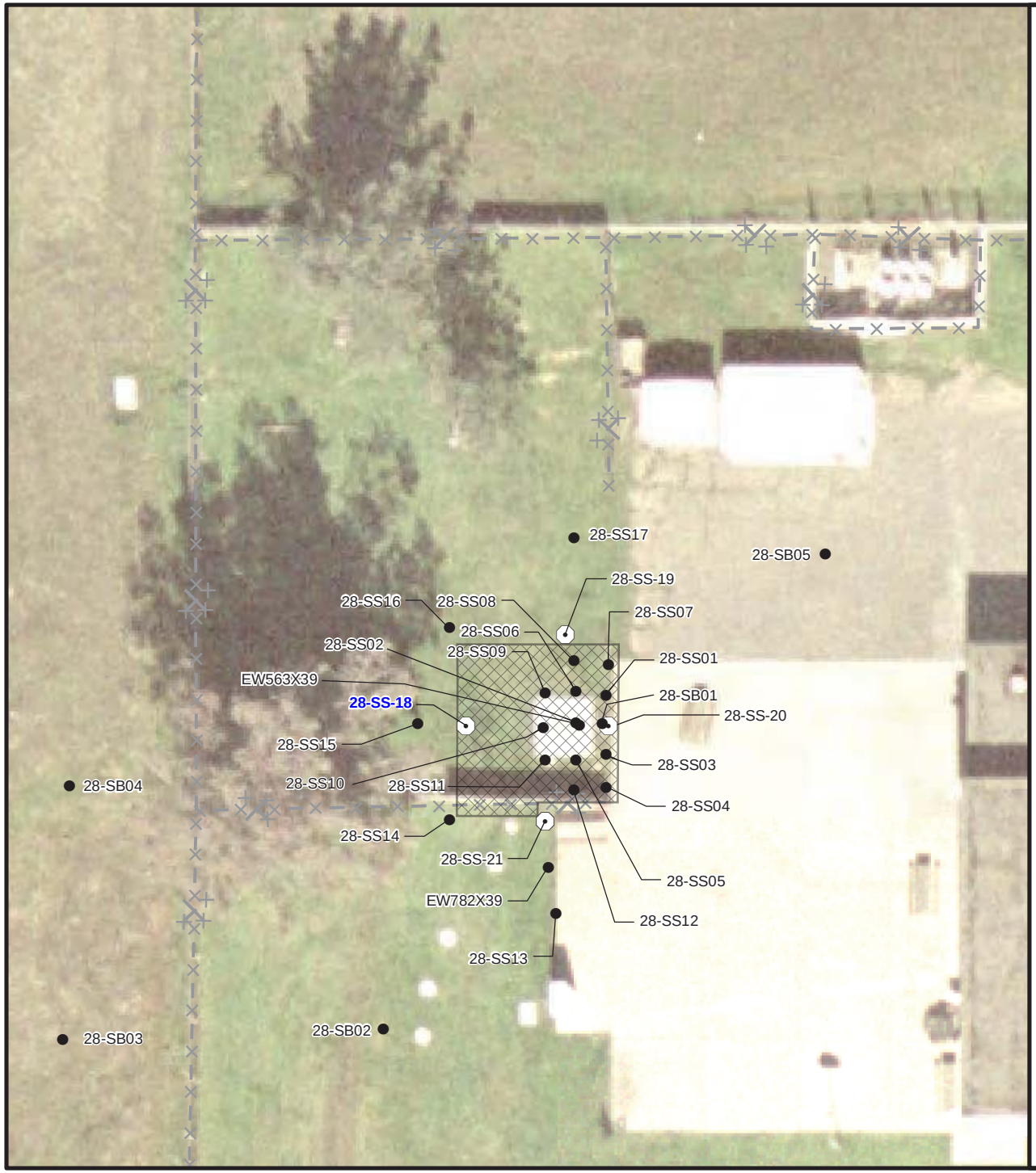
2.5 ROD Amendment Remedy Selection

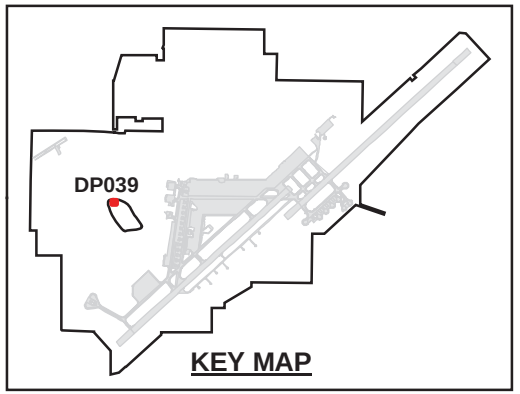
In 2015, the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) for Sites DP039, SD043, and SS046 was submitted for public review and comment. The Proposed Plan presented proposed changes to the existing remedies at these sites. See Section 8 of this ROD Amendment for additional details. Information regarding the State and public review of the preferred remedies for these sites is provided in Section 9 of this ROD Amendment.

The remedies selected in this ROD Amendment were originally evaluated in the WABOU Soil ROD (Travis AFB, 2002) but not initially selected for the sites. The specific changes to the selected soil remedies at Sites DP039, SD043, and SS046 are summarized in this section and described in more detail in Section 4 – Descriptions of New Alternatives. In summary, the site soil remedies change as follows:

- **Site DP039:** Alternative S2 – Land Use and Access Restrictions is changed to Alternative S1 – No Action
- **Site SD043:** Alternative S2 – Land Use and Access Restrictions is changed to Alternative S5 – Excavation/Off-base Disposal
- **Site SS046:** Alternative S2 – Land Use and Access Restrictions is changed to Alternative S5 – Excavation/Off-base Disposal

Successful completion of these changes to the soil remedies will allow unrestricted access to the sites and will continue to achieve protective and legally compliant remedies for soil at Travis AFB. The Air Force is responsible for implementing, maintaining, and monitoring the remedial actions identified herein for the duration of the remedies selected in this ROD Amendment. The Air Force will continue to exercise this responsibility in accordance with CERCLA and the NCP.





LEGEND

- HISTORICAL SOIL SAMPLE LOCATION
- CONFIRMATION SOIL SAMPLE LOCATION
- EXCAVATION AREA

NOTE: BORING LABEL SHOWN IN **BLUE** HAS CONTAMINANT CONCENTRATIONS GREATER THAN CLEANUP LEVELS FOR RESIDENTIAL USE. HOWEVER, THE LEAD EPC CALCULATED AT A 95% UCL IS LESS THAN THE CLEANUP LEVEL.

SAMPLE DEPTHS RANGED FROM 0 TO 16 FEET BGS.

N

0 25 50

FEET

FIGURE 2-1
SITE DP039 SITE FEATURES, SOIL SAMPLE LOCATIONS, AND EXCAVATION AREA

WABOU SOIL ROD AMENDMENT
TRAVIS AIR FORCE BASE, CALIFORNIA

\\LOKI\PROJECTS\RDDGIS\TRAVIS\381459_TRAVISBAA\MAPFILES\BAA_WORKPLAN\BAAWORKPLAN_FIG05.MXD 10/28/2008 16:42:29
ES040114184541SAC Figure_2-1_WABOU_V4-nl.ai tdaus 11.17.2017

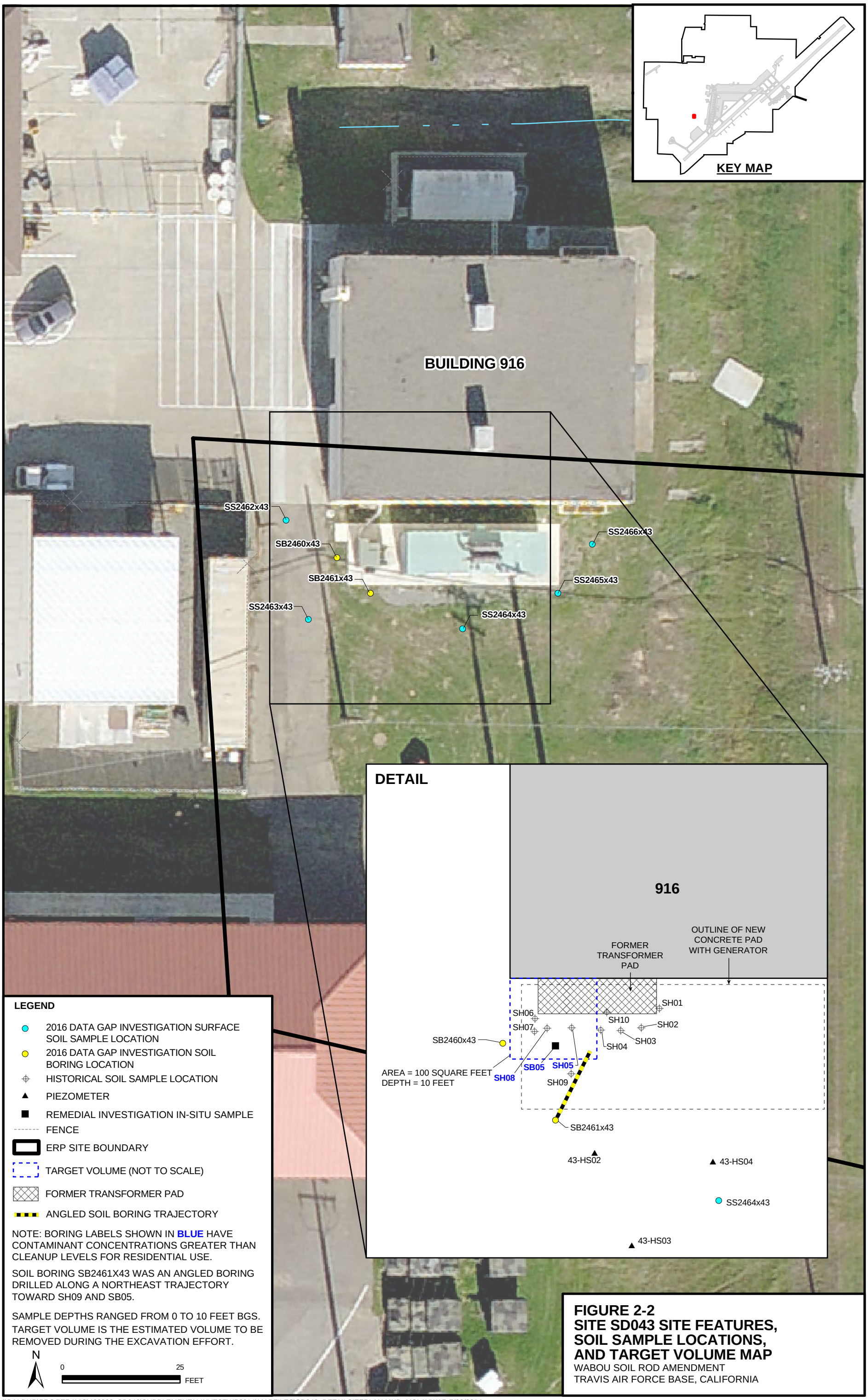


FIGURE 2-2
SITE SD043 SITE FEATURES, SOIL SAMPLE LOCATIONS, AND TARGET VOLUME MAP
WABOU SOIL ROD AMENDMENT
TRAVIS AIR FORCE BASE, CALIFORNIA

\\BALDUR\PROJ\TRAVIS\482366_SD043\SUPPLEMENTALINVESTWP2014\MAPFILES\SD043_DETAILSITEPLAN.MXD MCLAYWAR 7/23/2014
EN1228151011SAC Figure_2-2_WABOU_V5-nl.ai tdaus 08.15.2018

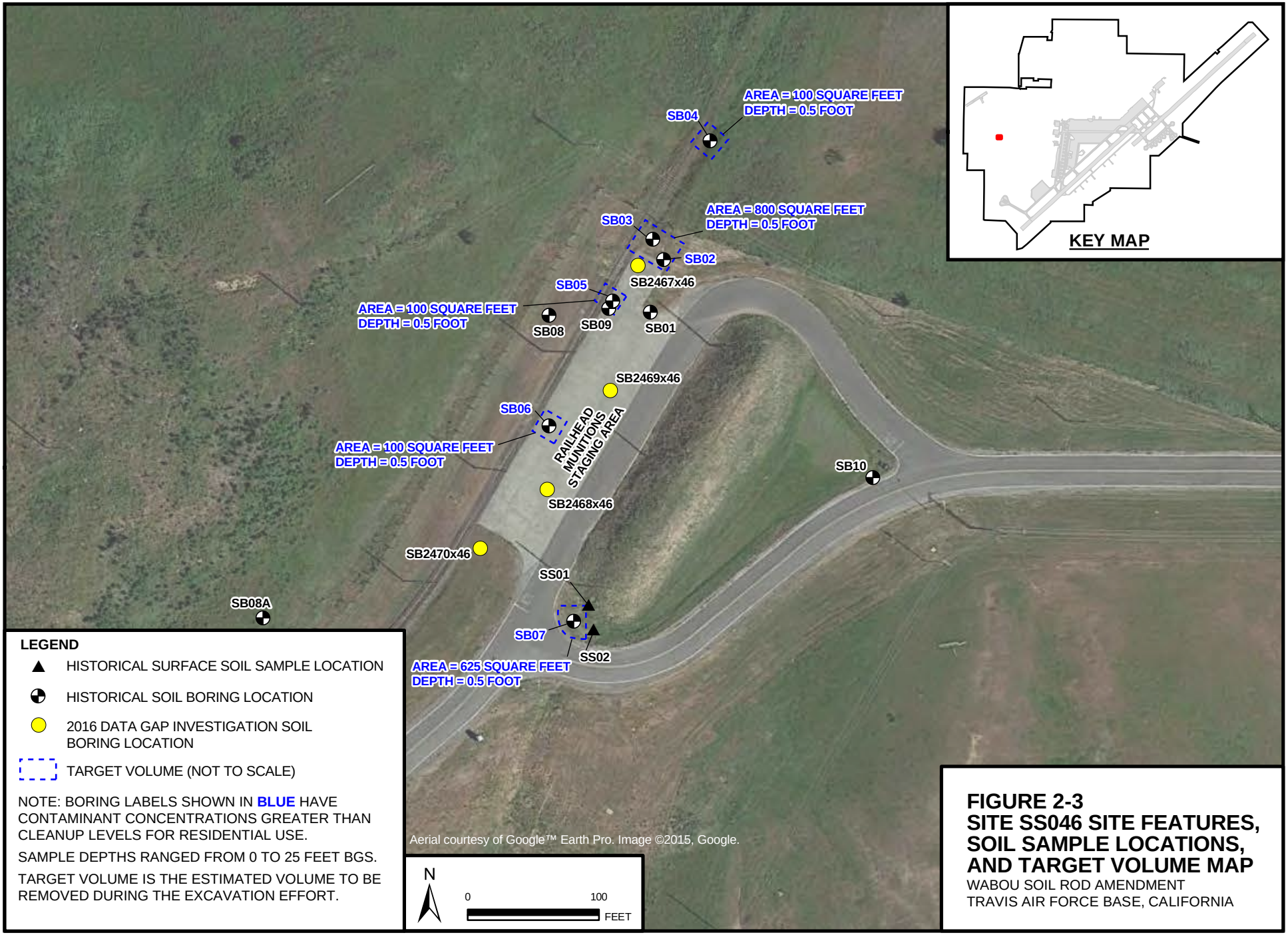


FIGURE 2-3
SITE SS046 SITE FEATURES, SOIL SAMPLE LOCATIONS, AND TARGET VOLUME MAP

WABOU SOIL ROD AMENDMENT
TRAVIS AIR FORCE BASE, CALIFORNIA

EN1228151011SAC Figure_2-3_WABOU_V5-nl.ai tdaus 08.15.2018

SECTION 3

Basis for the Document

This section summarizes the information that supports the development of this ROD Amendment to change the soil remedies previously selected for Sites DP039, SD043, and SS046 in the WABOU Soil ROD (Travis AFB, 2002).

The amended remedies selected in this ROD Amendment are necessary, because a fundamental change to those remedies previously selected in the WABOU Soil ROD (Travis AFB, 2002) is needed. Since the implementation of the original remedies, an action has been conducted (Site DP039) and new information has been collected for Sites SD043 and SS046 to support a change from the original remedy. This information is summarized below and discussed in more detail in the following sections.

In 2008, Travis AFB was selected to test a new groundwater treatment technology (bioreactor) at Site DP039 that was designed to address high chlorinated solvent concentrations in groundwater. The footprint of the bioreactor covered the entire area at Site DP039 that was under LUCs because of the presence of lead in surface soil. As described in the *Site DP039 Lead-contaminated Soil Excavation Technical Memorandum* (CH2M HILL, 2015), during the excavation to create the bioreactor, lead-contaminated surface soil was removed, and the remaining soil within the LUC footprint did not contain elevated lead concentrations. Therefore, the soil LUCs that were selected in the WABOU Soil ROD (Alternative S2) for the protection of human health and the environment are no longer necessary, and no additional remediation is required at Site DP039. Upon removal of the soil LUCs, the site soil will be considered appropriate for unlimited use and unrestricted exposure, and groundwater will continue to be remediated consistent with the Groundwater ROD (Travis AFB, 2014).

The Air Force has been taking additional measures toward reducing its environmental liability in order to make properties available for development to support the Base mission. Therefore, conditions at Sites SD043 and SS046 have been reevaluated to facilitate site closeout. An updated HHRA for residential exposure was conducted, which concluded that the chemical concentrations at Sites SD043 (PCB-1254) and SS046 (arsenic, lead, pentachlorophenol, and cPAHs) continue to be associated with unacceptable levels of risk. The changed soil remedial alternatives described in this ROD Amendment will allow for unlimited use of and unrestricted exposure to the soil at Sites SD043 and SS046.

At each of the sites, under the currently selected ROD remedy of Alternative S2, LUCs are enforced to prohibit residential use of the property. The expected outcomes of the current ROD remedies are that LUCs will remain in effect for as long as contaminants in soil remain at the sites at concentrations above the residential cleanup level. Conversely, under the fundamentally changed remedies described in this ROD Amendment, the expected outcomes are that the residential soil cleanup levels are achieved and the current soil LUCs will be removed. The sites will then be available for unlimited use and unrestricted exposure for soil.

SECTION 4

Descriptions of New Alternatives

This section provides the remedial action objectives (RAOs), soil cleanup levels, and descriptions of the changed soil remedial alternatives that will achieve the RAOs for Sites DP039, SD043, and SS046.

4.1 Remedial Action Objectives

RAOs provide a general description of what the soil remedial alternatives will accomplish. The RAOs for the soil remedies selected in this ROD Amendment are as follows:

- Prevent potential future residents or current Base workers from ingestion, inhalation, or coming into direct dermal contact with PCB-1254, cPAHs, pentachlorophenol, and metal contaminants in soil above acceptable exposure levels.
- Restore contaminated sites to achieve residential soil cleanup levels (refer to Table 4-1), which will allow for unlimited use of and unrestricted exposure to the soil, while minimizing interference with the Base military mission.

The fundamental difference between RAOs for the remedies originally selected in the WABOU Soil ROD (Travis AFB, 2002) and the changed remedies described in this ROD Amendment is in the outcome of remediation. Achieving the listed RAOs will result in residual soil contaminants meeting residential cleanup standards and will allow the LUCs currently being enforced to be removed. At that time, the soil at each site will be suitable for unlimited use and unrestricted exposure. Removal of encumbrances to the use of the sites will improve Travis AFB's capacity to adapt to future military mission requirements and carry out new activities at the sites. This is in contrast to the objective of the original remedies selected in the ROD, which was to manage soil contamination at concentrations greater than the residential cleanup levels by restricting land use.

4.2 Soil Cleanup Levels

This section describes the risk-based soil cleanup standards for the contaminants in soil identified as COCs at Sites DP039, SD043, and SS046, based on the revised assumption of residential exposure for unlimited use.

Cleanup standards for contaminants (except lead) in soil at Sites SD043 and SS046 are numerical cleanup levels that determine when concentrations of COCs have been achieved that allow for unlimited use and unrestricted exposure; these are generally based on residential exposure to the contaminant. The numerical cleanup levels to be achieved by the final remedies presented in this ROD Amendment are presented in Table 4-1, and represent the concentrations equivalent to a 1×10^{-6} carcinogenic risk or the concentration equivalent to an HI of 1 for noncancer risk. The risk calculations are conducted using the EPA Regional Screening Levels (RSLs) (EPA, 2018), which are used as RBSLs. The RBSLs are the risk-based cleanup levels for the sites. Additional details on the risk assessment calculations are included in Attachment 2 of the *Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046* (CH2M HILL, 2018).

Cleanup levels for lead in soil at Sites DP039 and SS046 were based on the OEHHA residential CHHSL of 80 mg/kg for residential use (OEHHA, 2009).

For cPAHs, PCB-1254, pentachlorophenol, and metals in soil, risk-based cleanup levels supportive of residential use were developed based on exposure via ingestion of soil, inhalation, and dermal contact. The cleanup levels for COCs in soil are based on the 0- to 2-foot-bgs and 0- to 10-foot-bgs depth ranges. For metals, the maximum detected concentrations were compared to the respective inorganic reference concentration (as background) according to the WABOU RI (CH2M HILL, 1997). For cPAHs, RBSLs were calculated by the EPA RSL Calculator (EPA, 2017a), which uses the recently updated toxicity values for benzo(a)pyrene in the Integrated Risk Information System (EPA, 2017b). Concentrations of cPAHs were converted to a benzo(a)pyrene equivalent, and total benzo(a)pyrene equivalents per soil sample were compared to the RBSL for benzo(a)pyrene. The benzo(a)pyrene equivalent is used for cPAHs, because cPAHs are a complex mixture of individual cPAHs, and toxicity values are only available for benzo(a)pyrene. Further discussion of benzo(a)pyrene equivalent is included in Attachment 10 of the *Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046* (CH2M HILL, 2018).

The industrial use soil cleanup levels originally specified in the WABOU Soil ROD (Travis AFB, 2002) are provided for comparison to the cleanup levels based on current residential risk-based standards. The site-specific COCs and their corresponding cleanup levels under a residential exposure scenario are listed in Table 4-1, along with the basis for the cleanup levels provided in the footnotes.

As with the original WABOU Soil ROD, no soil cleanup levels are necessary for ecological receptors. For Site DP039, although unacceptable lead concentrations are no longer present at the site, lead was not a COEC according to Section 5.3.1 of the WABOU Soil ROD. As stated in Section 5.3.3 of the WABOU Soil ROD, there are no COECs associated with Site SD043. Similarly, as stated in Section 5.3.8 of the WABOU Soil ROD, there is no potential unacceptable ecological risk at Site SS046. COECs in the site soil will not adversely affect the populations of species (Travis AFB, 2002).

TABLE 4-1
Summary of Soil Cleanup Levels
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Site	Soil COC	Residential Soil Cleanup Concentration (mg/kg)	
		Original ROD[a]	ROD Amendment
Site DP039 – Building 755	Lead	400	80[b]
Site SD043 – Building 916	PCB-1254	0.22	0.24[c]
Site SS046 – RMSA	Arsenic	NA[d]	14.4 / 25.3[e]
	Lead	400	80[b]
	Pentachlorophenol	3.0	1.0[f]
	Benzo(a)pyrene	0.062	NA[g]
	Benzo(b)fluoranthene	0.62	NA[g]
	Benzo(a)anthracene	0.62	NA[g]
	Benzo(k)fluoranthene	6.2	NA[g]
	Benzo(a)pyrene (equivalent)[g]	NA[g]	0.11[h]

[a] Soil cleanup levels based on values provided in the WABOU Soil ROD (Sections 5.3.3 and 5.3.8) for a residential exposure scenario (Travis AFB, 2002).

[b] Lead soil cleanup levels are based on the CHHSL for a residential exposure level. Source: Office of Environmental Health Hazard Assessment (OEHHA). 2009. Revised Human Health Screening Levels for Lead. Integrated Risk Assessment Branch. September.

[c] PCB-1254 soil cleanup level based on a residential exposure scenario cancer risk = 1×10^{-6}.
Source: EPA RSL (Residential Soil) (EPA, 2018).

[d] Arsenic was not identified as a COC in the WABOU Soil ROD (Travis AFB, 2002).

[e] Arsenic soil cleanup levels are based on background concentrations for surface and subsurface soils, respectively.
Source: WABOU RI (CH2M HILL, 1997).

A background investigation was conducted for all of Travis AFB in 1994. Also, the Inorganic Constituent Evaluation Methodology was issued and approved by the regulators in 1995. The background concentrations for metals for the WABOU were established as part of the WABOU RI with the 1994 background investigation results, with a supplement from six (6) additional samples that were reported in the WABOU RI, and using the approved 1995 Inorganic Constituent Evaluation Methodology.

[f] Pentachlorophenol soil cleanup level based on a residential exposure scenario cancer risk = 1×10^{-6}.
Source: EPA RSL Table (Residential Soil) (EPA, 2018).

[g] As a result of updating risk assessment calculations, benzo(a)pyrene equivalent concentrations were calculated for each of the soil samples. These equivalent concentrations were then compared to the benzo(a)pyrene RSL (residential) of 0.11 mg/kg, instead of the individual cPAH RSLs. Benzo(a)pyrene equivalent concentrations were not calculated as part of the WABOU Soil ROD (Travis AFB, 2002). Source: CH2M HILL. 2018. *Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046.* Final. February.

[h] Benzo(a)pyrene soil cleanup level based on a residential exposure scenario cancer risk = 1×10^{-6}.
Source: EPA RSL Table (Residential Soil) (EPA, 2018).

Note:

NA = not applicable

4.3 Descriptions of Alternatives

This subsection describes the soil remedial alternatives selected to achieve the RAOs. These newly selected remedies were evaluated in the WABOU Soil ROD (Travis AFB, 2002), but were not originally selected for the sites. Descriptions of the soil remedies originally selected in the WABOU Soil ROD and the changed remedies described in this ROD Amendment are provided in Table 4-2.

TABLE 4-2
Summary Descriptions of Selected Soil Remedies
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

	Selected Remedy Description	
Site	**Original ROD[a]**	**ROD Amendment[b]**
Site DP039	Alternative S2 – Land Use and Access Restrictions Land use restrictions are used to prohibit the excavation or disturbance of contaminated soil and prevent residential use, because residential cleanup levels are exceeded. Signs are posted to prevent access. Land use and access restrictions enforced under Alternative S2 are described in the WABOU Soil ROD, Part II – Decision Summary, Subsection 5.4.	Alternative S1 – No Action No remediation activities, monitoring, or long-term site management activities are conducted and no costs are incurred. No land use restrictions are required under Alternative S1. Risks posed by residual contaminant concentrations in soil are acceptable under a residential exposure scenario. Soil at the site is suitable for unlimited use and unrestricted exposure.
Site SD043	Alternative S2 – Land Use and Access Restrictions Land use restrictions are used to prohibit the excavation or disturbance of contaminated soil and prevent residential use because residential cleanup levels are exceeded. Signs are posted to prevent access. Land use and access restrictions enforced under Alternative S2 are described in the WABOU Soil ROD, Part II – Decision Summary, Subsection 5.4.	Alternative S5 – Excavation/Off-base Disposal Soil with contaminant concentrations greater than residential cleanup levels is excavated and transported by truck to an off-base EPA-approved facility. The excavation void is backfilled with clean, imported fill soil. No land use restrictions are required under Alternative S5. Risks posed by residual contaminant concentrations in soil are acceptable under a residential exposure scenario. Soil at the site is suitable for unlimited use and unrestricted exposure.
Site SS046	Alternative S2 – Land Use and Access Restrictions Land use restrictions are used to prohibit the excavation or disturbance of contaminated soil and prevent residential use because residential cleanup levels are exceeded. Signs are posted to prevent access. Land use and access restrictions enforced under Alternative S2 are described in the WABOU Soil ROD, Part II – Decision Summary, Subsection 5.4.	Alternative S5 – Excavation/Off-base Disposal Soil with contaminant concentrations greater than residential cleanup levels is excavated and transported by truck to an off-base EPA-approved facility. To make it easier for the field crew to gain access to the contaminated soil, railroad tracks and ties within the site boundaries and portions of the concrete pad will be dismantled and removed from the site. The excavation void is backfilled with clean, imported fill soil. No land use restrictions are required under Alternative S5. Risks posed by residual contaminant concentrations in soil are acceptable under a residential exposure scenario. Soil at the site is suitable for unlimited use and unrestricted exposure.

[a] Soil remedy as described in the WABOU Soil ROD, Table II-4-1 (Travis AFB, 2002).
[b] The changed remedy described in this ROD Amendment is a remedy described in the WABOU Soil ROD, Table II-4-1, but not originally selected for the subject site.

4.4 Descriptions of Remedy Components

Descriptions of the key remedy components for the Sites DP039, SD043, and SS046 soil remedial alternatives are summarized in Tables 4-3, 4-4, and 4-5.

TABLE 4-3
Summary of Remedy Components – Site DP039
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Component	Original ROD Alternative S2 – Land Use and Access Restrictions*	ROD Amendment Alternative S1 – No Action
Remediation technologies and materials	None	None
Containment/storage	None	None
Institutional controls	Yes, as described in the WABOU Soil ROD, Section 5.4.	None
O&M activities	• Annual site inspection and reporting • Periodic maintenance of signs and placards	None
Monitoring	None	None

*Under the original ROD, LUCs will remain in place in perpetuity until the remedy requirements are removed, despite the fact that the soil contaminants have been removed.

TABLE 4-4
Summary of Remedy Components – Site SD043
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Component	Original ROD Alternative S2 – Land Use and Access Restrictions*	ROD Amendment Alternative S5 – Excavation/ Off-base Disposal
Remediation technologies and materials	None	Excavation, offsite disposal
Containment/storage	None	None
Institutional controls	Yes, as described in the WABOU Soil ROD, Section 5.4.	None
O&M activities	• Annual site inspection and reporting • Periodic maintenance of signs and placards	None
Monitoring	None	None

* In the original ROD, soil contaminants and LUCs remain in place in perpetuity.

TABLE 4-5
Summary of Remedy Components – Site SS046
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Component	Original ROD Alternative S2 – Land Use and Access Restrictions*	ROD Amendment Alternative S5 – Excavation/ Off-base Disposal
Remediation technologies and materials	None	Excavation, offsite disposal
Containment/storage	None	None
Institutional controls	Yes, as described in the WABOU Soil ROD, Section 5.4.	None
O&M activities	• Annual site inspection and reporting • Periodic maintenance of signs and placards	None
Monitoring	None	None

* In the original ROD, soil contaminants and LUCs remain in place in perpetuity.

4.5 Common Elements and Distinguishing Features of Each Alternative

The alternatives include common elements, as well as distinguishing features unique to each option. Descriptions of these common elements and distinguishing features for the soil remedies at Sites DP039, SD043, and SS046 are summarized below in Tables 4-6, 4-7, and 4-8.

Common elements are as follows:

- All newly selected alternatives are compatible with the intended site reuse.
- All newly selected alternatives, except for Alternative 1, are expected to be completed and available/facilitate reuse within a year.

Distinguishing features are as follows:

- The distinguishing features of Alternative S1 are that no remedial action would take place under this alternative and that there is no cost associated with this alternative.
- The distinguishing feature of Alternative S5 is excavation. The long-term reliability of this alternative is high, because the waste is removed from the site and shipped off-base for disposal at an appropriate facility. It is expected that the excavations under Alternative S5 would be planned and executed within one (1) year. A further distinguishing feature of Alternative S5 is that this alternative will result in soil at the site suitable for unlimited use and unrestricted exposure.

4.5.1 Site DP039

Soil removal associated with previous construction activities has reduced risk at Site DP039 to residual lead concentrations in soil that are currently acceptable under a residential exposure scenario. Table 4-6 summarizes the key features for the soil remedy change from Alternative S2 – Land Use and Access Restrictions to Alternative S1 – No Action.

TABLE 4-6
Common Elements and Distinguishing Features – Site DP039
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Element	Original ROD Alternative S2 – Land Use and Access Restrictions[a, b]	ROD Amendment Alternative S1 – No Action
Key ARARs	Refer to the WABOU Soil ROD, Tables II-6-1 through II-6-6.	Refer to Appendix C, Tables C-1, C-2, and C-3.
Long-term reliability of remedy	Successfully demonstrated since the ROD remedy was implemented in 2003.	Not applicable. No additional action is taken because no soil contaminants are currently present at concentrations greater than the residential cleanup level.
Quantity of untreated waste to be disposed of offsite	None	None
Estimated time for design and construction (years)	None	None
Estimated time to reach remediation goals (years)	> 100	0
Estimated capital cost ($)[c]	0	0
Estimated annual O&M cost ($)	1,400	0
Estimated total O&M present worth ($)[d]	26,075	0
Estimated periodic costs present worth ($)[e]	696	0
Estimated total cost present worth ($)	26,995	0
Discount rate (percent)[f]	3.4	2.8
Number of years over which cost is projected	30	0
Use of presumptive remedies and/or innovative technologies	None	None

[a] LUCs remain in place in perpetuity.

[b] The estimated costs represent the continued implementation of the remedy selected in the WABOU Soil ROD (Travis AFB, 2002).

[c] All capital costs needed to implement Alternative S2 were incurred after the ROD-selected remedy was implemented in 2003. There are no capital costs required under Alternative S1 because no additional actions will be taken at the site.

[d] Currently, residual lead concentrations are acceptable under a residential exposure scenario. However, because the site remedy is currently LUCs (Alternative S2), long-term O&M costs include costs for conducting annual site inspections and preparation of the Site DP039 portion of the annual LUC report, which documents the enforcement status of the site LUCs until the remedy requirements are removed.

Under Alternative S1, no long-term O&M costs will be incurred, because concentrations of lead in the soil are already acceptable under a residential exposure scenario. No site inspections or reporting will be required.

[e] Periodic costs under Alternative S2 are assumed to be required for maintenance or replacement of signs or placards installed as part of the LUCs. No periodic costs will be incurred under Alternative S1 because no actions are taken.

[f] Office of Management and Budget Circular A-94 – Guidelines and Discount Rates for Benefit-Cost Analyses of Federal Programs, 12-14-14.

Note:

ARAR = applicable or relevant and appropriate requirement

4.5.2 Site SD043

For Site SD043, the soil remedy change from Alternative S2 – Land Use and Access Restrictions to Alternative S5 – Excavation/Off-base Disposal is presented in Table 4-7. Capital costs under Alternative S5 include excavating soil contaminated with PCB-1254 at concentrations greater than the residential cleanup levels. The excavated soil will be transported to an off-base landfill for proper disposal. Under Alternative S5, no long-term or periodic costs will be required because following excavation, the site will be acceptable under a residential exposure scenario and will be available for unlimited use and unrestricted exposure.

TABLE 4-7
Common Elements and Distinguishing Features – Site SD043
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Element	Original ROD Alternative S2 – Land Use and Access Restrictions[a, b]	ROD Amendment Alternative S5 – Excavation/ Off-base Disposal[b]
Key ARARs	Refer to the WABOU Soil ROD, Tables II-6-1 through II-6-6.	Refer to Appendix C, Tables C-1, C-2, and C-3.
Long-term reliability of remedy	Successfully demonstrated since the ROD remedy was implemented in 2003.	Reliable
Quantity of untreated waste to be disposed of offsite	None	40 yd^3
Estimated time for design and construction (years)	None	> 1
Estimated time to reach remediation goals (years)	> 100	1
Estimated capital cost ($)[c]	0	19,260
Estimated annual O&M cost ($)	1,400	0
Estimated total O&M present worth ($)[d]	26,075	0
Estimated periodic costs present worth ($)[e]	696	0
Estimated total cost present worth ($)	26,995	101,149
Discount rate (percent)	3.4	2.8
Number of years over which cost is projected	30	1
Use of presumptive remedies and/or innovative technologies	None	None

[a] Soil contaminants and LUCs remain in place in perpetuity.

[b] The estimated costs represent the continued implementation of the remedy selected in the WABOU Soil ROD (Travis AFB, 2002) and the implementation of the changed remedy as described in this ROD Amendment.

[c] All capital costs needed to implement Alternative S2 were incurred after the ROD-selected remedy was implemented in 2003. Capital costs under Alternative S5 include those for excavating soil contaminated with PCB-1254 at concentrations greater than the residential cleanup level. The excavated soil will then be transported to an off-base landfill for proper disposal.

[d] The current ROD requires enforcement of the soil LUCs under Alternative S2 until this requirement is removed. Long-term O&M costs under Alternative S2 include costs for conducting annual site inspections and preparation of the Site SD043 portion of the annual LUC report, which documents the enforcement status of the site LUCs.

Under Alternative S5, no long-term O&M costs will be required, because residual concentrations of PCB-1254 will be acceptable under a residential exposure scenario.

[e] Periodic costs under Alternative S2 are assumed to be required for maintenance or replacement of signs or placards installed as part of the LUCs. No periodic costs will be incurred under Alternative S5.

Note:

yd^3 = cubic yard(s)

4.5.3 Site SS046

At Site SS046, the soil remedy change from Alternative S2 – Land Use and Access Restrictions to Alternative S5 – Excavation/Off-base Disposal is presented in Table 4-8. Capital costs under Alternative S5 include excavating soil contaminated with arsenic, lead, cPAHs, and pentachlorophenol at concentrations greater than the residential cleanup levels. The excavated soil will be transported to an off-base landfill for proper disposal. Under Alternative S5, no long-term or periodic costs will be required, because residual concentrations will be acceptable under a residential exposure scenario. The site will then be available for unlimited use and unrestricted exposure.

TABLE 4-8
Common Elements and Distinguishing Features – Site SS046
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Element	Original ROD Alternative S2 – Land Use and Access Restrictions[a, b]	ROD Amendment Alternative S5 – Excavation/ Off-base Disposal[b]
Key ARARs	Refer to the WABOU Soil ROD, Tables II-6-1 through II-6-6.	Refer to Appendix C, Tables C-1, C-2, and C-3.
Long-term reliability of remedy	Successfully demonstrated since the ROD remedy was implemented in 2003.	Reliable
Quantity of untreated waste to be disposed of offsite	None	32 yd^3
Estimated time for design and construction (years)	None	> 1
Estimated time to reach remediation goals (years)	>100	1
Estimated capital cost ($)[c]	0	28,916
Estimated annual O&M cost ($)	1,400	0
Estimated total O&M present worth ($)[d]	26,075	0
Estimated periodic costs present worth ($)[e]	696	0
Estimated total cost present worth ($)	26,995	112,253
Discount rate (percent)	3.4	2.8
Number of years over which cost is projected	30	1
Use of presumptive remedies and/or innovative technologies	None	None

[a] Soil contaminants and LUCs remain in place in perpetuity.

[b] The estimated costs represent the continued implementation of the remedy selected in the WABOU Soil ROD (Travis AFB, 2002) and the implementation of the changed remedy as described in this ROD Amendment.

[c] All capital costs needed to implement Alternative S2 were incurred after the ROD-selected remedy was implemented in 2003. Capital costs under Alternative S5 include those for excavating soil contaminated with cPAHs, pentachlorophenol, and metals at concentrations greater than the residential cleanup level. The excavated soil will then be transported to an off-base landfill for proper disposal.

[d] The current ROD requires enforcement of the soil LUCs under Alternative S2 until this requirement is removed. Long-term O&M costs under Alternative S2 include costs for conducting annual site inspections and preparation of the Site SS046 portion of the annual LUC report, which documents the enforcement status of the site LUCs.

Under Alternative S5, no long-term O&M costs will be required, because residual concentrations of pentachlorophenol and metals contamination following excavation will be acceptable under a residential exposure scenario.

[e] Periodic costs under Alternative S2 are assumed to be required for maintenance or replacement of signs or placards installed as part of the LUCs. No periodic costs will be incurred under Alternative S5.

4.6 Expected Outcomes of the Selected Remedies

Summaries of the expected outcomes of the soil remedies previously selected for Sites DP039, SD043, and SS046 in the WABOU Soil ROD (Travis AFB, 2002) and the changed remedies selected in this ROD Amendment are provided in the following subsections.

4.6.1 Expected Outcomes at Site DP039

At Site DP039, the main expected outcome of changing the soil remedy from Alternative S2 – Land Use and Access Restriction to Alternative S1 – No Action is removal of the existing soil LUCs, because soil is currently suitable for unlimited use and unrestricted exposure. The expected outcomes are summarized in Table 4-9.

No remedial action is required at Site DP039, because soil removal associated with the installation of a technology demonstration bioreactor has already achieved the residential cleanup level for lead (CH2M HILL, 2015).

TABLE 4-9
Expected Outcomes of Each Alternative – Site DP039
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Element	Alternative S2 Land Use and Access Restrictions	Alternative S1 No Action
Availability of land use	Restricted	Unrestricted
Time frame to achieve available land use (years)	> 100*	0
Other impacts or benefits associated with alternative	Low cost	No cost

*Under Alternative S2, unnecessary LUCs remain at the site in perpetuity.

4.6.2 Expected Outcomes at Site SD043

At Site SD043, the main expected outcome of changing the soil remedy from Alternative S2 – Land Use and Access Restriction to Alternative S5 – Excavation/Off-base Disposal is removal of contaminated soil and the existing soil LUCs because following contaminated soil removal, remaining soil will be suitable for unlimited use and unrestricted exposure. The expected outcomes are summarized in Table 4-10.

TABLE 4-10
Expected Outcomes of Each Alternative – Site SD043
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Element	Alternative S2 Land Use and Access Restrictions[a]	Alternative S5 Excavation/Off-base Disposal
Availability of land use	Restricted	Unrestricted
Time frame to achieve available land use (years)	> 100[b]	1
Other impacts or benefits associated with alternative	Low cost	Moderate cost

[a] Under Alternative S2, soil contaminants remain in place at concentrations greater than the cleanup level for the residential exposure scenario.

[b] Under Alternative S2, LUCs remain at the site in perpetuity.

4.6.3 Expected Outcomes at Site SS046

At Site SS046, the main expected outcome of changing the soil remedy from Alternative S2 – Land Use and Access Restriction to Alternative S5 – Excavation/Off-base Disposal is the removal of contaminated soil and the existing soil LUCs because following contaminated soil removal, remaining soil will be suitable for unlimited use and unrestricted exposure. The expected outcomes are summarized in Table 4-11.

TABLE 4-11
Expected Outcomes of Each Alternative – Site SS046
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Element	Alternative S2 Land Use and Access Restrictions[a]	Alternative S5 Excavation/Off-base Disposal
Availability of land use	Restricted	Unrestricted
Time frame to achieve available land use (years)	> 100[b]	1
Other impacts or benefits associated with alternative	Low cost	Moderate cost

[a] Under Alternative S2, soil contaminants remain in place at concentrations greater than the cleanup level for the residential exposure scenario.

[b] Under Alternative S2, LUCs remain at the site in perpetuity.

SECTION 5

Evaluation of Alternatives

This section provides evaluations of the soil remedies originally selected in the WABOU Soil ROD (Travis AFB, 2002) and the changed remedies selected in this ROD Amendment. In accordance with the NCP, the alternatives for contaminated soil at Travis AFB were evaluated using the nine (9) criteria described in Section 121(a) and (b) of CERCLA and 40 CFR 300.430(e)(9)(iii) as cited in 40 CFR 300.430(f)(5)(i).

The overall cleanup strategy for soil remedies described in this ROD Amendment is to achieve soil concentrations acceptable under a residential exposure scenario, such that soil LUCs are not required. The soil will then be available for unlimited use and unrestricted exposure to humans. In contrast, the strategy used for the remedies originally selected in the WABOU Soil ROD (Travis AFB, 2002) was to achieve cleanup to an industrial worker exposure scenario and implement LUCs to protect from potential human exposure. Land use at the sites was therefore restricted.

In accordance with the NCP (Section 300.430(f)(5)(i)), the remedial alternatives were evaluated against the following nine (9) criteria:

- **Criterion 1: Overall Protection of Human Health and the Environment –** This criterion addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.
- **Criterion 2: Compliance with ARARs –** This criterion addresses whether each alternative complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action. Section 121(d) of CERCLA and NCP 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites attain ARARs, unless such ARARs are waived under CERCLA Section 121(d)4.
- **Criterion 3: Long-term Effectiveness and Permanence –** Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.
- **Criterion 4: Reduction of Toxicity, Mobility, or Volume through Treatment –** Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.
- **Criterion 5: Short-term Effectiveness –** Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during construction and operation of the remedy until cleanup levels are achieved.
- **Criterion 6: Implementability –** Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other government entities are also considered.

- **Criterion 7: Cost –** The cost of an alternative addresses all engineering, construction, and O&M costs incurred over the life of the project. The assessment against this criterion is based on the estimated present worth of these costs for each alternative. Present worth is used to estimate expenditures that occur over different lengths of time.
- **Criterion 8: State Acceptance –** This assessment evaluates the technical and administrative issues, concerns, and preferences the State may have regarding each of the alternatives. Resource agencies have reviewed the site documents and have agreed with the selected remedies.
- **Criterion 9: Community Acceptance –** This assessment evaluates the issues, concerns, and preferences the public may have regarding each of the alternatives.

The nine (9) criteria are categorized as threshold criteria, primary balancing criteria, or modifying criteria. Threshold criteria are requirements that each alternative must meet to be eligible for selection as the preferred alternative. The threshold criteria are 1 and 2 – overall protection of human health and the environment and compliance with ARARs. Primary balancing criteria are used to weigh effectiveness and cost tradeoffs among alternatives. They are the main technical criteria upon which the alternative evaluation is based. The balancing criteria are 3 through 7 – long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. Modifying criteria may be used to modify aspects of the preferred alternative. The modifying criteria are 8 and 9 – State acceptance and community acceptance.

5.1 Comparative Analysis of Alternatives

The original screening and detailed analysis of potential soil remedial alternatives were conducted in the WABOU FS Report (CH2M HILL, 1998), and further described in the WABOU Soil ROD (Travis AFB, 2002). Seven (7) potential soil remedial alternatives were evaluated using the nine (9) CERCLA criteria, and the remedy originally selected in the WABOU Soil ROD (Travis AFB, 2002) to address contaminated soil at Sites DP039, SD043, and SS046 was Alternative S2 – Land Use and Access Restrictions. The remedies selected for these sites in this ROD Amendment are Alternative S1 – No Action (Site DP039) and Alternative S5 – Excavation/Off-base Disposal (Sites SD043 and SS046). The following sections describe how the previously selected soil remedy for a site in the WABOU Soil ROD (Travis AFB, 2002) and the soil remedy selected in this ROD Amendment satisfy each CERCLA evaluation criterion and how those remedies compare with each other. The remedy comparisons are described in Tables 5-1, 5-2, and 5-3.

TABLE 5-1
Comparative Analysis of Soil Remedies at Site DP039
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

	Soil Remedy	
Evaluation Criterion	**Original ROD[a] Alternative S2 – Land Use and Access Restrictions**	**ROD Amendment[b] Alternative S1 – No Action**
Overall Protection of Human Health and the Environment	As stated in Section 4.4.1 of the WABOU Soil ROD (Travis AFB, 2002), Alternative S2 – Land Use and Access Restrictions is protective of human health and the environment. Although Alternative S2 has demonstrated protectiveness, the soil LUCs currently enforced at Site DP039 are no longer necessary to provide for protection of human health and the environment. Lead-contaminated soil has already been permanently removed from the site by excavation and properly disposed of at an off-base landfill (CH2M HILL, 2015). The residual risk posed by lead is acceptable under a residential exposure scenario. However, this acceptable level of residual risk to human health continues to be managed by the enforcement of soil LUCs required under Alternative 2, even though the soil cleanup level for lead has been achieved.	Alternative S1 – No Action is similarly protective of human health and the environment under the current conditions that exist at Site DP039. The soil cleanup level for lead contamination under a residential exposure scenario has already been permanently achieved by excavation and off-base disposal (CH2M HILL, 2015). Therefore, continued enforcement of soil LUCs under Alternative S2 is not needed, and the LUCs are removed under Alternative S1. Soil at the site is suitable for unlimited use and unrestricted exposure.
Compliance with ARARs	As stated in Section 4.4.2 of the WABOU Soil ROD (Travis AFB, 2002), Alternative S2 – Land Use and Access Restrictions complies with ARARs. The ARARs are described in Section 6.0 of the ROD. Although Alternative S2 has demonstrated compliance with ARARs, the soil LUCs currently enforced at Site DP039 are no longer necessary. Lead-contaminated soil has already been permanently removed from the site by excavation and properly disposed of at an off-base landfill (CH2M HILL, 2015). The residual risk concentrations of lead at the site are currently compliant with chemical-specific ARARs under a residential exposure scenario. However, this acceptable level of residual risk to human health continues to be managed by the enforcement of soil LUCs required under Alternative 2, even though the soil cleanup level for lead has been achieved.	Because of the soil removal associated with previous construction activities, soil contamination above the cleanup levels established for a residential exposure scenario has been physically removed from Site DP039 (CH2M HILL, 2015). Although chemical-specific ARARs under the residential exposure scenario have been achieved, the No Action alternative (Alternative S1) does not require compliance with ARARs per OSWER guidance (EPA, 1999). Updated listings of the chemical-specific, action-specific, and location-specific ARARs are provided in Appendix C of this ROD Amendment.
Long-term Effectiveness and Permanence	As stated in Section 4.4.3 of the WABOU Soil ROD (Travis AFB, 2002), Alternative S2 – Land Use and Access Restrictions achieved an acceptable measure of long-term effectiveness and permanence. Currently, lead-contaminated soil has already been effectively and permanently removed from the site by excavation and properly disposed of at an off-base landfill. The residual risk posed by lead is acceptable under a residential exposure scenario. However, this acceptable level of residual risk to human health continues to be managed by the enforcement of soil LUCs required under Alternative 2 even though the soil cleanup level for lead has been achieved.	Potential risks to human health posed by lead-contaminated soil have already been permanently reduced to levels that are acceptable under a residential exposure scenario. Therefore, continued enforcement of soil LUCs under Alternative S2 is unnecessary. Under Alternative S1, the soil LUCs are removed. The site soil is currently available for unlimited use and unrestricted exposure.

TABLE 5-1
Comparative Analysis of Soil Remedies at Site DP039
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

	Soil Remedy	
Evaluation Criterion	**Original ROD[a] Alternative S2 – Land Use and Access Restrictions**	**ROD Amendment[b] Alternative S1 – No Action**
Reduction of Toxicity, Mobility, or Volume through Treatment	Discussion of this criterion is provided in Section 4.4.4 of the WABOU Soil ROD (Travis AFB, 2002). Alternative S2 – Land Use and Access Restrictions does not employ an active treatment process to reduce the toxicity, mobility, or volume of contaminants. However, lead-contaminated soil at concentrations above the residential cleanup level has already been effectively and permanently removed from the site, and no treatment process is needed.	Similar to Alternative S2, Alternative S1 – No Action also does not employ a treatment process to reduce the toxicity, mobility, or volume of contaminants. However, the concentrations of lead in the soil have already been reduced below the residential cleanup level by excavation and off-base landfill disposal, and no treatment process is needed.
Short-term Effectiveness	As stated in Section 4.4.5 of the WABOU Soil ROD (Travis AFB, 2002), Alternative S2 – Land Use and Access Restrictions is effective in the short term. Human health was effectively protected immediately after the alternative was implemented and LUCs enforced. There were no adverse effects to the community, workers, or environment during implementation of the remedy. Enforcement of LUCs under the remedy effectively minimized the risks posed by soil lead contamination at the site. After the subsequent excavation and disposal of lead-contaminated soil, human health risks were reduced to levels acceptable under a residential exposure scenario. The site soil is currently available for unlimited use and unrestricted exposure.	In contrast to Alternative S2, no further remedial actions are taken under Alternative S1 and there are therefore no adverse effects to the community, workers, or environment during implementation of the alternative. Concentrations of lead in the soil have already been reduced below the residential cleanup level, and the site soil is currently suitable for unlimited use and unrestricted exposure.
Implementability	Discussion of the Implementability criterion is provided in Section 4.4.6 of the WABOU Soil ROD (Travis AFB, 2002). Consistent with that discussion, Alternative S2 – Land Use and Access Restrictions has been demonstrated to be both technically and administratively implementable at Site DP039 since the remedy was originally selected in the ROD.	In the context of technical implementability, the soil cleanup level for lead under a residential exposure scenario has already been permanently achieved by excavation and off-base landfill disposal. The site soil is already suitable for unlimited use and unrestricted exposure. Therefore, there are no issues related to technical implementation of a soil remedy. Administratively, selection of the No Action alternative via this ROD Amendment provides a greater degree of implementability. The LUCs enforced under Alternative S2 are no longer required at Site DP039.

TABLE 5-1
Comparative Analysis of Soil Remedies at Site DP039
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

	Soil Remedy	
Evaluation Criterion	**Original ROD[a] Alternative S2 – Land Use and Access Restrictions**	**ROD Amendment[b] Alternative S1 – No Action**
Cost	Discussion of the Cost criterion is provided in Section 4.4.7 of the WABOU Soil ROD (Travis AFB, 2002). Alternative S2 currently includes conducting an annual field inspection of the LUCs implemented at the site and preparation of an annual LUC report, including a site-specific portion, which addresses all Travis AFB ERP sites with LUCs. The annual cost of the site inspection and reporting is approximately $1,400. These long-term costs related to the continued enforcement of LUCs will continue in perpetuity.	In contrast to Alternative S2, under Alternative S1 – No Action, no capital costs or long-term costs are incurred. Because soil cleanup levels under a residential exposure scenario have already been permanently achieved, the soil LUCs required under Alternative S2 are no longer needed, and no long-term costs related to continued enforcement of LUCs are necessary.
State/Regulatory Agency Acceptance	As stated in Section 5.5.5 of the WABOU Soil ROD (Travis AFB, 2002), the California DTSC, Water Board, and EPA expressed their support for Alternative S2 when it was presented in the *WABOU Proposed Plan for Soil Cleanup* (Travis AFB, 1998) and then by concurrence with the remedy selection in the WABOU Soil ROD (Travis AFB, 2002).	As with Alternative S2, the Air Force and EPA jointly evaluated and selected Alternative S1 as presented in the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) and this ROD Amendment. The California DTSC and Water Board concur with the changed remedy.
Community Acceptance	As stated in Section 5.5.5 of the WABOU Soil ROD (Travis AFB, 2002), the community expressed support for the selection of Alternative S2 at Site DP039 when it was presented in the *WABOU Proposed Plan for Soil Cleanup* (Travis AFB, 1998). Comments received from the community on the *WABOU Proposed Plan for Soil Cleanup* (Travis AFB, 1998) during July 8 through August 8, 1998, and February 23 through March 24, 2000, public comment periods are provided in Part III – Responsiveness Summary of the ROD.	The community expressed support for the selection of Alternative S1 at Site DP039 when it was presented in the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015). No comments were received from the community on the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) during the public comment period conducted between April 15 and May 15, 2015, nor during the public meeting held on April 23, 2015.

[a] Soil remedy selected in the WABOU Soil ROD (Travis AFB, 2002).
[b] The changed remedy described in this ROD Amendment is an existing remedy identified in the WABOU Soil ROD, but not originally selected for the subject site.

Note:

OSWER = Office of Solid Waste and Emergency Response

TABLE 5-2
Comparative Analysis of Soil Remedies at Site SD043
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

	Soil Remedy	
Evaluation Criterion	**Original ROD[a] Alternative S2 – Land Use and Access Restrictions**	**ROD Amendment[b] Alternative S5 – Excavation/Off-base Disposal**
Overall Protection of Human Health and the Environment	As stated in Section 4.4.1 of the WABOU Soil ROD (Travis AFB, 2002), Alternative S2 – Land Use and Access Restrictions, is protective of human health and the environment. Enforcement of LUCs at Site SD043 has demonstrated overall protectiveness since the remedy was successfully implemented in late 2002. Use of the land at Site SD043 is encumbered by the potential risks posed by the presence of soil contamination. Potential risks are posed by contaminants in soil at concentrations acceptable under an industrial exposure scenario, but unacceptable under a residential exposure scenario. Continued enforcement of LUCs is required to manage these risks and maintain protectiveness.	The changed remedy is also protective of human health and the environment. A greater degree of overall protectiveness is achieved in comparison with Alternative S2. Soil cleanup concentrations are permanently achieved by removal of contaminated soil, instead of contaminated soil remaining at the site under long-term management. In addition, in contrast to Alternative S2, risks posed by contaminant concentrations in soil after excavation are acceptable under both industrial and residential exposure scenarios. No LUCs are required, and the site soil is available for unlimited use and unrestricted exposure.
Compliance with ARARs	As stated in Section 4.4.2 of the WABOU Soil ROD (Travis AFB, 2002), Alternative S2 – Land Use and Access Restrictions complies with ARARs. The ARARs are described in Section 6.0 of the ROD. Alternative S2 has demonstrated compliance with ARARs since the remedy was successfully implemented in late 2002.	Both alternatives comply equally with ARARs. However, implementation of Alternative S5 is preferred, since it removes contaminant concentrations in soil above cleanup levels that are acceptable for residential use. No soil LUCs are required, and the site soil is available for unlimited use and unrestricted exposure. Updated descriptions of the chemical-specific, action-specific, and location-specific ARARs are provided in Appendix C of this ROD Amendment.
Long-term Effectiveness and Permanence	As stated in Section 4.4.3 of the WABOU Soil ROD (Travis AFB, 2002), Alternative S2 – Land Use and Access Restrictions achieved an acceptable measure of long-term effectiveness and permanence. The LUCs enforced under Alternative S2 have been demonstrated to provide adequate and reliable protection of human health and the environment since the remedy was successfully implemented in late 2002. In terms of permanence, continued long-term enforcement of soil LUCs is required to reliably manage potential risks posed by soil contaminants remaining at the site.	In comparison to Alternative S2, Alternative S5 provides a greater degree of long-term effectiveness and permanence. Potential risks to human health posed by contaminated soil are effectively and permanently reduced to levels that are acceptable under a residential exposure scenario. Continued enforcement of soil LUCs is unnecessary. The soil LUCs are removed after excavation is completed, and the site soil is made available for unlimited use and unrestricted exposure.

TABLE 5-2
Comparative Analysis of Soil Remedies at Site SD043
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

	Soil Remedy	
Evaluation Criterion	**Original ROD[a] Alternative S2 – Land Use and Access Restrictions**	**ROD Amendment[b] Alternative S5 – Excavation/Off-base Disposal**
Reduction of Toxicity, Mobility, or Volume through Treatment	Discussion of this criterion is provided in Section 4.4.4 of the WABOU Soil ROD (Travis AFB, 2002). Alternative S2 – Land Use and Access Restrictions does not employ an active treatment process to reduce the toxicity, mobility, or volume of contaminants.	As with Alternative S2, Alternative S5 does not employ an active treatment process to reduce the toxicity, mobility, or volume of contaminants. Although no treatment occurs following soil excavation at Site SD043, contaminants at concentrations greater than residential cleanup levels will be removed from the site through excavation and landfilling.
Short-term Effectiveness	As stated in Section 4.4.5 of the WABOU Soil ROD (Travis AFB, 2002), Alternative S2 – Land Use and Access Restrictions provides short-term effectiveness. Human health was protected after the alternative was implemented and the LUCs enforced. There were no adverse effects to the community, workers, or environment during implementation of the remedy. Enforcement of LUCs under the remedy effectively minimized the risks posed by soil contamination. Under this remedy, soil contaminants remain in place. Use of the land at Site SD043 is encumbered by the potential risks posed by the presence of soil contamination. Potential risks are posed by contaminants in soil at concentrations acceptable under an industrial exposure scenario, but unacceptable under a residential exposure scenario. Achieving the residential soil cleanup level is not expected under this remedy. Therefore, enforcement of LUCs under Alternative S2 are required in perpetuity. Alternative S2 does not actively provide for sustainable remediation. However, implementation of the remedy results in only minimal carbon dioxide generation and energy consumption related to the routine annual inspections of the LUCs.	As with Alternative S2, no adverse effects to the community, workers, or environment are anticipated during implementation of Alternative S5. Excavation and off-base disposal of contaminated soil are expected to require from several weeks to one (1) to two (2) months depending on the complexity of the excavation and the volume of contaminated soil requiring excavation to achieve residential cleanup levels. Unlike Alternative S2, the risk posed by residual contaminant concentrations in soil is acceptable under both industrial and residential exposure scenarios following successful implementation of Alternative S5. No soil LUCs are required, and the site soil is available for unlimited use and unrestricted exposure.

TABLE 5-2
Comparative Analysis of Soil Remedies at Site SD043
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

	Soil Remedy	
Evaluation Criterion	**Original ROD[a] Alternative S2 – Land Use and Access Restrictions**	**ROD Amendment[b] Alternative S5 – Excavation/Off-base Disposal**
Implementability	Discussion of the Implementability criterion is provided in Section 4.4.6 of the WABOU Soil ROD (Travis AFB, 2002). Consistent with that discussion, Alternative S2 – Land Use and Access Restrictions has been demonstrated to be both technically and administratively implementable at Site SD043 after the remedy was originally selected in the ROD.	In terms of technical implementability, Alternative S5 will be more difficult to implement than Alternative S2. The excavation component of Alternative S5 relies on readily available services and materials. Excavation is implemented using conventional and available equipment (e.g., backhoe, excavator, loaders, dump truck, and water truck). Excavation may also require the use of conventional shoring equipment (e.g., trench box) to provide sidewall soil stability. In addition, the excavation area for Site SD043 is located adjacent to Building 916, potentially making it difficult to access the area. The off-base disposal component of the remedy is also readily implementable. Several off-base landfill facilities are available to receive the contaminated soil excavated from the site. Administratively, Alternative S5 is implementable to a greater degree than Alternative S2. Successful implementation of Alternative S5 will remove encumbrances to use of the land at the site. This will improve Travis AFB's capacity to adapt to future military mission requirements and carry out new activities on property currently with restricted land use and access restrictions. Conversely, continued enforcement of LUCs under Alternative S2 will limit the Air Force's options in carrying out military mission requirements.
Cost	The current ROD remedy includes conducting an annual site inspection and preparation of a portion of an annual LUC report at an estimated annual cost of approximately $1,400. Long-term costs related to the continued enforcement of LUCs will continue in perpetuity.	Total costs for Alternative S5 will increase over Alternative S2 because the Air Force is taking a more aggressive approach to achieving soil cleanup via excavation and off-base disposal instead of enforcing LUCs. Under Alternative S5, an estimated total cost of $101,149 will be required to implement the post-ROD changes in 2018-2019. No future periodic costs and no long-term O&M costs will be incurred, because residential soil cleanup levels will be permanently achieved by excavation and off-base disposal. Soil LUCs are removed, and no long-term costs related to continued enforcement of LUCs are required.

TABLE 5-2
Comparative Analysis of Soil Remedies at Site SD043
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

	Soil Remedy	
Evaluation Criterion	**Original ROD[a] Alternative S2 – Land Use and Access Restrictions**	**ROD Amendment[b] Alternative S5 – Excavation/Off-base Disposal**
State/Regulatory Agency Acceptance	As stated in Section 5.5.5 of the WABOU Soil ROD (Travis AFB, 2002), the California DTSC, Water Board, and EPA expressed their support for Alternative S2 when it was presented in the *WABOU Proposed Plan for Soil Cleanup* (Travis AFB, 1998) and then by concurrence with the remedy selection in the WABOU Soil ROD (Travis AFB, 2002).	Alternative S5 was not the selected remedy for Site SD043 as presented in the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015). Instead Alternative S4 (Excavation/Treatment/On-base Consolidation) was originally proposed. However, because of the small volume of soil estimated to be excavated and potentially treated, it is not cost effective to select Alternative S4. The Air Force and EPA have jointly evaluated and selected the changed soil remedy (Alternative S5). The California DTSC and Water Board concur with the changed remedy.
Community Acceptance	As stated in Section 5.5.5 of the WABOU Soil ROD (Travis AFB, 2002), the community expressed support for the selection of Alternative S2 at Site SD043 when it was presented in the *Proposed Plan for Soil Cleanup* (Travis AFB, 1998). Comments received from the community on the *Proposed Plan for Soil Cleanup* (Travis AFB, 1998) during July 8 through August 8, 1998, and February 23 through March 24, 2000, public comment periods are provided in Part III – Responsiveness Summary of the ROD.	The Air Forces anticipates the support from the community on the selection of Alternative S5. An explanation of this slight modification of the selected remedy is further discussed in Section 8 of this ROD Amendment.

[a] Soil remedy selected in the WABOU Soil ROD (Travis AFB, 2002).
[b] The changed remedy described in this ROD Amendment is a remedy identified in the WABOU Soil ROD, but not originally selected for the subject site.

TABLE 5-3
Comparative Analysis of Soil Remedies at Site SS046
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

	Soil Remedy	
Evaluation Criterion	**Original ROD[a] Alternative S2 – Land Use and Access Restrictions**	**ROD Amendment[b] Alternative S5 – Excavation/Off-base Disposal**
Overall Protection of Human Health and the Environment	As stated in Section 4.4.1 of the WABOU Soil ROD (Travis AFB, 2002), Alternative S2 – Land Use and Access Restrictions is protective of human health and the environment. Enforcement of LUCs at Site SS046 has demonstrated overall protectiveness since the remedy was successfully implemented in late 2002. Use of the land at Site SS046 is encumbered by the potential risks posed by the presence of soil contamination. Potential risks are posed by contaminants in soil at concentrations acceptable under an industrial exposure scenario, but unacceptable under a residential exposure scenario. Continued enforcement of LUCs is required to manage these risks and maintain protectiveness.	The changed remedy is also protective of human health and the environment. A greater degree of overall protectiveness is achieved in comparison with Alternative S2. Soil cleanup concentrations are permanently achieved by removal instead of contaminated soil remaining at the site under long-term management. In addition, in contrast to Alternative S2, risks posed by contaminant concentrations in soil after excavation are acceptable under both industrial and residential exposure scenarios. No LUCs are required, and the site soil is available for unlimited use and unrestricted exposure.
Compliance with ARARs	As stated in Section 4.4.2 of the WABOU Soil ROD (Travis AFB, 2002), Alternative S2 – Land Use and Access Restrictions complies with ARARs. The ARARs are described in Section 6.0 of the ROD. Alternative S2 has demonstrated compliance with ARARs since the remedy was successfully implemented in late 2002.	Both alternatives comply equally with ARARs. However, implementation of Alternative S5 is preferred, since it removes contaminant concentrations in soil above cleanup levels that are acceptable for residential use. No soil LUCs are required, and the site soil is available for unlimited use and unrestricted exposure. The off-base disposal component of Alternative S5 also complies with chemical-specific, location-specific, and action-specific ARARs. Updated descriptions of the chemical-specific, action-specific, and location-specific ARARs are provided in Appendix C of this ROD Amendment.
Long-term Effectiveness and Permanence	As stated in Section 4.4.3 of the WABOU Soil ROD (Travis AFB, 2002), Alternative S2 – Land Use and Access Restrictions achieved an acceptable measure of long-term effectiveness and permanence. The LUCs enforced under Alternative S2 have been demonstrated to provide adequate and reliable protection of human health and the environment since the remedy was successfully implemented in late 2002. In terms of permanence, continued long-term enforcement of soil LUCs is required to reliably manage potential risks posed by soil contaminants remaining at the site.	In comparison to Alternative S2, Alternative S5 provides a greater degree of long-term effectiveness and permanence. Potential risks to human health posed by contaminated soil are effectively and permanently reduced to levels that are acceptable under a residential exposure scenario. Continued enforcement of soil LUCs is unnecessary. The soil LUCs are removed, and the site soil is made available for unlimited use and unrestricted exposure.

TABLE 5-3
Comparative Analysis of Soil Remedies at Site SS046
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

	Soil Remedy	
Evaluation Criterion	**Original ROD[a] Alternative S2 – Land Use and Access Restrictions**	**ROD Amendment[b] Alternative S5 – Excavation/Off-base Disposal**
Reduction of Toxicity, Mobility, or Volume through Treatment	Discussion of this criterion is provided in Section 4.4.4 of the WABOU Soil ROD (Travis AFB, 2002). Alternative S2 – Land Use and Access Restrictions does not employ an active treatment process to reduce the toxicity, mobility, or volume of contaminants.	As with Alternative S2, Alternative S5 does not employ an active treatment process to reduce the toxicity, mobility, or volume of contaminants. Although no treatment occurs following soil excavation at Site SS046, contaminants at concentrations greater than residential cleanup levels will be removed from the site through excavation and landfilling.
Short-term Effectiveness	As stated in Section 4.4.5 of the WABOU Soil ROD (Travis AFB, 2002), Alternative S2 – Land Use and Access Restrictions provides short-term effectiveness. During implementation of the remedy, two (2) posts were installed for placement of signage. Site workers took necessary precautions to ensure that there was not exposure to contaminants during installation. Thus, there were no adverse effects to the community, workers, or environment during implementation of the remedy. After the alternative was implemented and the LUCs enforced, human health was protected and the risk posed by soil contamination was effectively minimized. Under this remedy, soil contaminants remain in place. Use of the land at Site SS046 is encumbered by the potential risks posed by the presence of soil contamination. Potential risks are posed by contaminants in soil at concentrations acceptable under an industrial exposure scenario, but unacceptable under a residential exposure scenario. Achieving the residential soil cleanup levels is not expected under this remedy. Therefore, enforcement of LUCs under Alternative S2 are required in perpetuity. Alternative S2 does not actively provide for sustainable remediation. However, implementation of the remedy results in only minimal carbon dioxide generation and energy consumption related to the routine annual inspections of the LUCs.	As with Alternative S2, no adverse effects to the community, workers, or environment are anticipated during implementation of Alternative S5. Excavation and off-base disposal of contaminated soil are expected to require from several weeks to one (1) to two (2) months depending on the complexity of the excavation and the volume of contaminated soil requiring excavation to achieve residential cleanup levels. Unlike Alternative S2, the risk posed by residual contaminant concentrations in soil is acceptable under both industrial and residential exposure scenarios following successful implementation of Alternative S5. No soil LUCs are required, and the site soil is available for unlimited use and unrestricted exposure. Alternative S5 provides a measure of sustainable remediation by allowing for recycling of the railroad tracks and ties present at the site, if necessary.

TABLE 5-3
Comparative Analysis of Soil Remedies at Site SS046
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

	Soil Remedy	
Evaluation Criterion	**Original ROD[a] Alternative S2 – Land Use and Access Restrictions**	**ROD Amendment[b] Alternative S5 – Excavation/Off-base Disposal**
Implementability	Discussion of the Implementability criterion is provided in Section 4.4.6 of the WABOU Soil ROD (Travis AFB, 2002). Consistent with that discussion, Alternative S2 – Land Use and Access Restrictions has been demonstrated to be both technically and administratively implementable at Site SS046 after the remedy was originally selected in the ROD.	In terms of technical implementability, Alternative S5 will be more difficult to implement than Alternative S2. The excavation component of the remedy relies on readily available services and materials. Excavation is implemented using conventional and available equipment (e.g., backhoe, excavator, loaders, dump truck, and water truck). Excavation may also require the use of conventional shoring equipment (e.g., trench box) to provide sidewall soil stability. In addition, the location of the excavation area for Site SS046 is within the explosive safety clear zone, making it necessary to coordinate with additional Base personnel. The off-base disposal component of the remedy is also readily implementable. Several off-base landfill facilities are available to receive the contaminated soil excavated from the site. Administratively, Alternative S5 is implementable to a greater degree than Alternative S2. Successful implementation of Alternative S5 will remove encumbrances associated with the use of the land at the site. This will improve Travis AFB's capacity to adapt to future military mission requirements and carry out new activities on property currently with restricted land use and access restrictions. Conversely, continued enforcement of LUCs under Alternative S2 will limit the Air Force's options in carrying out military mission requirements.
Cost	The current ROD remedy includes conducting an annual site inspection and preparation of a portion of an annual LUC report at an estimated annual cost of approximately $1,400. Long-term costs related to the continued enforcement of LUCs will continue in perpetuity.	Total costs for Alternative S5 will increase over Alternative S2, because the Air Force is taking a more aggressive approach to achieving soil cleanup via excavation and off-base disposal instead of enforcing LUCs over an extended period of time. Under Alternative S5, an estimated total cost of $112,253 will be required to implement the post-ROD changes in 2018-2019. No future capital costs and no long-term O&M costs will be incurred, because residential soil cleanup levels will be permanently achieved by excavation and off-base disposal. Soil LUCs are removed, and no long-term costs related to continued enforcement of LUCs are required.

TABLE 5-3
Comparative Analysis of Soil Remedies at Site SS046
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

	Soil Remedy	
Evaluation Criterion	**Original ROD[a] Alternative S2 – Land Use and Access Restrictions**	**ROD Amendment[b] Alternative S5 – Excavation/Off-base Disposal**
State/Regulatory Agency Acceptance	As stated in Section 5.5.5 of the WABOU Soil ROD (Travis AFB, 2002), the California DTSC and Water Board concurred with the Air Force and EPA in the selection of Alternative S2 when it was presented in the *WABOU Proposed Plan for Soil Cleanup* (Travis AFB, 1998) and WABOU Soil ROD (Travis AFB, 2002).	As with Alternative S2, the Air Force and EPA jointly evaluated and selected Alternative S5 as presented in the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) and this ROD Amendment. The California DTSC and Water Board concur with the changed remedy.
Community Acceptance	As stated in Section 5.5.5 of the WABOU Soil ROD (Travis AFB, 2002), the community expressed support for the selection of Alternative S2 at Site SS046 when it was presented in the *Proposed Plan for Soil Cleanup* (Travis AFB, 1998). Comments received from the community on the *Proposed Plan for Soil Cleanup* (Travis AFB, 1998) during July 8 through August 8, 1998, and February 23 through March 24, 2000, public comment periods are provided in Part III – Responsiveness Summary of the ROD.	The community expressed support for the selection of Alternative S5 at Site SS046 when it was presented in the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015). No comments were received from the community on the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) during the public comment period conducted between April 15 and May 15, 2015, nor during the public meeting held on April 23, 2015.

[a] Soil remedy selected in the WABOU Soil ROD (Travis AFB, 2002).
[b] The changed remedy described in this ROD Amendment is a remedy identified in the WABOU Soil ROD, but not originally selected for the subject site.

5.1.1 Summary of Comparative Analyses

This section summarizes the comparative analyses of alternatives with respect to the CERCLA evaluation criteria. The overall ranking of alternatives varies by site upon consideration of numerous factors within the balancing criteria, including the level of existing risk to human health, current and future land use, and incremental cost (i.e., the cost difference between alternatives). Graphical depictions of the comparative alternative performance at Sites DP039, SD043, and SS046 based on the evaluation criteria are shown in Tables 5-4, 5-5, and 5-6.

5.1.1.1 Overall Protection of Human Health and the Environment

As described in Section 4.4 of the WABOU Soil ROD (Travis AFB, 2002), Alternatives S2 and S5 meet the threshold criterion of Overall Protection of Human Health and the Environment at Sites DP039, SD043, and SS046.

For Site DP039, residual soil contamination already meets the residential soil cleanup level.

For Sites SD043 and SS046, Alternative S5 provides a greater degree of overall protectiveness than Alternative S2, because soil contaminants are physically removed from the site instead of being left in place and LUCs enforced.

5.1.1.2 Compliance with ARARs

Alternatives S2 and S5 also meet the threshold criterion of Compliance with ARARs, as stated in Section 4.4 of the WABOU Soil ROD (Travis AFB, 2002).

For Site DP039, residual soil contamination already meets the residential soil cleanup level. For the current existing site contaminant conditions, Alternatives S2 and S5 are not applicable to Site DP039.

For Sites SD043 and SS046, both alternatives comply equally with ARARs. However, Alternative S5 is preferred because soil contaminants are physically removed from the site and residual concentrations of soil contaminants are below residential cleanup levels.

5.1.1.3 Long-term Effectiveness and Permanence

For Sites SD043 and SS046, Alternative S5 provides a greater degree of long-term effectiveness and permanence than Alternative S2, because soil contaminants are effectively and permanently removed instead of being left in place and LUCs enforced in perpetuity.

For Site DP039, residual soil contamination already meets the residential cleanup level for soil.

5.1.1.4 Reduction of Toxicity, Mobility, and Volume through Treatment

For Sites SD043 and SS046, no reduction of toxicity, mobility, and volume through treatment occurs under Alternative S2 or S5.

For Site DP039, residual soil contamination already meets the residential soil cleanup level.

5.1.1.5 Short-term Effectiveness

Continued enforcement of existing LUCs under Alternative S2 best satisfies this criterion at Sites SD043 and SS046. Continuation of land use and access restrictions under Alternative S2 poses the fewest potential adverse effects to the community, workers, and the environment during implementation of the remedy in comparison to Alternative S5.

For Site DP039, residual soil contamination already meets the residential soil cleanup level.

5.1.1.6 Implementability

The criterion of implementability includes consideration of the technical implementability and administrative feasibility of the remedial alternatives at each site.

Technical Implementability. At Sites SD043 and SS046, the continuation of existing LUCs under Alternative S2 is the most technically implementable alternative. Excavation and off-base disposal of contaminated soil under Alternative S5 poses more technical implementability issues than does the continuation of existing LUCs under Alternative S2. For example, under Alternative S5, the excavation area for Site SD043 is located adjacent to Building 916 potentially making it difficult to access the area, and the location of the excavation area for Site SS046 is within the explosive safety clear zone. Thus, implementation of Alternative S5 will require additional Base coordination to effectively execute the remedy.

Administrative Feasibility. In terms of administrative feasibility, Alternative S5 has a greater degree of implementability than continuation of LUCs under Alternative S2. Implementation of Alternative S5 at Sites SD043 and SS046 will result in concentrations of residual soil contamination that allow for unlimited use of and unrestricted exposure to the soil. In comparison, continuation of land use and access restrictions under Alternative S2 will be required in perpetuity and use of the soil at the sites will be permanently encumbered.

In recent years, the Air Force has taken steps toward reducing its environmental liability by remediating sites to residential cleanup levels. It is highly likely that these sites will remain industrial in nature for the foreseeable future. As long as the industrial work at these sites does not change, LUCs are effective and inexpensive, and Alternative S2 remains implementable. However, the activities at Travis AFB have changed in the past to adapt to new global military mission requirements. This trend is expected to continue as the Base continues to take on new responsibilities. Therefore, Base decision-makers have decided to remediate sites with restricted land use and access restrictions to residential cleanup levels to allow more flexibility for new construction and new land use activities.

Based on this evaluation, Alternatives S2 and S5 are equally implementable. Alternative S2 is technically implementable, while less administratively feasible. Alternative S5 is administratively feasible, but less technically implementable.

5.1.1.7 Cost

At Site DP039, soil cleanup levels under a residential exposure scenario have already been permanently achieved, and no further actions will be taken. In comparison, no capital costs will be incurred under Alternative S2, but long-term O&M costs related to continued enforcement of LUCs will be incurred in perpetuity.

At Sites SD043 and SS046, Alternative S2 best satisfies the cost criterion. Under Alternative S2, no capital costs will be incurred, but long-term O&M costs will be incurred in perpetuity. Conversely, Alternative S5 will have capital costs, but no O&M costs will be incurred.

The primary reason for originally selecting soil LUCs for these sites was cost. It was much less expensive to restrict access to these sites than to excavate the contaminated soil and transport it to an off-base landfill. However, after years of enforcing LUCs at Sites DP039, SD043, and SS046 as well as other soil and groundwater sites, it became obvious that the long-term costs of continuing LUCs at an active military installation are greater than the short-term expense of excavation and disposal. Detailed cost tables are provided in Appendix D.

5.1.1.8 State Acceptance

The California DTSC and the Water Board have expressed their support of the alternatives presented in the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015).

5.1.1.9 Community Acceptance

The Air Force issued the Proposed Plan for the WABOU Soil ROD Amendment (Travis AFB, 2015) in April 2015. The Proposed Plan invited the public to review and comment on the preferred alternatives during the public comment period from April 15 to May 15, 2015. A public meeting was also held on April 23, 2015, at the Northern Solano County Association of Realtors building located at 3690 Hilborn Road, Fairfield, California 94535. Travis AFB received no comments on the Proposed Plan during the public comment period or at the public meeting.

TABLE 5-4
Summary of Comparative Analysis Alternatives – Site DP039
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Criterion	Alternative S2 – Land Use and Access Restrictions	Alternative S1 – No Action*
Overall Protection of Human Health and the Environment	●	●
Compliance with ARARs	●	●
Long-term Effectiveness and Permanence	◐	●
Reduction of Toxicity, Mobility, and Volume through Treatment	○	○
Short-term Effectiveness	◐	●
Implementability	◐	●
Cost	◐	●
State Acceptance	●	●
Community Acceptance	●	●

* The No Action alternative for Site DP039 satisfies each criterion, except Reduction of Toxicity, Mobility, and Volume through Treatment, because residual soil contamination already meets the residential soil cleanup level.

Notes:

● = Alternative satisfies the criterion.
◐ = Alternative moderately satisfies the criterion.
○ = Alternative not applicable or does not satisfy the criterion.

TABLE 5-5
Summary of Comparative Analysis Alternatives – Site SD043
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Criterion	Alternative S2 – Land Use and Access Restrictions	Alternative S5 – Excavation/Off-base Disposal
Overall Protection of Human Health and the Environment	◐	●
Compliance with ARARs	◐	●
Long-term Effectiveness and Permanence	◐	●
Reduction of Toxicity, Mobility, and Volume through Treatment	○	○
Short-term Effectiveness	●	◐
Implementability	◐	◐
Total Cost	◐	●
State Acceptance	●	●
Community Acceptance	●	●

Notes:
● = Alternative satisfies the criterion.
◐ = Alternative moderately satisfies the criterion.
○ = Alternative not applicable or does not satisfy the criterion.

TABLE 5-6
Summary of Comparative Analysis Alternatives – Site SS046
Amendment to the WABOU Soil ROD, Travis Air Force Base, California

Criterion	Alternative S2 – Land Use and Access Restrictions	Alternative S5 – Excavation/Off-base Disposal
Overall Protection of Human Health and the Environment	◐	●
Compliance with ARARs	◐	●
Long-term Effectiveness and Permanence	◐	●
Reduction of Toxicity, Mobility, and Volume through Treatment	○	○
Short-term Effectiveness	●	◐
Implementability	◐	◐
Total Cost	●	◐
State Acceptance	●	●
Community Acceptance	●	●

Notes:
● = Alternative satisfies the criterion.
◐ = Alternative moderately satisfies the criterion.
○ = Alternative not applicable or does not satisfy the criterion.

Overall, Alternative S5 is likely the highest ranking (i.e., most preferable) alternative relative to the original alternative, because it is most protective and is most effective long-term.

SECTION 6

Support Agencies Comments

This ROD Amendment has been prepared in consultation and concurrence with EPA and the State of California. Comments provided by the regulatory agencies were addressed by Travis AFB prior to the issuance of the Final ROD Amendment. Response to comments developed by Travis AFB are provided in Appendix E.

SECTION 7

Statutory Determinations

This section describes how the changed remedies selected in this ROD Amendment satisfy the statutory requirements of CERCLA Section 121 (as required by 40 CFR 300.430[f][5][ii]). These requirements include the following:

- Protection of human health and the environment
- Compliance with ARARs
- Cost-effectiveness
- Utilization of permanent solutions and alternative treatment technologies or resource recovery technologies to maximum extent practicable
- Satisfying the preference for treatment as a principal element of the remedy
- Conducting five (5)-year reviews

7.1 Protection of Human Health and the Environment

Protection of human health and the environment for the sites in this ROD Amendment will be achieved by eliminating exposure to contaminants by cleaning up to levels acceptable for unlimited use and unrestricted exposure. Under Alternative S5, contaminated soil at concentrations greater than residential use cleanup levels will be excavated and disposed of offsite, thereby eliminating any potential for direct exposure and improving overall protectiveness. Under Alternative S1, no action is taken when current site conditions are protective of human health and the environment as a result of past actions. The following remedies selected in this ROD Amendment are protective of human health and the environment:

- **Site DP039 –** Contaminated soil was previously removed by excavation during installation of a bioreactor at the site and disposed of at an off-base landfill. No additional actions are needed under Alternative S1.
- **Site SD043 –** Excavation will be combined with off-base landfill disposal under Alternative S5 to permanently achieve protectiveness.
- **Site SS046 –** Excavation will be combined with off-base landfill disposal under Alternative S5 to permanently achieve protectiveness.

7.2 Compliance with ARARs

Site DP039 already complies with ARARs. This site contains chemicals at concentrations that have been determined to be acceptable for the protection of human health and the environment.

The selected soil remedy (Alternative S5 – Excavation/Off-base Disposal) for Sites SD043 and SS046 complies with State of California and federal ARARs and is expected to achieve cleanup levels that are based on risk-based values for the protection of human health and the environment. Alternative S5 is considered compliant with ARARs.

The soil ARARs are provided in Appendix C.

7.3 Cost Effectiveness

Overall cost effectiveness is determined by evaluating long-term effectiveness and permanence; reduction in toxicity, mobility, and volume; and short-term effectiveness (balancing criteria 3, 4, and 5). The overall effectiveness of the remedy is then compared to the cost for the remedy. The selected remedy for Sites SD043 and SS046 (Alternative S5 – Excavation/Off-Base Disposal) is cost-effective and represents a reasonable value for the money to be spent. The cost of the remedy is judged to be proportional to its overall effectiveness. Under Alternative S1 – No Action, no capital costs or long-term costs are incurred, because soil cleanup levels under a residential exposure scenario have already been permanently achieved. Although CERCLA does not require that the most cost-effective remedy be chosen, the most cost-effective remedy is often selected. The remedy costs are summarized in Appendix D.

7.4 Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies

The selected remedies utilize, to the maximum extent practicable, permanent solutions to the potential threats posed by soil contamination at each site:

- **Site DP039 –** Soil contamination was previously removed by excavation and off-base landfill disposal, and no additional actions are needed.
- **Site SD043 –** Excavation of soil will be combined with off-base landfill disposal under Alternative S5 to permanently achieve protectiveness at the site.
- **Site SS046 –** Excavation of soil will be combined with off-base landfill disposal under Alternative S5 to permanently achieve protectiveness at the site.

The selected remedy (Alternative S5) for Sites SD043 and SS046 includes a permanent solution, excavation and offsite disposal. Treatment is not a component under Alternative S5. Alternative S5 is selected as the remedy for Sites SD043 and SS046, because treatment could not be cost effectively applied considering the relatively low risks, particularly at Site SD043, and metals are COCs at Site SS046 (metals are not effectively remediated through treatment). The excavated soil volume also will be minimal, and therefore, not cost effective to treat.

7.5 Preference for Treatment as a Principal Element

No treatment processes are utilized in the selected remedies at Sites DP039, SD043, and SS046.

Toxicity, mobility, and volume would effectively be reduced at Sites SD043 and SS046 upon excavation; however, not through treatment. While the statutory preference for treatment as a principal element will not be met through Alternatives S1 or S5, the small volume of impacted soil and relatively low site risks make a treatment technology impractical. In addition, the California DTSC's Proven Technologies and Remedies Guidance identifies "excavation and offsite disposal" as the sole remedy by which unrestricted land use can be attained for metals in soil. Thus, the selected remedies do not satisfy the statutory preference for treatment as a principal element of the site remedies.

7.6 Five (5)-year Reviews

Because these remedies are expected to be completed in less than five (5) years and will not result in hazardous substances remaining onsite at concentrations greater than levels that allow for unlimited use and unrestricted exposure, the next scheduled five (5)-year review will document the actions taken to achieve unlimited use and unrestricted exposure at the sites addressed in this ROD Amendment. Thus, subsequent five (5)-year reviews will not be required for the specific sites covered in this ROD Amendment. However, if unlimited use and unrestricted exposure status is not achieved within five (5) years of the date the ROD Amendment is signed, then a five (5)-year review will be completed in accordance with CERCLA and will evaluate the remedy status to verify that the remedy will be protective of human health and the environment.

SECTION 8

Documentation of Significant Changes

Remedies originally selected for Sites DP039, SD043, and SS046 are presented in the WABOU Soil ROD (Travis AFB, 2002). The selected remedy for each site is Alternative S2 – Land Use and Access Restrictions. Because the Air Force desires more flexibility to redevelop the property at the Base, the remedy for Sites DP039, SD043, and SS046 was reevaluated.

In 2015, the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) for Sites DP039, SD043, and SS046 presented proposed remedial actions to clean up the sites to residential use levels. The alternatives proposed in the 2015 Proposed Plan included Alternative S1 for Site DP039; Alternative S4 for Site SD043; and Alternative S5 for Site SS046. In this ROD Amendment, Alternatives S1 and S5 remain the selected remedy for Sites DP039 and SS046, respectively. However, the Air Force selected a slightly different remedy for Site SD043 to address the same site contaminant, PCB-1254. The Air Force selected Alternative S5, which includes excavation and offsite disposal, instead of Alternative S4, which included excavation, thermal treatment, and on-base consolidation, possibly in a Corrective Action Management Unit (CAMU). Under Alternative S4, the original estimated quantity of soil to be excavated and disposed of was 112 cubic yards, compared to 40 cubic yards estimated for disposal under Alternative S5, as currently selected and presented in this ROD Amendment. Based on the 2016 data gap investigation, the horizontal and vertical extent of PCB-1254 soil contamination was more accurately defined, and resulted in a smaller required excavation volume. Because the quantity of soil impacted decreased from the initial estimate presented in the 2015 Proposed Plan and the concentrations of PCB-1254 detected are relatively low, the previously proposed alternative, excavation with thermal treatment and onsite consolidation, is not cost effective. In addition, the CAMU located at Travis AFB is no longer available to accept waste. Instead, the newly selected remedy, as described in this ROD Amendment, for Site SD043 will include excavation, but thermal treatment will not be conducted and disposal will take place offsite at an EPA-approved landfill. The newly selected remedy (Alternative S5) is not considered a significant change when compared to the remedy (Alternative S4) proposed in the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015). The newly selected remedy is protective of human health and the environment and will achieve the cleanup levels outlined in this ROD Amendment. Because this remedy is only slightly different than the remedy presented in the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) for Sites DP039, SD043, and SS046, a second public meeting or comment period is not necessary.

SECTION 9

Public Participation Compliance

Public participation requirements set out in NCP 300.435(c)(2)(ii) have been met. This ROD Amendment will become part of the Travis AFB AR file in accordance with NCP Section 300.825(a)(2).

Advertisements for the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) and public meeting were published in the Travis AFB *Guardian* newsletter issued on April 6, 2015.

A public notice of availability and a brief description of the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) were published in the Fairfield *Daily Republic* and Vacaville *Reporter*, newspapers of general circulation on April 14, 2015. The Proposed Plan was also made available for public review at the Vacaville Cultural Center Library at 1020 Ulatis Drive, Vacaville, California 95687 during the hours of 10:00 a.m. to 9:00 p.m. Monday through Thursday, Friday and Saturday from 10:00 a.m. to 5:00 p.m., and Sunday from 1:00 to 5:00 p.m.

The public comment period for the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) was from April 15 to May 15, 2015. A public meeting was also held on April 23, 2015, at the Northern Solano County Association of Realtors building located at 3690 Hilborn Road, Fairfield, California (94535).

Travis AFB received no comments on the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) during the April 15 to May 15, 2015, public comment period. During the public meeting on April 23, 2015, no written or verbal comments were received regarding clarification of the changed alternatives described therein.

Appendix A
Acronyms and Abbreviations

APPENDIX A

Acronyms and Abbreviations

AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
Air Force	U.S. Air Force
AR	Administrative Record
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAMU	Corrective Action Management Unit
CDI	chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHHSL	California Human Health Screening Level
COC	chemical of concern
COEC	chemical of ecological concern
COPC	chemical of potential concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CSF	cancer slope factor
CTV	critical toxicity value
DERP	Defense Environmental Restoration Program
DTSC	California Department of Toxic Substances Control
ELCR	excess lifetime cancer risk
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ERA	ecological risk assessment
ERP	Environmental Restoration Program
ESD	Explanation of Significant Difference
FS	feasibility study
GRISR	Groundwater Remediation Implementation Status Report
HHRA	human health risk assessment
HI	hazard index

HQ	hazard quotient
IRP	Installation Restoration Program
ISS	Installation Support Section
J	estimated concentration
J-	estimated concentration, biased low
LUC	land use control
mg/kg	milligram(s) per kilogram
mg/kg-day	milligram(s) per kilogram per day
NA	not applicable
NCP	National Contingency Plan
O&M	operation and maintenance
OEHHA	Office of Environmental Health Hazard Assessment
OSWER	Office of Solid Waste and Emergency Response
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
RAO	remedial action objective
RBSL	risk-based screening level
RfD	reference dose
RI	remedial investigation
RMSA	Railhead Munitions Staging Area
ROD	record of decision
RSL	regional screening level
RTV	reference toxicity value
SARA	Superfund Amendments and Reauthorization Act
SVOC	semivolatile organic compound
TCE	trichloroethene
TPH	total petroleum hydrocarbons
UCL	upper confidence limit
VOC	volatile organic compound
WABOU	West/Annexes/Basewide Operable Unit
Water Board	San Francisco Bay Regional Water Quality Control Board
yd^3	cubic yard(s)

Appendix B
References

APPENDIX B

References

CH2M HILL. 2018. *Data Gap Investigation Results Technical Memorandum for Soil Sites SD033, SD043, and SS046*. Prepared for Travis Air Force Base, California. Final. February.

CH2M HILL. 2017. *2016 Annual Groundwater Remediation Implementation Status Report.* Prepared for Travis Air Force Base, California. Final. December.

CH2M HILL. 2015. *Site DP039 Lead-contaminated Soil Excavation Technical Memorandum*. Prepared for Travis Air Force Base, California. Final. February.

CH2M HILL. 2011. *Technical Report for the Sustainable Bioreactor Demonstration at Site DP039*. Prepared for Travis Air Force Base, California. Final. April.

CH2M HILL. 2001. Evaluation of Ecological Protection for Remedial Actions in the WABOU Soil ROD Technical Memorandum. Prepared for Travis Air Force Base, California. December.

CH2M HILL. 1998. *West/Annexes/Basewide Operable Unit (WABOU) Feasibility Study, 60th Air Mobility Wing*. Prepared for Travis Air Force Base, California. Final. April.

CH2M HILL. 1997. *West/Annexes/Basewide Operable Unit (WABOU) Remedial Investigation Report*. Volumes 1-4. Prepared for Travis Air Force Base, California. Final. May.

Office of Environmental Health Hazard Assessment (OEHHA). 2009. Revised Human Health Screening Levels for Lead. Integrated Risk Assessment Branch. September.

Travis Air Force Base. 2016. *Annual Report on the Status of Land Use Controls on Restoration Sites in 2015*. Environmental Restoration Program. 60th Air Mobility Wing. Final. March.

Travis Air Force Base. 2015. *Proposed Plan for the West/Annexes/Basewide Operable Unit (WABOU) Soil ROD Amendment*. Environmental Restoration Program. 60th Air Mobility Wing. Final. April.

Travis Air Force Base. 2014. *Groundwater Record of Decision*. Travis Air Force Base, California. Final. June.

Travis Air Force Base. 2005. *Annual Report on the Status of Land Use Controls on Restoration Sites in 2004*. Environmental Restoration Program. 60th Air Mobility Wing. Final. January.

Travis Air Force Base. 2002. *Soil Record of Decision for the West/Annexes/Basewide Operable Unit.* Installation Restoration Program. Travis Air Force Base, California. Final. December.

Travis Air Force Base. 1998. *WABOU Proposed Plan for Soil Cleanup*. Installation Restoration Program. Travis Air Force Base, California. Final. July.

U.S. Environmental Protection Agency (EPA). 2017a. Regional Screening Level Calculator. https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search. Accessed March 16, 2017.

U.S. Environmental Protection Agency (EPA). 2017b. Integrated Risk Information System (IRIS). www.epa.gov/iris. Accessed June 2017.

U.S. Environmental Protection Agency (EPA). 2018. *Regional Screening Levels Table*. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016. May.

U.S. Environmental Protection Agency (EPA). 2016. *ProUCL Version 5.1: Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations.* June.

U.S. Environmental Protection Agency (EPA). 1999. *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents.* EPA 540-R-98-031. OSWER 9200-1-23P. PB98-963241. July.

Appendix C
Summary of ARARs

TABLE C-1
Travis Air Force Base WABOU Soil Sites – Waste Characterization, Classification, and Management ARARs
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Summary of ARARs

Citation	Section	ARAR Determination	ARAR Type	Description	Remarks	Sites and Alternatives
Soil Characterization						
22 CCR 66261.3 (a) (2) (A) through (F)	20090(d)	Applicable	Action-specific	Provides specifications for determining whether a waste is a hazardous waste.	Excavated soil must be characterized for disposal.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
Waste Classification						
RCRA Hazardous Waste Determination Title 22 CCR, Division 4.5, Chapter 11, 66261.21, 66261.22(a)(1), 66261.22(a)(2), 66261.23, and 66261.24(a)(1) or Article 4, Chapter 11		Applicable	Action-specific	A hazardous waste is considered a RCRA hazardous waste if it exhibits any of the characteristics of ignitability, corrosivity, reactivity, or toxicity or if it is listed as a hazardous waste. Most waste determinations will focus on whether the generated waste (e.g., contaminated soil and treatment residuals) could be classified as toxicity-characteristic waste as defined by the contaminant concentrations.	Wastes generated during remediation must be characterized and managed in accordance with RCRA requirements. Generator knowledge and analytical testing will be used to determine the waste classification of the excavated soil.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
22 CCR 66261.100 and 66261.101 (a)(1) and (a)(2)		Applicable	Action-specific	Provides specifications for determining whether a waste is a RCRA hazardous or RCRA nonhazardous waste.	Wastes generated during remediation must be characterized and managed in accordance with RCRA requirements. Generator knowledge and analytical testing will be used to determine the waste classification of the excavated soil.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
22 CCR 66262.11		Applicable	Action-specific	Requires waste generators to determine if wastes are hazardous and establishes procedures for such determinations.	Wastes generated during remediation must be characterized and managed in accordance with RCRA requirements. Generator knowledge and analytical testing will be used to determine the waste classification of the excavated soil.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
Waste Management						
22 CCR 66262.34		Applicable	Action-specific	Defines accumulation times for onsite storage of RCRA hazardous waste.	Wastes generated during remediation must be managed in accordance with RCRA requirements.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
40 CFR 264.554(d)		Applicable	Action-specific	Defines the staging pile requirements, standards, and design criteria.	Wastes generated during remediation are allowed to be temporarily stored before and/or after treatment.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
22 CCR 66264.171 through 66264.175, 66264.177, 66264.178 – Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities		Relevant and Appropriate	Action-specific	Sets standards and establishes requirements for containers holding hazardous waste for chemicals recovered from sediments, surface soils, or groundwater.	Containers will be used to transfer and store wastes generated from remedial actions.	Site SD043: S5 – Excavation/Offsite Disposal

*California statutes and regulations comprising the federally authorized RCRA program are found in 22 CCR 66250 through 66279 and 67100 through 67800.5.

Notes:

ARAR = applicable or relevant and appropriate requirement
CCR = California Code of Regulations
RCRA = Resource Conservation and Recovery Act
ROD = record of decision
WABOU = West/Annexes/Basewide Operable Unit

TABLE C-2
Travis Air Force Base WABOU Soil Sites – Water ARARs
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Summary of ARARs

Source	Citation	ARAR Determination	ARAR Type	Description	Remarks	Sites and Alternatives
NPDES Discharges of Storm Water from Construction	40 CFR 122, 123, and 124, implemented in California by SWRCB Order 2009-0009-DWQ Construction General Permit	To-be-considered	Action-specific	Regulates pollutants in discharge of stormwater associated with construction activity (clearing, grading, or excavation) involving the disturbance of 1 acre or more. Requires the preparation of a stormwater pollution prevention plan, implementation of BMPs to minimize the effects of disturbed soil on stormwater, and monitoring of stormwater to demonstrate compliance.	Permit is not promulgated. Total area disturbed between the two sites is expected to be less than 1 acre.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
NPDES General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s)	SWRCB Order No. 2013-0001-DWQ	To-be-considered	Action-specific	Regulates pollutants in discharge of stormwater associated with small MS4s. A portion of Travis AFB is subject to an MS4 permit. Sites SD043 and SS046 are located within the area subject to Travis AFB's MS4 permit Requires the implementation of BMPs to minimize the effects of disturbed soil on stormwater.	Permit is not promulgated.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
RWQCB-SFB Basin Plan (the Basin Plan)	Chapter 2 – Beneficial Uses	See Remarks	Action-specific	Establishes the beneficial uses of surface waters and groundwaters.	**Joint comments:** The beneficial use designations in the basin plan apply to restoration actions for purposes of determining cleanup levels. **AF comments:** Beneficial use designation is not an ARAR, because does not set a numeric standard. AF accepts the beneficial use designations in the basin plan for purposes of determining cleanup level. AF reserves the right to challenge beneficial use designations as provided for by state law. **State comments:** The beneficial uses are water quality standards and are, therefore, ARARs. The State reserves the right to assure protection of all beneficial uses as required by state and federal law.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
	Chapter 3 – Water Quality Objectives	See Remarks	Action-specific	Establishes both narrative and numerical water quality objectives for surface and ground waters. Narrative objectives describe the water quality to attain via pollution control and form the basis for the numerical values. Numerical objectives are designed to limit the adverse effects of pollutants.	**Joint comments:** Potential ARARs are water quality objectives (WQOs) for bacteria (2.2 organisms per 100 ml); chemical constituents based on State MCLs (if more stringent than Federal MCLs); lead (0.015 mg/l); and radionuclide MCLs. Baseline risk assessment will evaluate cumulative human health and ecological risk and assist in identifying needs for risk reduction. **AF comments:** The following are probably not ARARs: WQOs for chemical constituents based on secondary MCLs if not risk-based; WQOs for taste, odor (not risk based); narrative WQO for toxicity (vague and does not set a numerical standard). In evaluating other provisions, such as those regarding beneficial uses other than drinking water (MUN), AF would consider whether the provision is related to the beneficial use; is risk-based; is numeric; and is chemical-specific or location-specific. **State comments:** Generally agree with numeric standards; disagree that secondary standards are not ARARs – taste and odor can ruin the water for its beneficial use. There is no requirement in CERCLA that ARARs are only numeric standards; the NCP preamble includes extensive discussion of application of narrative standards, the NPDES regulations have specific provisions on application of narrative standards. There are also water quality standards that protect uses other than drinking water and they may be ARARs in a given circumstance.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal

TABLE C-2
Travis Air Force Base WABOU Soil Sites – Water ARARs
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Summary of ARARs

Source	Citation	ARAR Determination	ARAR Type	Description	Remarks	Sites and Alternatives
Statement of Policy with Respect to Maintaining High Quality Waters in California (Anti-Degradation Policy)	SWRCB Resolution No. 68-16	See Remarks	Chemical-specific	Requires that high quality surface and ground waters be maintained to the maximum extent possible. Degradation of waters will be allowed (or allow to remain) only if it is consistent with the maximum benefit to the people of the state, does not unreasonably affect present and anticipated beneficial uses, and does not result in water quality less than that prescribed in the RWQCB and State Water Resources Control Board (SWRCB) policies. If degradation is allowed, the discharge must meet best practicable treatment or control, which must prevent pollution or nuisance and result in the highest water quality consistent with maximum benefit to the people of the state.	**Joint comments:** Res. 68-16 is a potential ARAR for the reinjection or discharge of treated effluent into surface water or groundwater above background. This is based on an EPA decision resolving a dispute between AF and State at Mather/George AFBs. Res. 68-16 is not an ARAR for determining cleanup levels. Air Force and State disagree on whether Res. 68-16 is a potential ARAR for the treatment of ground water via injection of treatment media. **AF comments:** General AF position is Res. 68-16 is not an ARAR because it does not meet NCP criteria of enforceability and general applicability because directed to state agencies. It is also not relevant or appropriate because background level may be zero or a level not related to risk. AF also believes Res. 68-16 is not an ARAR for injection of treatment media to groundwater because treatment media is not a waste under Water Code §1350(d). **State comments:** Res. 68-16 applies to discharges of waste, included treatment media and treated groundwater, to waters of the state (groundwater and surface water). Water Boards have adopted permits and other approvals of reinjection and found those to be consistent with Res. 68-16. State ARARs are those requirements that are more stringent than federal law. Res. 68-16 requires use of best practicable treatment or control to achieve background or at least a level that meets the water quality standards. Since Res. 68-16 is more stringent than federal law so it is an ARAR.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code 13304	SWRCB Resolution 92-49	See Remarks	Chemical-specific	Establishes policies and procedures for the oversight of investigation and cleanup and abatement activities resulting from discharges of waste which affect or threaten water quality. It requires cleanup of all waste discharged and restoration of affected water to background conditions (i.e., the water quality that existed before the discharge). Requires actions for cleanup and abatement to conform to Resolution No. 68-16, (Anti-degradation Policy) water quality control plans and policies, and applicable provisions of California Code of Regulations, Title 23, Division 3, Chapter 15 (Discharges of Hazardous Waste to Land) as feasible.	**Joint comments:** Air Force and State disagree on whether Res. 92-49 is a potential ARAR. As a practical matter, AF and State have been able to reach agreement on cleanup levels at specific sites. Although AF believes it is not required to do so, AF has conducted technical and economic feasibility analyses (TEFAs) to demonstrate that achievement of background levels is infeasible. TEFAs may be conducted as a part of the Feasibility Study if appropriate. Another option is to designate an interim cleanup level (such as the MCL) in the Record of Decision and conduct a TEFA after that interim cleanup level is achieved. **AF comments:** Insofar as 92-49 establishes a process for the RWQCB to follow, it is not applicable to AF. CERCLA and the NCP require that clean-up levels are to be protective, based on the identified risk to human health and the environment. Background levels are not risk based or necessary to protect human health and the environment. Investigation requirements are pre-remedy and therefore are not ARARs because ARARs specify clean up levels and standards of control a remedy must attain not the investigation of a site. AF conducts site investigations in accordance with the CERCLA process. **State comments:** Disagree with reasons why Res 92-49 is not an ARAR. CERCLA says that state ARARs are those that are more stringent than federal law without limitation as to risk. In addition, Res. 92-49 has language nearly identical to federal regulations that are also ARARs for soil cleanups.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal

TABLE C-2
Travis Air Force Base WABOU Soil Sites – Water ARARs
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Summary of ARARs

Source	Citation	ARAR Determination	ARAR Type	Description	Remarks	Sites and Alternatives
Sources of Drinking Water Policy	SWRCB Resolution 88-63	See Remarks	Chemical-specific	Designates, with certain exceptions, all ground and surface waters have the beneficial use of municipal or domestic water supply.	**Joint comments:** The beneficial use designations in the basin plan apply to restoration actions for purposes of determining cleanup level. **AF comments:** Res. 88-63 is not an applicable requirement because it applies only to RWQCBs. Nor is it relevant or appropriate in that is procedural and does not establish substantive requirements for remediation. AF accepts the beneficial use designations in the basin plan for purposes of determining cleanup level. AF reserves the right to challenge beneficial use designations as provided for by state law. **State comments:** Disagree with AF's legal premise. Many federal requirements, such as the Clean Water Act and its regulations, require EPA to include provisions in permits and yet federal NPDES requirements are considered applicable. The determination of the beneficial uses of waters of the state is a standard and, therefore, is a potential ARAR.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
Title 27, CCR, Division 2, Subdivision 1 Title 23, CCR, Division 3, Chapter 15	Section 20080 et seq. and Section 2510 et seq.	See Remarks	Chemical-specific	Establishes waste and siting classification systems and minimum waste management standards for discharges of waste to land for treatment, storage, and disposal. Engineered alternatives that are consistent with Title 27/ Title 23 performance goals may be considered. Establishes corrective action requirements for responding to leaks and other unauthorized discharges	**Joint comments:** State must identify specific regulations to address each action or site for ARAR consideration. AF complies with regulatory requirements and good engineering practices in management of waste left in place and in the handling and disposal of waste generated during remediation. **AF comments:** As a general matter, provisions addressing non-hazardous waste are not ARARs as non-hazardous waste is not a CERCLA hazardous substance. In specific situations, non-hazardous waste can be a CERCLA pollutant or contaminant. **State comments:** Generally agree, however, Title 23 applies to hazardous wastes, which are generally also hazardous substances. Title 27 applies to designated waste and non-hazardous waste, which can often be hazardous substances or pollutants and contaminants as defined in CERCLA. Even if not, Title 27 would be relevant and appropriate to the non-hazardous constituents. **EPA comment:** Title 27, CCR, Division 2, Subdivision 1 and Title 23, CCR, Division 3, Chapter 15 are not considered ARARs by EPA.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal

TABLE C-2
Travis Air Force Base WABOU Soil Sites – Water ARARs
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Summary of ARARs

Source	Citation	ARAR Determination	ARAR Type	Description	Remarks	Sites and Alternatives
Designated Waste to Class I or Class II Waste Management Units	Title 23, CCR, Sections 2520 and 2521	See Remarks	Action-specific	Applies to discharges of hazardous waste to land for treatment, storage or disposal. Requires that hazardous waste be discharged to Class I waste management units that meet certain design and monitoring standards.	**Joint comments:** Potentially applicable ARAR if remedy includes treatment storage, or disposal outside of the area of contamination. Potentially relevant and appropriate ARAR within area of contamination. **State Comments:** Do not agree with distinction between within or outside area. Title 23 would be applicable in either circumstance. **EPA comment:** Designated Waste to Class I or Class II Waste Management Units (Title 23, CCR, Sections 2520 and 2521) are not considered ARARs by EPA.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
	Title 27, CCR, Sections 20200(c) and 20210	See Remarks	Action-specific	Applies to discharges of designated waste (nonhazardous waste that could cause degradation of surface or ground waters) to land for treatment, storage, or disposal. Requires that designated waste be discharged to Class I or Class II waste management units.	**Joint comments:** Potential ARAR if waste is a CERCLA hazardous substance, pollutant, or contaminant. **State comment:** Soil remediation could involve the placement of the contaminated soil on land. In such case, any waste classified as "designated waste" must be disposed in a Class I or II unit unless an exemption applies. AF would still be responsible for disposal of materials even if not hazardous. **EPA comment:** Designated Waste to Class I or Class II Waste Management Units (Title 27, CCR, Sections 20200(c) and 20210) are not considered ARARs by EPA.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal

Notes:

AF = U.S. Air Force
AFB = Air Force Base
ARAR = applicable or relevant and appropriate requirement
BMP = best management practice
CCR = California Code of Regulations
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR = Code of Federal Regulations
MCL = maximum contaminant level
mL = milliliter(s)
NCP = National Contingency Plan
NPDES = National Pollutant Discharge Elimination System
ROD = record of decision
RWQCB-SFB = California Regional Water Quality Control Board, San Francisco Bay
SWRCB = State Water Resources Control Board
TEFA = technical and economic feasibility analysis
WABOU = West/Annexes/Basewide Operable Unit
WQO = water quality objective

TABLE C-3
Travis Air Force Base WABOU Soil Sites – Ecological ARARs
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Summary of ARARs

Source	Section	ARAR Determination	ARAR Type	Description	Remarks	Sites and Alternatives
California						
California Fish and Game Code	3503	Applicable	Action-specific	Prohibits destruction of nest or eggs of any bird.	A survey of the site will be performed to look for nests and eggs before construction starts.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
	3503.5	Applicable	Action-specific	Prohibits the take, possession, or destruction of any birds of prey, their nests, or their eggs if they are likely to occur onsite.	Birds of prey are not likely to be present on the sites.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
	3005	Applicable	Action-specific	This code section prohibits taking of birds or animals with net, pound, cage, trap, set line, wire, or poison. "Take" is defined by Fish and Game Code Section 86 to include killing.	"Poison" is not defined in the code, but the contaminants of concern at Site SS046 may be considered poisons when present at certain levels. Measures must be taken during remediation to prevent the taking of birds or animals.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
	3513	Applicable	Action-specific	Prohibits taking of migratory non-game birds as designated by the MBTA.	A survey of the site will be performed to look for nests and eggs before construction starts.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
	3800	Applicable	Action-specific	Actions must be taken to prevent the take of nongame birds. This section prohibits the take of nongame birds, except in accordance with regulations of the Fish and Game Commission.	This section is applicable and relevant to the extent that nongame birds or their eggs are located on or near the site and such species have not been included in the Fish and Wildlife Conservation Plan filed pursuant to the Federal Fish and Wildlife Conservation Act. Species included in the plan will be protected at the federal standard making this section an ARAR to the extent that it is more stringent than the federal standard of protection. Measures must be taken during remediation to prevent the taking of any nongame bird.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
14 CCR	472	Applicable	Action-specific	This regulation provides that nongame birds and mammals may not be taken except as provided in subsections (a) through (d) of this section and in Sections 478 and 485.	Measures must be taken during remediation to prevent the taking of birds or mammals.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
16 USC 703-712, MBTA	703	Applicable	Location-specific	The taking of any migratory species of wild bird is prohibited. Remediation activities that might affect migratory birds will require informal consultation with USFWS. Remedial alternatives shall consider effects on migratory birds.	USFWS has been consulted as discussed in the final 2015 *Biological Assessment.* A survey of the site will be performed to look for nests and eggs before construction starts.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal

Notes:

ARAR = applicable or relevant and appropriate requirement
CCR = California Code of Regulations
MBTA = Migratory Bird Treaty Act
ROD = record of decision
USC = United States Code
USFWS = U.S. Fish and Wildlife Service
WABOU = West/Annexes/Basewide Operable Unit

TABLE C-4
Travis Air Force Base WABOU Soil Sites – Air Quality ARARs
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Summary of ARARs

Source	Section	ARAR Determination	ARAR Type	Description	Remarks	Sites and Alternatives
BAAQMD Regulation 6: Particulate Matter, Rule 1 – General Requirements	6-1-301, 6-1-303	Relevant and Appropriate	Action-specific	A person shall not emit from any source for a period or periods aggregating more than three (3) minutes in any hour, a visible emission which is as dark as or darker than No. 1 on the Ringelmann Chart, > 20 percent opacity, or of such opacity as to obscure an observer's view to an equivalent or greater degree.	Relevant and appropriate for construction operations (e.g., excavation).	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
BAAQMD Regulation 6: Particulate Matter, Rule 1 – General Requirements	6-1-501	Applicable	Action-specific	Anyone subject to Regulation 6 Rule 1 must provide sampling and monitoring equipment and must keep records of the monitoring.		Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal

Notes:

ARAR = applicable or relevant and appropriate requirement
BAAQMD = Bay Area Air Quality Management District
ROD = record of decision
WABOU = West/Annexes/Basewide Operable Unit

TABLE C-5
Travis Air Force Base WABOU Soil Sites – Other Federal ARARs
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Summary of ARARs

Source	Section	ARAR Determination	ARAR Type	Description	Remarks	Sites and Alternatives
16 USC 470aa-ii, Archeological Resources Protection Act	43 CFR 7	Applicable	Location-specific	Steps must be taken to protect archaeological resources and sites that are on public lands and to preserve data. Investigators of archaeological sites must fulfill professional requirements.	The proposed remedial alternatives will not alter or destroy any known prehistoric or historic archaeological features. However, substantive mitigation measures to protect the area would be implemented if such a discovery were uncovered.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal
16 U.S.C. §§ 470 et seq. National Historic Preservation Act	36 CFR 800	Applicable	Location-specific	Requires consultation with the State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO) and any Native American organization that might attach religious and cultural significance to properties within the area of potential effect.	The proposed remedial alternative will not alter or destroy any known properties of religious or cultural significance. Building 916 may have historic significance, and the SHPO will be contacted to determine this. If necessary, mitigation measures to protect the building will be implemented.	Site SD043: S5 – Excavation/Offsite Disposal
25 U.S.C. §§ 3001 et seq. Native American Graves Protection and Repatriation Act	43 CFR 10.4 (c) and (d)	Applicable	Location-specific	Requires consultation with Native Americans organization to determine disposition of objects discovered. If human remains are found, proper disposition will be coordinated.	The proposed remedial alternatives will not alter or destroy any known prehistoric or historic archaeological features. However, substantive mitigation measures to protect the area would be implemented if such a discovery were uncovered.	Site SD043: S5 – Excavation/Offsite Disposal Site SS046: S5 – Excavation/Offsite Disposal

Notes:

ARAR = applicable or relevant and appropriate requirement
CFR = Code of Federal Regulations
ROD = record of decision
SHPO = State Historic Preservation Officer
THPO = Tribal Historic Preservation Officer
USC = United States Code
WABOU = West/Annexes/Basewide Operable Unit

Appendix D
Cost Estimates

TABLE D-1
Cost Estimate – Site DP039
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Cost Estimates

Item	Original ROD Alternative S2 – Land Use and Access Restrictions	ROD Amendment Alternative S1 – No Action
Capital Cost	$0	$0
O&M Cost (annual)	$1,400	$0
Duration of Remedy (years)	30	0
Interest Rate[a]	3.4%	2.8%
O&M Cost (PV)	$26,075	$0
Periodic Cost (every 5 years)	$200	$0
Year	**Periodic Cost – PV**	**Periodic Cost – PV**
5	$169	$0
10	$143	$0
15	$121	$0
20	$102	$0
25	$87	$0
30	$73	$0
Periodic Cost (PV)	**$696**	**$0**
Alternative Subtotal Cost (PV)[b]	**$26,771**	**$0**
Contingency 0%[c]	$0	$0
Project Management (5%)[c]	$84	$0
Remedial Design (5%)[c]	$70	$0
Construction Management (5%)[c]	$70	$0
Alternative Total Cost	**$26,995**	**$0**

[a] Office of Management and Budget Circular A-94 – *Guidelines and Discount Rates for Benefit-Cost Analyses of Federal Programs, 12-14-14.*

[b] Alternative Subtotal Cost: O&M PV + Periodic Cost PV.

[c] Alternative S2: No Contingency costs; Project Management, Remedial Design, and Construction Management percentage rates applied to the annual O&M cost.

Notes:

O&M = operations and maintenance
PV = present value
ROD = record of decision
WABOU = West/Annexes/Basewide Operable Unit

TABLE D-2
Cost Estimate – Site SD043
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Cost Estimates

Item	Original ROD Alternative S2 – Land Use and Access Restrictions	ROD Amendment Alternative S5 – Excavation/ Off-base Disposal
Capital Cost	**$0**	**$19,260**
Soil excavation, 40 yd^3	$0	$800
Backfill, compacted, 40 yd^3	$0	$1,600
Landfill disposal, Class II, 40 yd^3	$0	$1,560
Confirmation/waste profile sampling	--	$4,200
Site setup, restoration	$0	$6,000
Mobilization/demobilization	--	$3,500
Project Closeout	--	$1,600
O&M Cost (annual)	$1,400	$0
Duration of Remedy (years)	30	1
Interest Rate[a]	3.4%	2.8%
O&M Cost (PV)	$26,075	$0
Periodic Cost (every 5 years)	$200	$0
Year	**Periodic Cost – PV**	**Periodic Cost – PV**
5	$169	$0
10	$143	$0
15	$121	$0
20	$102	$0
25	$87	$0
30	$73	$0
Periodic Cost (PV)	**$696**	**$0**
Alternative Subtotal Cost (PV)[b]	**$26,771**	**$19,260**
Contingency	$0[c]	$2,889[d]
Project Management	$84[c]	$1,600[e]
Remedial Design	$70[c]	$52,400[f]
Construction Management	$70[c]	$15,000[g]
Closure Report	--	$10,000
Alternative Total	**$26,995**	**$101,149**

TABLE D-2
Cost Estimate – Site SD043
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Cost Estimates

[a] Office of Management and Budget Circular A-94 – *Guidelines and Discount Rates for Benefit-Cost Analyses of Federal Programs, Nov 2017.*

[b] Alternative Subtotal Cost: O&M PV + Periodic Cost PV.

[c] Alternative S2: No Contingency costs; Project Management, Remedial Design, and Construction Management percentage rates of 5 percent applied to the annual O&M cost.

[d] Alternative S5: Contingency percentage rate applied to the capital cost.

[e] Alternative S5: Project management is based on one (1) eight (8)-hour day.

[f] Alternative S5: Remedial design includes development of construction documents including the QAPP and RAWP, and also includes the pre-design investigation and pre-construction submittals.

[g] Alternative S5: Construction management is based on ten (10)-hour days, and also includes QA/QC design during construction.

Notes:

-- = cost not estimated
O&M = operations and maintenance
PV = present value
QA = quality assurance
QC = quality control
ROD = record of decision
WABOU = West/Annexes/Basewide Operable Unit
yd^3 = cubic yard(s)

TABLE D-3
Cost Estimate – Site SS046
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Cost Estimates

Item	Original ROD Alternative S2 – Land Use and Access Restrictions	ROD Amendment Alternative S5 – Excavation/ Off-base Disposal
Capital Cost	**$0**	**$28,916**
Soil excavation, 32 yd^3	$0	$640
Demolish concrete pad, 689 ft^2	$0	$4,823
Demolish tracks and ties, 45 lf	$0	$5,625
Landfill disposal, Class II, 32 yd^3	$0	$1,248
Backfill, compacted, 32 yd^3	$0	$1,280
Confirmation/waste profile sampling	$0	$4,200
Site setup, restoration	$0	$6,000
Mobilization/demobilization		$3,500
Project Closeout	--	$1,600
Annual O&M Cost	$1,400	$0
Duration of Remedy (years)	30	1
Interest Rate[a]	3.4%	2.8%
O&M PV	$26,075	$0
Periodic Cost (every 5 years)	$200	$0
Year	**Periodic Cost – PV**	**Periodic Cost – PV**
5	$169	$0
10	$143	$0
15	$121	$0
20	$102	$0
25	$87	$0
30	$73	$0
Periodic Cost (PV)	**$696**	**$0**
Alternative Cost Subtotal[b]	**$26,771**	**28,916**
Contingency	$0[c]	$4,337[d]
Project Management	$84[c]	$1,600[e]
Remedial Design	$70[c]	$52,400[f]
Construction Management	$70[c]	$15,000[g]
Closure Report	--	$10,000
Alternative Total	**$26,995**	**$112,253**

TABLE D-3
Cost Estimate – Site SS046
Amendment to the WABOU Soil ROD, Travis Air Force Base, California – Cost Estimates

[a] Office of Management and Budget Circular A-94 – *Guidelines and Discount Rates for Benefit-Cost Analyses of Federal Programs, Nov 2017.*

[b] Alternative Subtotal Cost: O&M PV + Periodic Cost PV.

[c] Alternative S2: No Contingency; Project Management, Remedial Design, and Construction Management percentage rates of 5 percent applied to the annual O&M cost.

[d] Alternative S5: Contingency percentage rate applied to the capital cost.

[e] Alternative S5: Project management is based on one (1) eight (8)-hour day.

[f] Alternative S5: Remedial design includes development of construction documents including the QAPP and RAWP, and also includes the pre-design investigation and pre-construction submittals.

[g] Alternative S5: Construction management is based on ten (10)-hour days, and also includes QA/QC design during construction

Notes:

-- = cost not estimated
ft^2 = square foot
lf = linear foot
O&M = operations and maintenance
PV = present value
QA = quality assurance
QAPP = quality assurance project plan
QC = quality control
RAWP = remedial action work plan
ROD = record of decision
WABOU = West/Annexes/Basewide Operable Unit
yd^3 = cubic yard(s)

Appendix E
Response to Comments

Responses to Comments on the
Draft Final Amendment to the West/Annexes/Basewide Operable Unit Soil Record of Decision,
Environmental Restoration Program Sites DP039, SD043, and SS046, August 17, 2018
Travis Air Force Base, California

Environmental Protection Agency Region IX

No.	Comments	Responses
REVIEW COMMENTS – Nadia Hollan Burke, EPA Region IX – dated August 31, 2018		
1.	**Review of Response to General Comment 6 (01/25/18):** The response indicates that the text and tables were updated to reflect the changes, however the following narrative description of implementability in the text on Page 5-15 is not included in the Tables 5-2 and 5-3. Please revise the Tables to parallel the narrative text and include: "Based on this evaluation, Alternatives S2 and S5 are equally implementable. Alternative S2 is technically implementable, while less administratively feasible. Alternative S5 is administratively feasible, but less technically implementable."	The Air Force acknowledges and agrees with EPA's comment. The Air Force elected not to revise the text, however, given EPA's characterization of the comments as minor editorial issues, and the need to complete the ROD in order to begin field work as quickly as possible.
2.	**Review of Response to Editorial Comment 14a (08/02/18):** The remarks column did not include the reason for EPA's determination for ARARs Table C-2, page 3, Row 2, "Title 27, CCR, Division 2, Subdivision 1/Title 23, CCR, Division 3, Chapter 15:" Please add to the text of EPA's comment by inserting before the period, "because the citations do not specifically identify requirements (see CERCLA Section 121(d)(2)(A)), and because the remedy does not include on site treatment, storage or disposal."	The Air Force acknowledges and agrees with EPA's comment. The citations are too general and inclusive to constitute either an ARAR or TBC; the NCP and EPA guidance require that proposed state ARARs be specifically identified and cited. The Air Force elected not to revise the text because the Draft Final version already included EPA's statement of disagreement with the inclusion of the citations and, in this instance, the Air Force concluded that the benefit of revising the ARARs table to add EPA's statement of the basis for its determination was outweighed by the need to complete the ROD in order to begin field work as quickly as possible.
3.	**Review of Response to Editorial Comment 14a (08/02/18):** The remarks column did not include the reason for EPA's determination for ARARs Table C-2, page 4, Rows 1 & 2, "Designated Waste to Class I or Class II Waste Management Units (Title 23, CCR, Sections 2520 and 2521, and Title 27, CCR, Sections 20200(c) and 20210:" Please add to the text of EPA's comment in both rows 1 and 2 by inserting before the period in each case, "because the remedy does not include on site treatment, storage or disposal."	The Air Force acknowledges and agrees with EPA's comment about the referenced ARARs citations because they address primarily storage, treatment and/or disposal of hazardous waste, and the Air Force's on-site actions will be limited to excavating contaminated soil and promptly shipping them to an off-site facility for disposal. The Air Force elected not to revise the ARARs table because the Draft Final version already included EPA's statement of disagreement with the inclusion of the citations and, in this instance, the Air Force concluded that the benefit of revising the ARARs table to add EPA's statement of the basis for its determination was outweighed by the need to complete the ROD in order to begin field work as quickly as possible, and because the additional text does not affect the status of the referenced citations as ARARs.

No.	Comments	Responses
4.	**New General Comment:** EPA anticipated that by the Draft Final version of the WABOU ROD Amendment that all ARARs would be identified, however, there is still language in ARARs Table C-2 that indicates there are "potential" ARARs and clarification is needed. It also isn't clear whether the "Joint Comments" identify the ARARs that have been agreed upon. At this stage, ARARs should be clarified and specific requirements cited. For example, the issues below should be resolved: **a. ARARs Table C-2, page 1, Row 3 through page 4:** Please specify whether the agreed-upon requirements are applicable, relevant and appropriate, or some other category, such as "to be considered" (TBCs). **b. ARARs Table C-2, page 1, Row 3 through page 4:** The status of the WQOs as ARARs is not clear from the remarks. It is assumed that the "Joint Comments" represent the only parts of the cited provision that the AF and Water Board have agreed upon, however the text describes the provisions referenced under the heading "Joint Comments" as "Potential ARARs." Request that the status of the standards cited under "Joint Comments" be clarified as either ARARs or some other designation, and not "potential". This comment also applies to **various** other items, including, SWRCB Resolutions No. 68-16 and 92-49, Title 23 and 27.	The Air Force acknowledges EPA's comments and is aware that the Travis 2014 Groundwater ROD ("GW ROD") designated the same ARARs citations as those in the WABOU RODA referenced by EPA's comments, yet designated them as "TBC," and included EPA's statement of agreement/disagreement on these provisions as well. The Air Force agrees that it will follow the GW ROD model in future Travis remedy decision documents including citations such as Water Board resolutions, about which there is agreement to disagree among the parties, and designate such citations as "TBC" and include statements by all parties who have taken a position on a provision. With regard to the use of the term "potential" in the comments about these citations, the Air Force agrees with EPA that use of the term "potential" to describe a citation's status as an ARAR at the final draft stage of a remedy decision document is inappropriate, but the text in question is the result of negotiations with the Water Board. The Air Force is willing to discuss with EPA and the Water Board the removal of this term from the agree-to-disagree text as appropriate.

Responses to Comments on the
Draft Amendment to the West/Annexes/Basewide Operable Unit Soil Record of Decision,
Environmental Restoration Program Sites DP039, SD043, and SS046, November 30, 2017
Travis Air Force Base, California

Environmental Protection Agency Region IX

No.	Comments	Responses
REVIEW COMMENTS – Nadia Hollan Burke, EPA Region IX – dated January 25, 2018, with additional comments dated February 12, July 6, and August 2, 2018.		
GENERAL COMMENTS dated January 25, 2018 and July 6, 2018		
1. (01/25/18)	Additional information should be provided in the ROD Amendment about the basis for the proposed excavation areas and volume of soil to be excavated. Sections 2.2.2 and 2.2.3 of the include a discussion of the extent of contaminant detections in soils and references to Figures 2-2 and 2-3 in support of that discussion. However, the ROD Amendment does not specifically discuss the locations of the proposed excavation areas nor the volumes of contaminated soils that will be removed. Figures 2-2 and 2-3 show "Target Volumes" which appear to be the proposed excavation areas, but these areas are not discussed in the text. Please revise the ROD Amendment to include a description of the proposed areas to be excavated, the volume of contaminated soils to be removed, and a reference to the figures that show the excavation areas. Also, please clarify in the text whether the Target Volumes shown in Figures 2-2 and 2-3 represent the proposed excavation areas.	We replaced the last sentence of Section 2.2.2 with the following text: "The soil remedy to address the PCB-1254 contamination at Site SD043 is based on the analytical results from historical soil borings SB05, SH05, and SH08, located southwest of Building 916 where PCB-1254 concentrations exceed the residential cleanup level. The results from the 2016 data gap investigation were used to clarify the extent of the excavation footprint for this remedy. The excavation will be conducted to a depth of approximately 10 feet bgs and will result in approximately 40 cubic yards of contaminated soil removed (target volume). Figure 2-2 presents the excavation area, target volume, and boring locations that contain the impacted soil." We added the following text to the end of Section 2.2.3: "Based on the results of the 2016 data gap investigation and historical soil concentrations, the proposed excavation area for the contaminants in soil includes historical soil borings SB02, SB03, SB04, and SB05, where concentrations of site contaminants exceed the residential cleanup level and background concentrations. Excavations will be conducted at five (5) locations to an approximate depth of 0.5 foot bgs at each location along the railroad tracks and beneath the concrete. The volume of contaminated soil removed will be approximately 32 cubic yards (target volume). Figure 2-3 presents the excavation area, volume of soil to be removed, and boring locations that contain the impacted soil."

No.	Comments	Responses
2. (01/25/18)	The extent to which portions of the railroad line, concrete pad, and potentially contaminated soil will be removed at Site SS046 is not clear from the descriptions in the Amended ROD. Table 2-1 indicates that soil contamination may be present beneath the railroad line and concrete pad. However, this potential soil contamination is not otherwise discussed in the ROD Amendment. Also, the cost estimate for SS046, presented in Appendix D, identifies the demolition of railroad tracks and ties and a concrete pad, but these activities are not discussed in the ROD Amendment. Please revise the ROD Amendment to discuss the extent to which demolition of railroad tracks and ties and the concrete pad will take place and whether soil contamination is expected to be present beneath the railroad line and concrete pad.	Railroad tracks and ties and portions of the concrete pad will be dismantled and removed from the site as needed to support the remediation of areas with soil contamination above the cleanup levels as discussed in this ROD amendment. Confirmation soil sampling will be conducted to verify that impacted soil has been removed and determine whether additional soil excavation and associated additional infrastructure dismantling and removal is necessary. We revised the text in the Site SS046 comments section in Table 2-1 as follows: "Based on results from previous investigations, soil concentrations greater than cleanup levels are located in discrete locations along the railroad tracks and at one (1) location beneath the concrete pad, as shown on Figure 2-3. To ensure that contaminated soil from site-related activities only is excavated, the excavation area will not extend beyond the northeast border of the SB04 footprint, as shown on Figure 2-3." We revised the alternative description (first paragraph) for Site SS046 in Table 4-2 as follows: "Soil with contaminant concentrations greater than residential cleanup levels is excavated and transported by truck to an off-base EPA-approved landfill. To make it easier for the field crew to gain access to the contaminated soil, railroad tracks and ties within the site boundaries and portions of the concrete pad will be dismantled and removed from the site. The excavation void is backfilled with clean, imported fill soil."
3. (01/25/18)	Section 8 of the ROD Amendment states that the soil impacted at SD043 "decreased from the initial estimate presented in the 2015 Proposed Plan;" however, this decrease is not otherwise discussed in the ROD Amendment. Please revise the ROD Amendment to discuss the decrease in soil impacted at SD043 compared to the initial estimate and whether that decrease impacted the volume of soil proposed for excavation.	We added the following text after the fifth sentence in the second paragraph of Section 8: "Under Alternative S4, the original estimated quantity of soil to be excavated and disposed of was 112 cubic yards, compared to 40 cubic yards estimated for disposal under Alternative S5, as currently selected and presented in this ROD Amendment. Based on the 2016 data gap investigation, the horizontal and vertical extent of PCB-1254 soil contamination was more accurately defined, and resulted in a smaller required excavation volume."
4. (01/25/18)	The cost estimates presented in Tables D-2 and D-3 in Appendix D of the ROD Amendment do not include all the components required to complete a soil/material excavation and disposal project. For example, costs do not appear to include mobilization/demobilization of equipment, preparation of a Remedial Action Work Plan (or Amended RAWP), confirmation soil samples and analysis, waste analysis for landfill disposal and preparation of the associated quality assurance project plan (QAPP). Please revise the cost estimates presented in Tables D-2 and D-3 and the applicable sections of the ROD Amendment where the cost estimates are referenced.	We revised the cost estimates to include some components, as specified, that were inadvertently missed. We updated Tables D-2 and D-3 and corresponding text in Tables 4-7 and 4-8.

No.	Comments	Responses
4a. (07/06/18)	Review of Response to General Comment (GC) 4: The response partially addresses the comment. Specifically, while Table D-2 and D-3 were updated to include costs for preparation of the Remedial Design/Remedial Action Work Plan (RD/RAWP), the line item indicates that the Remedial Design is 5% of the costs. The Remedial Design line items significantly exceed 5% of the costs. Please resolve this discrepancy.	The note labels for contingency, project management, remedial design, and construction management that apply to Alternatives S2 and S5 are indicated on the cost amounts presented in Tables D-2 and D-3. We revised the cost amounts to read as follows: **Table D-2** Project Management $84[c] $1,600[e] Remedial Design $70[c] $52,400[f] Construction Management $70[c] $15,000[g] **Table D-3** Project Management $84[c] $1,600[e] Remedial Design $70[c] $52,400[f] Construction Management $70[c] $15,000[g]
5. (01/25/18)	There are several inconsistencies in the information presented in Table 4-1. These inconsistencies include the following: • Footnote c in Table 4-1 indicates that the cleanup level for PCB-1254 is based on the "noncancer risk, HI=1." However, Table 2-2 identifies PCB-1254 as posing an unacceptable cancer risk (greater than 1X10-6), but an acceptable non-cancer risk (HI less than 1). Also, the EPA Regional Screening Level (RSL) for residential soil exposures to PCB-1254 is based on cancer risk, not a non-cancer hazard index (HI). Please revise the Footnote in Table c to clarify how the cleanup level for PCB-1254 was derived. • Several of the footnotes reference EPA, 2016b as the EPA Regional Screening Level (RSL) table for residential soil. However, the reference list in Appendix B of the ROD Amendment includes this reference as EPA, 2016a. Also, the EPA RSL table for residential soil was updated in November 2017, and the most recent version of the EPA RSLs should be cited when the ROD is published. Please revise Table 4-1 to ensure the footnotes in the table are correct and reflect the most current version of the RSL tables.	• Footnote "c" in Table 4-1 has been updated to reflect that the cleanup level for PCB-1254 is based on a residential exposure scenario cancer risk of 1×10^{-6}. • We updated the references to reflect the May 2018 EPA RSLs; this also corrects the footnote issue.
5a. (07/06/18)	Review of Response to GC 5: The response partially addresses the comment; however, the response states that "we updated the references to reflect the November 2017 EPA RSLs" [Regional Screening Levels], but the May 2018 RSLs have been released. Since the Amendment has not been finalized, it should be revised to use the most up-to-date RSLs. Please revise the Amendment to use the updated May 2018 RSLs.	We updated the WABOU ROD-A to reflect the "May 2018 EPA RSLs."

No.	Comments	Responses
6. (01/25/18)	Implementability is not adequately evaluated in the ROD Amendment. As discussed in Section 5.1.1.6, implementability includes an evaluation of technical implementability and administrative feasibility, and Alternative 2 is the most technically implementable for Sites SD043 and SS046, while Alternative 5 has a greater degree of implementability when considering administrative feasibility. Based on this evaluation, Alternatives 2 and 5 should be considered equally implementable. However, Tables 5-2 and 5-3 do not discuss that Alternative 5 will be more difficult to implement from a technical standpoint than Alternative 2, and Tables 5-5 and 5-6 show Alternative 5 as better meeting the implementability criterion than Alternative 2. Please revise the ROD Amendment so that the evaluation of implementability is consistently presented and reflects that Alternatives 2 and 5 are overall equal with respect to implementability.	We revised the text regarding implementability for Alternatives S2 and S5 to indicate that overall, Alternatives S2 and S5 are equally implementable. We added the following text to Section 5.1.1.6: "Based on this evaluation, Alternatives S2 and S5 are equally implementable. Alternative S2 is technically implementable, while less administratively feasible. Alternative S5 is administratively feasible, but less technically implementable." We updated the text in Tables 5-2 and 5-3 to reflect the implementability of Alternatives S2 and S5. We revised the applicability indicator in Tables 5-5 and 5-6 to indicate that Alternatives S2 and S5 are equal and moderately satisfy the Implementability criterion.
7. (01/25/18)	The cost comparisons between Alternatives S2 and S5 for Site SD043 are inconsistently discussed in the ROD Amendment. For example, according to Table 4-7 and the cost estimate presented in Table D-2 in Appendix D, the cost for Alternative 2 is higher than that of Alternative 5. However, Tables 5-2 and 5-5 indicate that Alternative 5 is more expensive, and less favorable from a cost perspective, than Alternative 2. Please revise the ROD Amendment to consistently discuss and present the cost comparisons between Alternatives S2 and S5 for Site SD043.	We revised the cost comparisons in Section 5 and are now based on comparing the estimated total cost instead of estimated capital cost for each alternative.
8. (01/25/18)	Acronyms are not always used correctly in the ROD Amendment. The acronym for carcinogenic polycyclic aromatic hydrocarbon (cPAH) should be used when discussing potential carcinogenic risks associated with the sites evaluated in the ROD. However, the acronym PAH is used in some circumstances, for example the first paragraph on Page 2-11 and the first bullet item in Section 4.1. Also, there are a few instances where the acronym for polychlorinated biphenyl (PCB) or PCBs are used instead of PCB-1254 when describing the potential risks associated with the sites. For example, the first bullet item in Section 4.1 and the first paragraph on Page 4-2. Please revise the ROD Amendment to ensure the correct acronyms are used when discussing potential risks associated with soil contaminants at the sites.	We updated the acronyms (cPAH and PCB-1254) throughout the ROD amendment.

No.	Comments	Responses
SPECIFIC COMMENTS dated January 25, 2018		
1.	**Section 1.1 Site Name and Location, Operable Unit (OU)/Site:** Please add the EPA's designated "OU 4" number to the list of OU designations.	We added EPA designation OU 4 for the WABOU to the site name and location information presented in Section 1.1.
2.	**Section 2.2.2, Site SD043 Soil Contamination, Pages 2-4 and 2-5:** The last sentence in this section states, "Thus, PCB-1254 concentrations in surface soil do not exceed the residential cleanup level," but the first paragraph of Section 2.2.2 does not summarize the Aroclor 1254 (PCB-1254) results for the pre-ROD historical surface soil samples. The text only states that PCB-1254 concentrations in surface soils did not exceed the residential cleanup level in the data gaps investigation conducted in 2016. Please revise the ROD Amendment to describe whether PCB-1254 concentrations in surface soil exceeded the residential cleanup level during pre-ROD soil sampling.	We added the following text at the end of the first paragraph in Section 2.2.2: "PCB-1254 concentrations were detected in surface soil in two (2) borings only during the RI (SH08 at 0.17 mg/kg and SH10 at 0.047 mg/kg). Historical PCB-1254 concentrations in surface soil do not exceed the residential cleanup level for PCB-1254."
3.	**Section 2.3.1.2, Summary of Risk Estimates, Page 2-9:** The first sentence indicates that human health risk estimates for Sites DP039, SD043, and SS046 are summarized in Table 2-1, but the risk estimates are presented in Table 2-2. Please revise the reference in the first sentence of Section 2.3.1.2 to Table 2-2.	We corrected the reference in the first sentence of paragraph one in Section 2.3.1.2 to Table 2-2.
4.	**Section 2.4, Original Remedy Selection, Page 2-15:** The description of the contents of the 2015 Proposed Plan should be revised to reflect the change in preferred remedy for Site SD043. The second bullet item on this page implies that the remedial alternatives presented in the Amended ROD were previously presented in the 2015 Proposed Plan. The text in the bullet item states, "The Proposed Plan presented the proposed changes to the existing remedies at these sites." However, as discussed in Section 8 of the ROD Amendment, a different remedial alternative was proposed for Site SD043 in the 2015 Proposed Plan than is proposed in the ROD Amendment. Please revise the text in the bullet item to state that the Proposed Plan presented proposed changes to the existing remedies at these sites (i.e., remove the word "the" preceding proposed changes), and reference Section 8 of the ROD Amendment for further details.	Based on a subsequent comment and response (EPA comment 7, 07/06/2018), we moved this revised second paragraph of Section 2.4 to Section 2.5 as the first paragraph. The modified text now reads as follows: "The Proposed Plan presented proposed changes to the existing remedies at these sites. See Section 8 of this ROD Amendment for additional details."

No.	Comments	Responses
5.	**Section 3, Basis for the Document, Page 3-1:** The fourth paragraph lists "PCB" (polychlorinated biphenyl) as being at concentrations that result in unacceptable levels of risk at Site SS046; however, based on information presented in Section 2 and Table 2-2, pentachlorophenol is the chemical that is at concentrations that result in unacceptable levels of risk at Site SS046. Please revise Section 3 to correct this discrepancy.	We corrected the third sentence in the fourth paragraph as follows: "An updated HHRA for residential exposure was conducted, which concluded that the chemical concentrations at Sites SD043 (PCB-1254) and SS046 (arsenic, lead, pentachlorophenol, and cPAHs) continue to be associated with unacceptable levels of risk."
6.	**Table 4-7, Common Elements and Distinguishing Features – Site SD043, Page 4-8:** The estimated total cost present worth is listed as 16.848 in the table, but based on the Cost Estimates presented in Appendix B, the value should be 16,848. Please revise Table 4-7 to list the correct estimated total cost present worth, consistent with the cost estimate for Site SD043.	We corrected the text in Table 4-7 with updated cost information.
7.	**Tables 4-10 and 4-11, Pages 4-10 and 4-11:** These tables indicate 0 years as the timeframe to achieve remediation goals, but Tables 4-7 and 4-8 state that it will take 1 year to achieve remediation goals. Based on the remediation activities discussed in the ROD Amendment, 1 year to achieve remediation goals appears more realistic. Please revise Tables 4-10 and 4-11 to indicate that it will take 1 year to achieve remediation goals.	We corrected Tables 4-10 and 4-11 to indicate "1-year" to achieve available land use.
8.	**Table 5-2, Comparison Analysis of Soil Remedies at SD043, Page 5-8:** The discussion of State/Regulatory Acceptance includes the following statement: "The Air Force anticipates the support of the [California Department of Toxics Substance Control] DTSC, Water Board, and EPA for the selection of Alternative S5 and solicits approval or concurrence with the selection of the changed remedy (Alternative S5) as provided in this ROD Amendment." However, Section 1.2 states that "The Air Force and EPA have jointly evaluated and selected the changed soil remedies. The California DTSC and Water Board concur with the changed remedies." While it is understood that the first statement was pending the initial review of the draft by the regulators, please revise Table 5-2 or Section 1.2 so that state/regulatory acceptance of the selected remedies are described consistently in the Draft Final version.	We revised the text to indicate that EPA, DTSC, and Water Board have concurred with the changed remedy. We replaced the last sentence under the State/Regulatory Agency Acceptance criterion for Alternative S5 (Table 5-2) with the following text: "The Air Force and EPA have jointly evaluated and selected the changed soil remedy (Alternative S5). The California DTSC and Water Board concur with the changed remedy."

No.	Comments	Responses
9.	**Table 5-2, Comparison Analysis of Soil Remedies at SD043, Page 5-6; Table 5-3, Comparison Analysis of Soil Remedies at SS046, Page 5-10; and Section 5.1.1.4, Reduction of Toxicity, Mobility and Volume through Treatment, Page 5-13:** Under Reduction of Toxicity, Mobility, or Volume Through Treatment, the last paragraph in the Alternative S5 column in Tables 5-2 and 5-3 incorrectly states that the "volume of soil contamination…is permanently reduced." There is a similar statement in Section 5.1.1.4, which refers to contaminant reductions by physically removing the soil from the site. However, sending the contaminated soils to a landfill does not permanently reduce the volume of contamination, it just moves the soil to another location. Also, treatment is required to satisfy the criterion of contaminant reduction of toxicity, mobility, or volume through treatment. Please revise the sections/tables of the ROD Amendment that address reduction of toxicity, mobility, or volume through treatment to clarify statements indicating that contaminants and contaminant volumes will be reduced through excavation and landfilling.	We revised the text in Table 5-2 as follows: "Although no treatment occurs following soil excavation at Site SD043, contaminants at concentrations greater than residential cleanup levels will be removed from the site through excavation and landfilling." We revised the text in Table 5-3 as follows: "Although no treatment occurs following soil excavation at Site SS046, contaminants at concentrations greater than residential cleanup levels will be removed from the site through excavation and landfilling." We replaced the first paragraph in Section 5.1.1.4 with the following text: "For Sites SD043 and SS046, no reduction of toxicity, mobility, and volume through treatment occurs under Alternative S2 or S5."
10	**Section 5.1.1.7, Cost, Page 5-14:** The last paragraph of this section includes a statement that is not applicable to the cost evaluation criterion. The paragraph states. "In general, Alternative S5 is likely the highest ranking (i.e., most preferable) alternative relative to the original alternative, because it is most protective and is most effective long-term." Since this statement does not have any relation to the evaluation of cost, please revise Section 5.1.1.7 to remove the statement, and/or move it to the applicable section.	The statement was intended to be a conclusion statement indicating that Alternative S5 was the best Alternative overall. We moved the statement to the end of Section 5.
11.	**Appendix A, References, Page B-1:** Two of the documents supporting the ROD Amendment are listed as Draft. Please ensure these Draft technical documents are finalized, added to the Administrative Record, and the References section is updated accordingly prior to finalization of the ROD Amendment. Please also ensure any changes made to the Draft documents prior to finalization are reflected in the ROD Amendment, if necessary.	Reference documents indicated as "Draft" in the Draft WABOU ROD Amendment have been finalized, so we updated Appendix B (References) accordingly.
12.	**Appendix B, References, Page B-2:** For consistency, please add the month of July to the end of the reference.	We added the month of July to the following reference in Appendix B: "U.S. Environmental Protection Agency (EPA). 1999. *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*. EPA 540-R-98-031. OSWER 9200-1-23P. PB98-963241. July."

No.	Comments	Responses
13.	**Appendix C, Summary of ARARs:** In addition to listing the Archeological Resources Protection Act, please include the following similar federal laws, along with the same following "remark," modified for each law, i.e., "The proposed remedial alternatives will not alter or destroy any known prehistoric or historic archaeological features. However, substantive mitigation measures to protect the area would be implemented if such a discovery were uncovered." a. The National Historic Preservation Act, 16 U.S.C. §§ 470 et seq. Please list only the substantive, non-procedural provisions, as "applicable". b. The Native American Graves Protection and Repatriation Act, 25 U.S.C. §§ 3001 et seq. Please list only the substantive, non-procedural provisions, as "applicable".	We added the ARARs as indicated in "a" and "b" of this comment to Table C-5 of Appendix C.
ADDITIONAL COMMENTS, dated February 12, 2018		
1.	**Page 1-2:** Please revise ROD amendment to refer to EPA as the lead oversight agency and the state as a support agency. Please also add the following concurrence language: "The [federal agency] shall not modify or terminate Land Use Controls, implementation actions, or modify land use without approval by EPA and the [state]. The [federal agency] shall seek prior concurrence before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for LUCs."	We revised the third paragraph as follows: This ROD Amendment is issued by the Air Force as the lead agency. The Air Force is amending the ROD and the remedy for the sites within the WABOU in accordance with CERCLA and the NCP, as required by the Defense Environmental Restoration Program (DERP). The EPA is the lead oversight agency, and the State of California, represented by California Department of Toxic Substances Control (DTSC) and the San Francisco Bay Regional Water Quality Control Board (Water Board), is the support agency. The Air Force and EPA have jointly evaluated and selected the changed soil remedies. The California DTSC and Water Board concur with the changed remedies. The Air Force shall not modify or terminate land use controls (LUCs), implementation actions, or land usage without approval by EPA and the State of California. The Air Force shall seek concurrence before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for them.
2.	**Figure 1-1 (legend and figure):** Please identify the current LUC boundaries for the Sites.	We updated Figure 1-1 to show the current LUC boundaries.
EDITORIAL COMMENTS, dated July 6, 2018 and August 2, 2018		
1. (07/06/18)	Section 1.1 Site Name and Location: Please identify "EPA Operable Unit 4" at the end of the Operable Unit/Site Designation information.	We added the "EPA Operable Unit 4" text at the end of the Designation information in Section 1.1 as follows: **"Operable Unit (OU)/Site:** West/Annexes/Basewide Operable Unit (WABOU) Environmental Restoration Program (ERP) sites designated as Sites DP039, SD043, and SS046 (EPA OU 4)"

No.	Comments	Responses
2. (07/06/18)	Section 1.2 Statement of Purpose: New language added to page 1-2 appropriately refers to the fact that the Air Force and EPA have jointly selected the remedy. However, earlier in this section, only the Air Force is designated as selecting the remedy. Also, Tables 5-1, 5-2 and 5-3 State/Regulatory Agency Acceptance in both columns, the EPA's joint selection of the remedy is described as concurrence or is not clear. To provide consistency throughout the document, please refer more explicitly to EPA's co-selection or joint selection of the remedy on Page 1-2, Tables 5-1, 5-2, and 5-3 and throughout the document.	We have revised the text in Section 1.2, paragraph 3, last sentence as follows: "However, the Air Force and EPA have determined that the newly selected remedial alternatives as presented in this ROD Amendment are now more appropriate to meet Air Force mission requirements, as described in detail below." We modified the entire text under "State/Regulatory Agency Acceptance" criterion in Tables 5-1 and 5-3, and replaced the second paragraph under "State/Regulatory Agency Acceptance" criterion in Table 5-2 as follows: **Table 5-1** "As with Alternative S2, the Air Force and EPA jointly evaluated and selected Alternative S1 as presented in the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) and this ROD Amendment. The California DTSC and Water Board concur with the changed remedy." **Table 5-2** "The Air Force and EPA have jointly evaluated and selected the changed soil remedy (Alternative S5). The California DTSC and Water Board concur with the changed remedy." **Table 5-3** "As with Alternative S2, the Air Force and EPA jointly evaluated and selected Alternative S5 as presented in the *Proposed Plan for the WABOU Soil ROD Amendment* (Travis AFB, 2015) and this ROD Amendment. The California DTSC and Water Board concur with the changed remedy."
3. (07/06/18)	Section 1.3 Authorizing Signatures, Name and Title: This specific information for the signatories was not designated in the Draft document. For EPA, please include the following for the signatory line, and add the other regulatory agencies signatories, as appropriate: Angeles Herrera Assistant Director Federal Facilities and Site Cleanup Branch Superfund Division U.S. Environmental Protection Agency Region IX	We added Ms. Angeles Herrera and corresponding information to the signature box in Section 1.3. We also added the following names and corresponding information for DTSC and Water Board to the signature box in Section 1.3. "CHARLES RIDENOUR, P.E. Supervising Hazardous Substances Engineer II Sacramento Office Brownfields and Environmental Restoration Program California Department of Toxic Substances Control" "BRUCE H. WOLFE Executive Officer San Francisco Bay Regional Water Quality Control Board"

No.	Comments	Responses
4. (07/06/18)	Section 2.1.1 Site DP039 (Building 755), page 2-2, second paragraph: The language in this section indicates that the excavation did not extend beyond the footprint of the bioreactor to the east and south, however, does not explicitly state that the confirmation sample results confirmed that excavation was not necessary beyond the footprint of the excavation either. Please add clarifying language to provide that confirmation was done to verify that contamination did not extend beyond the footprint of the excavation. Otherwise, LUCs would still be required because of the unknown extent of contamination beyond the footprint of the excavation.	We modified the second to last sentence in the fourth paragraph of Section 2.1.1 as follows: "Confirmation samples were collected from the north, west, south, and east sides of the excavation footprint, and the analytical results from these samples were statistically evaluated and indicated that elevated lead concentrations were successfully removed, and lead contamination did not extend beyond the footprint of the excavation (CH2M HILL, 2015)."
5. (07/06/18)	Section 2.2.2 Site SD043 Soil Contamination, page 2-5, second paragraph: The data gap investigation discussion and the conclusions in this paragraph indicate that the results of the previous investigation exceeding the residential cleanup level were not confirmed by the new data. Therefore, it appears that action is being taken based on the historical results, and not the new results, which would indicate excavation is not necessary. This section should clarify this, and indicate why nevertheless action is being taken on the historical results (ie, out of an abundance of caution, the excavation footprint is being based on the historical results).	We modified the first sentence in the fourth paragraph (last paragraph) of Section 2.2.2 to read as follows: "The soil remedy to address the PCB-1254 contamination at Site SD043 is based on the analytical results from historical soil borings SB05, SH05, and SH08, located southwest of Building 916 where PCB-1254 concentrations exceed the residential cleanup level. The results from the 2016 data gap investigation were used to clarify the extent of the excavation footprint for this remedy."
6. (07/06/18)	Table 2-1 Summary of Nature and Extent of Contamination, Site SS046, Comments column: EPA assumes that the excavation planned will address the soil contamination present beneath the railroad line and concrete pad that is indicated in this table. Otherwise, LUCs would still need to be required.	Figure 2-3, as indicated in the "Comments" column of Table 2-1, shows the specific locations where the excavations to address the contamination identified in Table 2-1 will take place.
6a. (08/02/18)	Editorial Comment 6: The response does not adequately capture the changes that were made to Table 2-1 in response to the comment. Please update the response to provide more information regarding the changes that were made, such as specifically indicate in the response that contamination beneath the railroad line and concrete pad will be addressed.	We have revised the above response (6) as follows: Figure 2-3, as indicated in the "Comments" column of Table 2-1, shows the specific locations where the excavations to address the contamination beneath the railroad line and concrete pad will occur as identified in Table 2-1.
7. (07/06/18)	Section 2.4 Original Remedy Selection: Discussion is included in this section related to the 2015 Proposed Plan. EPA suggests moving the information about the 2015 Proposed Plan to the following section, 2.5 ROD Amendment Remedy Selection.	We moved the second paragraph of the WABOU Proposed Plan subsection in Section 2.4 that discussed the 2015 Proposed Plan to Section 2.5 as the first paragraph.
8. (07/06/18)	Section 3 Basis for the Document, Page 3-1, fourth paragraph: Site SS046 does not include pentachlorophenol in the list of contaminants, however elsewhere in the document this is included. Please add pentachlorophenol to the list for consistency.	PCB was mistakenly included in the list of contaminants for Site SS046 as pointed out in a previous EPA comment. We corrected the list of contaminants for Site SS046 by replacing PCB with pentachlorophenol.

No.	Comments	Responses
9. (07/06/18)	Section 5.1.1.2, Tables 5-2 and 5-3, Compliance with ARARs: These sections indicate that Alternatives S2 and S5 comply differently to ARARs because of risk. However, these two ARARs comply equally with ARARS, and risk is not a factor in this evaluation. Please remove the references to the different risks, and clarify that these two alternatives comply equally with ARARs.	We revised the third paragraph in Section 5.1.1.2 to read as follows: "For Sites SD043 and SS046, both alternatives comply equally with ARARs. However, Alternative S5 is preferred because soil contaminants are physically removed from the site and residual concentrations of soil contaminants are below residential cleanup levels." We revised the text in Tables 5-2 and 5-3, "Compliance with ARARs", first paragraph as follows: "Both alternatives comply equally with ARARs. However, implementation of Alternative S5 is preferred, since it removes contaminant concentrations in soil above cleanup levels that are acceptable for residential use. No soil LUCs are required, and the site soil is available for unlimited use and unrestricted exposure."
10. (07/06/18)	Section 5.1.1.4 Reduction of Toxicity, Mobility, and Volume through Treatment: This section is not consistent with the Tables and other associated sections of the document, as the language indicates that there is greater compliance with reduction of mobility; however this is not reduction through treatment. Please clarify that neither alternative provides reduction of toxicity, mobility, and volume through treatment, and remove the language that S5 is greater degree of compliance than S2, as neither provides for treatment.	We replaced the first paragraph of Section 5.1.1.4 with the following sentence: "For Sites SD043 and SS046, no reduction of toxicity, mobility, and volume through treatment occurs under Alternative S2 or S5."
11. (07/06/18)	Section 5.1.1.7 Cost, page 5-14, third paragraph: The last sentence indicating that potential future costs cannot be quantified is not consistent with the other sections of the document, which quantify cost for both alternatives. This sentence should instead indicate that the long-term costs of continuing LUCs are greater than the short-term expense of excavation and disposal.	We revised the last sentence in the third paragraph of Section 5.1.1.7 as follows: "However, after years of enforcing LUCs at Sites DP039, SD043, and SS046 as well as other soil and groundwater sites, it became obvious that the long-term costs of continuing LUCs at an active military installation are greater than the short-term expense of excavation and disposal."
12. (07/06/18)	Section 7.2 Compliance with ARARs, Page 7-1, second paragraph: The statement regarding off-site transfer should be removed, and moved to another section, as it is considered a requirement that cannot be waived; therefore it is not considered an ARAR, but instead is a requirement of CERCLA that is necessary by statute.	We deleted the statement regarding the off-site transfer from the second paragraph of Section 7.2. Although Table 4-2 (Summary Descriptions of Selected Soil Remedies) already mentions the transportation of contaminated soil for Sites SD043 and SS046 as part of the remedies, we revised the text for Sites SD043 and SS046 in Table 4-2 to be more consistent with the text removed from Section 7.2 as follows: "Soil with contaminant concentrations greater than residential cleanup levels is excavated and transported by truck to an off-base EPA-approved facility."

No.	Comments	Responses
13. (07/06/18)	Section 7.6 Five (5)-year Reviews: This section indicates that a five (5)-year review would not be required because it is anticipated that the remedies are expected to be completed within the next 5 years, however the next review document covering the period that UU/UE was reached should still mention that these sites achieved UU/UE. Please add language to indicate that after UU/UE is achieved, the following five (5)-year review will note this development occurred within the 5 year period, and that the Sites will no longer be addressed in subsequent documents.	We revised the first sentence in Section 7.6 as follows: "Because these remedies are expected to be completed in less than five (5) years and will not result in hazardous substances remaining onsite at concentrations greater than levels that allow for unlimited use and unrestricted exposure, the next scheduled 5-year review will document the actions taken to achieve unlimited use and unrestricted exposure at the sites addressed in this ROD Amendment. Thus, subsequent 5-year reviews will not be required."
13a. (08/02/18)	Editorial Comment 13: The response addresses the comment, however the last sentence should specify that 5-year reviews will not be required for the specific sites covered in the ROD Amendment, so that the statement is not interpreted globally.	We have revised the above response (13) as follows: "Because these remedies are expected to be completed in less than five (5) years and will not result in hazardous substances remaining onsite at concentrations greater than levels that allow for unlimited use and unrestricted exposure, the next scheduled 5-year review will document the actions taken to achieve unlimited use and unrestricted exposure at the sites addressed in this ROD Amendment. Thus, subsequent 5-year reviews will not be required for the specific sites covered in this ROD Amendment."
14. (07/06/18)	Table C-1 ARARs, Waste Management: Since the pre-transport requirements of packaging, labeling, marking, and placarding relate to off-site actions that will be taken, and must already comply with regulations that cannot be waived, these activities should not be listed in the Description. Also, since excavations will take place over several weeks, it is assumed that staging areas for excavated material will be required, as well as holding tank for contaminated fluids. The ARARs table should include a citation addressing the appropriate on-site waste management requirements, such as 40 CFR 264.554(d), that will be followed for staging areas. There may also be an ARAR for fluids management, depending on the nature of management proposed (ie., holding tank). Please ensure the appropriate ARARs for managing on-site materials of the excavated soils staging piles and any wash down fluids are included.	We removed the ARARs regarding packaging, labeling, marking, and placarding (22 CCR 66262.30, 66262.31, 66262.32, 66262.33) from Table C-1, Waste Management. However, we maintained ARAR 22 CCR 66262.34 (accumulation times) in Table C-1, Waste Management, and revised the Description as follows: "Defines accumulation times for onsite storage of RCRA hazardous waste." We added 40 CFR 264.554(d), Staging Piles, to Table C-1, Waste Management to address the staging pile requirements, standards, and design criteria. In the unlikely event that dewatering becomes necessary at SD043, groundwater will be collected and managed in the appropriate container. We added 22 CCR 66264.171 through 66264.175, 66264.177, 66264.178, Use and Management of Containers, to Table C-1, Waste Management to address the requirements of containers holding hazardous waste.

No.	Comments	Responses
14a. (08/02/18)	Editorial Comment 14: The changes made to the document address the comment, however the response does not reflect that the management of liquids related to the decontamination of equipment is also addressed by these ARARs; the response only mentions dewatering in terms of fluid management. Please add this clarification to the response. Also, the remedy does not include on site treatment, storage or disposal, other than temporary storage that is addressed by the ARARs added pursuant to this response, therefore, EPA does not consider the following to be ARARs, and a note should be added to the Remarks in Table C-1 indicating that they are not considered ARARs by EPA: Title 27, CCR, Division 2, Subdivision 1; Title 23, CCR, Division 3, Chapter 15; and Designated Waste to Class I or Class II Waste Management Units (Title 23, CCR, Sections 2520 and 2521, and Title 27, CCR, Sections 20200(c) and 20210).	We have revised the above response (14) and addressed the additional comment presented in editorial comment 14 as follows: We removed the ARARs regarding packaging, labeling, marking, and placarding (22 CCR 66262.30, 66262.31, 66262.32, 66262.33) from Table C-1, Waste Management. However, we maintained ARAR 22 CCR 66262.34 (accumulation times) in Table C-1, Waste Management, and revised the Description as follows: "Defines accumulation times for onsite storage of RCRA hazardous waste." We added 40 CFR 264.554(d), Staging Piles, to Table C-1, Waste Management to address the staging pile requirements, standards, and design criteria. In the unlikely event that dewatering becomes necessary at SD043, groundwater will be collected and managed in the appropriate container. We added 22 CCR 66264.171 through 66264.175, 66264.177, 66264.178, Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities, to Table C-1, Waste Management to address the requirements of containers holding hazardous waste and liquids related to the decontamination of excavation equipment. Also based on the additional comment (Editorial Comment #14 – 08/02/18) received on August 2, 2018 regarding ARARs specified in Table C-2 of the WABOU ROD Amendment, we have added the following text in the corresponding "Remarks" column of Table C-2: "**EPA comment:** – Title 27, CCR, Division 2, Subdivision 1 and Title 23, CCR, Division 3, Chapter 15 are not considered ARARs by EPA." "**EPA comment:** – Designated Waste to Class I or Class II Waste Management Units (Title 23, CCR, Sections 2520 and 2521) are not considered ARARs by EPA." "**EPA comment:** – Designated Waste to Class I or Class II Waste Management Units (Title 27, CCR, Sections 20200(c) and 20210) are not considered ARARs by EPA."

Responses to Comments on the
Draft Amendment to the West/Annexes/Basewide Operable Unit Soil Record of Decision,
Environmental Restoration Program Sites DP039, SD043, and SS046, November 30, 2017
Travis Air Force Base, California

Regional Water Quality Control Board

No.	Comments	Responses
REVIEW COMMENTS – Adriana Constantinescu, P.G., Regional Water Quality Control Board – E-mail dated February 6, 2018		
GENERAL COMMENTS		
In Appendix C, Summary of Applicable or Relevant and Appropriate Requirements (ARARs), we identified the following State laws and policies applicable to the selected remedy for Sites SD043 and SS046 that should be included:		
1.	RWQCB-SFB Basin Plan (the Basin Plan), Chapter 2 – Beneficial Uses and Chapter 3 – Water Quality Objectives (Chapter 2 describes beneficial uses of surface and ground waters and Chapter 3 establishes water quality objectives, including narrative and numerical standards that protect the beneficial uses and water quality objectives of surface and ground waters in the region. This ARAR applies where any activity, including, but not limited to the discharge of contaminated soils must not result in actual water quality exceeding water quality objectives.	We divided the response to this comment into two parts: first addressing Chapter 2 – Beneficial Uses, then addressing Chapter 3 – Water Quality Objectives. We added each part separately in Table C-2 – Water ARARs in the WABOU ROD-A, and included the following text in the "Remarks" section of the table. **"Chapter 2 – Beneficial Uses** **Joint comments:** The beneficial use designations in the basin plan apply to restoration actions for purposes of determining cleanup levels. **AF comments:** Beneficial use designation is not an ARAR, because does not set a numeric standard. AF accepts the beneficial use designations in the basin plan for purposes of determining cleanup level. AF reserves the right to challenge beneficial use designations as provided for by state law. **State comments:** The beneficial uses are water quality standards and are, therefore, ARARs. The State reserves the right to assure protection of all beneficial uses as required by state and federal law. **Chapter 3 – Water Quality Objectives** **Joint comments:** Potential ARARs are water quality objectives (WQOs) for bacteria (2.2 organisms per 100 ml); chemical constituents based on State MCLs (if more stringent than Federal MCLs); lead (0.015 mg/l); and radionuclide MCLs. Baseline risk assessment will evaluate cumulative human health and ecological risk and assist in identifying needs for risk reduction.

No.	Comments	Responses
		AF comments: The following are probably not ARARs: WQOs for chemical constituents based on secondary MCLs if not risk-based; WQOs for taste, odor (not risk based); narrative WQO for toxicity (vague and does not set a numerical standard). In evaluating other provisions, such as those regarding beneficial uses other than drinking water (MUN), AF would consider whether the provision is related to the beneficial use; is risk-based; is numeric; and is chemical-specific or location-specific. **State comments:** Generally agree with numeric standards; disagree that secondary standards are not ARARs – taste and odor can ruin the water for its beneficial use. There is no requirement in CERCLA that ARARs are only numeric standards; the NCP preamble includes extensive discussion of application of narrative standards, the NPDES regulations have specific provisions on application of narrative standards. There are also water quality standards that protect uses other than drinking water and they may be ARARs in a given circumstance."
2.	SWRCB Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters in California (Anti- Degradation Policy) establishes policy that whenever the existing water quality is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated that any change will be consistent with the maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than prescribed in the policies. It applies to sites where discharges of contaminants to the soil or soil action have potential to cause active discharges to surface waters and groundwater. In-situ cleanup levels for contaminated soils must be set so that groundwater will not be degraded, unless degradation is consistent with the maximum benefit of the people of the state. If degradation is allowed, the discharge must meet best practical treatment or control standards, and result in the highest water quality possible consistent with the maximum benefit to the people of the state. In no case may water quality objectives be exceeded.	We added SWRCB Resolution No. 68-16 to Table C-2 – Water ARARs in the WABOU ROD-A, and included the following text in the "Remarks" section of the table: "**Joint comments:** Res. 68-16 is a potential ARAR for the reinjection or discharge of treated effluent into surface water or groundwater above background. This is based on an EPA decision resolving a dispute between AF and State at Mather/George AFBs. Res. 68-16 is not an ARAR for determining cleanup levels. Air Force and State disagree on whether Res. 68-16 is a potential ARAR for the treatment of ground water via injection of treatment media. **AF comments:** General AF position is Res. 68-16 is not an ARAR because it does not meet NCP criteria of enforceability and general applicability because directed to state agencies. It is also not relevant or appropriate because background level may be zero or a level not related to risk. AF also believes Res. 68-16 is not an ARAR for injection of treatment media to groundwater because treatment media is not a waste under Water Code Section 1350(d). **State comments:** Res. 68-16 applies to discharges of waste, included treatment media and treated groundwater, to waters of the state (groundwater and surface water). Water Boards have adopted permits and other approvals of reinjection and found those to be consistent with Res. 68-16. State ARARs are those requirements that are more stringent than federal law. Res. 68-16 requires use of best practicable treatment or control to achieve background or at least a level that meets the water quality standards. Since Res. 68-16 is more stringent than federal law so it is an ARAR."

No.	Comments	Responses
3.	SWRCB Resolution 92-49, Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code 13304 establishes requirements for investigation and cleanup and abatement of discharges. It applies to all cleanups of wastes to soil that threatens or may affect the quality of ground or surface water.	We added SWRCB Resolution No. 92-49 to Table C-2 – Water ARARs in the WABOU ROD-A, and included the following text in the "Remarks" section of the table: "**Joint comments:** Air Force and State disagree on whether Res. 92-49 is a potential ARAR. As a practical matter, AF and State have been able to reach agreement on cleanup levels at specific sites. Although AF believes it is not required to do so, AF has conducted technical and economic feasibility analyses (TEFAs) to demonstrate that achievement of background levels is infeasible. TEFAs may be conducted as a part of the Feasibility Study if appropriate. Another option is to designate an interim cleanup level (such as the MCL) in the Record of Decision and conduct a TEFA after that interim cleanup level is achieved. **AF comments:** Insofar as 92-49 establishes a process for the RWQCB to follow, it is not applicable to AF. CERCLA and the NCP require that clean-up levels are to be protective, based on the identified risk to human health and the environment. Background levels are not risk based or necessary to protect human health and the environment. Investigation requirements are pre-remedy and therefore are not ARARs because ARARs specify clean up levels and standards of control a remedy must attain not the investigation of a site. AF conducts site investigations in accordance with the CERCLA process. **State comments:** Disagree with reasons why Res 92-49 is not an ARAR. CERCLA says that state ARARs are those that are more stringent than federal law without limitation as to risk. In addition, Res. 92-49 has language nearly identical to federal regulations that are also ARARs for soil cleanups."
4.	SWRCB Resolution 88-63, Sources of Drinking Water Policy, as contained in the Basin Plan, specifies that, with certain exemptions, all ground and surface waters must have the beneficial use of municipal or domestic supply. It applies to soil actions that will result in a discharge to groundwater or surface water.	We added SWRCB Resolution 88-63 to Table C-2 – Water ARARs in the WABOU ROD-A, and included the following text in the "Remarks" section of the table: "**Joint comments:** The beneficial use designations in the basin plan apply to restoration actions for purposes of determining cleanup level. **AF comments:** Res. 88-63 is not an applicable requirement because it applies only to RWQCBs. Nor is it relevant or appropriate in that is procedural and does not establish substantive requirements for remediation. AF accepts the beneficial use designations in the basin plan for purposes of determining cleanup level. AF reserves the right to challenge beneficial use designations as provided for by state law. **State comments:** Disagree with AF's legal premise. Many federal requirements, such as the Clean Water Act and its regulations, require EPA to include provisions in permits and yet federal NPDES requirements are considered applicable. The determination of the beneficial uses of waters of the state is a standard and, therefore, is a potential ARAR."

No.	Comments	Responses
5.	Title 27, CCR, Division 2, Subdivision 1 (Section 20080 et seq.) and Title 23, CCR, Division 3, Chapter 15, (Section 2510 et seq.). It applies to all discharges of waste to land for treatment, storage, or disposal that may affect water quality. Provisions of Title 23 apply to hazardous waste and provisions of Title 27 apply to designated and non-hazardous waste.	We added Title 27, CCR, Division 2, Subdivision 1 (Section 20080 et seq.) and Title 23, CCR, Division 3, Chapter 15, (Section 2510 et seq.) to Table C-2 – Water ARARs in the WABOU ROD-A, and included the following text in the "Remarks" section of the table: "**Joint comments:** State must identify specific regulations to address each action or site for ARAR consideration. AF complies with regulatory requirements and good engineering practices in management of waste left in place and in the handling and disposal of waste generated during remediation. **AF comments:** As a general matter, provisions addressing non-hazardous waste are not ARARs as non-hazardous waste is not a CERCLA hazardous substance. In specific situations, non-hazardous waste can be a CERCLA pollutant or contaminant. **State comments:** Generally agree, however, Title 23 applies to hazardous wastes, which are generally also hazardous substances. Title 27 applies to designated waste and non-hazardous waste, which can often be hazardous substances or pollutants and contaminants as defined in CERCLA. Even if not, Title 27 would be relevant and appropriate to the non-hazardous constituents."
6.	Title 23, CCR, Sections, 2520, 2521, 20200(c), 20210 requires that designated waste be discharged to Class I or Class II waste management units. It applies to discharges of designated waste (nonhazardous waste that could cause degradation of surface or ground waters) to land for treatment, storage, or disposal.	Please note that Sections 20200(c) and 20210 are addressed under Title 27, CCR not Title 23. We divided the response to this comment into two parts: first addressing Sections 2520 and 2521, then addressing Sections 20200(c) and 20210. We added each part separately in Table C-2 – Water ARARs in the WABOU ROD-A, and included the following text in the "Remarks" section of the table. "**Sections 2520 and 2521** **Joint comments:** Potentially applicable ARAR if remedy includes treatment storage, or disposal outside of the area of contamination. Potentially relevant and appropriate ARAR within area of contamination. **State Comments:** Do not agree with distinction between within or outside area. Title 23 would be applicable in either circumstance. **Sections 20200(c) and 20210** **Joint comments:** Potential ARAR if waste is a CERCLA hazardous substance, pollutant, or contaminant. **State comment:** Soil remediation could involve the placement of the contaminated soil on land. In such case, any waste classified as "designated waste" must be disposed in a Class I or II unit unless an exemption applies. AF would still be responsible for disposal of materials even if not hazardous."

No.	Comments	Responses
7.	In Table C-2, please include a reference to the NPDES General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) Order No. 2013-0001-DWQ, under which Travis AFB is a permittee.	We modified Table C-2 to include NPDES General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) Order No. 2013-0001-DWQ as a relevant and appropriate requirement. Because excavation is considered construction and the total area disturbed is less than 1 acre, the Construction General permit would be an applicable requirement, as originally cited in Table C-2.
SPECIFIC COMMENTS		
1.	Section 2, Site Histories, Contamination, and Selected Remedies: At the very beginning of the section, in the first bullet point on page 2-1, add more background for the Travis AFB "Installation Development Plan".	We added the following text after the first sentence in the first bullet of this section. "Similar in structure and content to the Base General Plan, the IDP summarizes the Travis AFB Comprehensive Planning Process and applies geospatial and written data to allocate resources through project programming, promote airfield safety, and enhance the general health and welfare of the natural and built environment."
2.	Figures 2-2 and 2-3 should have a note or short explanation to the Legend explaining what "Target Volume" refers to. Are these the intended areas of excavation?	We added the following text to Figures 2-2 and 2-3 and in Table 2-1 and Section 2.2: "Target volume is the estimated volume to be removed during the excavation effort."
3.	Table 4-7, page 4-8: The value '16.848' listed in the row for Estimated total cost present worth ($), seems to be a typo. Revisit this value and confirm that it is correct, or fix it if it is indeed a typo.	The value "16.848" was a typo. However, based on a comment from EPA (general comment #4; 1/25/18), the cost value has been corrected and includes additional costing elements. The revised cost value for "estimated total cost present worth" in Table 4-7 is $101,149.

Responses to Comments on the
Draft Amendment to the West/Annexes/Basewide Operable Unit Soil Record of Decision,
Environmental Restoration Program Sites DP039, SD043, and SS046, November 30, 2017
Travis Air Force Base, California

Department of Toxic Substances Control

No.	Comments	Responses
REVIEW COMMENTS – Ben Fries, Department of Toxic Substances Control – e-mail dated February 16, 2018		
GENERAL COMMENTS		
1.	DTSC staff reviewed this document and had no comments.	No response necessary.